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-AB5/_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-AB5/00-customer-inputs/_extracted/pages/BM

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

Tier 0 — EE Plan (TUEC), Cover Letter

rojel-rivera/RTRX13-Shared/Proposals/projects/2026-04-kingsford-bms-AB5/00-customer-inputs/_extracted/pages/

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

jel-rivera/RTRX13-Shared/Proposals/projects/2026-04-kingsford-bms-AB5/00-customer-inputs/_extracted/pages/M

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

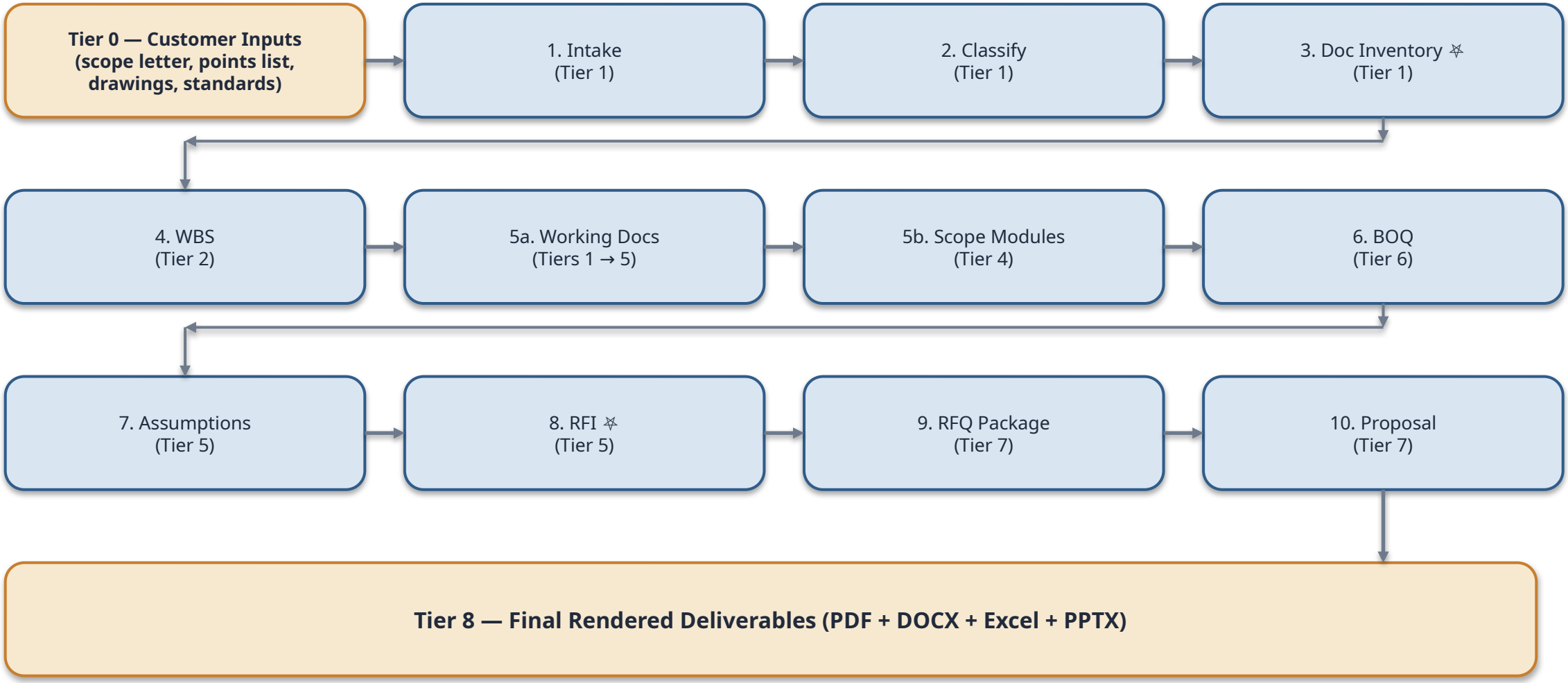
Tier 0 — MC Standards, Plumbing Points List

ojel-rivera/RTRX13-Shared/Proposals/projects/2026-04-kingsford-bms-AB5/00-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 **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`

Parties

Role	Entity	Notes
Owner / Developer	Megaworld Corporation	9/F Two World Square, 24th Upper McKinley Road, Taguig City
Owner project manager (addressee)	Rome Amiel P. Gonzales	Per EE Plan cover letter
Electrical design consultant	TUEC — John Paul P. Dres, REE (Design Engineer In-charge)	Issued EE drawings + Construction Bulletin No.8
Mechanical / project consultant	(referenced as "the consultant" in EE cover letter; TUEC is electrical)	(not stated in inputs)
Main contractor	(not stated)	—
ME Contractor / Equipment Supplier	Referenced as point-list responsibility column	Roles split per BMS points list C/O column
BMS Contractor	(this proposal)	—

Project context

- Building type: Hotel / Hospitality (Kingsford Hotel) — appears to include casino lobby provisions per APD note in EE Plan
- Stage: Cover letter wording is "Rehabilitation"; technical evidence (EE Construction Bulletin No.8 dated November 2025; design revisions for kitchen layout; "For Construction" status) points to **new construction / Greenfield**. Triangulation discussed in Phase 2.
- Reference standards mentioned: "MC Standards" — Megaworld Corporation standard ME and PL points-list templates (provided as separate PDFs)
- Schedule mentioned: (not stated)
- Commercial signals: (not stated — no warranty, payment terms, currency, or tax language in cover letter)

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 **Customer:** Megaworld Corporation (slug: `megaworld` ; customer-kb entry: yes — STUB) **Date:** 2026-04-28

Discipline

- **Primary:** BMS (building management / automation — HVAC, ventilation, plumbing, electrical metering, integration)
- **Secondary:** none

Stage

- **Greenfield (new construction)** — classified per technical evidence, despite cover letter wording.
- Cited evidence:
  - Cover letter: *"…Rehabilitation of Building Management System for the Kingsford Hotel Bacolod project."* (`Requirement.rtf`) — **weak signal**.
  - EE Plan cover letter: *"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."* (`EE Plan (TUEC).pdf` p.1, dated November 5, 2025, Construction Bulletin No.8) — **strong greenfield signal**.
  - BMS Points list and EE Plan are stamped Construction Bulletin (revision-controlled new-construction issuance).
  - **No existing-system inventory** present in the input bundle — strong greenfield signal.
- Per Phase-2 triangulation rule: **technical-document evidence governs**. Classify as Greenfield. Promote the wording mismatch to clarification (`Q-001` in Phase 8).

