

BAHAMAS AGRICULTURAL & INDUSTRIAL CORPORATION

DETAILED ELECTRICAL UPGRADE

SCOPE OF WORKS

ANDROS PACKING HOUSE

North Andros, The Bahamas

Document	Details
Client	Bahamas Agricultural & Industrial Corporation (BAIC)
Purpose	Tender / contractor pricing and execution
Basis	Electrical Assessment Report dated April 14, 2026 and issued single-line diagram
Issue	Draft for Tender Development
Date	September 2026

IMPORTANT: The Contractor shall verify all dimensions, ratings, routes, quantities, available fault levels and utility requirements before procurement or construction.

Document Control

Revision	Date	Status	Prepared for
0	September 2026	Draft for Tender Development	BAIC / Ministry of Finance

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1. Purpose and Project Intent

This SOW defines the works required to upgrade the Andros Packing House electrical infrastructure, correct weather-related deterioration and earthing/protection deficiencies, and establish sufficient, compatible capacity for current operations and proposed refrigerated/cold-chain loads.

The completed installation shall provide a safe, maintainable and expandable electrical distribution system suitable for present packing-house operations and the proposed Cold Chain Project, including refrigerated containers, storage coolers, HVAC and other future loads. The scope includes design verification, utility coordination, supply, installation, testing, commissioning, documentation and warranty.

1.1 Contracting Strategy

This is a performance-based electrical upgrade scope. The Contractor shall deliver a complete operational system, including incidental components reasonably necessary for code compliance and reliable operation, whether or not every fitting is individually listed. Any conflict between site conditions, the assessment report and the single-line diagram shall be raised through a written Request for Information before affected work proceeds.

1.2 Definitions

Term	Meaning
Authority	BAIC and its authorized representatives.
Contractor	Licensed electrical contractor responsible for the complete works.
BPL	Bahamas Power and Light or the serving utility.
Engineer	Authority-appointed electrical engineer.
SOW	This Scope of Works and its appendices.
Existing	Installed equipment to be verified in the field; not a guarantee of serviceability.

2. Basis, Existing Conditions and Design Criteria

2.1 Reference Documents

- BAIC Andros & Nassau Packing House Electrical Assessment Report, submission date April 14, 2026.
- BAIC - Single Line Diagram, titled "BAIC Soldier Road Warehouse Electrical Single Line - Solar & Freezers," where applicable to Nassau.
- Latest approved architectural, structural, equipment and utility information issued during tender or construction.

2.2 Recorded Existing Conditions

- Two separately supplied electrical groups were reported: an overhead BPL supply from a pole with three pole-mounted transformers feeding three buildings, and an underground supply from a second pole feeding the onion house and a nearby building.
- Each reported service is rated approximately 200 A at 240 V; actual voltage, phase, conductor size, metering and transformer capacity require field/BPL verification.
- The packing-house switchgear was reported fairly new and in good condition, while exterior switchgear at the onion washing building shows weather-related deterioration.
- The assessment states that present supply capacity is insufficient for existing and future loads and that proposed refrigerated reefers may require 480 V.
- Five buildings share the facility; roof damage/patch repairs, exterior building damage, no air conditioning and uncontrolled site access may affect electrical equipment condition and siting.
- No emergency power was reported. Ground-mounted solar and a dedicated packing-building generator were identified as optional recommendations.

2.3 Mandatory Field Verification

- Trace, identify and label all incoming services, feeders, panels, loads and earthing conductors affected by the works.
- Record utility service voltage, phase, frequency, transformer nameplate data, service conductor sizes, metering arrangement, main ratings and available spare capacity.
- Perform a minimum seven-day load study at each affected service/main using a calibrated power-quality logger. Capture maximum demand, phase current, voltage, power factor, voltage unbalance and significant events.
- Complete insulation-resistance, continuity, polarity, phase-rotation and earth-electrode resistance tests before alteration. Record defects separately.
- Survey cable routes, penetrations, working clearances, environmental exposure, corrosion, roof/wall condition and equipment access.
- Verify refrigeration, cooler, HVAC and future equipment nameplates and starting characteristics. Obtain manufacturer MCA/MOCP data before final breaker and feeder selection.

