Single Panel Marina Calculation Report

Harbor Point Marina - Sample Project | 125 Harbor Point Drive, Coastal City, FL 33767

Project Information

Field	Project Value	Field	Project Value
Project	Harbor Point Marina - Sample Project	Report Version	2.1.3
Address	125 Harbor Point Drive, Coastal City, FL 33767	Code Basis	2026 NEC
Prepared For	Harbor Point Marina	Prepared By	Southern Electrical Solutions
Marina Basis	New marina / new slips	Generated	7/20/2026
Mode	Single Panel Marina	Sub-Meters	All entered pedestal rows are sub-metered, but at least one counted same-slip lift contribution is not confirmed through that meter; no facility-level 0.90 multiplier applied
Article 555 Feeder Classification	Not used for the 2026 basis - entered docking-facility feeders and branch circuits are screened directly	Classification Scope	2026 feeder/branch docking-supply screen
Calculation Boundary	Calculation boundary begins at the single landside panel feeding marina pedestal circuits.	Report Status	Planning calculation aid - project-specific verification required

This report is an informational planning calculation aid, not a sealed design or permit-ready document. Independently confirm the project-specific inputs, adopted code and local amendments, utility and manufacturer requirements, equipment ratings and listings, fault-current conditions, grounding and bonding, and field conditions before procurement, construction, or energizing.

Single Panel Marina Calculation Report (continued)

Harbor Point Marina - Sample Project | 125 Harbor Point Drive, Coastal City, FL 33767

Calculation Summary

Total Demand
94.80 kVA

Demand Current
405.50 A
120/240V

Main Breaker
450/2P

Shore Receptacles
9

Shore Demand Factor
80%

Other Marina Loads
0.00 kVA
Added at 100%

Boat Lift Motor Demand
10.20 kVA

Phase Imbalance
2520 VA

System Basis

Basis	Reported Value
Panel	Main Dock Panel | 120/240V
Source Connection	Service conductors to service equipment
Main / Service-Entrance Conductors	450/2P; 2 x 4/0 AWG (paralleled) Copper; no load-side EGC; GEC 1/0 AWG Copper; main bonding jumper 1/0 AWG Copper; VD 1.32%
Raceway / Grounding Basis	Sch80-THWN-2; 2 identical raceways; service conductors ahead of the first service OCPD, with no load-side EGC; GEC and main bonding jumper reported separately
Demand Basis	Table 120.120; All entered pedestal rows are sub-metered, but at least one counted same-slip lift contribution is not confirmed through that meter; no facility-level 0.90 multiplier applied; 100.00% facility shore-load multiplier

Main Dock Panel Calculation

Single Panel Marina

Calculated Demand
94.80 kVA

Demand Current
405.50 A
120/240V

Panel Main
450/2P

Shore Receptacles
9

Other Loads
0.00 kVA
Added at 100%

Service Grounding
GEC 1/0 AWG Copper
No load-side EGC; main bonding jumper 1/0 AWG Copper

Main / Service-Entrance Conductors: 450/2P; 2 x 4/0 AWG (paralleled) Copper; no load-side EGC; GEC 1/0 AWG Copper; main bonding jumper 1/0 AWG Copper; VD 1.32%

Pedestal Circuit Inputs

Circuit	Pedestal Side 1	Pedestal Side 2	Installation	Material	Distance
Ckt 1-3	30A + 20A GFCI	30A + 20A GFCI	Sch40-THWN-2	Copper	60 ft
Ckt 3-5	50A + 20A GFCI	50A + 20A GFCI	Sch40-THWN-2	Copper	90 ft
Ckt 5-7	50A + 30A	50A + 30A	G-Cable	Copper	125 ft
Ckt 7-9	100A + 50A	50A + 30A + 20A GFCI	Sch80-THWN-2	Aluminum	170 ft

Main Dock Panel Calculation (continued)

Single Panel Marina

Panel Schedule

Circuit	VA A	VA B	Breaker	VD	Distance	Wire	Material	EGC	Conduit
Ckt 1-3	2880	6480	70/2P	2.07%	60 ft	6 AWG	Copper	8	3/4"
Ckt 3-5	12180	12180	110/2P	1.49%	90 ft	2 AWG	Copper	6	1 1/4"
Ckt 5-7	12000	12000	100/2P	2.21%	125 ft	2 AWG ↑	Copper	2 x 7 Cu + 8 Cu ground check per cable	N/A (G-Cable)
Ckt 7-9	24180	24000	225/2P	2.71%	170 ft	250 kcmil	Aluminum	4	2 1/2"
Ckt 2-4	5100	5100	50/2P	1.94%	70 ft	8 AWG	Copper	10	3/4"
Ckt 6	180	0	20/1P	0.35%	70 ft	12 AWG	Copper	12	1/2"

↑ Conductor upsized above minimum ampacity size.

NEC Table 120.120 Note 2: the 0.90 multiplier was not applied because a same-slip boat-lift contribution governed the load without confirmation that the complete lift circuit is measured by the individual slip submeter.

Circuit Ckt 5-7: copper Type G cable values use Southwire SPEC 44140, 3/C Type G-GC ampacity and impedance data. Aluminum Type G is not supported. Confirm the exact listed cable, continuous-submersion suitability, installation method, manufacturer requirements, and that its grounding construction provides the wire-type insulated equipment grounding conductor required by NEC 555.37. ShorePowerCalc conservatively models that EGC as copper; 555.37 does not itself specify copper. This cable is not modeled as permanent building wiring.

Main Dock Panel Calculation (continued)

Single Panel Marina

Type G Cable Manufacturer Table Basis

Circuit	Construction	Manufacturer Table	Material	Integrated Grounding	Calculation Basis
Ckt 5-7	3/C Type G-GC	Southwire SPEC 44140	Copper only	2 x 7 Cu + 8 Cu ground check per cable; independently confirm exact cable construction satisfies the wire-type insulated EGC requirement in 555.37; copper is the ShorePowerCalc planning assumption	Manufacturer ampacity and impedance table

Type G results are copper-only and use the exact 3/C or 4/C manufacturer table shown above for ampacity, impedance, and integrated grounding-conductor data. Four-conductor Type G receives the exact 0.80 current-carrying-conductor adjustment. After correction and adjustment are applied to the 90 C manufacturer ampacity, the result is capped at the applicable 75 C equipment-termination ampacity. Independently confirm that the exact listed cable grounding construction provides the wire-type insulated EGC required by NEC 555.37. ShorePowerCalc conservatively models that EGC as copper; 555.37 does not itself specify copper.

