RVParkCalc User Guide

Version 1.0.0

RV park electrical planning, calculation, schedules, and one-line documentation
Southern Electrical Solutions
Guide revision: July 2026

RVParkCalc is a Windows desktop application for organizing RV-park electrical inputs, applying the selected RV-site load and demand basis, reviewing distribution loading, and producing coordinated schedules, a tagged one-line, and a PDF calculation report. Its pine green, moss, warm ivory, and earth-brown interface supports a clear, consistent seven-step workflow from project setup through the one-line.

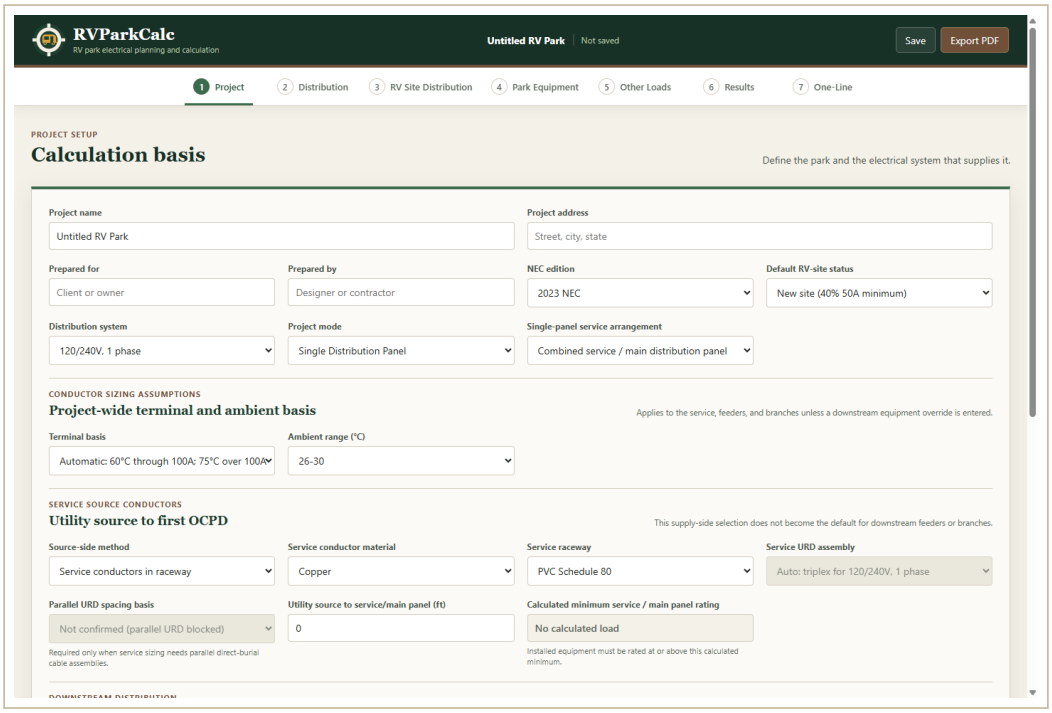

Figure 1. *RVParkCalc v1.0.0 project window showing the earth-tone header and seven-step workflow.*

Important notice

RVParkCalc is an informational calculation and documentation aid. It is not engineering advice, does not exercise professional judgment, and does not create sealed, permit-ready, procurement-ready, construction-ready, or energization-ready documents. The official adopted NEC, local amendments, utility requirements, equipment listings, manufacturer instructions, project specifications, field conditions, and authority having jurisdiction always control.

Every input, output, action item, applied calculation note, conductor or raceway result, phase assignment, voltage-drop value, transformer entry, grounding and bonding detail, and protective-device selection must be independently reviewed by appropriately qualified professionals before use.

Contents

1. Install and open RVParkCalc

Supported environment

RVParkCalc is designed as a local Windows desktop application. It is not a hosted web application and does not require a browser to perform project calculations.

- Windows 10 or Windows 11, 64-bit
- A normal user-writable location for project and PDF files

Packaged customer builds require a valid Gumroad license. An internet connection is required for initial activation and periodic validation, normally every 30 days. Project calculations remain local desktop operations; license validation does not upload `.rvp` project contents or exported reports.

License term and renewal

A one-time RVParkCalc purchase through Gumroad provides one term of 365 consecutive days. The term begins at the original Gumroad purchase timestamp, not when the application is installed, first opened, or activated. Delaying activation, reinstalling, deactivating, changing devices, or deleting local application data does not pause, extend, or restart the term.

The purchase does not automatically renew. When the 365-day term expires, the old key no longer provides licensed access. Purchase another term through Gumroad and activate the new key issued for that purchase.

Each purchase normally provides three Gumroad activation uses unless the quantity purchased grants more. Each new activation request can consume one use, including reactivation on the same computer after the protected local license record has been removed. Reinstallation, deactivation, or deletion of local application data does not restore a used activation. A refunded, disputed, chargebacked, cancelled, or otherwise revoked purchase and its key are not valid licenses.

Activate a packaged build

1. Connect the computer to the internet and open the installed or portable RVParkCalc application.
2. Enter the license key supplied with the Gumroad purchase.
3. Enter the customer's name and the email address used for the Gumroad purchase.
4. Review the current RVParkCalc End User License Notice.
5. Select the acceptance checkbox and choose **Activate & Unlock**.
6. Confirm that the application shows the licensed term and expiration information before beginning project work.

RVParkCalc periodically contacts Gumroad over an encrypted HTTPS connection to validate the key and purchase. The production app stores an encrypted local activation record using Windows-protected operating-system storage. The record can include a protected key record, a one-way device identifier, purchase and validation timestamps, term dates, purchaser information returned by Gumroad, activation status, and acceptance of the license notice. Gumroad receives the key and product/purchase verification data needed for licensing; RVParkCalc does not send project-file or report content as part of that process. Gumroad's privacy and security terms govern information processed by Gumroad, and users remain responsible for protecting their device, Windows account, and license key.

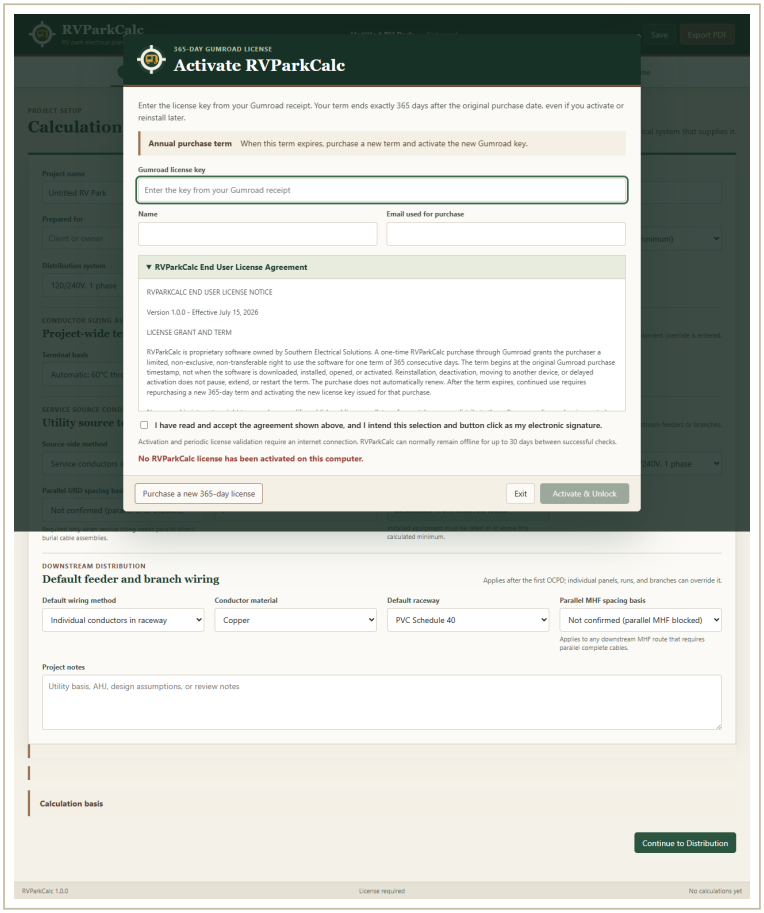

Figure 2. *Packaged RVParkCalc activation screen with the 365-day purchase-term notice, Gumroad key fields, license agreement, purchase button, and locked project workspace.*

Installed build

When an installer build is provided, run the RVParkCalc setup program and follow the Windows prompts. Open RVParkCalc from its installed shortcut. The v1.0.0 binaries are unsigned, so Windows Defender SmartScreen may display an unrecognized-app or reputation warning. Confirm the publisher and file source before proceeding.

Portable build

When a portable build is provided, place the executable in a stable folder and run it directly. A portable executable is the application, not a project file. Save projects separately as `.rvp` files in a backed-up project folder.

Update, reinstall, uninstall, or remove the portable build

Before changing the application, save every active project as a normal `.rvp` file in a backed-up folder and close RVParkCalc. Installing a replacement build over the existing installation normally preserves the current Windows-user application data, but it does not restart the 365-day term or restore a Gumroad activation use. If activation is requested again, the request can consume another use.

To uninstall the installed build, open **Windows Settings > Apps > Installed apps**, select **RVParkCalc**, and choose **Uninstall**. To remove the portable build, close RVParkCalc and delete `RVParkCalcPortable1.0.0.exe`. Neither action deletes separately saved `.rvp` projects or exported PDFs.

The installed and portable builds both keep per-user application data under `%APPDATA%\RVParkCalc`. That data includes the encrypted local license record, local settings, and the atomic working-draft file used for unsaved recovery. Program uninstall or deletion of the portable executable can leave this per-user data in place. Choose **Help > Deactivate License** before removal when you intend to delete the protected local license record; deactivation does not restore a Gumroad activation use. After RVParkCalc is closed and any needed `.rvp` projects are backed up, deleting

`%APPDATA%\RVParkCalc` removes remaining local settings and recovery data, but the next activation can consume another activation use.

For licensing, installation, or recovery help, contact **sc@southernelectrical.solutions**.

First licensed launch

After a packaged build is activated, RVParkCalc opens to an untitled project on the **Project** step. The header shows:

- the RVParkCalc name and RV park electrical planning subtitle;
- the active project name;
- the save state, such as **Ready**, **Unsaved changes**, or **Saved**; and
- one **Export PDF** button.

Project open and save commands are located in the native **File** menu.

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2. Safety, scope, and terminology

This guide uses three labels to prevent code requirements from being confused with software assumptions.

Label	Meaning in this guide
NEC-based rule	A rule traced in the local engineering record to NFPA material for the selected edition. The issued code, adopted edition, amendments, and AHJ interpretation still control.
RVParkCalc planning behavior	A software method, default, action threshold, or preliminary sizing convention. It is not automatically an NEC requirement.
Manual review	A subject the user or qualified reviewer must determine outside the automated calculation.

What the application is intended to do

RVParkCalc organizes:

- RV-site connected load and demand calculations;
- single-panel, multi-panel, and large MDP/transformer project arrangements;
- dedicated park equipment and other calculated loads;
- preliminary feeder, branch, conductor, EGC, general-table GEC, bonding-jumper, raceway, and voltage-drop results;
- phase-loading summaries and automatic phase assignment;
- panel, branch, and site assignment schedules;
- a tagged source-to-load planning one-line; and
- a coordinated PDF report.

What it does not replace

The application does not replace:

- an adopted-code and local-amendment review;
- utility service design or utility transformer selection;
- short-circuit, arc-flash, or selective-coordination studies;
- final service, feeder, branch-circuit, transformer, grounding, or bonding design;
- equipment listing and manufacturer-instruction review;
- motor overload, controller, disconnect, and short-circuit protection design;

- civil routing, trench, burial, overhead-clearance, working-space, or site-layout design;
- permit documents or a professional seal; or
- field verification and commissioning.

Core terminology

RV site means one recreational vehicle location counted for the RV-park load calculation. One combination pedestal with 50A, 30A, and 20A receptacles at one site is still one site.

Direct-fed pedestal means one physical pedestal served by one panel-to-pedestal supply. One record models one pedestal and has no RV-pedestal quantity multiplier. A single-sided pedestal contains one separately counted RV site; a dual-sided pedestal contains two separately counted RV sites on the one common supply.

Continuing radial pedestal run means one common feeder entered as an ordered series of pedestal segments from the panel outward. RVParkCalc also recognizes the field term **loop feed**, but a continuing modeled path remains one-source and radial; it is not a closed ring energized from both ends.

Pedestal segment means the one-way path from the panel or preceding pedestal to the next pedestal. Each segment terminates at one pedestal location serving one or two separately counted RV sites.

Distance is always a one-way modeled route length. A direct-fed pedestal has one panel-to-pedestal distance for its one common supply. A continuing radial run has one distance for each ordered segment measured from the previous point.

Park Equipment is current-based dedicated equipment such as pumps, pool equipment, HVAC, EVSE, or laundry equipment.

Other Load is a user-entered load already calculated in volt-amperes after all applicable occupancy, continuous-load, motor, appliance, or equipment-specific rules have been considered outside RVParkCalc.

Serving equipment is the panel or MDP scope to which a Park Equipment or Other Load row is assigned.

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3. The seven-step workflow

RVParkCalc follows one continuous project path:

1. **Project** - enter project identity, code basis, default RV-site status, system, mode, and project-wide planning inputs.
2. **Distribution** - define the service/MDP boundary, panels, feeders, and park-owned transformers where applicable.
3. **RV Site Distribution** - add each direct-fed physical pedestal as single- or dual-sided, or enter an ordered one-source radial run when one feeder continues from pedestal to pedestal.
4. **Park Equipment** - enter dedicated current-based equipment branches.
5. **Other Loads** - enter already-calculated park building and amenity loads.
6. **Results** - resolve action items and review applied calculation notes, service load, phase loading, feeder and branch schedules, conductor planning, and site assignments.
7. **One-Line** - reconcile the tagged source-to-load diagram with the schedules and calculation boundary.

The step bar remains available throughout the project. **Back** and **Continue** buttons support sequential work, while the numbered steps permit direct navigation.

Recommended practice is to complete Steps 1 through 5, use **Calculate Project** at the end of **Other Loads**, correct every action item, expand the applied notes when verifying an automatic basis, review the schedules and one-line together, then save and export the PDF.

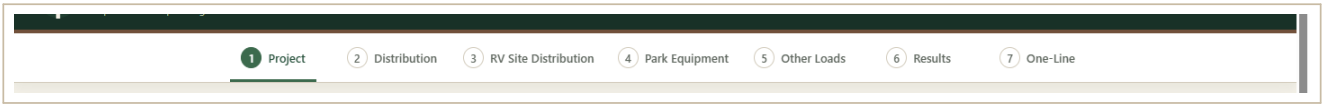


Figure 3. The seven numbered workflow steps from Project through One-Line.

4. Step 1 - Project

The **Project** step establishes the calculation boundary and project-wide defaults.

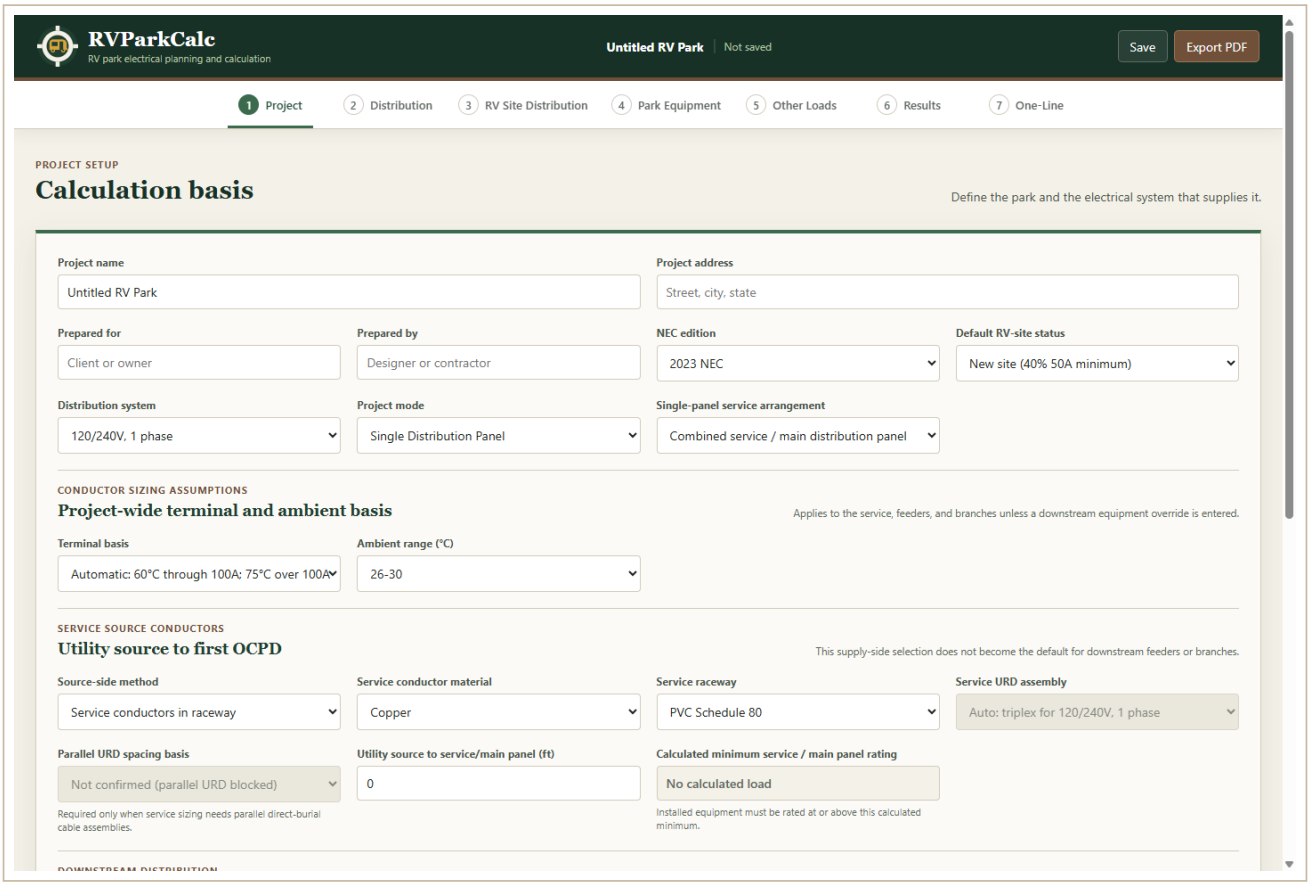


Figure 4. Project step with calculation-basis fields and the NEC basis note.

Project identity

Field	Use
Project name	Appears in the application title, saved-file default, and PDF report.
Project address	Identifies the location in the report.
Prepared for	Client, developer, owner, or reviewing organization.
Prepared by	Designer, estimator, contractor, or reviewer.
Project notes	Record jurisdiction, utility, assumptions, exclusions, review notes, and unresolved decisions.

Code basis and default RV-site status

NEC edition selects the RV-site load and demand reference displayed and used by the calculation engine.

