

# 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 H

Source: 2026-04-kingsford-bms-AB/\_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

el-rivera/RTRX13-Shared/Proposals/projects/2026-04-kingsford-bms-AB/00-customer-inputs/\_extracted/pages/BMS

## Tier 0 — EE Plan (TUEC), Cover Letter

rojel-rivera/RTRX13-Shared/Proposals/projects/2026-04-kingsford-bms-AB/00-customer-inputs/\_extracted/pages/E

*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

ojel-rivera/RTRX13-Shared/Proposals/projects/2026-04-kingsford-bms-AB/00-customer-inputs/\_extracted/pages/M

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

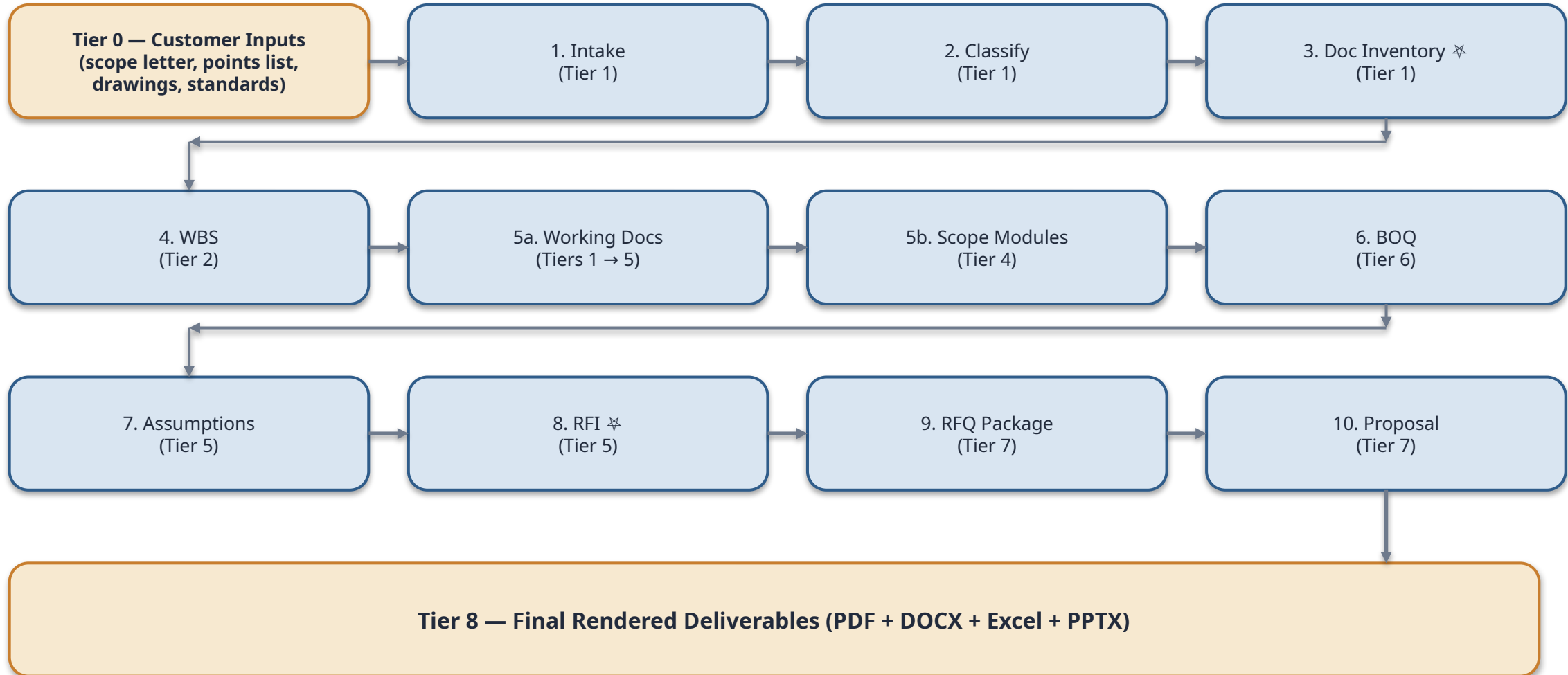
## Tier 0 — MC Standards, Plumbing Points List

ojel-rivera/RTRX13-Shared/Proposals/projects/2026-04-kingsford-bms-AB/00-customer-inputs/\_extracted/pages/M

*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 — Building Management System (Rehabilitation) **Customer:** Megaworld Corporation (Owner / Developer) **Location:** Manhattan Street, The Upper East, Bacolod City, Negros Occidental, Philippines  
**Date prepared:** 2026-04-28

#### 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 (entire body)

#### Parties

Role	Entity	Notes
Owner / Developer	Megaworld Corporation	9/F Two World Square, 24th Upper McKinley Road, Taguig City — addressee on EE cover letter is Rome Amiel P. Gonzales (Megaworld)
Mechanical Engineer (BMS standards)	Reynaldo J. Calpo (R.J. Calpo & Company, Inc.)	Sealed BMS Construction Bulletin sheets (BMS-01..03), title PR# 104-334-983
Architect	Hermes M. Coyland (per BMS-01 title block)	Project architect referenced in title strip
Electrical Consultant	Mario A. Alix Philippines, Inc. (John Paul P. Dres, REE)	Issued Construction Bulletin No. 8 (2025-11-05) covering electrical revisions; APD reviewed 2025-11-19/20
Megaworld review	F. Villa-Real II (BMS sheets, 2025-12-05); F.L. Dilidili (EE-CB#8, 2025-11-18); CABuenconsejo APD	(not stated) main contractor on the issued documents
Main contractor	(not stated)	

#### Project context

- **Building type:** Mixed-use Casino-Hotel (Casino at 2nd Level; guest rooms at 3rd Floor and Roofdeck Level; BOH/Amenities/Restaurants at GF and Lower-Ground/Basement)
- **Stage: Rehabilitation** of the BMS (per the literal request — "Rehabilitation of Building Management System"). Surrounding mechanical/electrical works are at "For Construction" stage (Construction Bulletin revisions issued Oct–Nov 2025), so this BMS rehab is being done in coordination with active M+E construction.
- **Reference standards mentioned:** Megaworld DRC-004-2024 REVISED BMS Standards (CONDOTELS) — supplies the points-list standard for Mechanical (Part B) and Plumbing & Sanitary (Part C).
- **Schedule mentioned:** (not stated explicitly in inputs; latest issued document = EE-CB#8 dated 2025-11-05 with Megaworld APD review 2025-11-19. BMS sheets reviewed 2025-12-05.)

