Proposal Generation Framework

How we built the Kingsford BMS proposal — a walkthrough

Agenda

- 1. The challenge — why we needed a new approach
- 2. The solution — a structured, agent-driven framework
- 3. Tier 0 — the customer's inputs (what we received)
- 4. The end-to-end flow
- 5. Tier 1 — the agent's first interpretation
- 6. Tier 2 — the engineering basis (working documents)
- 7. Tier 3 — derived working documents
- 8. Tier 4 — scope modules and integrated outputs
- 9. Tier 6 — the costed Bill of Quantities
- 10. Tier 7–8 — the customer-facing proposal and final deliverables
- 11. Design principles — applicability, determinism, mechanical/agent split
- 12. Quality and trust — why this approach is auditable
- 13. Time savings — before vs. after
- 14. v0 — this is the worst version this system will ever be
- 15. Vision — per-customer × per-discipline tracks (megaworld-bms, etc.)

The Challenge: proposals took too long, and quality was inconsistent

Why the old way wasn't working

Pain points

• Proposal preparation took 2–3 weeks per project, repeating much of the same work.

• Each estimator started from scratch, often with different assumptions.

• Junior staff had no structured framework to learn from.

• Customer asks 'where did this number come from?' — answer required digging through emails.

Hidden costs

• No clear inventory of what we'd assumed vs. confirmed.

• Schedule estimates didn't reconcile with manpower didn't reconcile with cost.

• Each new project forgot the lessons of the last.

• Customer clarifications were missed, ad-hoc, or sent late.

The Solution: structured, agent-driven, tier-based

Each step is a sub-routine the AI agent follows; documents flow in tiers

• • Two-layer separation: a reusable Master Playbook (sub-routines / agent instructions) + per-project workspace (working files)

• • 10 sequential phases (sub-routines) from intake to deliverables

• • Documents are organized in TIERS — Tier 0 = customer inputs, each generated tier reads only from lower tiers (strict DAG, no circular references)

• • Working documents capture the engineering basis at each tier

• • Mechanical helpers handle safe data aggregation between standardized formats

• • Engineering judgment stays in the agent's adaptive markdown sub-routines

• • Standard formats are the contract that lets it all stay deterministic

Tier 0

What we received from the customer

5 documents (~165 MB) — the raw material the agent reads but never produces

The 5 Tier 0 documents

What the customer sent — the agent's input boundary

Document	From	What it tells us
Customer Enquiry Letter (Requirement.rtf)	Megaworld	Scope statement: Complete supply, install, T&C of BMS
BMS Points list (TUEC).pdf, 3 sheets, 22 MB	R.J. Calpo & Co.	BMS-01 spec + I/O tabulation; BMS-02 more I/O; BMS-03 P&IDs
EE Plan (TUEC).pdf, 22 pages, 38 MB	Mario A. Alix Phils.	Construction Bulletin No.8 — revised electrical layouts and load schedules
MC Standards — ME Points List.pdf, 7 pages	Megaworld portfolio standard	Mechanical points-list baseline (DOAS, AHU, EAS, BOH templates)
MC Standards — PL Points List.pdf, 1 page	Megaworld portfolio standard	Plumbing points-list baseline (calorifiers, heat pumps, recirc pumps)

Tier 0 — Customer Enquiry Letter (Requirement.rtf)

Customer Enquiry Letter

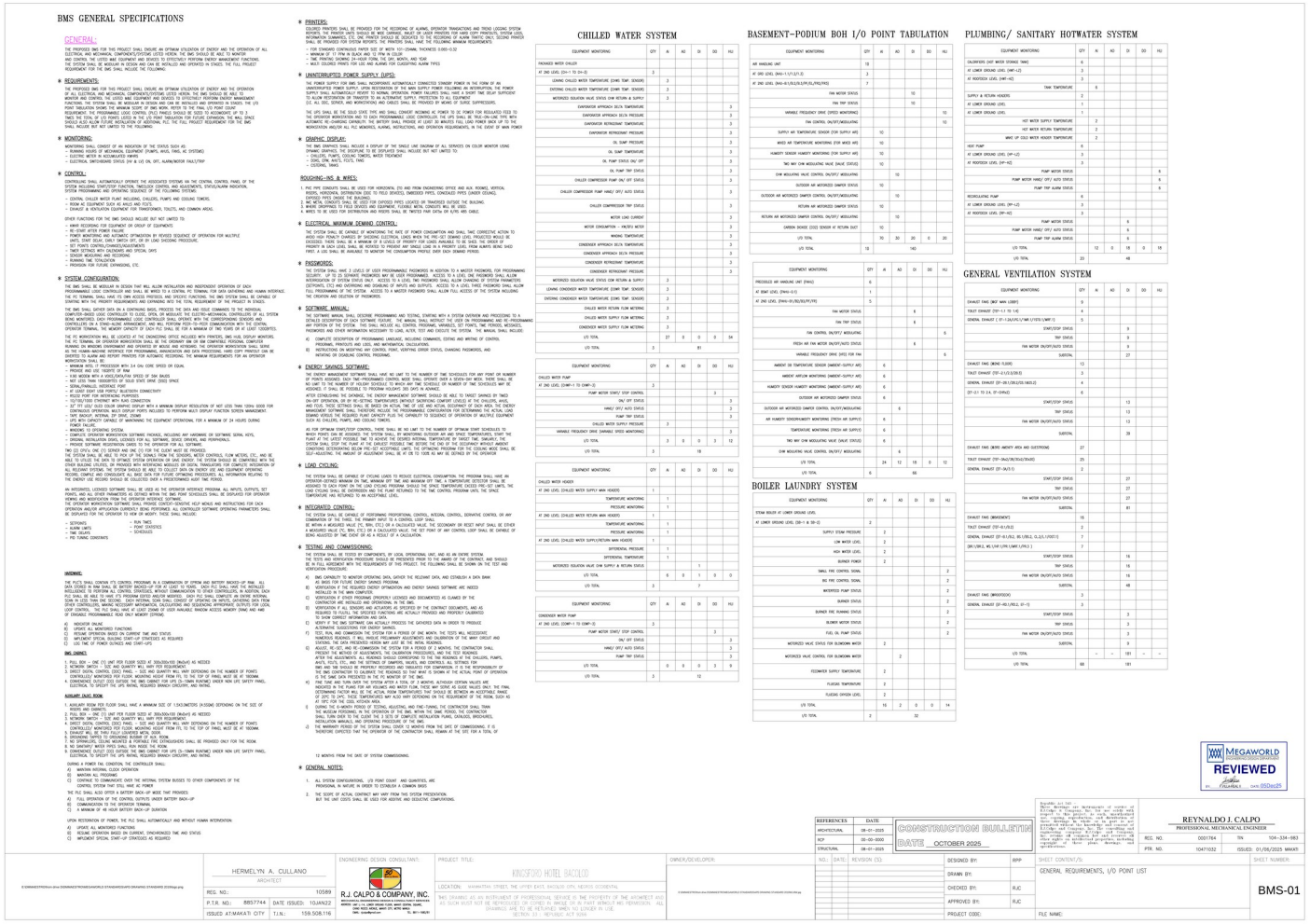
Tier 0 — what the customer sent us

We would like to request your proposal for the Complete Supply, Delivery, Installation, Testing and Commissioning for the Rehabilitation of Building Management System for the Kingsford Ho

Source: 2026-04-kingsford-bms/_deliverables/screenshots/tier0-requirement.txt

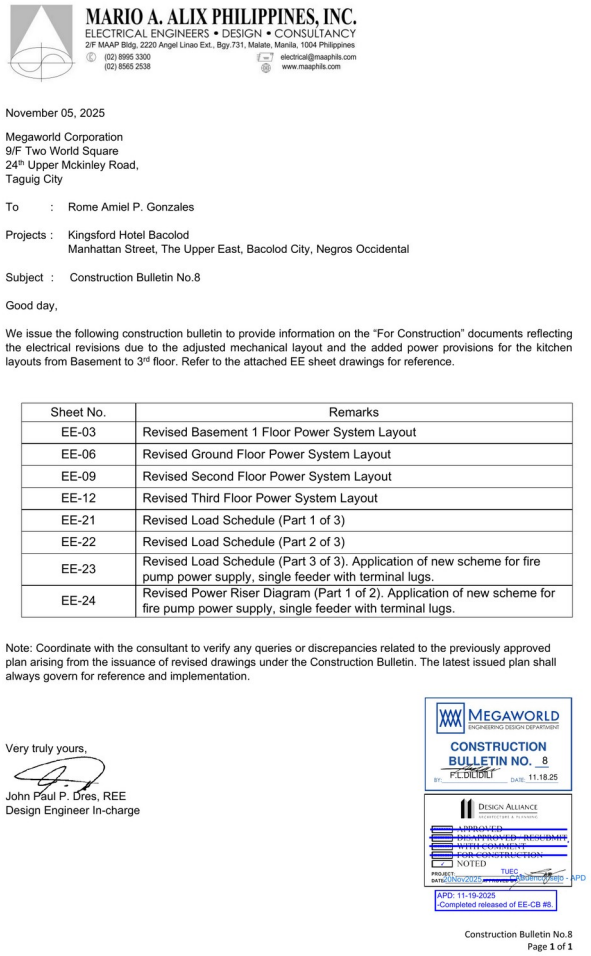
One-paragraph scope statement. Note the word 'Rehabilitation' — the trigger for our triangulation rule on stage classification.

Tier 0 — BMS Points list (TUEC), Sheet BMS-01



A1-format Construction Bulletin from R.J. Calpo & Co. — General BMS specifications + I/O tabulation per system.

Tier 0 — EE Plan (TUEC), Cover Letter



MARIO A. ALIX PHILIPPINES, INC.
ELECTRICAL ENGINEERS • DESIGN • CONSULTANCY
2/F MAAP Bldg, 2220 Angel Linao Ext., Bgy.731, Malate, Manila, 1004 Philippines
(02) 8995 3300
(02) 8565 2538
electrical@maaphils.com
www.maaphils.com

November 05, 2025

Megaworld Corporation
9/F Two World Square
24th Upper Mckinley Road,
Taguig City

To : Rome Amiel P. Gonzales

Projects : Kingsford Hotel Bacolod
Manhattan Street, The Upper East, Bacolod City, Negros Occidental

Subject : Construction Bulletin No.8

Good day,

We issue the following construction bulletin to provide information on the "For Construction" documents reflecting the electrical revisions due to the adjusted mechanical layout and the added power provisions for the kitchen layouts from Basement to 3rd floor. Refer to the attached EE sheet drawings for reference.

Sheet No.	Remarks
EE-03	Revised Basement 1 Floor Power System Layout
EE-06	Revised Ground Floor Power System Layout
EE-09	Revised Second Floor Power System Layout
EE-12	Revised Third Floor Power System Layout
EE-21	Revised Load Schedule (Part 1 of 3)
EE-22	Revised Load Schedule (Part 2 of 3)
EE-23	Revised Load Schedule (Part 3 of 3). Application of new scheme for fire pump power supply, single feeder with terminal lugs.
EE-24	Revised Power Riser Diagram (Part 1 of 2). Application of new scheme for fire pump power supply, single feeder with terminal lugs.

Note: Coordinate with the consultant to verify any queries or discrepancies related to the previously approved plan arising from the issuance of revised drawings under the Construction Bulletin. The latest issued plan shall always govern for reference and implementation.

Very truly yours,

John Paul P. Dres, REE
Design Engineer In-charge

MEGAWORLD
ENGINEERING DESIGN DEPARTMENT
CONSTRUCTION BULLETIN NO. 8
BY: P.L.DILIDILI DATE: 11.18.25

DESIGN ALLIANCE
APPROVED
DISAPPROVED - RESUBMIT
WITH COMMENT
FOR CONSTRUCTION
NOTED
PROJECT:
DATE: 11NOV2025
TUEC
APD: 11-19-2025
-Completed released of EE-CB #8.

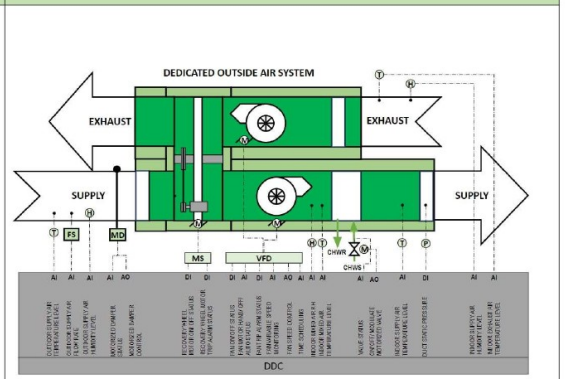
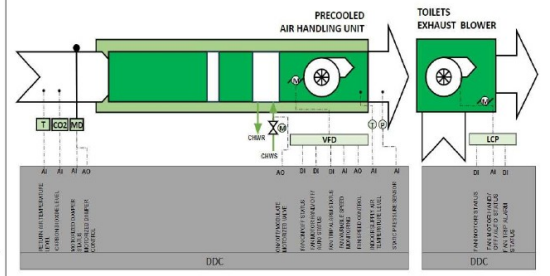
Construction Bulletin No.8
Page 1 of 1

Construction Bulletin No.8 cover from Mario A. Alix Phils. — adjusts mechanical layout and adds kitchen power provisions.

