Curating the Inputs for a Contingency Reserve Calculation

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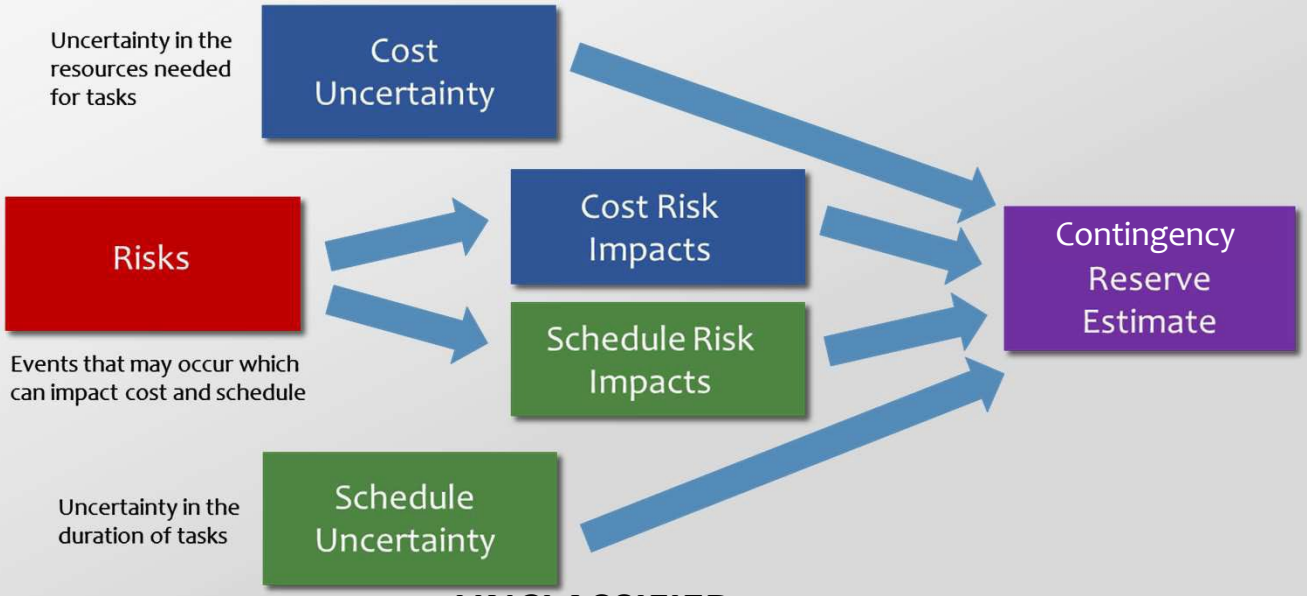
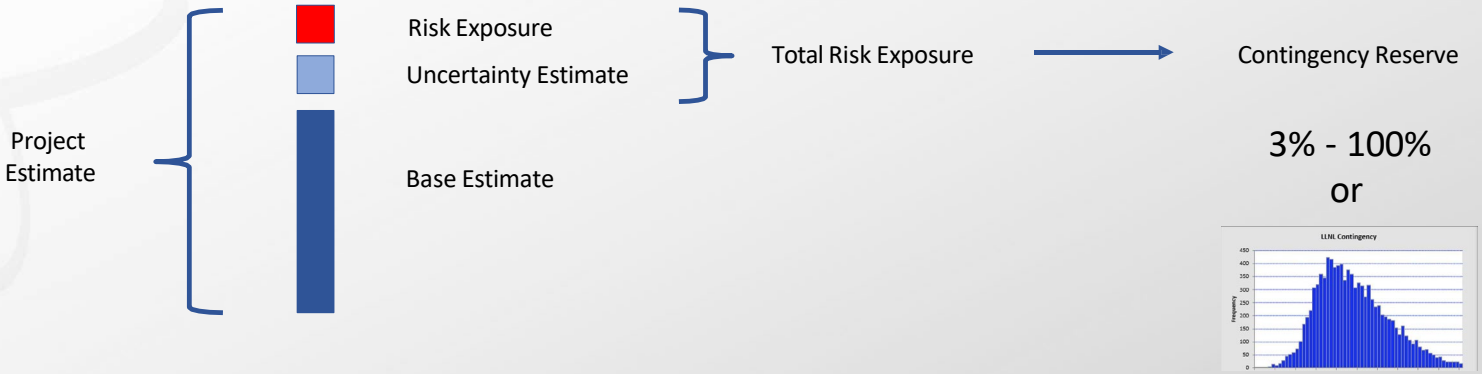
Overview of the Context

Uncertainty and risk analyses are used to develop estimates for Contingency Reserve, which are funds specifically for when a project does not go exactly as planned.



The Elements of a Typical Project Estimate



The amount of contingency may be:
- A percentage of the estimate
- Developed by quantitative risk analysis techniques such as Monte Carlo.

Benefits of Quantitative Risk Analysis:
- Numerical estimate of the overall effect of risk on the objectives.
- Results from this analysis indicate the likelihood of success in achieving objectives
- Estimates of contingency reserves