*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 Rehabilitation **Date:** 2026-04-28

#### Discipline

- **Primary:** BMS (Building Management System)
- **Secondary:** none — peripheral coordination with Mechanical (HVAC) Contractor and Equipment Suppliers as scope-boundary partners only

#### Stage

- **Rehabilitation** with *greenfield-like execution patterns* — see signals below
- Cited evidence:
  - Customer cover letter ( Requirement . rtf ) explicitly: “Complete Supply, Delivery, Installation, Testing and Commissioning for the **Rehabilitation** of Building Management System”
  - **Conflicting/weak signals from technical docs:** issued documents are “Construction Bulletin” (BMS sheets dated Oct 2025; EE-CB#8 dated 2025-11-05) which is more typical of *active construction* — and the EE revisions are driven by “adjusted mechanical layout and the added power provisions for the kitchen layouts from Basement to 3rd floor”, which reads like new-build coordination, not retrofit-into-existing.
  - **No existing-system inventory** in the inputs: no existing BMS controller make/model, no as-built BMS architecture, no demolition scope, no phased cutover plan, no “existing equipment to remain” notes.

**Decision:** Classify as **Rehabilitation** per the customer’s explicit wording (highest evidence weight on contractual scope), but flag the wording mismatch as a clarification question (Q-001) so the team confirms whether: (a) this is a true *replacement of an existing legacy BMS while the building stays in operation* (cutover, hot-work permits, after-hours), or (b) “rehabilitation” is being used loosely to describe a refurbishment of an *existing hotel* with mostly-new MEP — i.e., greenfield-like BMS install in a refurb shell.

This stage flag drives downstream assumptions about: demolition + strip-out, hot cutover, existing cable reuse, after-hours surcharges, and integration with any existing legacy controllers.

#### Scope type

- **S — Supply** (“Complete Supply”)
- **I — Installation** (“Delivery, Installation”)
- **P — Programming** (implicit in T&C of a BMS — programming is integral)
- **T&C — Testing & Commissioning** (“Testing and Commissioning”)
- **TR — Training** (not stated — assumed standard operator/technician training included; Q-002)
- **M — Maintenance** (not stated — DLP only assumed; AMC offered as option; Q-003)

#### Facility type

*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 · 762 record(s)

project: Kingsford Hotel Bacolod — BMS Rehabilitation (AV... · date: 2026-04-28 · status: draft v1

id	system	equipment_class	equipment_instance	location	panel	type	c_o
P0001	AC	AHU (Chilled-Water-Served)	AHU-1.1	Ground Floor	FCP-GF	DI	ME Contractor
P0002	AC	AHU (Chilled-Water-Served)	AHU-1.1	Ground Floor	FCP-GF	AO	ME Contractor
P0003	AC	AHU (Chilled-Water-Served)	AHU-1.1	Ground Floor	FCP-GF	AI	BMS Contractor
P0004	AC	AHU (Chilled-Water-Served)	AHU-1.1	Ground Floor	FCP-GF	AI	BMS Contractor
P0005	AC	AHU (Chilled-Water-Served)	AHU-1.1	Ground Floor	FCP-GF	AO	ME Contractor
P0006	AC	AHU (Chilled-Water-Served)	AHU-1.1	Ground Floor	FCP-GF	DI	Equipment Supplier
P0007	AC	AHU (Chilled-Water-Served)	AHU-1.1	Ground Floor	FCP-GF	DI	Equipment Supplier
P0008	AC	AHU (Chilled-Water-Served)	AHU-1.1	Ground Floor	FCP-GF	HLI	Equipment Supplier
P0009	AC	AHU (Chilled-Water-Served)	AHU-1.1	Ground Floor	FCP-GF	HLI	Equipment Supplier
P0010	AC	AHU (Chilled-Water-Served)	AHU-1.1	Ground Floor	FCP-GF	AI	BMS Contractor
P0011	AC	AHU (Chilled-Water-Served)	AHU-1.1	Ground Floor	FCP-GF	AI	BMS Contractor
P0012	AC	AHU (Chilled-Water-Served)	AHU-1.1	Ground Floor	FCP-GF	DI	Equipment Supplier
P0013	AC	AHU (Chilled-Water-Served)	AHU-1.1	Ground Floor	FCP-GF	AO	Equipment Supplier
P0014	AC	AHU (Chilled-Water-Served)	AHU-1.1	Ground Floor	FCP-GF	AI	BMS Contractor
P0015	AC	AHU (Chilled-Water-Served)	AHU-1.2	Ground Floor	FCP-GF	DI	ME Contractor
P0016	AC	AHU (Chilled-Water-Served)	AHU-1.2	Ground Floor	FCP-GF	AO	ME Contractor
P0017	AC	AHU (Chilled-Water-Served)	AHU-1.2	Ground Floor	FCP-GF	AI	BMS Contractor
P0018	AC	AHU (Chilled-Water-Served)	AHU-1.2	Ground Floor	FCP-GF	AI	BMS Contractor

... showing 18 of 762 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

### Working Documents — Applicability Matrix

**Project:** Kingsford Hotel Bacolod BMS Rehabilitation **Classification:** bms-rehab (medium tier, hospitality) **Date:** 2026-04-28

Per Design Principle C in `ORCHESTRATOR.md`, this matrix is the foundation of Phase 5a — recorded *before* any working doc is generated. R = required for this scope; CP = customer-provided (translate to standard format); AG = agent-generated; CP+AG = mixed.