Tier 0 — MC Standards, Mechanical Points List

PART B

BUILDING MANAGEMENT SYSTEM - POINTS LIST
KINGSFORD HOTEL BACOLOD

SYSTEM DESCRIPTION		TYPE	POINTS LIST DESCRIPTION	FIELD DEVICE	C/O	PHYS AI	PHYS DI	PHYS AO	PHYS DO	HLI	DESCRIPTION OF OPERATIONS	BMS CONTROL DIAGRAM
MECHANICAL												
ROOF DECK LEVEL (GUEST ROOM LEVELS)												
VENT	Dedicated Outdoor Air System (DOAS) Ventilation System: *Roofdeck - RD1/RD2 Serving Guestrooms*	MONITOR	Temperature Monitoring (Outside - Supply Air)	Temperature Sensor	BMS Contractor	■					**MONITOR & RECORD** 1. Run status of the Fan (ON/ OFF) - Supply & Exhaust 2. Hand/ Off/ Auto Status of the Fan - Supply & Exhaust 3. Run status of the Recovery Wheel Motor (ON/ OFF) 4. Fan Variable Speed Drive Speed 5. Outdoor Supply Air Motorized Damper Status 6. CHW/ Cooling Coil Valve Status 7. Outdoor Supply Temperature & Flow Rate & Humidity Level 8. Indoor Mixed Air Temperature 9. Indoor Mixed Air Relative Humidity 10. Indoor Supply Air Temperature 11. Indoor Exhaust Air Temperature 12. Whenever the Fan is tripped 13. Outdoor Supply Temperature & Flow drops/ exceeds defined limits 14. Indoor Mixed Air Temperature drops/ exceeds defined limits 15. Indoor Supply Air Temperature drops/ exceeds defined limits 16. Indoor Exhaust Air Temperature drops/ exceeds defined limits **GENERATE ALARM** 1. Whenever the Fan is tripped 2. Outdoor Supply Temperature & Flow drops/ exceeds defined limits 3. Indoor Mixed Air Temperature drops/ exceeds defined limits 4. Indoor Supply Air Temperature drops/ exceeds defined limits 5. Indoor Exhaust Air Temperature drops/ exceeds defined limits 6. Indoor Mixed Air Relative Humidity drops/ exceeds defined limits **GENERATE REPORT** 1. Accumulated runtime of the DOAS (daily, weekly, monthly) 2. DOAS status report and DOAS trend log **TURN ON/ OFF/ MODULATE** 1. Supply Fan Motor Speed - According to pre-determined Temp. & Relative Humidity 2. Exhaust Fan Motor Speed - According to pre-determined Temp. & Relative Humidity 3. Outdoor Supply Air Motorized Damper - According to pre-determined Temp. & Relative Humidity 4. CHWS/ Cooling Coil Valve - per Supply Air Temperature Sensor & Relative Humidity	
		MONITOR	Flow Monitoring (Outside - Supply Air)	Flow Sensor	BMS Contractor	■						
		MONITOR	Humidity Monitoring (Outdoor - Supply Air)	Humidity Sensor	BMS Contractor	■						
		MONITOR	Outdoor Supply Air Motorized Damper Status	Damper Controller	ME Contractor	■						
		CONTROL	Outdoor Supply Air Motorized Damper Control (On/ Off/ Modulating)	Damper Controller	ME Contractor			■				
		MONITOR	Recovery Wheel Motor Status	Auxiliary Contact	Equipment Supplier		■					
		MONITOR	Recovery Wheel Motor Trip Alarm Status	Auxiliary Contact	Equipment Supplier		■					
		MONITOR	Supply Fan Motor Status	Auxiliary Contact	Equipment Supplier		■					
		MONITOR	Supply Fan Motor Hand/ Off/ Auto Status	Auxiliary Contact	Equipment Supplier	■						
		MONITOR	Supply Fan Trip Alarm Status	Auxiliary Contact	Equipment Supplier		■					
		MONITOR	Supply Fan Variable Speed Monitoring	VFD	Equipment Supplier					☑		
		CONTROL	Supply Fan Control (On/ Off/ Modulating)	VFD	Equipment Supplier					☑		
		MONITOR	Temperature Monitoring (Indoor - Mixed Air)	Temperature Sensor	Equipment Supplier	■						
		MONITOR	Humidity Monitoring (Indoor - Mixed Air)	Humidity Sensor	Equipment Supplier	■						
		MONITOR	CHWS/ Cooling Coil Valve Status	Electric Valve Actuator	ME Contractor	■						
		CONTROL	CHWS Valve Control (On/ Off/ Modulating)	Electric Valve Actuator	ME Contractor			■				
		MONITOR	Temperature Monitoring (Indoor - Supply Air)	Temperature Sensor	BMS Contractor	■						
		MONITOR	Humidity Monitoring (Indoor - Exhaust Air)	Humidity Sensor	BMS Contractor	■						
		MONITOR	Temperature Monitoring (Indoor - Exhaust Air)	Temperature Sensor	BMS Contractor	■						
		MONITOR	Exhaust Fan Motor Status	Auxiliary Contact	Equipment Supplier		■					
		MONITOR	Exhaust Fan Motor Hand/ Off/ Auto Status	Auxiliary Contact	Equipment Supplier	■						
		MONITOR	Exhaust Fan Trip Alarm Status	Auxiliary Contact	Equipment Supplier		■					
		MONITOR	Exhaust Fan Variable Speed Monitoring	VFD	Equipment Supplier					☑		
		CONTROL	Exhaust Fan Control (On/ Off/ Modulating)	VFD	Equipment Supplier					☑		
VENT	Precooled Fresh Air (PAHU) System: *Roofdeck*	MONITOR	Temperature Monitoring (Outside - Supply Air)	Temperature Sensor	BMS Contractor	■					**MONITOR & RECORD** 1. Run status of the Fan (ON/ OFF) 2. Hand/ Off/ Auto Status of the Fan 3. Fan Variable Speed Drive Speed 4. Outdoor Supply Air Motorized Damper Status 5. CHW/ Cooling Coil Valve Status 6. Outdoor Supply Temperature & Flow 7. Indoor Supply Air Temperature. 8. Whenever the Fan is tripped 9. Outdoor Supply Temperature & Flow drops/ exceeds defined limits 10. Indoor Supply Air Temperature drops/ exceeds defined limits **GENERATE ALARM** 1. Whenever the Fan is tripped 2. Outdoor Supply Temperature & Flow drops/ exceeds defined limits 3. Indoor Supply Air Temperature drops/ exceeds defined limits **GENERATE REPORT** 1. Accumulated runtime of the Fan Motor (daily, weekly, monthly) 2. Fan Motor status report and Fan Motor trend log **TURN ON/ OFF/ MODULATE** 1. Fan Motor Speed - According to pre-determined Temperature and Relative Humidity 2. Outdoor Supply Air Motorized Damper 3. CHWS/ Cooling Coil Valve - per Supply Air Temperature Sensor and Relative Humidity	
		MONITOR	Flow Monitoring (Outside - Supply Air)	Flow Sensor	BMS Contractor	■						
		MONITOR	Outdoor Supply Air Motorized Damper Status	Damper Controller	Equipment Supplier	■						
		CONTROL	Outdoor Supply Air Motorized Damper Control (On/ Off/ Modulating) **(A)**	Damper Controller	Equipment Supplier			■				
		CONTROL	CHWS/ Cooling Coil Valve Control (On/ Off/ Modulating) **(A)**	Electric Valve Actuator	ME Contractor			■				
		MONITOR	Fan Motor Status	Auxiliary Contact	Equipment Supplier		■					
		MONITOR	Fan Motor Hand/ Off/ Auto Status	Auxiliary Contact	Equipment Supplier		■					
		MONITOR	Fan Trip Alarm Status	Auxiliary Contact	Equipment Supplier		■					
		MONITOR	Variable Speed Monitoring	VFD	Equipment Supplier					☑		
		CONTROL	Fan Control (On/ Off/ Modulating)	VFD	Equipment Supplier					☑		
		MONITOR	Temperature Monitoring (Indoor - Supply Air)	Temperature Sensor	BMS Contractor	■						

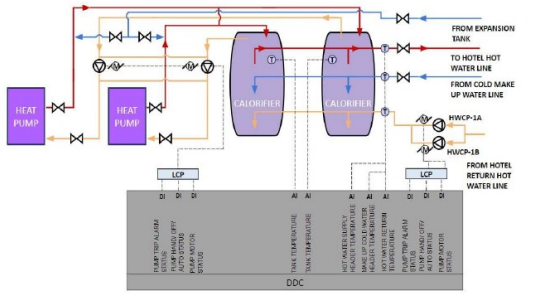
Megaworld's CONDOTELS BMS standard for mechanical systems — applies as baseline where the project-specific is silent.

Tier 0 — MC Standards, Plumbing Points List

PART C

BUILDING MANAGEMENT SYSTEM - POINTS LIST
KINGSFORD HOTEL BACOLOD

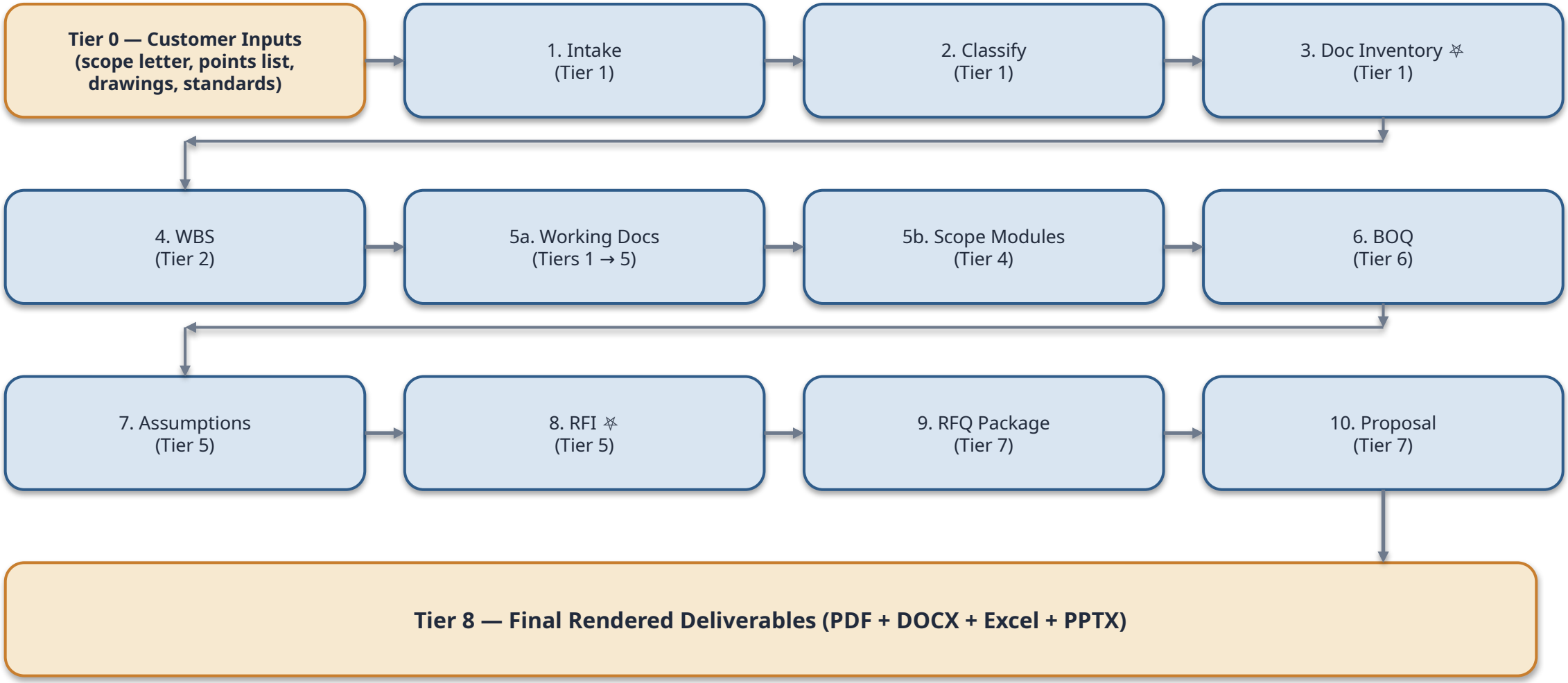
SYSTEM DESCRIPTION		TYPE	POINTS LIST DESCRIPTION	FIELD DEVICE	C/O	PHYS AI	PHYS DI	PHYS AO	PHYS DO	HLI	DESCRIPTION OF OPERATIONS	BMS CONTROL DIAGRAM
PLUMBING & SANITARY												
CENTRALIZED HOT WATER ROOM/ AREA												
HWL	Calorifiers *At Lower Ground Level* *At Roof deck*	MONITOR	Tank Temperature	Temperature Sensor	BMS Contractor	■					**MONITOR & RECORD** 1. Water Temperature 2. When the water temperature drops/ exceeds Defined Limits **GENERATE ALARM** 1. When the water temperature drops/ exceeds Defined Limits	
HWL	Supply & Return Headers *At Lower Ground Level*	MONITOR	Hot Water Supply Header Temperature	Temperature Sensor	BMS Contractor	■					**MONITOR & RECORD** 1. Hot Water Supply Header Temperature 2. Make Up Cold Water Header Temperature 3. Hot Water Return Header Temperature 4. Supply Header Temperature Level drops/ exceeds Defined Limits 5. Return Header Temperature Level drops/ exceeds Defined Limits **GENERATE ALARM** 1. Hot Water Supply Header Temperature Level drops/ exceeds Defined Limits 2. Return Header Temperature Level drops/ exceeds Defined Limits	
		MONITOR	Make Up Cold Water Header Temperature	Temperature Sensor	BMS Contractor	■						
		MONITOR	Hot Water Return Temperature	Temperature Sensor	BMS Contractor	■						
HWL	Heat Pump *At Lower Ground Level* *At Roof deck*	MONITOR	Pump Motor Status	Auxiliary Contact	Equipment Supplier		■				**MONITOR & RECORD** 1. Run status of the pump (ON/ OFF) 2. Hand/ Off/ Auto Status of the Pump 3. Whenever the pump is tripped **GENERATE ALARM** 1. Whenever the pump is tripped **GENERATE REPORT** 1. Accumulated runtime of the equipment (daily, weekly, monthly) 2. Preventive runtime of the equipment, pump status report, and pump trend log	
		MONITOR	Pump Motor Hand/ Off/ Auto Status	Auxiliary Contact	Equipment Supplier		■					
		MONITOR	Pump Trip Alarm Status	Auxiliary Contact	Equipment Supplier		■					
HWL	Circulating Pumps *At Lower Ground Level* *At Roof deck*	MONITOR	Pump Motor Status	Auxiliary Contact	Equipment Supplier		■				**MONITOR & RECORD** 1. Run status of the pump (ON/ OFF) 2. Hand/ Off/ Auto Status of the Pump 3. Whenever the pump is tripped **GENERATE ALARM** 1. Whenever the pump is tripped **GENERATE REPORT** 1. Accumulated runtime of the equipment (daily, weekly, monthly) 2. Preventive runtime of the equipment, pump status report, and pump trend log	
		MONITOR	Pump Motor Hand/ Off/ Auto Status	Auxiliary Contact	Equipment Supplier		■					
		MONITOR	Pump Trip Alarm Status	Auxiliary Contact	Equipment Supplier		■					



Megaworld's CONDOTELS BMS standard for plumbing — calorifiers, heat pumps, recirculating pumps.

End-to-End Flow

Each box is a sub-routine. ✲ marks gates where the team validates before continuing.



Tier 1

The agent's first interpretation

Documents produced directly from customer inputs — what the agent understands the project to be

Tier 1 — Project Requirement Brief

Project Requirement Brief

Tier 1 — agent's parsed understanding of the customer's enquiry

01 — Requirement Summary

Project: Kingsford Hotel Bacolod — BMS (greenfield, new construction) **Customer:** Megaworld Corporation (to confirm — Q-001) **Location:** Manhattan Street, The Upper East, Bacolod City, Negros Occidental **Date prepared:** 2026-04-27 (updated after stage triangulation)

Explicit request

> "We would like to request your proposal for the **Complete Supply, Delivery, Installation, Testing and Commissioning for the Rehabilitation of Building Management System** for the **Kingsford Hotel Bacolod** project."

— Source: `00-customer-inputs/Requirement.rtf`

> ⚠️ **Note on wording:** The cover letter uses *"Rehabilitation"* but the supporting documents (BMS Points list and EE Plan) are both **Construction Bulletins** dated Oct/Nov 2025 — i.e., active-construction documents, not retrofit-on-operating-building documents. After triangulation (see `02-classification.md`), this is classified as **greenfield (new construction)**, with a customer clarification (Q-018) requested to confirm the wording.

