Geothermal Power Plant Project Design Stages - What to expect

A design led journey for tendering Major Projects

Geothermal Power Plant Project Design Stages - What to expect

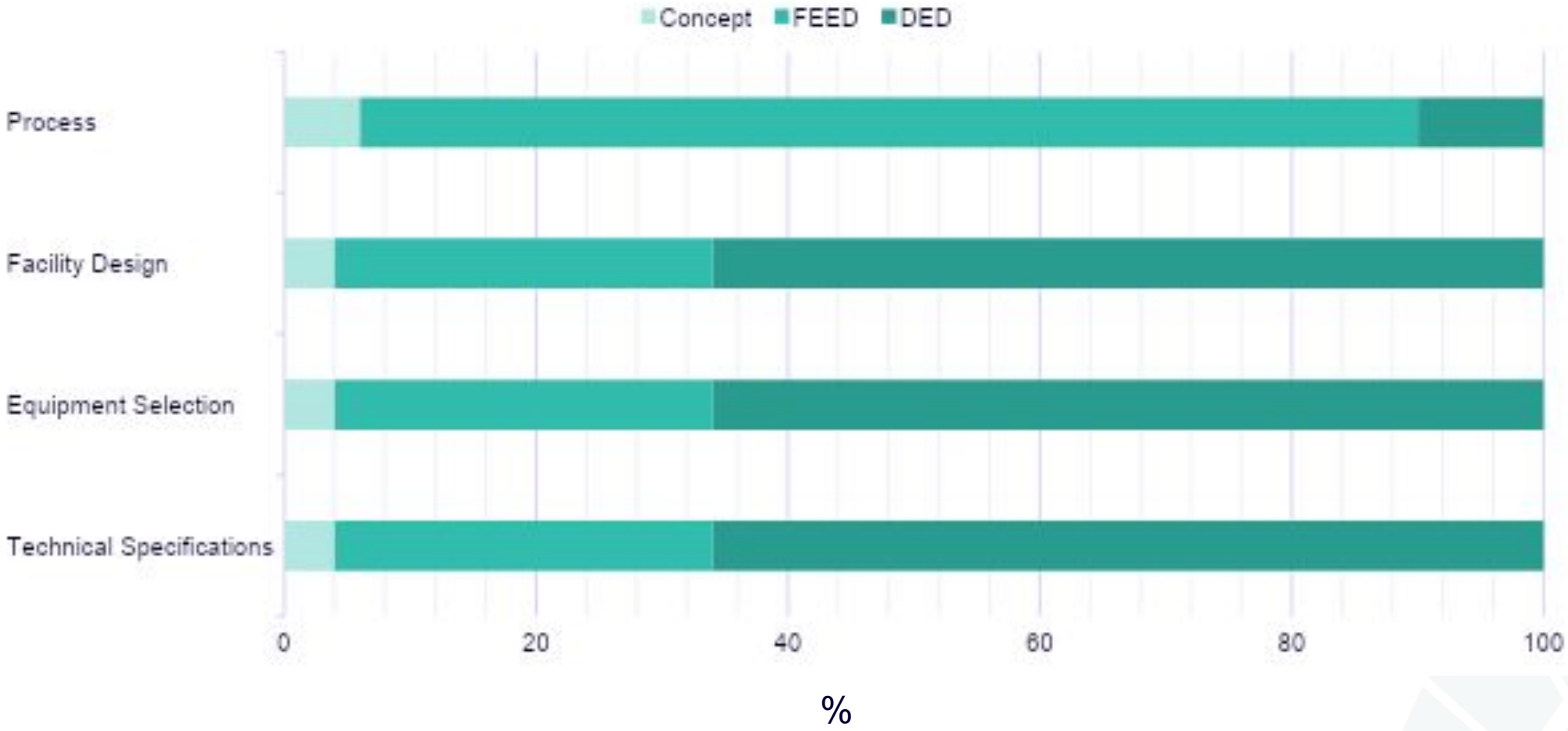
Engineering Design Stages

Feasibility Study / Concept

Front End Engineering Design

Detailed Engineering Design

Engineering Definition by Stage



Resourcing Requirements for FEED & DED

Project Z Example

30,000 Hours (FEED)