Working doc	R/N-A	CP/AG	Source if CP / location if AG	Notes
A1. Consolidated I/O List	R	AG (synthesized from CP points lists)	05-working-docs/A1-io-list.yaml	Synthesized from MC Standards - ME/PL Points list.pdf (DRC-004-2024 generic points) + BMS Points list (TUEC).pdf (per-zone equipment quantities). Both customer files are translated into the standard A1 schema.
A2. Equipment Takeoff	R	AG	05-working-docs/A2-equipment-takeoff.yaml	Generated by <code>_playbook/tools/generate-a2-equipment-takeoff.py</code> 2026-04-kingsford-bms-AB
A3. Cable Schedule	R	AG	05-working-docs/A3-cable-schedule.yaml	Generated by <code>_playbook/tools/generate-a3-cable-schedule.py</code> (uses A-001 cable-length heuristic)
A4. Panel Schedule	R	AG	05-working-docs/A4-panel-schedule.yaml	Generated by <code>_playbook/tools/generate-a4-panel-schedule.py</code>
A5. Network Architecture + Switch Schedule	R	AG	05-working-docs/A5-network-architecture.md	Mermaid + YAML inventory; uses A-003
A6. Head-End Equipment List	R	AG	05-working-docs/A6-head-end-equipment.yaml	DRC-004 narrative + medium-tier hotel head-end
A7. Power Provisions Schedule	R	AG	05-working-docs/A7-power-provisions.yaml	Per panel from A4; assumes 240 V, 100 A per panel

*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 Rehabilitation **Date:** 2026-04-28 **Classification:** bms-rehab (medium tier, hospitality / casino-hotel)

#### Level-1 outline

- 1.0 Project Management & Engineering
- 2.0 Material Supply
- 3.0 Installation
- 4.0 Programming & Configuration
- 5.0 Testing & Commissioning
- 6.0 Training & Handover
- 7.0 Optional / Out-of-scope

#### Detailed WBS

##### 1.0 Project Management & Engineering

WBS	Title	Module	Source	Working docs	Status
1.1	Project management	modules/bms/project-management-engineering.md	Standard S+I+P+T&C	D1, D2	In scope
1.2	Engineering & design (shop drawings, panel layouts, cable schedules, network arch)	(same)	DRC-004 narrative requires submittals	A1–A7, B1–B3	In scope
1.3	Submittals & approvals (BMS spec, panel GA, sample submittals)	(same)	Standard	—	In scope
1.4	Factory Acceptance Test (FAT) — head-end + 1× sample MCP	(same)	Standard medium-tier	—	In scope
1.5	Site survey & existing-system inventory (rehab, conditional on Q-001)	(same)	A-008/A-009	—	In scope (rehab)

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 · 125 record(s)

project: Kingsford Hotel Bacolod — BMS Rehabilitation (AV...

id	equipment_class	quantity	location	system	panel	primary_co	io_summary
AHU-1.1	AHU (Chilled-Water-Served)	1	Ground Floor	AC	FCP-GF	Equipment Supplier	{'physical_io': 12, 'hli_subpoints': 2, 'network...
AHU-1.2	AHU (Chilled-Water-Served)	1	Ground Floor	AC	FCP-GF	Equipment Supplier	{'physical_io': 12, 'hli_subpoints': 2, 'network...
AHU-1.3	AHU (Chilled-Water-Served)	1	Ground Floor	AC	FCP-GF	Equipment Supplier	{'physical_io': 12, 'hli_subpoints': 2, 'network...
AHU-2M.1	AHU (Modulating CHW-served)	1	2nd Floor (Casino)	AC	FCP-2F	BMS Contractor	{'physical_io': 15, 'hli_subpoints': 2, 'network...
AHU-2M.2	AHU (Modulating CHW-served)	1	2nd Floor (Casino)	AC	FCP-2F	BMS Contractor	{'physical_io': 15, 'hli_subpoints': 2, 'network...
AHU-B.1	AHU (Chilled-Water-Served)	1	2nd Floor	AC	FCP-2F	Equipment Supplier	{'physical_io': 12, 'hli_subpoints': 2, 'network...
AHU-B.2	AHU (Chilled-Water-Served)	1	2nd Floor	AC	FCP-2F	Equipment Supplier	{'physical_io': 12, 'hli_subpoints': 2, 'network...
AHU-B.3	AHU (Chilled-Water-Served)	1	2nd Floor	AC	FCP-2F	Equipment Supplier	{'physical_io': 12, 'hli_subpoints': 2, 'network...
AHU-EL	AHU (Chilled-Water-Served)	1	2nd Floor	AC	FCP-2F	Equipment Supplier	{'physical_io': 12, 'hli_subpoints': 2, 'network...
AHU-FR2	AHU (Chilled-Water-Served)	1	2nd Floor	AC	FCP-2F	Equipment Supplier	{'physical_io': 12, 'hli_subpoints': 2, 'network...
AHU-FR3	AHU (Chilled-Water-Served)	1	2nd Floor	AC	FCP-2F	Equipment Supplier	{'physical_io': 12, 'hli_subpoints': 2, 'network...
AHU-PF	AHU (Chilled-Water-Served)	1	2nd Floor	AC	FCP-2F	Equipment Supplier	{'physical_io': 12, 'hli_subpoints': 2, 'network...
ATS-1	Multifunction Power Meter (Main)	1	Basement (Genset)	EE	FCP-BSMT	EE Contractor	{'physical_io': 2, 'hli_subpoints': 0, 'network...
BLR-1	Steam Boiler	1	Lower Ground	VENT	FCP-BSMT	Equipment Supplier	{'physical_io': 16, 'hli_subpoints': 0, 'network...
BLR-2	Steam Boiler	1	Lower Ground	VENT	FCP-BSMT	Equipment Supplier	{'physical_io': 16, 'hli_subpoints': 0, 'network...
CH-1	Chiller (Package Water-Cooled)	1	2nd Floor (Plant Room)	AC	MCP-PLANT	Equipment Supplier	{'physical_io': 11, 'hli_subpoints': 18, 'network...
CH-2	Chiller (Package Water-Cooled)	1	2nd Floor (Plant Room)	AC	MCP-PLANT	Equipment Supplier	{'physical_io': 11, 'hli_subpoints': 18, 'network...
CH-3	Chiller (Package Water-Cooled)	1	2nd Floor (Plant Room)	AC	MCP-PLANT	Equipment Supplier	{'physical_io': 11, 'hli_subpoints': 18, 'network...

