Implementing Risk Management in an Integrated Project Controls Phased Environment

Andrew Bates, PhD, PMI-RMP
Richard Citrine, PMI-RMP

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Meet the Presenters

From Norristown, PA

Studied Civil Engineering, USAFA, UC Boulder, NYU

Project Manager, US Air Force

Andrew Bates PhD

Senior Risk Manager

Risk Analysis Professor NYU Tandon School of Engr

Risk Engineer NYC, USA

Senior Risk Manager USA

Meet the Presenters

From Liverpool, UK

Studied Chemistry, Nottingham UK

Risk Analyst,
Kings Cross Program UK

Richard Citrine PMI-RMP
Director of Risk Management

Risk Manager
Heathrow T2 Program UK

Lead Risk Engineer NYC, USA

Director of Risk Management
USA

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Agenda

1. What do we mean by an “Integrated Project Controls Phased Environment”
2. Where does risk management fit in?
3. Using risk to understand your project
4. Risk Management Once the Contract is Awarded

What do we mean by an “Integrated Project Controls Phased Environment”

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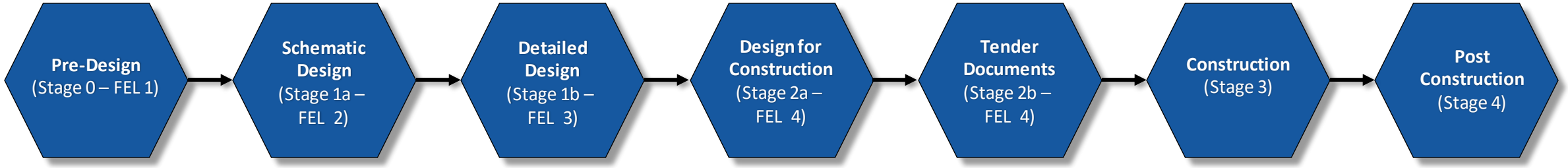
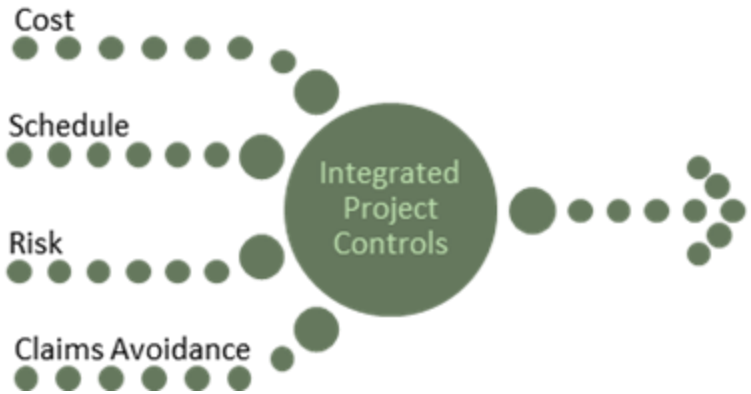
The Phase-Gate Process

The most consistently successful results come from the Integrated Project Controls / Design Stage-Gate effort. This effort is aligned with 7 project lifecycle phases:





"Design-to-Budget"

ARCADIS Design & Consultancy for natural and built assets

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Where does risk management fit in?

Pre-Design (Stage 0 – FEL 1) → Schematic Design (Stage 1a – FEL 2) → Detailed Design (Stage 1b – FEL 3) → Design for Construction (Stage 2a – FEL 4) → Tender Documents (Stage 2b – FEL 4) → Construction (Stage 3) → Post Construction (Stage 4)

Engages Team

- Teams Remain Focused
- Expectations for Success are Understood

Effective Management

- Easier to spot trouble
- Fewer Surprises

Maximize Return on Investment

- Better Quality Data for Decision Making
- Resources allocated where they are needed

A risk assessment is the best way to fully understand your project

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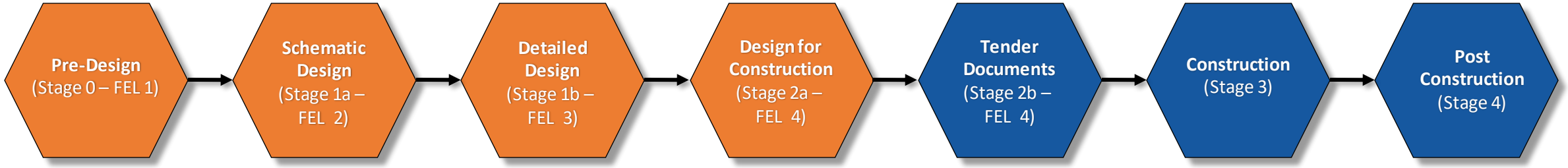
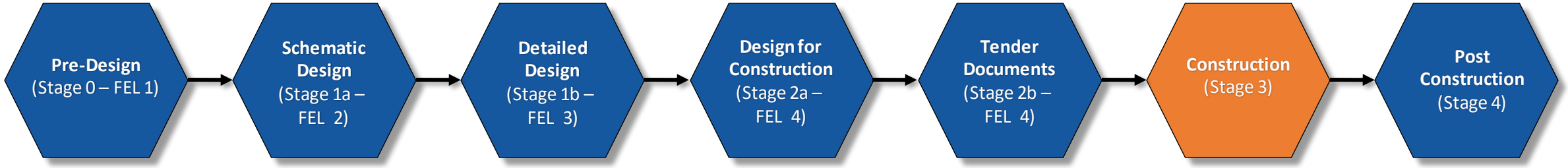
The Phase-Gate Process



The Phase-Gate Process



Using risk to understand your project

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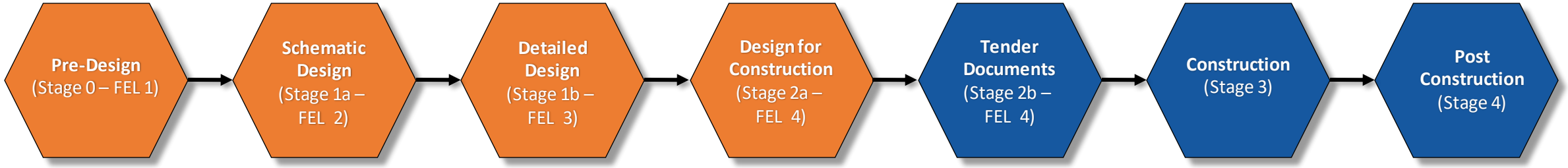
The Phase-Gate Process