- **2023 NEC:** 551.73 and Table 551.73(A)
- **2026 NEC:** Article 120, Part VIII, 120.130 and Table 120.130(A)

The 2026 edition is published, and the calculation relocation leaves the four site-load bases and demand factors unchanged in substance. For each project, compare the displayed citation and related Article 551 cross-references with the current official text, errata, TIAs, jurisdictional adoption, and local amendments.

Default RV-site status is inherited by each non-tent site unless that site's **Site status** is explicitly set to New or Existing:

- **New:** at least 40 percent of the new-site subgroup is checked as 50A capable.
- **Existing:** at least 20 percent of the existing-site subgroup is checked as 50A capable.

Mixed work is supported. RVParkCalc rounds and checks the new and existing 50A minimums independently, then adds those subgroup minimums for the project total. Extra 50A sites in one subgroup do not cure a shortfall in the other subgroup.

The 70 percent 30A-capable check is rounded once across all non-tent sites, regardless of status. Dedicated qualifying tent sites are excluded from both the 30A and 50A percentage denominators.

Distribution system and project mode

Select the project mode first, then confirm its system:

- **Single Distribution Panel** - normally 120/240V, 1 phase, or 208Y/120V, 3 phase.
- **Multi-Panel Park** - a low-voltage MDP or switchboard supplies multiple RV distribution panels.
- **Large MDP & Transformer Park** - the application uses a 480Y/277V, 3-phase MDP with park-owned transformers supplying 120/240V or 208Y/120V downstream panels.

Changing to **Large MDP & Transformer Park** forces the project MDP system to 480Y/277V. The transformer secondary and panel voltage remain separate inputs.

The 480Y/277V source option is available only in Large mode. Single and Multi-Panel modes use the supported low-voltage systems directly and do not model an implied step-down transformer.

On a **208Y/120V, 3-phase, 4-wire** park system, the service and full distribution panels use A, B, C, and neutral. A 50A RV site remains a single-phase, two-pole branch using AB, BC, or CA with a full-size neutral and EGC. Its calculation is two 6,000 VA, 120V line-to-neutral legs, or 12,000 VA per site; it is not a three-pole branch and is not calculated as 208V multiplied by 50A. The application balances 30A and 20A sites across A, B, and C. Shared pedestal and radial supplies include the ungrounded phases actually occupied by their resolved sites, so a two-line derived supply remains two pole while a route using A, B, and C receives the complete three-phase conductor set.

Project-wide planning inputs

The Project step presents the inputs in source-to-load order:

1. **Conductor sizing assumptions** - the project-wide terminal-temperature and ambient basis used by service and downstream calculations.
2. **Service source conductors** - the utility/source-to-first-OCPD method and route.
3. **Downstream distribution** - the default feeder and branch wiring method used after the first OCPD.

Field	RVParkCalc planning behavior	Required review
Terminal rating	Selects the project-wide embedded 60 degC or 75 degC planning ampacity column.	Confirm actual conductor and equipment termination limitations at every applicable boundary.
Ambient range	Applies the project-wide embedded ambient correction factor.	Confirm design temperature and all correction/adjustment conditions.

Field	RVParkCalc planning behavior	Required review
Source-side method	Separately selects **Utility-defined / not calculated**, individual conductors in raceway, or **Aluminum URD to first OCPD only**. URD Auto uses triplex for 120/240V or quadruplex for 208Y/120V; a mismatched assembly blocks calculation/export. The source-side choice never becomes a downstream default, and the source-to-first-service-OCPD segment has no EGC. Raceway and URD methods calculate service conductors, voltage drop, a general Table 250.66 copper service GEC, and a Table 250.102(C)(1) wire-type main bonding jumper. Utility-defined mode reports service demand and minimum first-OCPD rating only; conductor, grounded conductor, raceway, voltage drop, GEC, and bonding-jumper values remain not calculated.	Verify the exact service boundary and ownership, service-conductor permissions, cable construction/markings, terminals, burial, utility/AHJ rules, grounding-electrode system and connection topology, electrode-specific allowances, bonding locations, and field installation details. Supply-side bonding jumpers, bonding fittings, and parallel-raceway bonding under 250.92 and 250.102(C) require the actual utility/meter/enclosure/raceway topology and are not automatically sized.
Parallel URD spacing basis	Defaults to **Not confirmed**, which blocks any service-side URD result that requires parallel complete cable assemblies. **Maintained spacing confirmed** permits the app to apply current-carrying-conductor adjustment within each separated cable rather than treating all spaced cables as one bundle.	Confirm and preserve the maintained spacing for the complete route, plus exact construction, thermal/burial conditions, equal paths, terminals, utility requirements, and adopted rules.
Service run	Provides the modeled source-to-service/MDP length used for service voltage-drop planning when raceway or URD service conductors are modeled. Utility-defined mode does not calculate that segment's voltage drop.	Confirm route length, source location, conductor geometry, and all serial segments.
Default downstream wiring method	Selects **Individual conductors in raceway** or, only on a compatible 120/240V underground scope, **4-wire aluminum MHF**. A panel, direct-fed pedestal, radial run, Park Equipment branch, or Other Load branch can inherit or override this setting. MHF is unavailable on 208Y/120V, 480Y/277V, aboveground, or single-pole routes.	MHF is compatible only with a complete 120/240V single-phase feeder on a modeled underground route. Aboveground and three-phase routes require individual conductors in an approved raceway. Verify the exact wiring method, product listing and markings, transitions, and local requirements.
Downstream conductor material	Sets copper or aluminum as the default for individual conductors in raceway. Selecting MHF locks the modeled assembly to aluminum.	Verify conductor type, insulation, equipment listing, and every termination for the selected material and size.
Default raceway	For the raceway method, selects PVC Schedule 40, PVC Schedule 80, EMT, IMC, or GRC / steel RMC.	Verify permitted use, wet-location conductors, corrosion protection, burial, physical protection, fill, fittings, grounding and bonding, and local requirements.
Parallel MHF spacing basis	Defaults to **Not confirmed**, which blocks any downstream MHF result that requires parallel complete cable assemblies. **Maintained spacing confirmed** permits the app to apply current-carrying-conductor adjustment within each separated cable.	Confirm and preserve the maintained spacing for every applicable MHF route, plus exact construction, thermal/burial conditions, equal paths, terminals, and adopted rules.

The note beneath the form identifies the selected RV-site calculation basis and reminds the user that the RV demand factor is applied independently at each distribution boundary before the separately calculated park loads are added.

Service/MDP and panel ampere ratings are calculated outputs, not manual inputs. RVParkCalc determines the minimum planning OCPD/equipment ampere rating from the calculated load at each modeled distribution boundary. Select the actual installed service equipment, MDP, panel, bus, main, and protective device at or above that minimum, then independently confirm available standard ratings, listings, terminal limitations, fault duty, series ratings, utility requirements, adopted code, and AHJ acceptance.

The downstream MHF choice means a Southwire-style full-neutral four-conductor assembly with two aluminum ungrounded conductors, a full-size aluminum neutral, and an insulated aluminum EGC. RVParkCalc permits it only on modeled underground 120/240V single-phase routes. It is not compatible with aboveground routes, 208Y/120V or other three-phase systems, single-pole branch circuits, or reduced-neutral catalog constructions. Ordinary triplex/quadruplex URD remains a

separate utility/source-to-first-OCPD description only. That service segment correctly has no EGC; when the service conductors are modeled as URD, RVParkCalc separately reports the calculated copper service GEC and wire-type main bonding jumper at the first service OCPD.

Parallel MHF and service-side URD never rely on silently assumed spacing. If the calculated arrangement requires more than one complete direct-burial cable, the result fails closed until the applicable Project spacing field explicitly confirms maintained spacing. The calculated ampacity then uses the current-carrying-conductor count within each separated complete cable; it does not aggregate the conductors from separately spaced cables into one bundled count.

For raceway or URD service methods, the service GEC is the general Table 250.66 result based on the modeled service ungrounded-conductor area, including equivalent area across parallel sets. In **Utility-defined / not calculated** mode, no conductor area exists in the model, so the service GEC and wire-type main bonding jumper remain explicitly not calculated. The app never infers those values from hidden defaults. It also does not infer the grounding-electrode system, apply electrode-specific allowances, or design topology-specific service supply-side bonding jumpers/fittings for metallic meter and service raceways. Confirm the actual electrodes, permitted connection point, conductor routing and protection, 250.92/250.102(C) supply-side bonding topology, material compatibility, utility requirements, and field conditions.

The former **Other listed cable** option is no longer available for new work. An unspecified cable does not establish assembly ampacity, conductor count or sizes, neutral, EGC, temperature basis, installation restrictions, or voltage-drop resistance. Older projects retain that selection only so it can be corrected. Calculation and PDF export remain blocked until **Individual conductors in raceway** or compatible underground MHF is selected, and RVParkCalc does not invent sizing for the unknown cable.

5. Choose the project mode

The project mode changes the distribution editor, available serving-equipment choices, and one-line hierarchy. Choose the simplest mode that represents the actual calculation boundary.

Mode	Source model	Downstream model	Best fit
Single Distribution Panel	Utility/service boundary	One main RV distribution panel	Small park or one-panel calculation boundary
Multi-Panel Park	Low-voltage service/MDP	Multiple 120/240V or 208Y/120V RV panels	Park with one main distribution point and several areas or radial runs
Large MDP & Transformer Park	480Y/277V MDP	Park-owned transformers and low-voltage RV panels	Large campus-style distribution with local transformation

Single Distribution Panel

This mode contains one service or main distribution panel. The **Add panel** command is hidden. RV Site Distribution, Park Equipment, and Other Loads are assigned to that one panel.

If a loaded project contains multiple panels, it cannot remain in single-panel mode. RVParkCalc migrates or requires the project to use **Multi-Panel Park** until extra panels are removed.

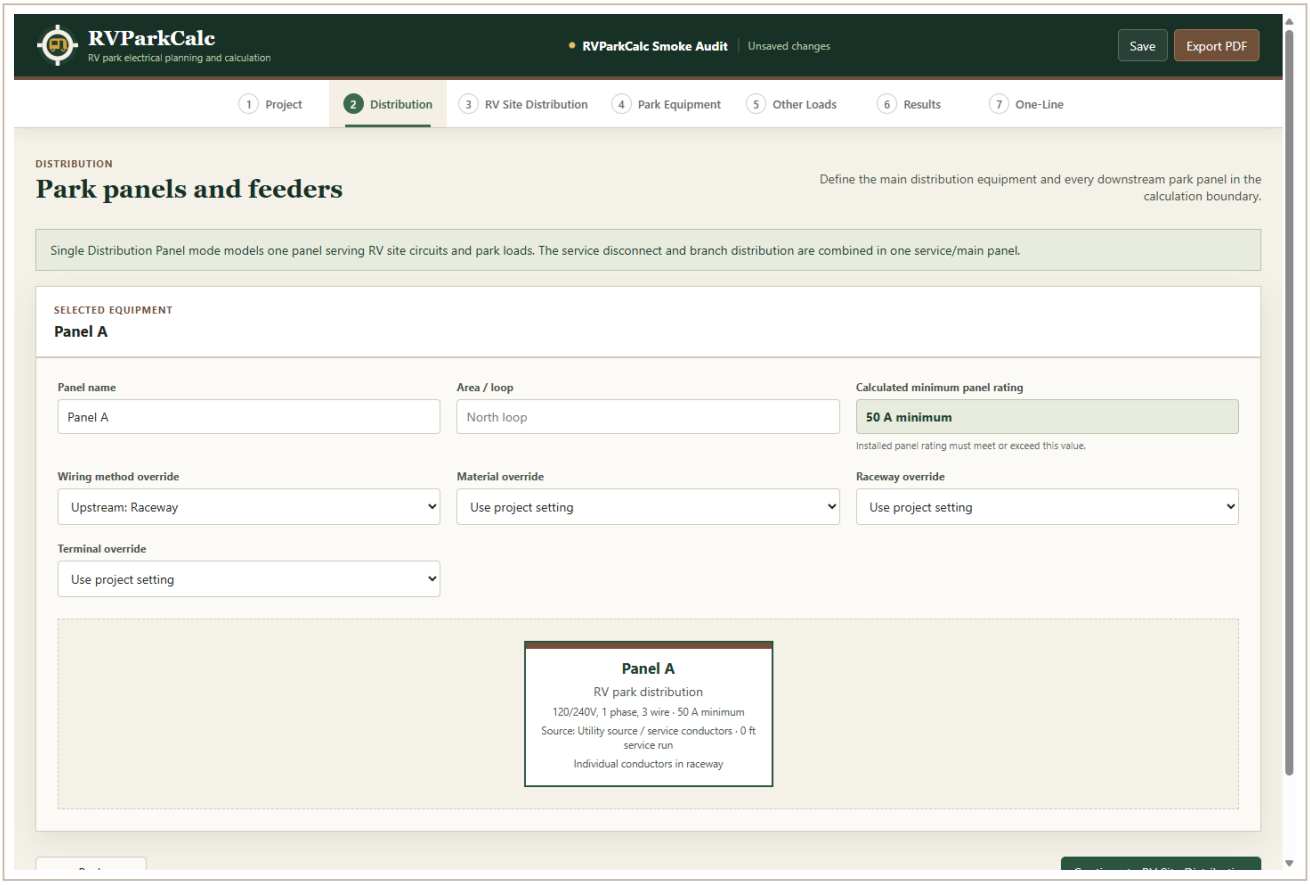


Figure 5. *Single Distribution Panel mode with one selected panel and source shown as Service / Utility.*

Multi-Panel Park

This mode models a low-voltage MDP or switchboard as the first service OCPD, feeding multiple distribution panels. Add one panel for each meaningful feeder boundary or park area. Park Equipment and Other Loads may be assigned directly to the MDP using the **MDP Direct** serving-equipment choice. The separate-first-disconnect arrangement belongs only to Single Distribution Panel mode; a saved or imported Multi-mode project that retains that arrangement is blocked rather than silently omitting a disconnect-to-MDP feeder.

NEC-based rule: RV demand at the MDP is recalculated from the raw connected load and total number of RV sites served at that boundary. Do not determine the upstream RV demand by adding already-demanded panel results.

Example: two panels each serve six 30A/20A sites. Each panel has 21.6 kVA connected and uses the six-site 60 percent factor, or 12.96 kVA per panel. The MDP serves 12 sites, so it recalculates 43.2 kVA at the 12-site 50 percent factor, or 21.6 kVA. Adding the two panel demands would incorrectly produce 25.92 kVA.

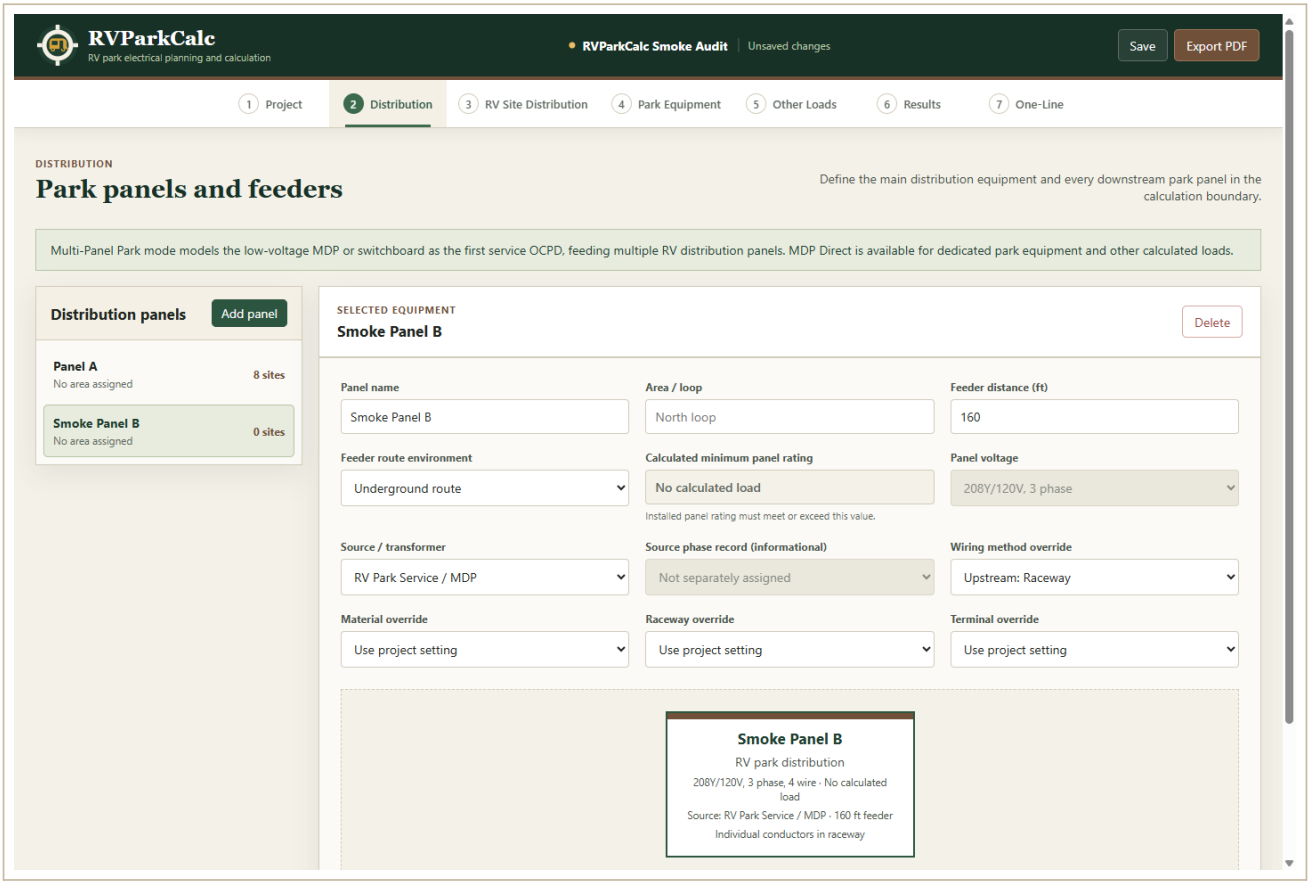


Figure 6. Multi-Panel Park distribution view with several panels and the low-voltage MDP hierarchy.

Large MDP & Transformer Park

This mode starts at a 480Y/277V MDP modeled as the first service OCPD and adds a transformer schedule between the MDP and low-voltage RV panels. Each panel is assigned to a park-owned transformer. The separate-first-disconnect arrangement belongs only to Single Distribution Panel mode; a saved or imported Large-mode project that retains it is blocked rather than silently omitting a disconnect-to-MDP feeder. The transformer can be entered as:

- three phase with a 208Y/120V secondary; or
- single phase with a 120/240V secondary.

The Distribution screen follows the electrical source-to-load sequence. In Large mode, first define the park-owned transformers fed from the 480Y/277V Service / MDP. Then create the downstream panel from the appropriate transformer row. The panel is assigned to that transformer and inherits its supported secondary system; the transformer row also lists every panel it serves.