Scope type

- [x] Supply
- [x] Delivery
- [x] Installation
- [x] Testing & Commissioning (explicitly named)
- [x] Programming / engineering (implicit in "Complete … Commissioning of BMS")
- [ ] Training (not stated — flag in Phase 8)
- [ ] Maintenance / O&M after handover (not stated — flag)

Facility type

- Hotel / Hospitality. Casino lobby provisions referenced in EE Plan (`PPCAS-14` panel relocated inside casino lobby per APD note). Apply `bms-hospitality-casino` overlay on top of `bms-greenfield` base checklist.

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 · 619 record(s)

project: Kingsford Hotel Bacolod — BMS · **date:** 2026-04-28 · **source:** BMS Points list (TUEC) BMS-01/02/03 + MC Standar… · **status:** draft

id	system	equipment_class	equipment_instance	location	panel	type	point_description
P-00001	Chilled Water Plant	Chiller (Package Water-Cooled)	CH-1 to CH-3	2F	BMS-PNL-CHWPLANT-2F	AI	AI point #1 of 27 for CH-1 to CH-3
P-00002	Chilled Water Plant	Chiller (Package Water-Cooled)	CH-1 to CH-3	2F	BMS-PNL-CHWPLANT-2F	AI	AI point #2 of 27 for CH-1 to CH-3
P-00003	Chilled Water Plant	Chiller (Package Water-Cooled)	CH-1 to CH-3	2F	BMS-PNL-CHWPLANT-2F	AI	AI point #3 of 27 for CH-1 to CH-3
P-00004	Chilled Water Plant	Chiller (Package Water-Cooled)	CH-1 to CH-3	2F	BMS-PNL-CHWPLANT-2F	AI	AI point #4 of 27 for CH-1 to CH-3
P-00005	Chilled Water Plant	Chiller (Package Water-Cooled)	CH-1 to CH-3	2F	BMS-PNL-CHWPLANT-2F	AI	AI point #5 of 27 for CH-1 to CH-3
P-00006	Chilled Water Plant	Chiller (Package Water-Cooled)	CH-1 to CH-3	2F	BMS-PNL-CHWPLANT-2F	AI	AI point #6 of 27 for CH-1 to CH-3
P-00007	Chilled Water Plant	Chiller (Package Water-Cooled)	CH-1 to CH-3	2F	BMS-PNL-CHWPLANT-2F	AI	AI point #7 of 27 for CH-1 to CH-3
P-00008	Chilled Water Plant	Chiller (Package Water-Cooled)	CH-1 to CH-3	2F	BMS-PNL-CHWPLANT-2F	AI	AI point #8 of 27 for CH-1 to CH-3
P-00009	Chilled Water Plant	Chiller (Package Water-Cooled)	CH-1 to CH-3	2F	BMS-PNL-CHWPLANT-2F	AI	AI point #9 of 27 for CH-1 to CH-3
P-00010	Chilled Water Plant	Chiller (Package Water-Cooled)	CH-1 to CH-3	2F	BMS-PNL-CHWPLANT-2F	AI	AI point #10 of 27 for CH-1 to CH-3
P-00011	Chilled Water Plant	Chiller (Package Water-Cooled)	CH-1 to CH-3	2F	BMS-PNL-CHWPLANT-2F	AI	AI point #11 of 27 for CH-1 to CH-3
P-00012	Chilled Water Plant	Chiller (Package Water-Cooled)	CH-1 to CH-3	2F	BMS-PNL-CHWPLANT-2F	AI	AI point #12 of 27 for CH-1 to CH-3
P-00013	Chilled Water Plant	Chiller (Package Water-Cooled)	CH-1 to CH-3	2F	BMS-PNL-CHWPLANT-2F	AI	AI point #13 of 27 for CH-1 to CH-3
P-00014	Chilled Water Plant	Chiller (Package Water-Cooled)	CH-1 to CH-3	2F	BMS-PNL-CHWPLANT-2F	AI	AI point #14 of 27 for CH-1 to CH-3
P-00015	Chilled Water Plant	Chiller (Package Water-Cooled)	CH-1 to CH-3	2F	BMS-PNL-CHWPLANT-2F	AI	AI point #15 of 27 for CH-1 to CH-3
P-00016	Chilled Water Plant	Chiller (Package Water-Cooled)	CH-1 to CH-3	2F	BMS-PNL-CHWPLANT-2F	AI	AI point #16 of 27 for CH-1 to CH-3
P-00017	Chilled Water Plant	Chiller (Package Water-Cooled)	CH-1 to CH-3	2F	BMS-PNL-CHWPLANT-2F	AI	AI point #17 of 27 for CH-1 to CH-3
P-00018	Chilled Water Plant	Chiller (Package Water-Cooled)	CH-1 to CH-3	2F	BMS-PNL-CHWPLANT-2F	AI	AI point #18 of 27 for CH-1 to CH-3

… showing 18 of 619 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

05a — Working Documents Applicability Matrix

Project: Kingsford Hotel Bacolod — BMS **Date:** 2026-04-28 **Classification:** `bms-greenfield` + `bms-hospitality-casino`

Working doc	R / N-A	CP / AG	Source if CP / location if AG	Notes
A1 — Consolidated I/O List	R	AG (built from CP points list)	`05-working-docs/A1-io-list.yaml` (script `_scripts/build-a1.py`)	619 points expanded from BMS-01/02/03 aggregate rows
A2 — Equipment Takeoff	R	AG	`05-working-docs/A2-equipment-takeoff.yaml` (helper)	—
A3 — Cable Schedule	R	AG	`05-working-docs/A3-cable-schedule.yaml` (helper, fed by `A3-route-lengths.yaml` + `A3-cable-spec-rules.yaml`)	Per Op#10/#11 — measured trunk + riser, typical-range fallback for guestroom/casino field cables
A4 — Panel Schedule	R	AG	`05-working-docs/A4-panel-schedule.yaml` (helper)	—
A5 — Network Architecture	R	AG	`05-working-docs/A5-network-architecture.md`	Mermaid diagram + switch inventory
A6 — Head-End Equipment	R	AG	`05-working-docs/A6-head-end-equipment.yaml`	Standard hotel BMS reference; Q-007 to confirm
A7 — Power Provisions	R	AG	`05-working-docs/A7-power-provisions.yaml`	Per A4 + EE-21/22/23 standard
B1 — Programming Object Inventory	R	AG	`05-working-docs/B1-programming-objects.yaml` (helper, fed by `B1-trend-strategy.yaml`)	—
B2 — Graphics Page Inventory	R	AG	`05-working-docs/B2-graphics-pages.yaml`	One per equipment + per floor + summary
B3 — Commissioning Point Inventory	R	AG	`05-working-docs/B3-commissioning-points.yaml` (helper)	—
B4 — Installation Manhour Takeoff	R	AG	`05-working-docs/B4-installation-manhours.yaml` (helper, fed by `B4-site-factors.yaml`)	—
C1 — C/O Matrix	R	AG (script-derived from A1)	`05-working-docs/C1-co-matrix.yaml` (helper)	—
C2 — Inter-discipline Coordination Matrix	R	AG	`05-working-docs/C2-coordination-matrix.md`	Standard interfaces; Q-