Pre-Design (Stage 0 – FEL 1)

Schematic Design (Stage 1a – FEL 2)

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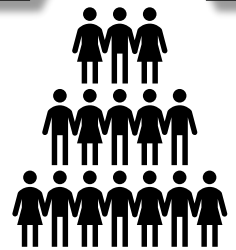
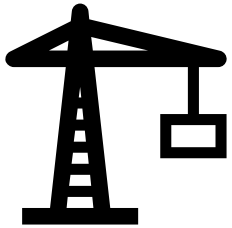


Stakeholders

Project risk is generally driven by three main factors

Resources



Technical

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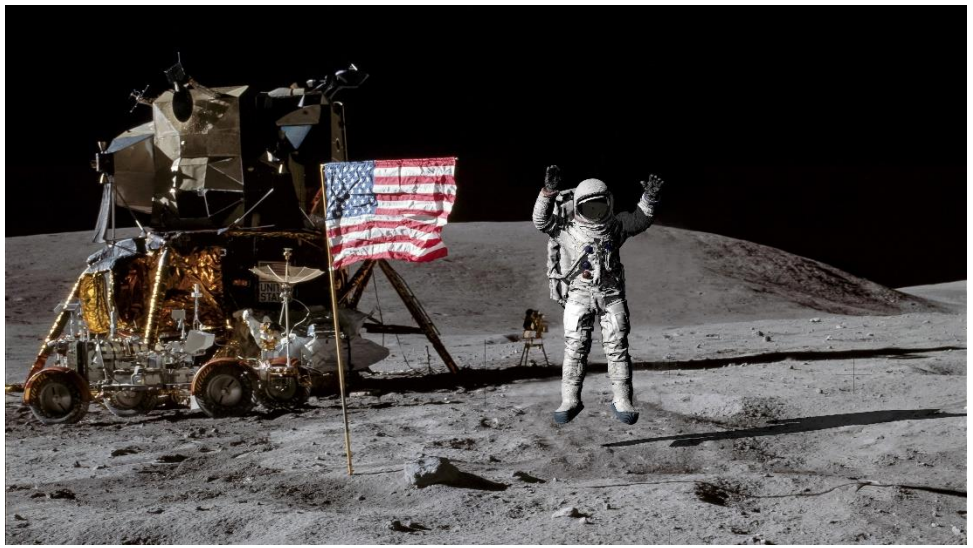

When NASA sent a man to the moon in 1969 they had to overcome a large number of risks - **but what do you think was the biggest risk to the space program?**

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Pre-Design (Stage 0 – FEL 1) → Schematic Design (Stage 1a – FEL 2) → Detailed Design (Stage 1b – FEL 3) → Design for Construction (Stage 2a – FEL 4) → Tender Documents (Stage 2b – FEL 4) → Construction (Stage 3) → Post Construction (Stage 4)

This is a Bridge over a river in Georgia.

Fairly standard bridge - there thousands of similar bridges across the USA

Final cost of the project was 50% higher than the initial budget – why?

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US Tidal System
Breeding manatees, limits on time of year contractor can work in the river

Local Residents
Limit work hours
Project requires dedicated outreach resources

Local Politicians
Won't allow bridge to be closed – construction methodology much more complex

Local Fishing Fleet.
Want compensation due to impact on their businesses

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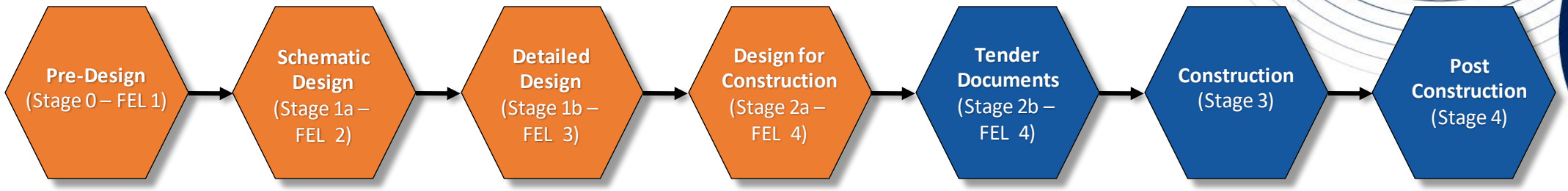

Stakeholders

Project risk is generally driven by three main factors

Resources

Technical

Good risks management is all about understanding your project.

If we understand our stakeholders early in the project's lifecycle, it can prevent them becoming risks that impact on either our resources or technical approach.

The phase get process enables us to regularly review and communicate any stakeholders issues

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Risk Management Once the Contract is Awarded