Parties

Role	Entity	Notes
Owner / Developer	**Megaworld Corporation**	Reviewed-by stamp on BMS Points list (F. Villa-Real II, 05Dec25); recipient of EE bulletin
BMS-discipline engineer of record	**R.J. Calpo & Company** — Reynaldo J. Calpo, PME (License 0001784)	Author of project-specific BMS Points list, dated October 2025
Electrical-discipline consultant	**Mario A. Alix Philippines, Inc.**	Author of EE Plan revisions (Construction Bulletin No.8, 11/05/2025)
Architect	**Design Alliance Architecture & Planning**	Title block on EE floor plans
Customer representative (recipient of EE bulletin)	Rome Amiel P. Gonzales (Megaworld)	
Architectural reference (BMS sheet)	Hermelyn A. Cullano, Architect	Title block stamp
Requesting entity	(not stated in Requirement.rtf — assumed Megaworld pending Q-001)	A-015

Project context

Generated from Tier 0 customer enquiry letter + supporting docs. The agent's parsed understanding of who, what, and where.

Tier 1 — Project Classification (with triangulation evidence)

Project Classification

Tier 1 — discipline × stage tagging with triangulation evidence

02 — Classification

Project: Kingsford Hotel Bacolod — BMS **Date:** 2026-04-27 (updated 2026-04-27 after stage re-evaluation)

Discipline

- **Primary: BMS** (Building Management System)
- **Secondary:** EE-monitoring (power metering integration), FDAS-integration (likely per BMS general spec; confirm in Phase 4)

Stage

- **Greenfield (new construction)**

Stage triangulation (per `_playbook/phases/02-classify.md` rule)

Signal	Source	Reading
Cover letter wording	`Requirement.rtf`	Says *"Rehabilitation of Building Management System"* — **suggests rehab**
Technical document status	`BMS Points list (TUEC).pdf` BMS-01 title block	**Construction Bulletin — DATE: October 2025** — strong greenfield signal
Technical document status	`EE Plan (TUEC).pdf` cover letter	**Construction Bulletin No.8**, dated November 5, 2025 — strong greenfield signal
Reason for revisions	EE Plan cover letter	*"electrical revisions due to the **adjusted mechanical layout** and the **added power provisions for the kitchen layouts** from Basement to 3rd floor"* — these are construction-phase design adjustments, not retrofit indicators
Existing-system documentation	(absent)	No as-built drawings, no existing BMS inventory, no condition assessment, no demolition scope — **consistent with greenfield**
Drawing status	EE Plan p5 (sheet EE-12)	*"For construction"* drawings issued by Design Alliance (architect) — strong greenfield signal
Operational context	EE Plan annotation p2	"*PPCAS-14 inside the casino lobby*" — pre-occupancy design coordination, not active-hotel retrofit

Resolution: Technical-document evidence is overwhelmingly greenfield (multiple Construction Bulletins, layout-adjustment revisions, no existing-system docs). Cover letter wording is misleading. Classify as **Greenfield**; ask customer to confirm wording (Q-018).

(Per playbook rule: technical-document evidence beats cover-letter wording when they conflict.)

Discipline × stage tagging. Note the triangulation table: technical-document evidence (Construction Bulletins) overrides the cover letter's 'rehabilitation' wording.

Tier 1 — A1 I/O List (the foundation)

A1 — I/O List (the foundation)

Tier 1 — translated from customer's BMS Points list and MC Standards into our standard YAML schema · showing field: io_list · 716 record(s)

project: Kingsford Hotel Bacolod BMS

id	system	equipment_class	equipment_instance	location	point_description	type	field_device
chws.ch-1.network	Chilled Water	Chiller (Package Water-Cooled)	CH-1	GND/Chiller Plant Room	BACnet/IP gateway from chiller controller	Network	-
chws.ch-1.entering-chw-temp	Chilled Water	Chiller (Package Water-Cooled)	CH-1	GND/Chiller Plant Room	Entering Chilled Water Temperature	AI	Temperature Sensor (immersion/thermowell)
chws.ch-1.leaving-chw-temp	Chilled Water	Chiller (Package Water-Cooled)	CH-1	GND/Chiller Plant Room	Leaving Chilled Water Temperature	AI	Temperature Sensor (immersion/thermowell)
chws.ch-1.entering-cw-temp	Chilled Water	Chiller (Package Water-Cooled)	CH-1	GND/Chiller Plant Room	Entering Condenser Water Temperature	AI	Temperature Sensor (immersion/thermowell)
chws.ch-1.leaving-cw-temp	Chilled Water	Chiller (Package Water-Cooled)	CH-1	GND/Chiller Plant Room	Leaving Condenser Water Temperature	AI	Temperature Sensor (immersion/thermowell)
chws.ch-1.chw-supply-flow	Chilled Water	Chiller (Package Water-Cooled)	CH-1	GND/Chiller Plant Room	Chilled Water Supply Flow Metering	AI	Flow Sensor (insertion or in-line)
chws.ch-1.chw-return-flow	Chilled Water	Chiller (Package Water-Cooled)	CH-1	GND/Chiller Plant Room	Chilled Water Return Flow Metering	AI	Flow Sensor (insertion or in-line)
chws.ch-1.cw-supply-flow	Chilled Water	Chiller (Package Water-Cooled)	CH-1	GND/Chiller Plant Room	Condenser Water Supply Flow Metering	AI	Flow Sensor (insertion or in-line)
chws.ch-1.iso-vlv-chw-rs	Chilled Water	Chiller (Package Water-Cooled)	CH-1	GND/Chiller Plant Room	Isolation Motorized Valve Status — CHW Return & …	DI	Electric Valve Actuator (limit switch)
chws.ch-1.iso-vlv-cw-rs	Chilled Water	Chiller (Package Water-Cooled)	CH-1	GND/Chiller Plant Room	Isolation Motorized Valve Status — COW Return & …	DI	Electric Valve Actuator (limit switch)
chws.ch-1.evap-approach-dt	Chilled Water	Chiller (Package Water-Cooled)	CH-1	GND/Chiller Plant Room	Evaporator Approach Delta Temperature	HLI	-
chws.ch-1.evap-approach-dp	Chilled Water	Chiller (Package Water-Cooled)	CH-1	GND/Chiller Plant Room	Evaporator Approach Delta Pressure	HLI	-
chws.ch-1.evap-refrig-press	Chilled Water	Chiller (Package Water-Cooled)	CH-1	GND/Chiller Plant Room	Evaporator Refrigerant Pressure	HLI	-
chws.ch-1.evap-refrig-temp	Chilled Water	Chiller (Package Water-Cooled)	CH-1	GND/Chiller Plant Room	Evaporator Refrigerant Temperature	HLI	-
chws.ch-1.cond-refrig-press	Chilled Water	Chiller (Package Water-Cooled)	CH-1	GND/Chiller Plant Room	Condenser Refrigerant Pressure	HLI	-
chws.ch-1.cond-refrig-temp	Chilled Water	Chiller (Package Water-Cooled)	CH-1	GND/Chiller Plant Room	Condenser Refrigerant Temperature	HLI	-
chws.ch-1.cond-approach-dt	Chilled Water	Chiller (Package Water-Cooled)	CH-1	GND/Chiller Plant Room	Condenser Approach Delta Temperature	HLI	-
chws.ch-1.cond-approach-dp	Chilled Water	Chiller (Package Water-Cooled)	CH-1	GND/Chiller Plant Room	Condenser Approach Delta Pressure	HLI	-

… showing 18 of 716 rows

Translated from BMS Points list + MC Standards into our standard YAML schema. 716 points; every row cites its source. Most downstream documents read from this.

Tier 2

The engineering basis begins

WBS, applicability matrix, and the first round of derived working documents

Tier 2 — Working Documents Applicability Matrix

Working-Documents Applicability Matrix

Tier 2 — what we need × what the customer gave us × what we generate

Phase 5a — Working-Documents Applicability Matrix

Project: Kingsford Hotel Bacolod — BMS (greenfield) **Date:** 2026-04-27 **Source catalog:** `_playbook/checklists/working-documents.md`

Legend

Tag	Meaning
R	Required for this project
N/A	Not applicable to this scope/stage
CP	Customer-provided (use theirs, no generation)
AG	Agent-generated (we create it in `05-working-docs/`)
CP+AG	Customer provided partial; we supplement

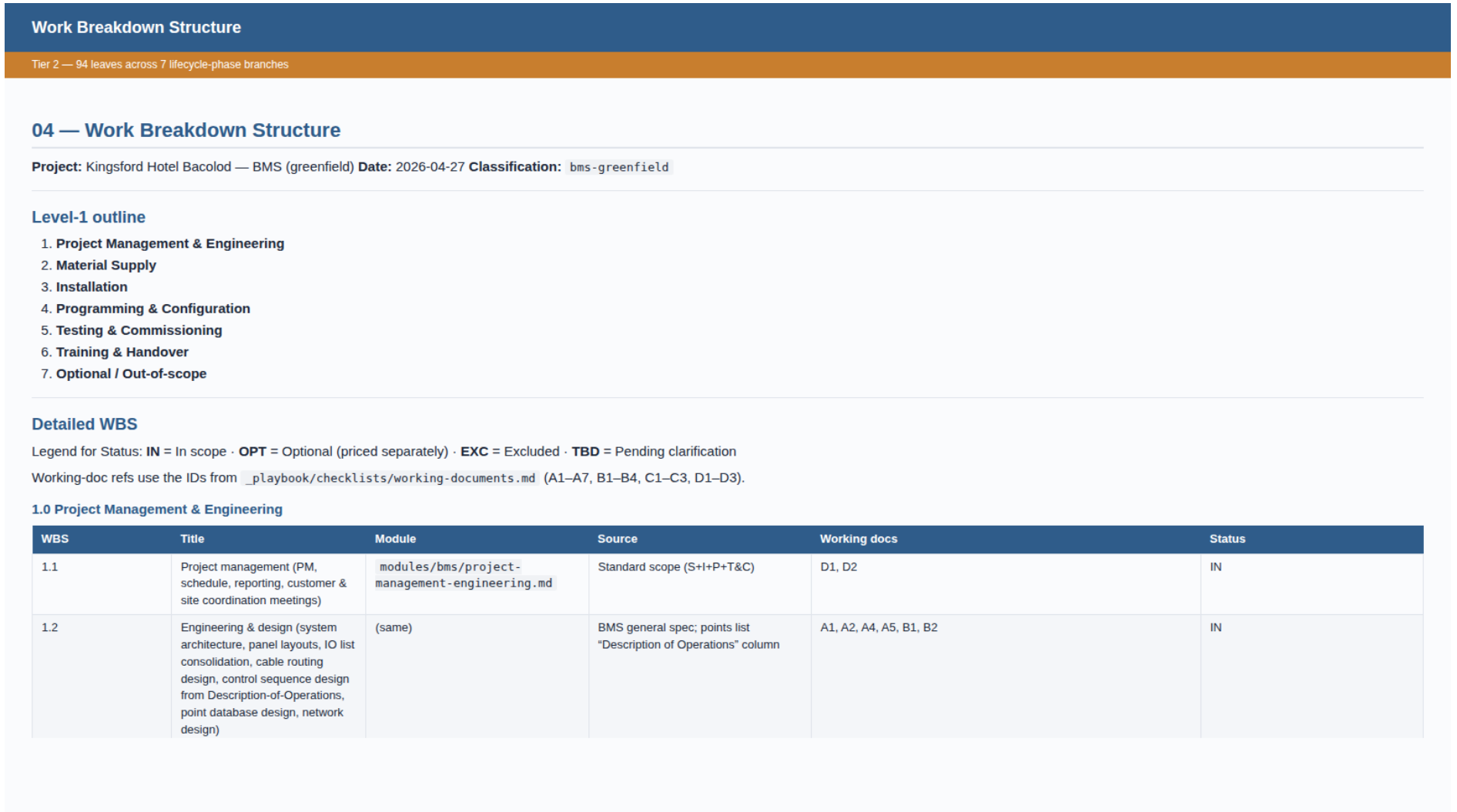
Matrix

Group A — Quantification (drives material BOQ)

#	Doc	R/N-A	CP/AG	Output file	Effort tier*	Notes
A1	Consolidated I/O List	**R**	**AG**	`A1-io-list.yaml`	**High**	Foundation for everything. Must walk through all 3 A1 sheets of `BMS Points list (TUEC).pdf` exhaustively (currently sampled only); merge with MC Standards. **Estimated 800–1500 rows.**
A2	Equipment Takeoff	**R**	**AG**	`A2-equipment-takeoff.yaml`	Medium	Equipment counts mostly visible in points list summaries; floor locations partially inferable from

The agent's check-and-translate-and-generate plan. R/N-A × CP/AG/CP+AG marking for all 17 working-doc types.

Tier 2 — Work Breakdown Structure



Work Breakdown Structure

Tier 2 — 94 leaves across 7 lifecycle-phase branches

04 — Work Breakdown Structure

Project: Kingsford Hotel Bacolod — BMS (greenfield) **Date:** 2026-04-27 **Classification:** `bms-greenfield`

Level-1 outline

1. **Project Management & Engineering**
2. **Material Supply**
3. **Installation**
4. **Programming & Configuration**
5. **Testing & Commissioning**
6. **Training & Handover**
7. **Optional / Out-of-scope**

Detailed WBS

Legend for Status: **IN** = In scope · **OPT** = Optional (priced separately) · **EXC** = Excluded · **TBD** = Pending clarification

Working-doc refs use the IDs from `_playbook/checklists/working-documents.md` (A1–A7, B1–B4, C1–C3, D1–D3).

1.0 Project Management & Engineering

WBS	Title	Module	Source	Working docs	Status
1.1	Project management (PM, schedule, reporting, customer & site coordination meetings)	`modules/bms/project-management-engineering.md`	Standard scope (S+I+P+T&C)	D1, D2	IN
1.2	Engineering & design (system architecture, panel layouts, IO list consolidation, cable routing design, control sequence design from Description-of-Operations, point database design, network design)	(same)	BMS general spec; points list “Description of Operations” column	A1, A2, A4, A5, B1, B2	IN

94 leaves across 7 lifecycle-phase branches (PM, Supply, Install, Programming, T&C, Training, Optional). Each leaf cites a module template.