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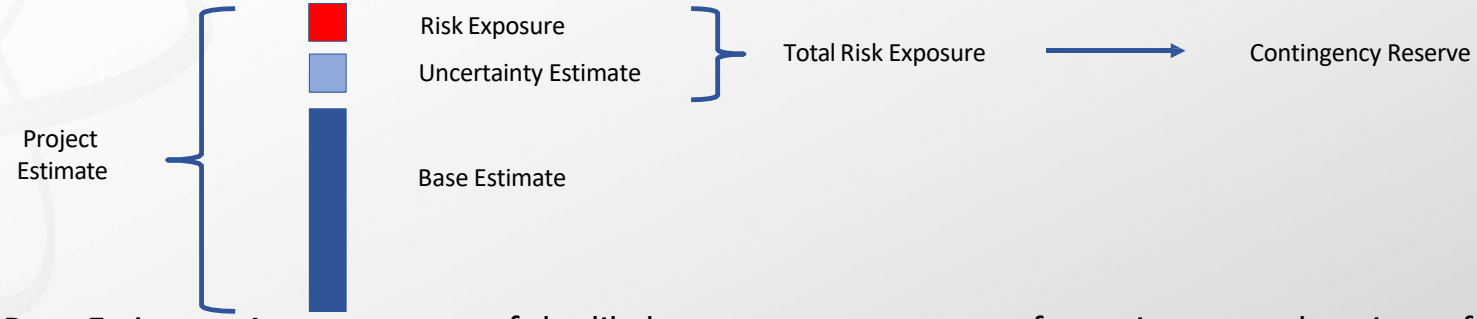


Base Estimate: An assessment of the likely amount or outcome of a project cost, duration, effort, or resource.

Uncertainty Estimate: The variance from the baseline estimate of planned work representing lack of understanding or awareness of issues, events, paths to follow, or solutions to pursue.

Risk exposure: The aggregate measure of the potential impact of all risks, that is events that may or may not occur, at any given point in time in a project that impact project objectives.

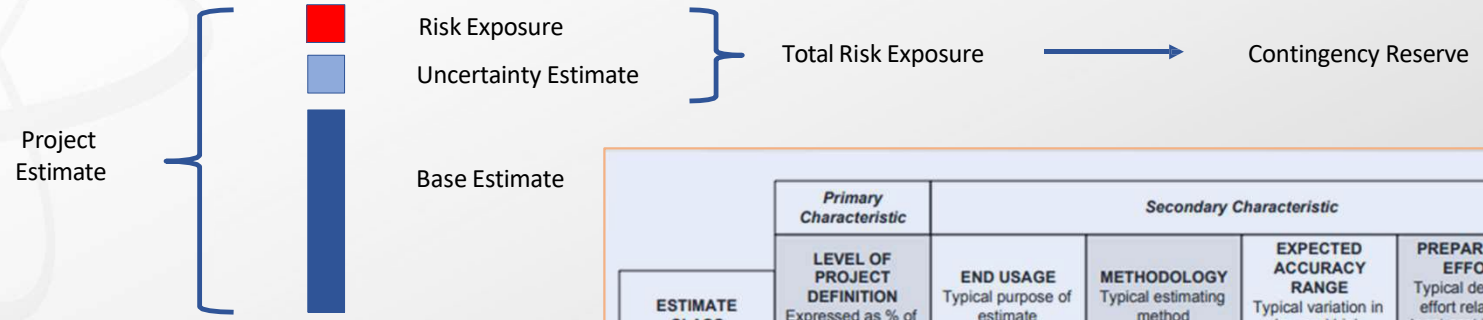
Contingency Reserve: Time or money allocated in the schedule or cost baseline for known uncertainties and risks with active response strategies.

The Elements of a Typical Project Estimate

Initially, the inputs of a project estimate, including a contingency reserve, are captured in various high-level documents, including:

- Requirement documents
  - Technical characteristics
  - Solutions requirements
- Activities Lists
- Risk Lists
- Attributes
- Resource Lists

The Elements of a Typical Project Estimate



The maturity of the project estimate indicates the expected accuracy of the project estimate.

Early project estimates may not have identified risks, which is reflected in the wider range of expected accuracy.

	Primary Characteristic	*Secondary Characteristic*			
ESTIMATE CLASS	**LEVEL OF PROJECT DEFINITION** Expressed as % of complete definition	**END USAGE** Typical purpose of estimate	**METHODOLOGY** Typical estimating method	**EXPECTED ACCURACY RANGE** Typical variation in low and high ranges [a]	**PREPARATION EFFORT** Typical degree of effort relative to least cost index of 1 [b]
Class 5	0% to 2%	Concept Screening	Capacity Factored, Parametric Models, Judgment, or Analogy	L: -20% to -50% H: +30% to +100%	1
Class 4	1% to 15%	Study or Feasibility	Equipment Factored or Parametric Models	L: -15% to -30% H: +20% to +50%	2 to 4
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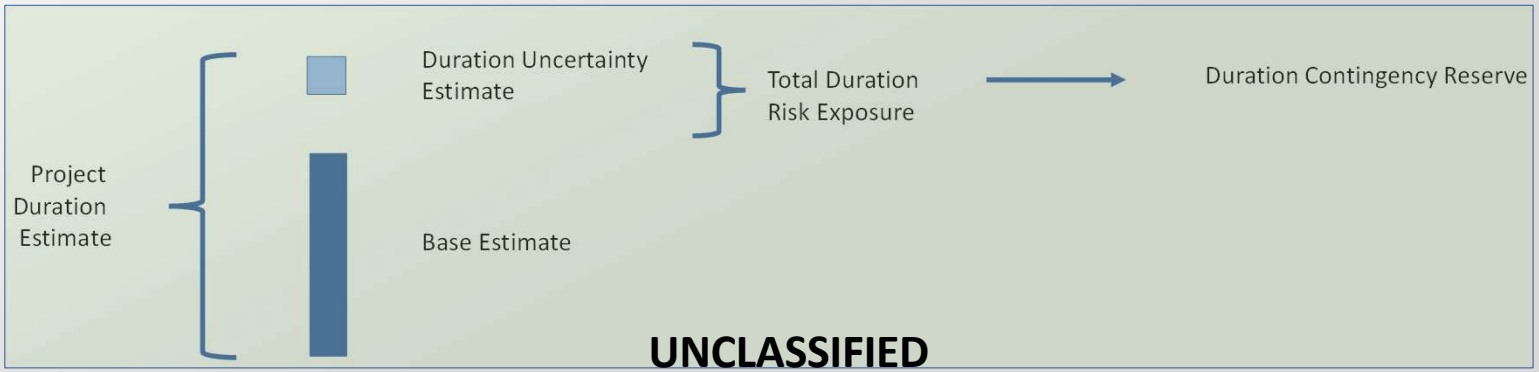
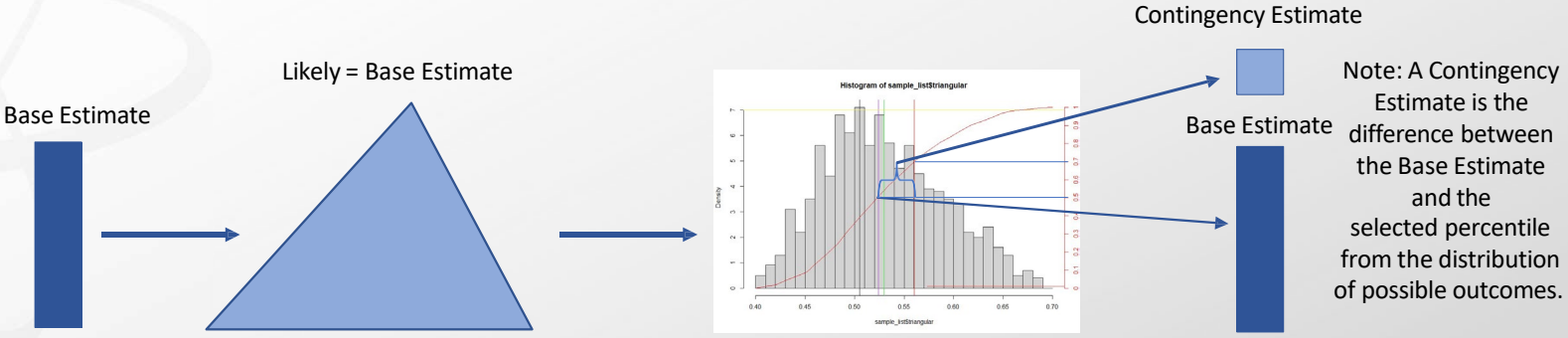
The Elements of a Typical Project Estimate