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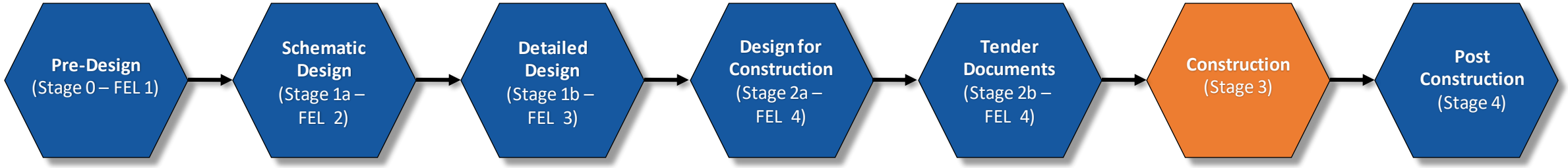
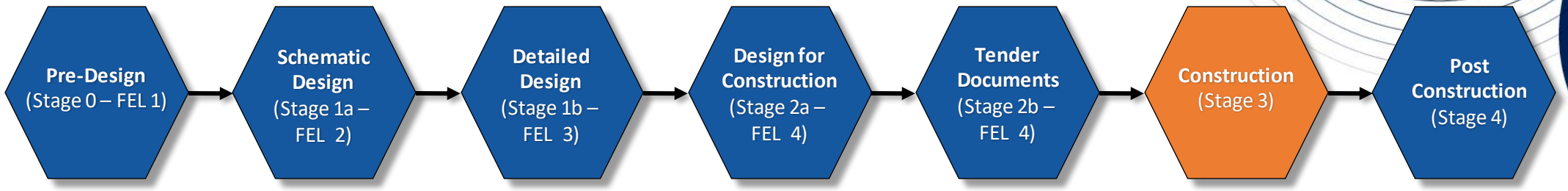
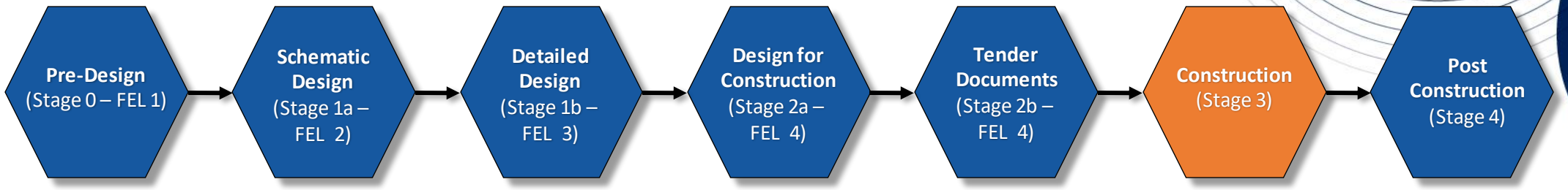
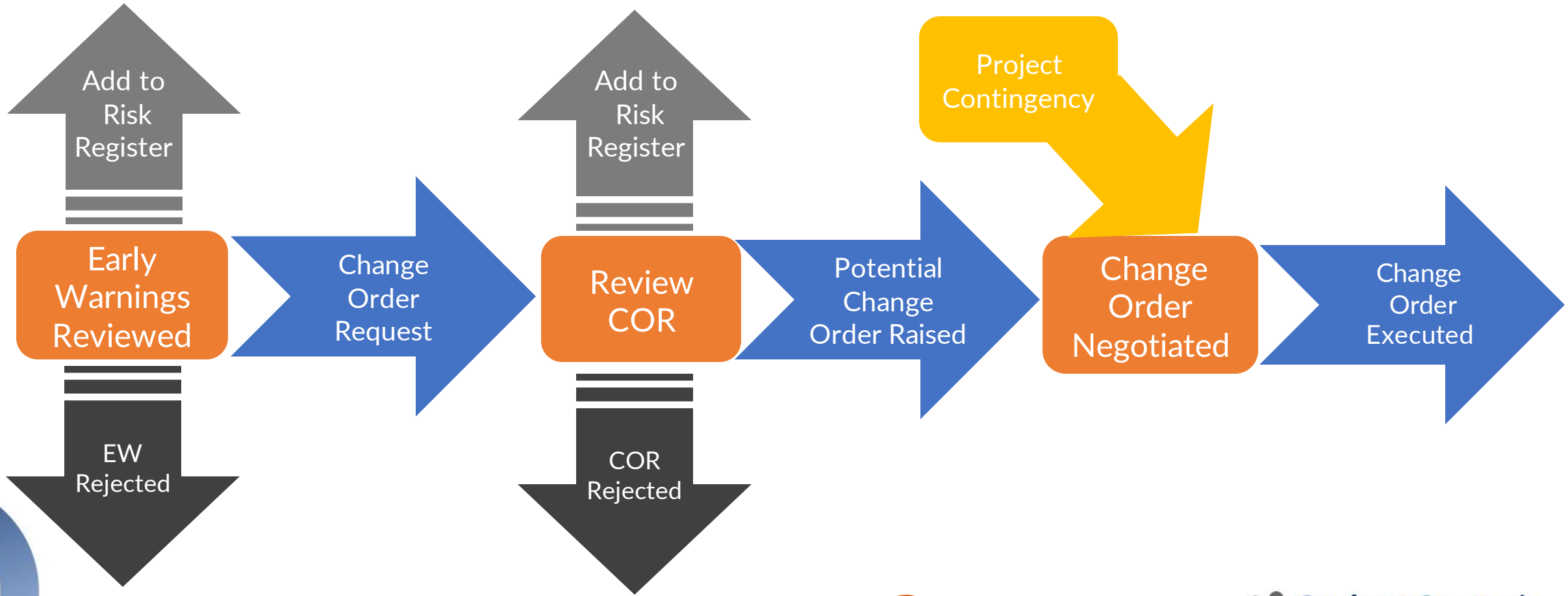
The Phase-Gate Process





- This is the most expensive and active part of the project.
- Any changes can have a large impact of the budget, schedule and scope.
- Changes can also create additional risks that need to be understood and managed.
- The project needs confidence in its final cost - this can be done by monitoring spend vs. contingency.
- The project needs confidence in completion dates and understand direction of its critical path and near critical path.





