SELECTED PROJECT CASE STUDY

Underground Dewatering Infrastructure Project

Planning, progress control, development readiness, delay analysis, field verification and resource-cost planning for a major underground programme.

US$20M	~5.3 km	Weekly	3
PROJECT VALUE	REVISED SCOPE underground development	CONTROL CYCLE	COST DRIVERS manpower | equipment | materials

PROJECT PLANNING

PROJECT CONTROLS

FIELD COORDINATION

00 / PROJECT PURPOSE & RISK CONTEXT

Why this project mattered.

The project exists because uncontrolled water and wet-material movement became a major operational risk. The response required a dedicated, maintainable dewatering pathway that could be developed and controlled as an underground infrastructure project.

PUBLIC INCIDENT CONTEXT

Following the September 2025 external mud rush at the Grasberg Block Cave underground mine, strengthening mine-water management and reducing exposure to uncontrolled water and wet-material movement became a critical operational priority.

SEPTEMBER 2025
EXTERNAL MUD RUSH

MULTIPLE LEVELS
OPERATIONAL IMPACT
Significant access and remediation challenges

DEWATERING
RISK-MITIGATION RESPONSE
Controlled drainage + maintainable access

PROJECT RESPONSE

Dedicated dewatering infrastructure with service access.

The project was developed as part of the dewatering risk-mitigation response, creating a controlled underground pathway for long-term water management while maintaining reliable access for inspection, maintenance and infrastructure support.

DRIFT 1

Service & maintenance access

Provides access to inspect, maintain and support the primary drainage infrastructure.

→

DRIFT 2

Primary drainage pathway

Provides the controlled drainage route toward the downstream dewatering / discharge system.

PROJECT OBJECTIVE

Strengthen long-term mine-water management, improve operational resilience and reduce exposure to uncontrolled water accumulation and wet-material movement.

Public incident context: Freeport-McMoRan public updates (Sept-Nov 2025). Project-purpose description reflects the portfolio owner's project scope. Exact mine layouts, hydraulic capacities and internal engineering details are omitted.

01 / FROM PROJECT PURPOSE TO EXECUTION

Turning the dewatering response into a controllable plan.

Once the project purpose and drift functions were defined, my role was to convert the scope into an executable development plan linking readiness, resources, schedule, field progress, delays and cost.

US$20M
PROJECT VALUE

~5.3 km
DEVELOPMENT SCOPE

Underground
ENVIRONMENT

Weekly
CONTROL CYCLE

THE CONTROL CHALLENGE

Maintain a realistic and executable plan while approvals, rock conditions, resource availability, field progress and delays could change the development path.

MY CONTRIBUTION

Built the project schedule; updated weekly progress; coordinated stakeholders; verified field conditions; analysed delays; and estimated manpower, equipment and material requirements.

01 **Front-end readiness**

02 **Baseline scheduling**

03 **Weekly progress**

04 **Delay analysis**

05 **Field verification**

06 **Cost & resources**

INTEGRATED PROJECT-CONTROLS FLOW

PURPOSE – Why
READINESS – Can work proceed?
RESOURCES – What is needed?
BASELINE – When?
WEEKLY CONTROL – What changed?
FIELD / DELAY – Why?
COST UPDATE – Impact?

HOW THE STORY CONNECTS

Project purpose defines the required infrastructure. Front-end readiness confirms how it can be executed. Scheduling converts that plan into time and production targets. Weekly field verification, delay analysis and cost updates keep execution aligned with the intended outcome.

02 / FRONT-END DEVELOPMENT READINESS

Build the schedule from executable field conditions.

Before baselining the programme, planning inputs were developed with Geo Engineering and translated into excavation readiness, resource requirements, ground-support demand and practical development targets.

01

Geo & approval readiness

Coordinated with Geo Engineering to assess rock-mass conditions and incorporate recommendations into ATE (Approval to Excavate) and ATIGS (Approval to Install Ground Support) readiness.

OUTPUT

Excavation readiness inputs

02

Resource planning

Estimated manpower demand; identified primary development and supporting equipment; and estimated ground-support material requirements for Drift 1 and Drift 2 in line with geotechnical recommendations.

OUTPUT

Crew + equipment + material demand

03

Production targeting

Converted planned metre targets into development rounds using a nominal 3.5 m advance per heading round, then established the daily and weekly round requirements needed to stay aligned with plan.