Most initial estimates during the concept screening phase begin as a set of two estimates, cost and duration, of the overall project without any granularity.



How do you quantify the uncertainty of an initial estimate?



Note: A Contingency Estimate is the difference between the Base Estimate and the selected percentile from the distribution of possible outcomes.

To quantify a contingency for an initial estimate, you can be provided with a three-point estimate, that is a minimum and maximum in addition to a base estimate, or you can infer a minimum and maximum based on the level of expected accuracy associated with the level of maturity of the estimate, then:

- Assign a flat percentage
- Use a probability-based solution, such as calculating a closed-form percentile or calculating a percentile using Monte Carlo techniques

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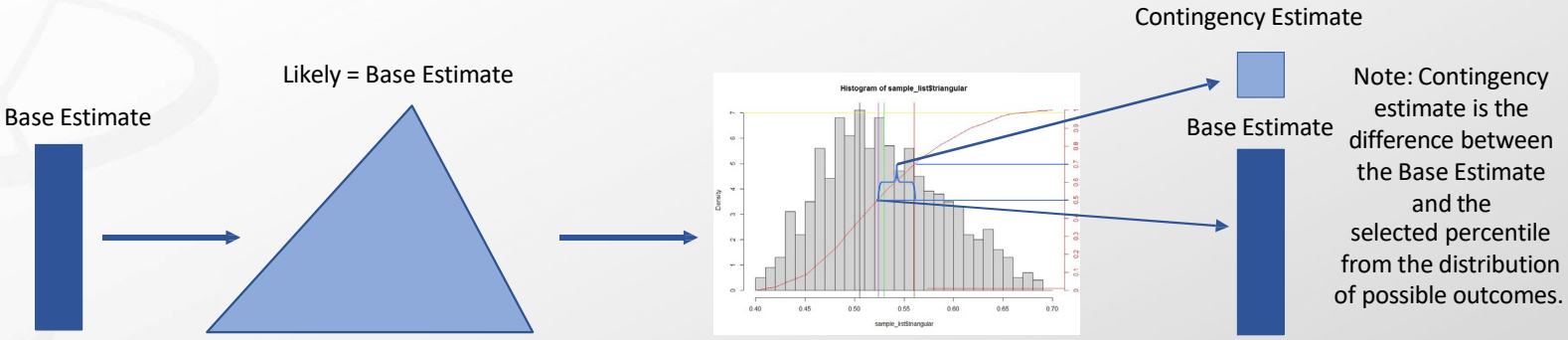

Three-Point Estimating: A technique used to estimate by applying an optimistic (minimum) , pessimistic (maximum), and most likely (base estimate) value to account for uncertainty.