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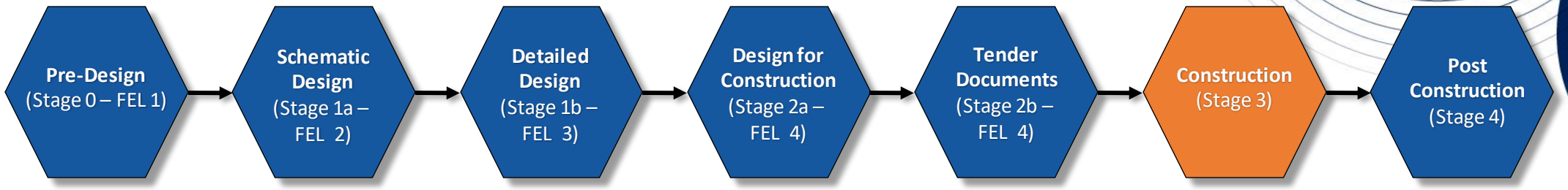
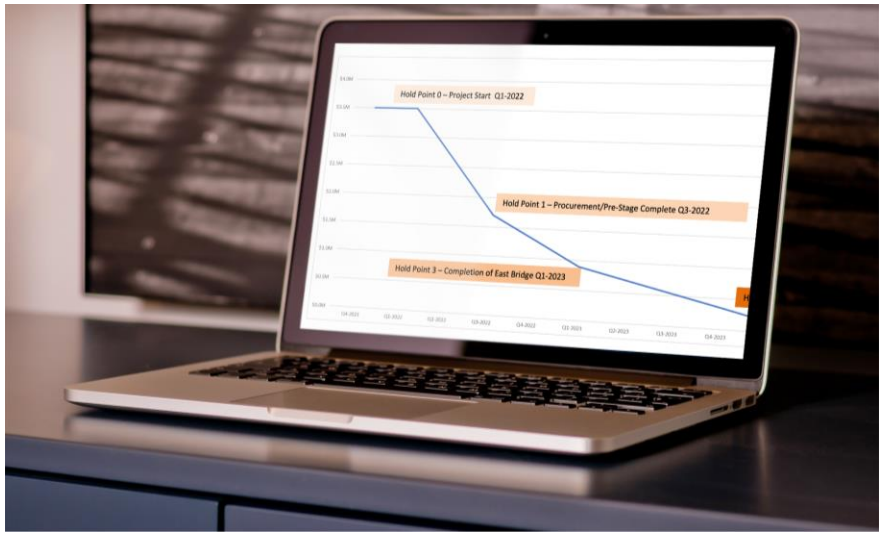
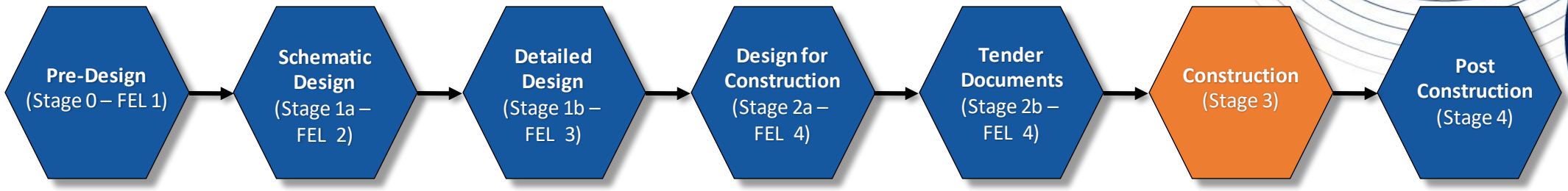


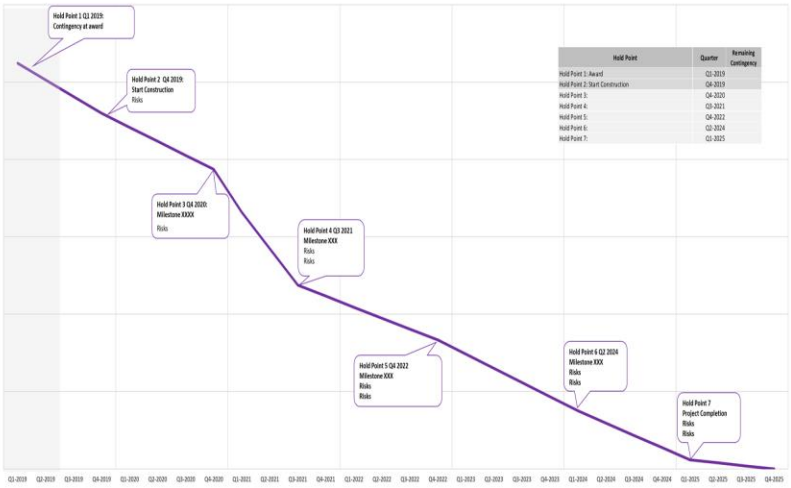
Contingency Drawdown



- There are several methods to track risk retirement and contingency drawdown overtime.
- These can be used as a project management tool to help aid with decision making, keep control of costs and give an early warning if the project will have cost pressures.
- Also helps keep risk management central to every project decision.
- We are going to use the Hold Point methodology
- This is a simple approach that can be applied and adapted to a wide variety of different projects.
- It is also easy to explain to non-specialists and senior managers



Hold Point Methodology



- Hold points should be milestones within the schedule where a major element of scope has been delivered.
- They should be visible and understood by everyone on the project.
- Generally , this is applied to larger projects that are multi-year endeavors and as such the hold points should be 6-12 months apart in time.
- After each hold point a number of risks that should retire once this hold point is passed.
- These drawdown curves should be tied to agreed hold points with the approved baseline schedule.
- After every hold point a revised QRA should be run and the drawdown curve updated