... showing 18 of 125 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 - 6 record(s)

project: Kingsford Hotel Bacolod — BMS Rehabilitation (AV...

id	location	system_scope	equipment_served	io_summary	controller_estimate	power_estimate_w	enclosure_assumption
FCP-2F	2nd Floor / 2nd Floor (Casino)	[AC', 'VENT']	{'instance_count': 30, 'instances': ['AHU-2M.1', ...	{'physical_io': 234, 'hli_subpoints': 32, 'netwo...	{'ddc_controllers': 6, 'network_gateway': 1, 'to...	180	Wall-mount IP54 metal cabinet, sized per control...
FCP-3F	3rd Floor (Amenity) / 3rd Floor (Guestroom)	['VENT']	{'instance_count': 27, 'instances': ['EF-3GE.1', ...	{'physical_io': 81, 'hli_subpoints': 0, 'network...	{'ddc_controllers': 3, 'network_gateway': 0, 'to...	75	Wall-mount IP54 metal cabinet, sized per control...
FCP-BSMT	Basement / Basement (Genset) / Lower Ground	['EE', 'HWL', 'VENT']	{'instance_count': 15, 'instances': ['ATS-1', 'B...	{'physical_io': 72, 'hli_subpoints': 2, 'network...	{'ddc_controllers': 2, 'network_gateway': 1, 'to...	55	Wall-mount IP54 metal cabinet, sized per control...
FCP-GF	Ground Floor	[AC', 'VENT']	{'instance_count': 12, 'instances': ['AHU-1.1', ...	{'physical_io': 63, 'hli_subpoints': 6, 'network...	{'ddc_controllers': 2, 'network_gateway': 0, 'to...	50	Wall-mount IP54 metal cabinet, sized per control...
FCP-RD	Roofdeck	[AC', 'HWL', 'VENT']	{'instance_count': 19, 'instances': ['COW-HDR', ...	{'physical_io': 113, 'hli_subpoints': 12, 'netwo...	{'ddc_controllers': 3, 'network_gateway': 1, 'to...	95	Wall-mount IP54 metal cabinet, sized per control...
MCP-PLANT	2nd Floor (Plant Room)	[AC', 'EE']	{'instance_count': 22, 'instances': ['CH-1', 'CH...	{'physical_io': 66, 'hli_subpoints': 58, 'networ...	{'ddc_controllers': 2, 'network_gateway': 1, 'to...	110	Wall-mount IP54 metal cabinet, sized per control...

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 Rehabilitation (A/B run) **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	469	61.5%
BMS Contractor	206	27.0%
ME Contractor	82	10.8%
EE Contractor	5	0.7%
<b>Total</b>	<b>762</b>	<b>100%</b>

#### Per-Equipment-Class Breakdown

**AHU (Chilled-Water-Served) · 10 units, 140 I/O points**

**Instances:** AHU-1.1, AHU-1.2, AHU-1.3, AHU-B.1, AHU-B.2, AHU-B.3, AHU-EL, AHU-FR2, AHU-FR3, AHU-PF

Supplier	I/O Count	Provides
Equipment Supplier	60	Auxiliary Contact (20×), VFD (20×), Damper Controller (20×)
BMS Contractor	50	Temperature Sensor (40×), CO2 Sensor (10×)
ME Contractor	30	Damper Controller (20×), Electric Valve Actuator (10×)

**Braced Air Handling Unit · 8 units, 112 I/O points**

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 · 198 record(s)

project: Kingsford Hotel Bacolod — BMS Rehabilitation (AV...