These types of estimates are convenient because:

- The terms are native to Subject-Matter Experts.
- Probability distributions exist that accept these terms as parameters (i.e., uniform, triangular, beta-PERT)

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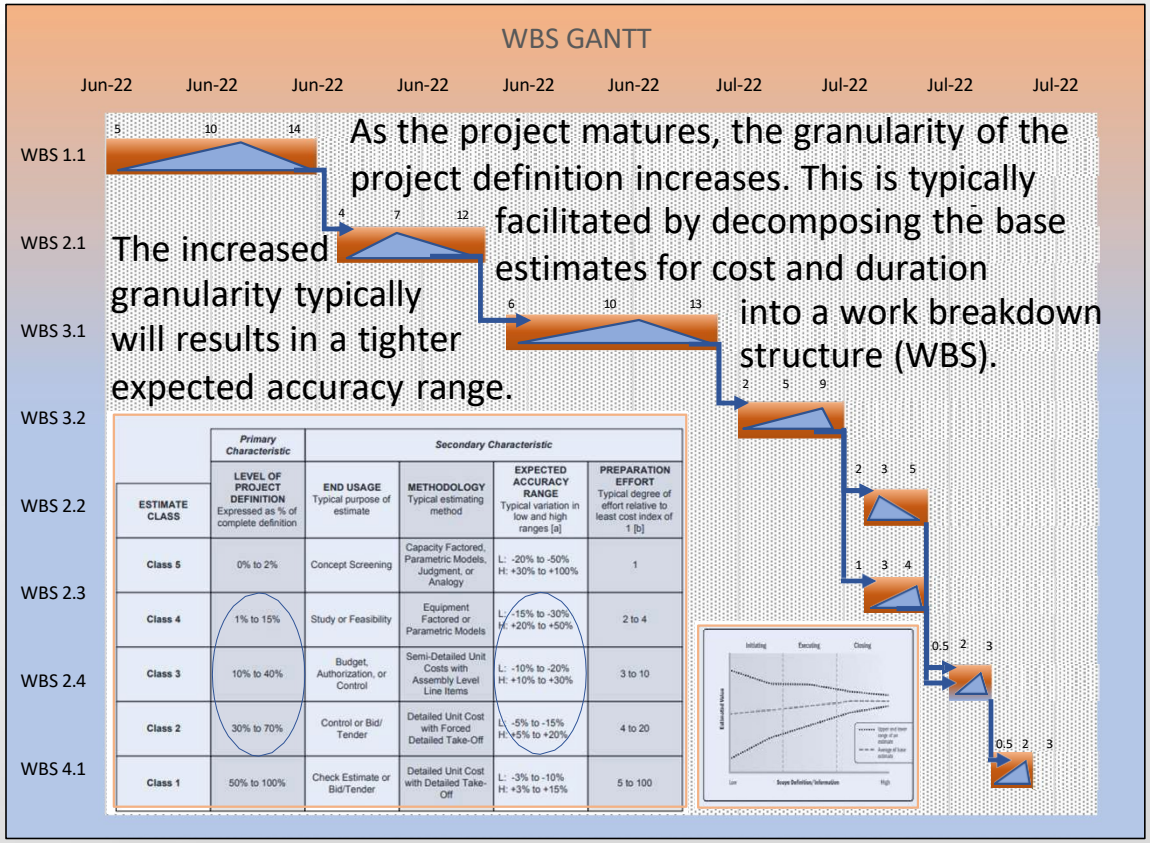
Increasing Fidelity



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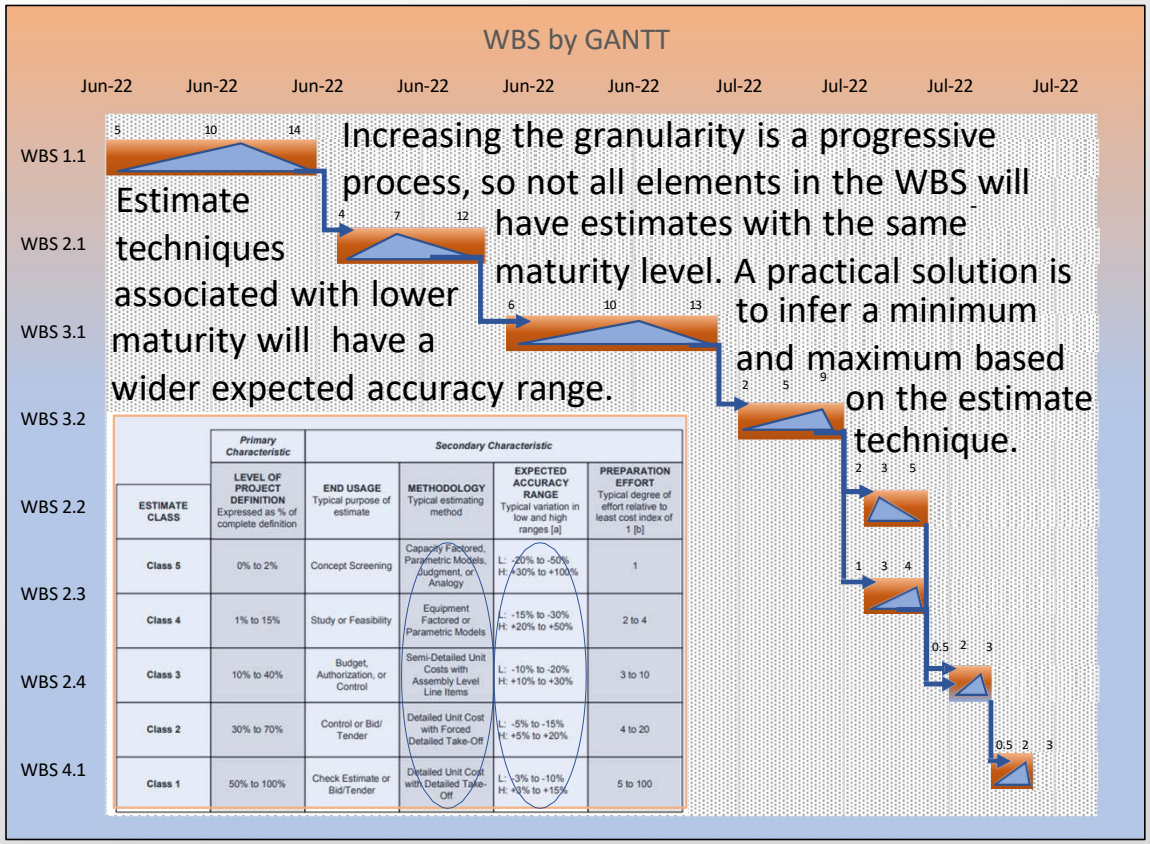