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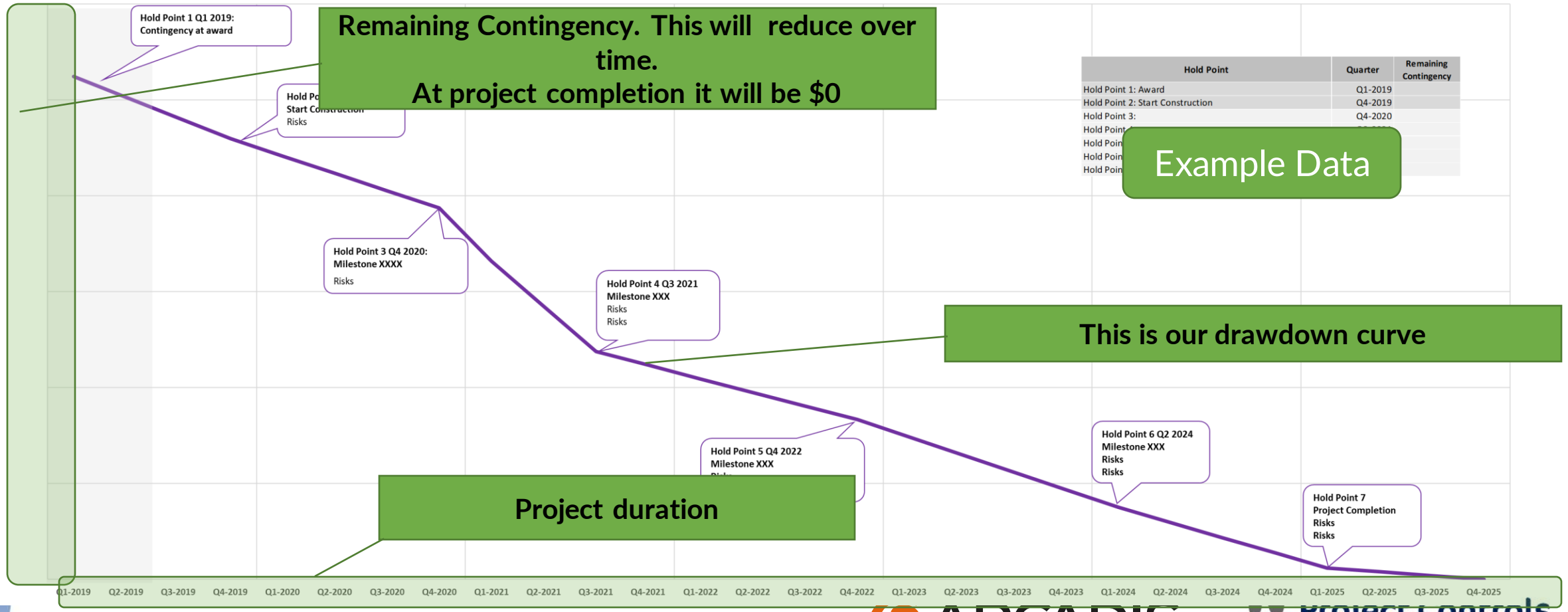
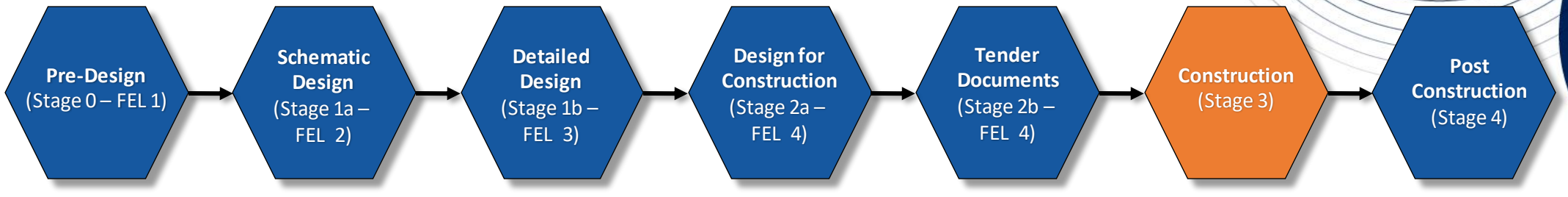
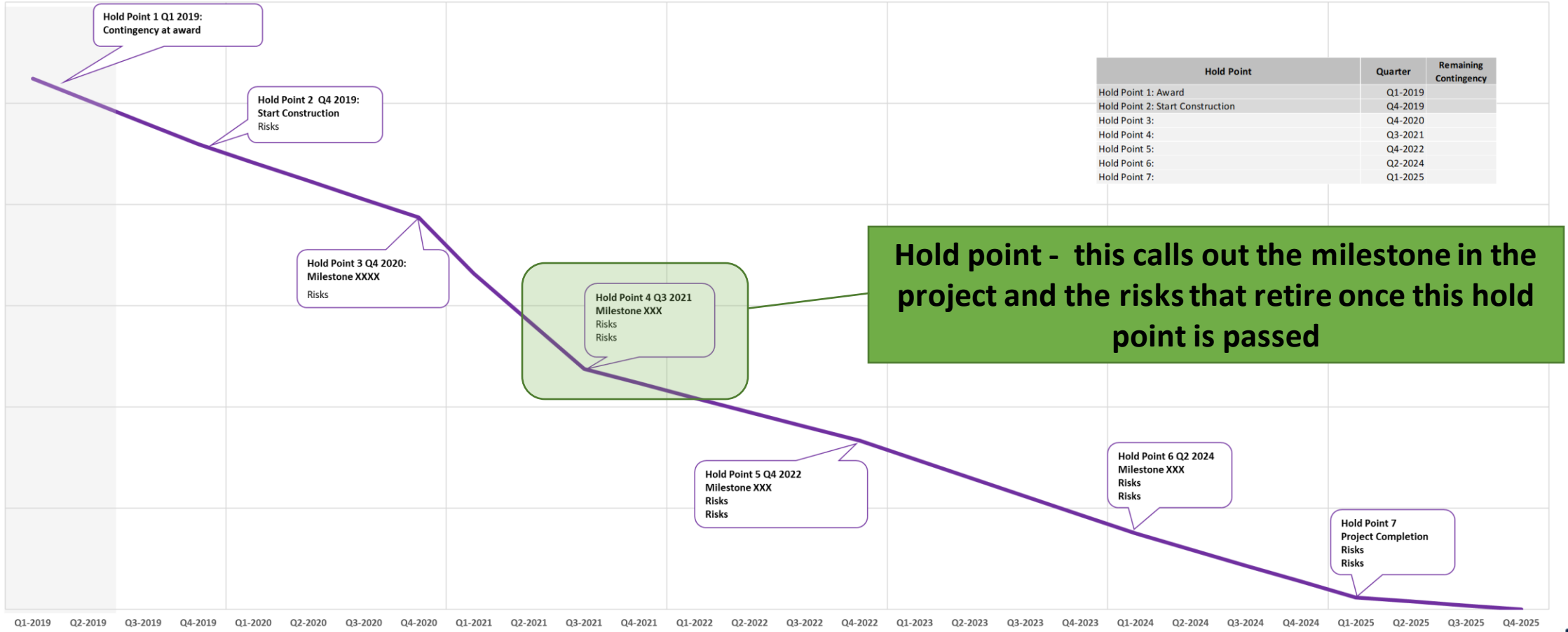


Hold Point	Quarter	Remaining Contingency
Hold Point 1: Award	Q1-2019	
Hold Point 2: Start Construction	Q4-2019	
Hold Point 3:	Q4-2020	
Hold Point		
Hold Point		
Hold Point		
Hold Point		

Example Data





Hold Point	Quarter	Remaining Contingency
Hold Point 1: Award	Q1-2019	
Hold Point 2: Start Construction	Q4-2019	
Hold Point 3:	Q4-2020	
Hold Point 4:	Q3-2021	
Hold Point 5:	Q4-2022	
Hold Point 6:	Q2-2024	
Hold Point 7:	Q1-2025	