The transformer schedule records the name, type, 480V primary, secondary system, primary phase or phase pair, primary-feeder distance, first-secondary-OCPD topology, and any transformer-to-remote-main distance. **Selected catalog size** is read-only. RVParkCalc enforces the supported pairings: a three-phase transformer supplies a 208Y/120V secondary, and a single-phase transformer supplies a 120/240V secondary.

For a single-phase transformer, choose the actual 480V primary pair A-B, B-C, or C-A when the design has already assigned it. Choose **Auto balance** when the pair should be planned from the modeled load. Auto evaluates all three pairs against explicit MDP-direct phase loading, manually assigned transformer pairs, and the automatic transformers already placed. It resolves the largest automatic transformer loads first and deterministically chooses the pair that best limits maximum service phase current and phase spread. Results, one-lines, and the PDF show the resolved pair as **Auto** → **A-B**, **Auto** → **B-C**, or **Auto** → **C-A**. The `.rvp` file continues to store **Auto balance**, not the derived pair, so changing loads can produce a different resolved pair on the next calculation. Auto is a planning assignment; verify that the purchased transformer and installed primary connection use the reported pair. A manual pair remains fixed until the user changes it.

Choose **Integral secondary main / distribution** when the first secondary OCPD is part of the transformer distribution assembly. This topology intentionally models no field transformer-secondary conductor segment, raceway, voltage drop, or supply-side bonding jumper between separated enclosures. Choose **Remote first secondary main** when field secondary conductors run from the transformer to one first secondary main. Enter a length greater than 0 ft and not over 25 ft. A run through 10 ft uses 240.21(C)(2); a run over 10 ft through 25 ft uses 240.21(C)(6).

RVParkCalc planning behavior: the engine calculates the minimum transformer kVA from both downstream calculated demand and the most-loaded secondary phase or winding. For a three-phase 208Y/120V secondary, the phase-current equivalent is `3 x 120 V x maximum calculated secondary phase current / 1000`. This phase-consistent nominal basis prevents a balanced 120V load at an exact catalog boundary from being over-selected because 208V and 120V x 1.732 are rounded system labels. For a single-phase 120/240V secondary, the winding equivalent is `240 V x maximum calculated secondary leg current / 1000`. The larger result is the **Calculated minimum kVA**. The app then selects the next embedded manufacturer-published low-voltage dry-type size: 15-333 kVA for the modeled single-phase sequence or 15-1000 kVA for the modeled three-phase sequence.

The selected catalog kVA drives rated primary and secondary current, primary-feeder sizing, and primary-only protection at 125 percent of rated primary full-load current under the selected-edition transformer table. It also drives the Results schedule, one-line, and PDF. The transformer result explicitly identifies the primary-feeder EGC.

The first secondary main is conservatively selected at the next standard rating at or above selected-transformer rated secondary current and is checked against the selected-edition transformer-table maximum. This is a full-utilization planning selection, not the table's maximum transformer-protection allowance. In Remote mode, tagged `TX-S` phase conductors and a full-size neutral use the project conductor material, raceway, ambient, and terminal basis. They must carry the exact secondary-main OCPD; the 240.4(B) next-higher-size allowance is not applied. The app includes one calculated copper supply-side bonding jumper in each raceway under 250.102(C)(2), calculates secondary-segment voltage drop from the actual modeled downstream load current rather than transformer rated current, and reports the selected 10-ft or 25-ft rule. The selected transformer and secondary-main ratings continue to govern ampacity and protection. The copper SDS GEC and system bonding jumper are then derived from that actual calculated remote-secondary conductor arrangement. Integral mode derives them from its calculated full-rating secondary basis and clearly reports that no field secondary segment is modeled.

Each panel-feeder source OCPD is calculated at the selected integral or remote secondary main/distribution point, and each panel-feeder EGC remains listed in the panel feeder schedule. The entered panel-feeder distance starts on the protected load side of that OCPD. A minimum above the embedded catalog range requires panels to be reassigned among additional transformers or a manufacturer-configured transformer design; the app does not invent a larger low-voltage dry-type catalog step.

Project verification: confirm transformer impedance, temperature rise, losses, harmonics, manufacturer inrush/trip compatibility, available fault current, interrupting/SCCR ratings, enclosure, ventilation, working space, and utility criteria. For the displayed SDS GEC, system bonding jumper, and remote-segment supply-side bonding jumper, verify the actual grounding-electrode system and connection topology, electrode-specific allowances, bonding point, conductor routing/protection, material compatibility, and field installation details. Secondary tap arrangements other than the modeled integral assembly or one remote main within 25 ft are outside the topology. Utility-owned transformers are outside this calculation boundary.

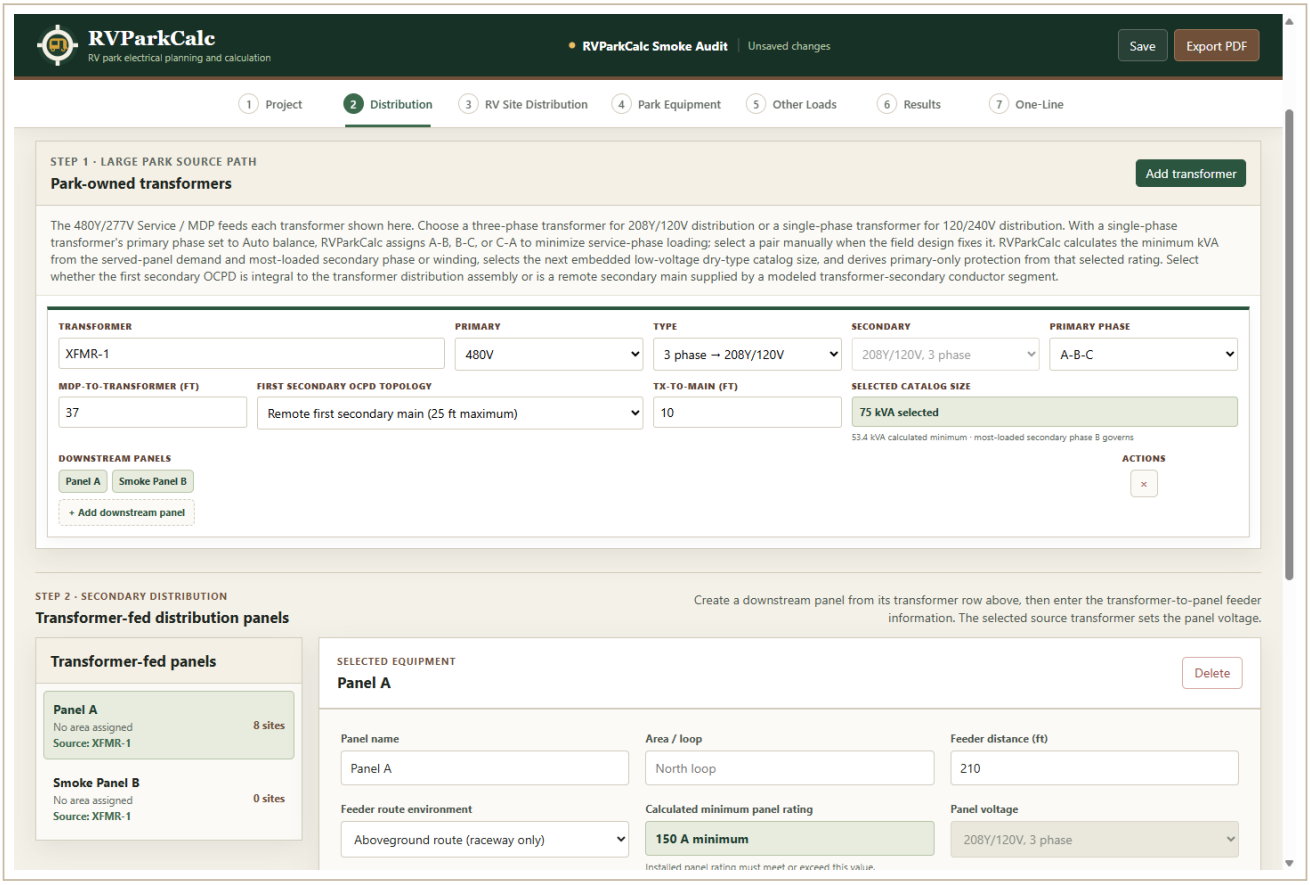


Figure 7. *Large MDP & Transformer Park mode with the transformer schedule and panels assigned to transformer sources.*

6. Step 2 - Distribution

The **Distribution** step defines every panel and feeder inside the project boundary.

Work with panels

The panel list at left shows the selected equipment, area, assigned source, and site count. Select a panel to edit it. In Multi-Panel mode, use **Add panel** to create another panel. In Large mode, use **Add downstream panel** on the transformer that will supply it; this prevents a new panel from being created without a visible source assignment. **Delete** removes the selected panel and all of its RV-site supply records, Park Equipment, and Other Loads after confirmation.

Panel fields

Field	Description
Panel name	Unique field identifier used in schedules, one-line nodes, and report output.
Area / loop	Physical or operational area name, such as North Area or Expansion Loop. This is an equipment label only; it does not select or calculate an RV-site wiring topology.
Feeder distance	Modeled source-to-panel feeder length in feet.
Panel voltage	120/240V, 1 phase, or 208Y/120V, 3 phase.
Source / transformer	Utility/service, low-voltage MDP, or a selected park transformer, depending on mode.
Source phase	Disabled informational record in the current panel editor. In Large mode, set the actual upstream transformer phase or phase pair in the transformer schedule.
Wiring method override	Uses the project downstream method or selects **Individual conductors in raceway** or **4-wire aluminum MHF (underground, 120/240V, 1 phase)**. Aboveground routes require the raceway method.
Material override	Uses the project conductor material or overrides it with copper or aluminum. MHF is an aluminum assembly and disables this choice.
Raceway override	For the raceway method, uses the project raceway or selects PVC Schedule 40, PVC Schedule 80, EMT, IMC, or GRC / steel RMC.
Terminal override	Uses the project terminal rating or selects 60 degC or 75 degC for the selected panel.

The equipment preview and calculated schedules summarize the selected panel voltage, source, distance, calculated load, and minimum planning OCPD/equipment ampere rating. That calculated minimum is not approval of a particular panel, bus, main, or protective device.

Distribution practices requiring review

NEC-based rule: the RV-site distribution system must have capacity for the supplied site receptacles under the applicable RV-park calculation and an ampacity of at least 30A.

NEC-based rule: RV-site feeder and branch-circuit neutrals are not reduced below the ungrounded-conductor size. RVParkCalc reports a full-size neutral for RV-site distribution.

RVParkCalc planning behavior: downstream MHF is restricted to modeled underground complete 120/240V single-phase feeders and contains two aluminum ungrounded conductors, a full-size aluminum neutral, and an insulated aluminum EGC. An aboveground, three-phase, or single-pole selection is incompatible and produces no usable MHF sizing. Ordinary triplex and quadruplex URD have no EGC and are confined to the utility/source side of the first OCPD; the neutral is never treated as an EGC.

RVParkCalc planning behavior: Auto phase assignment selects the valid phase or phase pair with the least loaded current state at the time each unit is resolved. It is load-aware, not a guaranteed A/B or AB/BC/CA alternation. Preserve and verify the resolved physical assignments. An upstream summary must not invent a different phase arrangement.

For an RV-site distribution boundary, the application uses a minimum 30A planning OCPD even when the calculated load alone would select a smaller standard device. This implements the minimum planning boundary; it does not replace verification of the actual equipment, conductor, and protection requirements.

Manual review: confirm service arrangement, panel bus and main ratings, series ratings, fault duty, disconnects, grounding and bonding, available spaces, conductor routing, trench details, equipment environmental ratings, and utility requirements.

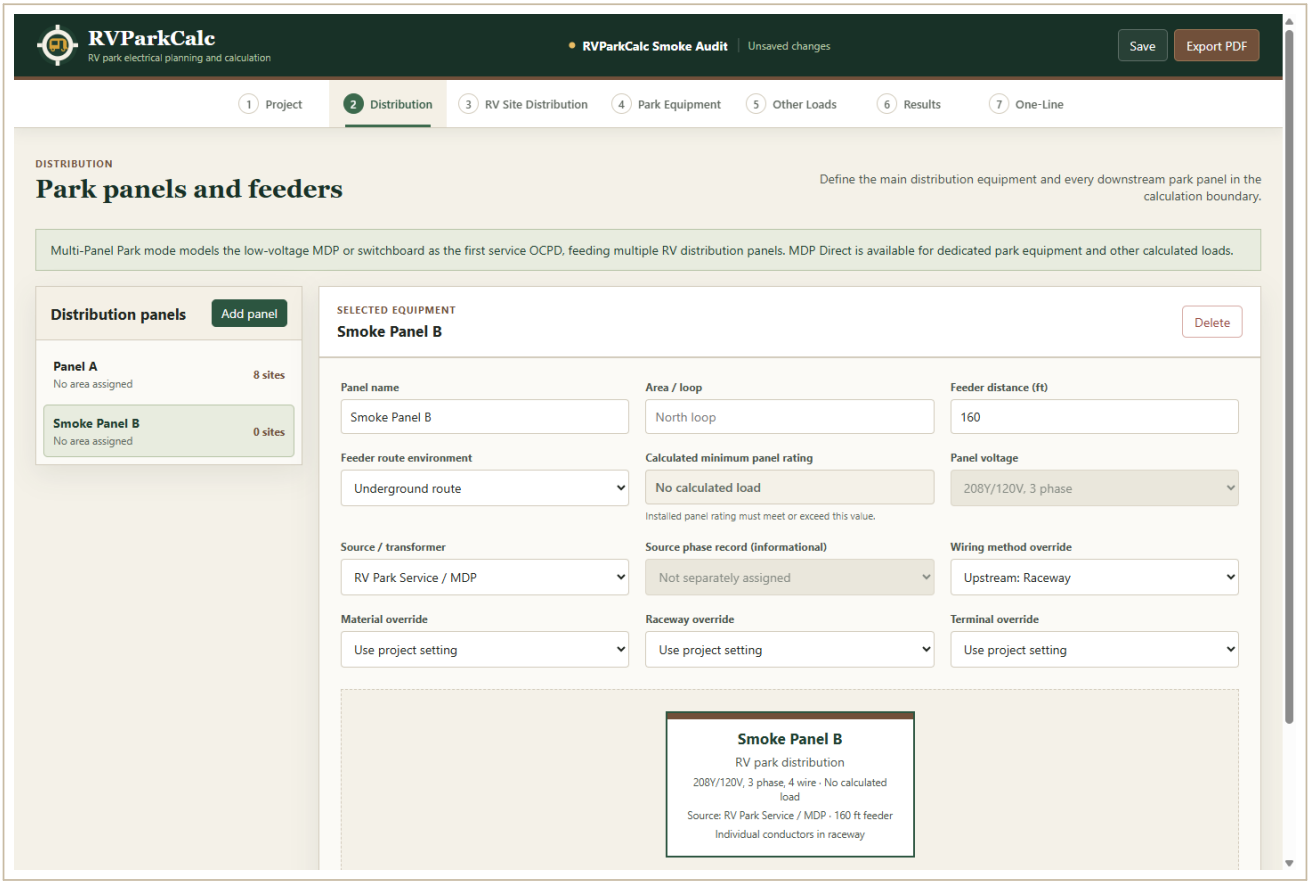


Figure 8. *Distribution editor showing the panel list, selected-panel fields, and equipment preview.*

7. Step 3 - RV Site Distribution

Use **RV Site Distribution** to model the physical site-supply topology for each selected panel. A direct-fed pedestal has one panel-to-pedestal supply. A continuing radial run uses ordered segments because one feeder continues from pedestal to pedestal.

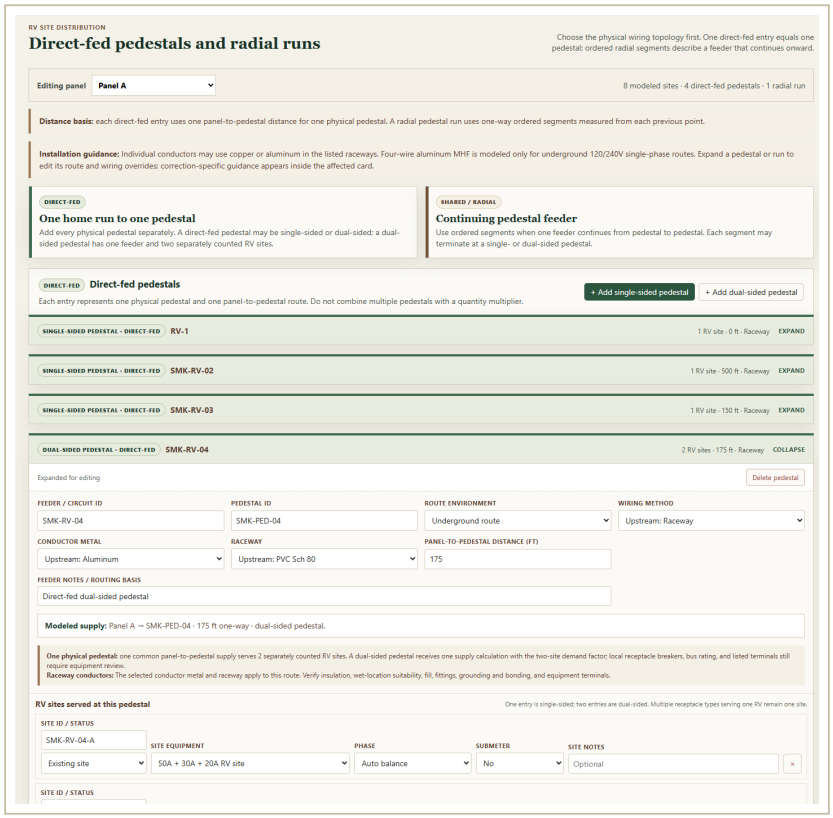


Figure 9. *RV Site Distribution view with the direct-fed pedestal cards, serving-panel selector, and continuing-radial editor.*

Choose the serving panel

Use **Editing panel** to select the distribution panel whose site records are being edited. The status at right shows the modeled site count, direct-fed pedestal count, and radial-run count for that panel. Changing the selected panel changes the visible records; it does not move them between panels.

Choose the physical topology

Use the model that matches the actual source-to-site path:

- **Direct-fed - One home run to one pedestal:** one record represents one physical pedestal and its one panel-to-pedestal supply. The pedestal may be single-sided or dual-sided.
- **Shared / radial - Continuing pedestal feeder:** use ordered segments when one feeder continues from pedestal to pedestal. Each segment terminates at a single- or dual-sided pedestal.

Use one dual-sided direct-fed pedestal when a listed pedestal has one common bus/feed connection serving two RV sides. Add two separate direct-fed pedestals only when there are two physical pedestal locations or the exact listed/custom equipment truly has two independent panel-to-pedestal supplies.

"Loop feed" in the application means a continuing feed-through arrangement on a one-source radial path. The actual pedestal bus, service rating, terminals, lugs, local breakers, and listing still require review. RVParkCalc does not model a closed ring, a run energized from both ends, a meshed network, or an arbitrary branching tree.

Enter direct-fed pedestals

Use **+ Add single-sided pedestal** or **+ Add dual-sided pedestal**. Each button creates one physical pedestal record; neither creates a quantity group.