16 - 24 months

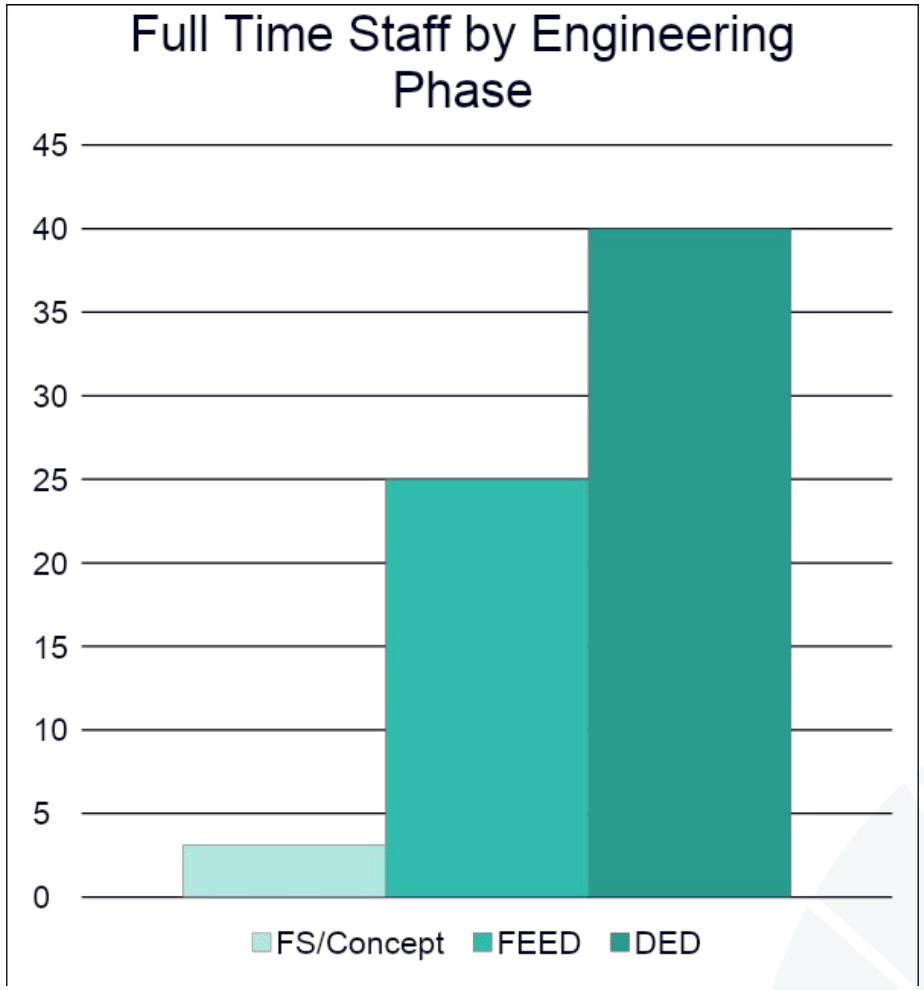
25 to 40 Person FEED/DED Team

Excluding other business support and non-technical functions

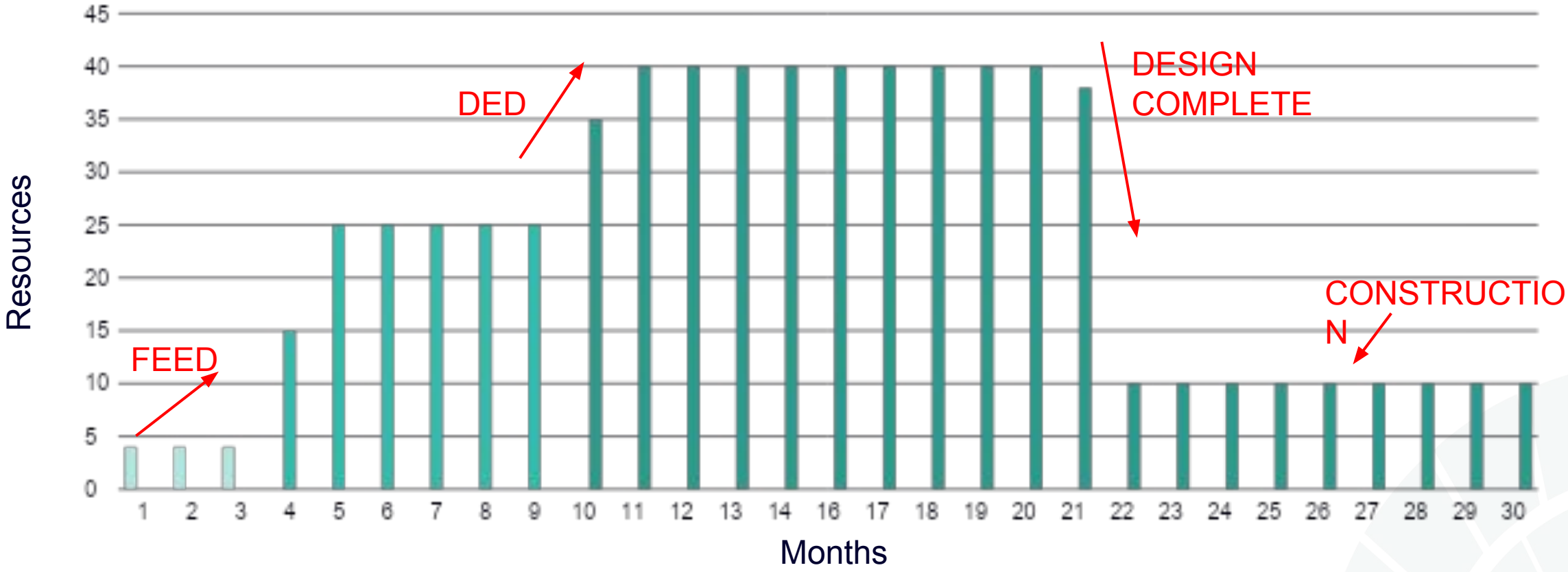
Discipline Leads MUST be highly experienced

Client team needs to be equally experienced

Requires significant client commitment of resources from Feasibility Study / Concept to FEED