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 **Date:** 2026-04-28 **Classification:** `bms-greenfield` + `bms-hospitality-casino`

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 (PM, scheduling, reporting)	`modules/bms/project-management-engineering.md`	Standard for S+I+P+T&C scope	D1, D2	In scope
1.2	Engineering & design (control narratives, panel layouts, schematics)	`modules/bms/project-management-engineering.md`	MC Standards reference + project-specific Points list	A1, A2, A4, A5, B1, B2	In scope
1.3	Submittals & approvals (shop drawings, equipment data, FAT plan)	`modules/bms/project-management-engineering.md`	Standard for Megaworld projects	—	In scope
1.4	Factory Acceptance Test	`modules/bms/project-management-engineering.md`	Standard for medium-tier project	—	In scope
1.5	As-built documentation & O&M manuals	`modules/bms/project-management-engineering.md`	Standard handover deliverable	—	In scope

2.0 Material Supply

WBS	Title	Module	Source	Working docs	Status
2.1.1	Supervisory server + redundancy storage	`modules/bms/head-end.md`	A-016 + Megaworld standard	A6	In scope
2.1.2	Operator workstation + HMI	`modules/bms/head-end.md`	A-016	A6	In scope

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 · 23 record(s)

project: Kingsford Hotel Bacolod — BMS

id	equipment_class	quantity	location	system	panel	primary_co	io_summary
AHU-2/B.2/B.3/PP/CL/FRE/FRD	AHU (Chilled-Water-Served)	1	2F	Air Handling — Basement / Podium BOH	BMS-PNL-BOHAHU-2F	BMS Contractor	{'physical_io': 120, 'hli_subpoints': 20, 'netwo…
AHU-RD (with CHW mod valve)	AHU (Chilled-Water-Served)	1	RD	Air Handling — Roofdeck AHU	BMS-PNL-AHU-RD	BMS Contractor	{'physical_io': 32, 'hli_subpoints': 0, 'network…
CDWP-1 to CDWP-3	Condenser Water Pump	1	2F	Chilled Water Plant	BMS-PNL-CHWPLANT-2F	ME Contractor	{'physical_io': 12, 'hli_subpoints': 0, 'network…
CH-1 to CH-3	Chiller (Package Water-Cooled)	1	2F	Chilled Water Plant	BMS-PNL-CHWPLANT-2F	ME Contractor	{'physical_io': 81, 'hli_subpoints': 0, 'network…
CHW Supply & Return Main Header	CHW Supply Main Header	1	2F	Chilled Water Plant	BMS-PNL-CHWPLANT-2F	BMS Contractor	{'physical_io': 7, 'hli_subpoints': 0, 'network_…
CHWP-1 to CHWP-3	Primary CHW Pump	1	2F	Chilled Water Plant	BMS-PNL-CHWPLANT-2F	ME Contractor	{'physical_io': 21, 'hli_subpoints': 0, 'network…
CT-1 to CT-3	Cooling Tower	1	RD	Heat Rejection — Cooling Tower	BMS-PNL-CT-RD	BMS Contractor	{'physical_io': 35, 'hli_subpoints': 1, 'network…
DOAS (Casino) — 2 units	DOAS Unit	1	2F	Casino MVAC — Dedicated Outdoor Air	BMS-PNL-CASINO-2F	BMS Contractor	{'physical_io': 26, 'hli_subpoints': 4, 'network…
EF-RD.1/RD.2, EF-1	Exhaust Fan (General)	1	RD	General Ventilation	BMS-PNL-VENT-RD	ME Contractor	{'physical_io': 9, 'hli_subpoints': 0, 'network_…
HP-HZ (×3)	Heat Pump	1	RD	Plumbing — Sanitary Hot Water	BMS-PNL-PLUMBING-RD	Equipment Supplier	{'physical_io': 0, 'hli_subpoints': 9, 'network_…
HP-LZ (×3)	Heat Pump	1	LG	Plumbing — Sanitary Hot Water	BMS-PNL-PLUMBING-LG	Equipment Supplier	{'physical_io': 0, 'hli_subpoints': 9, 'network_…
HW Supply & Return Header (LG)	CHW Supply Main Header	1	LG	Plumbing — Sanitary Hot Water	BMS-PNL-PLUMBING-LG	BMS Contractor	{'physical_io': 6, 'hli_subpoints': 0, 'network_…
HWT-HZ (×3)	Calorifier (Hot Water Storage Tank)	1	RD	Plumbing — Sanitary Hot Water	BMS-PNL-PLUMBING-RD	BMS Contractor	{'physical_io': 3, 'hli_subpoints': 0, 'network_…
HWT-LZ (×3)	Calorifier (Hot Water Storage Tank)	1	LG	Plumbing — Sanitary Hot Water	BMS-PNL-PLUMBING-LG	BMS Contractor	{'physical_io': 3, 'hli_subpoints': 0, 'network_…
PAHU-0.1	Precooled Air Handling Unit	1	2F	Air Handling — Pre-cooled	BMS-PNL-AHU-2F	BMS Contractor	{'physical_io': 12, 'hli_subpoints': 4, 'network…
PAHU-RD (×2)	Precooled Air Handling Unit	1	RD	Air Handling — Pre-cooled (Roofdeck)	BMS-PNL-AHU-RD	ME Contractor	{'physical_io': 12, 'hli_subpoints': 2, 'network…
RP-HZ (×3)	Recirculating Pump	1	RD	Plumbing — Sanitary Hot Water	BMS-PNL-PLUMBING-RD	ME Contractor	{'physical_io': 9, 'hli_subpoints': 0, 'network_…
RP-LZ (×3)	Recirculating Pump	1	LG	Plumbing — Sanitary Hot Water	BMS-PNL-PLUMBING-LG	ME Contractor	{'physical_io': 9, 'hli_subpoints': 0, 'network_…