OUTPUT

Daily / weekly round targets

FRONT-END PLANNING LOGIC

GEO REVIEW – ATE / ATIGS – RESOURCE PLAN – ROUND TARGETS – BASELINE – WEEKLY CONTROL

PLANNING RULE

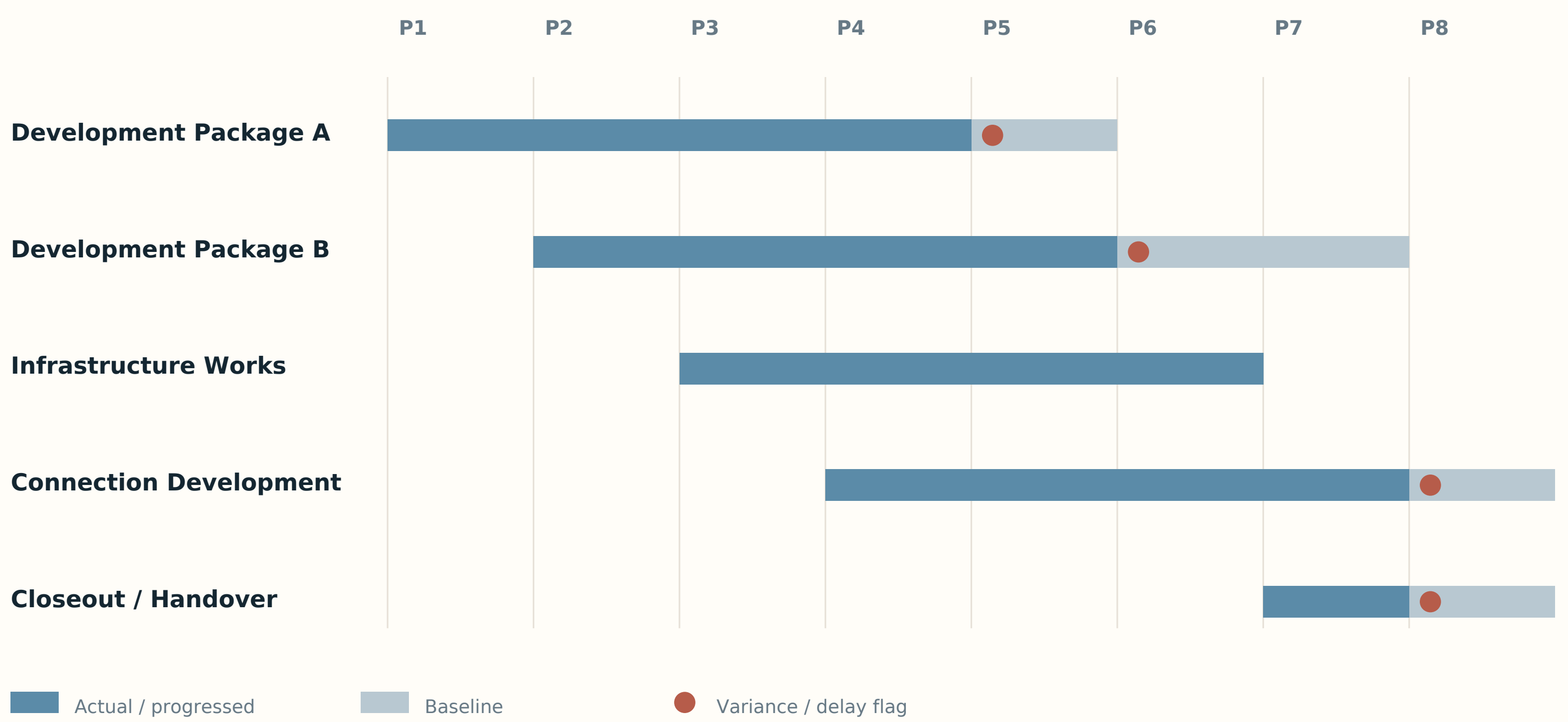
Required development rounds = planned advance metres / 3.5 m nominal advance per round

Public portfolio version: specific geotechnical classifications, support designs/quantities, equipment IDs, mine locations and approval records are intentionally omitted.

Turn readiness into a baseline - then keep it current.

Front-end readiness and production targets were converted into a Microsoft Project baseline, then updated weekly to control sequence, milestones, round requirements, progress variance and delay exposure.

ANONYMISED SCHEDULE RECONSTRUCTION



ROUND TARGETING

Planned metres

÷ 3.5 m nominal advance

= Required rounds

→ Daily / weekly target

WEEKLY CONTROL LOOP

FIELD progress — **UPDATE** schedule — **VARIANCE** review — **ACTION** coordinate

The weekly cycle kept baseline logic, current progress, production targets and emerging delays visible in one control process.