Main Dock Panel Tagged Feeder Schedule

Tags correspond directly to the vertical one-line diagram

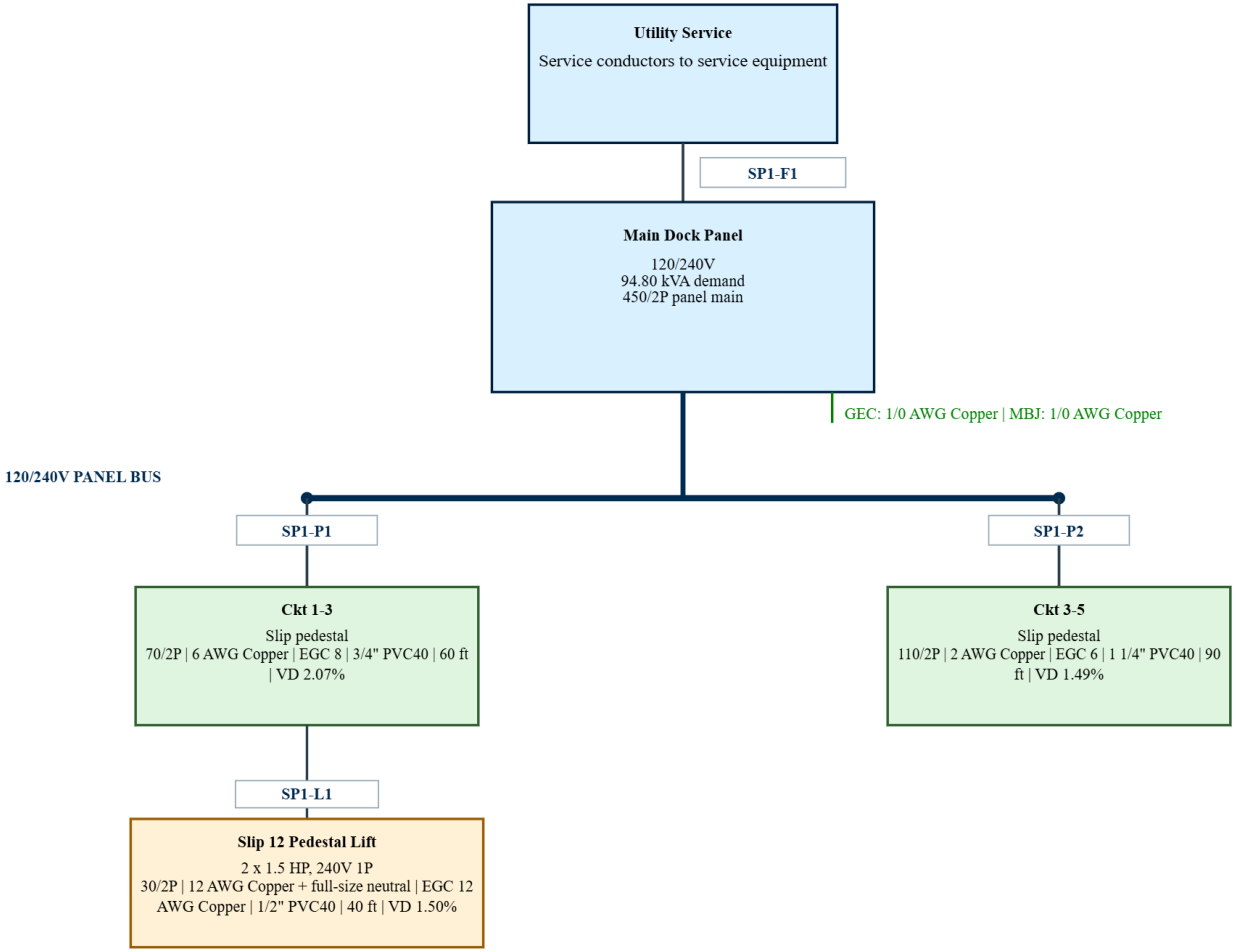
Tag	Destination	Breaker	Phase	Conductors	EGC	Conduit	Distance	VD
SP1-F1	Main Dock Panel	450/2P	A-B	2 x 4/0 AWG (paralleled) Copper	Not applicable - source side of first OCPD	2 x 2" PVC80	100 ft	1.32%
SP1-P1	Ckt 1-3	70/2P	A-B	6 AWG Copper	8	3/4" PVC40	60 ft	2.07%
SP1-P2	Ckt 3-5	110/2P	B-A	2 AWG Copper	6	1 1/4" PVC40	90 ft	1.49%
SP1-P3	Ckt 5-7	100/2P	A-B	2 AWG Copper ↑	2 x 7 Cu + 8 Cu ground check per cable	N/A G-Cable	125 ft	2.21%
SP1-P4	Ckt 7-9	225/2P	B-A	250 kcmil Aluminum	4	2 1/2" PVC80	170 ft	2.71%
SP1-L1	Ckt 1-3 - Slip 12 Pedestal Lift	30/2P	A-B	12 AWG Copper + full-size neutral	12 AWG Copper	1/2" PVC40	40 ft	1.50%
SP1-L2	Ckt 2-4 - Maintenance Dock Lift	50/2P	A-B	8 AWG Copper + full-size neutral	10 AWG Copper	3/4" PVC40	70 ft	1.94%
SP1-A2	Ckt 6 - Maintenance Dock Lift 20A Receptacles	20A/1P	A	12 AWG Copper	12 AWG Copper	1/2" PVC40	70 ft	0.35%

↑ Conductor upsized above minimum ampacity size.

Boat-lift breaker values are branch SC/GF protection planning values, not motor overload settings. Boat-lift EGCs use the valid entered actual branch SC/GF OCPD, or the reported maximum when unresolved, so the EGC can be larger than the controller-supply conductors. Boat-lift raceway fill includes a full-size neutral and one copper EGC in the selected PVC Schedule 40 or Schedule 80 raceway. Independently confirm the listed multi-motor controller and individual motor overload protection.

Main Dock Panel One-Line Diagram (1 of 3)

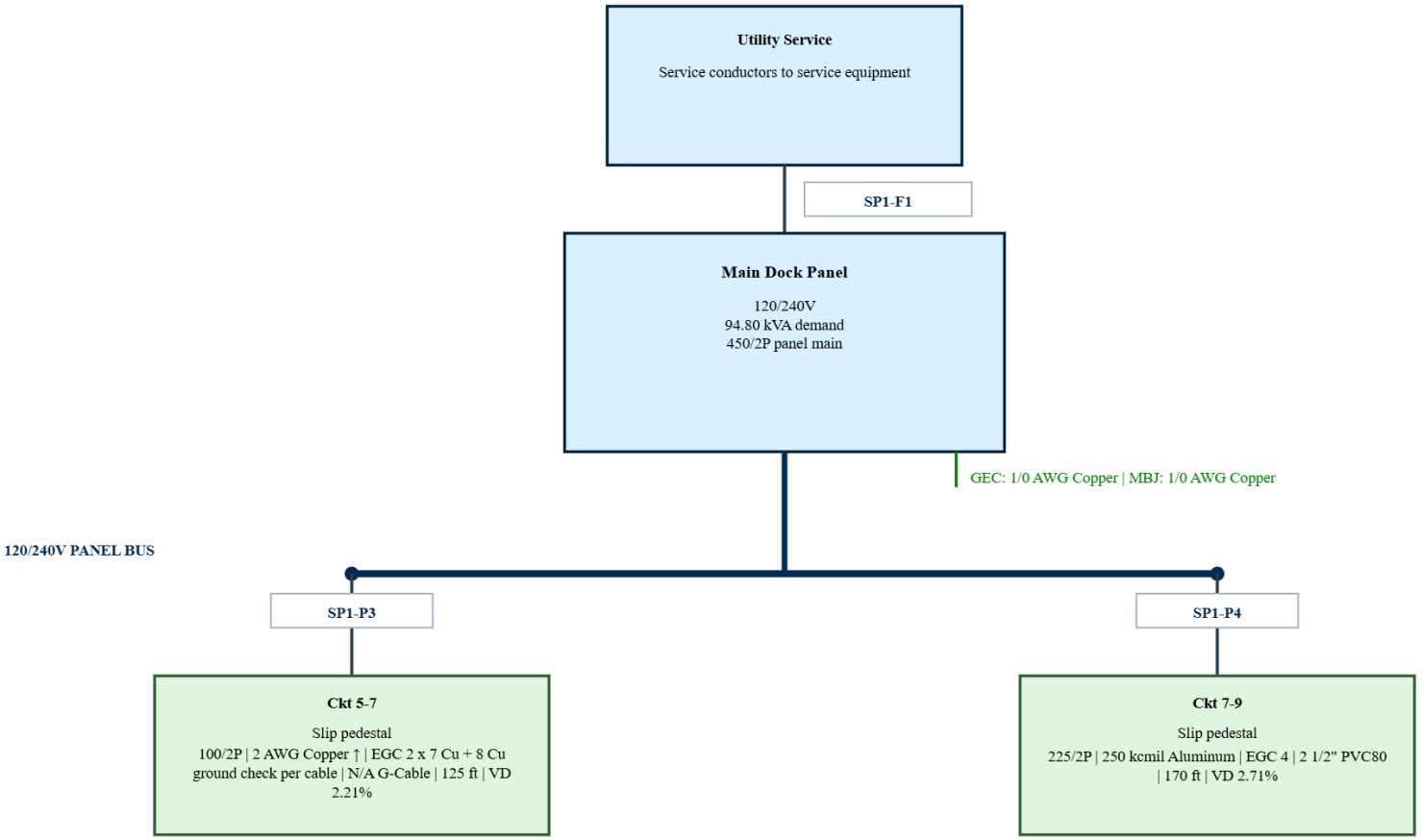
Vertical source-to-load hierarchy; feeder tags link to the tagged schedule | Source, equipment, feeder tags, conductor and protection details, and downstream load hierarchy