… showing 18 of 23 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 · 13 record(s)

project: Kingsford Hotel Bacolod — BMS

id	location	system_scope	equipment_served	io_summary	controller_estimate	power_estimate_w	enclosure_assumption
BMS-PNL-AHU-2F	2F	['Air Handling — Pre-cooled']	{'instance_count': 1, 'instances': ['PAHU-0.1'],…	{'physical_io': 12, 'hli_subpoints': 4, 'network…	{'ddc_controllers': 1, 'network_gateway': 0, 'to…	25	Wall-mount IP54 metal cabinet, sized per control…
BMS-PNL-AHU-RD	RD	['Air Handling — Pre-cooled (Roofdeck)', 'Air Ha…	{'instance_count': 2, 'instances': ['AHU-RD (wit…	{'physical_io': 44, 'hli_subpoints': 2, 'network…	{'ddc_controllers': 2, 'network_gateway': 0, 'to…	50	Wall-mount IP54 metal cabinet, sized per control…
BMS-PNL-BOHAHU-2F	2F	['Air Handling — Basement / Podium BOH']	{'instance_count': 1, 'instances': ['AHU-2/B.2/B…	{'physical_io': 120, 'hli_subpoints': 20, 'netwo…	{'ddc_controllers': 3, 'network_gateway': 0, 'to…	75	Wall-mount IP54 metal cabinet, sized per control…
BMS-PNL-BOILER-LG	LG	['Boiler / Laundry']	{'instance_count': 1, 'instances': ['SB-1 & SB-2…	{'physical_io': 22, 'hli_subpoints': 0, 'network…	{'ddc_controllers': 1, 'network_gateway': 0, 'to…	25	Wall-mount IP54 metal cabinet, sized per control…
BMS-PNL-CASINO-2F	2F	['Casino MVAC — Dedicated Outdoor Air', 'Casino …	{'instance_count': 2, 'instances': ['DOAS (Casin…	{'physical_io': 30, 'hli_subpoints': 4, 'network…	{'ddc_controllers': 1, 'network_gateway': 0, 'to…	25	Wall-mount IP54 metal cabinet, sized per control…
BMS-PNL-CHWPLANT-2F	2F	['Chilled Water Plant']	{'instance_count': 4, 'instances': ['CDWP-1 to C…	{'physical_io': 121, 'hli_subpoints': 0, 'networ…	{'ddc_controllers': 4, 'network_gateway': 0, 'to…	100	Wall-mount IP54 metal cabinet, sized per control…
BMS-PNL-CT-RD	RD	['Heat Rejection — Cooling Tower']	{'instance_count': 1, 'instances': ['CT-1 to CT-…	{'physical_io': 35, 'hli_subpoints': 1, 'network…	{'ddc_controllers': 1, 'network_gateway': 0, 'to…	25	Wall-mount IP54 metal cabinet, sized per control…
BMS-PNL-PLUMBING-LG	LG	['Plumbing — Sanitary Hot Water']	{'instance_count': 4, 'instances': ['HP-LZ (×3)'…	{'physical_io': 18, 'hli_subpoints': 9, 'network…	{'ddc_controllers': 1, 'network_gateway': 0, 'to…	25	Wall-mount IP54 metal cabinet, sized per control…
BMS-PNL-PLUMBING-RD	RD	['Plumbing — Sanitary Hot Water']	{'instance_count': 3, 'instances': ['HP-HZ (×3)'…	{'physical_io': 12, 'hli_subpoints': 9, 'network…	{'ddc_controllers': 1, 'network_gateway': 0, 'to…	25	Wall-mount IP54 metal cabinet, sized per control…
BMS-PNL-VENT-2F	2F	['General Ventilation']	{'instance_count': 1, 'instances': ['TEF-2.1/2.3…	{'physical_io': 39, 'hli_subpoints': 0, 'network…	{'ddc_controllers': 1, 'network_gateway': 0, 'to…	25	Wall-mount IP54 metal cabinet, sized per control…
BMS-PNL-VENT-3F	3F	['General Ventilation']	{'instance_count': 1, 'instances': ['TEF-3Ax2/3B…	{'physical_io': 81, 'hli_subpoints': 0, 'network…	{'ddc_controllers': 3, 'network_gateway': 0, 'to…	75	Wall-mount IP54 metal cabinet, sized per control…
BMS-PNL-VENT-GF	GF	['General Ventilation']	{'instance_count': 1, 'instances': ['TEF-1.1 to …	{'physical_io': 27, 'hli_subpoints': 0, 'network…	{'ddc_controllers': 1, 'network_gateway': 0, 'to…	25	Wall-mount IP54 metal cabinet, sized per control…
BMS-PNL-VENT-RD	RD	['General Ventilation']	{'instance_count': 1, 'instances': ['EF-RD.1/RD.…	{'physical_io': 9, 'hli_subpoints': 0, 'network_…	{'ddc_controllers': 1, 'network_gateway': 0, 'to…	25	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 **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
ME Contractor	336	54.3%
BMS Contractor	230	37.2%
Equipment Supplier	53	8.6%
Total	**619**	**100%**

Per-Equipment-Class Breakdown

AHU (Chilled-Water-Served) · 2 units, 172 I/O points

Instances: AHU-2/B.2/B.3/PP/CL/FRE/FRD, AHU-RD (with CHW mod valve)

Supplier	I/O Count	Provides
BMS Contractor	120	Sensor (T/RH/P/flow per point) (86×), Modulating actuator / VFD set-point (34×)
ME Contractor	32	Auxiliary contact / status relay (28×), Command relay (4×)
Equipment Supplier	20	BACnet/Modbus gateway driver (20×)

Exhaust Fan (General) · 4 units, 156 I/O points

Instances: EF-RD 1/RD 2, EF-1, TEF-1.1 to 1.4 + EF-1.2A/LPG 1/1MR 1/1STO 1/MRE 1, TEF-2.1/2.3/2B.3 + EF-2B.1/2B.2/GS 1&GS 2 + EF-2.1 to 2.4 + EF-CHRx2, TEF-3Ax2/3B/3Cx2/3Dx20 + others