Tier 2 — A2 Equipment Takeoff

A2 — Equipment Takeoff

Tier 2 — derived from A1 (135 equipment instances grouped by class, location, panel) · showing field: takeoff · 135 record(s)

project: Kingsford Hotel Bacolod BMS

id	equipment_class	quantity	location	system	panel	primary_co	io_summary
AHU-2M.1	AHU (Modulating CHW-served)	1	2nd Level/Casino MVAC Plant	AHU - Casino	PNL-AHU-L2	BMS Contractor	{'physical_io': 13, 'hli_subpoints': 2, 'network…
AHU-2M.2	AHU (Modulating CHW-served)	1	2nd Level/Casino MVAC Plant	AHU - Casino	PNL-AHU-L2	BMS Contractor	{'physical_io': 13, 'hli_subpoints': 2, 'network…
BTU-CHWS-MAIN	BTU Meter	1	2F/CHW Pump Room	Chilled Water	PNL-CHWP-L2	BMS Contractor	{'physical_io': 0, 'hli_subpoints': 3, 'network_…
CH-1	Chiller (Package Water-Cooled)	1	GND/Chiller Plant Room	Chilled Water	PNL-CH-PLANT-GND	Equipment Supplier	{'physical_io': 9, 'hli_subpoints': 18, 'network…
CH-2	Chiller (Package Water-Cooled)	1	GND/Chiller Plant Room	Chilled Water	PNL-CH-PLANT-GND	Equipment Supplier	{'physical_io': 9, 'hli_subpoints': 18, 'network…
CH-3	Chiller (Package Water-Cooled)	1	GND/Chiller Plant Room	Chilled Water	PNL-CH-PLANT-GND	Equipment Supplier	{'physical_io': 9, 'hli_subpoints': 18, 'network…
CHWP-1.1	AHU (Chilled-Water-Served)	1	GND/BOH AHU Area	BOH Air Handling	PNL-CHWP-GND	Equipment Supplier	{'physical_io': 14, 'hli_subpoints': 2, 'network…
CHWP-1.2	AHU (Chilled-Water-Served)	1	GND/BOH AHU Area	BOH Air Handling	PNL-CHWP-GND	Equipment Supplier	{'physical_io': 14, 'hli_subpoints': 2, 'network…
CHWP-1.3	AHU (Chilled-Water-Served)	1	GND/BOH AHU Area	BOH Air Handling	PNL-CHWP-GND	Equipment Supplier	{'physical_io': 14, 'hli_subpoints': 2, 'network…
COMP-1	Condenser Water Pump	1	2F/CHW Pump Room	Chilled Water	PNL-CHWP-L2	Equipment Supplier	{'physical_io': 4, 'hli_subpoints': 0, 'network_…
COMP-2	Condenser Water Pump	1	2F/CHW Pump Room	Chilled Water	PNL-CHWP-L2	Equipment Supplier	{'physical_io': 4, 'hli_subpoints': 0, 'network_…
COMP-3	Condenser Water Pump	1	2F/CHW Pump Room	Chilled Water	PNL-CHWP-L2	Equipment Supplier	{'physical_io': 4, 'hli_subpoints': 0, 'network_…
CT-1	Cooling Tower	1	Roofdeck/Cooling Tower Area	Chilled Water	PNL-CT-RD	BMS Contractor	{'physical_io': 9, 'hli_subpoints': 0, 'network_…
CT-2	Cooling Tower	1	Roofdeck/Cooling Tower Area	Chilled Water	PNL-CT-RD	BMS Contractor	{'physical_io': 9, 'hli_subpoints': 0, 'network_…
CT-3	Cooling Tower	1	Roofdeck/Cooling Tower Area	Chilled Water	PNL-CT-RD	BMS Contractor	{'physical_io': 9, 'hli_subpoints': 0, 'network_…
CT-COMMON	Cooling Tower (Common)	1	Roofdeck/Cooling Tower Area	Chilled Water	PNL-CT-RD	BMS Contractor	{'physical_io': 2, 'hli_subpoints': 0, 'network_…
DOAS-2W	DOAS Unit	1	2nd Level/Casino MVAC Plant	DOAS - Casino MVAC	PNL-DOAS-L2	Equipment Supplier	{'physical_io': 21, 'hli_subpoints': 4, 'network…
DOAS-RD.1	DOAS Unit	1	Roofdeck/Hotel DOAS Plant	DOAS - Hotel/Roofdeck	PNL-DOAS-RD	Equipment Supplier	{'physical_io': 21, 'hli_subpoints': 4, 'network…

… showing 18 of 135 rows

Auto-derived from A1: 135 equipment instances grouped by class, location, panel, and primary supplier.

Tier 2 — A4 Panel Schedule

A4 — Panel Schedule

Tier 2 — derived from A1 (18 panels with I/O density + controller estimates) · showing field: panels · 18 record(s)

project: Kingsford Hotel Bacolod BMS

id	location	system_scope	equipment_served	io_summary	controller_estimate	power_estimate_w	enclosure_assumption
PNL-AHU-L2	2nd Level/Casino MVAC Plant	['AHU - Casino', 'AHU - Casino (Ozonizer)']	{'instance_count': 4, 'instances': ['AHU-2M.1', ...	{'physical_io': 32, 'hli_subpoints': 4, 'network...	{'ddc_controllers': 1, 'network_gateway': 1, 'to...	60	Wall-mount IP54 metal cabinet, sized per control...
PNL-BL-LZ	Lower Ground/Boiler Room	['Boiler/Laundry']	{'instance_count': 2, 'instances': ['SB-1', 'SB-...	{'physical_io': 32, 'hli_subpoints': 0, 'network...	{'ddc_controllers': 1, 'network_gateway': 0, 'to...	25	Wall-mount IP54 metal cabinet, sized per control...
PNL-CH-PLANT-GND	GND/Chiller Plant Room	['Chilled Water']	{'instance_count': 3, 'instances': ['CH-1', 'CH-...	{'physical_io': 27, 'hli_subpoints': 54, 'networ...	{'ddc_controllers': 1, 'network_gateway': 1, 'to...	65	Wall-mount IP54 metal cabinet, sized per control...
PNL-CHWP-GND	GND/BOH AHU Area	['BOH Air Handling']	{'instance_count': 3, 'instances': ['CHWP-1.1', ...	{'physical_io': 42, 'hli_subpoints': 6, 'network...	{'ddc_controllers': 2, 'network_gateway': 1, 'to...	65	Wall-mount IP54 metal cabinet, sized per control...
PNL-CHWP-L2	2F/CHW Pump Room	['Chilled Water']	{'instance_count': 11, 'instances': ['BTU-CHWS-M...	{'physical_io': 40, 'hli_subpoints': 3, 'network...	{'ddc_controllers': 1, 'network_gateway': 1, 'to...	55	Wall-mount IP54 metal cabinet, sized per control...
PNL-CT-RD	Roofdeck/Cooling Tower Area	['Chilled Water']	{'instance_count': 6, 'instances': ['CT-1', 'CT-...	{'physical_io': 31, 'hli_subpoints': 0, 'network...	{'ddc_controllers': 1, 'network_gateway': 0, 'to...	25	Wall-mount IP54 metal cabinet, sized per control...
PNL-DOAS-L2	2nd Level/Casino MVAC Plant	['DOAS - Casino MVAC']	{'instance_count': 1, 'instances': ['DOAS-2W'], ...	{'physical_io': 21, 'hli_subpoints': 4, 'network...	{'ddc_controllers': 1, 'network_gateway': 1, 'to...	55	Wall-mount IP54 metal cabinet, sized per control...
PNL-DOAS-RD	Roofdeck/Hotel DOAS Plant	['DOAS - Hotel/Roofdeck']	{'instance_count': 2, 'instances': ['DOAS-RD.1',...	{'physical_io': 42, 'hli_subpoints': 8, 'network...	{'ddc_controllers': 2, 'network_gateway': 1, 'to...	60	Wall-mount IP54 metal cabinet, sized per control...
PNL-EE-DIST	Distribution (per A4)	['Power Metering']	{'instance_count': 10, 'instances': ['MTR-FDR-01...	{'physical_io': 0, 'hli_subpoints': 50, 'network...	{'ddc_controllers': 1, 'network_gateway': 1, 'to...	100	Wall-mount IP54 metal cabinet, sized per control...
PNL-EE-MAIN	Main Switchgear Room	['Power Metering']	{'instance_count': 3, 'instances': ['MTR-MAIN-1'...	{'physical_io': 0, 'hli_subpoints': 15, 'network...	{'ddc_controllers': 1, 'network_gateway': 1, 'to...	65	Wall-mount IP54 metal cabinet, sized per control...
PNL-PAHU-RD	Roofdeck/PAHU Plant	['PAHU - Roofdeck']	{'instance_count': 2, 'instances': ['PAHU-RD.1',...	{'physical_io': 22, 'hli_subpoints': 4, 'network...	{'ddc_controllers': 1, 'network_gateway': 1, 'to...	60	Wall-mount IP54 metal cabinet, sized per control...
PNL-PL-HZ	Roofdeck/HW Plant	['Plumbing & Sanitary Hotwater']	{'instance_count': 10, 'instances': ['HDR-HW-HZ'...	{'physical_io': 6, 'hli_subpoints': 18, 'network...	{'ddc_controllers': 1, 'network_gateway': 0, 'to...	25	Wall-mount IP54 metal cabinet, sized per control...
PNL-PL-LZ	Lower Ground/HW Plant	['Plumbing & Sanitary Hotwater']	{'instance_count': 10, 'instances': ['HDR-HW-LZ'...	{'physical_io': 24, 'hli_subpoints': 0, 'network...	{'ddc_controllers': 1, 'network_gateway': 0, 'to...	25	Wall-mount IP54 metal cabinet, sized per control...
PNL-VENT-[illegible]	Basement	['General Ventilation']	{'instance_count': 16, 'instances': ['EF-[illegible]	{'physical_io': 48, 'hli_subpoints': 0, [illegible]	{'ddc_controllers': 2, [illegible]	50	Wall-mount IP54 metal cabinet, sized per [illegible]

Auto-derived from A1: 18 BMS panels with I/O density, controller estimate, power consumption.

Tier 2 — C1 Contractor / Owner Matrix

C1 — Contractor / Owner Matrix

Tier 2 — supplier responsibility per equipment class (BMS / ME / EE / Equipment Supplier / Owner)

C1 — Contractor / Owner-Supplied Matrix

Project: Kingsford Hotel Bacolod BMS **Generated from:** A1-io-list.yaml **Generator:** `_playbook/tools/generate-c1-co-matrix.py`

This matrix shows, per equipment class, which **BMS-side field devices** are supplied by which party. It is the contractual-scope-boundary view derived from the points list `C/O` column.

Suppliers: - **BMS Contractor** — we (the proposing party) supply - **ME Contractor** — Mechanical contractor supplies (typically valves, dampers, motorized actuators) - **EE Contractor** — Electrical contractor supplies (power metering related — varies by project) - **Equipment Supplier** — Manufacturer / Equipment vendor supplies (auxiliary contacts on motors/pumps, native equipment data via BACnet/Modbus, VFDs) - **Owner** — Customer / building owner supplies

Overall Summary

Supplier	Total BMS I/O Points	Share
Equipment Supplier	447	62.4%
BMS Contractor	215	30.0%
ME Contractor	54	7.5%
Total	**716**	**100%**

Per-Equipment-Class Breakdown

Exhaust Fan (Toilet) · 34 units, 102 I/O points

Instances: TEF-1.1, TEF-1.2, TEF-1.3, TEF-1.4, TEF-2.1, TEF-2.3, TEF-2B.3, TEF-3A.1, TEF-3A.2, TEF-3B, TEF-3C.1, TEF-3C.2, TEF-3D.1, TEF-3D.10, TEF-3D.11, TEF-3D.12, TEF-3D.13, TEF-3D.14, TEF-3D.15, TEF-3D.16, TEF-3D.17, TEF-3D.18, TEF-3D.19, TEF-3D.2, TEF-3D.20, TEF-3D.3, TEF-3D.4, TEF-3D.5, TEF-3D.6, TEF-3D.7, TEF-3D.8, TEF-3D.9, TEF-B.1, TEF-B.2

Supplier	I/O Count	Provides
Equipment Supplier	102	Auxiliary Contact (102×)

Exhaust Fan (General) · 34 units, 102 I/O points

Instances: EF-1 (RD), EF-1.2A, EF-1MR.1, EF-1ST0.1, EF-2.1, EF-2.2, EF-2.3, EF-2.4, EF-2B.1, EF-2B.2, EF-3.1, EF-3.2, EF-3SF.2, EF-8R.1, EF-B.1, EF-B.2, EF-BS.1, EF-BS.2, EF-CHR.1, EF-CHR.2, EF-GLZ.1, EF-GLZ.2, EF-GS.1, EF-GS.2, EF-HP.1, EF-LPG.1, EF-MC.1, EF-MFP.1, EF-MRF.1, EF-PR.1, EF-PR.2, EF-RD.1, EF-RD.2, EF-RR.2

Auto-derived from A1: per-equipment-class supplier responsibility — BMS / ME / EE / Equipment Supplier / Owner — with I/O counts.

Tier 3

Derived working documents

Cable schedule, network architecture, commissioning inventory — built on Tier 2

Tier 3 — A3 Cable Schedule

A3 — Cable Schedule

Tier 3 — derived from A1+A2+A4 (200 cables, 6,810 m total, with cable types and lengths per A-001) · showing field: field_cables · 175 record(s)

project: Kingsford Hotel Bacolod BMS

id	from	to	equipment_class	system	location	cable_type	spec_source
C0001	PNL-AHU-L2	AHU-2M.1 (BMS Contractor)	AHU (Modulating CHW-served)	AHU - Casino	2nd Level/Casino MVAC Plant	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	legacy:bms_signal
C0002	PNL-AHU-L2	AHU-2M.1 (Equipment Supplier)	AHU (Modulating CHW-served)	AHU - Casino	2nd Level/Casino MVAC Plant	4C × 1.5 mm² FRLS (equipment aux contacts — stat…	legacy:equipment_aux
C0003	PNL-AHU-L2	AHU-2M.1 (ME Contractor)	AHU (Modulating CHW-served)	AHU - Casino	2nd Level/Casino MVAC Plant	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — …	legacy:me_actuator
C0004	PNL-AHU-L2	AHU-2M.2 (BMS Contractor)	AHU (Modulating CHW-served)	AHU - Casino	2nd Level/Casino MVAC Plant	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	legacy:bms_signal
C0005	PNL-AHU-L2	AHU-2M.2 (Equipment Supplier)	AHU (Modulating CHW-served)	AHU - Casino	2nd Level/Casino MVAC Plant	4C × 1.5 mm² FRLS (equipment aux contacts — stat…	legacy:equipment_aux
C0006	PNL-AHU-L2	AHU-2M.2 (ME Contractor)	AHU (Modulating CHW-served)	AHU - Casino	2nd Level/Casino MVAC Plant	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — …	legacy:me_actuator
C0007	PNL-CH-PLANT-GND	CH-1 (BMS Contractor)	Chiller (Package Water-Cooled)	Chilled Water	GND/Chiller Plant Room	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	legacy:bms_signal
C0008	PNL-CH-PLANT-GND	CH-1 (ME Contractor)	Chiller (Package Water-Cooled)	Chilled Water	GND/Chiller Plant Room	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — …	legacy:me_actuator
C0009	PNL-CH-PLANT-GND	CH-2 (BMS Contractor)	Chiller (Package Water-Cooled)	Chilled Water	GND/Chiller Plant Room	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	legacy:bms_signal
C0010	PNL-CH-PLANT-GND	CH-2 (ME Contractor)	Chiller (Package Water-Cooled)	Chilled Water	GND/Chiller Plant Room	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — …	legacy:me_actuator
C0011	PNL-CH-PLANT-GND	CH-3 (BMS Contractor)	Chiller (Package Water-Cooled)	Chilled Water	GND/Chiller Plant Room	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	legacy:bms_signal
C0012	PNL-CH-PLANT-GND	CH-3 (ME Contractor)	Chiller (Package Water-Cooled)	Chilled Water	GND/Chiller Plant Room	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — …	legacy:me_actuator
C0013	PNL-CHWP-GND	CHWP-1.1 (BMS Contractor)	AHU (Chilled-Water-Served)	BOH Air Handling	GND/BOH AHU Area	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	legacy:bms_signal
C0014	PNL-CHWP-GND	CHWP-1.1 (Equipment Supplier)	AHU (Chilled-Water-Served)	BOH Air Handling	GND/BOH AHU Area	4C × 1.5 mm² FRLS (equipment aux contacts — stat…	legacy:equipment_aux
C0015	PNL-CHWP-GND	CHWP-1.1 (ME Contractor)	AHU (Chilled-Water-Served)	BOH Air Handling	GND/BOH AHU Area	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — …	legacy:me_actuator
C0016	PNL-CHWP-GND	CHWP-1.2 (BMS Contractor)	AHU (Chilled-Water-Served)	BOH Air Handling	GND/BOH AHU Area	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	legacy:bms_signal
C0017	PNL-CHWP-GND	CHWP-1.2 (Equipment Supplier)	AHU (Chilled-Water-Served)	BOH Air Handling	GND/BOH AHU Area	4C × 1.5 mm² FRLS (equipment aux contacts — stat…	legacy:equipment_aux
C0018	PNL-CHWP-GND	CHWP-1.2 (ME Contractor)	AHU (Chilled-Water-Served)	BOH Air Handling	GND/BOH AHU Area	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — …	legacy:me_actuator

… showing 18 of 175 rows

Auto-derived from A1+A2+A4 with cable-length assumption A-001. 200 cable runs; 6,810 m total.