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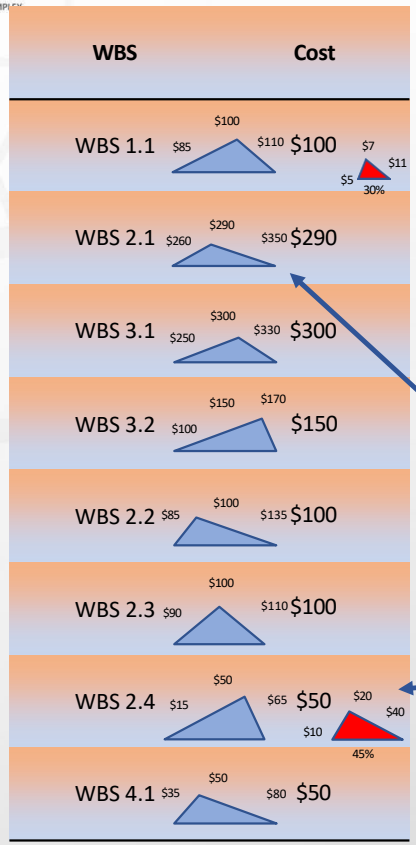
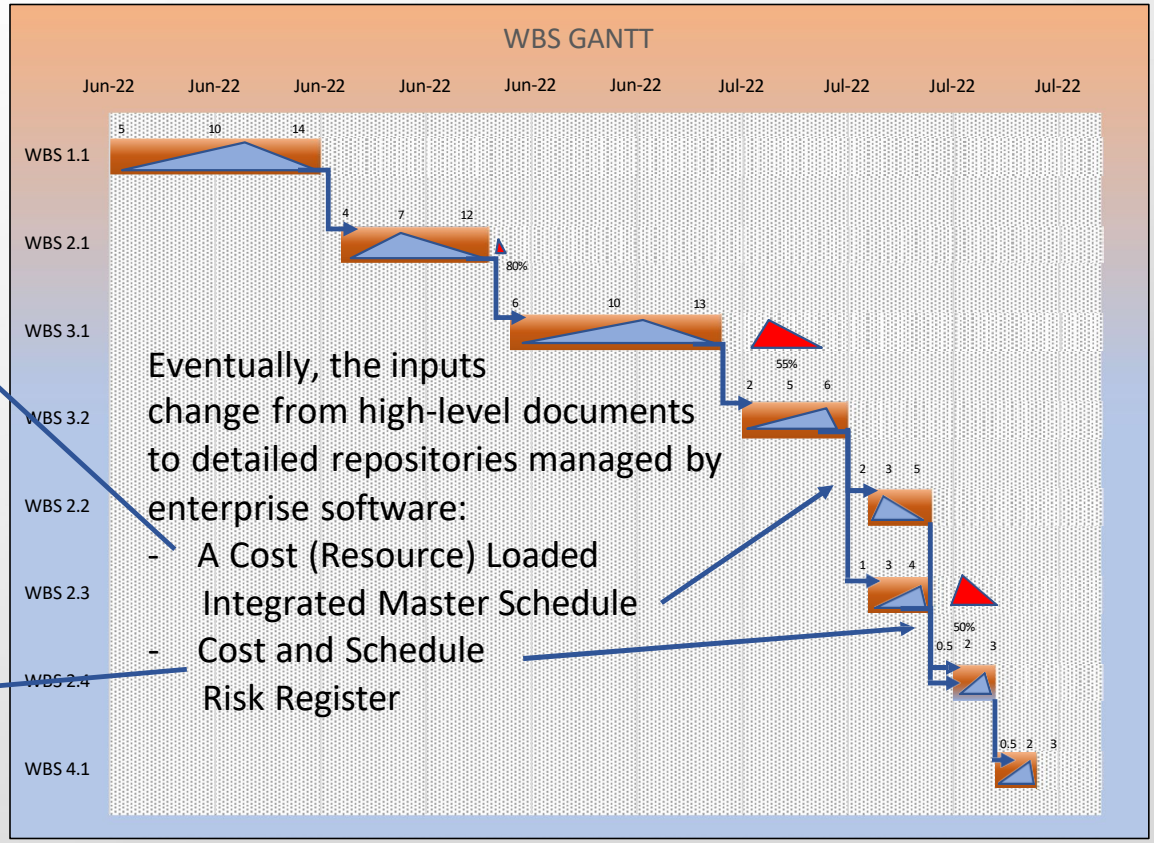
Integrated Schedule and Cost Model