Complete the pedestal-supply fields:

Field	Use
Feeder / circuit ID	A unique field tag for this pedestal supply, such as `RV-01`.

Field	Use
Pedestal ID	The physical pedestal or equipment-location identifier.
Route environment	Underground or **Aboveground route (raceway only)**. RVParkCalc blocks MHF on an aboveground route. Cable markings, permitted transitions, physical protection, and the complete raceway installation remain review items.
Wiring method	Leave blank to inherit a compatible panel/project setting, or select **Individual conductors in raceway** or **4-wire aluminum MHF (underground, 120/240V, 1 phase)**. If upstream MHF is unavailable for an aboveground route, explicitly select raceway.
Conductor metal	Project/panel material or a pedestal-level copper/aluminum override for the raceway method. MHF locks the assembly to aluminum and disables this choice.
Raceway	For the raceway method, leave blank to inherit the panel and project selection or choose PVC Schedule 40, PVC Schedule 80, EMT, IMC, or GRC / steel RMC. MHF does not produce an individual-conductor raceway-fill size.
Panel-to-pedestal distance (ft)	The one-way length of the one common supply to this physical pedestal. It is used once in the pedestal-supply voltage-drop calculation.
Feeder notes / routing basis	Routing, equipment listing, existing conditions, or supply-level review notes.

Then complete one or two RV-site-side records:

Site field	Use
Site ID / side	The separately counted RV-site identifier at this pedestal.
Site equipment	50A + 30A + 20A RV site; 30A + 20A RV site; 20A-only RV site; or dedicated 20A tent site.
Phase	Auto balance or an explicit phase/phase-pair assignment valid for the panel system.
Submeter	Records the choice for this RV site; it does not perform a billing or revenue-metering design.
Site notes	Side/location, equipment, metering, or review notes for this RV site.

A single-sided pedestal contains one separately counted RV site and uses the one-site 100 percent demand factor for its supply. A dual-sided pedestal contains two separately counted sites, sums the selected highest-rated facility for both sides, and applies the two-site 90 percent factor to one common pedestal supply. The conductor, OCPD, neutral, EGC, raceway, and voltage-drop result belongs to that common supply; the two sides do not become two independent home runs.

Example: one dual-sided pedestal with two 50A RV sides has 24,000 VA connected and 21,600 VA demanded at its common supply before phase-current resolution. It is one pedestal record with two site records, not a quantity of two pedestals.

Add another direct-fed pedestal record for every additional physical pedestal, even when its fields are otherwise identical.

Enter a continuing radial pedestal run

Use **+ Add radial pedestal run** when one feeder continues from pedestal to pedestal. Use **+ Add dual-sided pedestal** as a shortcut when the first pedestal on a new shared feeder serves two separately counted RV sites; it creates one new run with one initial segment and two site-side records, and additional ordered segments can still be added afterward. Complete the run-level fields once:

Field	Use
Run ID	A field tag such as `RUN-A` or `NORTH-RUN`.
Route environment / Wiring method	Common route and method settings used for the complete run. The wiring method may inherit a compatible panel/project setting or be overridden as **Individual conductors in raceway** or **4-wire aluminum MHF (underground, 120/240V, 1 phase)**. Aboveground routes require raceway conductors.
Conductor metal / Raceway	For raceway, choose copper or aluminum conductors and PVC Schedule 40, PVC Schedule 80, EMT, IMC, or GRC / steel RMC. Underground MHF is aluminum and carries its own full-size neutral and insulated aluminum EGC. RVParkCalc deliberately uses one uniform conductor arrangement for every segment.

Field	Use
Run notes / routing basis	Record the source, equipment listing, feed-through-lug basis, routing, existing conditions, and unresolved review items.

Then enter segments from the panel outward in their actual order:

Segment or site field	Use
Segment ID	Unique tag for the source-to-pedestal section.
Pedestal / destination	Field identifier for the pedestal reached by the segment.
From previous point (ft)	One-way length from the panel to the first pedestal or from the preceding pedestal to the next. Do not enter the cumulative source-to-pedestal distance.
Site ID / Site equipment / Phase / Submeter / Notes	Defines each RV site located at that pedestal. Each entry represents exactly one site.

Each ordered pedestal segment must contain one or two RV sites. One entry models a single-sided pedestal. Two entries at the same pedestal model a listed dual-sided or back-to-back pedestal. A combination 50A/30A/20A receptacle set serving one RV is still one site; a dual-sided pedestal serving two RVs contains two separately entered sites, and the calculation includes the highest-rated facility selected for each site.

Eaton provides a current manufacturer example: its Powerhouse literature identifies a double-sided design serving up to two RVs and lists separate product-specific bus and service ratings. Its Powerslide literature also distinguishes single- and dual-sided equipment and direct- versus loop-feed bus arrangements. These examples confirm the topology, but they do not allow RVParkCalc to infer a selected product's ampere rating from its conductor-lug range. Verify the exact catalog number and listing. See the Eaton Powerhouse brochure and Powerslide specifications.

Use the arrow controls only when the physical pedestal order changes. Because every segment distance begins at the preceding point, RVParkCalc asks for confirmation and resets all run distances to zero after a reorder. Deleting a segment also requires confirmation and resets the following segment distance when its starting point changes. Deleting a complete radial run requires confirmation because it removes every segment and site in that run.

RVParkCalc processes the run from its farthest segment back toward the panel. Each segment uses the raw connected load of all sites at and downstream of that segment and the Article 551 demand factor for that downstream site count. Voltage drop is then accumulated phase by phase from the run source toward each pedestal.

The source-segment load and cumulative 3 percent run target select one source OCPD and one conductor/neutral/EGC/raceway arrangement. The conductor arrangement is then kept uniform through every segment. Individual assignment rows label this as the **shared pedestal / radial run**. RVParkCalc does not design the local pedestal/receptacle OCPD, equipment bus/service rating, or approve conductor transitions, tap rules, intermediate overcurrent protection, pedestal feed-through lugs, or manufacturer-specific terminal limitations.

Verified site-load bases

Site supply configuration	Load used by RVParkCalc
50A site with 50A/30A/20A facilities	12,000 VA per site
Site with 30A and 20A facilities	3,600 VA per site
20A-only RV site	2,400 VA per site
Dedicated tent site with only a 20A supply	600 VA per site

NEC-based rule: use only the highest-rated receptacle at one RV site. Do not add 12,000 VA, 3,600 VA, and 2,400 VA for one combination pedestal.

NEC-based rule: where one supply-equipment location serves two RVs, count two sites and include the two highest-rated receptacles. Both sites and the shared equipment arrangement require independent 551.77 review. Enter each site separately and use separate topology records when their supply paths differ.

NEC-based rule: the special 600 VA basis expressly applies to a dedicated tent site with only a 20A supply. Do not use 600 VA for a 15A-only tent supply without a separately documented code or AHJ basis.

Demand factors

Sites served	Factor	Sites served	Factor
1	100%	10-12	50%
2	90%	13-15	48%
3	80%	16-18	47%
4	75%	19-21	45%
5	65%	22-24	43%
6	60%	25-35	42%
7-9	55%	36 or more	41%

The factor is selected by the number of sites served at the calculation boundary, not by the number of receptacles. RVParkCalc applies the factor to raw connected RV-site load and recalculates it at panel, transformer, and service/MDP boundaries. It does not intentionally compound demand factors.

RVParkCalc v1.0.0 applies the published table factor automatically and provides no demand-factor override. If a project uses a more conservative factor or another engineered/AHJ basis, calculate and document that boundary outside the application rather than treating the displayed table result as the alternate calculation.

Site-equipment percentage summary

The compliance strip summarizes the whole project across all panels.

NEC-based rules traced in the local source record:

- every electrified RV site has a 20A, 125V receptacle;
- at least 70 percent of eligible sites are 30A capable;
- at least 40 percent of new sites or 20 percent of existing sites are 50A capable;
- each 50A site is also 30A capable;
- qualifying dedicated tent sites may be excluded from the 30A and 50A denominators; and
- fractional minimum site counts round upward to the next whole site.

The strip flags a shortfall but does not verify listed equipment, exact receptacle configuration, weather resistance, disconnects, access, mounting, marking, working space, or field location.

Receptacle and site-equipment review

The local 2023 record requires weather-resistant 20A and 30A site receptacles and makes the 50A weather-resistant requirement effective January 1, 2026. The published 2026 rule consolidates the covered site receptacles as listed weather resistant. Confirm the locally adopted text and the exact product listing.

For receptacles installed in RV site supply equipment, the Article 551 GFCI requirement identified in the source record applies to 125V, single-phase, 15A and 20A receptacles. Other park receptacles are reviewed under the applicable general rule, including 210.8(B). Do not transfer Article 555 marina GFPE thresholds to 30A or 50A RV-site receptacles.

8. Step 4 - Park Equipment

Use **Park Equipment** for dedicated equipment branches entered from current rather than from an already-calculated VA value.

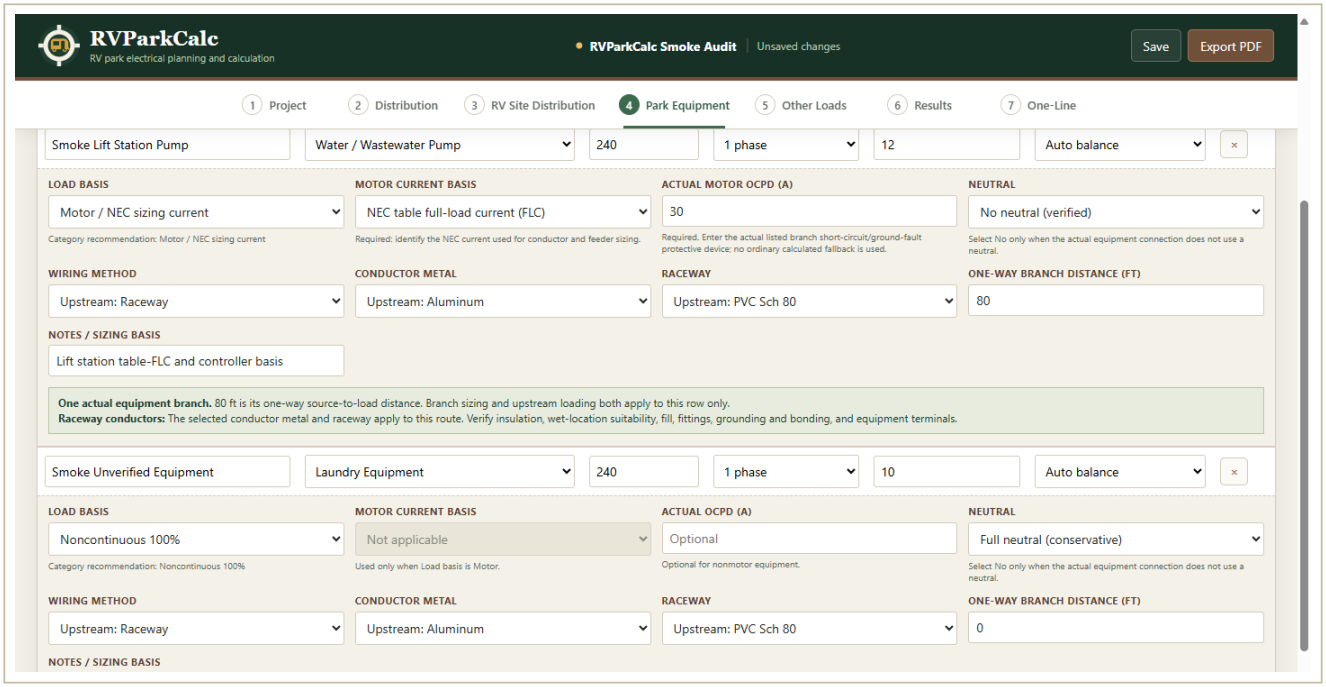


Figure 10. *Park Equipment schedule with a motor branch and its labeled conductor-planning details.*

Select the serving equipment

Choose a distribution panel. In multi-panel and large modes, **MDP Direct** is also available for equipment supplied directly from the MDP. Enter one row for each actual physical equipment branch. Add separate rows even when multiple branches are otherwise identical.

Park Equipment fields

Column	Use
Description	Field name or equipment identifier.
Category	Water/wastewater pump, pool/spa equipment, HVAC/heat pump, EV supply equipment, laundry, maintenance, or other dedicated equipment.
Voltage	Entered equipment voltage from 100V through 600V. New rows default to the serving line-to-line voltage: 240V on 120/240V, 208V on 208Y/120V, or 480V for direct 480Y/277V MDP equipment. It must correspond to the actual serving system and connection.
Phase type	One phase or three phase where the selected system supports it.
Sizing current (A)	User-entered current used for this branch's conductor and upstream feeder calculations. For a motor, this must be the applicable NEC motor sizing current, not an unlabeled generic nameplate value.
Basis	Motor / 430 review, continuous 125%, or noncontinuous 100%.
Motor current basis	Required for a motor row. Select **NEC table full-load current (FLC)**, **Permitted equipment/nameplate current**, or **Other applicable code-table value** to document why the entered current is permitted for sizing.
Actual OCPD	A valid positive Actual OCPD is required for a motor row before calculation or PDF export. That entered device is retained as the motor branch OCPD and is used to size the EGC; RVParkCalc does not invent an ordinary calculated motor breaker/EGC fallback. On a nonmotor row, a valid entered value replaces the displayed planning OCPD; otherwise a starred calculated planning value can be shown. Passing the input guardrails does not complete protection design or approve the device.
Neutral	Full neutral is the conservative default. A line-to-neutral equipment connection always includes a full-size neutral and locks the selector to **Full neutral (required)**. Select **No neutral (verified)** only for actual line-to-line or three-phase equipment whose connection and manufacturer instructions do not require a neutral. Results, the detailed one-line branch, and the PDF state the applied neutral result.
Phase	Auto balance or explicit phase assignment.
Wiring method / Conductor metal	Project/serving-equipment defaults or branch overrides. Raceway planning permits copper or aluminum. MHF is not a general Park Equipment branch method; use it only for a compatible modeled-underground complete 120/240V single-phase feeder.
Raceway	Raceway choices are PVC Schedule 40, PVC Schedule 80, EMT, IMC, and GRC / steel RMC. MHF results do not receive an individual-conductor raceway-fill size.
One-way branch distance	The source-to-load one-way length of this actual branch.
Notes	Current source, code table or permitted equipment-current rule, OCPD, manufacturer, or review basis.

How the three bases behave

RVParkCalc planning behavior - Motor / 430 review: branch conductor current is planned at 125 percent of the entered, explicitly identified motor sizing current. Each panel and transformer boundary applies the applicable 430.24 current arithmetic: all modeled motor currents plus 25 percent of the largest motor on each ungrounded conductor. Motor units remain identifiable through transformer rollups so the common service applies one common-boundary largest-motor adjustment instead of summing a separate adder from every transformer. RVParkCalc does **not** select or approve feeder short-circuit/ground-fault OCPDs under 430.62 or 430.63. Displayed service, panel, and feeder OCPDs are planning/equipment ratings only; the entered Actual motor OCPD applies to the branch and EGC. Complete feeder protection would also require the actual branch and feeder device types/settings, applicable FLC or compressor basis, MCC/listed group-equipment status, starting/inrush data, and the exact role of every intermediate OCPD. When a project contains motors, this boundary is repeated in Results and the PDF Applied Calculation Notes.

RVParkCalc planning behavior - Continuous 125%: the entered load is multiplied by 125 percent for conductor ampacity and protection planning. Voltage drop uses the entered physical load current and its modeled phase relationship, not the 125-percent sizing current.

RVParkCalc planning behavior - Noncontinuous 100%: the entered current is used at 100 percent for ampacity, protection, and voltage-drop current before any applicable upstream demand calculation.

There is no Branch Count multiplier. Each row produces one branch conductor, OCPD, EGC, raceway, one-way-distance, and voltage-drop result, and that branch is included once in its serving-equipment and upstream totals. Add another row for every additional branch.

Park Equipment schedules use a compact OCPD marker only for nonmotor rows. A value such as `70/2P*` is a nonmotor calculated planning OCPD because a usable **Actual OCPD** was not entered. An unstarred value such as `60/2P` uses an entered Actual OCPD that passed the embedded input guardrails. Motor rows never receive the starred fallback: a missing or invalid motor Actual OCPD blocks calculation and PDF export. The asterisk is not applied to service, panel, transformer, RV-pedestal, radial-run, or Other Load OCPDs.

Equipment voltage, phase type, and phase assignment must be a valid actual connection for the selected panel or MDP system. When voltage changes, RVParkCalc refreshes the valid phase choices. When the project system changes, an incompatible saved voltage, three-phase selection, or explicit phase remains correction-required instead of being silently converted to a different connection. Calculation and PDF export remain blocked until it is corrected. A nonmatching voltage, or a low-voltage load entered as **MDP Direct** on a 480Y/277V MDP, requires an explicitly modeled transformer and distribution path; RVParkCalc does not infer that transformer.

Manual review: verify motor full-load-current basis, duty, simultaneous operation, conductor sizing, overload protection, branch short-circuit and ground-fault protection, controller, disconnect, group-motor rules, equipment instructions, and any permitted exceptions. Review EVSE, pools and spas, HVAC, laundry, wastewater, and other special equipment under their applicable NEC articles.

9. Step 5 - Other Loads

Use **Other Loads** for park buildings, lighting, amenities, and other loads that have already been calculated under their applicable rules.

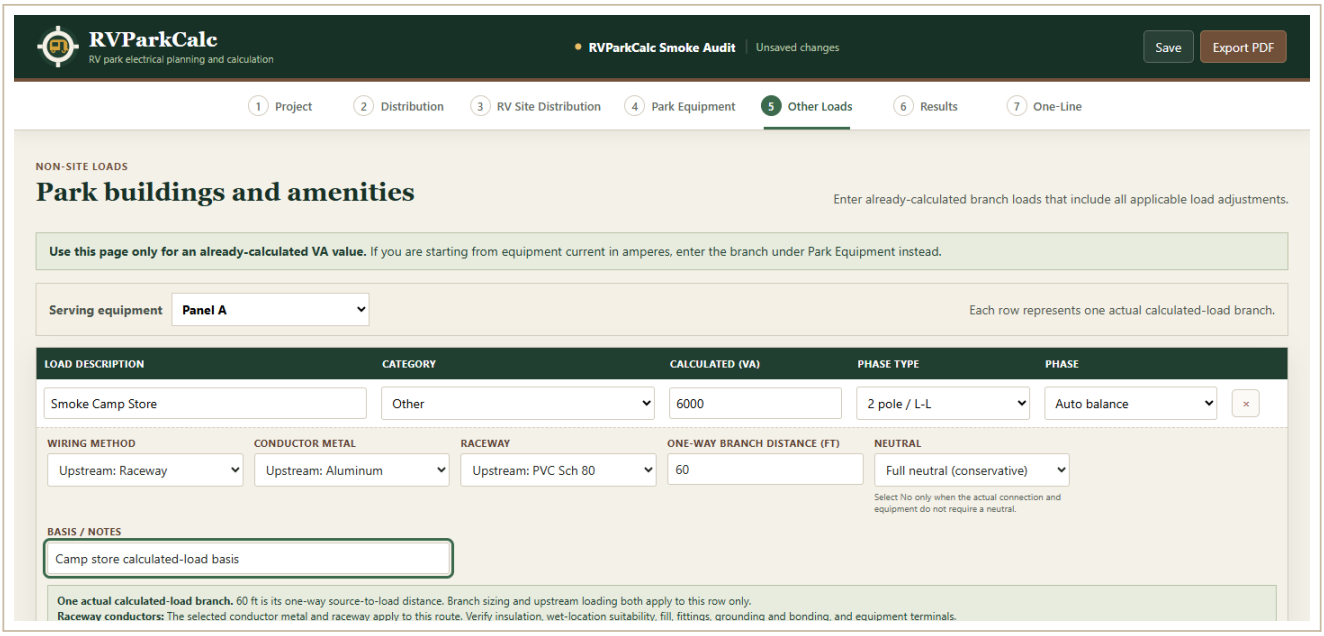


Figure 11. *Other Loads schedule with a calculated building load and its labeled branch-planning details.*

Enter only calculated VA

RVParkCalc does not automatically calculate occupancy, receptacle, appliance, HVAC, pool, EV, or building demand in this step. Determine the applicable calculated load first, then enter it in volt-amperes.