Tier 3 — A5 Network Architecture (formatted MD)

A5 — Network Architecture

Tier 3 — topology (1 core + 6 edge switches), riser fiber, IP plan, switch schedule

A5 — Network Architecture & Switch Schedule

Project: Kingsford Hotel Bacolod BMS **Date prepared:** 2026-04-27 **Source:** A-007 (isolated BMS LAN) · A4 panel schedule · BMS general spec on BMS-01

Topology

Star-and-tree topology centered on the **BMS Server Room core switch**, with riser fiber to floor/zone edge switches, and Cat6 drops to BMS panels and BACnet/IP equipment.

A5 — BMS Network Architecture

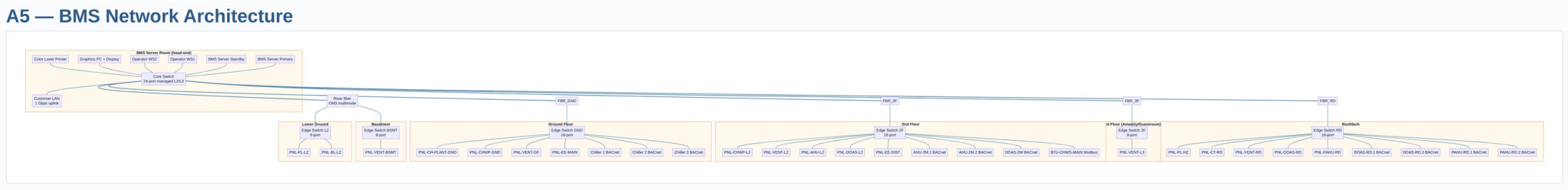
Horizontal-orientation diagram — used in both the comprehensive proposal PDF and the internal PPTX. Auto-rendered from the mermaid below by `_playbook/tools/render-mermaid.py` per the visualize-network-architecture sub-routine. Source-of-truth is the mermaid; the PNG regenerates on every deliverables run.

```
graph TD
  subgraph "BMS Server Room (head-end)"
    SVR1[BMS Server Primary]
    SVR2[BMS Server Standby]
    WS1[Operator WS1]
    WS2[Operator WS2]
    GFX[Graphics PC + Display]
    PRT[Color Laser Printer]
    CORE[Core Switch<br/>24-port managed L2/L3]
    UPLINK[Customer LAN<br/>1 Gbps uplink]
    SVR1 --- CORE
    SVR2 --- CORE
    WS1 --- CORE
    WS2 --- CORE
    GFX --- CORE
    PRT --- CORE
    CORE --- UPLINK
  end

  CORE === FBR_LZ[Riser fiber<br/>OM3 multimode]
  CORE === FBR_GND
```

Hand-curated topology and switch schedule. 1 core + 6 edge switches, OM3 fiber backbone, flat /24 IP plan.

Tier 3 — A5 Network Architecture (visual diagram)



uto-rendered from the A5 mermaid block. Star-and-tree centered on the core switch; riser fiber to per-floor edge switches; BACnet/IP equipment direct to the floor switch

Tier 3 — B3 Commissioning Point Inventory

B3 — Commissioning Point Inventory

Tier 3 — 666 test items (P2P + functional + integrated) → 313 hours of T&C · showing field: functional_test_inventory · 135 record(s)

project: Kingsford Hotel Bacolod BMS

equipment	equipment_class	location
AHU-2M.1	AHU (Modulating CHW-served)	2nd Level/Casino MVAC Plant
AHU-2M.2	AHU (Modulating CHW-served)	2nd Level/Casino MVAC Plant
BTU-CHWS-MAIN	BTU Meter	2F/CHW Pump Room
CH-1	Chiller (Package Water-Cooled)	GND/Chiller Plant Room
CH-2	Chiller (Package Water-Cooled)	GND/Chiller Plant Room
CH-3	Chiller (Package Water-Cooled)	GND/Chiller Plant Room
CHWP-1.1	AHU (Chilled-Water-Served)	GND/BOH AHU Area
CHWP-1.2	AHU (Chilled-Water-Served)	GND/BOH AHU Area
CHWP-1.3	AHU (Chilled-Water-Served)	GND/BOH AHU Area
COMP-1	Condenser Water Pump	2F/CHW Pump Room
COMP-2	Condenser Water Pump	2F/CHW Pump Room
COMP-3	Condenser Water Pump	2F/CHW Pump Room
CT-1	Cooling Tower	Roofdeck/Cooling Tower Area
CT-2	Cooling Tower	Roofdeck/Cooling Tower Area
CT-3	Cooling Tower	Roofdeck/Cooling Tower Area
CT-COMMON	Cooling Tower (Common)	Roofdeck/Cooling Tower Area
DOAS-2W	DOAS Unit	2nd Level/Casino MVAC Plant
DOAS-RD.1	DOAS Unit	Roofdeck/Hotel DOAS Plant

... showing 18 of 135 rows

Auto-derived from A1+A2: every physical I/O for P2P, every equipment for functional tests, plus 8 cross-system integrated sequences. 313 hours of T&C.

Tier 4

Integrated outputs and scope modules

Manpower, schedule, risks, and the 11 scope-module instances

Tier 4 — B4 Installation Manhour Takeoff

B4 — Installation Manhour Takeoff

Tier 4 — 3,336 hours derived from A2+A3+A4 with standard production rates · showing field: line_items · 13 record(s)

project: Kingsford Hotel Bacolod BMS

task	quantity	unit	rate_h_per_unit	hours	notes
Cable pulling (control + network + power feeds)	6810	m	0.33	2247.3	Total 6810 m. Includes 5250 m field, 1020 m trun…
Conduit installation (BMS-scope branch conduit)	2043	m	0.13	265.6	Conduit fraction = 30% of total cable. Basis: LE…
BMS field panel installation	18	panels	5.0	90.0	Mount, dress, internal verification. Pre-built i…
Field device installation (mounting + initial te…	135	devices	1.0	135.0	135 BMS-monitored equipment instances at LEGACY …
Cable termination (both ends per cable)	350	ends	0.25	87.5	175 field cables × 2 ends
Cable continuity / insulation testing	175	cables	0.25	43.8	Pre-terminate continuity + post-terminate insula…
Panel power-up + smoke test (pre-commissioning)	18	panels	1.0	18.0	Initial energization, smoke check, controller bo…
Network drop setup (patch + label + connectivity)	27	drops	0.5	13.5	BACnet/IP and Modbus drops
Field analog sensor calibration	126	AI points	0.75	94.5	Calibrate 126 analog sensors against reference; …
Fire-stopping / sealed cable penetrations	105	penetrations	0.5	52.5	Estimated 30% of cable ends require sealed penet…
Site safety attendance (toolbox, JHA, HSE briefi…	3047.7000000000003	h	0.05	152.4	5% uplift on labor base hours (LEGACY default)
Punch-list / rework allowance	3047.7000000000003	h	0.05	152.4	5% of base labor for as-installed deviations and…
As-built documentation (red-line + point DB expo…	3047.7000000000003	h	0.04	121.9	4% of base labor for as-built drawings, red-line…

Auto-derived from A2+A3+A4 using standard production rates. 3,336 hours installation labor; 417 person-days.

Tier 4 — Scope Module Instance (Controller Panels)

Scope Module Instance — Controller Panels

Tier 4 — module template instantiated as 2.3+3.4--controller-panel.md

Instance: BMS Controller Panel — Kingsford BMS

WBS leaves served: 2.3.1, 2.3.2, 2.3.3, 2.3.4, 2.3.5, 3.4.1, 3.4.2, 3.4.3, 3.4.4 **Module ref:** `_playbook/modules/bms/controller-panel.md` **Project:** Kingsford Hotel Bacolod BMS

Project-specific parameter values

- `panel_count` : **18** (per A4)
- `total_controllers` : **30** (per A4)
- `total_physical_io` : **523** (AI 126 + AO 29 + DI 348 + DO 20 = 523 per cumulative A1; subtract AI/AO from A1 actual = 126+29 = 155 plus DI 348 + DO 20 = 503 — verify)
- `total_network_drops` : **27** (per A1 Network type rows)
- `total_hli_subpoints` : 166 (per A1, drives programming hours but not physical I/O modules)
- `enclosure_size_distribution` : ~10 small + 6 medium + 2 large (refine per A4 panel I/O density)
- `redundant_psu_required` : yes for plant-room critical panels (PNL-CH-PLANT-GND, PNL-CHWP-L2, PNL-AHU-L2, PNL-DOAS-L2, PNL-BL-LZ, PNL-EE-MAIN — 6 panels)

BOQ line items (Phase 6 input)

WBS	Description	Qty	Unit	Reference
2.3.1	Plant room BMS panel (chiller plant)	1	each	A4 PNL-CH-PLANT-GND
2.3.1	Plant room BMS panel (chiller pumps + headers + BTU)	1	each	A4 PNL-CHWP-L2
2.3.1	Plant room BMS panel (cooling tower)	1	each	A4 PNL-CT-RD
2.3.1	Plant room BMS panel (LZ hotwater)	1	each	A4 PNL-PL-LZ
2.3.1	Plant room BMS panel (RD hotwater)	1	each	A4 PNL-PL-HZ
2.3.1	Plant room BMS panel (LZ boiler)	1	each	A4 PNL-BL-LZ
2.3.2	Mechanical equipment panel (BOH AHU at GND)	1	each	A4 PNL-CHWP-GND
2.3.2	Mechanical equipment panel (Casino AHUs at 2F)	1	each	A4 PNL-AHU-L2
2.3.2	Mechanical equipment panel (Casino DOAS at 2F)	1	each	A4 PNL-DOAS-L2
2.3.2	Mechanical equipment panel (Roofdeck DOAS)	1	each	A4 PNL-DOAS-RD
2.3.2	Mechanical equipment panel (Roofdeck PAHU)	1	each	A4 PNL-PAHU-RD

One of 11 scope modules instantiated for Kingsford. Module template + project-specific parameters → BOQ-ready line items.

Tier 4 — D1 Project Schedule

D1 — Project Schedule

Tier 4 — 16-week Gantt reconciled with B4 manhours (peak 11 personnel weeks 9–10)

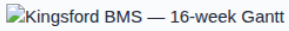
D1 — Project Schedule (High-Level Gantt)

Project: Kingsford Hotel Bacolod BMS **Total duration assumed:** 16 weeks (A-009) — refine after Q-007 (customer required completion date) **Date prepared:** 2026-04-27

Schedule basis

- **Per A-009:** 16-week duration from PO to handover, comfortable schedule, normal manpower.
- **Reconciled with B4 (Installation Manhour Takeoff):** B4 estimates 3,336 manhours of installation work (excluding engineering, programming, and T&C). At a 4-person crew, that's ~21 weeks. To fit installation in the 16-week envelope, **plan for a 6-person installation crew** during the installation phase (≈14 weeks of installation at 6-person × 8 hr × 5 day = 1,680 hrs/week → 2 weeks per 3,360 hrs = matches).
- **Critical-path activities:**
  - Engineering & Submittals → blocks Supply procurement
  - Supply (long-lead chiller controllers, head-end server, power meters) → blocks Installation
  - Installation completion of plant rooms (chiller, hotwater, boiler) → blocks plant T&C
  - Plant T&C → blocks integrated commissioning
  - Integrated commissioning → blocks SAT and Handover

Gantt (visual)


Kingsford BMS — 16-week Gantt

Kingsford BMS — 16-week Gantt

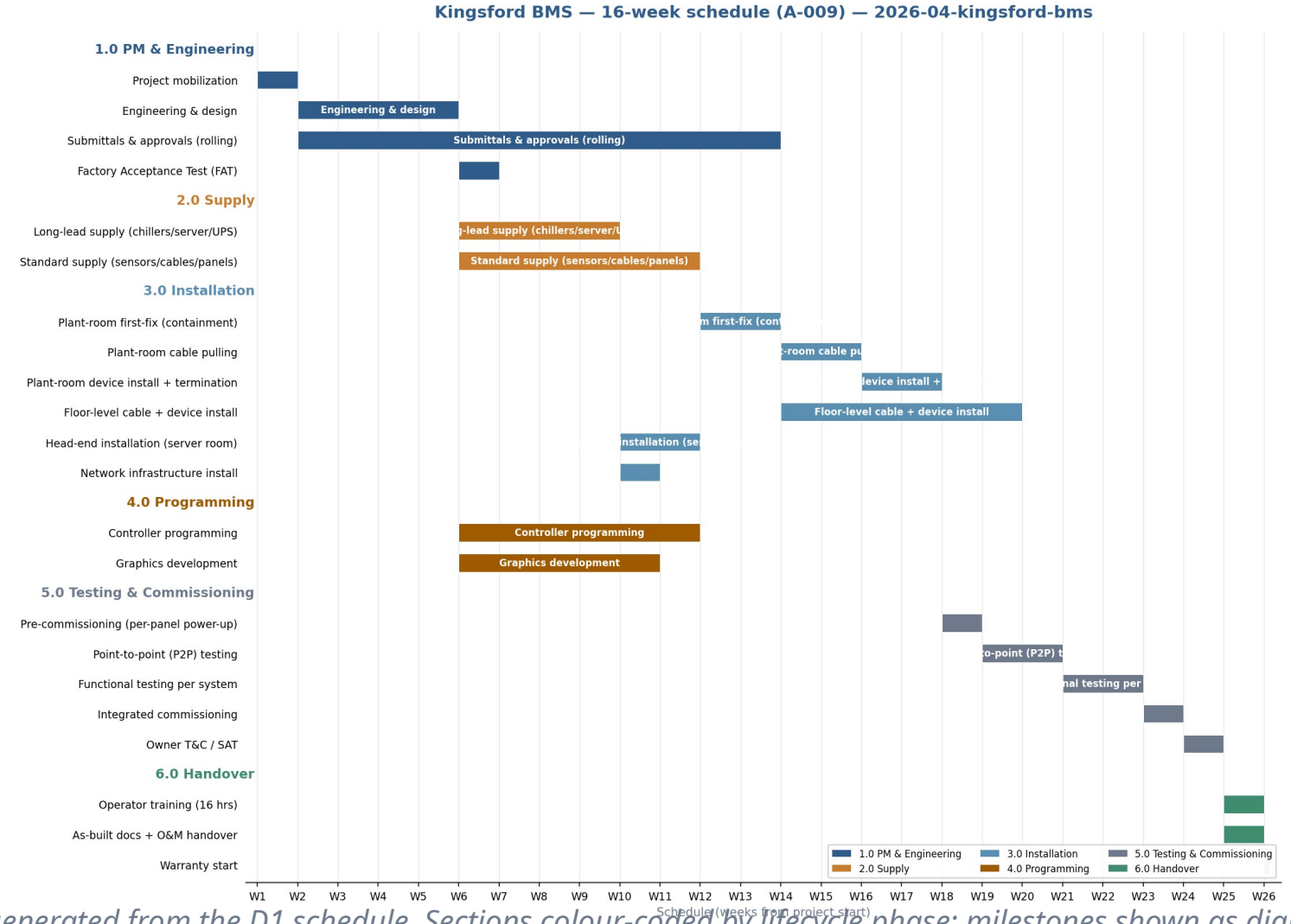
Auto-generated from the mermaid block below by `_playbook/tools/generate-gantt.py`. Source-of-truth is the mermaid; the PNG is regenerable on every deliverables run.