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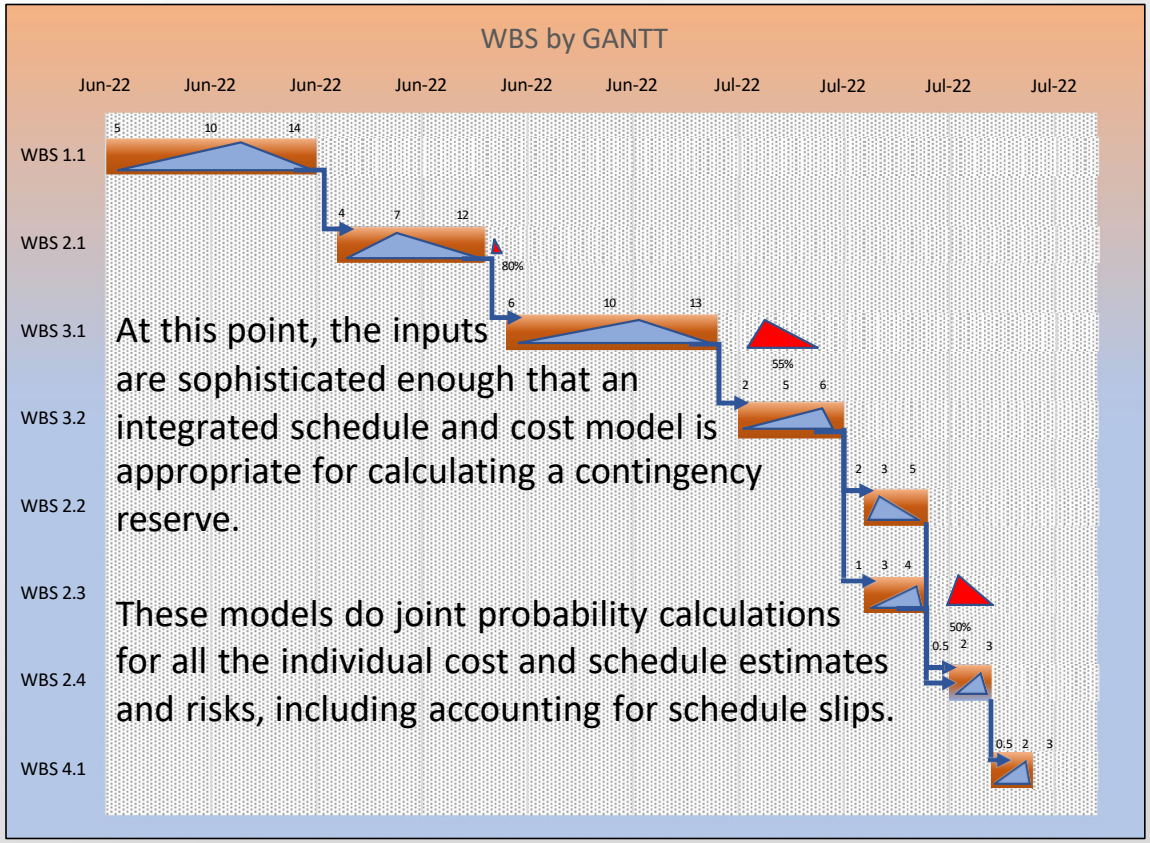