2.4 Design Criteria

Criterion	Requirement
System capacity	Size from verified load schedule and demand calculation with at least 25% usable spare capacity at new distribution equipment unless the Engineer approves otherwise.
Voltage	Maintain existing utilization voltages where retained; provide a correctly engineered 277/480 V, 3-phase source/distribution arrangement for reefer or other high-voltage loads where confirmed.
Voltage drop	Maximum 3% branch circuit and 5% total feeder plus branch circuit, or more stringent

Criterion	Requirement
	equipment-manufacturer limit.
Phase balance	Distribute single-phase loads to minimize unbalance; demonstrate final phase currents under representative load.
Environment	Outdoor or exposed equipment shall be weatherproof, corrosion resistant and rated for the installed location; use stainless hardware and suitable seals/glands.
Resilience	Coordinate future generator and renewable-energy interfaces without unsafe backfeed; install physical provisions only where shown or priced.
Maintainability	Provide clear access, permanent labels, typed panel schedules, spare ways and safe isolation points.

3. Contractor Responsibilities and Preconstruction Requirements

3.1 Site Investigation and Engineering

- Attend a mandatory site visit and coordinate access with BAIC.
- Retain a licensed professional electrical engineer to validate the final load calculation, protection scheme, transformer requirements, conductor sizing, fault duty, selective coordination and voltage-drop calculations.
- Submit a site-verified existing single-line diagram and proposed single-line diagram. The proposed diagram shall show normal supply, metering, mains, overcurrent devices, transformers, distribution panels, future provisions, earthing and any generator/solar interconnection points.
- Coordinate all service modifications, metering, transformer work, inspections and energization requirements with BPL and the applicable authorities. Include applications, drawings, fees and attendance unless identified as a provisional sum.
- Prepare an outage, temporary-power and switching plan. No shutdown shall occur without written approval.

3.2 Calculations and Studies

Submission	Minimum Content
Load schedule	Existing and proposed connected loads, demand factors, continuous loads, motor/reefer starting loads, spare capacity and service adequacy.
Short-circuit study	Utility/source assumptions, calculated fault current at each new board and confirmation that interrupting ratings are adequate.
Protection coordination	Time-current coordination for main, feeder, transformer and branch devices; settings

Submission	Minimum Content
	schedule for adjustable breakers.
Arc-flash review	Incident-energy assessment or approved equivalent, equipment labels and recommended PPE boundaries as required by adopted standards.
Earthing design	Electrode arrangement, conductor sizes, bonding details, target resistance and test method.
Voltage-drop study	Worst-case normal and starting voltage drop for refrigeration and other significant loads.

3.3 Submittal Hold Point

The Contractor shall not order main switchgear, transformers, service equipment, distribution panels or major feeders until the Engineer approves the site-verified design package. Approval does not relieve the Contractor of responsibility for correctness, coordination or code compliance.

4. Detailed Electrical Scope of Works

4.1 Existing Service Rationalization and Utility Coordination

- Verify both BPL service points, ownership boundaries, metering, pole-mounted transformer bank configurations, service capacities and the buildings served by each source.
- Develop and submit an approved service strategy: either retain two coordinated services with clearly segregated loads or consolidate/upgrade supplies where BPL and the load study demonstrate benefit. Do not interconnect two utility services except through specifically approved transfer/switching equipment.
- Coordinate any required BPL transformer, overhead service, underground service, meter or service-entrance modification. Replace undersized or deteriorated service conductors, supports, weatherheads, ducts and terminations within the Contractor/BAIC scope.
- Provide surge protection and safe lockable main isolation at each retained service.

4.2 Main Switchgear and Distribution Upgrade

- Retain the packing-house switchgear only if inspection, testing, ratings, fault-duty review and spare-capacity calculation confirm suitability. Clean, torque, test, relabel and modify it with approved manufacturer components.
- Replace the weather-deteriorated exterior onion-house switchgear with new weatherproof, corrosion-resistant service/distribution equipment on a raised pad or protected mounting arrangement. Provide sun/rain shielding only where code clearances and ventilation remain compliant.

- Provide new feeders and distribution panels necessary to separate buildings and major loads, eliminate unsafe taps/splices and provide individual overcurrent protection and isolation.
- Provide at least 25% spare bus capacity and spare physical ways in each new principal distribution board.