Gantt (mermaid source)

```
gantt
    title Kingsford BMS — 16-week schedule (A-009)
    dateFormat  YYYY-MM-DD
    axisFormat  W%V
    section 1.0 PM & Engineering
    Project mobilization                  :pm1, 2026-05-01, 1w
    Engineering & design                  :eng1, after pm1, 4w
    Submittals & approvals (rolling)      :sub1, after pm1, 12w
```

Hand-curated 16-week schedule reconciled with B4 manhours. Reveals: 4-person crew can't fit; need 6-person.

Tier 4 — D1 Project Schedule (visual Gantt)



Auto-generated from the D1 schedule. Sections colour-coded by lifecycle phase; milestones shown as diamonds.

Tier 6

Bill of Quantities — the costed output

86 line items aggregated from working docs + pricing rate library — PHP 21.98 M grand total

Tier 6 — Bill of Quantities

06 — Bill of Quantities

Tier 6 — 86 line items aggregated from working docs + pricing rate library; PHP 21.98 M grand total

06 — Bill of Quantities (BOQ)

Project: Kingsford Hotel Bacolod BMS **Currency:** PHP **Total line items:** 86 · **RFQ-required:** 63 (73.3%) **Generated:** by `_playbook/tools/generate-06-boq.py` from working docs A1–B4 + pricing defaults

Pricing structure

- Base subtotal: **PHP 15,211,875**
- Overhead & margin (20%): PHP 3,042,375
- Cost + overhead: PHP 18,254,250
- Contingency (7.5%): PHP 1,369,069
- Cost + contingency: PHP 19,623,319
- VAT (12%): PHP 2,354,798
- **Grand total: PHP 21,978,117**
- *Optional items (7.x), priced separately:* PHP 0 (most TBD per Q-012/Q-015/Q-016)

Section subtotals

Section	Subtotal	% of base
1.0	PHP 1,688,000	11.1%
2.0	PHP 10,792,510	70.9%
3.0	PHP 1,743,025	11.5%
4.0	PHP 417,040	2.7%
5.0	PHP 480,100	3.2%
6.0	PHP 91,200	0.6%
Base total	**PHP 15,211,875**	**100.0%**

Cost pool breakdown (base, excl. optional)

Mechanical aggregation: the BOQ generator reads working docs A1–B4 and applies the pricing rate library. Every line cites its source.

Tier 7

Customer-facing synthesis

The proposal narrative + supplier RFQ package

Tier 7 — Customer Proposal Draft

10 — Customer Proposal Draft

Tier 7 — synthesizes 01–09 into customer-facing narrative with cover letter, technical proposal, commercial summary

Proposal — Building Management System

Kingsford Hotel Bacolod Project

Submitted to: Megaworld Corporation **Project Reference:** TUEC-PR-AUX-010 — BMS **Date:** 2026-04-28 **Proposal validity:** 90 days from issue **Currency:** Philippine Peso (PHP)

1. Cover Letter

To Megaworld Corporation Attention: Mr. Rome Amiel P. Gonzales

Dear Sir,

We are pleased to submit our proposal for the **Complete Supply, Delivery, Installation, Testing and Commissioning of the Building Management System** for the **Kingsford Hotel Bacolod** project, in response to your enquiry and based on the following Construction Bulletin documents:

- BMS Points list (TUEC) — sheets BMS-01, BMS-02, BMS-03, dated October 2025, by R.J. Calpo & Company
- EE Plan (TUEC) — Construction Bulletin No.8, dated November 5, 2025, by Mario A. Alix Philippines, Inc.
- Megaworld MC Standards — BMS Standards CONDOTELS (DRC-004-2024), Mechanical and Plumbing Points Lists

This proposal covers a comprehensive Building Management System designed to monitor and control the building's mechanical, plumbing, electrical-metering, and casino-MVAC systems, with operator-friendly graphics, energy-savings algorithms, and standards-compliant integration via BACnet IP and Modbus protocols. Our scope follows the project-specific points list issued by R.J. Calpo & Company while complying with the Megaworld MC Standards baseline.

We have identified a number of items that we have assumed for purposes of this proposal — these are listed in **Section 7 (Stated Assumptions)** and **Section 8 (Inclusions / Exclusions / Clarifications)**. Should you wish to confirm any of these or revise our basis, our team is ready to refine the proposal accordingly.

We thank you for the opportunity and look forward to your favourable consideration.

Sincerely yours,

[BMS Contractor signatory] [Name, Title]

2. Executive Summary

Item	Value
Project	Kingsford Hotel Bacolod — BMS

sizes Tiers 1–6 into a customer-facing narrative: cover letter, executive summary, technical proposal, schedule, commercial summary, stated assumptions, inclusions/excl

Tier 8

Final rendered deliverables

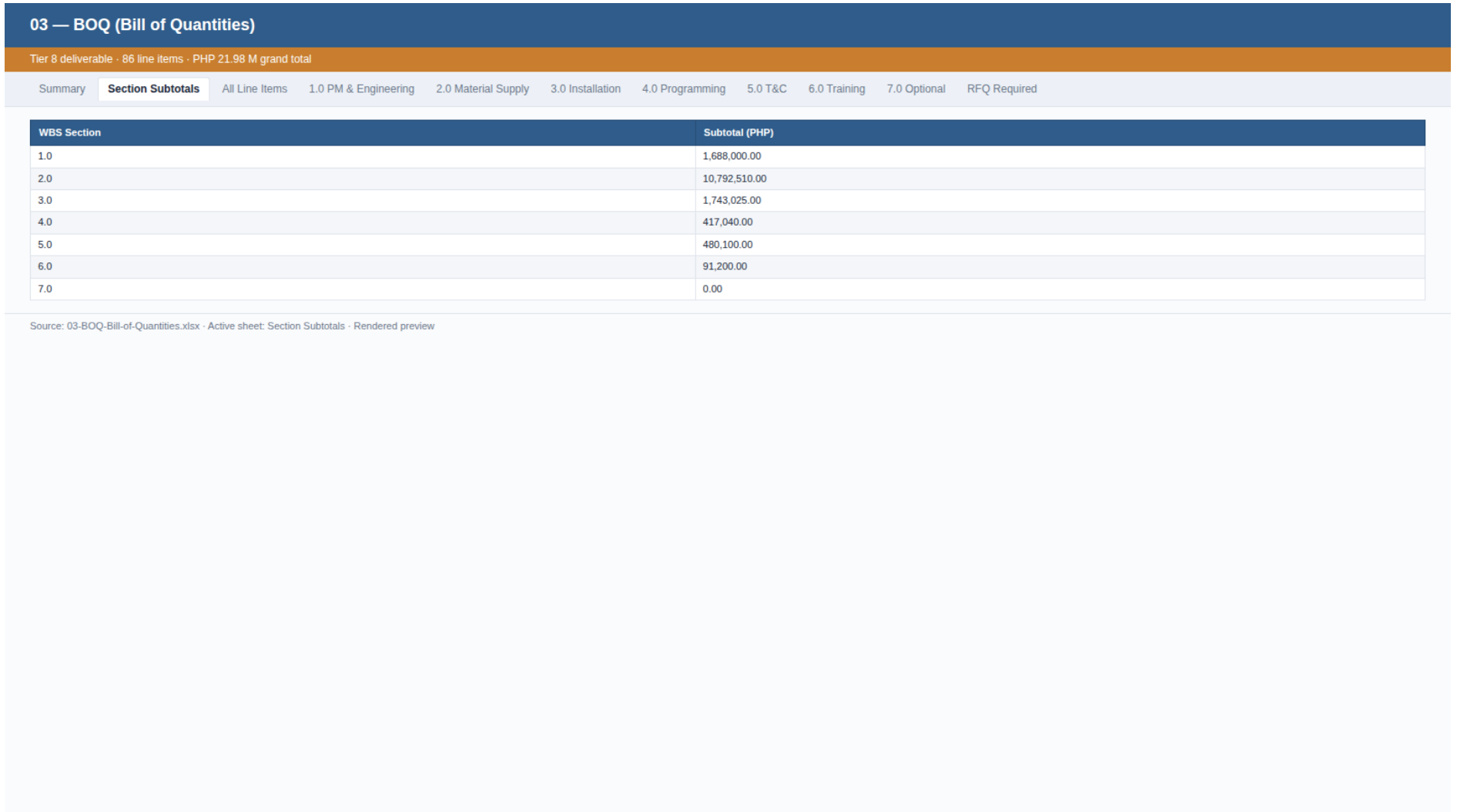
13 customer-ready files produced from a single command

Tier 8 — Final Deliverables Package

Mechanical helpers render Tier 7 markdown/YAML into PDF / DOCX / Excel / PPTX

File	Format	Size	Pages / Sheets / Slides
01-Initial-Overview	PDF	80 KB	7 pages
02-Proposal-Draft	PDF	239 KB	30 pages
03-BOQ-Bill-of-Quantities	Excel	29 KB	11 sheets
04-A1-IO-List	Excel	51 KB	2 sheets
05-A2-Equipment-Takeoff	Excel	18 KB	2 sheets
06-A3-Cable-Schedule	Excel	20 KB	4 sheets
07-A4-Panel-Schedule	Excel	10 KB	3 sheets
08-Open-Items-RFI	Word	15 KB	—
09-Stated-Assumptions	Word	16 KB	—
10-Proposal-Comprehensive	PDF + DOCX	1.5 MB + 50 KB	92 pages
11-Customer-Proposal-Presentation	PowerPoint	74 KB	31 slides
12-Internal-Methodology-Presentation	PowerPoint	70 KB	this deck

Tier 8 — BOQ (Bill of Quantities), Section Subtotals



03 — BOQ (Bill of Quantities)

Tier 8 deliverable · 86 line items · PHP 21.98 M grand total

Summary | **Section Subtotals** | All Line Items | 1.0 PM & Engineering | 2.0 Material Supply | 3.0 Installation | 4.0 Programming | 5.0 T&C | 6.0 Training | 7.0 Optional | RFQ Required

WBS Section	Subtotal (PHP)
1.0	1,688,000.00
2.0	10,792,510.00
3.0	1,743,025.00
4.0	417,040.00
5.0	480,100.00
6.0	91,200.00
7.0	0.00

Source: 03-BOQ-Bill-of-Quantities.xlsx · Active sheet: Section Subtotals · Rendered preview

The Excel file the team opens. Multi-sheet workbook — Summary, Section Subtotals, All Line Items, per-WBS sheets, RFQ Required filter. PHP 21.98 M grand total.

Tier 8 — BOQ · All Line Items

03 — BOQ · All Line Items

Tier 8 deliverable · WBS-grouped, costed, RFQ-flagged

Summary | Section Subtotals | **All Line Items** | 1.0 PM & Engineering | 2.0 Material Supply | 3.0 Installation | 4.0 Programming | 5.0 T&C | 6.0 Training | 7.0 Optional | RFQ Required