Engineering Resource Ramp Up / Ramp Down



Best Design Practices – Defined Process Design during FEED

PFD, HMBD, P&ID's

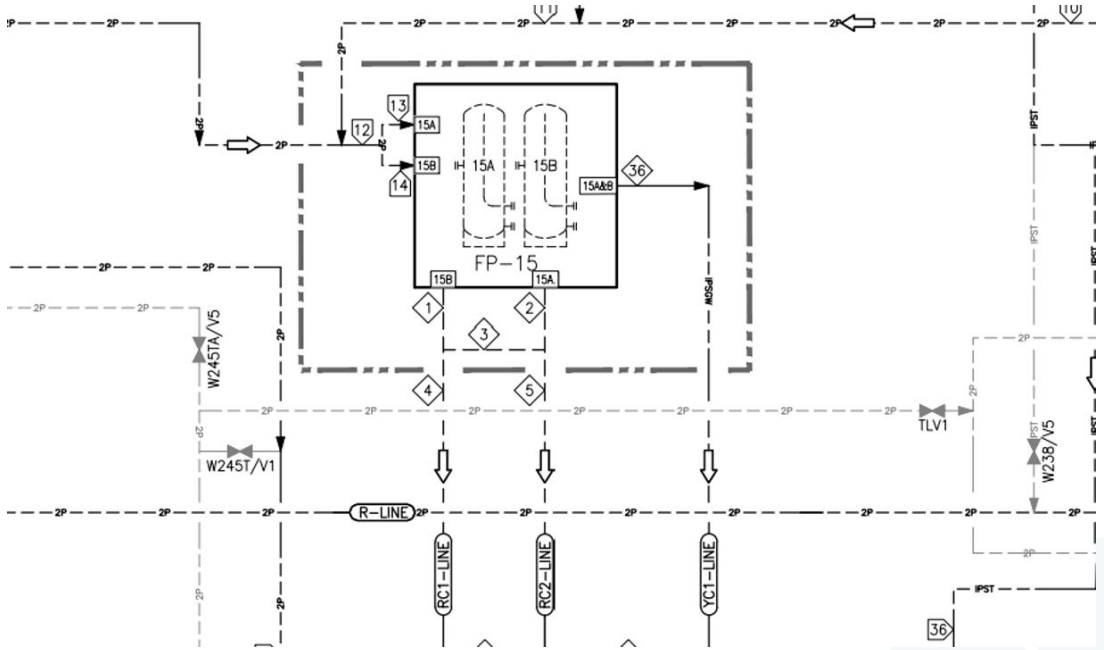
HAZOPs & Safety Studies

Flexibility designed into the Technical Solution

Key long lead equipment sized and specified

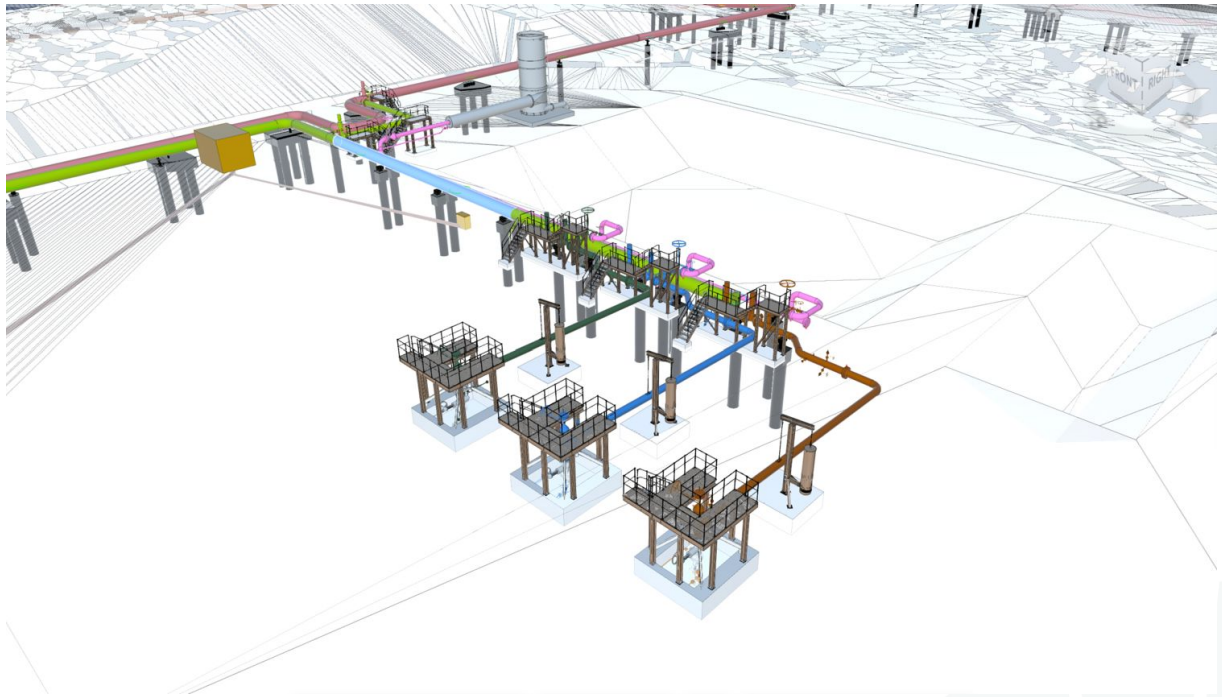
Controls and Operational Philosophy defined

Process changes can lead to a large amount of change over all disciplines and potential cost implications