4.3 480 V Refrigeration / Reefer Supply

- Confirm reefer quantity, operating voltage, phase, frequency, MCA/MOCP, receptacle type and simultaneous demand with the Cold Chain equipment supplier.
- Provide an engineered 277/480 V, 3-phase distribution solution. This may require a new BPL service/transformer or a dry-type transformer supplied from an adequately sized low-voltage service; select only after load, fault, starting and utility studies.
- Install a dedicated high-voltage distribution panel, individual lockable feeder breakers/disconnects, approved interlocked reefer receptacles or hardwired connection points, equipment grounding conductors and weatherproof containment.
- Provide one installed connection per confirmed reefer and an identified spare/future provision as directed. Exact rating and quantity are to be confirmed before pricing/procurement.
- Provide undervoltage/phase-loss/phase-reversal protection where required by the reefer manufacturer.

4.4 Existing Building Feeders and Branch Circuits

- Trace and test feeders to all five buildings; replace damaged, exposed, improperly supported, undersized or unidentified feeders and terminations.
- Correct overhead clearances, support, weatherhead and drip-loop deficiencies. Correct underground duct, depth, marker and water-entry deficiencies where found.
- Provide dedicated circuits and local isolators for new cooler, HVAC, lighting, receptacle and process loads shown on the approved schedule.
- Balance single-phase loads across phases where a three-phase system is available and update every panel directory.

4.5 Electrical Equipment Environmental Protection

- Relocate vulnerable electrical equipment away from active roof leaks and structurally damaged areas where practicable. Coordinate repairs before installing new equipment.
- Provide appropriately rated enclosures, sealed entries, anti-corrosion treatment, stainless fixings and raised mounting for exposed equipment.
- Provide ventilation or cooling for electrical spaces where heat-loss calculations or manufacturer limits require it. Do not use comfort cooling as a substitute for correcting overloaded equipment.

4.6 Emergency Power Interface Provision

- Provide a priced alternate for a dedicated packing-house generator system sized by the final essential-load and motor-starting study.
- Where the alternate is not awarded, provide labelled space, conduits and an approved future transfer-switch connection strategy without creating an energized generator inlet or backfeed risk.
- If awarded, include generator, weather/sound enclosure, integral or separate fuel system, concrete pad, ATS, emergency distribution, grounding, exhaust/ventilation, controls, load-bank testing and operator training.

4.7 Ground-Mounted Solar Interface Provision

- Provide a separate optional price for a ground-mounted PV system only after energy/load study, land/siting review, BPL interconnection approval and structural/civil assessment of supports.
- Coordinate PV point of connection, protection, isolation, metering, anti-islanding, signage and any battery system with the approved service strategy and future generator controls.
- The assessment budget reference is not a final PV design or guaranteed capacity; submit a complete engineered proposal if this alternate is offered.

4.8 Builders Work and Reinstatement

- Provide all sleeves, core drilling, fire stopping, weather sealing, trenching, excavation, sand bedding, warning tape, cable markers, concrete encasement, equipment pads, bollards and supports required for a complete installation.
- Scan for concealed services before cutting or excavation. Reinstall walls, roofs, slabs, roads, finishes and waterproofing to match or exceed the existing condition.
- Coordinate structural review before mounting heavy equipment or installing rooftop renewable-energy equipment. Electrical work shall not conceal unresolved structural or water-ingress defects.

5. Protection, Earthing, Labelling and Safety

5.1 Protection and Isolation

- Provide lockable disconnecting means within sight of equipment where required.
- Use listed/approved breakers and fuses with interrupting ratings not less than calculated available fault current. Series ratings are permitted only with documented manufacturer certification and Engineer approval.
- Provide ground-fault, residual-current and surge protection as required by the adopted code, the utility and connected equipment manufacturers.
- Provide Type 1 or Type 2 surge protective devices at new main/distribution boards as appropriate, with status indication and replaceable modules.

- Coordinate refrigeration protection with compressor starting, control and defrost loads; do not oversize protective devices to suppress nuisance trips.