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 · 29 record(s)

project: Kingsford Hotel Bacolod — BMS

id	from	to	equipment_class	system	location	cable_type	spec_source
C0001	BMS-PNL-BOHAHU-2F	AHU-2/B.2/B.3/PP/CL/FRE/FRD (BMS Contractor)	AHU (Chilled-Water-Served)	Air Handling — Basement / Podium BOH	2F	4C × 1.5 mm² shielded FRLS (BMS sensor signal)	rule:bms_signal_default
C0002	BMS-PNL-BOHAHU-2F	AHU-2/B.2/B.3/PP/CL/FRE/FRD (ME Contractor)	AHU (Chilled-Water-Served)	Air Handling — Basement / Podium BOH	2F	4C × 1.5 mm² FRLS (equipment aux contacts — stat…	rule:equipment_aux_default
C0003	BMS-PNL-AHU-RD	AHU-RD (with CHW mod valve) (BMS Contractor)	AHU (Chilled-Water-Served)	Air Handling — Roofdeck AHU	RD	4C × 1.5 mm² shielded FRLS (BMS sensor signal)	rule:bms_signal_default
C0004	BMS-PNL-AHU-RD	AHU-RD (with CHW mod valve) (ME Contractor)	AHU (Chilled-Water-Served)	Air Handling — Roofdeck AHU	RD	4C × 1.5 mm² FRLS (equipment aux contacts — stat…	rule:equipment_aux_default
C0005	BMS-PNL-CHWPLANT-2F	CDWP-1 to CDWP-3 (ME Contractor)	Condenser Water Pump	Chilled Water Plant	2F	4C × 1.5 mm² FRLS (equipment aux contacts — stat…	rule:equipment_aux_default
C0006	BMS-PNL-CHWPLANT-2F	CH-1 to CH-3 (BMS Contractor)	Chiller (Package Water-Cooled)	Chilled Water Plant	2F	4C × 1.5 mm² shielded FRLS (BMS sensor signal)	rule:bms_signal_default
C0007	BMS-PNL-CHWPLANT-2F	CH-1 to CH-3 (ME Contractor)	Chiller (Package Water-Cooled)	Chilled Water Plant	2F	4C × 1.5 mm² FRLS (equipment aux contacts — stat…	rule:equipment_aux_default
C0008	BMS-PNL-CHWPLANT-2F	CHW Supply & Return Main Header (BMS Contractor)	CHW Supply Main Header	Chilled Water Plant	2F	4C × 1.5 mm² shielded FRLS (BMS sensor signal)	rule:bms_signal_default
C0009	BMS-PNL-CHWPLANT-2F	CHWP-1 to CHWP-3 (ME Contractor)	Primary CHW Pump	Chilled Water Plant	2F	4C × 1.5 mm² FRLS (equipment aux contacts — stat…	rule:equipment_aux_default
C0010	BMS-PNL-CT-RD	CT-1 to CT-3 (BMS Contractor)	Cooling Tower	Heat Rejection — Cooling Tower	RD	4C × 1.5 mm² shielded FRLS (BMS sensor signal)	rule:bms_signal_default
C0011	BMS-PNL-CT-RD	CT-1 to CT-3 (ME Contractor)	Cooling Tower	Heat Rejection — Cooling Tower	RD	4C × 1.5 mm² FRLS (equipment aux contacts — stat…	rule:equipment_aux_default
C0012	BMS-PNL-CASINO-2F	DOAS (Casino) — 2 units (BMS Contractor)	DOAS Unit	Casino MVAC — Dedicated Outdoor Air	2F	4C × 1.5 mm² shielded FRLS (BMS sensor signal)	rule:bms_signal_default
C0013	BMS-PNL-CASINO-2F	DOAS (Casino) — 2 units (ME Contractor)	DOAS Unit	Casino MVAC — Dedicated Outdoor Air	2F	4C × 1.5 mm² FRLS (equipment aux contacts — stat…	rule:equipment_aux_default
C0014	BMS-PNL-VENT-RD	EF-RD.1/RD.2, EF-1 (ME Contractor)	Exhaust Fan (General)	General Ventilation	RD	4C × 1.5 mm² FRLS (equipment aux contacts — stat…	rule:equipment_aux_default
C0015	BMS-PNL-PLUMBING-LG	HW Supply & Return Header (LG) (BMS Contractor)	CHW Supply Main Header	Plumbing — Sanitary Hot Water	LG	4C × 1.5 mm² shielded FRLS (BMS sensor signal)	rule:bms_signal_default
C0016	BMS-PNL-PLUMBING-RD	HWT-HZ (×3) (BMS Contractor)	Calorifier (Hot Water Storage Tank)	Plumbing — Sanitary Hot Water	RD	4C × 1.5 mm² shielded FRLS (BMS sensor signal)	rule:bms_signal_default
C0017	BMS-PNL-PLUMBING-LG	HWT-LZ (×3) (BMS Contractor)	Calorifier (Hot Water Storage Tank)	Plumbing — Sanitary Hot Water	LG	4C × 1.5 mm² shielded FRLS (BMS sensor signal)	rule:bms_signal_default
C0018	BMS-PNL-AHU-2F	PAHU-0.1 (BMS Contractor)	Precooled Air Handling Unit	Air Handling — Pre-cooled	2F	4C × 1.5 mm² shielded FRLS (BMS sensor signal)	rule:bms_signal_default

… showing 18 of 29 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 **Date:** 2026-04-28 **Source:** A-006 (isolated BMS LAN); A4 panel schedule (13 panels); EE-24 power riser (Part 1) for shaft routing.