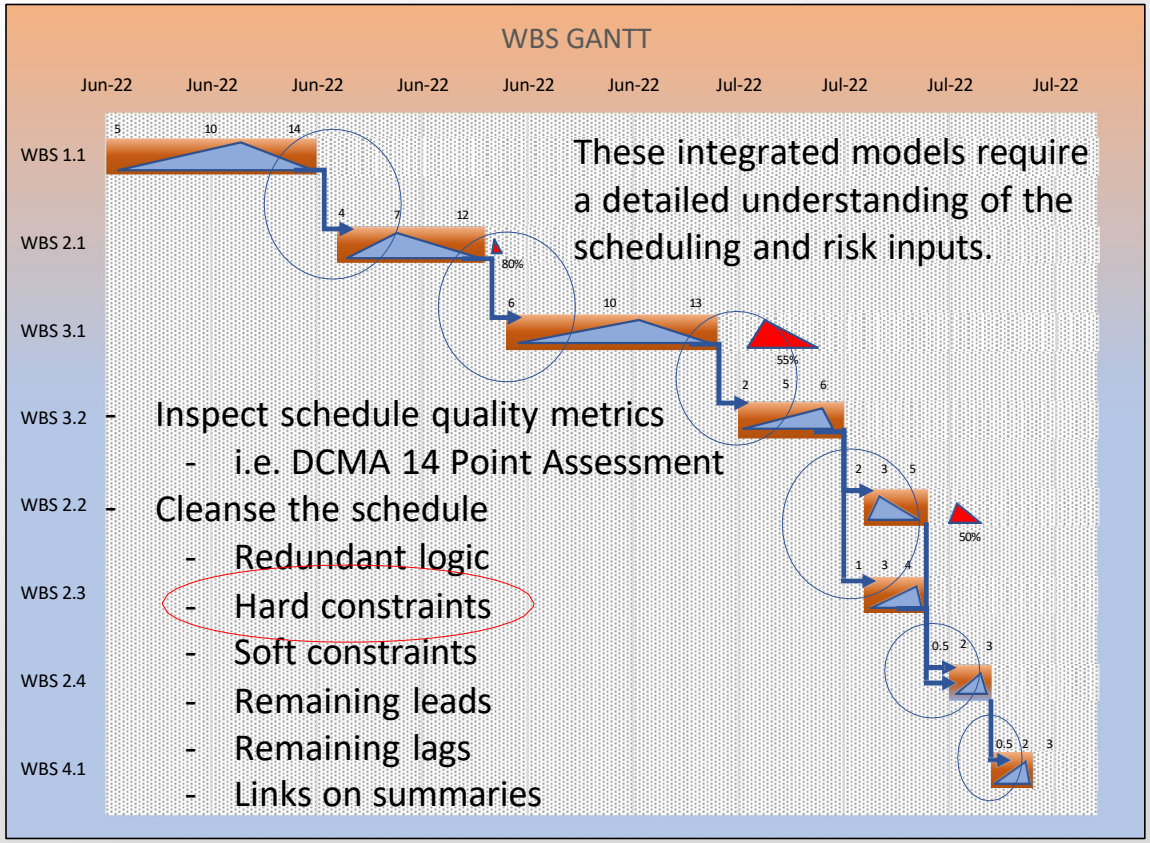
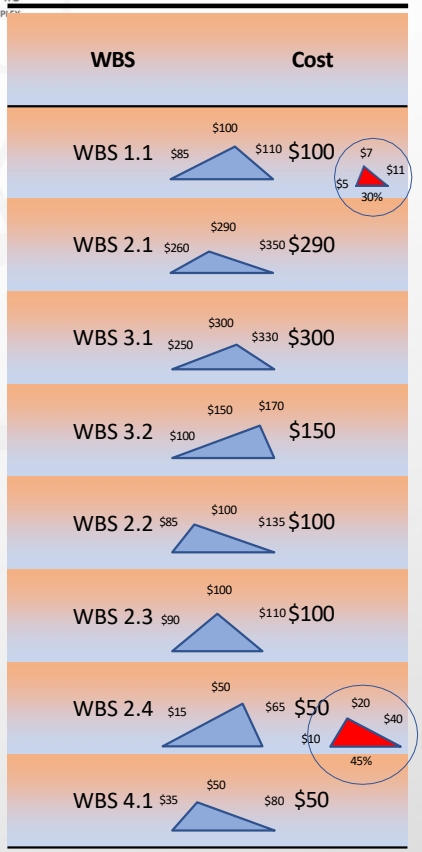
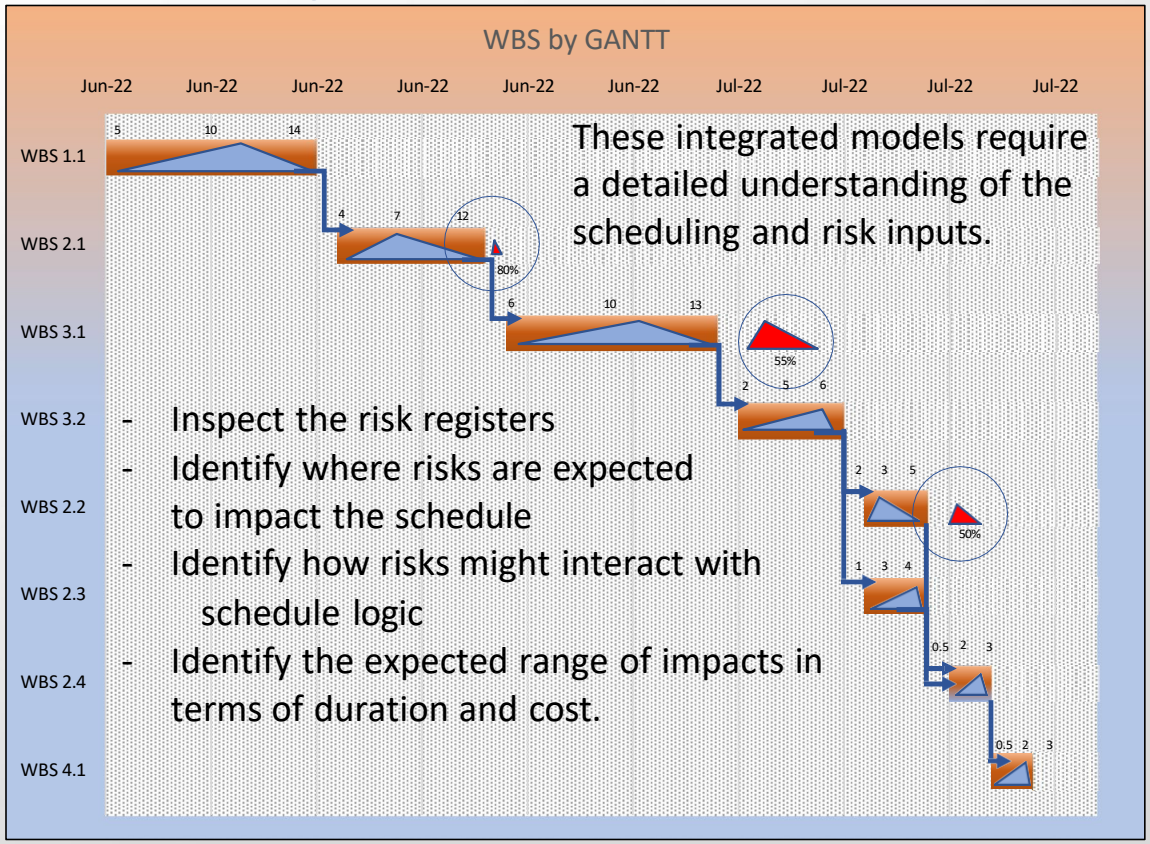