id	from	to	equipment_class	system	location	cable_type	conductor_count_required
C0001	FCP-GF	AHU-1.1 (BMS Contractor)	AHU (Chilled-Water-Served)	AC	Ground Floor	4C × 1.5 mm <sup>2</sup> shielded FRLS (BMS signal — sensors)	7
C0002	FCP-GF	AHU-1.1 (Equipment Supplier)	AHU (Chilled-Water-Served)	AC	Ground Floor	4C × 1.5 mm <sup>2</sup> FRLS (equipment aux contacts — stat...	6
C0003	FCP-GF	AHU-1.1 (ME Contractor)	AHU (Chilled-Water-Served)	AC	Ground Floor	4C × 1.5 mm <sup>2</sup> FRLS (ME-supplied valves/dampers — ...	5
C0004	FCP-GF	AHU-1.2 (BMS Contractor)	AHU (Chilled-Water-Served)	AC	Ground Floor	4C × 1.5 mm <sup>2</sup> shielded FRLS (BMS signal — sensors)	7
C0005	FCP-GF	AHU-1.2 (Equipment Supplier)	AHU (Chilled-Water-Served)	AC	Ground Floor	4C × 1.5 mm <sup>2</sup> FRLS (equipment aux contacts — stat...	6
C0006	FCP-GF	AHU-1.2 (ME Contractor)	AHU (Chilled-Water-Served)	AC	Ground Floor	4C × 1.5 mm <sup>2</sup> FRLS (ME-supplied valves/dampers — ...	5
C0007	FCP-GF	AHU-1.3 (BMS Contractor)	AHU (Chilled-Water-Served)	AC	Ground Floor	4C × 1.5 mm <sup>2</sup> shielded FRLS (BMS signal — sensors)	7
C0008	FCP-GF	AHU-1.3 (Equipment Supplier)	AHU (Chilled-Water-Served)	AC	Ground Floor	4C × 1.5 mm <sup>2</sup> FRLS (equipment aux contacts — stat...	6
C0009	FCP-GF	AHU-1.3 (ME Contractor)	AHU (Chilled-Water-Served)	AC	Ground Floor	4C × 1.5 mm <sup>2</sup> FRLS (ME-supplied valves/dampers — ...	5
C0010	FCP-2F	AHU-2M.1 (BMS Contractor)	AHU (Modulating CHW-served)	AC	2nd Floor (Casino)	4C × 1.5 mm <sup>2</sup> shielded FRLS (BMS signal — sensors)	10
C0011	FCP-2F	AHU-2M.1 (Equipment Supplier)	AHU (Modulating CHW-served)	AC	2nd Floor (Casino)	4C × 1.5 mm <sup>2</sup> FRLS (equipment aux contacts — stat...	6
C0012	FCP-2F	AHU-2M.1 (ME Contractor)	AHU (Modulating CHW-served)	AC	2nd Floor (Casino)	4C × 1.5 mm <sup>2</sup> FRLS (ME-supplied valves/dampers — ...	5
C0013	FCP-2F	AHU-2M.2 (BMS Contractor)	AHU (Modulating CHW-served)	AC	2nd Floor (Casino)	4C × 1.5 mm <sup>2</sup> shielded FRLS (BMS signal — sensors)	10
C0014	FCP-2F	AHU-2M.2 (Equipment Supplier)	AHU (Modulating CHW-served)	AC	2nd Floor (Casino)	4C × 1.5 mm <sup>2</sup> FRLS (equipment aux contacts — stat...	6
C0015	FCP-2F	AHU-2M.2 (ME Contractor)	AHU (Modulating CHW-served)	AC	2nd Floor (Casino)	4C × 1.5 mm <sup>2</sup> FRLS (ME-supplied valves/dampers — ...	5
C0016	FCP-2F	AHU-B.1 (BMS Contractor)	AHU (Chilled-Water-Served)	AC	2nd Floor	4C × 1.5 mm <sup>2</sup> shielded FRLS (BMS signal — sensors)	7
C0017	FCP-2F	AHU-B.1 (Equipment Supplier)	AHU (Chilled-Water-Served)	AC	2nd Floor	4C × 1.5 mm <sup>2</sup> FRLS (equipment aux contacts — stat...	6
C0018	FCP-2F	AHU-B.1 (ME Contractor)	AHU (Chilled-Water-Served)	AC	2nd Floor	4C × 1.5 mm <sup>2</sup> FRLS (ME-supplied valves/dampers — ...	5

... showing 18 of 198 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

**Project:** Kingsford Hotel Bacolod — BMS Rehabilitation (A/B run) **Date:** 2026-04-28 **Status:** draft v1 **Sources:** A4 panel schedule ( A4-panel-schedule.yaml ), assumptions A-003 / A-011

### Topology

Star topology with the BMS Server at the head-end. A core managed L3 switch (1U, GbE, fiber-uplink-capable) sits in the BMS server cabinet at 2nd Floor (Plant Room). Six edge switches — one per panel location — each terminate the BACnet/IP traffic from the controllers in that panel and the small population of native-BACnet/IP equipment (DOAS, chillers) in their zone. Vertical interconnect is OS2 single-mode fiber (LC-LC duplex) on a riser path from the basement through to the roofdeck. A firewalled uplink connects the BMS LAN to the customer's IT LAN for remote monitoring (graphics-only, no controller writes).

```
graph TD
  BMS_SERVER[BMS Server / Engineering WS<br/>2F Plant Room]
  CORE[Core L3 Managed Switch<br/>24-port GbE + 4x SFP]
  UPS[UPS 1.5 kVA]
  FIREWALL[Firewall to IT LAN]
  IT[Customer IT LAN]

  BMS_SERVER --- CORE
  UPS --- BMS_SERVER
  UPS --- CORE
  CORE --- FIREWALL
  FIREWALL --- IT

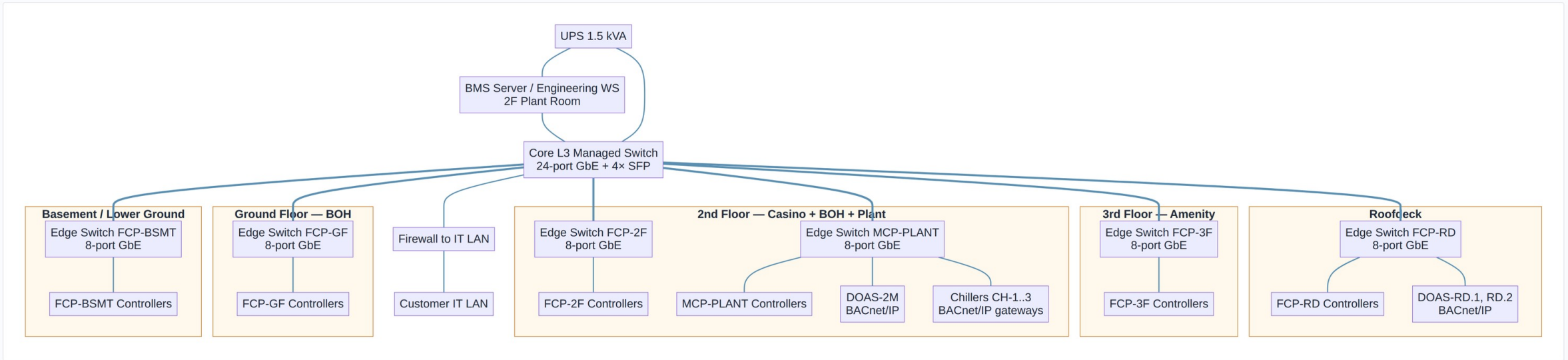
  subgraph RD [Roofdeck]
    direction LR
    SW_RD[Edge Switch FCP-RD<br/>8-port GbE]
    FCP_RD[FCP-RD Controllers]
    DOAS_RD[DOAS-RD.1, RD.2<br/>BACnet/IP]
  end

  subgraph F3 [3rd Floor - Amenity]
    direction LR
    SW_3F[Edge Switch FCP-3F<br/>8-port GbE]
    FCP_3F[FCP-3F Controllers]
  end
```