Vertical source-to-load hierarchy. Feeder tags link to the tagged feeder schedule; Other Load branch values are for planning and require equipment verification.
↑ Conductor upsized above minimum ampacity size.

Main Dock Panel One-Line Diagram (2 of 3)

Vertical source-to-load hierarchy; feeder tags link to the tagged schedule | Source, equipment, feeder tags, conductor and protection details, and downstream load hierarchy

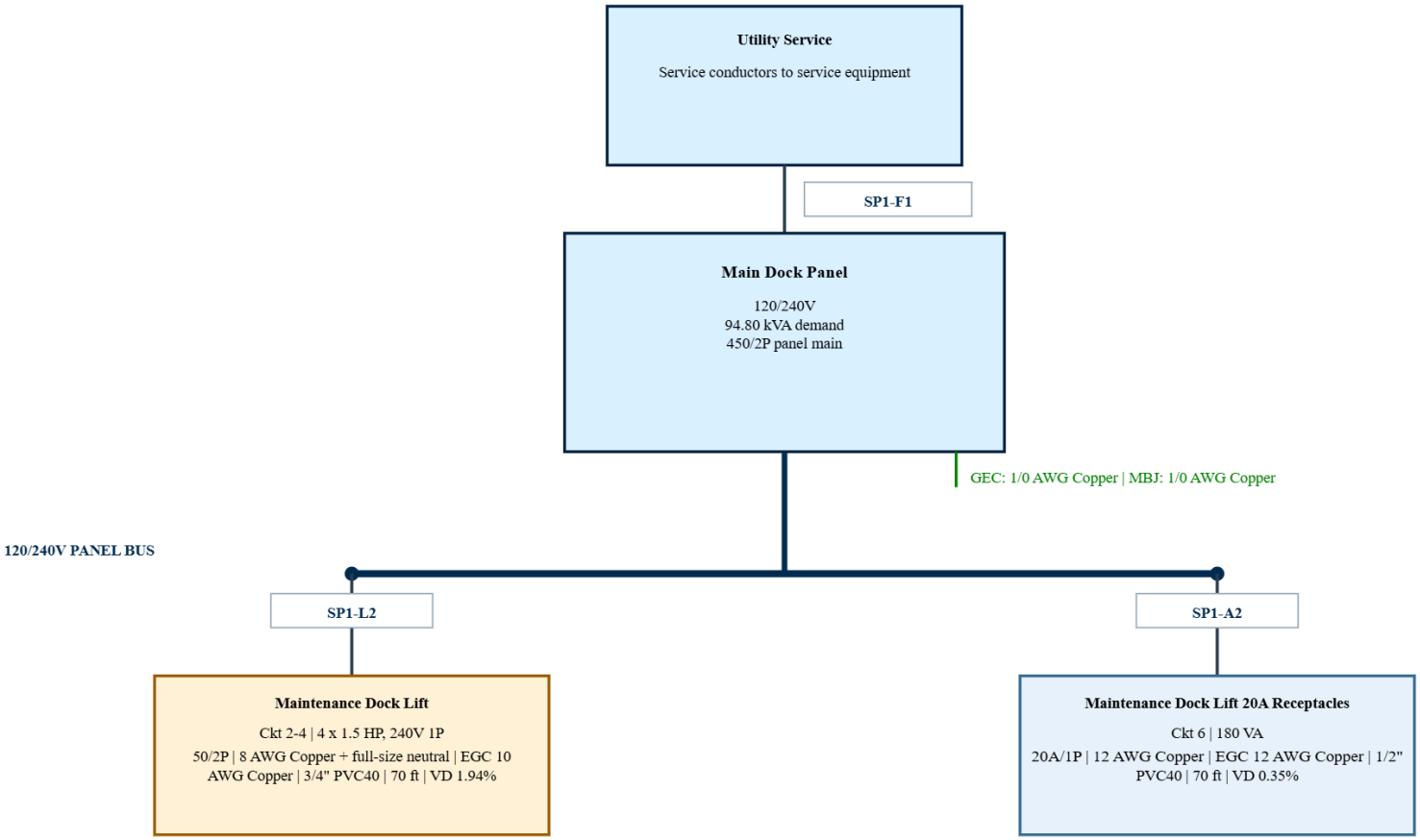


Vertical source-to-load hierarchy. Feeder tags link to the tagged feeder schedule; Other Load branch values are for planning and require equipment verification.

↑ Conductor upsized above minimum ampacity size.

Main Dock Panel One-Line Diagram (3 of 3)

Vertical source-to-load hierarchy; feeder tags link to the tagged schedule | Source, equipment, feeder tags, conductor and protection details, and downstream load hierarchy



Vertical source-to-load hierarchy. Feeder tags link to the tagged feeder schedule; Other Load branch values are for planning and require equipment verification.

↑ Conductor upsized above minimum ampacity size.