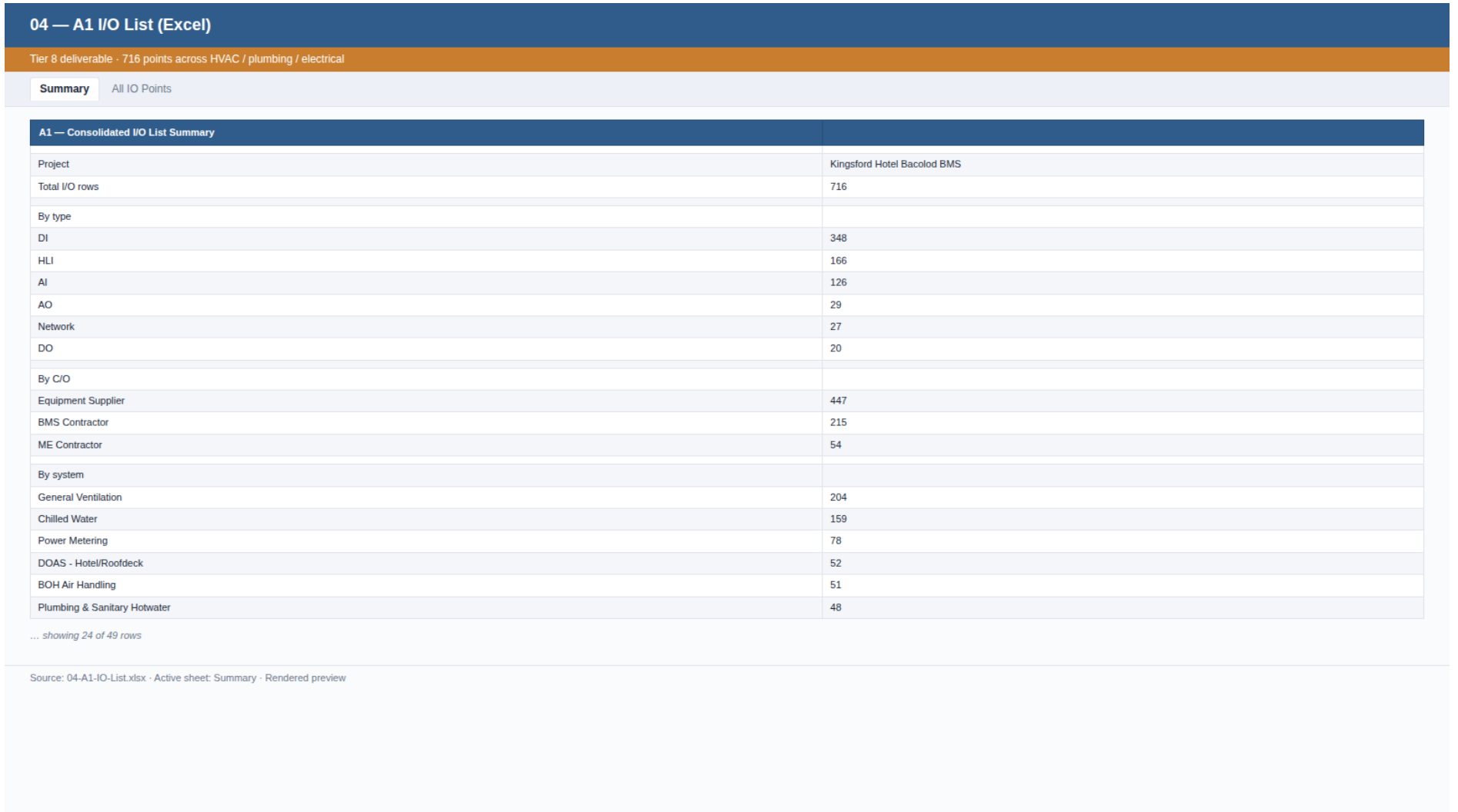
WBS	Description	Qty	Unit	Unit Price (PHP)	Extended (PHP)	Source	Rate Source	RFQ Required
1.1	Project management (off-site, full duration, 16 weeks)	640	hr	1500	960000	D2 PM 1 FTE × 16 wk	internal	
1.1	Site mobilization (week 1)	80	hr	1500	120000	D1 + B4 mobilization	internal	
1.2	Engineering & design (system architecture, panel layouts, …	320	hr	1200	384000	D2 engineering allocation	internal	
1.3	Submittals & approvals administration	80	hr	1200	96000	within engineering budget	internal	
1.4	Factory Acceptance Test (FAT) delivery	1	lot	80000	80000	D1 week 5	default	
1.4	FAT support hours (BMS engineer)	40	hr	1200	48000	D2 week 5	internal	
2.1.1	BMS Server (Primary) — dual-CPU, 16+ GB RAM, redundant PSU	1	each	350000	350000	A6 HE-SVR-01	default	✓
2.1.1	BMS Server (Standby, redundancy)	1	each	350000	350000	A6 HE-SVR-02	default	✓
2.1.2	Operator Workstation	2	each	80000	160000	A6 HE-WS-01, HE-WS-02	default	✓
2.1.3	Graphics PC + 55-inch Display	1	set	150000	150000	A6 HE-GFX-01	default	✓
2.1.4	Head-End UPS (3 kVA, 30-min runtime)	1	each	90000	90000	A6 HE-UPS-01	default	✓
2.1.5	Software licenses (server + 3 client + energy module + gra…	1	lot	600000	600000	A6 HE-SW-*	default	✓
2.1.6	Server-room peripherals (KVM, console monitor, color laser…	1	lot	80000	80000	A6 HE-PRINTER, HE-RACK, HE-KVM, HE-MON	default	✓
2.2.1	Core managed L2/L3 switch (24-port + 4 SFP)	1	each	120000	120000	A5 SW-CORE	default	✓
2.2.2	Edge managed L2 switch (16-port + 2 SFP)	3	each	35000	105000	A5 SW-GND/2F/RD	default	✓
2.2.2	Edge managed L2 switch (8-port + 2 SFP)	3	each	18000	54000	A5 SW-LZ/3F/BSMT	default	✓
2.2.3	Riser fiber, OM3 multimode 6-strand armored	300	m	280	84000	A5	default	✓
2.2.3	Fiber transceivers (1G SX/LX, paired)	14	each	8000	112000	A5	default	✓
2.2.4	IDF wall-mount enclosures (9U)	6	each	18000	108000	A5	default	✓
2.3.1+2.3.2+2.3.3+2.3.4	BMS field cabinet (small, IP54 wall-mount)	10	each	40000	400000	A4 panels (small I/O)	default	✓
2.3.1+2.3.2+2.3.3+2.3.4	BMS field cabinet (medium, IP54 wall-mount)	6	each	80000	480000	A4 panels (medium I/O)	default	✓
2.3.1+2.3.2+2.3.3+2.3.4	BMS field cabinet (large, IP54 wall-mount)	2	each	150000	300000	A4 panels (large I/O)	default	✓
2.3.5	DDC controllers (incl. network gateway controllers)	30	each	90000	2700000	A4 total_controllers	default	✓
2.3.5	AI input modules (16-channel)	10	each	40000	400000	126 AI + 25% spare ÷ 16	default	✓

… showing 24 of 86 rows

Source: 03-BOQ-Bill-of-Quantities.xlsx · Active sheet: All Line Items · Rendered preview

86 costed line items, WBS-grouped, RFQ-flagged. Every quantity traces to a working doc; every rate to the pricing rate library.

Tier 8 — A1 I/O List (Excel)



04 — A1 I/O List (Excel)

Tier 8 deliverable · 716 points across HVAC / plumbing / electrical

Summary | All IO Points

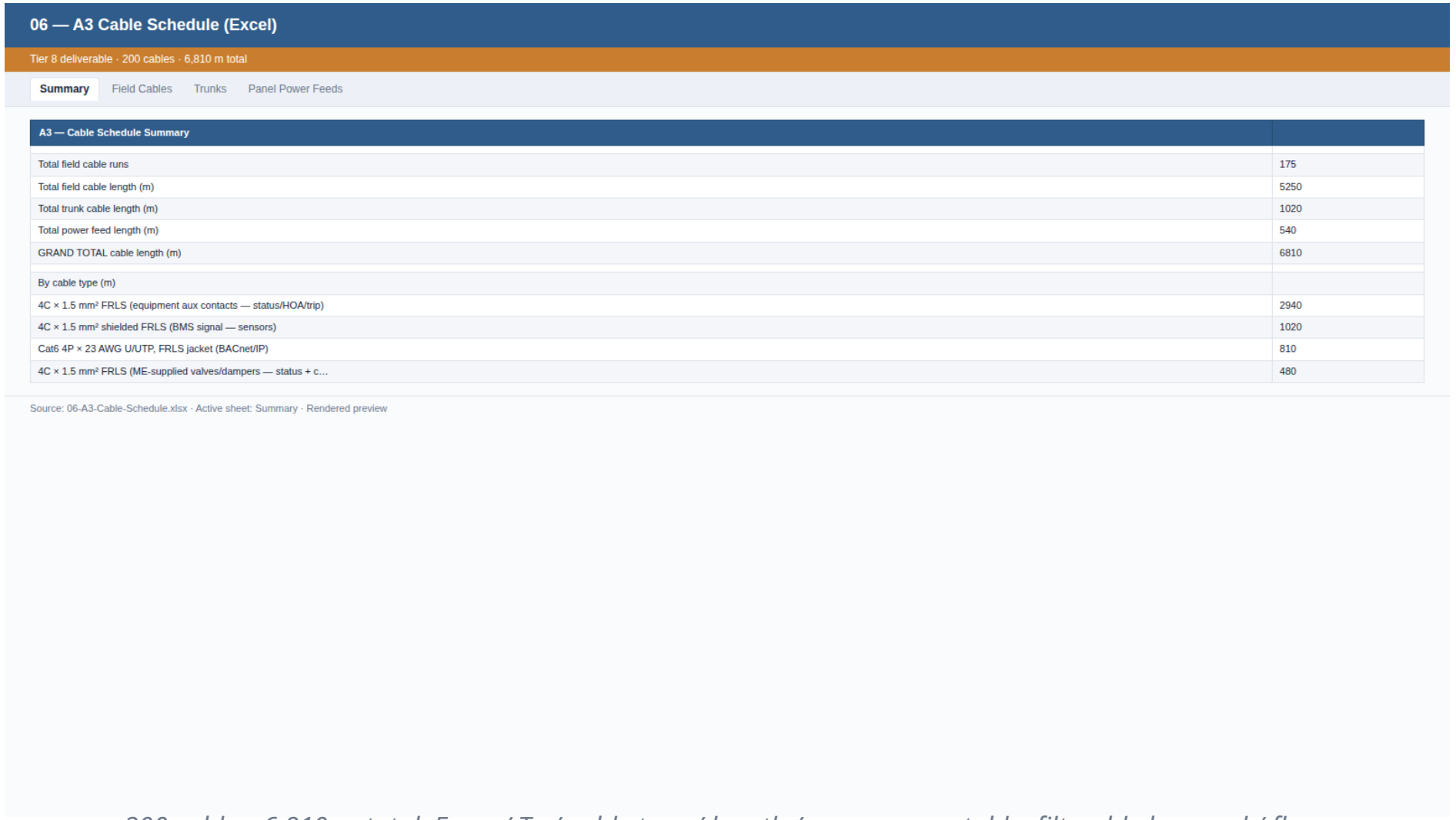
A1 — Consolidated I/O List Summary	
Project	Kingsford Hotel Bacolod BMS
Total I/O rows	716
By type	
DI	348
HLI	166
AI	126
AO	29
Network	27
DO	20
By C/O	
Equipment Supplier	447
BMS Contractor	215
ME Contractor	54
By system	
General Ventilation	204
Chilled Water	159
Power Metering	78
DOAS - Hotel/Roofdeck	52
BOH Air Handling	51
Plumbing & Sanitary Hotwater	48

... showing 24 of 49 rows

Source: 04-A1-IO-List.xlsx · Active sheet: Summary · Rendered preview

716 points across HVAC / plumbing / electrical, with system / equipment / location / panel / point description / type / source.

Tier 8 — A3 Cable Schedule (Excel)



06 — A3 Cable Schedule (Excel)

Tier 8 deliverable · 200 cables · 6,810 m total

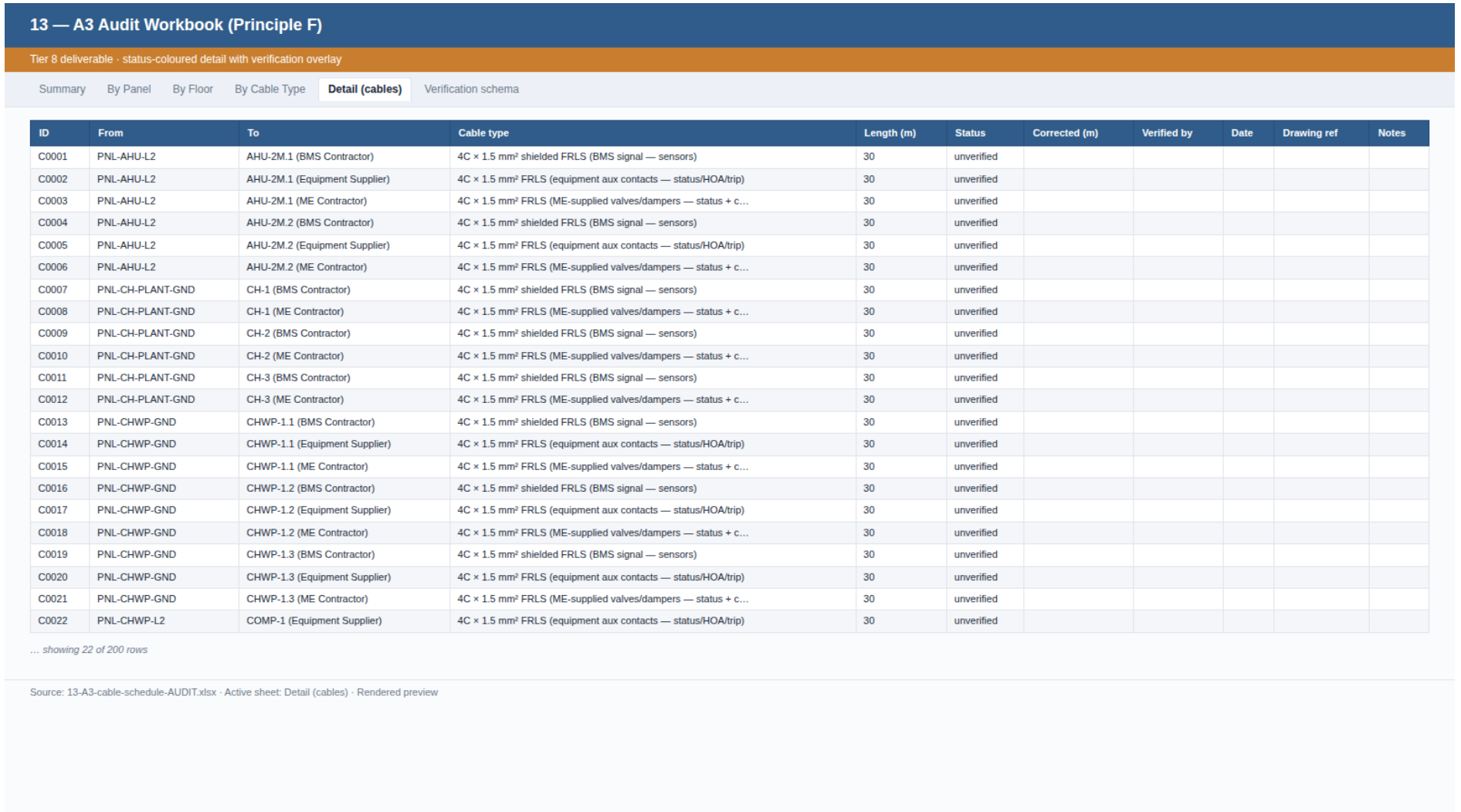
Summary | Field Cables | Trunks | Panel Power Feeds

A3 — Cable Schedule Summary	
Total field cable runs	175
Total field cable length (m)	5250
Total trunk cable length (m)	1020
Total power feed length (m)	540
GRAND TOTAL cable length (m)	6810
By cable type (m)	
4C × 1.5 mm² FRLS (equipment aux contacts — status/HOA/trip)	2940
4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	1020
Cat6 4P × 23 AWG U/UTP, FRLS jacket (BACnet/IP)	810
4C × 1.5 mm² FRLS (ME-supplied valves/dampers — status + c…	480

Source: 06-A3-Cable-Schedule.xlsx · Active sheet: Summary · Rendered preview

200 cables, 6,810 m total. From / To / cable type / length / source — sortable, filterable by panel / floor.