Hold point - this calls out the milestone in the project and the risks that retire once this hold point is passed

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Hold Point	Quarter	Remaining Contingency
Hold Point 1: Award	Q1-2019	
Hold Point 2: Start Construction	Q4-2019	
Hold Point 3:	Q4-2020	
Hold Point 4:	Q3-2021	
Hold Point 5:	Q4-2022	
Hold Point 6:	Q2-2024	
Hold Point 7:	Q1-2025	

So, we have our baseline – what happens after we get started

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We are now at Hold Point 1

Good news – we only have $500k of approved changes, so we have more than enough contingency to deliver the job

Bad news - we have almost $2M in PCOs, $500K in negotiated change and some new risks!! I think we are looking at an overspend

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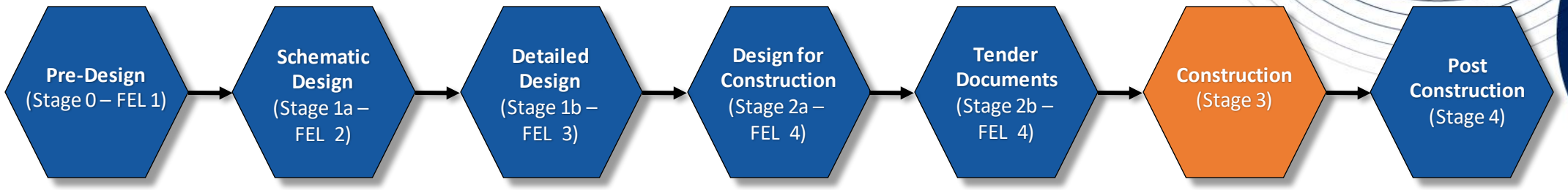

How do we update our curve?

Approved Changes	These are now fixed costs and should be removed from the model, so Hold Point 1 is now actualized at $4.70M (= $5.2M- $500K)	$500k
Negotiated Changes	These are 100% certain to impact the project , but there could be some variance in the cost. Include in model in a similar way to estimating uncertainty - the variance in cost should be quite small	$500k
Potential Change Orders (PCOs)	These are unagreed changes and the cost values are the contractor's numbers so they could be reduced significantly. Include in model and range in a similar way to estimating uncertainty.	$2,000k
Risk Register	The risk register should be updated, with risks that have retired, closed, and any new risks added to the model	$3,000k

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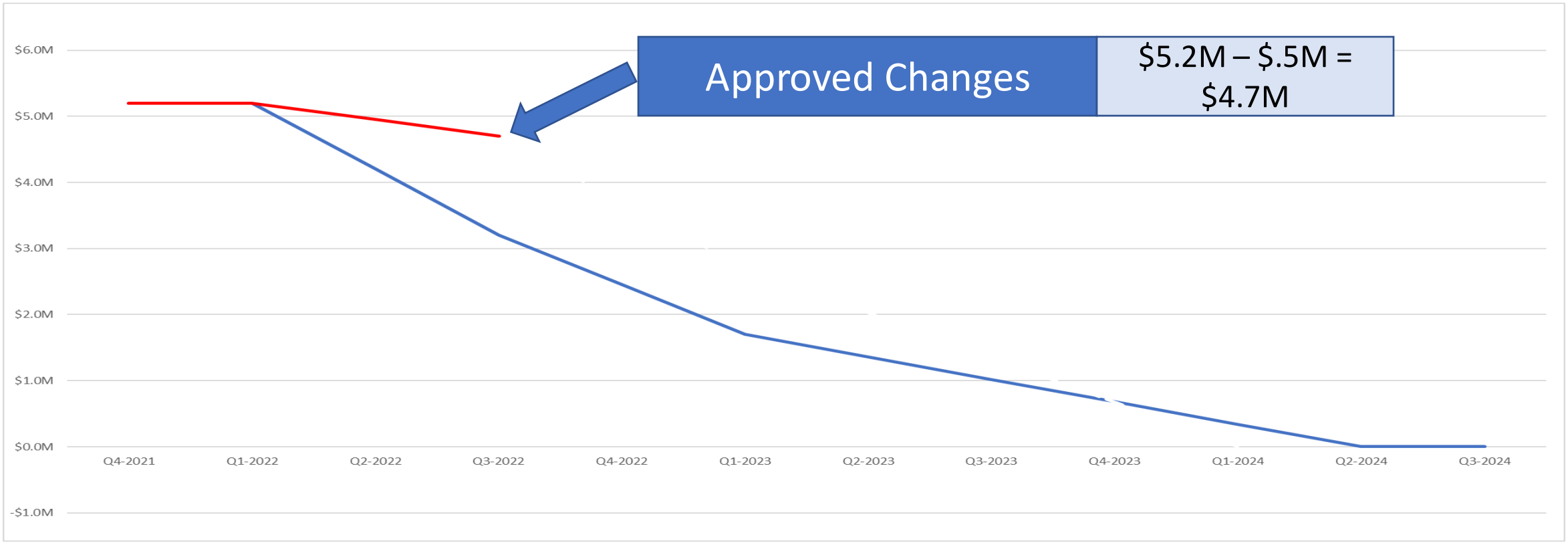

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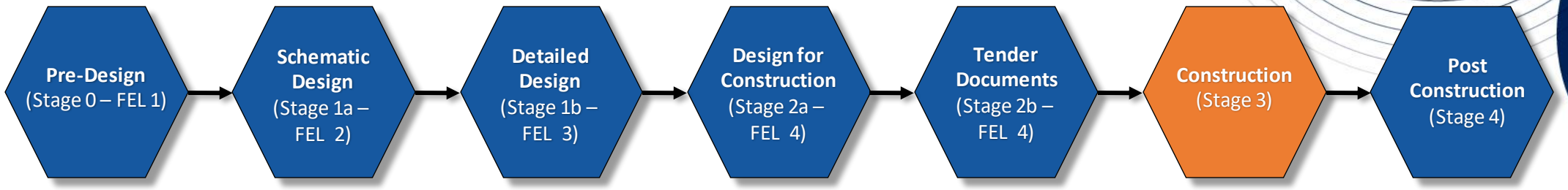