Main Dock Panel Boat Lift Schedule

Controller-supply planning values and motor load reconciliation

Tag	Location	Source / Circuit	Motor Load	Branch VA / A	Controller Supply / Neutral	Each Motor	Branch SC/GF OCPD / EGC	Raceway / Run / VD	Result
SP1-L1	Slip 12 Pedestal Lift	Pedestal Circuit / Ckt 1-3	2 x 1.5 HP, 240V 1P	5400 VA / 22.50 A	Controller supply: 12 AWG Copper; Neutral: 12 AWG Copper (full-size)	Each motor: 12 AWG Copper minimum	30/2P / EGC 12 AWG Copper	PVC Schedule 40 1/2" / 40 ft / 1.50%	Boat Lift controls same-slip comparison. Motor overload protection remains unresolved; multi-motor group-controller listing and overloads are unresolved.
SP1-L2	Maintenance Dock Lift	Serving Panel Circuit / Ckt 2-4	4 x 1.5 HP, 240V 1P	10200 VA / 42.50 A	Controller supply: 8 AWG Copper; Neutral: 8 AWG Copper (full-size)	Each motor: 12 AWG Copper minimum	50/2P / EGC 10 AWG Copper	PVC Schedule 40 3/4" / 70 ft / 1.94%	Serving-panel branch included in documented simultaneous operating set. Motor overload protection remains unresolved; multi-motor group-controller listing and overloads are unresolved.

Main Dock Panel Boat Lift Schedule (continued)

Controller-supply planning values and motor load reconciliation

Boat Lift Operating-Set Summary

Connected Applicable Lifts 1	**430.26 Scenario Lifts** Not applied	**Calculation Scope** Single-panel source connection and panel feeder-conductor ampacity review	**All-Connected Motor Demand** 10.20 kVA
430.24 Scheduled Ampacity 409.50 A	**430.26 Scenario Ampacity** Not applied	**Local Method** All connected - NEC 430.24	**Permission Status** notDocumented

All connected applicable lifts are included; no local operating-set reduction is applied. Operating / duty evidence: Operating controls limit the two complete lifts to one at a time.. This evidence is supporting information, not AHJ permission or approval. NEC 430.26 is shown only as an alternate feeder-conductor ampacity scenario. The scheduled conductor and feeder OCPD retain the all-connected NEC 430.24 basis. This scenario does not reduce local panel or service demand, main OCPD, transformer kVA, individual controller branches, the all-connected NEC 430.62/430.63 motor-feeder OCPD review, the 2026 Design BE/CE five-second locked-rotor thermal screen, or upstream MDP demand.

Calculated demand remains 94.80 kVA on the all-connected basis, including applicable shore-power, boat-lift, accessory, and other marina loads.

Reported boat-lift OCPDs are branch short-circuit and ground-fault (SC/GF) protection planning values, not motor overload settings. Motor overload protection based on motor nameplate current, service factor or temperature rise, NEC 430.32, the listed controller, and manufacturer instructions remains outside this calculation scope. For multi-motor lifts, independently confirm that the controller is listed for the entered motor count and horsepower and that each motor has compliant overload protection.

Main Dock Panel Boat Lift Schedule (continued)

Controller-supply planning values and motor load reconciliation

The Motor Feeder OCPD schedule reports unresolved upstream coordination items. Boat-lift EGCs use the valid entered actual branch SC/GF OCPD, or the reported maximum when unresolved. Controller-supply and controller-to-motor conductor results are separate. Raceway fill includes a full-size neutral and one copper EGC. For applicable 2026 three-phase Design BE/CE planning cases, each Result cell reports the five-second locked-rotor thermal screen and whether it governs conductor size. Operational lift-diversity limits do not reduce that thermal screen. See Assumptions and Notes for the complete Article 430 basis.

Panel Main Motor Feeder OCPD Check: NEC 430.24 minimum feeder ampacity is 409.50 A. All 2 downstream lift-controller OCPDs were entered. The governing NEC 430.62 motor-only calculation is 70.00 A, with a 70A standard feeder OCPD ceiling. The governing entered branch OCPD is 30A for Slip 12 Pedestal Lift plus the other selected motor currents. With 347.00 A nonmotor load on governing Phase B, the NEC 430.63 preliminary breaker basis is 450A. Reported planning selection: 450/2P. The entered controller OCPDs were applied; equipment markings, conductor protection, and coordination must still be verified. NEC 430.24 feeder ampacity, 430.62 motor-only ceiling, and 430.63 mixed-load rating. Actual listed controller/equipment OCPDs, manufacturer instructions, conductor protection, selective coordination, and project-specific requirements govern.

Ckt 1-3 Motor Feeder OCPD Check: NEC 430.24 minimum feeder ampacity is 54.00 A. All 1 downstream lift-controller OCPDs were entered. The governing NEC 430.62 motor-only calculation is 30.00 A, with a 30A standard feeder OCPD ceiling. The governing entered branch OCPD is 30A for Slip 12 Pedestal Lift plus the other selected motor currents. With 31.50 A nonmotor load on governing Phase B, the NEC 430.63 preliminary breaker basis is 70A. Reported planning selection: 70/2P. The entered controller OCPDs were applied; equipment markings, conductor protection, and coordination must still be verified. NEC 430.24 feeder ampacity, 430.62 motor-only ceiling, and 430.63 mixed-load rating. Actual listed controller/equipment OCPDs, manufacturer instructions, conductor protection, selective coordination, and project-specific requirements govern.

Marina Protection and Article 555 Requirements

2026 NEC | Requirements triggered by the entered project scope

Project Protection and Demand Inputs

Item	Reported Value
Project default	Yes - new pedestal rows default to individually sub-metered
Entered pedestal scope	All entered pedestal rows are sub-metered, but at least one counted same-slip lift contribution is not confirmed through that meter; no facility-level 0.90 multiplier applied
Physical shore-power receptacles	12
Demand-table shore-power receptacles	9
Demand treatment	The 0.90 facility multiplier is applied only when every shore-powered pedestal in the calculation scope includes an individual kilowatt-hour submeter for each slip. Mixed scope receives no reduction.
Effective shore-load multiplier	100.00% facility shore-load multiplier
2023 feeder-location classification	Not used for the 2026 basis - entered docking-facility feeders and branch circuits are screened directly
Demand-table basis	Table 120.120; Table 120.120 Note 2

The project setting is a default for new pedestal rows. A row-level Yes/No selection overrides that default. If any applicable pedestal is unmetered, the facility-level 0.90 multiplier is not applied to that calculation scope.

Triggered Article 555 Protection Schedule

Protection Item	Entered Scope	Planning Requirement	Reference	Status
Docking feeders and branch circuits	Non-fire-pump feeders and branch circuits serving docking facilities and piers	Listed GFPE rated not more than 100 mA for the applicable non-fire-pump distribution. Coordinate permitted upstream and downstream protection; entered fire-pump circuits are reported separately under Article 695.	2026 NEC 555.35(A)	Required design provision; automatic device selection is outside this calculation scope

Marina Protection and Article 555 Requirements (continued)

2026 NEC | Requirements triggered by the entered project scope

Triggered Article 555 Protection Schedule (continued)