Topology

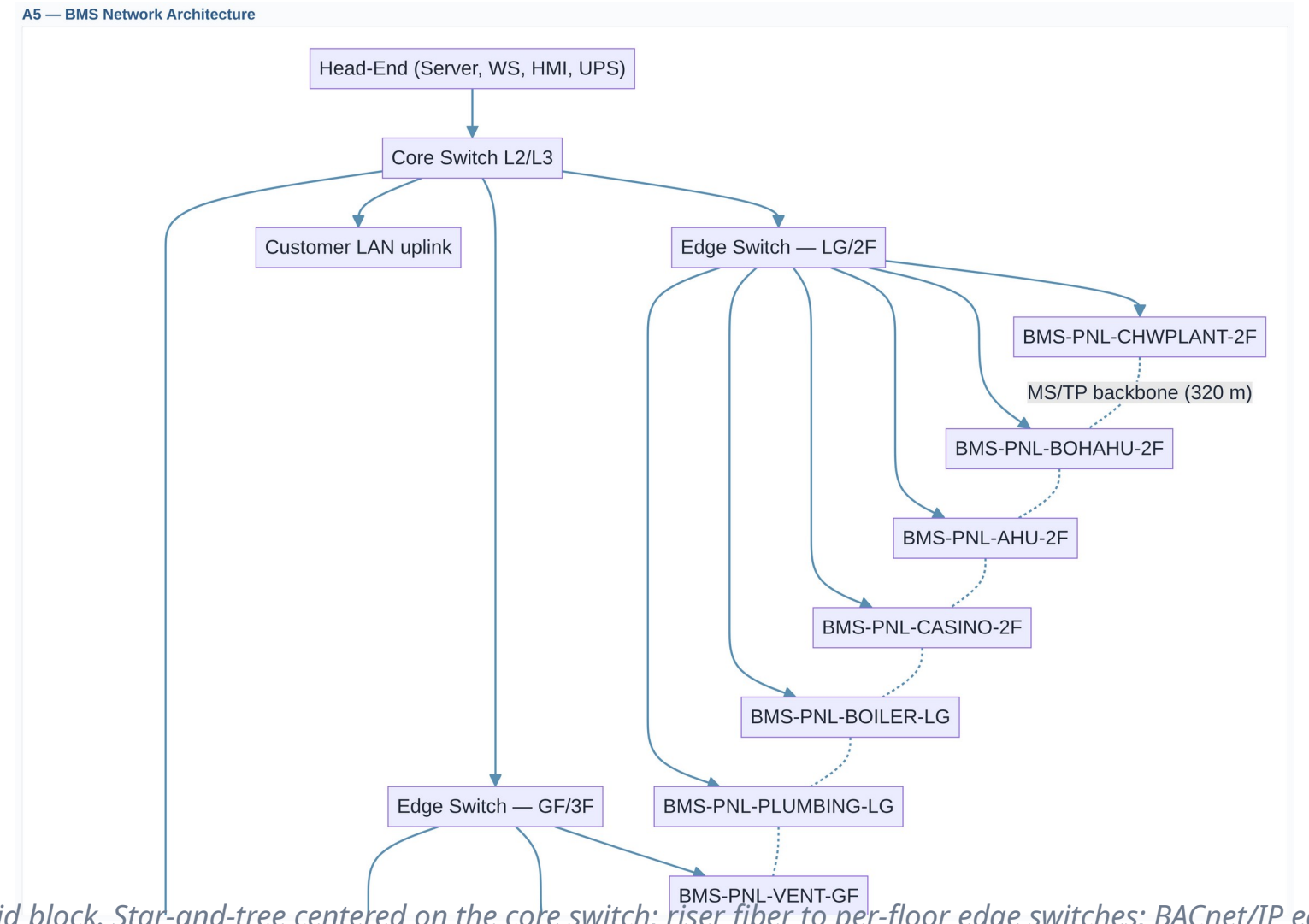
Two-tier BACnet topology per Megaworld MC Standards:

- **Supervisory layer (BACnet/IP)** — head-end server, operator/HMI workstations, primary BACnet/IP between core/edge switches. Cat6 + fiber where shaft length exceeds 90 m (none in this project; building is compact).
- **Field layer (BACnet MS/TP)** — daisy-chained shielded twisted-pair backbone visiting all 13 BMS field panels. Total backbone ~320 m measured per A3 trunk_topology.

```
flowchart TD
  HE["Head-End (Server, WS, HMI, UPS)"] --> CSW[Core Switch L2/L3]
  CSW --> ESW1[Edge Switch — LG/2F]
  CSW --> ESW2[Edge Switch — GF/3F]
  CSW --> ESW3[Edge Switch — Roofdeck]
  CSW --> CWLAN[Customer LAN uplink]

  ESW1 --> P_CHW[BMS-PNL-CHWPLANT-2F]
  ESW1 --> P_BOH[BMS-PNL-BOHAHU-2F]
  ESW1 --> P_AHU2F[BMS-PNL-AHU-2F]
  ESW1 --> P_CASINO[BMS-PNL-CASINO-2F]
  ESW1 --> P_BOIL[BMS-PNL-BOILER-LG]
  ESW1 --> P_PLLG[BMS-PNL-PLUMBING-LG]

  ESW2 --> P_VENTGF[BMS-PNL-VENT-GF]
  ESW2 --> P_VENT2[BMS-PNL-VENT-2F]
  ESW2 --> P_VENT3[BMS-PNL-VENT-3F]

  ESW3 --> P_AHURD[BMS-PNL-AHU-RD]
  ESW3 --> P_CTRD[BMS-PNL-CT-RD]
  ESW3 --> P_PLRD[BMS-PNL-PLUMBING-RD]
  ESW3 --> P_VENTRD[BMS-PNL-VENT-RD]

  P_CHW -. "MS/TP backbone (320 m)" .- P_BOH
  P_BOH -.- P_AHU2F
```

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 · 23 record(s)

project: Kingsford Hotel Bacolod — BMS

equipment	equipment_class	location
AHU-2/B.2/B.3/PP/CL/FRE/FRD	AHU (Chilled-Water-Served)	2F
AHU-RD (with CHW mod valve)	AHU (Chilled-Water-Served)	RD
CDWP-1 to CDWP-3	Condenser Water Pump	2F
CH-1 to CH-3	Chiller (Package Water-Cooled)	2F
CHW Supply & Return Main Header	CHW Supply Main Header	2F
CHWP-1 to CHWP-3	Primary CHW Pump	2F
CT-1 to CT-3	Cooling Tower	RD
DOAS (Casino) — 2 units	DOAS Unit	2F
EF-RD.1/RD.2, EF-1	Exhaust Fan (General)	RD
HP-HZ (×3)	Heat Pump	RD
HP-LZ (×3)	Heat Pump	LG
HW Supply & Return Header (LG)	CHW Supply Main Header	LG
HWT-HZ (×3)	Calorifier (Hot Water Storage Tank)	RD
HWT-LZ (×3)	Calorifier (Hot Water Storage Tank)	LG
PAHU-0.1	Precooled Air Handling Unit	2F
PAHU-RD (×2)	Precooled Air Handling Unit	RD
RP-HZ (×3)	Recirculating Pump	RD
RP-LZ (×3)	Recirculating Pump	LG