Tier 8 — A3 Audit Workbook (Principle F)



13 — A3 Audit Workbook (Principle F)

Tier 8 deliverable · status-coloured detail with verification overlay

Summary | By Panel | By Floor | By Cable Type | **Detail (cables)** | Verification schema

ID	From	To	Cable type	Length (m)	Status	Corrected (m)	Verified by	Date	Drawing ref	Notes
C0001	PNL-AHU-L2	AHU-2M.1 (BMS Contractor)	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	30	unverified					
C0002	PNL-AHU-L2	AHU-2M.1 (Equipment Supplier)	4C × 1.5 mm² FRLS (equipment aux contacts — status/HOA/trip)	30	unverified					
C0003	PNL-AHU-L2	AHU-2M.1 (ME Contractor)	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — status + c…	30	unverified					
C0004	PNL-AHU-L2	AHU-2M.2 (BMS Contractor)	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	30	unverified					
C0005	PNL-AHU-L2	AHU-2M.2 (Equipment Supplier)	4C × 1.5 mm² FRLS (equipment aux contacts — status/HOA/trip)	30	unverified					
C0006	PNL-AHU-L2	AHU-2M.2 (ME Contractor)	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — status + c…	30	unverified					
C0007	PNL-CH-PLANT-GND	CH-1 (BMS Contractor)	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	30	unverified					
C0008	PNL-CH-PLANT-GND	CH-1 (ME Contractor)	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — status + c…	30	unverified					
C0009	PNL-CH-PLANT-GND	CH-2 (BMS Contractor)	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	30	unverified					
C0010	PNL-CH-PLANT-GND	CH-2 (ME Contractor)	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — status + c…	30	unverified					
C0011	PNL-CH-PLANT-GND	CH-3 (BMS Contractor)	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	30	unverified					
C0012	PNL-CH-PLANT-GND	CH-3 (ME Contractor)	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — status + c…	30	unverified					
C0013	PNL-CHWP-GND	CHWP-1.1 (BMS Contractor)	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	30	unverified					
C0014	PNL-CHWP-GND	CHWP-1.1 (Equipment Supplier)	4C × 1.5 mm² FRLS (equipment aux contacts — status/HOA/trip)	30	unverified					
C0015	PNL-CHWP-GND	CHWP-1.1 (ME Contractor)	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — status + c…	30	unverified					
C0016	PNL-CHWP-GND	CHWP-1.2 (BMS Contractor)	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	30	unverified					
C0017	PNL-CHWP-GND	CHWP-1.2 (Equipment Supplier)	4C × 1.5 mm² FRLS (equipment aux contacts — status/HOA/trip)	30	unverified					
C0018	PNL-CHWP-GND	CHWP-1.2 (ME Contractor)	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — status + c…	30	unverified					
C0019	PNL-CHWP-GND	CHWP-1.3 (BMS Contractor)	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	30	unverified					
C0020	PNL-CHWP-GND	CHWP-1.3 (Equipment Supplier)	4C × 1.5 mm² FRLS (equipment aux contacts — status/HOA/trip)	30	unverified					
C0021	PNL-CHWP-GND	CHWP-1.3 (ME Contractor)	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — status + c…	30	unverified					
C0022	PNL-CHWP-L2	COMP-1 (Equipment Supplier)	4C × 1.5 mm² FRLS (equipment aux contacts — status/HOA/trip)	30	unverified					

… showing 22 of 200 rows

Source: 13-A3-cable-schedule-AUDIT.xlsx · Active sheet: Detail (cables) · Rendered preview

Per-cable Detail with status-coloured cells (green/red/yellow/grey) — auto-filter so the team can isolate unverified rows for site walkthroughs.

Tier 8 — Comprehensive Proposal (PDF cover page)

Kingsford Hotel Bacolod BMS

Comprehensive Technical & Commercial Proposal

Document version: 1.0 (initial issue) **Date of issue:** 2026-04-28 **Prepared for:** Megaworld Corporation **Project reference:** TUEC-PR-AUX-010 — Building Management System **Site:** Manhattan Street, The Upper East, Bacolod City, Negros Occidental **Proposal validity:** 90 days from date of issue **Currency:** Philippine Peso (PHP)

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1. Cover Letter

To Megaworld Corporation

Attention: Mr. Rome Amiel P. Gonzales

Dear Sir,

Subject: Proposal — Building Management System, Kingsford Hotel Bacolod

This proposal covers the supply, installation, testing, and commissioning of the BMS for the Kingsford Hotel Bacolod project. It is based on the documents you provided:

- **BMS Points list (TUEC)** — sheets BMS-01, BMS-02, and BMS-03 (Process and Instrumentation Diagrams), dated October 2025, prepared by R.J. Calpo & Company under the seal of Reynaldo J. Calpo, Professional Mechanical Engineer (License No. 0001784)
- **EE Plan (TUEC)** — Construction Bulletin No.8, dated 5 November 2025, prepared by Mario A. Alix Philippines, Inc., covering revised electrical layouts, load schedules, and power riser diagrams
- **Megaworld MC Standards** — DRC-004-2024 Revised BMS Standards Condotels, including Mechanical and Plumbing Points Lists

The project-specific points list governs the scope. The MC Standards serve as the baseline where the project-specific specification is silent. Where the documents are silent or ambiguous, we made the assumptions catalogued in **Section 11 (Stated Assumptions)** with their cost impact. Review those before contract execution.

The customer-facing PDF. ~92 pages: cover letter, executive summary, technical proposal, schedule, commercial summary, stated assumptions, inclusions/exclusions.

Principles

Why the framework holds together

Five design principles that govern every project

Design Principles A–F

These principles govern when to extend the framework and what to keep adaptive

	Principle	Why it matters
A	Mechanical helpers operate only on standardized agent-prepared data	Customer document interpretation stays adaptive, in agent instructions
B	Engineering judgment lives in agent instructions	Agent CAN write project-specific helpers when needed; permanent tools are mechanical
C	The applicability check is foundational	Phase 5a always begins with 'what we need vs. what's given'
D	Determinism through standard formats — and translation when needed	Customer-provided docs are translated to standard format BEFORE downstream work
E	Document tier classification (the dependency DAG)	Strict tier ordering; no circular references; build order is known
F	Transparency and auditability — never hide weak spots	Auto-generated quantities the team must verify get a verification overlay + sibling audit workbook

Determinism through standard formats

Standard formats are the contract that lets mechanical helpers run reliably

Standard formats (the contract)

Every working-doc type has ONE canonical format:

• I/O list — standard YAML schema (id, system, equipment, location, point description, type, field device, C/O, source, ...)

• BOQ — standard YAML schema (line items with WBS, qty, unit, rate, source, RFQ flag)

• Cable, panel, equipment takeoff — each has a single canonical format

• Pricing rate library + equipment-class defaults — standard YAML, peer-reviewable

Translation at the entry boundary

When the customer supplies a document that covers a working-doc type:

1. The agent transcribes it into our standard format BEFORE proceeding.

2. Each translated row cites the customer's source file for traceability.

3. Schema mismatches surface as assumptions and clarifications.

4. Downstream work always operates on the standardized representation, never on the customer's native format.

Result: regardless of customer format variation, downstream pipeline stays deterministic.

Where mechanical automation ends and judgment begins

We're conservative about what we automate

Mechanical (Python helpers)

Pure data aggregators on standardized YAML — no customer-document interpretation:

- BOQ aggregator
- RFQ packager
- Excel exporters
- PDF / DOCX rendering
- Presentation builders

Why safe:

- No customer-document interpretation
- Input/output formats are fixed
- Every quantity is sourced from agent-prepared data

Agent-driven (sub-routines / instructions)

Adaptive instructions in the playbook — sub-routines the agent follows:

- Customer document extraction protocol
- Project classification (triangulation)
- Required-doc checklist comparison
- WBS scope decomposition
- Working-document applicability matrix
- Working-document content (e.g., interpreting a points list into an I/O list)
- Module instance parameter selection
- Assumption rationale and impact assessment
- Customer clarification framing

When format/scope is genuinely unique, the agent writes a project-specific helper script.

Principle F — Transparency & auditability layer

Some auto-generated quantities are inherently soft. We don't pretend; we make them visible and editable.

The honest framing

The named weakest spot: cable lengths.

Today the agent uses assumption A-001 — 30 m average panel-to-device run, 80 m trunk per floor — because we don't always have scaled drawings or a site walkthrough yet.

Field-verified lengths typically vary ±20% per cable. If we hide that, the BOQ looks more confident than it is.

The fix is a transparency layer that makes weak spots obvious and editable — not buried in a YAML footnote.

The mechanism (Principle F)

How it works:

1. Every team-verifiable working doc (A1, A2, A3, A4, A6, B4, D1) supports a verification: overlay block per row — status / corrected_<field> / verified_by / drawing_ref / notes.

2. Mechanical helpers respect the corrected value when present — corrections flow into B4 manhours, BOQ, and final deliverables automatically.

3. A sibling Excel audit workbook is generated alongside each YAML — that's the team's review surface.

4. Audit workbook is regenerable; canonical YAML is the single source of truth.

The audit workbook — what the team actually opens

XLSX, multi-sheet, filterable. Built for how the proposal team works in Excel daily.

What's in the workbook

Each audit workbook contains:

• Summary — totals, status counts (colour-coded), known weak points, correction workflow

• Per-axis rollups — e.g., A3 cable schedule has By Panel / By Floor / By Cable Type

• Detail — every row with auto-filter + frozen header; status cells colour-coded (green=verified, red=needs correction, yellow=uncertain, grey=unverified)

• Verification schema — copy-pasteable YAML template + priority-ordered verification methods

How the team uses it

Workflow in practice:

• At desk: open A3-cable-schedule-AUDIT.xlsx, filter Detail by panel, cross-check totals against architectural drawings.

• On site: print or open on tablet, walk the building, mark up.

• Back at desk: edit A3-cable-schedule.yaml — add a verification: block with corrected_length_m, status, drawing_ref.

• Re-run the deliverables generator — corrections propagate.

Where this is going — the proposal cockpit (v1+)

v0 surfaces ask the user to think like the agent. The cockpit inverts that.

Where we are

Today (v0):

• Customer drops files in a folder
• Agent runs in a terminal
• Outputs land as XLSX / PDF / DOCX
• Verification = open Excel + edit YAML

Honest, but technical. The user has to think in our shapes.

Where we're going

Tomorrow (v1+ journey-style UX):

1. Drop-zone intake — drag-and-drop with auto-classified document tiles.

2. One 'Generate proposal' button — live phase-by-phase progress.

3. Tier walk — visual timeline Tier 0 → Tier 8, click any node to inspect lineage.

4. Audit cockpit — split-pane: drawing on left ~70%, filterable row list on right ~30%; click a row, drawing pans to the grid reference; inline-edit writes back to YAML.

5. Regen loop — one button refreshes downstream artifacts; diffs are visible per phase.

Quality and Trust

Why this approach delivers a defensible, auditable proposal

- ✓ Every quantity is traceable — each BOQ line cites its working doc; each working doc cites the customer's source document
- ✓ Assumptions are explicit — 19 stated assumptions in the proposal, each with cost-impact-if-wrong
- ✓ The basis is reproducible — re-run the aggregators and the same input produces the same output
- ✓ No hidden magic in labor / rates — pricing defaults are a peer-reviewable rate library
- ✓ Customer questions have documented answers — each clarification has a default assumed and a rationale
- ✓ Audit trail — every change committed with a 'why' message
- ✓ Deliverables are internally consistent — the BOQ in the PDF equals the BOQ in the Excel equals the BOQ in the proposal narrative

Time Savings: before vs. after

What used to take 2–3 weeks now takes 5–7 working days

Phase	Before (hand-rolled)	After (this framework)
Phases 1–4: Intake → WBS	2–3 days, often inconsistent	1 day with structured walkthrough
Phase 5a: Working docs	5–7 days hand-typing	2–3 days (about half are auto-aggregated)
Phase 5b: Module instantiation	Skipped or hand-built	0.5 day (templates)
Phase 6: BOQ	2–3 days hand-Excel	Hours (one command)
Phases 7–8: Assumptions + RFI	Often missed, ad-hoc	Hours (auto-organized)
Phase 9: RFQ to suppliers	Manual emails per category	Hours (12 docs auto-categorized)
Phase 10: Proposal narrative	3–5 days hand-write	1 day (templates + auto-populate)
Total typical	2–3 weeks	5–7 working days

Kingsford BMS Pilot — what we produced

From 5 customer documents (~165 MB) to a 13-file deliverables package

716
BMS I/O points enumerated

135
Equipment instances cataloged

18
Field panels designed

6,810 m
Cable footage estimated

4,648 hr
Project effort calculated

PHP 21.98M
Grand total proposal value

63 / 86
BOQ items / RFQ-flagged

12
Supplier RFQ docs generated

19
Customer clarifications cataloged

This is version 0. It will be the worst version of this system.

Every project from now on patches the agent instructions where edge cases surface

- What v0 IS:
  - A working end-to-end pipeline that produced the Kingsford proposal
  - A baseline of the 17 working-doc types and 11 scope modules for BMS
  - A pricing rate library that's defensible at mid-market
  - A complete deliverables package the customer can act on
- What v0 is NOT yet:
  - Calibrated against won-bid actuals (so pricing defaults will tighten)
  - Tested across customer formats beyond Megaworld's TUEC convention
  - Tracking edge cases that haven't been encountered yet
  - Handling rehab/retrofit scope (modules retired during Kingsford classification will be re-activated)
-
- Every project from here is an opportunity to improve. When an edge case surfaces, we patch the agent's instructions immediately so the next project benefits.

The vision: per-customer × per-discipline tracks

Soon the agent will recognize which 'track' a project belongs to and apply tuned defaults

Tracks the framework will support

Examples of future tracks:

• megaworld-bms
  → Tuned for TUEC points-list convention, Megaworld portfolio standardization, hotel/condotel scope patterns

• san-miguel-electrical
  → Tuned for SMC's switchgear standards, motor-control specifications, plant electrical typology

• dmci-automation
  → Tuned for DMCI's process-automation conventions, PLC + SCADA standards

Each track tunes:
  – the required-docs checklist
  – the equipment-class defaults
  – the pricing rate library
  – the module templates

How tracks emerge from real projects

How tracks emerge:

1. After 2–3 projects on the same (customer × discipline) pair, patterns become clear:
   – Which docs they always supply
   – Which they never supply
   – Their preferred brands
   – Their typical project profile
   – Their commercial term defaults

2. We capture those patterns as a track configuration in the playbook (still markdown / YAML).

3. The agent loads the track at project kickoff and starts with track-tuned defaults instead of framework-wide defaults.

4. Over time, every major customer-discipline combination has its own track, and the agent's first proposal on that pairing is already 80% calibrated.

Next Steps

What we're asking the team to do

- ☐ Review this Kingsford pilot — proposal narrative, BOQ, working documents
- ☐ Validate the pricing defaults against your last 2–3 won bids
- ☐ Provide feedback on module templates (anything missing? anything redundant?)
- ☐ Identify the next project to pilot the framework on
- ☐ Identify 2–3 estimators willing to learn the framework
- ☐ Decide on adoption pace: opt-in pilot, then mandate
- ☐ Approve the pricing rate library for inclusion in the playbook
- ☐ Schedule a follow-up review in 2 weeks after a second pilot
- ☐ Begin curating the first track — likely megaworld-bms, given Kingsford as the seed

Questions, Feedback, Discussion

Let's discuss how we make this stick — and which project to run next.