Protection Item	Entered Scope	Planning Requirement	Reference	Status
GFPE exceptions and monitoring	Entered docking-facility distribution	No short separately derived system secondary or ground-fault-monitoring-circuit exception is applied automatically. Entered fire-pump rows receive a separate Article 695 and adopted-edition treatment.	2026 NEC 555.35(A)	Default calculation basis keeps non-fire-pump protection required; unverified exceptions are not modeled
Shore-power receptacle GFPE	12 physical shore-power receptacle(s); 9 retained for demand	Provide listed GFPE rated not more than 30 mA for each shore-power receptacle.	2026 NEC 555.35(B)(1)	Required design provision; automatic device selection is outside this calculation scope
Shore-power disconnect	Each shore-power connection	Provide an identified, readily accessible disconnect ahead of and not more than 30 in. from the receptacle it controls.	2026 NEC 555.36	Required design provision; automatic device selection is outside this calculation scope
Required non-shore-power GFCI receptacle	12 physical shore-power receptacle(s); qualifying 120V convenience receptacle represented	Where shore power is installed to boats, install a 120V ac, 15A or 20A GFCI receptacle for other than shore power.	2026 NEC 555.33(B)	Entered scope includes a qualifying receptacle; confirm location, marking, listing, and final circuit
Other-than-shore-power outlet GFCI	Entered accessory receptacle outlets	Provide GFCI protection for personnel for single-phase outlets not over 150V to ground and 60A, and 3-phase outlets not over 150V to ground and 100A.	2026 NEC 555.35(B)(2)	Applies to the entered qualifying accessory outlets
Boat-lift GFCI	2 entered boat-lift outlet(s) at 240V or less	Provide GFCI protection for personnel for outlets supplying boat lifts at docking facilities.	2026 NEC 555.35(C)	Required design provision; automatic device selection is outside this calculation scope
Marina leakage-current measurement	12 physical shore-power receptacles	A listed marina leakage-current measurement device must be available and used for boats using shore power, unless the permitted shore-equipment leakage indicator/alarm exception applies.	2026 NEC 555.35(D)	Physical receptacle-count trigger; equipment selection and field use remain project-specific
GFPE coordination and performance testing	Installed marina protection system	Coordinate the GFPE system and have qualified persons performance-test it at initial installation by an approved method following manufacturer instructions. Retain a written test record and make it available to the authority having jurisdiction.	2026 NEC 555.35(E)	Field commissioning requirement; outside this calculation scope
Engineered pier-distribution design documentation	Entered marina or docking-facility distribution	Provide documentation of the engineered electrical design of the pier distribution system when requested by the authority having jurisdiction. ShorePowerCalc does not establish the one- and two-family dwelling exception.	2026 NEC 555.9	Project documentation requirement; exception eligibility remains unresolved
Emergency electrical disconnect	Each marina power outlet or enclosure providing shore power	Provide a listed wet-location emergency shutoff/electrical disconnect that is clearly marked, within sight, readily accessible, externally operable, manually resettable, and de-energizes all supplied circuits. A circuit-breaker handle by itself is not the emergency shutoff.	2026 NEC 555.36(C)	2026 NEC shore-power provision; device selection and location remain project-specific

Marina Protection and Article 555 Requirements (continued)

2026 NEC | Requirements triggered by the entered project scope

Triggered Article 555 Protection Schedule (continued)

Protection Item	Entered Scope	Planning Requirement	Reference	Status
Insulated equipment grounding conductor	Marina circuits on or serving docking facilities	Install a wire-type insulated equipment grounding conductor with the circuit conductors, sized per 250.122 and not smaller than 12 AWG. ShorePowerCalc models this conductor as copper as a conservative software assumption; 555.37 does not itself specify copper.	2026 NEC 555.37	Type G cable rows remain unresolved until the exact listed cable grounding construction is verified
Bonding of marina metal parts	Non-current-carrying metal parts likely to become energized	Connect applicable parts to the branch-circuit or feeder equipment grounding conductor or to the panelboard grounding bus. A separate bonding conductor is not required to be larger than 8 AWG copper; make bonding connections in accordance with 250.8.	2026 NEC 555.13	2026 field-condition requirement; outside this calculation scope
Equipotential plane	Conditional: outdoor service/disconnect equipment operating over 250V to ground and within 10 ft of in/on-water equipment	Where all 555.14 trigger conditions are present, provide the required equipotential plane extending at least 36 in. from the equipment and bond it with solid copper not smaller than 8 AWG using the permitted construction and connection methods.	2026 NEC 555.14	Conditional field-layout requirement; field location must be classified

GFPE performance testing must be completed at initial installation by qualified persons using an approved method that follows manufacturer instructions. Retain the written test record and make it available to the authority having jurisdiction (AHJ).

This schedule reports requirements triggered by entered scope. ShorePowerCalc does not select or list GFPE/GFCI devices, establish settings or selective coordination, independently confirm disconnect locations, inspect bonding or equipotential-plane conditions, perform commissioning tests, or certify field performance.

Source-to-Load Voltage-Drop Paths

Combined calculated conductor segments to each reported destination

Cumulative Voltage-Drop Schedule

Scope	Destination	Calculated Conductor Segments	Combined VD	Status
Main Dock Panel	Main Dock Panel	Source-to-panel conductors: 1.32%	1.32%	Calculated - within the 5% feeder-plus-branch recommendation
Main Dock Panel	Ckt 1-3 pedestal feeder	Source-to-panel conductors: 1.32%; Main Dock Panel branch Ckt 1-3: 2.07%	3.39%	Calculated - within the 5% feeder-plus-branch recommendation
Main Dock Panel	Ckt 3-5 pedestal feeder	Source-to-panel conductors: 1.32%; Main Dock Panel branch Ckt 3-5: 1.49%	2.81%	Calculated - within the 5% feeder-plus-branch recommendation
Main Dock Panel	Ckt 5-7 pedestal feeder	Source-to-panel conductors: 1.32%; Main Dock Panel branch Ckt 5-7: 2.21%	3.53%	Calculated - within the 5% feeder-plus-branch recommendation
Main Dock Panel	Ckt 7-9 pedestal feeder	Source-to-panel conductors: 1.32%; Main Dock Panel branch Ckt 7-9: 2.71%	4.03%	Calculated - within the 5% feeder-plus-branch recommendation
Main Dock Panel	Ckt 2-4 - Maintenance Dock Lift	Source-to-panel conductors: 1.32%; Main Dock Panel branch Ckt 2-4: 1.94%	3.26%	Calculated - within the 5% feeder-plus-branch recommendation
Main Dock Panel	Ckt 6 - Maintenance Dock Lift 20A Receptacles	Source-to-panel conductors: 1.32%; Main Dock Panel branch Ckt 6: 0.35%	1.67%	Calculated - within the 5% feeder-plus-branch recommendation
Main Dock Panel	Slip 12 Pedestal Lift controller	Source-to-panel conductors: 1.32%; Main Dock Panel branch Ckt 1-3 to selected pedestal: 2.07%; Slip 12 Pedestal Lift controller branch: 1.50%	4.89%	Calculated - within the 5% feeder-plus-branch recommendation

Voltage-drop results use NEC Chapter 9 Table 9, 75 C AC resistance and reactance values for conductors in PVC/nonmagnetic raceway. Type G results use the selected manufacturer impedance table. Because load power factor and phase angles are not entered, the calculation uses impedance magnitude as a conservative unknown-power-factor AC estimate; it is not a power-factor-specific phasor solution and does not model metallic-raceway impedance. Unbalanced 3-phase results are conservative magnitude screens rather than full phasor solutions. The 5% combined feeder-plus-branch value is an informational recommendation, not a universal mandatory rule. Paths through a transformer remain partial because transformer internal impedance and regulation are not modeled.