Examples include:

- site lighting;
- office or camp store;
- laundry building;
- recreation building;
- pool or spa;
- maintenance building;
- EV charging;
- security and communications; and
- other separately calculated loads.

Other Load fields

Column	Use
Load description	Field identifier for the branch or calculated load.
Category	Reporting category.
Calculated (VA)	Calculated volt-amperes for this actual branch after applicable external adjustments.
Phase type	One-pole line-to-neutral, two-pole line-to-line, or three phase where supported.
Phase	Auto balance or explicit assignment.
Wiring method / Conductor metal	Project/serving-equipment defaults or branch overrides. Raceway planning permits copper or aluminum. MHF is not valid for a one-pole load, a three-phase load, or an aboveground route and is accepted only for a compatible modeled-underground complete 120/240V single-phase feeder.
Raceway	Raceway choices are PVC Schedule 40, PVC Schedule 80, EMT, IMC, and GRC / steel RMC. MHF results do not receive an individual-conductor raceway-fill size.
One-way branch distance	The source-to-load one-way length of this actual branch.
Neutral	Auto/verify, full neutral, or no neutral. Line-to-neutral loads always include a neutral. Auto currently includes a full-size neutral for two-pole and three-phase loads; No suppresses it only for a compatible connection.
Basis / Notes	Record the calculation source and assumptions.

RVParkCalc planning behavior: Other Loads are added at 100 percent of the entered calculated VA. The RV-site demand factor is not applied to them.

There is no Branch Count multiplier. Each row represents one actual physical load branch, produces one branch result, and is included once in the serving-equipment and upstream totals. Add a separate row for every additional branch, including otherwise identical branches.

When all project inputs are complete, select **Calculate Project**. This opens **Results** and recalculates the whole project.

10. Step 6 - Results

The **Results** step presents the project from the service/MDP boundary down to branch details. Opening Results, selecting **Recalculate**, opening One-Line, or exporting a PDF recalculates the current inputs.

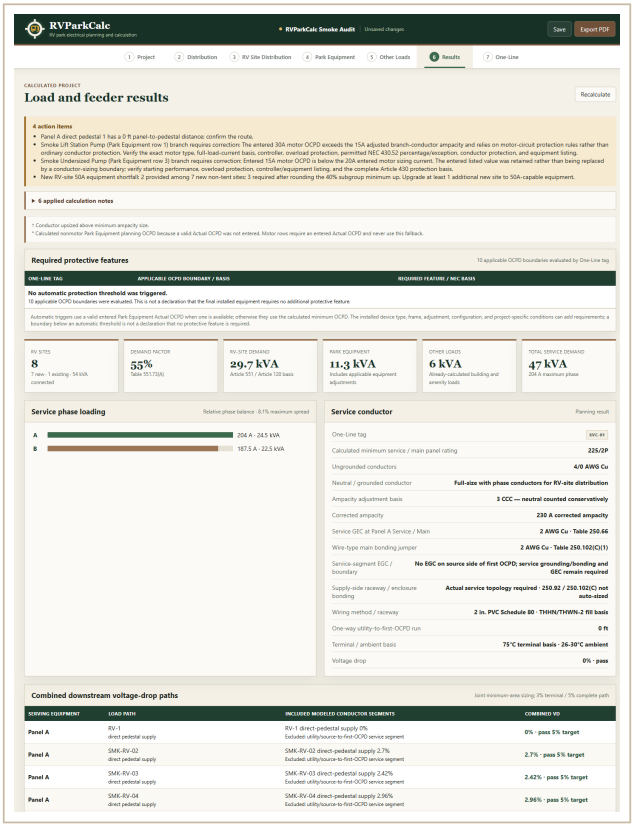


Figure 12. *Results overview with Calculation Status, Applied Calculation Notes, service metrics, phase bars, and service conductor planning.*

Calculation status and applied notes

The Calculation Status area separates two different kinds of information:

- **Action items** identify an invalid, incomplete, out-of-range, incompatible, or out-of-target result that must be corrected or resolved before relying on the schedule.
- **Applied Calculation Notes** document a rule or modeled boundary the app already applied successfully. Notes are collapsed by default and do not count as action items.

Action items may identify:

- a 30A-capable or 50A-capable site-equipment shortfall;
- a transformer with no panels, a calculated minimum above the embedded catalog-size range, an unresolved primary feeder, or an incompatible source/secondary topology;
- a calculated panel or service/MDP requirement outside the embedded OCPD/equipment-rating range;
- a conductor arrangement outside the embedded planning limits;
- a terminal direct-pedestal/branch or cumulative radial route above 3 percent, a complete modeled downstream path above 5 percent, or a separately evaluated service segment above its planning target;
- a radial run with no segment/site, invalid ordering data, or more than two sites at one pedestal;
- an unresolved legacy grouped row whose saved quantity and distance do not identify its physical topology;
- a missing or invalid row value;

- an unsupported or migrated project-file value; or
- a project with no valid loads.

Common applied notes identify:

- use of the immediate next standard OCPD planning rule, with the exact adjusted ampacity and OCPD shown in the schedule;
- the cable-geometry impedance method retained for MHF and service-side URD; supported individual-conductor raceways use their resolved Chapter 9, Table 9 basis without a broad method note;
- the source-to-first-OCPD service boundary and absence of a load-side EGC on that segment;
- supported MHF, URD, or utility-source calculation boundaries;
- the calculated transformer minimum and selected catalog-size basis;
- the calculated transformer primary-only protection basis; and
- the transformer-secondary source-OCPD topology used for downstream panel feeders.

Resolve each action item before using the affected result. Applied notes require no data correction; expand them when you need the basis for a calculated result. A message stating that no automated action items were found means the represented load, ampacity, topology, and voltage-drop checks passed; it does not establish permit or construction approval.

Required protective features

This compact schedule evaluates every modeled OCPD boundary and keys each result to the same globally unique tag shown on the One-Line. Panel-local pedestal and radial identifiers are panel-qualified in these tags, such as `P01-RV-1` and `P02-RV-1`, so identical field circuit IDs on different panels cannot be confused. A valid entered Park Equipment **Actual OCPD** is the applicable rating for that branch; other modeled boundaries use the calculated minimum planning OCPD.

- On a solidly grounded wye system over 150V to ground and not over 1000V, an applicable OCPD rating of 1000A or more identifies service ground-fault protection of equipment under 230.95, feeder ground-fault protection under 215.10, or qualifying branch-circuit ground-fault protection under 210.13.
- An applicable OCPD rating of 1200A or more identifies arc-energy reduction. A known circuit breaker is reported under 240.87, a known fused device under 240.67, and an unspecified final device with both references until its type is selected.
- Results shows whether the applicable rating is an entered Actual OCPD or a calculated minimum, and preserves the calculated minimum for comparison when an entered rating governs. The installed device rating, highest continuous-current trip setting, fuse size, adjustment, device type, configuration, and project-specific conditions can add requirements. A boundary below an automatic threshold is not a statement that no additional protective feature is required.

These calculated requirements appear in Results and the PDF and use `GFPE` and `AER` markers on the One-Line. They are not duplicated as generic action-item warnings.

Project metrics

The top cards report:

- total RV-site count and connected site load;
- selected service-level RV demand factor;
- demanded RV-site load;
- park equipment load; and
- total service demand and maximum phase current.

Other Load VA is included in total service demand even though it is not a separate top card.

Service phase loading

Phase bars show phase current and VA with a maximum-spread indicator. On a three-phase service, the same card also reports modeled neutral current as the vector sum of the phase-current phasors at the linear fundamental frequency. Harmonic and nonlinear-load neutral current is not modeled; the displayed neutral value is phase-balance context, not a harmonic neutral-sizing result.

RVParkCalc planning behavior: Auto assignments select the valid phase or phase pair with the least loaded current state as each unit is resolved; they do not promise strict alternation. A 50A site divides into two 6,000 VA, 120V legs. On 120/240V those legs occupy A and B; on 208Y/120V they occupy the selected AB, BC, or CA pair.

For a continuing radial run, each segment retains the actual assignments of all sites at and downstream of that segment. Segment current and voltage drop are calculated from the physical phase and neutral current phasors for those downstream assignments after applying the segment's site-count demand factor, then accumulated phase by phase from the source to each pedestal.

Manual review: reconcile assignments with actual panel positions and feeder phase conductors. Three-phase fundamental neutral current is a phasor result; equal current on two 120-degree phases does not cancel as it does on a 120/240V split-phase system. Evaluate harmonics and nonlinear loads separately.

Service conductor planning

The service card always shows:

- the `SVC-01` One-Line tag used for the utility-to-service/MDP conductor segment;
- calculated maximum service/MDP load current;
- minimum planning OCPD/equipment ampere rating based on that load;
- ungrounded conductors and parallel sets when the service method is modeled, or **Utility-defined / not calculated** when it is not;
- the modeled neutral and current-carrying-conductor basis, or an explicit utility-defined not-calculated statement;
- corrected ampacity when calculated;
- the general Table 250.66 copper service GEC and Table 250.102(C)(1) wire-type main bonding jumper when raceway or URD conductors supply the required area basis, or explicit not-calculated values in utility-defined mode;
- the explicit source-to-first-OCPD no-EGC boundary;
- selected raceway size or service-source-URD result when modeled; and
- voltage-drop percentage with pass/exceeds-target status when calculated.

These are planning results. Confirm service versus feeder rules, permitted OCPD, equipment rating, terminal temperature, conductor insulation, correction and adjustment, parallel-conductor rules, current-carrying conductors, neutral treatment, raceway fill, and installation conditions. Utility-defined mode requires the actual service construction before any omitted conductor, voltage-drop, GEC, or bonding-jumper result can be established. For displayed GEC and main-bonding-jumper values, also confirm the actual grounding-electrode system, connection topology, electrode-specific allowances, bonding locations, conductor routing/protection, material compatibility, and field conditions.

Panel feeder schedule

Each feeder row includes a tag, panel, sites, RV demand, Park Equipment plus Other Loads, current, calculated source OCPD/minimum panel rating, conductors/raceway, EGC, and voltage-drop status. Feeder tags such as `RVP-F01` match the one-line.

Large-mode results also render each transformer primary-feeder and primary-protection calculation, explicitly identify the primary-feeder EGC, show the first-secondary-main OCPD, and identify whether the main is integral or remote. A remote selection adds its `TX-S` tag, phase conductors, full neutral, one copper supply-side bonding jumper per raceway, raceway, voltage drop, and 240.21(C) rule. Integral selection explicitly states that no field secondary conductor segment is modeled. Results calculate the copper SDS GEC and system bonding jumper from the applicable secondary basis, identify the

panel-feeder source OCPDs at the selected secondary distribution point, and retain the transformer-to-panel hierarchy. Primary, remote secondary, panel-feeder, branch, and radial conductor arrangements participate in the same downstream voltage-drop optimization when they are physically in series. Their Results rows show the actual CCC count and basis used. Panel-feeder EGCs remain in the panel feeder schedule. Loads assigned to **MDP Direct** are rendered as their own branch/report rows and are included directly at the MDP boundary rather than being hidden inside a downstream panel.

Combined downstream voltage-drop paths

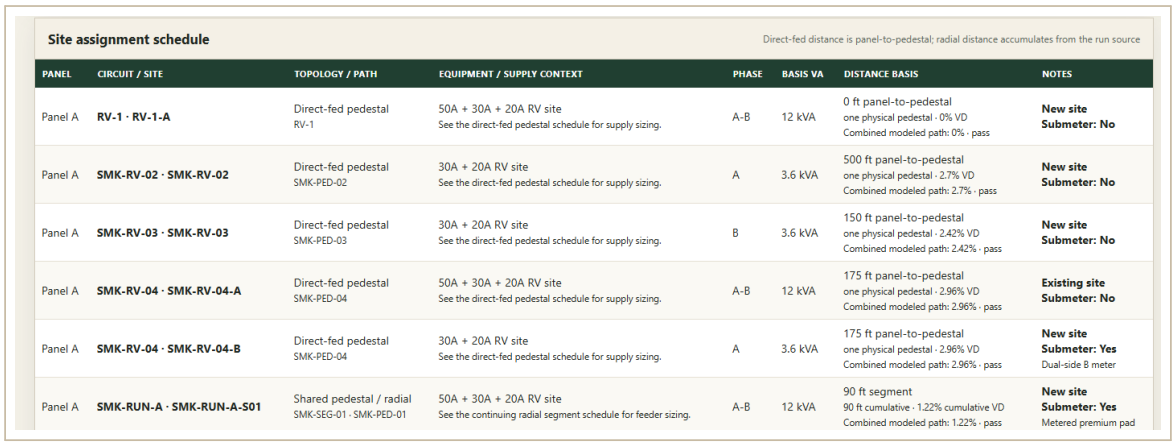
The Results page and PDF include one combined path for every physical direct/dedicated RV supply, every radial pedestal destination that serves a site, every Park Equipment branch, and every Other Calculated Load branch. Each row identifies the conductor segments actually placed in series by the selected topology and compares their summed modeled percentage with the 5 percent feeder-plus-branch planning target.

- Multi-panel and separate-disconnect paths include the physical panel feeder plus the load branch.
- A combined single-panel or MDP-direct path begins at its local source OCPD and therefore contains the load branch only.
- A Large-mode path includes the transformer primary feeder, the remote transformer-secondary conductor segment only when that field segment is modeled, the protected panel feeder, and the load branch.
- A radial branch contribution is the cumulative run voltage drop through that pedestal, not merely the last segment and not the maximum drop at some other pedestal.
- Utility/source-to-first-OCPD service conductors are excluded from every combined downstream path. Transformer internal regulation is also excluded from Large-mode paths.

RVParkCalc globally evaluates the supported conductor combinations for all downstream segments that participate in the modeled topology. It selects the combination with the minimum installed conductor area, accounting for route length, conductor count, and parallel sets, while keeping each terminal branch or cumulative radial route at or below 3 percent and every complete downstream path at or below 5 percent. It does not reserve or force 2 percent for each panel feeder, transformer primary feeder, or remote transformer-secondary segment. A qualifying feeder may therefore use more or less of the complete-path budget when that produces the least installed conductor area without violating either limit.

Every candidate must still satisfy conductor ampacity and protection, correction and adjustment, the full-neutral rule, EGC sizing and proportional increase, raceway fill, supported cable restrictions, and the 750 kcmil maximum individual copper or aluminum conductor size before permitted equal parallel sets are considered. The final transformer, feeder, branch, radial, neutral, EGC, fill, marker, linked site/supply, one-line, and path-arithmetic results are regenerated from the selected combination. A path remains actionable only when the supported candidate range or modeled topology cannot satisfy the targets; the warning then directs the user to shorten a route, revise distribution placement, or complete the required design outside the automatic boundary. The combined arithmetic remains planning guidance rather than a declaration of code compliance.

NEC-based rule: upstream RV demand is recalculated from raw sites served and the factor for that boundary. Park Equipment and Other Loads are then added using their respective entered or adjusted bases.



Site assignment schedule

Direct-fed distance is panel-to-pedestal; radial distance accumulates from the run source

PANEL	CIRCUIT / SITE	TOPOLOGY / PATH	EQUIPMENT / SUPPLY CONTEXT	PHASE	BASIS VA	DISTANCE BASIS	NOTES
Panel A	**RV-1 · RV-1-A**	Direct-fed pedestal RV-1	50A + 30A + 20A RV site See the direct-fed pedestal schedule for supply sizing.	A-B	12 kVA	0 ft panel-to-pedestal one physical pedestal · 0% VD Combined modeled path: 0% · pass	**New site** **Submeter: No**
Panel A	**SMK-RV-02 · SMK-RV-02**	Direct-fed pedestal SMK-PED-02	30A + 20A RV site See the direct-fed pedestal schedule for supply sizing.	A	3.6 kVA	500 ft panel-to-pedestal one physical pedestal · 2.7% VD Combined modeled path: 2.7% · pass	**New site** **Submeter: No**
Panel A	**SMK-RV-03 · SMK-RV-03**	Direct-fed pedestal SMK-PED-03	30A + 20A RV site See the direct-fed pedestal schedule for supply sizing.	B	3.6 kVA	150 ft panel-to-pedestal one physical pedestal · 2.42% VD Combined modeled path: 2.42% · pass	**New site** **Submeter: No**
Panel A	**SMK-RV-04 · SMK-RV-04-A**	Direct-fed pedestal SMK-PED-04	50A + 30A + 20A RV site See the direct-fed pedestal schedule for supply sizing.	A-B	12 kVA	175 ft panel-to-pedestal one physical pedestal · 2.96% VD Combined modeled path: 2.96% · pass	**Existing site** **Submeter: No**
Panel A	**SMK-RV-04 · SMK-RV-04-B**	Direct-fed pedestal SMK-PED-04	30A + 20A RV site See the direct-fed pedestal schedule for supply sizing.	A	3.6 kVA	175 ft panel-to-pedestal one physical pedestal · 2.96% VD Combined modeled path: 2.96% · pass	**New site** **Submeter: Yes** Dual-side B meter
Panel A	**SMK-RUN-A · SMK-RUN-A-S01**	Shared pedestal / radial SMK-SEG-01 · SMK-PED-01	50A + 30A + 20A RV site See the continuing radial segment schedule for feeder sizing.	A-B	12 kVA	90 ft segment 90 ft cumulative · 1.22% cumulative VD Combined modeled path: 1.22% · pass	**New site** **Submeter: Yes** Metered premium pad

Figure 13. *Panel feeder schedule with matching RVP - F tags and conductor planning columns.*

Pedestal and branch detail schedules

The Direct-Fed, Shared/Radial, Park Equipment, and Other Loads schedules use the same field order in Results and the PDF. Each physical pedestal, radial segment, equipment branch, or calculated-load branch remains one record. Identity, route, demand, connection, conductor, protection, and voltage-drop facts appear on separate labeled lines instead of being compressed into a single sentence.