5.2 Earthing and Bonding

- Inspect and test the complete earthing/bonding path serving the works. Correct loose, corroded, undersized or discontinuous connections.
- Provide a code-compliant grounding electrode system and main earthing terminal. Bond service equipment, transformers, panels, metallic raceways, cable armour, equipment frames and building steel as applicable.
- Use irreversible or listed connections in buried/corrosive locations and provide accessible test links where appropriate.
- Achieve the resistance required by the serving authority and adopted code. If the project target is not otherwise stated, propose a design target of 5 ohms or less for Engineer review; add electrodes or engineered treatment only as approved.
- Submit pre-work and final calibrated test results with a sketch identifying every test point.

5.3 Identification and Safety

- Label all service equipment, mains, panels, disconnects, transformers, junction boxes and feeders with engraved laminated labels. Labels shall state source, voltage, phase and upstream device where practical.
- Provide typed, site-verified circuit directories and durable feeder identification at both ends.
- Apply warning labels for multiple sources, arc-flash hazard, shock hazard, transformer voltage and available emergency/renewable sources.
- Maintain required working space, illumination, ventilation and housekeeping around electrical equipment. Do not use electrical rooms for storage.
- Execute all isolations under an approved lockout/tagout procedure. Barricade work areas and protect BAIC staff and operations throughout the works.

6. Testing, Commissioning and Training

6.1 Pre-Energization Tests

System/Equipment	Required Checks
Feeders and circuits	Continuity, conductor identification, insulation resistance, torque verification, polarity and phase rotation.
Switchgear/panels	Mechanical operation, breaker ratings/settings, interlocks, clearances, bus integrity, labels and schedules.
Transformers	Ratio, winding insulation, bonding/grounding, tap setting, phase sequence and secondary voltage.

System/Equipment	Required Checks
Earthing	Electrode resistance, continuity of protective conductors and bonding connections.
Controls/interfaces	Functional tests of contactors, alarms, shunt trips, interlocks, emergency stops and any generator/solar interface provisions.
Loaded system	Voltage/current on all phases, voltage unbalance, power factor, abnormal heating/noise and representative operational test.

6.2 Commissioning

- Provide calibrated instruments and submit current calibration certificates.
- Give the Authority and Engineer at least five working days notice of witnessed testing.
- Energize in an approved sequence and monitor the upgraded system under representative operational load.
- Correct all deficiencies, repeat failed tests and submit signed final test sheets.
- Provide infrared thermographic scans of accessible new/modified terminations after stable loading; rescan corrected hot spots.
- Train BAIC personnel on normal operation, isolation, breaker reset restrictions, emergency response, maintenance and interpretation of labels/schedules.

7. Submittals and Deliverables

Stage	Deliverables
Tender	Detailed priced schedule, inclusions/exclusions, proposed equipment, programme, outage assumptions, licenses, similar experience and deviations.
Before procurement	Site survey, load logger report, calculations/studies, proposed single-line, equipment layouts, product data, BPL correspondence and work programme.
Before installation	Approved shop drawings, cable schedules, panel schedules, containment/support details, method statements, risk assessments and switching/outage plan.
At commissioning	Test forms, settings schedule, inspection approvals, training records, defect/punch-list closeout and energization authorization.
Handover	Stamped as-built drawings in PDF and editable format, final single-line posted on site, O&M manuals, warranties, spares list, asset register and photo record.

8. Outages, Phasing and Site Controls

- Maintain facility operations where practicable. Phase work so only the approved area is de-energized.
- Submit outage requests at least ten working days in advance or as directed by BAIC/BPL. State affected loads, duration, personnel, switching sequence, rollback plan and temporary-power provisions.
- Provide temporary distribution or generation only when approved. Temporary systems shall be protected, earthed, weatherproof, tested and fuelled by the party identified in the price schedule.
- Protect food-handling, refrigeration and stored products from dust, water, temperature excursion and unplanned interruption. Coordinate critical-load transfers with BAIC.
- Keep access routes clear, segregate construction areas, remove waste daily and restore all areas after work.

9. Quality, Codes and Workmanship

The installation shall comply with the latest editions adopted by the Bahamian authorities and BPL, including applicable Bahamas Building Code requirements, utility service rules and recognized electrical safety/installation standards. Where a recognized standard is used for design, apply it consistently and identify it in the tender. Conflicts shall be referred to the Engineer; the more stringent safe requirement shall not be omitted without written direction.