Assumptions, Notes, and Limitations

These pages are part of the calculation report and must remain with the schedules and one-lines

ShorePowerCalc is provided "as is" as an informational planning and calculation aid only. It does not exercise engineering judgment and does not create sealed, permit-ready, or construction-ready documents. Calculations depend on user-entered information, selected assumptions, embedded tables, and selected NEC code-basis labels and may contain errors, omissions, or inaccuracies. Outputs are estimates and do not establish compliance with the adopted NEC edition, local amendments, utility requirements, manufacturer instructions, project specifications, or site-specific conditions. Before permitting, procurement, construction, installation, or energizing, the responsible project parties must independently confirm the project inputs, calculations, assumptions, equipment data, grounding and bonding, GFCI/GFPE requirements, construction documents, and final installation against the project-specific governing requirements. Use of this tool is at your own risk, and Southern Electrical Solutions assumes no liability for damages, injuries, losses, rejected permits, rework, non-compliance, or unsafe installations arising from use of or reliance on the tool.

Conductor, Cable, and Source Grounding Basis

PVC raceway conductors are modeled as wet-location-rated THWN-2. Ambient-temperature and current-carrying-conductor corrections are applied to the 90 C insulation ampacity, and the corrected result is capped at the applicable 75 C equipment-termination ampacity. The final allowable ampacity is the lesser value; 90 C ampacity is never used as the final termination ampacity. Every modeled conductor endpoint is required to have terminals listed and identified for 75 C conductors; a 60 C-only termination is outside the supported calculation scope.

Type G cable is modeled as copper only using the manufacturer table selected by circuit construction: Southwire SPEC 44140, 3/C Type G-GC, or Southwire SPEC 44122, 4/C Type G. The matching table supplies 75 C and 90 C ampacity, impedance, and integral grounding-conductor data. Four-conductor Type G is treated as four current-carrying conductors and receives the exact 0.80 current-carrying-conductor adjustment. After correction and adjustment are applied to the 90 C manufacturer ampacity, every Type G result is capped at the applicable 75 C equipment-termination ampacity. Type G is not evaluated with the generic THWN-2 ampacity table. Independently confirm that the exact listed cable grounding construction provides the wire-type insulated equipment grounding conductor required by NEC 555.37. ShorePowerCalc conservatively models that EGC as copper; 555.37 does not itself specify copper, and the manufacturer grounding entry alone does not close field verification.

PVC raceway fill uses NEC Chapter 9 raceway and conductor areas, a full-size neutral where applicable, and the normal 40% fill limit. Load-side feeder and branch raceways include one insulated copper EGC per raceway. A service-source path reports the service grounded-conductor bond, grounding electrode conductor, and main bonding jumper at the service disconnect; the supply side of that disconnect is not modeled with a load-side EGC. A feeder-source path keeps the grounded conductor isolated at downstream equipment, includes a load-side EGC, and does not use a main bonding jumper there. A separately derived system uses its system bonding jumper and grounding electrode conductor at the permitted derived-system bonding point, plus the applicable supply-side bonding jumper or equipment grounding path; it is not identified as a main bonding jumper. Every parallel set is modeled in its own identical raceway.

Voltage-drop results use NEC Chapter 9 Table 9, 75 C AC resistance and reactance values for conductors in PVC/nonmagnetic raceway. Type G results use the selected manufacturer impedance table. Because load power factor and phase angles are not entered, the calculation uses impedance magnitude as a conservative unknown-power-factor AC estimate; it is not a power-factor-specific phasor solution and does not model metallic-raceway impedance. Unbalanced 3-phase results are conservative magnitude screens rather than full phasor solutions. The 5% combined feeder-plus-branch value is an informational recommendation, not a universal mandatory rule. Paths through a transformer remain partial because transformer internal impedance and regulation are not modeled.

General and Single Panel Assumptions

- Outputs are only as accurate as the information entered by the user. Independently confirm all receptacle quantities, voltages, distances, conductor materials, raceways, equipment ratings, environmental conditions, and field routing before relying on any result.
- Results are calculation aids only and are not a substitute for project-specific governing documents, utility coordination, manufacturer instructions, field confirmation, permitting documents, or inspection requirements.

Assumptions, Notes, and Limitations (continued)

These pages are part of the calculation report and must remain with the schedules and one-lines

- Software input default: standard 30A shore receptacles are modeled at 120V and standard 50A, 100A, and 200A shore receptacles are modeled at the selected line-to-line voltage. Custom receptacles must include an explicit voltage when that default does not match the installed device.

- Voltage-drop sizing uses NEC Chapter 9 Table 9, 75 C AC resistance and reactance values for conductors in PVC/nonmagnetic raceway; Type G uses the selected manufacturer impedance table. Because power factor and phase angles are not entered, the calculation uses impedance magnitude as a conservative unknown-power-factor AC estimate, not a power-factor-specific phasor solution. Metallic-raceway impedance is outside the supported model. The tool uses a 3% branch/feeder design target and reports combined calculated conductor segments; the 5% combined value is an informational recommendation, not a universal mandatory rule. Paths through a transformer remain partial because transformer impedance and regulation are not modeled.

- Neutral sizing: Ensure neutral conductor is sized per NEC 220.61, typically matching phase conductors for non-linear loads.

- Equipment grounding conductor: ShorePowerCalc conservatively models equipment grounding conductors as copper. The base copper EGC is selected from NEC Table 250.122 using the feeder or branch-circuit OCPD. For conventional marina wiring within Article 555 scope, NEC 555.37 requires a wire-type insulated EGC sized under 250.122 and not smaller than 12 AWG; 555.37 does not itself specify copper. Where phase conductors are increased beyond the corrected/adjusted ampacity minimum, the EGC is increased proportionately under the selected edition's NEC 250.122 provisions and is capped at the largest ungrounded conductor in that raceway without reducing the 12 AWG marina floor. In schedules and one-lines, the up-arrow symbol identifies a phase conductor or EGC that was increased above its minimum ampacity size.

- The selected upstream connection controls the source-conductor rule. Service conductors are checked against NEC 230.42, feeders include load-side grounding and isolated-neutral requirements, and transformer-secondary conductors require a user-selected supported NEC 240.21(C) rule, primary voltage, primary OCPD, and distance within that rule. THWN-2 correction starts from the 90 C insulation ampacity and is capped at the required 75 C listed/identified equipment terminations. Voltage drop is calculated when distance is provided using a 2% source-segment planning target.

- Ambient-temperature correction uses the 90 C factors in NEC Table 310.15(B)(1)(1) for THWN-2 insulation. Current-carrying-conductor adjustment is also applied where required. The corrected and adjusted result is never permitted to exceed the applicable 75 C equipment-termination ampacity.

- General feeder, service, pedestal distribution, Other Load, and local boat-lift controller and motor calculations are limited to equipment terminals listed and identified for 75 C conductors. A result is outside this calculator's supported scope if either end of a modeled conductor does not have an applicable 75 C termination rating. The 90 C conductor value is used only as the NEC starting point for correction and adjustment; it is never used as the final termination ampacity.

- For 4-wire, 3-phase wye distribution raceways, the neutral is conservatively counted as a current-carrying conductor because marina loads are treated as predominantly nonlinear. Four current-carrying conductors therefore receive the 80% adjustment factor from NEC Table 310.15(C)(1). A single-phase neutral carrying only imbalance is not counted. Independently confirm the actual load characteristics and conductor grouping for the project.