At both direct-fed and shared pedestals, each RV side has its own separated block showing the site ID and equipment, New/Existing status, submeter choice, resolved phase, and optional site notes. A dual-sided pedestal still has one common direct supply or one radial segment; the two side blocks do not create two feeder results. Ordinary desktop widths show fixed, top-aligned schedule columns. At narrow or zoomed widths, the same facts reflow into labeled record cards rather than being squeezed into unreadable columns.

Site assignment schedule

This schedule shows one assignment for every physical RV site, including every side at a direct-fed pedestal and every site at a radial-run pedestal. It identifies the panel, circuit/site, topology/path, equipment and supply context, resolved phase, site-basis VA, distance basis, submeter choice, and notes.

For a direct-fed assignment, distance is the one-way panel-to-pedestal length of the common pedestal supply, and each site side points to that shared supply result. For a radial assignment, the path identifies its run, segment, and pedestal; distance is cumulative from the run source, and voltage drop is the cumulative phase result through that pedestal.

Use it to verify that:

- the number of assignments matches the physical sites;
- each site type is correct;
- explicit and automatic phases match the intended design;
- every direct-fed record represents exactly one physical pedestal with one or two entered site sides;
- radial segments are ordered from the panel outward, each segment distance is from the previous point, and each pedestal serves one or two entered sites; and
- notes identify any shared equipment or special condition.

Expandable pedestal, radial, and branch schedules

Expand each serving-equipment section to review:

- direct-fed RV pedestal supplies and continuing radial runs;
- Park Equipment; and
- Other Calculated Loads.

Direct-fed rows show the pedestal arrangement, separately counted site sides, connected and demanded pedestal load, submeter and routing notes, and the one common supply OCPD, conductor, EGC, raceway, panel-to-pedestal distance, and voltage drop. Radial rows show run routing notes, the source conductor/OCPD, and ordered segment details, including local and downstream site count, raw downstream connected load, segment demand factor, segment distance, segment voltage drop, and cumulative voltage drop. The same selected conductor arrangement is used for every segment in one run.

The Park Equipment and Other Calculated Load schedules retain their branch results, including separate **MDP Direct** sections when used. These are coordinated outputs, not construction panel schedules with every pole, circuit number, breaker catalog number, equipment label, feed-through-lug detail, or intermediate protective device.

Marker legends appear only when the corresponding condition exists:

- ↑ after a conductor means it was upsized above the minimum ampacity size. The marker follows a phase conductor or cable arrangement increased for voltage drop and follows the EGC only when that EGC was proportionately increased.
- ↑ after an OCPD means the embedded planning checks applied the immediate next standard rating at 800A or less. See **Applied Calculation Notes** and confirm the adopted-rule conditions for the actual project.

- * Calculated nonmotor Park Equipment planning OCPD because a usable Actual OCPD was not entered. Motor rows require an entered Actual OCPD and never use this fallback.

The same symbols and conditional explanations carry into the tagged One-Line and exported PDF. If the largest embedded conductor arrangement still cannot satisfy the target, the arrow remains an accurate upsizing indicator but does not replace the accompanying action item.

Figure 14. *Expanded panel detail showing direct-fed pedestal supplies, radial-segment results, Park Equipment, and Other Calculated Loads.*

11. Step 7 - One-Line

The **One-Line** step provides a tagged source-to-load planning diagram.

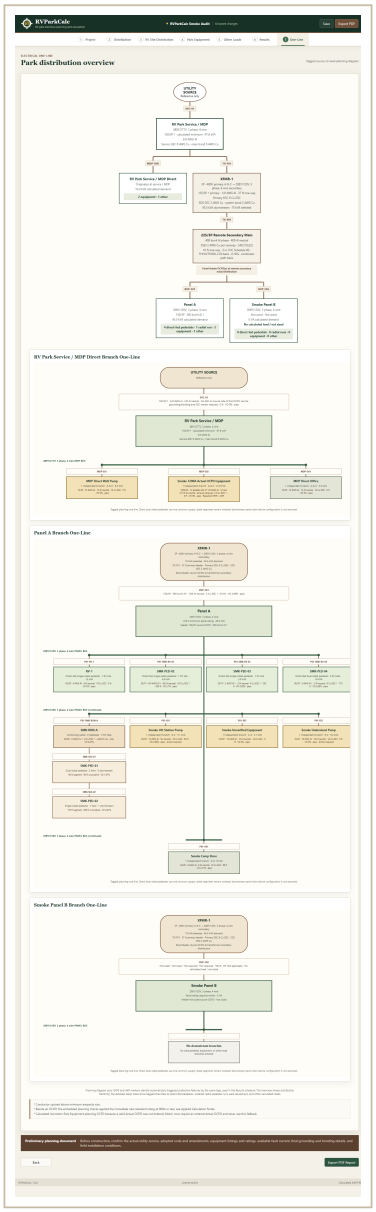


Figure 15. *One-Line view with utility source, service/MDP, transformer branch where applicable, and tagged panel feeders.*

Diagram hierarchy

Depending on mode, the diagram shows:

- **Utility Source** as a reference node;
- the **RV Park Service / MDP** with system, planning main, demand, and either modeled conductor/GEC/bonding results or explicit utility-defined not-calculated labels;
- park-owned transformers in large mode with the primary-feeder EGC, copper SDS GEC, and system bonding jumper;
- each large-mode transformer primary feeder and transformer-to-panel hierarchy;
- each downstream panel with its matching feeder tag, voltage, planning OCPD/conductor, and demand; and
- a leaf summary of direct-fed pedestals, continuing radial runs, Park Equipment rows, Other Load rows, and separately rendered MDP Direct branches.

The diagram is intentionally vertical and source-to-load. Feeder and branch tags correspond to the Results schedule and PDF report. `GFPE` and `AER` markers point to the Required Protective Features schedule for the same tag.

For Multi-Panel and Large projects, the first PDF one-line page is a tagged distribution overview. Every physical source, transformer, transformer-secondary, and panel-feeder path has a visible connector badge, and each MDP-direct or panel node lists the downstream branch and terminal tags that continue below it. The following detailed tagged pages then draw those branches through their actual pedestal, radial segment, Park Equipment, or Other Load destinations. This two-level report view preserves the complete source hierarchy without presenting a panel box as an unexplained endpoint. Single-panel reports begin directly with the detailed source-to-load diagram.

Required reconciliation

Before export, compare the diagram to the Distribution and Results steps. Confirm:

- every panel appears under the correct source or transformer;
- every feeder tag matches its schedule row;
- every `GFPE` or `AER` marker matches the Required Protective Features row carrying the same tag;
- transformer type and secondary system match the connected panel;
- the service GEC/main bonding jumper, when calculated, and each transformer primary EGC/SDS GEC/system bonding jumper match the Results schedule; utility-defined service omissions remain labeled not calculated;
- direct MDP loads are accounted for in the MDP total;
- every panel's direct-fed pedestals and radial runs reconcile with the Results schedules;
- phase assignments and system voltages are valid; and
- the calculation boundary does not imply utility or field details that were not entered.

The one-line displays calculated general-table grounding and wire-type bonding-jumper results only where the required conductor basis is modeled. Utility-defined service displays those values as not calculated. Neither result establishes the actual electrode system, electrode-specific allowances, grounding/bonding connection topology, conductor routing/protection, fault duty, protective-device coordination, exact disconnect arrangement, metering, or equipment listing.

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12. Open, save, autosave, and project files

RVParkCalc project files use the `.rvp` extension. Keep them separate from exported PDF reports.

File menu

Command	Shortcut	Action
New Project	Ctrl+N	Starts a new project after an unsaved-change confirmation when needed.
Open...	Ctrl+O	Opens an RVParkCalc `.rvp` file.
Save	Ctrl+S	Saves to the current path or prompts for a path the first time.
Save As...	Ctrl+Shift+S	Saves a copy to a selected `.rvp` path.
Export PDF Report...	Ctrl+P	Recalculates and exports the coordinated PDF.
Exit	-	Closes the application after an unsaved-change confirmation when needed.

Save-state indicators

The header displays a dot and **Unsaved changes** when the project has changed. After a successful save it displays **Saved**. The Windows title also begins with an asterisk while unsaved changes exist.

Autosaved draft

RVParkCalc stores an atomic local working draft after edits and attempts to recover a dirty draft after an unexpected shutdown or crash. Choosing **Discard Changes** during Exit clears that recovery draft before the app closes; if the cleanup cannot be acknowledged, the app remains open. A successful **Save** or confirmed **New Project** immediately replaces stale dirty recovery state so it cannot reappear on the next launch. Autosave is a recovery convenience, not a substitute for **Save**. It is local to the Windows user profile and does not create a portable `.rvp` file.

Opening older files

Current project files use schema 5 and retain the schema-4 separation between direct-fed pedestals and continuing radial runs. A schema-3 RV-site row with explicit `dedicated` topology migrates into one direct-fed pedestal per saved home run. When its former quantity is greater than one, RVParkCalc creates individual pedestal records, copies the saved route settings and panel-to-pedestal distance to each, and generates reviewable identifiers.

Schema-1 and schema-2 rows with quantity greater than one remain unresolved because their saved quantity and single distance cannot prove whether they meant separate panel-to-pedestal home runs or one continuing radial route. Calculation and PDF export remain blocked until every unresolved group is addressed. Choose **Split into individual pedestals** only when every saved unit was truly a separate home run of that same length. Otherwise rebuild the route as an ordered radial run with the actual distance of every segment, then delete the unresolved row. Save the converted project to a new file and compare all results with the earlier record before replacing it.

A schema-1/schema-2 quantity-one row becomes one direct-fed pedestal. A schema-3 row already marked unresolved remains blocked under the same review rule. A schema-4 Park Equipment or Other Load row with a former positive quantity/count migrates deterministically into that many separate schema-5 physical-branch rows, with the saved settings copied and unique internal identifiers generated. Continue to review generated IDs, panel sources, transformer assignments, raceways, equipment branches, and calculated results. An older multi-panel file cannot remain in single-panel mode.

File management practice

- Save the original project before major mode or distribution changes.
- Use **Save As** for design alternatives.
- Include the date or revision in issued filenames.
- Back up both the `.rvp` file and exported PDF.
- Do not manually edit the project JSON unless you understand the schema and have a backup.

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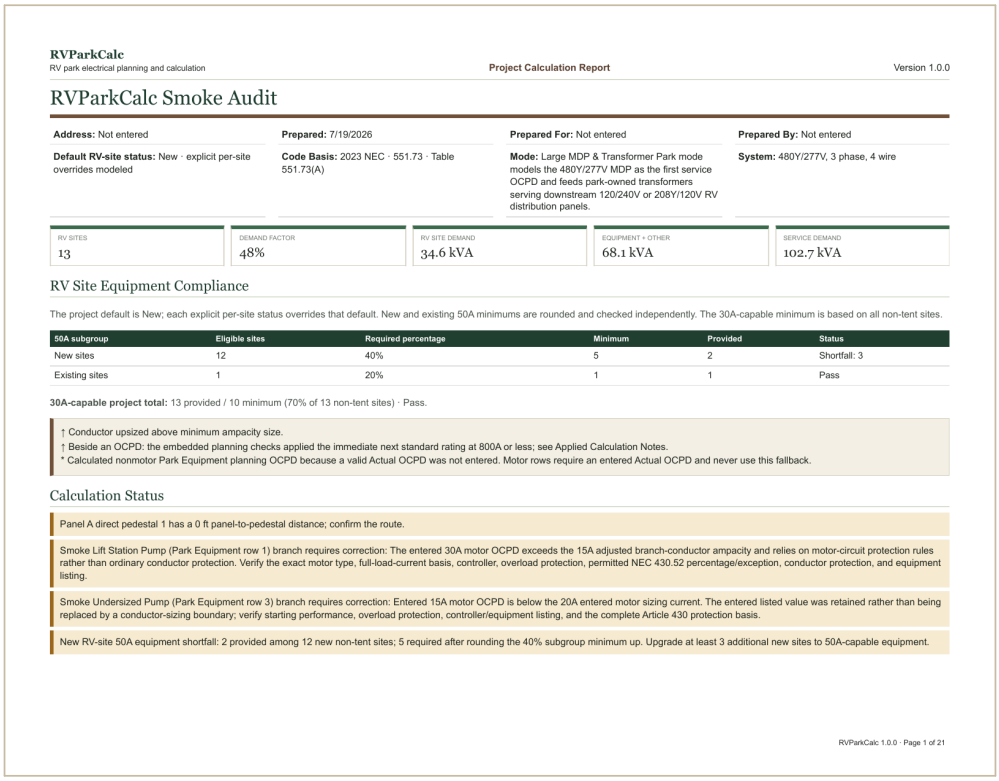
13. Export the PDF report

Select the header **Export PDF** button or **File > Export PDF Report...**. RVParkCalc recalculates the current project, asks for a `.pdf` path, and builds a consistently formatted Letter landscape report using the same earth-tone identity as the application.



RVParkCalc
RV park electrical planning and calculation
Project Calculation Report
Version 1.0.0

RVParkCalc Smoke Audit

Address: Not entered
Prepared: 7/19/2026
Prepared For: Not entered
Prepared By: Not entered
Default RV-site status: New · explicit per-site overrides modeled
Code Basis: 2023 NEC · 551.73 · Table 551.73(A)
Mode: Large MDP & Transformer Park mode models the 480Y/277V MDP as the first service OCPD and feeds park-owned transformers serving downstream 120/240V or 208Y/120V RV distribution panels.
System: 480Y/277V, 3 phase, 4 wire

RV SITES	DEMAND FACTOR	RV SITE DEMAND	EQUIPMENT + OTHER	SERVICE DEMAND
13	48%	34.6 kVA	68.1 kVA	102.7 kVA

RV Site Equipment Compliance

The project default is New; each explicit per-site status overrides that default. New and existing 50A minimums are rounded and checked independently. The 30A-capable minimum is based on all non-tent sites.

50A subgroup	Eligible sites	Required percentage	Minimum	Provided	Status
New sites	12	40%	5	2	Shortfall: 3
Existing sites	1	20%	1	1	Pass

30A-capable project total: 13 provided / 10 minimum (70% of 13 non-tent sites) · Pass.

† Conductor upsized above minimum ampacity size.
‡ Beside an OCPD: the embedded planning checks applied the immediate next standard rating at 800A or less; see Applied Calculation Notes.
* Calculated nonmotor Park Equipment planning OCPD because a valid Actual OCPD was not entered. Motor rows require an entered Actual OCPD and never use this fallback.

Calculation Status

Panel A direct pedestal 1 has a 0 ft panel-to-pedestal distance; confirm the route.

Smoke Lift Station Pump (Park Equipment row 1) branch requires correction: The entered 30A motor OCPD exceeds the 15A adjusted branch-conductor ampacity and relies on motor-circuit protection rules rather than ordinary conductor protection. Verify the exact motor type, full-load-current basis, controller, overload protection, permitted NEC 430.52 percentage/exception, conductor protection, and equipment listing.

Smoke Undersized Pump (Park Equipment row 3) branch requires correction: Entered 15A motor OCPD is below the 20A entered motor sizing current. The entered listed value was retained rather than being replaced by a conductor-sizing boundary; verify starting performance, overload protection, controller/equipment listing, and the complete Article 430 protection basis.

New RV-site 50A equipment shortfall: 2 provided among 12 new non-tent sites; 5 required after rounding the 40% subgroup minimum up. Upgrade at least 3 additional new sites to 50A-capable equipment.

RVParkCalc 1.0.0 · Page 1 of 21

Figure 16. *Exported RVParkCalc PDF cover/summary page in pine green, moss, ivory, and earth brown.*

Report contents

The PDF includes:

1. project identity and calculation basis;
2. summary metrics;
3. calculation action items and applied calculation notes;
4. service/MDP summary with the no-EGC source boundary and either modeled copper service GEC/main-bonding-jumper results or explicit utility-defined not-calculated values;
5. transformer sizing/protection/grounding results where applicable and the outgoing feeder schedule, including the transformer primary-feeder EGC, copper SDS GEC, system bonding jumper, and panel-feeder EGCs;
6. project notes;
7. RV-site distribution schedules for direct-fed pedestal supplies and radial segments; each direct-fed physical pedestal remains one common-supply row, with every served RV site's equipment, status, submeter selection, and phase shown on separate labeled lines;
8. Park Equipment schedule;
9. Other Calculated Loads schedule;
10. tagged electrical one-line; and
11. calculation assumptions and legal notice.

Before distributing a report

- Save the `.rvp` project.
- Recalculate, correct every action item, and review the applied notes behind automatic results.
- Verify project name, address, Prepared For, Prepared By, default RV-site status, every explicit site-status override, mode, system, and code edition.

- Compare service, transformer, feeder, and branch values with independent calculations.
- Reconcile the service and transformer grounding/bonding results with the actual electrode, connection, and bonding topology.
- Reconcile every feeder tag and panel source with the one-line.
- Confirm the PDF is complete and legible at 100 percent zoom.
- Mark the report as preliminary when professional and AHJ reviews are incomplete.

The PDF is not sealed or automatically permit-ready. Exporting it does not change the status of any planning result.

14. Calculation basis and assumptions

14.1 Edition reference map

Topic	2023 NEC basis in the local record	2026 NEC basis in the local record
RV-site receptacles and GFCI	551.71	551.71(A)-(D), restructured/consolidated
Distribution and neutral	551.72	551.72, neutral provisions restructured
Park service and feeder load	551.73 and Table 551.73(A)	Article 120, Part VIII, 120.130 and Table 120.130(A)
Overcurrent protection	551.74 and Article 240	551.74 and Article 240
Site-equipment grounding	551.76 and Article 250	551.76 and Article 250
Listed site supply equipment	551.77	551.77
Outdoor, overhead, underground, and receptacle details	551.78-551.81	551.78-551.81

The published 2026 edition and its development record support the relocation and substantive continuity of the load bases and demand table. For project reliance, verify the current official text, errata, TIAs, jurisdictional adoption, and local amendments.

14.2 Connected load and demand

NEC-based rule: RVParkCalc uses 12,000 VA, 3,600 VA, 2,400 VA, or 600 VA per site according to the selected highest-rated facility. The demand-table factor is selected by site count at each boundary.

A direct-fed pedestal has one common supply. A single-sided pedestal contains one site and uses the one-site 100 percent factor at that supply. A dual-sided pedestal contains two separately counted sites, sums their independently selected highest-rated facilities, and uses the two-site 90 percent factor for the one common supply. Panel, transformer, service, and radial-segment boundaries recalculate demand from the raw sites actually served at each boundary.

For a continuing radial run, the source segment serves every site in the run. Moving outward, each later segment serves only the sites at and beyond its destination. RVParkCalc applies the published factor for each segment's downstream site count to that segment's raw downstream connected load; it never compounds an upstream demand factor into a downstream calculation.