… showing 18 of 23 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)	1107	m	0.34650000000000003	383.6	Total 1107 m. Includes 473 m field, 400 m trunk,…
Conduit installation (BMS-scope branch conduit)	221	m	0.1365	30.2	Conduit fraction = 20% of total cable. Basis: Gr…
BMS field panel installation	13	panels	5.25	68.2	Mount, dress, internal verification. Pre-built i…
Field device installation (per equipment class)	23	devices	per-class (see notes)	46.0	Per-class breakdown: Exhaust Fan (General)=4×0.7…
Cable termination (both ends per cable)	58	ends	0.2625	15.2	29 field cables × 2 ends
Cable continuity / insulation testing	29	cables	0.2625	7.6	Pre-terminate continuity + post-terminate insula…
Panel power-up + smoke test (pre-commissioning)	13	panels	1.05	13.7	Initial energization, smoke check, controller bo…
Network drop setup (patch + label + connectivity)	0	drops	0.525	0.0	BACnet/IP and Modbus drops
Field analog sensor calibration	187	AI points	0.75	140.2	Calibrate 187 analog sensors against reference; …
Fire-stopping / sealed cable penetrations	17	penetrations	0.5	8.5	Estimated 30% of cable ends require sealed penet…
Site safety attendance (toolbox, JHA, HSE briefi…	713.2	h	0.06	42.8	6% uplift on labor base hours
Punch-list / rework allowance	713.2	h	0.05	35.7	5% of base labor for as-installed deviations and…
As-built documentation (red-line + point DB expo…	713.2	h	0.05	35.7	5% 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--controller-panels.md

2.3 — BMS Controller Panel Supply

Module: bms/controller-panel

Covers WBS leaves 2.3.1–2.3.7 (one instance grouped — all panels share template).

Field	Value	Source
Total field panels	13	A4 summary
Total controllers	21 (one per panel + extra where I/O > 40)	A4 controller_estimate
Network gateways	per panel where HLI present (DOAS, casino, plumbing, boiler)	A4
Brand	Siemens DESIGO PXC / equivalent (pending Q-008)	A-007
Enclosure	IP54 wall-mount, sized per controller + I/O modules + 30% spare	Module standard
I/O modules per panel	per A1 by_type counts ÷ 16-channel module size	A1 → A4
Spare capacity	25% per AI/AO/DI/DO	A-021
Power supply	24VDC 5A per panel	A7
Surge protection	at panel power input + on shielded analog inputs	Module standard

Panel	Location	I/O total	Controllers	Notes
BMS-PNL-CHWPLANT-2F	2F chiller plant	121	4	Chillers + CHWP + CDWP + headers
BMS-PNL-BOHAHU-2F	2F mechanical zone	140	4 (incl gateway for VFD HLI)	10 BOH AHUs
BMS-PNL-AHU-2F	2F mech	16	1 (+ gateway)	PAHU-0.1
BMS-PNL-CASINO-2F	2F casino zone	34	1 (+ gateway)	DOAS + sanitizers
BMS-PNL-AHU-RD	RD plant	46	2 (+ gateway)	PAHU-RD + AHU-RD
BMS-PNL-CT-RD	RD plant	36	1	Cooling Towers
BMS-PNL-PLUMBING-LG	LG plumbing	27	1 (+ gateway HP HLI)	Calorifier + HW header + HP + RP
BMS-PNL-PLUMBING-RD	RD plumbing	21	1 (+ gateway)	Calorifier + HP + RP

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

Project: Kingsford Hotel Bacolod — BMS **Date:** 2026-04-28 **Basis:** A-011 (14-week comfortable timeline). Pending Q-003 confirmation.

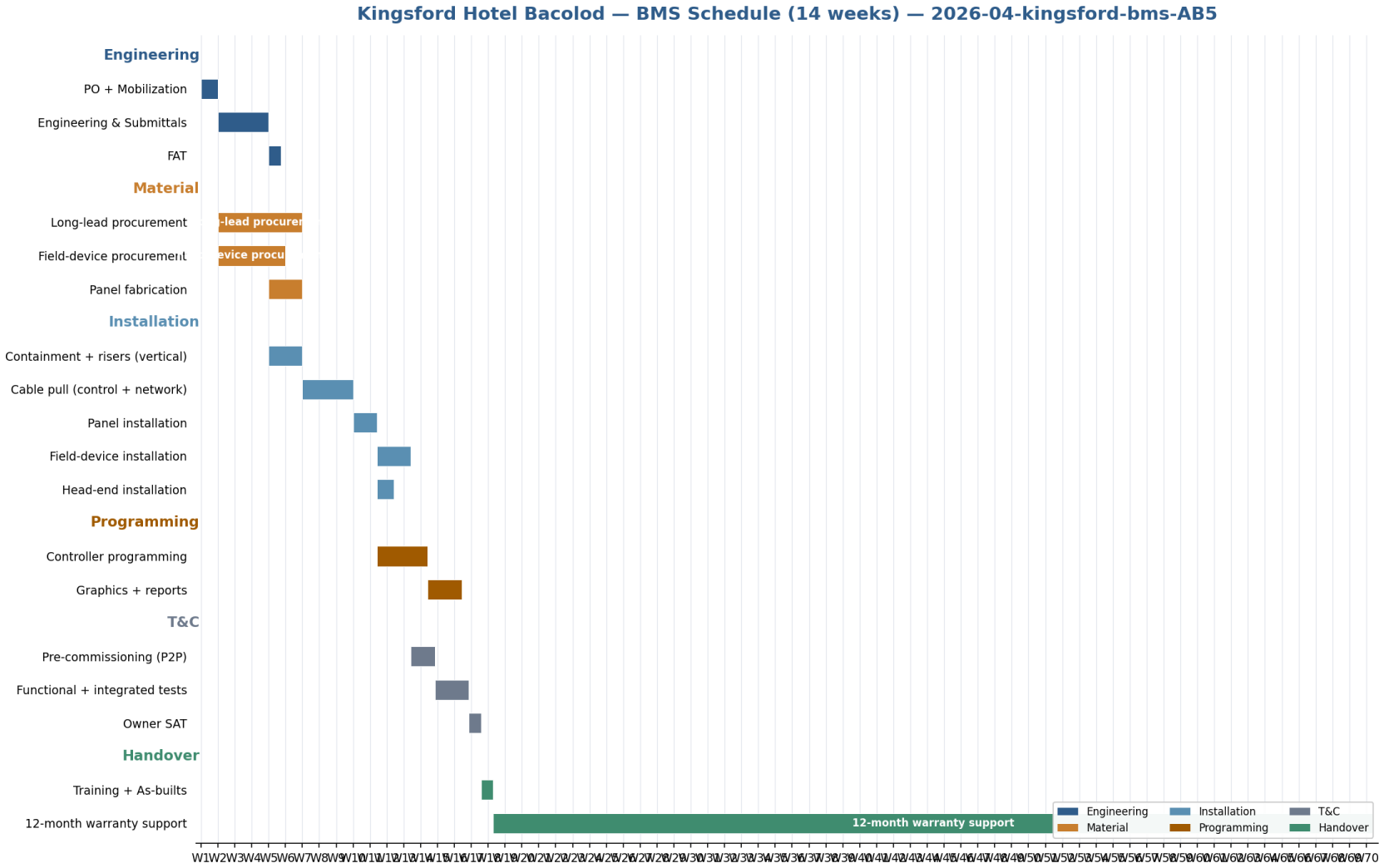
Phase plan

```
gantt
    dateFormat  YYYY-MM-DD
    title  Kingsford Hotel Bacolod — BMS Schedule (14 weeks)
    section Engineering
    PO + Mobilization                 :a1, 2026-05-15, 7d
    Engineering & Submittals          :a2, after a1, 21d
    FAT                               :a3, after a2, 5d
    section Material
    Long-lead procurement             :b1, after a1, 35d
    Field-device procurement          :b2, after a1, 28d
    Panel fabrication                 :b3, after a2, 14d
    section Installation
    Containment + risers (vertical)   :c1, 2026-06-12, 14d
    Cable pull (control + network)    :c2, after c1, 21d
    Panel installation                :c3, after c2, 10d
    Field-device installation         :c4, after c3, 14d
    Head-end installation             :c5, after c3, 7d
    section Programming
    Controller programming            :d1, after c3, 21d
    Graphics + reports                :d2, after d1, 14d
    section T&C
    Pre-commissioning (P2P)           :e1, after c4, 10d
    Functional + integrated tests     :e2, after e1, 14d
    Owner SAT                         :e3, after e2, 5d
    section Handover
    Training + As-builts              :f1, after e3, 5d
    12-month warranty support         :f2, after f1, 365d
```