- For nonmotor general circuits, the small-conductor overcurrent limits in NEC 240.4(D) are enforced in addition to 75 C ampacity: 12 AWG aluminum is limited to 15A, 12 AWG copper to 20A, 10 AWG aluminum to 25A, and 10 AWG copper to 30A. Article 430 motor-circuit exceptions are evaluated separately.

- For an OCPD rated over 800A, the corrected and adjusted conductor ampacity is never selected below the OCPD rating. The next-size allowance for devices rated 800A or less is not applied above 800A.

- Installation type determines the supported conductor construction, ampacity and impedance data, grounding construction, and raceway-fill treatment. Independently confirm the exact cable or raceway listing and installation conditions.

- Type G cable is modeled as copper only. Single-phase 1P3W circuits use the listed 3/C Type G-GC construction in Southwire SPEC 44140; 3-phase 3P4W circuits use the listed 4/C Type G construction in Southwire SPEC 44122. Manufacturer 75 C and 90 C ampacity, impedance, and integral grounding-conductor data are used. Four-conductor Type G is conservatively treated as four current-carrying conductors and receives the exact 0.80 adjustment. Aluminum Type G is not supported. Parallel designs use complete identical cable assemblies, not loose individual conductors.

- For PVC Schedule 40 and Schedule 80 raceways with wet-location-rated THWN-2 conductors, wire sizes are limited to 12 AWG through 500 kcmil; paralleling uses the smallest conductor size that meets the ampacity with the minimal number of conductors when exceeding 500 kcmil.

- For high loads exceeding single wire ampacity, paralleled conductors are recommended using the smallest size that allows the least number of conductors.

Assumptions, Notes, and Limitations (continued)

These pages are part of the calculation report and must remain with the schedules and one-lines

- Parallel conductors must comply with NEC 310.10(G), including the general 1/0 AWG minimum and identical length, material, circular-mil area, insulation, and termination method. Each raceway is assumed to contain the same number of conductors and the same electrical characteristics, with all circuit conductors and one EGC grouped as a complete set.
- For PVC Schedule 40 and Schedule 80 THWN-2 installations, the smallest wire size used is 12 AWG.
- For supported copper Type G cable installations, the smallest listed size in the modeled manufacturer table is 8 AWG.
- The explicit 20A GFCI accessory option is treated as an accessory/convenience receptacle and is not included in the shore-power receptacle count; its load is modeled at 180 VA (1.5 A x 120 V) and added at 100% demand. Adding the letters GFCI to a 30A-or-larger custom shore receptacle does not convert it to an accessory load.
- The tool assumes that pedestals have individual branch circuit breakers for each receptacle, so the circuits shown are feeders sized from the selected-edition marina demand calculation rather than the sum of all receptacle ratings.
- To loop multiple pedestals on a single feeder, enter the same circuit ID for each pedestal row. Provide the distance from the supply panel to the first pedestal, then list the span between each subsequent pedestal (unless explicitly labeled as a total run); the tool sums these spans, surfaces conflicts, and reports the feeder length in the loop notes.
- Looped pedestal circuits are identified on the one-line diagram by the count shown below each pedestal symbol; confirm each looped segment length and conductor size in the field.
- Each side of a pedestal is considered an individual slip when applying the selected-edition NEC marina demand table.
- The Individual Sub-Meters project setting is the default for new pedestal rows. Each row can inherit that default or override it with Yes or No. The permitted 0.90 facility multiplier is applied only when every shore-powered pedestal in the calculation scope includes an individual kilowatt-hour submeter for each slip. Mixed metered and unmetered scope receives no reduction.
- When a same-slip boat lift governs the automatic Note 3 comparison, the facility multiplier is applied to that lift-governed value only when the pedestal row is individually sub-metered and "Sub-meter covers complete lift circuit" is selected. Select it only when the same individual kWh meter measures the shore-power receptacle and the complete same-slip lift-controller circuit. Otherwise the calculation scope does not qualify for the facility multiplier.
- Demand-table Note 1 exclusions affect the demand calculation and retained demand-table count only. They do not erase a physically installed shore-power receptacle from Article 555 protection schedules or from the physical count used by 555.35(D).
- Under Note 1 of the selected-edition NEC marina demand table, a slip with exactly two shore-power receptacles of different voltages includes only the receptacle with the higher kVA rating. This is applied per pedestal side.
- For balancing, 120V loads (accessory and non-accessory) on side 1 are assigned starting with phase A and on side 2 starting with phase B when identical layouts are used.

Boat Lift Load Assumptions

- Boat lift motor FLC values use NEC Table 430.248 for single-phase motors and Table 430.250 for three-phase motors. The optional entered FLC can only increase the applicable table value; a lower entry is rejected, the table value is retained, and a warning is reported. Motor combinations without a supported table value fail closed rather than accepting an unrestricted nameplate substitute. Every motor on each selected complete lift is included at 100%, with one 25% largest-motor adder at each calculated feeder level.
- Motor-voltage choices follow the selected serving equipment. A 120/240V single-phase source offers 115/120V and 230/240V single-phase motors; a 120/208V source offers only the compatible 115/120V and 208V choices for its phase configuration; and a direct 480/277V MDP circuit offers 460/480V three-phase motors. Unusual motor ratings require a compatible source plus separately verified nameplate and manufacturer data.

Assumptions, Notes, and Limitations (continued)

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- Boat lift controller-supply conductors are sized for 125% of the highest-rated motor plus the full-load current of the other motors under NEC 430.24. These local branch results default to wet-location-rated copper THWN-2 and do not inherit the pedestal or panel feeder material. Ambient and conductor-count correction starts from the 90 C THWN-2 insulation ampacity and is capped at the assumed 75 C controller and motor equipment terminations. Each local lift branch occupies its own selected PVC Schedule 40 or Schedule 80 raceway. Raceway fill includes the controller-supply phase conductors, one full-size neutral matching the controller-supply conductor, and one copper EGC. The full-size neutral is conservatively counted as current carrying: a 1-phase controller run has three current-carrying conductors, while a 3-phase controller run has four and receives the applicable NEC 310.15(C)(1) adjustment. Separate controller-to-motor conductor results are sized at 125% of one motor FLC under NEC 430.22 and are shown independently from the controller supply. For the 2026 NEC basis, three-phase motors over 2 HP and under 125 HP are conservatively treated as Design BE/CE with full-voltage starting unless a reduced-current starting method is separately verified. Individual motor conductors receive the five-second locked-rotor thermal screen in 430.22(H); controller-supply and applicable upstream conductors receive the corresponding 430.24 Exception No. 4 screen using all applicable connected motor locked-rotor currents. A local Maximum Simultaneous Lifts entry is used only for the separately labeled NEC 430.26 feeder-conductor ampacity scenario and does not reduce the thermal-start screen or any scheduled result. Voltage drop applies only to the entered source-to-controller run. The reported maximum inverse-time circuit breaker is based on NEC 430.52 and, for multiple motors, 430.53(C)(4), assuming a listed group motor controller. The Actual OCPD input also assumes an inverse-time circuit breaker; fuses, instantaneous-trip devices, and other protection types require project-specific verification. A valid actual controller/equipment OCPD entered by the user replaces that calculated maximum in the branch and feeder review. Equipment markings and manufacturer instructions always govern. The copper EGC is sized from the entered actual OCPD when valid, otherwise from the reported maximum, using NEC Table 250.122.