Illustrative calculation:

- 20 x 50A sites = 240,000 VA
- 20 x 30A/20A sites = 72,000 VA
- 5 x 20A-only RV sites = 12,000 VA
- 5 x dedicated 20A tent sites = 3,000 VA
- 50 total sites = 327,000 VA connected
- 36 or more sites uses 41 percent = 134,070 VA RV-site demand

If the common service also supplies a separately calculated 20,000 VA laundry load, the combined planning demand is 154,070 VA before any other applicable review. The RV-site factor is not applied to the laundry load.

14.3 Phase model

For calculation purposes, a 50A RV site is modeled as two 6,000 VA, 120V line-to-neutral legs. On 208Y/120V, those legs occupy a selected phase pair; the site is not treated as one 12,000 VA line-to-line load divided by 208V.

Single-pole site and load assignments use the line-to-neutral voltage. Two-pole loads use line-to-line voltage. Three-phase loads use the entered phase system. Automatic phase selection uses the least-loaded current state at the time of assignment rather than a strict alternation sequence. Auto balance is a software convenience; actual circuit and phase assignments must be preserved and verified.

Physical VA and phase allocation use the entered connection, and entered three-phase loads are treated as balanced. Park Equipment nonmotor rows and Other Loads do not request a power-factor input. For feeder and service ampacity and protection sizing, their current magnitudes are therefore added arithmetically on each occupied conductor. This conservative envelope prevents A-B and B-C (or other mixed line-to-line) current angles from canceling and understating the common phase-conductor requirement. Three-phase service and panel summaries separately report the vector-sum neutral current of the modeled linear fundamental phase-current phasors. The engine does not model user-specific displacement power factor, harmonics, nonlinear neutral current, or phase-by-phase equipment imbalance.

Voltage-drop current is kept separate from ampacity and protection sizing current. Where the modeled connection resolves the relationship, RVParkCalc applies the physical phase and neutral current phasors: a line-to-neutral path includes both its phase-conductor and neutral-conductor drop, a line-to-line path uses the difference between the two phase-conductor drops, and an exclusively balanced three-phase component uses the corresponding balanced phasor result. Continuous-load and motor sizing factors, selected-transformer rated current, and OCPD multipliers remain in ampacity and protection calculations; they do not inflate physical voltage-drop current. When power factor or a transformer-side phase mapping cannot be resolved from the model, RVParkCalc uses the documented conservative fallback rather than assuming beneficial cancellation.

14.4 Neutral, equipment grounding, GEC, and bonding

NEC-based rule: RV-site feeder and branch-circuit neutrals are full size with the ungrounded conductors; RVParkCalc does not apply a reduced-neutral calculation to RV-site distribution.

Feeders supplying only permanent loads, buildings, or ancillary structures may be eligible for the applicable general neutral calculation, but that exception is not applied automatically to the RV-site distribution model.

For Other Loads, a line-to-neutral connection always includes a neutral. **Auto / verify** conservatively includes a full-size neutral on two-pole and three-phase connections in v1.0.0. **No neutral** suppresses the neutral only where the selected connection is compatible. Confirm the actual load, system, harmonics, and conductor-count treatment.

For ampacity adjustment in version 1.0.0, every modeled neutral is conservatively counted as a current-carrying conductor. Results and the PDF expose that count and basis directly; for example, a three-phase, four-wire feeder reports **4 CCC - neutral counted conservatively**. This release does not offer a neutral-CCC exclusion override.

NEC-based rule: run an equipment grounding conductor with the circuit conductors from the service or secondary transformer. A non-service RV site supply pedestal does not require its own grounding electrode; an auxiliary electrode may be permitted under 250.54. Ground each separately derived secondary system as required and do not use the grounded conductor as the equipment grounding conductor.

RVParkCalc planning behavior: the base copper EGC is selected from the entered or planning OCPD basis and is normally increased proportionately when the ungrounded conductor is upsized for voltage drop. Verify 250.122, 250.122(B), the actual OCPD, material, raceway arrangement, and any qualified-person exception.

The utility/source-to-first-service-OCPD segment does not include an EGC. When raceway or URD service conductors are modeled, RVParkCalc calculates a copper service GEC from the general Table 250.66 basis and a wire-type main bonding jumper from Table 250.102(C)(1). **Utility-defined / not calculated** provides no conductor-area basis, so those values remain not calculated. A displayed GEC does not automatically apply electrode-specific allowances or determine the electrode system and connection topology.

For a park-owned transformer, the primary feeder includes an EGC sized from its primary OCPD. Integral topology uses the calculated full-rating secondary arrangement to calculate a copper SDS GEC and copper system bonding jumper. Remote topology uses its actual calculated secondary-conductor arrangement and also reports one copper supply-side bonding jumper per raceway. The separate protected transformer-to-panel feeders keep their own EGC results in the panel feeder schedule.

For nonmotor Park Equipment, an entered **Actual OCPD** replaces the displayed planning device and becomes the EGC basis only after it passes the embedded numeric and minimum-current guardrails. An invalid or undersized nonmotor entry is retained for correction but is not applied; the displayed fallback planning OCPD carries *. For a motor row, a valid numeric Actual OCPD is required and is retained as the branch-device and EGC basis; a value below the entered motor sizing current is not automatically replaced, but it creates an Article 430 protection review item. An entered device can affect conductor selection where it exceeds 800A. Enter only the device actually intended or installed and independently verify all applicable overcurrent and conductor rules.

14.5 Conductor ampacity

The embedded planning engine considers:

- selected copper or aluminum material;
- selected 60 degC or 75 degC ampacity column;
- ambient correction;
- a current-carrying-conductor count adjustment;
- small-conductor limitations;
- a standard planning OCPD list;
- a 750 kcmil maximum individual conductor size for both copper and aluminum;
- equal complete parallel sets beginning at 1/0 when no individual conductor through 750 kcmil can satisfy the required ampacity and voltage-drop constraints; and
- a finite embedded OCPD and parallel-set range.

Automatic sizing never selects an individual copper or aluminum conductor larger than 750 kcmil. Where no supported single-conductor result through 750 kcmil satisfies both ampacity and voltage-drop constraints, RVParkCalc evaluates equal complete parallel sets rather than a larger individual conductor. Each set uses the same conductor size, material, insulation basis, and modeled length, and raceway installations use separate identical raceways.

When the embedded checks treat a modeled path as eligible for next-standard planning, the engine permits the immediate next higher standard OCPD only where the conductor ampacity falls between standard ratings and the selected OCPD is 800A or less. Above 800A, the total adjusted conductor ampacity must equal or exceed the OCPD; the next-standard allowance is not applied. The OCPD receives ↑, and an Applied Calculation Note records the exact use. This automated boundary does not determine whether every field condition satisfies 240.4(B), parallel-conductor, equipment-terminal, or installation requirements.

These inputs do not establish the final applicable ampacity table, termination rating, insulation rating, equipment listing, rooftop or earth-temperature condition, bundling, neutral current classification, more-than-three-current-carrying-conductor count, dwelling/service allowance, tap rule, or every special installation condition. Review Articles 110, 215, 225, 230, 240, 250, 300, and 310 as applicable.

14.6 Wiring-method and raceway planning

RVParkCalc planning behavior - individual conductors in raceway: the engine provides an approximate fill result for PVC Schedule 40, PVC Schedule 80, EMT, IMC, or GRC / steel RMC using separate embedded raceway-area data. Copper or aluminum is selected independently as the conductor material. RV-site distribution retains a full-size neutral and one copper wire EGC per raceway; selecting a metal raceway does not remove the modeled wire EGC. Parallel sets are modeled as complete sets in separate identical raceways.

A blank direct-pedestal or radial-run downstream wiring method, conductor metal, or raceway inherits the selected panel override and then the project default. One radial run uses the same planned conductor, neutral, EGC, and wiring-method arrangement through every segment.

RVParkCalc planning behavior - full-neutral aluminum MHF: the downstream MHF method models a Southwire-style four-conductor assembly containing two aluminum ungrounded conductors, a full-size aluminum neutral, and an insulated aluminum EGC. It is strictly a complete 120/240V single-phase feeder method. It is not accepted for a 208Y/120V or other three-phase circuit, a single-pole branch circuit, or a reduced-neutral cable construction. RVParkCalc uses the 75 degC basis only:

Full-neutral MHF cable makeup	75 degC cable ampacity	Conservative automatic common OCPD
Two #2 Al phase + #2 Al neutral + #4 Al EGC	90A	One set at 90A; #2 is not paralleled.
Two 2/0 Al phase + 2/0 Al neutral + #1 Al EGC	135A	One/two/three identical complete sets at 125A/250A/400A.
Two 4/0 Al phase + 4/0 Al neutral + 2/0 Al EGC	180A	One/two/three identical complete sets at 175A/350A/500A.

The ordinary parallel-conductor minimum is 1/0, so #2 MHF cannot be paralleled. Parallel 2/0 or 4/0 MHF requires complete identical sets with equal length, material, size, insulation, and termination characteristics. Every included EGC is checked against the **total** common OCPD, not the OCPD divided by the number of sets. The automatic table stops at three sets, and a parallel result fails closed until **Parallel MHF spacing basis** is explicitly set to **Maintained spacing confirmed**. With that saved input, CCC adjustment is applied within each separated complete cable instead of treating separately spaced cables as one bundle. Preserve the confirmed spacing for the complete route and verify ampacity correction/adjustment, burial conditions, cable markings, equipment space, terminal ratings, fault current, manufacturer instructions, adopted code, and AHJ acceptance.

RVParkCalc planning behavior - Aluminum URD to first OCPD only: ordinary triplex is L1/L2/neutral and ordinary quadruplex is A/B/C/neutral. Neither construction includes an EGC, so these are not downstream feeder or branch choices. RVParkCalc permits them only as a separate utility/source-to-first-OCPD description. At the first service OCPD, the app still calculates the general Table 250.66 copper service GEC and Table 250.102(C)(1) wire-type main bonding jumper. "URD" is a trade description, not proof of an NEC wiring type; verify exact AA-8000/premises suitability, RHH/RHW-2/USE-2 or other markings, permitted transitions, burial/physical protection, conductor identification, aluminum-rated terminals/splices, the actual electrode system and connection topology, electrode-specific allowances, and all utility/AHJ requirements.

RVParkCalc planning behavior - unspecified legacy cable: the former **Other listed cable** choice is not a supported calculation method and is unavailable for new work. If an older project contains that value, RVParkCalc retains it only so the record can be corrected. Calculation and PDF export remain blocked, and the engine returns no usable conductor size, parallel-set count, ampacity, neutral, EGC, voltage-drop, or raceway-fill result. Select individual conductors in an approved raceway or a compatible modeled-underground MHF assembly.

Treat all wiring-method output as preliminary. For raceways, verify the selected conductor insulation, exact conductor dimensions, Chapter 9 notes and tables, nipple rules, grounding/bonding conductor count, spare conductors, communications separation, corrosion protection, parallel-set arrangement, pull limitations, burial, physical protection, fittings, and actual installed conditions.

14.7 Voltage drop

The Article 551 voltage-drop material identified in the local source record is informational. It warns that long RV-park circuits may require conductors larger than the ampacity minimum and that serial-segment drops are added using the load and demand factor for the downstream sites served by each segment.

The familiar 3 percent farthest-outlet and 5 percent total feeder-plus-branch values are efficiency guidance, not automatic mandatory limits imposed by Article 551.

RVParkCalc planning behavior: version 1.0.0 jointly optimizes all supported downstream conductors that are physically in series, including transformer primary feeders, modeled remote transformer-secondary segments, panel feeders, terminal branches, direct-fed pedestal supplies, and uniform continuing-radial runs. The selected combination minimizes installed conductor area while holding each terminal branch or cumulative radial route to 3 percent or less and every complete modeled downstream path to 5 percent or less. There is no fixed 2-percent target for each downstream feeder. The

utility/source-to-first-OCPD service segment is evaluated separately and is excluded from this joint downstream path, as is transformer internal regulation.

Voltage drop is calculated from actual modeled load-current magnitudes and phase/neutral phasors. The 125-percent continuous and motor factors, selected-transformer full-load current, and OCPD sizing factors remain applicable to ampacity and protection but are not substituted for the physical voltage-drop current. If the model cannot resolve a power-factor or transformer-side phase relationship, it uses the conservative fallback. Candidate conductors must also satisfy the ampacity, full-neutral, EGC, correction/adjustment, fill, wiring-method, and topology constraints described in this guide. Individual copper and aluminum conductors stop at 750 kcmil; permitted equal parallel sets are evaluated after that point.

For individual copper or aluminum conductors in a supported raceway, the app uses embedded 75 degC, 60 Hz AC resistance and reactance values matched to the selected raceway under the NEC Chapter 9, Table 9 basis. PVC Schedule 40 and Schedule 80 use the PVC/nonmagnetic columns. Steel EMT, IMC, and GRC / steel RMC use the magnetic-steel columns. The resolved basis is used for direct-fed pedestal supplies, radial segments, branches, panel feeders, transformer primary feeders, and service conductors installed in raceway. Because Table 9 does not publish a separate 700 kcmil impedance row, the automatic 700 kcmil option conservatively uses the published 600 kcmil value rather than interpolating a lower value. A supported steel raceway therefore does not create an Applied Calculation Note merely because it is ferrous. See NFPA LiNK, NFPA 70 (2026), Eaton's *Basics of Power System Design*, pp. 57-58, and SDG&E's voltage-drop equations and tables, pp. 74-76.

MHF and service-side URD remain different because they are cable assemblies rather than individual conductors in a modeled conduit geometry. The app retains their numerical planning calculation and pass/exceeds-target status, plus an Applied Calculation Note identifying the cable-geometry basis and the need to verify exact assembly construction, impedance data, and installed conditions. A parallel assembly additionally requires the explicit maintained-spacing confirmation described above; without it, conductor sizing fails closed. The voltage-drop method note alone is not an action item; an actual target exceedance, unconfirmed parallel spacing, or another unresolved result is.

A direct-fed pedestal distance is the one-way panel-to-pedestal length of its one common supply. A radial segment distance is one-way from the preceding point. The engine calculates each radial segment's phase and neutral drop from the downstream demanded physical-current phasors, accumulates those drops phase by phase, and selects one uniform conductor arrangement for the entire run as part of the global downstream optimization.

The application does not taper radial-run conductors. This avoids implying that a reduced downstream conductor is protected merely because the calculated downstream load is smaller. Any field conductor transition, tap, intermediate OCPD, disconnect, feed-through lug, splice, or terminal arrangement requires separate adopted-code, equipment-listing, manufacturer, and AHJ review.

The combined schedule adds a physical panel feeder, when one exists, and the applicable branch for ordinary downstream paths. A combined-service single panel or an MDP-direct branch begins at its local source OCPD and therefore contains only the branch segment. Large-mode paths add the transformer primary feeder, the remote field secondary segment only when selected, the protected panel feeder, and the applicable branch. Integral-secondary mode does not invent a field secondary drop. Radial destinations use cumulative run drop through that pedestal. Source-to-first-OCPD service conductors and transformer internal regulation are explicitly excluded. Review the reported included/excluded basis before using the 5 percent comparison.

14.8 Park Equipment and Other Loads

The Article 551 RV-site demand table applies to the RV-site load, not to park buildings, lighting, laundry, pools, pumps, EV charging, and other amenities. Those loads are calculated separately under their applicable rules and added when supplied from the common source.

Park Equipment implements limited current-based motor, continuous, and noncontinuous planning using **Sizing current (A)**. Every motor row must identify the applicable NEC current basis and enter the actual motor OCPD. Other Loads use **Calculated (VA)**, are assumed to already include every applicable calculation adjustment, and are added at 100 percent. In both schedules, one row represents one actual physical branch; there is no Branch Count multiplier. Add separate rows for additional branches. The category name alone does not apply a code rule.

Entered voltage must correspond to the actual serving system. Nonmatching voltages and direct low-voltage loads on the Large-mode 480Y/277V MDP require an externally modeled transformer/distribution path or documented independent review.

14.9 Transformers

Large mode records park-owned transformer topology, phase, distance, and downstream demand; enforces three-phase-to-208Y/120V and single-phase-to-120/240V pairings; calculates minimum kVA from total demand and the most-loaded phase/winding; selects the next embedded catalog kVA; sizes the primary feeder and explicitly reports its EGC; and calculates supported primary-only protection at 125 percent of the selected rating's primary full-load current. A single-phase 480V primary may use a manual A-B, B-C, or C-A pair or deterministic **Auto balance**. Auto considers fixed MDP loads and manual transformer pairs, resolves the largest automatic loads first, and reports its selected pair without replacing the saved automatic setting. The selected first-secondary-main OCPD is the conservative next standard rating at or above rated secondary current and remains within the transformer-table maximum. Integral mode reports that no field secondary conductor segment is modeled. Remote mode is limited to one first secondary main more than 0 ft and not over 25 ft away, selects 240.21(C)(2) through 10 ft or 240.21(C)(6) above 10 ft, tags and sizes the phase conductors and full neutral without 240.4(B), includes one copper supply-side bonding jumper per raceway, and calculates raceway fill and voltage drop. The copper SDS GEC and system bonding jumper use the actual remote conductor arrangement or the integral full-rating basis. Panel-feeder source OCPDs are located at the selected integral or remote secondary distribution, panel-feeder EGCs remain in the feeder schedule, and the coordinated results appear throughout Results, one-line, and PDF. Set the upstream primary phase or phase pair in the transformer schedule, because the panel Source phase field is informational/disabled. Verify the actual SDS electrode system, connection and bonding topology, electrode-specific allowances, conductor routing/protection, material compatibility, actual product availability, impedance, fault current, inrush/trip compatibility, harmonics, losses, temperature rise, ventilation, enclosure, placement, working clearances, and manufacturer instructions. An unassigned transformer, a calculated minimum above the embedded catalog range, an unresolved primary or secondary conductor result, an out-of-range remote-main distance, or any other secondary tap/OCPD topology remains an action item.

15. Action items, limitations, and project verification

Automated action items are a floor, not a conclusion

RVParkCalc can flag only conditions represented by its inputs and embedded rules. No-action-item output means the represented load, ampacity, topology, and voltage-drop checks found no exception. Applied Calculation Notes identify successfully used assumptions and rule boundaries; neither status replaces project-specific code, utility, listing, or manufacturer verification.

Known version 1.0.0 calculation boundaries

The following remain incomplete, preliminary, or outside the automated boundary:

- automatic determination of 2026 NEC errata/TIA incorporation, jurisdictional adoption, and local amendments;
- a documented special-load basis for 15A-only tent sites;
- exact neutral-current reporting for every unbalanced and nonlinear condition;
- power-factor, harmonic, nonlinear-load, and unbalanced three-phase equipment modeling;
- closed-ring, double-ended, meshed, or arbitrary branching RV-site distribution networks;
- tapered radial-run conductors, conductor transitions, feeder-tap approval, intermediate overcurrent protection, or pedestal feed-through-lug design;
- automatic combination of every service, panel-feeder, site-run, and pedestal-internal drop into a final field source-to-outlet value;
- transformer product selection beyond the embedded catalog kVA sequence, impedance/inrush/fault-duty selection, alternate secondary tap/OCPD arrangements, losses, and grounding/bonding design beyond the displayed primary-feeder EGC, general-table copper SDS GEC, system bonding jumper, and secondary-source-OCPD topology;

- grounding-electrode-system selection and topology, electrode-specific GEC allowances, connection-point selection, conductor routing/protection, material compatibility, and field installation details;
- service and separately derived system bonding details beyond the displayed wire-type main/system bonding-jumper result;
- fault-current and interrupting-rating calculations;
- selective coordination and protective-device settings;
- complete Article 430 motor design;
- complete special-equipment and building-load workflows;
- final conductor, terminal, parallel-set, OCPD, wiring-method, cable-marking, and raceway verification; and
- field layout, overhead/underground installation, environmental rating, and equipment-access checks.