*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)

## A5 — BMS Network Architecture



Auto-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 · 125 record(s)

project: Kingsford Hotel Bacolod — BMS Rehabilitation (AV...

equipment	equipment_class	location
AHU-1.1	AHU (Chilled-Water-Served)	Ground Floor
AHU-1.2	AHU (Chilled-Water-Served)	Ground Floor
AHU-1.3	AHU (Chilled-Water-Served)	Ground Floor
AHU-2M.1	AHU (Modulating CHW-served)	2nd Floor (Casino)
AHU-2M.2	AHU (Modulating CHW-served)	2nd Floor (Casino)
AHU-B.1	AHU (Chilled-Water-Served)	2nd Floor
AHU-B.2	AHU (Chilled-Water-Served)	2nd Floor
AHU-B.3	AHU (Chilled-Water-Served)	2nd Floor
AHU-EL	AHU (Chilled-Water-Served)	2nd Floor
AHU-FR2	AHU (Chilled-Water-Served)	2nd Floor
AHU-FR3	AHU (Chilled-Water-Served)	2nd Floor
AHU-PF	AHU (Chilled-Water-Served)	2nd Floor
ATS-1	Multifunction Power Meter (Main)	Basement (Genset)
BLR-1	Steam Boiler	Lower Ground
BLR-2	Steam Boiler	Lower Ground
CH-1	Chiller (Package Water-Cooled)	2nd Floor (Plant Room)
CH-2	Chiller (Package Water-Cooled)	2nd Floor (Plant Room)
CH-3	Chiller (Package Water-Cooled)	2nd Floor (Plant Room)

... showing 18 of 125 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 - 8 record(s)

project: Kingsford Hotel Bacolod — BMS Rehabilitation (AV...

task	quantity	unit	rate_h_per_unit	hours	notes
Cable pulling (control + network + power feeds)	6780	m	0.33	2237.4	Total 6780 m. Includes 5940 m field, 660 m trunk...
Conduit installation (BMS-scope branch conduit)	2034	m	0.13	264.4	Assume 30% of cable length runs in BMS-installed...
BMS field panel installation	6	panels	5.0	30.0	Mount, dress, internal verification. Pre-built i...
Field device installation (mounting + initial te...	125	devices	1.0	125.0	125 BMS-monitored equipment instances
Cable termination (both ends per cable)	396	ends	0.25	99.0	198 field cables × 2 ends
Cable continuity / insulation testing	198	cables	0.25	49.5	Pre-terminate continuity + post-terminate insula...
Panel power-up + smoke test (pre-commissioning)	6	panels	1.0	6.0	Initial energization, smoke check, controller bo...
Network drop setup (patch + label + connectivity)	23	drops	0.5	11.5	BACnet/IP and Modbus drops

*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 Panels for Kingsford Hotel Bacolod (A/B run)

WBS leaves served: 2.3.1–2.3.8, 3.4 Module ref: `_playbook/modules/bms/controller-panel.md`

#### Project-specific parameter values

From `A4-panel-schedule.yaml` : - 6 panels (1× MCP-PLANT + 5× FCPs) - 18 controllers (per A4) - I/O density: see A1 totals (≈762 rows; physical I/O ≈ 380, HLI ≈ 250, network ≈ 130)

#### Per-panel summary

Panel	Location	Equipment served	Controllers	Power
MCP-PLANT	2F Plant Room	Chillers (×3), Primary CHW Pumps (×4), COW Pumps (×3), CHW Headers + Bypass, Power Meters	6	250 W
FCP-RD	Roofdeck	Cooling Towers (×3 + common), DOAS-RD.1/RD.2, PAHU-RD.1/RD.2, Calorifier-HZ ×3, HW-HDR-HZ, HP-HZ ×3, RP-HZ ×3, COW-HDR	4	110 W
FCP-2F	2F BOH/Casino	AHU-B.1..3/PF/ELU/FR2/FR3 (×7), PAHU-B.1..3/PF/FR (×5), AHU-2M.1/2.2 (×2), DOAS-2M, ION-2M.1/2 (×2), 2F exhaust (×13)	4	95 W
FCP-GF	GF BOH	AHU-1.1/1.2/1.3 (×3), GF exhaust (×9)	2	60 W
FCP-3F	3F Amenity	3F amenity AHU & general exhaust + 27× toilet/general exhaust	1	65 W
FCP-BSMT	Basement / Lower Ground	BLR-1, BLR-2, HWT-LZ ×3, HW-HDR-LZ, HP-LZ ×3, RP-LZ ×3, GEN-1, ATS-1, PAHU-0.1	1	70 W

#### BOQ line items

Per the module's BOQ items table — multiplied by quantities above. Spare I/O ≥ 20% per A-012.

#### Open assumptions

A-011 (panel layout), A-012 (spare 20%), A-004 (controller family).