- The default and scheduled feeder-conductor result uses the all-connected Article 430.24 motor-feeder ampacity calculation. When the user explicitly selects an NEC 430.26 planning scenario, the Motor Feeder OCPD Review separately reports the hypothetical reduced feeder-conductor ampacity that would require AHJ permission; it does not replace or reduce the scheduled conductor or feeder OCPD. Dedicated boat-lift branch breaker schedules show amperage and pole count; an asterisk identifies a reported maximum because a valid actual listed controller/equipment OCPD was not entered. The review applies NEC 430.62 and 430.63 only to feeders with valid downstream motor branches and applies each valid user-entered actual lift-controller OCPD. A missing or invalid controller OCPD does not establish a code-defined lower feeder OCPD; the review instead reports the Article 430.24 feeder-conductor ampacity, a load-based preliminary feeder selection, and the 430.62/430.63 maximum-controller boundary until every listed controller OCPD is entered. Equipment markings, conductor protection, selective coordination, manufacturer instructions, the adopted code, and project-specific requirements govern the final feeder breaker.

- Where a boat lift and shore power serve the same slip, the tool compares both calculated loads and uses the larger load under Note 3 of the selected-edition NEC marina demand table. The lift is still modeled with its own appropriately protected branch from the pedestal.

- A Pedestal Circuit automatically uses the larger lift or shore-power load for that slip under Note 3 of the applicable marina demand table. If the pedestal has no qualifying shore-power receptacle, the complete lift motor load is included on the selected pedestal feeder.

- The Extra 20A Recs field is only for accessory receptacles not already entered in the selected pedestal layout. These loads remain additional. The tool warns when a pedestal layout and lift row both contain accessory receptacles so possible duplicate entry can be reviewed.

- A Serving Panel Circuit is assigned its own panel circuit number and does not require a pedestal selection. Extra 20A receptacles on that row are assigned a separate 20A branch circuit and are not combined with the motor branch.

- Lift motor loads outside the automatic same-slip comparison do not receive the shore-power receptacle demand factor. All motors on one lift are treated as operating together, and one governing 25% largest-motor adder is applied at each calculated feeder level. The NEC does not provide a standard boat-lift diversity percentage. A panel or substation Maximum Simultaneous Lifts entry is used only to calculate a separate NEC 430.26 feeder-conductor ampacity planning scenario between complete lifts. It requires a documented maximum-load and duty basis plus AHJ permission; the basis note is supporting evidence and is not approval.

- An NEC 430.26 planning scenario does not reduce local panel or substation demand, service or main OCPD, transformer auto-sizing, upstream MDP demand, any individual controller branch, the scheduled all-connected NEC 430.24 feeder-conductor result, the all-connected NEC 430.62/430.63 OCPD review, or the 2026 five-second locked-rotor thermal-start screen. The report preserves the scheduled 430.24 ampacity and labels the alternate 430.26 feeder-conductor ampacity and user-reported permission status separately.

Assumptions, Notes, and Limitations (continued)

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- The marina-wide MDP default includes every connected applicable lift. A reduced upstream MDP planning scenario must explicitly select Documented Noncoincident Operating Set and provide a lower whole-lift maximum, evidence type, traceable reference, evidence date, preparer, operating-condition basis, and user attestation. Saved legacy limits and free-text notes alone are ignored. The scenario is reported under 2023 NEC 220.60 or 2026 NEC 120.6 and 555.6(C) and changes only upstream MDP feeder/service calculated demand; it does not reduce downstream panels or substations, transformer sizing, controller branches, motor-feeder OCPD, thermal-start checks, or Article 555 protection.
- Reported boat-lift branch OCPDs are short-circuit and ground-fault protection planning values, not motor overload settings. Individual motor overload protection and the listing/approval of a multi-motor controller remain unresolved until verified from the actual equipment and manufacturer data.

Ground-Fault Protection (NEC Article 555.35)

Before material purchase, independently confirm the adopted NEC edition, local amendments, utility requirements, listed equipment instructions, and project-specific Article 555 and load-calculation requirements.

- For the 2026 NEC basis, where shore power is installed to boats, the planning review also reports the 555.33(B) requirement for a 120V ac, 15A or 20A GFCI receptacle for other than shore power. The entered project must represent or separately document that receptacle.
- The Article 555 Protection Schedule maps protection requirements from the selected NEC edition and the entered load location and connection type. An Other Load left as Unspecified is reported as unresolved rather than being silently treated as a docking load.
- For the 2023 NEC basis, the Project tab requires a project-wide physical-route classification. Feeders reported as installed on docking facilities are scheduled with listed GFPE not exceeding 100 mA; Unknown is reported as unresolved, while No feeder on a docking facility records that the feeder-location trigger was not applied and still requires route verification. For the 2026 NEC basis, feeders and branch circuits supplying docking facilities or piers are scheduled with listed GFPE not exceeding 100 mA. Permitted exceptions are not assumed automatically.
- Each entered shore-power receptacle is scheduled with listed GFPE not exceeding 30 mA. Qualifying other-than-shore-power receptacle outlets are scheduled for personnel GFCI, and outlets supplying boat lifts at docking facilities are scheduled for personnel GFCI when the outlet does not exceed 240V.
- Projects with more than three physically installed shore-power receptacles are scheduled for the required listed marina leakage-current measurement capability unless a permitted code exception is established. Note 1 demand exclusions do not reduce this physical trigger count.
- For the 2026 basis, qualifying receptacle and hardwired outlets are screened under 555.35(B)(2). Docking-facility fire pumps receive the applicable monitoring/alarm treatment without automatic disconnection above 100 mA, while 2023 fire-pump treatment remains unresolved. Floating-building VA is included at 100%, but branch OCPD, conductors, EGC, raceway, and voltage drop remain unresolved for the separate 555.53 analysis.
- The 2026 basis reports GFPE coordination and performance testing at initial installation by qualified persons using an approved method that follows manufacturer instructions. A written test record must be retained and made available to the authority having jurisdiction.
- Article 555.13 bonding is edition-specific. The 2023 basis reports applicable metal parts in contact with water, metal piping, and non-current-carrying metal parts likely to become energized that are not connected to a branch-circuit or feeder EGC; connection to the panelboard grounding bus uses solid copper not smaller than 8 AWG. The 2026 basis narrows the scope to non-current-carrying metal parts likely to become energized and permits connection to the branch-circuit or feeder EGC or panelboard grounding bus using a bonding conductor not required to be larger than 8 AWG copper. Connections are made under 250.8.
- The app reports applicable requirements and unresolved classifications; it does not select a product, establish settings, prove selective coordination, place devices, or perform field testing. Independently confirm the adopted edition, local amendments, listed equipment instructions, accessibility, and project conditions before relying on the schedule.

Assumptions, Notes, and Limitations (continued)

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- All outputs are estimates and calculation aids; final project documents, equipment selections, and installations remain subject to the project-specific governing requirements and responsible parties.
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- In the event of any conflict between this tool and official NEC or local codes, the official sources prevail.
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