Potential Change Orders (PCOs)	These are unagreed changes and the cost values are the contractor's numbers so they could be reduced significantly. Include in model and range in a similar way to estimating uncertainty.	$2,000k

PCO	Contractor's Value	Owner Value	Model
PC01	$250k	$100k	Uniform Distribution Contractor's Value, Owner's Value)
	Contractor's Value Assumed to be the Worst Case	Owner's Value Assumed to be the Best Case	Actual value of change will be somewhere in-between the two

- Treat like an estimating uncertainty in your risk model. Review and range these in your risk workshops before you build your model.
- On projects in construction PCOs may be your largest risk input. **Make sure any PCO's are not double counted in the risk register.**

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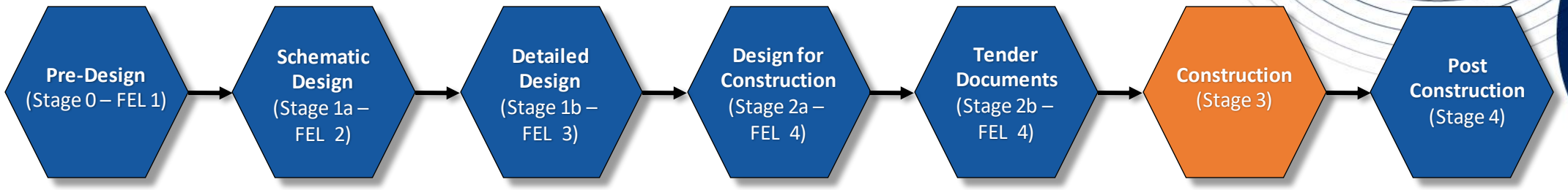
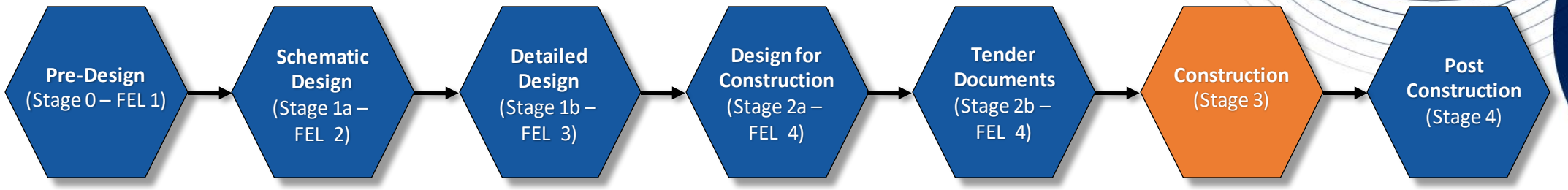


Negotiated Changes	These are 100% certain to impact the project, but there could be some variance in the cost. Include in model in a similar way to estimating uncertainty - the variance in cost should be quite small	$500k

Negotiated Change	Min	NCO Value	Max	Model
NCO-01	-5%	$200K	+5%	Triangular Distribution
	For a negotiated change order there should only be a small variance			

- Treat like an estimating uncertainty in your risk model. Review and range these in your risk workshops before you build your model.
- Make sure any negotiated changes are not double counted in the risk register.



Risk Register	The risk register should be updated, with risks that have retired, closed, and any new risks added to the model	$3,000k

- Risk's may retire or reduce as time progresses.
- If you are running a post award QRA, review the PCOs and Negotiated Changes before reviewing risks to ensure there is no double counting.
- Ideally any change order that is being funded from risk contingency should be tied to the risk register

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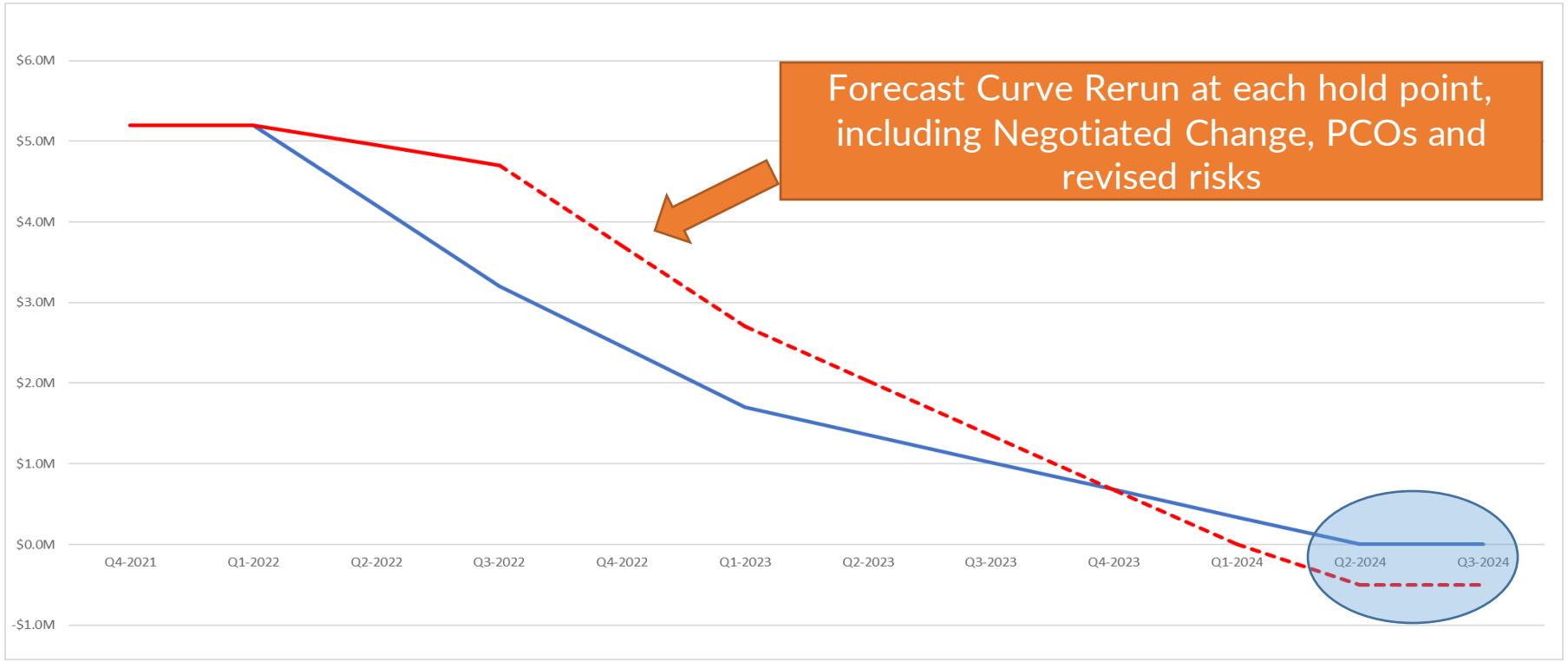