#### Cross-references

- Working docs: A1, A4, A5, A7, B4

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)

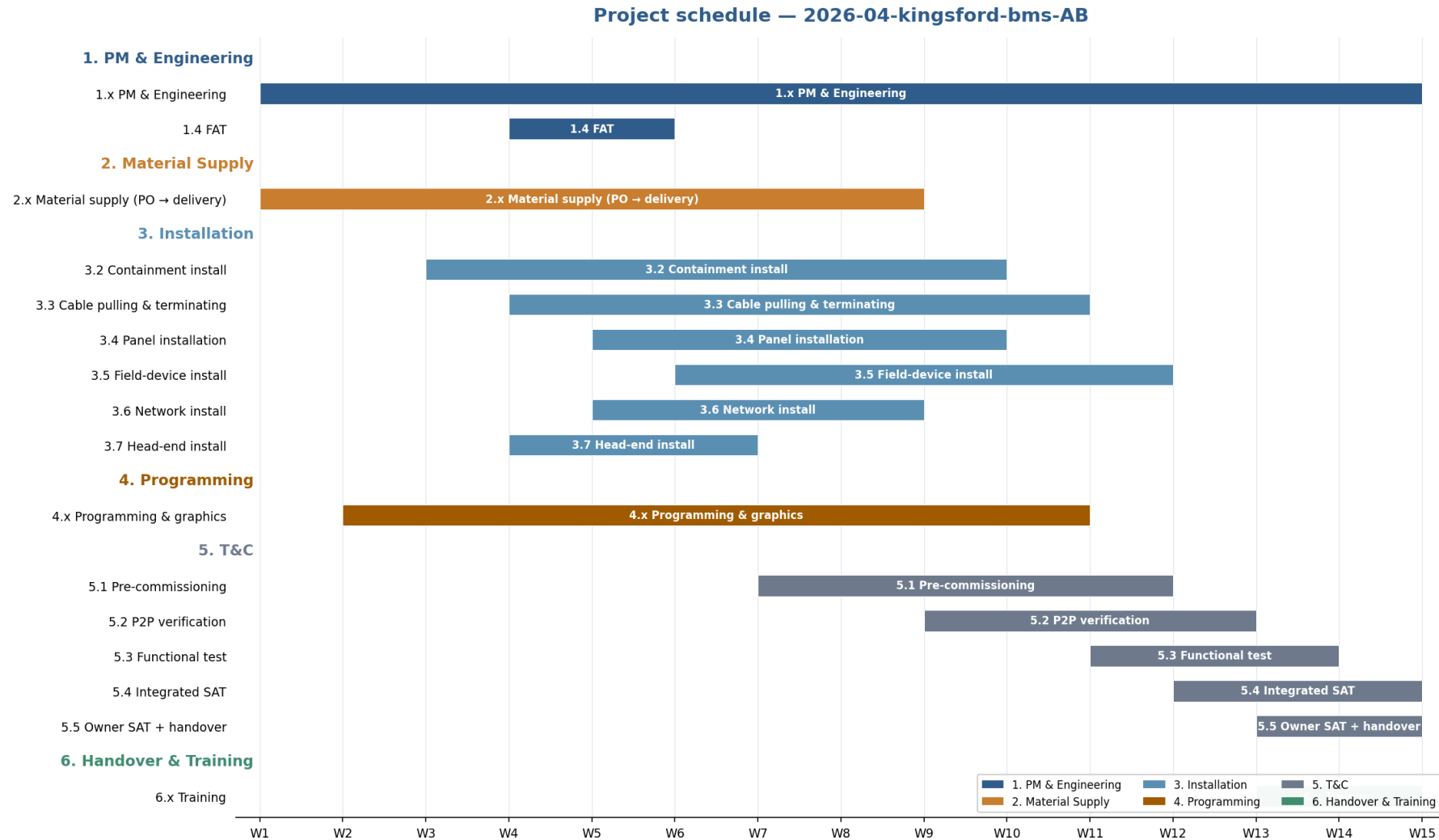
**Project:** Kingsford Hotel Bacolod — BMS Rehabilitation (A/B run) **Date:** 2026-04-28 **Basis:** A-006 (14 weeks medium-tier), A-008 (zone-by-zone cutover), A-014 (4 weeks T&C)

#### Weekly Gantt (W1 = mobilization)

Phase	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14
1.x PM & Engineering	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1.4 FAT				■	■									
2.x Material supply (PO → delivery)	■	■	■	■	■	■	■	■						
3.2 Containment install			■	■	■	■	■	■	■					
3.3 Cable pulling & terminating				■	■	■	■	■	■	■				
3.4 Panel installation					■	■	■	■	■					
3.5 Field-device install						■	■	■	■	■	■			
3.6 Network install					■	■	■	■						
3.7 Head-end install				■	■	■								
4.x Programming & graphics		■	■	■	■	■	■	■	■	■				
5.1 Pre-commissioning							■	■	■	■	■			
5.2 P2P verification									■	■	■	■		
5.3 Functional test											■	■	■	
5.4 Integrated SAT												■	■	■
5.5 Owner SAT + handover													■	■
6.x Training													■	■

*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 Rehabilitation (A/B run) **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 15,548,700**
- Overhead & margin (20%): PHP 3,109,740
- Cost + overhead: PHP 18,658,440
- Contingency (7.5%): PHP 1,399,383
- Cost + contingency: PHP 20,057,823
- VAT (12%): PHP 2,406,939
- **Grand total: PHP 22,464,762**
- *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	10.9%
2.0	PHP 11,069,210	71.2%
3.0	PHP 1,696,070	10.9%
4.0	PHP 523,560	3.4%
5.0	PHP 480,660	3.1%
6.0	PHP 91,200	0.6%
<b>Base total</b>	<b>PHP 15,548,700</b>	<b>100.0%</b>

#### 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

**Project:** Kingsford Hotel Bacolod **Customer:** Megaworld Corporation **Document:** Proposal v1 (draft) **Date:** 2026-04-28 **Validity:** 90 days from proposal date **Currency:** Philippine Pesos (PHP), VAT-inclusive

#### Cover Letter

To: Megaworld Corporation Attention: Mr. Rome Amiel P. Gonzales 9/F Two World Square, 24th Upper McKinley Road, Taguig City

Re: Complete Supply, Delivery, Installation, Testing and Commissioning for the Rehabilitation of the Building Management System (BMS) for the Kingsford Hotel Bacolod project

Dear Mr. Gonzales,

We are pleased to submit our proposal for the supply, delivery, installation, testing and commissioning of the Building Management System for Kingsford Hotel Bacolod, in accordance with the Megaworld DRC-004-2024 (CONDOTELS) BMS Standards (Parts B and C) and the project-specific I/O point tabulation issued under Construction Bulletin TUEC-PR-AUX-010 (October 2025).