- Use new, listed/approved materials suitable for voltage, fault duty, temperature, moisture, corrosion and UV exposure.
- Use copper conductors unless aluminium is expressly approved with compatible terminations and installation practices.
- Provide manufacturer-certified installation/start-up where required to preserve warranty.
- Maintain quality-control inspection records for concealed work, terminations, torque values, fire stopping, trenching and equipment installation.
- Provide a minimum one-year defects warranty from practical completion, in addition to manufacturer warranties; state any longer offered periods.

10. Measurement, Pricing and Alternates

The tender shall be a complete lump-sum price supported by the schedule below. Quantities shown by bidders remain their responsibility. State taxes/duties, BPL charges, professional fees, freight to site, mobilization, temporary power and contingency separately where requested by the procurement documents.

Price Item	Pricing Basis
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Price Item	Pricing Basis
1. Surveys, load monitoring and engineered design	Lump sum
2. BPL/service coordination and service alterations	Lump sum + identified provisional charges
3. Onion-house exterior switchgear replacement	Lump sum
4. Packing-house switchgear testing/modification	Lump sum
5. New feeders, panels and building distribution	Lump sum
6. 480 V reefer distribution and connection points	Unit rates + lump sum backbone
7. Earthing, bonding, SPD and identification	Lump sum
8. Testing, commissioning, training and closeout	Lump sum
9. Builders work and reinstatement	Lump sum
10. Generator alternate	Separate optional lump sum
11. Ground-mounted solar alternate	Separate optional lump sum

10.1 Required Alternates

- Alternate A - Dedicated emergency generator and ATS for the packing-house essential loads, sized from the approved study.
- Alternate B - Ground-mounted PV system, with battery storage stated and priced separately.
- Alternate C - Replacement rather than retention/modification of the packing-house switchgear if test results or fault-duty review render it unsuitable.
- Provide unit rates for each additional reefer connection point and for feeder cable/duct lengths beyond the tender allowance.

11. Exclusions, Clarifications and Acceptance

11.1 Exclusions Unless Added by Tender Addendum

- Structural repairs to damaged buildings/roofs, except penetrations and local reinstatement caused by the electrical works.
- New refrigeration, cooler, HVAC or process equipment, except electrical supply and connection where scheduled.
- Site perimeter fencing/access control unless added as an alternate.
- Utility-owned network upgrades beyond the agreed service point, except coordination and stated charges.

- Hazardous-material removal and concealed latent defects not reasonably discoverable during the mandatory site investigation.

11.2 Contractor Clarifications

- List every exception, assumption, owner-supplied item, provisional sum and long-lead item. Silence shall mean full compliance with this SOW.
- Do not rely solely on preliminary budget figures in the assessment report. Price the verified complete scope.
- Identify any condition that prevents compliance, including utility constraints, inadequate transformer capacity, structural defects, water ingress, hazardous materials or inaccessible routes.
- Propose substitutions with complete technical comparisons; no substitution is accepted without written approval.

11.3 Acceptance Criteria

- All approved work is complete, safe, labelled, clean and free of temporary connections.
- Required inspections and utility/authority approvals are complete.
- All test results meet approved design and manufacturer limits.
- Representative operating-load test demonstrates stable voltage, balanced loading and no abnormal heating or nuisance tripping.
- Punch-list items are closed and all handover documents, training and warranties are accepted.

Appendix A - Tender Schedule and Acceptance Checklist

No.	Tender Compliance Item	Bidder Response / Reference
1	Mandatory site visit completed and two service points verified.	
2	Seven-day load study included.	
3	Proposed single-line and service strategy included.	
4	Packing-house switchgear retain/replace basis stated.	
5	Weatherproof onion-house switchgear replacement included.	
6	480 V reefer solution and assumptions clearly stated.	
7	Earthing test and upgrade included.	
8	BPL coordination, fees and assumptions identified.	
9	Outage and temporary-power approach included.	
10	Generator alternate priced.	
11	Ground-mounted solar alternate priced.	
12	Testing, training, as-builts and warranty included.	

Appendix B - Source-Document Qualifications

The April 2026 assessment contains both a general statement that capacity was “adequate” and site-specific statements that the current supplies were insufficient. This SOW resolves that inconsistency by requiring measured load data, utility verification and engineered calculations before final ratings are selected. No final transformer, generator, PV, feeder or reefer-connection rating shall be inferred solely from the preliminary assessment budget.