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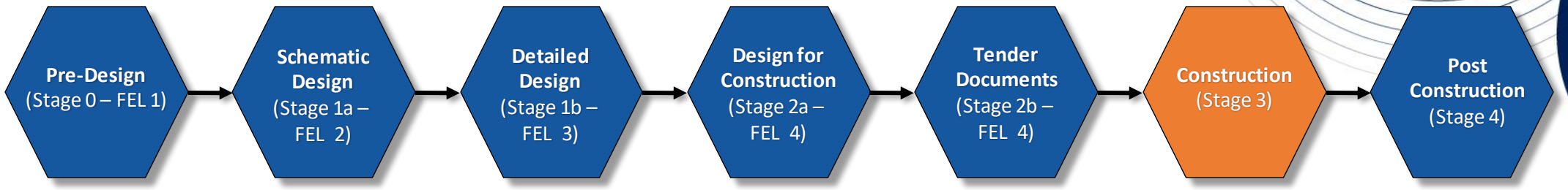

So, what are we going to do? Am I going to get fired?

- Don't worry, the key benefit of this approach is that it gives us an early warning of a contingency shortfall.
- If we are showing a contingency shortfall a recovery plan should be enacted
- If it is early enough in the schedule, we could look to mitigate some of the risks.
- We could also look for additional funding

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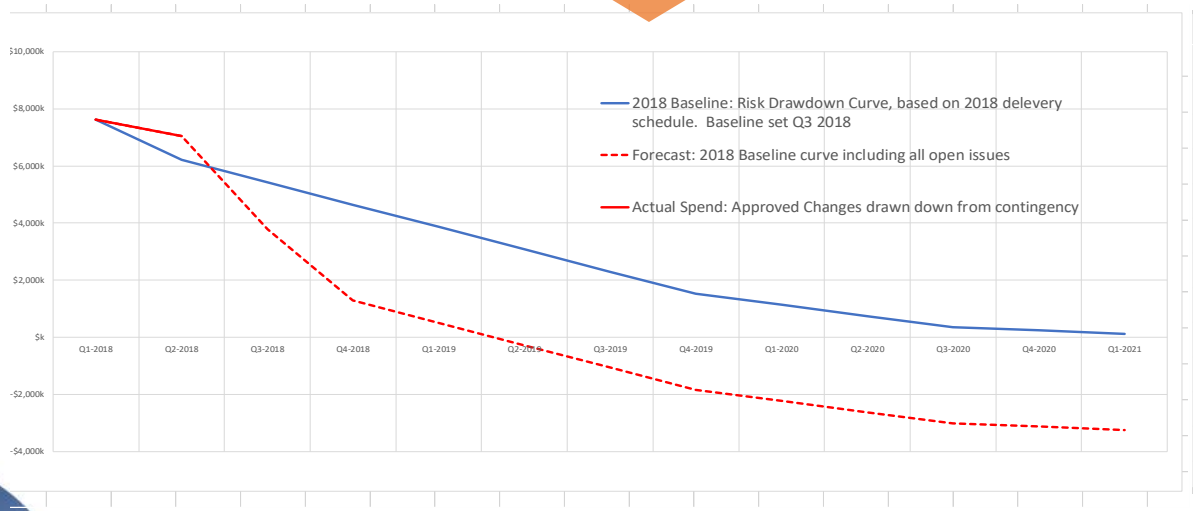
Program

2



Project 1 showing an overspend

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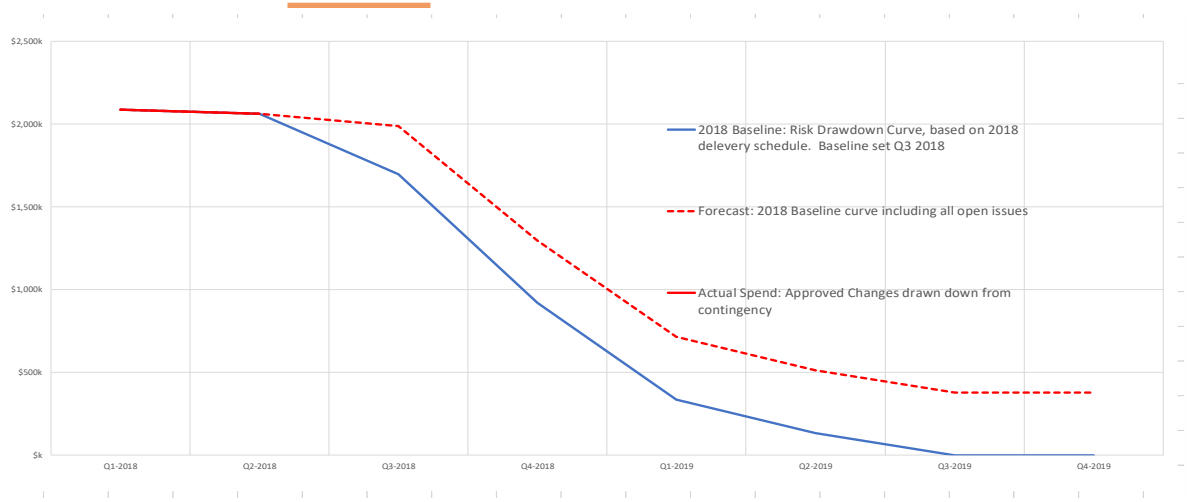

Project 2 showing a saving

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To conclude

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- Teams Remain Focused
- Expectations for Success are Understood

Effective Management

- Easier to spot trouble
- Fewer Surprises

Maximize Return on Investment

- Better Quality Data for Decision Making
- Resources allocated where they are needed

A risk assessment is the best way to fully understand your project

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THANK YOU

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