Data-entry limits

The application includes safety limits on panels, transformers, direct-fed pedestals, one or two sites per direct-fed pedestal, radial runs and segments, one or two sites per radial pedestal segment, total sites/units, distance, parallel sets, and OCPD range. An action item or **Review required** sizing result at one of those limits requires corrected input or a different documented calculation method; it is not permission to ignore the load.

Project handoff

A professional reviewer should receive:

- the saved `.rvp` project;
- the exported PDF;
- the adopted-code and local-amendment record;
- the utility service requirements;
- manufacturer data and equipment schedules;
- independent hand calculations;
- site plan and routing distances;
- fault-current and protection information; and
- a list of every open action item and every applied assumption that matters to the handoff.

16. Help and calculation sources

Open **Help > Assumptions and Notes** or press **F1**. The in-app reference is organized into:

- General;
- RV Sites;
- Distribution;
- Park Equipment;
- Project Modes; and
- Legal.

Open **Help > Calculation Sources** for the edition reference map and source-status notice. **Help > About RVParkCalc** shows the application version. The Help menu also provides the available license-information, activation, and deactivation commands and links to Southern Electrical Solutions.

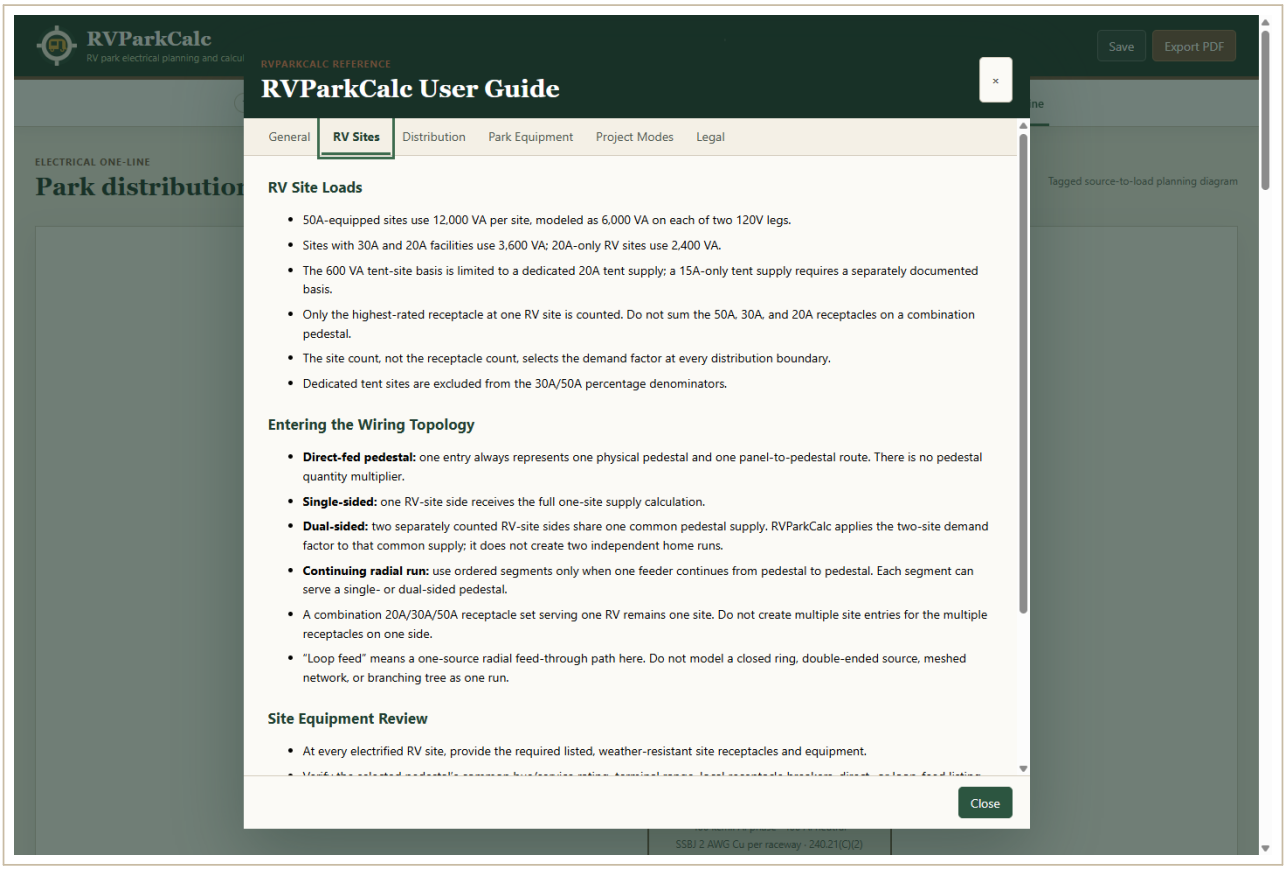


Figure 17. *Assumptions and Notes dialog with the RV Sites tab selected.*

Use the Help dialog as an application reminder, not as a substitute for the official adopted code or the detailed local engineering record.

17. Troubleshooting

The license will not activate

1. Confirm the computer is online and that its date, time, and time zone are correct.
2. Copy the complete license key from the Gumroad purchase receipt without adding spaces.
3. Confirm the key belongs to the RVParkCalc product and that the current license notice was accepted.
4. If Gumroad reports that the activation limit has been reached, remember that each purchase normally provides three activation uses unless the purchased quantity grants more. A new activation request can consume another use even on the same computer after its protected local record was removed; reinstallation and deactivation do not restore used activations.
5. If the original purchase timestamp is already 365 days old, repurchase another term and activate the new key. Reinstalling the application or removing its local data cannot renew an expired term.
6. A refunded, disputed, chargebacked, cancelled, or otherwise revoked purchase cannot be activated. Resolve an incorrect purchase status with Gumroad or Southern Electrical Solutions; do not attempt to alter the local license record.
7. RVParkCalc uses the Windows-aware Electron network stack for Gumroad, including Windows system proxy and enterprise certificate trust. If the app reports that Windows cannot validate the secure connection, try a trusted personal network or ask the network administrator to trust the organization's inspection certificate in Windows.
8. If the message identifies a proxy failure, ask the network administrator to allow HTTPS access to `api.gumroad.com`. Do not disable Windows certificate validation or TLS verification as a workaround.

The application requests online license validation

RVParkCalc normally revalidates an activated license at least once every 30 days. Reconnect to the internet and retry validation. Project calculations and reports are not uploaded during validation. If validation confirms that the term expired or the purchase was revoked, licensed access remains unavailable until a valid new purchase and key are activated.

The application was reinstalled, but the license date did not restart

This is expected. The 365-day term is measured from the original Gumroad purchase timestamp. Installation, activation, deactivation, device replacement, and removal of the encrypted local activation record do not change that timestamp or begin a new term.

A JavaScript error dialog appears

1. Record the complete error text or take a screenshot before closing it.
2. Close every RVParkCalc window. Wait for the process to exit before reopening.
3. Reopen the same installed shortcut or portable executable used previously; do not start multiple copies at once.
4. Do not update, reinstall, move, or replace application files while RVParkCalc is open.
5. If the error repeats with a blank project, restart Windows and retry once before contacting support.
6. If one `.rvp` file triggers the error, preserve a copy and test with a new blank project. Send the file, exact error, and reproduction steps to the maintainer; do not manually repair the only copy.

The application opens an unexpected recovered project

RVParkCalc found a locally autosaved dirty draft. Save it under a new `.rvp` name if it contains useful work. To begin again, use **File > New Project** and confirm the discard prompt.

Single Distribution Panel mode cannot be selected

The project contains more than one panel. Delete the extra panels after preserving any required site, equipment, and load data, or continue in **Multi-Panel Park** mode.

The project changes to 480Y/277V

Large MDP & Transformer Park uses a 480Y/277V MDP by design. Set each transformer secondary and downstream panel to its intended 120/240V or 208Y/120V system. Choose a different mode if the project has no park-owned 480V distribution boundary.

RVParkCalc enforces three-phase transformers with 208Y/120V secondaries and single-phase transformers with 120/240V secondaries. For a single-phase transformer, select a manual 480V primary pair or **Auto balance**. Auto reports the currently resolved A-B, B-C, or C-A pair while leaving the saved setting automatic; recalculate and recheck the resolved pair after changing loads. The panel Source phase record is not the controlling input.

The calculated transformer size seems higher than total downstream kVA

This can be correct when one secondary phase or one 120/240V winding leg is loaded more heavily than the others. Open Results and compare **Calculated minimum kVA**, **Selected catalog kVA**, and the stated governing basis. Rebalance movable loads or reassign panels only when that matches the physical design; do not reduce the selected size merely because the total kVA is lower than the phase/winding equivalent. The next catalog step may also be noticeably larger than the calculated minimum.

A site, equipment, or load row is missing from Results

Check that:

- every direct-fed pedestal contains one or two valid site-side entries;
- every radial run has at least one ordered segment and every segment contains one or two site entries;
- no unresolved legacy grouped row remains;
- the RV site type is valid;
- Park Equipment **Sizing current (A)** is greater than zero;
- every motor row identifies its NEC motor current basis and has a valid entered Actual OCPD;
- Other Load **Calculated (VA)** is greater than zero; and
- the row is assigned to the intended panel or MDP Direct scope.

The Calculation Status panel normally explains ignored or truncated rows as action items.

A conductor result says Review required

The load, selected conditions, or correction/adjustment exceeded the embedded conductor/OCPD/parallel-set range, or a valid arrangement was not found. Do not substitute the last listed size. Perform and document an independent engineered calculation.

An MHF or service-side URD result shows an applied note

This is expected for a resolved single-cable result: the app records the supported method, topology boundary, and cable-geometry voltage-drop basis without turning that informational note into an action item. For downstream MHF, confirm a complete 120/240V single-phase feeder on a modeled underground route, one of the supported full-neutral constructions, the included insulated aluminum EGC, the 75 degC basis, and the exact route markings, transition, termination, splice, impedance, spacing, and burial conditions. A parallel MHF or URD result is different: it remains blocked until the applicable saved spacing field explicitly confirms maintained spacing. For a permitted parallel result, confirm identical complete sets, preserve that spacing for the complete route, verify the adjustment basis, and check every MHF EGC against the total OCPD. For ordinary source-side URD, confirm it ends at the first OCPD, verify exact assembly impedance/spacing data, and do not infer an EGC on that segment. Review the separately displayed copper service GEC and wire-type main bonding jumper, then verify the actual electrode system, connection/bonding topology, electrode-specific allowances, and field installation. A legacy unspecified-cable selection remains blocked because RVParkCalc cannot establish the unknown assembly's conductor roles, ampacity, EGC, neutral, resistance, or installation permissions.

Voltage drop is higher than expected

Confirm voltage, phase assignment, conductor material, terminal rating, ambient range, current-carrying-conductor assumptions, and the applicable one-way distance. For a direct-fed pedestal, verify that the distance is its one panel-to-pedestal supply path and that the single-/dual-sided site count is correct. For a radial run, confirm segment order and that every distance is from the previous point rather than cumulative from the panel. Review each segment's downstream site count, demanded physical phase/neutral current, segment drop, and cumulative drop. The run OCPD and ampacity basis come from the source-segment load; one uniform run conductor then participates in the global downstream optimization and must satisfy both the 3-percent cumulative radial target and every applicable 5-percent complete path.

The PDF does not export

- Confirm the project calculates without a fatal input error.
- Choose a writable local folder and a filename ending in `.pdf`.
- Close an existing PDF with the same name if another application has locked it.
- Avoid a network or synchronized folder until a local export succeeds.
- Confirm enough disk space is available.

An older project reports migration messages

The application converted a prior schema. Completed repairs-such as generated identifiers, removed obsolete manual ratings, conservative neutral conversion, or expansion of a former Branch Count-appear as collapsed **Applied Calculation Notes** because the app has already completed them. Conditions that still need correction, involve omitted/truncated data, or leave an ambiguous physical topology remain amber action items. A schema-1 or schema-2 site row with quantity greater than one remains unresolved because its saved distance cannot identify separate home runs versus a continuing radial route; calculation and PDF export remain blocked until you split a true home-run group into individual pedestals or rebuild the physical route as an ordered radial run. Correct every migration action, review the import notes, save the result to a new file, and compare calculations with the prior report before replacing the original.

Text or controls appear clipped

Use **View > Reset Zoom**, maximize the window, and verify Windows display scaling. RVParkCalc requires a minimum practical window size; very high scaling may reduce the visible table area.

18. Quick-reference checklists

Before calculation

- [ ] Confirm jurisdiction, adopted NEC edition, amendments, and utility basis.
- [ ] Select the correct default RV-site status: new or existing.
- [ ] For mixed existing and new work, verify every explicit site-status override and confirm that each 50A subgroup passes independently.
- [ ] Select the correct project mode and system.
- [ ] Define every panel, source, transformer, feeder distance, and override.
- [ ] In Large mode, verify each transformer's manual or Auto-resolved primary pair, calculated minimum, governing phase/winding, selected catalog kVA, primary OCPD, primary-feeder EGC, integral full-rating or actual remote-secondary basis, copper SDS GEC, applicable supply-side/system bonding jumpers, and served-panel assignment.
- [ ] Enter one RV site for every electrified RV location.
- [ ] Use only the highest-rated receptacle basis per site.
- [ ] Resolve every migrated legacy group before calculating.
- [ ] Add one direct-fed record per physical pedestal, select single- or dual-sided, and confirm its one panel-to-pedestal distance.
- [ ] Enter radial segments from the panel outward, using one-way distance from the previous point and one or two site entries per pedestal.
- [ ] Confirm that "loop feed" means a one-source radial path, not a closed or double-ended ring.
- [ ] Select the actual wiring method separately from the route environment and conductor metal.
- [ ] For raceway work, confirm PVC Schedule 40, PVC Schedule 80, EMT, IMC, or GRC / steel RMC and verify the complete wet-location, corrosion, grounding/bonding, and fill basis.
- [ ] For downstream MHF, confirm a compatible complete 120/240V single-phase feeder, full-size neutral, included insulated aluminum EGC, supported 75 degC configuration, exact product markings, transitions, terminals, and burial/raceway basis.
- [ ] If MHF is paralleled, use only 2/0 or 4/0 identical complete sets, stop at the automatic three-set limit, verify maintained spacing/adjustment, and check every included EGC against the total OCPD.
- [ ] For ordinary triplex/quadruplex URD, use the **Aluminum URD to first OCPD only** source-side method, confirm that no EGC is shown on that segment, review the separately calculated copper service GEC and wire-type main bonding jumper at the first service OCPD, and verify utility rules, terminals, markings, burial, electrode topology, and field bonding details. If **Utility-defined / not calculated** is selected instead, confirm that conductors, grounded conductor, raceway, voltage drop, GEC, and bonding jumper all remain not calculated.
- [ ] Enter Park Equipment **Sizing current (A)** from a documented basis; for every motor, select the applicable motor-current basis and enter the actual motor OCPD.
- [ ] Confirm every equipment/load voltage matches its actual serving system and use the appropriate modeled transformer/distribution path where required.
- [ ] Enter Other Loads **Calculated (VA)** only after their applicable external calculation.
- [ ] Record unresolved assumptions in Project Notes or row notes.

Before report export

- [ ] Save the `.rvp` project.

- [ ] Calculate and resolve every action item; expand Applied Calculation Notes when verifying the basis behind an automatic result.
- [ ] Verify site-equipment percentage counts and upward rounding.
- [ ] Verify panel, transformer, and service loading independently; reconcile each calculated service GEC/main bonding jumper and transformer primary EGC/SDS GEC/system bonding jumper with the actual grounding and bonding topology. Confirm utility-defined service values remain explicitly not calculated.
- [ ] Verify phase assignments and neutral treatment.
- [ ] Verify each direct-pedestal common supply and each radial segment's downstream demand, source OCPD, uniform conductor/neutral/EGC/wiring-method basis, and cumulative voltage-drop result.
- [ ] Reconcile feeder tags between Results and One-Line.
- [ ] Confirm project metadata and calculation basis.
- [ ] Export and visually inspect the complete PDF.
- [ ] Mark the document status and final project-verification responsibility.

Keyboard shortcuts

Shortcut	Command
Ctrl+N	New Project
Ctrl+O	Open
Ctrl+S	Save
Ctrl+Shift+S	Save As
Ctrl+P	Export PDF Report
F1	Assumptions and Notes

19. Source record

The local engineering references supporting this guide are:

Internal engineering records maintained with the application source include the **RV Park Calculation Requirements** and **Article 551 Source Record**.

Primary NFPA materials identified in that record include:

- NFPA LiNK - NFPA 70 (2023)
- NFPA LiNK - NFPA 70 (2026)
- 2026 NEC Errata 70-26-1
- 2026 NEC Errata 70-26-2
- 2023 NEC CMP-7 first-draft report
- 2023 NEC CMP-7 second-draft statements
- 2023 NEC CMP-7 final second-draft ballot
- 2026 NEC CMP-7 final first-draft ballot
- 2026 NEC CMP-7 final second-draft ballot
- 2026 NEC CMP-7 second-draft report
- 2023 NEC CMP-6 parallel-conductor meeting record

- 2026 NEC CMP-5 preliminary second-revision record for EGCs in parallel cables
- 2023 NEC CMP-5 second-draft material reproducing Table 250.66 and the separately derived system GEC rule
- 2026 NEC CMP-5 preliminary first-draft material reproducing Table 250.102(C)(1)
- Schneider Electric - transformer kVA sizing from maximum load phase current
- Eaton - current low-voltage dry-type distribution transformer catalog
- Eaton - 480V-primary, 120/240V-secondary single-phase transformer example
- Schneider Electric - standard transformer kVA ratings
- 2023 NEC CMP-9 transformer-protection public-input record
- 2026 NEC CMP-9 transformer-protection preliminary second-revision record

The cable-construction record uses Southwire's official aluminum MHF product page, SPEC 10054 technical sheet, 600V UD triplex page, and 600V UD quadruplex page. These examples establish the modeled conductor roles; they do not approve a brand or substitute for exact product, installation, utility, adopted-code, and AHJ review.

The 2026 edition of NFPA 70 is published. Development records explain how provisions changed but do not replace the current official text; for project reliance, also check NFPA LiNK or a licensed copy, published errata and TIAs, jurisdictional adoption, and local amendments.

Document control

Item	Value
Product	RVParkCalc
Product version	1.0.0
Guide version	1.0.0
Guide date	July 2026
Project-file extension	`.rvp`
Publisher	Southern Electrical Solutions