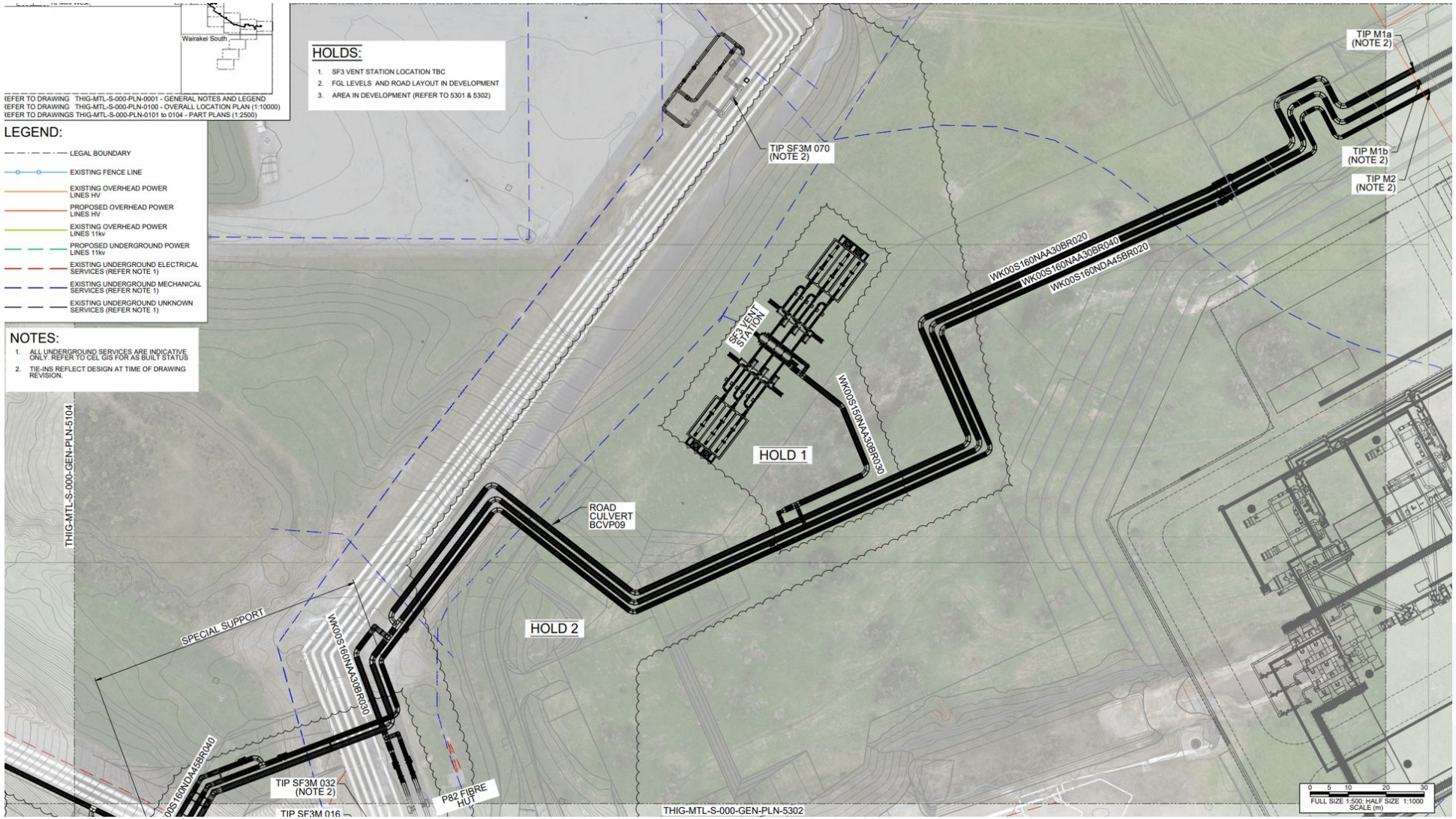


FEED Output Example

- Production wellpad 3x wells
- BoQ generated from 3D Model
- Standard pipe supports developed and optimised based on pipe stress analysis
- Vessel design
- Foundations, platforms and steelwork
- Electrical & Control
- Smallbore piping and minor items left to DED



FEED Output Example – Plot Plans for Piping and Plant Areas



Engineering Effort and Cost

- Project Z – USD400 mil EPC Powerplant & Steamfield (TIC)
- Total Owner's Engineering - ~4-6% of TIC USD16-20 mil

Phase	Concept	FEED	Detailed
Definition	4 – 6%	30-40%	100%
Cost	$300 - 500k	$6.4 - 8mil	$9.3 – 11.5mil
Hours Required	2 000 – 3 000	24 000 – 40 000	50 000 – 73 000
Timeline	3-5mo	6-10mo	8-12mo

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