Our proposal covers the full lifecycle: engineering, head-end and field hardware supply, panel assembly, network infrastructure, field-device installation, programming, graphics and reports, point-to-point and functional testing, integrated commissioning, training, and a 12-month Defect Liability Period.

The proposed work follows a 14-week schedule with phased zone-by-zone cutover to minimize operational risk. We highlight the assumptions on which the offer is based and a small number of clarifications which, when answered, will allow us to confirm or refine specific line items.

We thank you for the opportunity and remain available to clarify any aspect of this submission.

Yours respectfully,

(Name / Title — to fill before sending)

#### 1. Executive Summary

Item	Value
Scope	Complete Supply, Delivery, Installation, Testing & Commissioning of BMS — mechanical (HVAC), plumbing/sanitary, and electrical metering, per DRC-004-2024 and TUEC BMS-01..03
Building	Casino-Hotel — Basement / Lower Ground / GF / 2F / 3F / Roofdeck
Approximate point count	~760 monitored points across ~125 equipment instances
Field panels	6 (1× MCP + 5× FCPs)

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

# 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 <b>Section Subtotals</b> 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	11,069,210.00
3.0	1,696,070.00
4.0	523,560.00
5.0	480,660.00
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/2FRD	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)	15	each	40000	600000	184 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 Rehabilitation (A/B run)
Total I/O rows	762
By type	
DI	381
AI	184
HLI	110
AO	64
Network	23
By C/O	
Equipment Supplier	469
BMS Contractor	206
ME Contractor	82
EE Contractor	5
By system	
VENT	366
AC	334
HWL	48
EE	14
By panel	

... showing 24 of 30 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
<b>A3 — Cable Schedule Summary</b>	
Total field cable runs	198
Total field cable length (m)	5940
Total trunk cable length (m)	660
Total power feed length (m)	180
GRAND TOTAL cable length (m)	6780
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)	1380
4C × 1.5 mm² FRLS (ME-supplied valves/dampers — status + c...)	870
Cat6 4P × 23 AWG U/UTP, FRLS jacket (BACnet/IP)	690
Modbus shielded twisted-pair, 1pr × 22 AWG (e.g., Belden 9...)	60

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	FCP-GF	AHU-1.1 (BMS Contractor)	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	30	unverified					
C0002	FCP-GF	AHU-1.1 (Equipment Supplier)	4C × 1.5 mm² FRLS (equipment aux contacts — status/HOA/trip)	30	unverified					
C0003	FCP-GF	AHU-1.1 (ME Contractor)	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — status + c...	30	unverified					
C0004	FCP-GF	AHU-1.2 (BMS Contractor)	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	30	unverified					
C0005	FCP-GF	AHU-1.2 (Equipment Supplier)	4C × 1.5 mm² FRLS (equipment aux contacts — status/HOA/trip)	30	unverified					
C0006	FCP-GF	AHU-1.2 (ME Contractor)	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — status + c...	30	unverified					
C0007	FCP-GF	AHU-1.3 (BMS Contractor)	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	30	unverified					
C0008	FCP-GF	AHU-1.3 (Equipment Supplier)	4C × 1.5 mm² FRLS (equipment aux contacts — status/HOA/trip)	30	unverified					
C0009	FCP-GF	AHU-1.3 (ME Contractor)	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — status + c...	30	unverified					
C0010	FCP-2F	AHU-2M.1 (BMS Contractor)	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	30	unverified					
C0011	FCP-2F	AHU-2M.1 (Equipment Supplier)	4C × 1.5 mm² FRLS (equipment aux contacts — status/HOA/trip)	30	unverified					
C0012	FCP-2F	AHU-2M.1 (ME Contractor)	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — status + c...	30	unverified					
C0013	FCP-2F	AHU-2M.2 (BMS Contractor)	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	30	unverified					
C0014	FCP-2F	AHU-2M.2 (Equipment Supplier)	4C × 1.5 mm² FRLS (equipment aux contacts — status/HOA/trip)	30	unverified					
C0015	FCP-2F	AHU-2M.2 (ME Contractor)	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — status + c...	30	unverified					
C0016	FCP-2F	AHU-B.1 (BMS Contractor)	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	30	unverified					
C0017	FCP-2F	AHU-B.1 (Equipment Supplier)	4C × 1.5 mm² FRLS (equipment aux contacts — status/HOA/trip)	30	unverified					
C0018	FCP-2F	AHU-B.1 (ME Contractor)	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — status + c...	30	unverified					
C0019	FCP-2F	AHU-B.2 (BMS Contractor)	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	30	unverified					
C0020	FCP-2F	AHU-B.2 (Equipment Supplier)	4C × 1.5 mm² FRLS (equipment aux contacts — status/HOA/trip)	30	unverified					
C0021	FCP-2F	AHU-B.2 (ME Contractor)	4C × 1.5 mm² FRLS (ME-supplied valves/dampers — status + c...	30	unverified					
C0022	FCP-2F	AHU-B.3 (BMS Contractor)	4C × 1.5 mm² shielded FRLS (BMS signal — sensors)	30	unverified					

... showing 22 of 211 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 Rehabilitation (A/B run)

### 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 for the Complete Supply, Delivery, Installation, Testing and Commissioning of the Building Management System for the Kingsford Hotel Bacolod Project**

We are pleased to submit this comprehensive proposal in response to your enquiry regarding the supply and installation of the Building Management System (BMS) for the Kingsford Hotel Bacolod project. Our proposal has been prepared based on a detailed and structured engineering analysis of the following project documents:

- **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 Condotel, including Mechanical and Plumbing Points Lists

# 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  $\pm 20\%$  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*

**762**

BMS I/O points enumerated

**125**

Equipment instances cataloged

**6**

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.