Milestones

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 13,274,500**
- Overhead & margin (18%): PHP 2,389,410
- Cost + overhead:      PHP 15,663,910
- Contingency (9.0%):    PHP 1,409,752
- Cost + contingency:   PHP 17,073,662
- VAT (12%):              PHP 2,048,839
- **Grand total:**      **PHP 19,122,501**

- *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 | 12.7% |
| 2.0 | PHP 10,271,215 | 77.4% |
| 3.0 | PHP 497,245 | 3.7% |
| 4.0 | PHP 359,440 | 2.7% |
| 5.0 | PHP 367,400 | 2.8% |
| 6.0 | PHP 91,200 | 0.7% |
| **Base total** | **PHP 13,274,500** | **100.0%** |

## Cost pool breakdown (base, excl. optional)

| Pool | Subtotal | % of base |
|------|---------:|----------:|
| Material | PHP 9,325,215 | 70.2% |
| Labor | PHP 2,783,285 | 21.0% |
| Service/Lot | PHP 1,166,000 | 8.8% |

## 1.0  Project Management & Engineering

| WBS | Description | Qty | Unit | Unit Price | Extended | Source | RFQ? |
```

... (197 more lines)

Source: Proposals/projects/2026-04-kingsford-bms-AB5/06-boq.md

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 **Location:** Manhattan Street, The Upper East, Bacolod City, Negros Occidental **Date:** 28 April 2026 **Validity:** 60 days from issue

Cover

We submit our proposal for the Complete Supply, Delivery, Installation, Testing and Commissioning of the Building Management System for the Kingsford Hotel Bacolod project. This document covers the technical scope, schedule, commercial terms, and the open clarifications that will refine the final order.

1. Executive summary

The Building Management System covers HVAC, casino MVAC, plumbing / sanitary hot water, steam-boiler instrumentation, and general ventilation across Basement 1 through Roof Deck. The system carries approximately 619 hardwired and integrated points across 13 BMS field panels, with central supervision at a head-end server room. Programming follows the Description-of-Operations specified in the Megaworld MC Standards (DRC-004-2024) and the project-specific BMS Points list issued by TUEC.

The construction window is 14 weeks from notice to proceed. The base price is PHP 19,122,501 inclusive of overhead, contingency, and 12% VAT. Per-guestroom HVAC controls are excluded from this base scope (the project-specific points list does not enumerate them) and offered as a priced option pending customer confirmation.

2. Project background

The Kingsford Hotel Bacolod is a hotel + casino-lobby development on Manhattan Street. The cover letter wording references “Rehabilitation”; however the supporting documents — TUEC Construction Bulletin No.8 (November 2025), “For Construction” stamps, the absence of an existing-system inventory, and design revisions for new kitchen layouts — indicate new construction. We have classified the project as Greenfield on this basis and raised the wording mismatch as a clarification (Q-015).

3. Understanding of scope

The BMS controls and monitors:

- **Chilled Water Plant** at the 2nd Level: 3 packaged water-cooled chillers, 3 primary chilled-water pumps, 3 condenser-water pumps, supply and return headers.
- **Basement-Podium BOH Air Handling**: 10 chilled-water-served AHUs and 1 pre-cooled AHU.
- **Casino MVAC** at the 2nd Level: 2 dedicated outdoor-air systems (DOAS) with heat-recovery wheels, 2 smoke sanitizers serving AHU-2M.1/2M.2.
- **Hotel & Roofdeck**: 2 pre-cooled AHUs, 2 roofdeck AHUs with chilled-water modulating valves, 3 cooling towers.
- **Plumbing / Sanitary Hot Water**: 6 calorifiers, 6 heat pumps, 6 recirculating pumps, hot-water headers across Lower Ground and Roof Deck.
- **Steam Boilers**: 2 boilers at Lower Ground laundry with O2 / flue-gas / water-level instrumentation.
- **General Ventilation**: ~52 exhaust fans across Ground Floor, 2nd, 3rd Amenity + Guestroom, and Roof Deck.

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 — 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

619
BMS I/O points enumerated

23
Equipment instances cataloged

13
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.