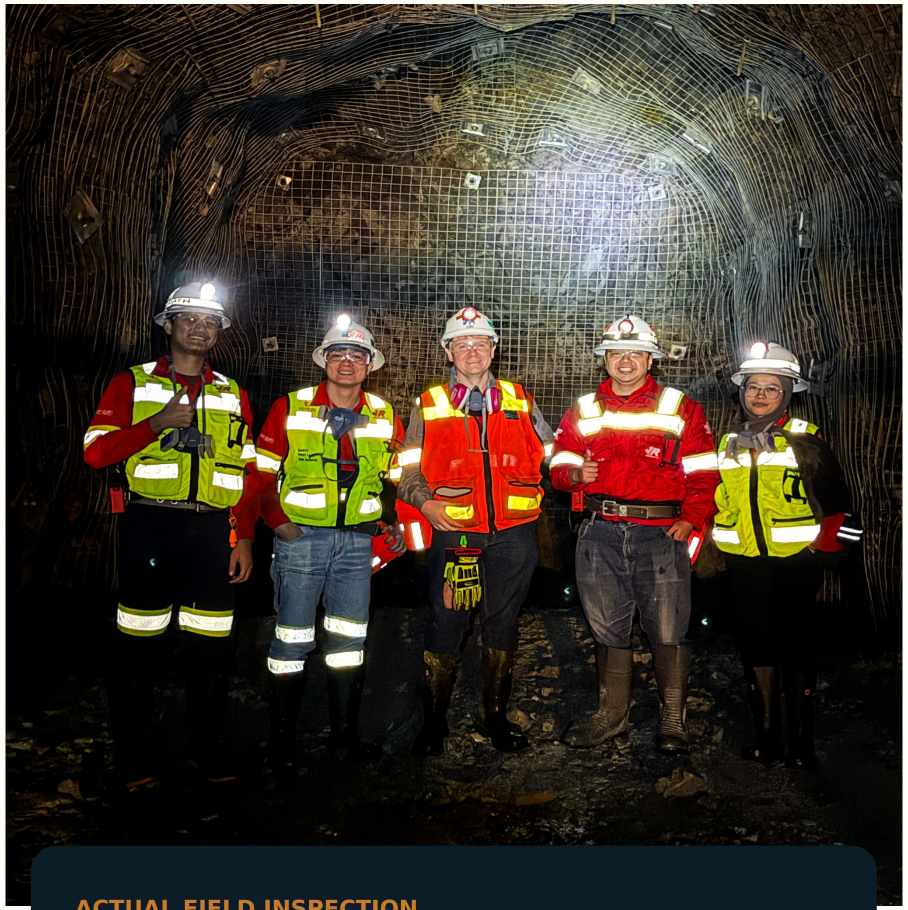
WHY THIS MATTERED

The schedule was not a static plan. It was the control backbone linking approved work, planned production, actual field progress and the actions needed when development moved away from plan.

Visuals are recreated and anonymised to explain the control method; they are not extracts from company systems.

Progress data only becomes useful when it leads to action.

When development moved away from plan, the process was to identify the delay, understand its schedule impact, verify the situation underground and coordinate the parties required to respond.



ACTUAL FIELD INSPECTION

Progress verification with the project team

DELAY ANALYSIS WORKFLOW

1
Detect
Weekly progress update

2
Review
Identify delayed activity

3
Validate
Field inspection / discussion

4
Assess
Evaluate schedule impact

5
Coordinate
Align actions with stakeholders

6
Update
Reflect latest position in schedule

STAKEHOLDER COORDINATION

Area owners | Operations | Project team | Management

Coordination kept access, priorities, schedule impacts and required actions visible across the parties involved.

Public version: mine names, exact locations, delay causes and operationally sensitive details are not reproduced.

Close the loop: scope, resources, progress and cost.

Cost and resource planning were linked back to the planned development rate and updated as progress or execution conditions changed.

MANPOWER

Workforce requirement

Crew demand, labour hours and supporting roles required for the planned development rate.

EQUIPMENT

Primary + support equipment

Development equipment and supporting assets required to sustain the planned sequence.

MATERIALS

Ground-support materials

Ground-support material demand estimated against development scope and approved geotechnical recommendations.

INTEGRATED CONTROL LOGIC

PURPOSE Why the project exists — **READINESS** Can work proceed? — **RESOURCES** What is required? — **SCHEDULE** When? — **PROGRESS** What changed? — **COST** What is the impact?

WHAT THIS PROJECT DEMONSTRATES

- **Front-end planning before scheduling**
- **Weekly project-control discipline**
- **Field-based delay validation**
- **Integrated resource and cost thinking**

PROJECT CONTROLS CONTRIBUTION

Supported planning and control of a US$20M underground infrastructure project covering ~5.3 km of development through integrated readiness planning, scheduling, weekly progress control, field verification, delay analysis and resource-cost estimation.

PORTFOLIO CONFIDENTIALITY

Project information and visuals are simplified and anonymised; internal drawings, exact mine layouts, coordinates, operational data and commercial details are not reproduced.