Schedule Diagnostics

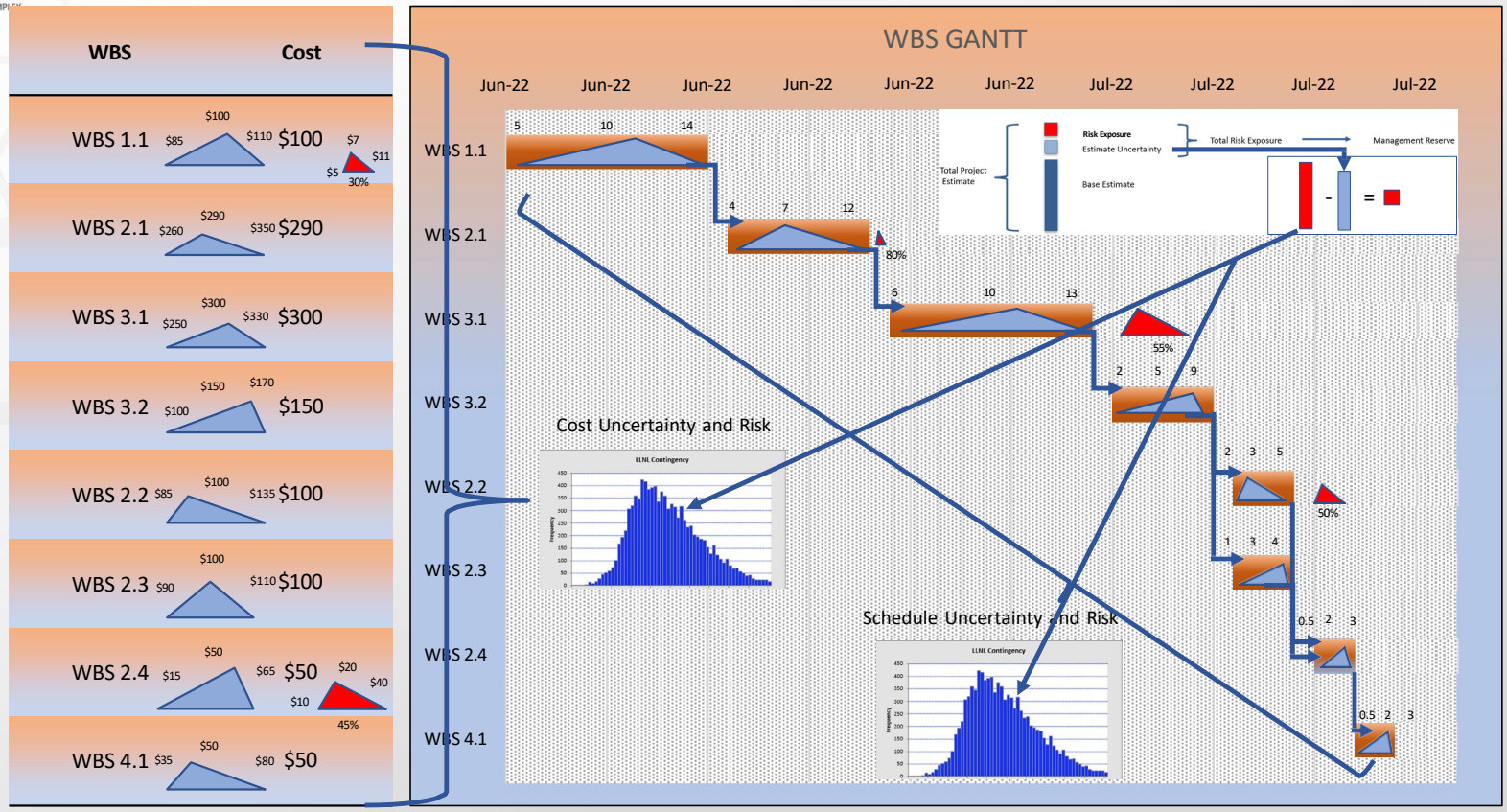


Assess Potential Risk Impacts





Performing Joint Analysis



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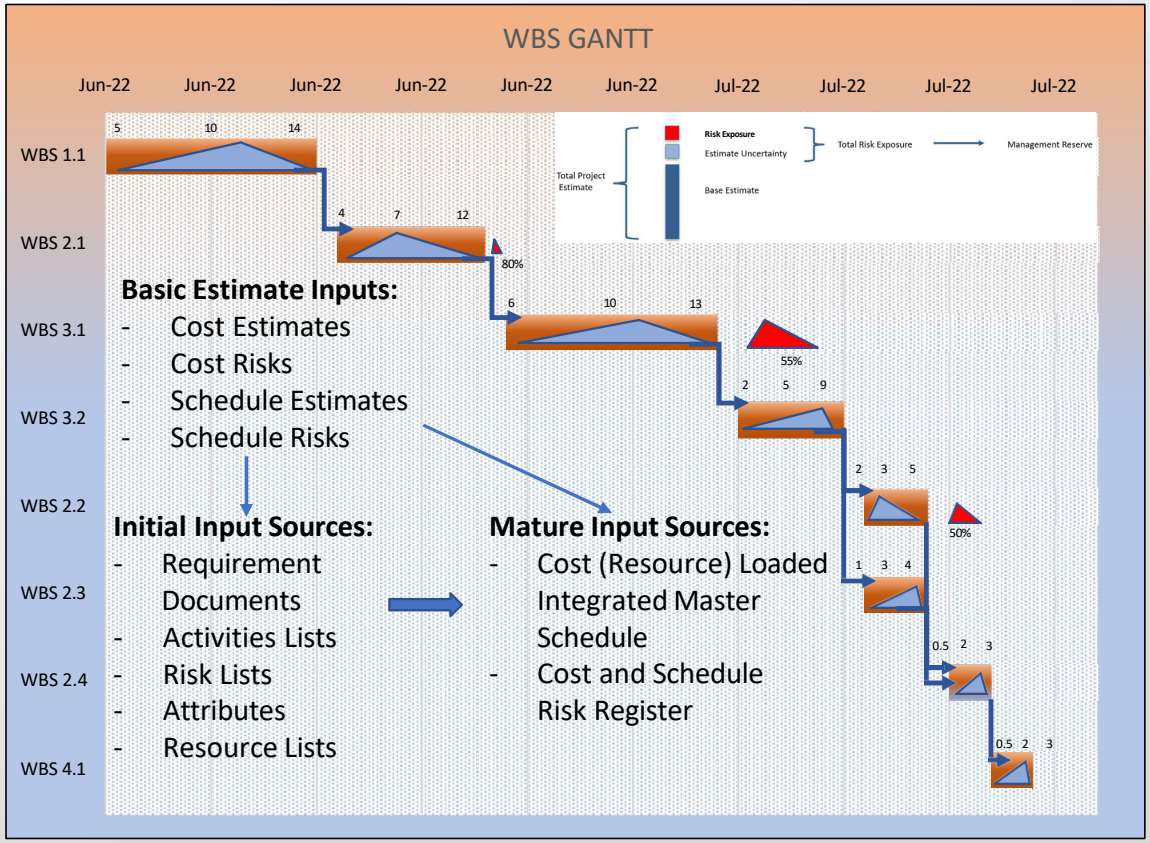

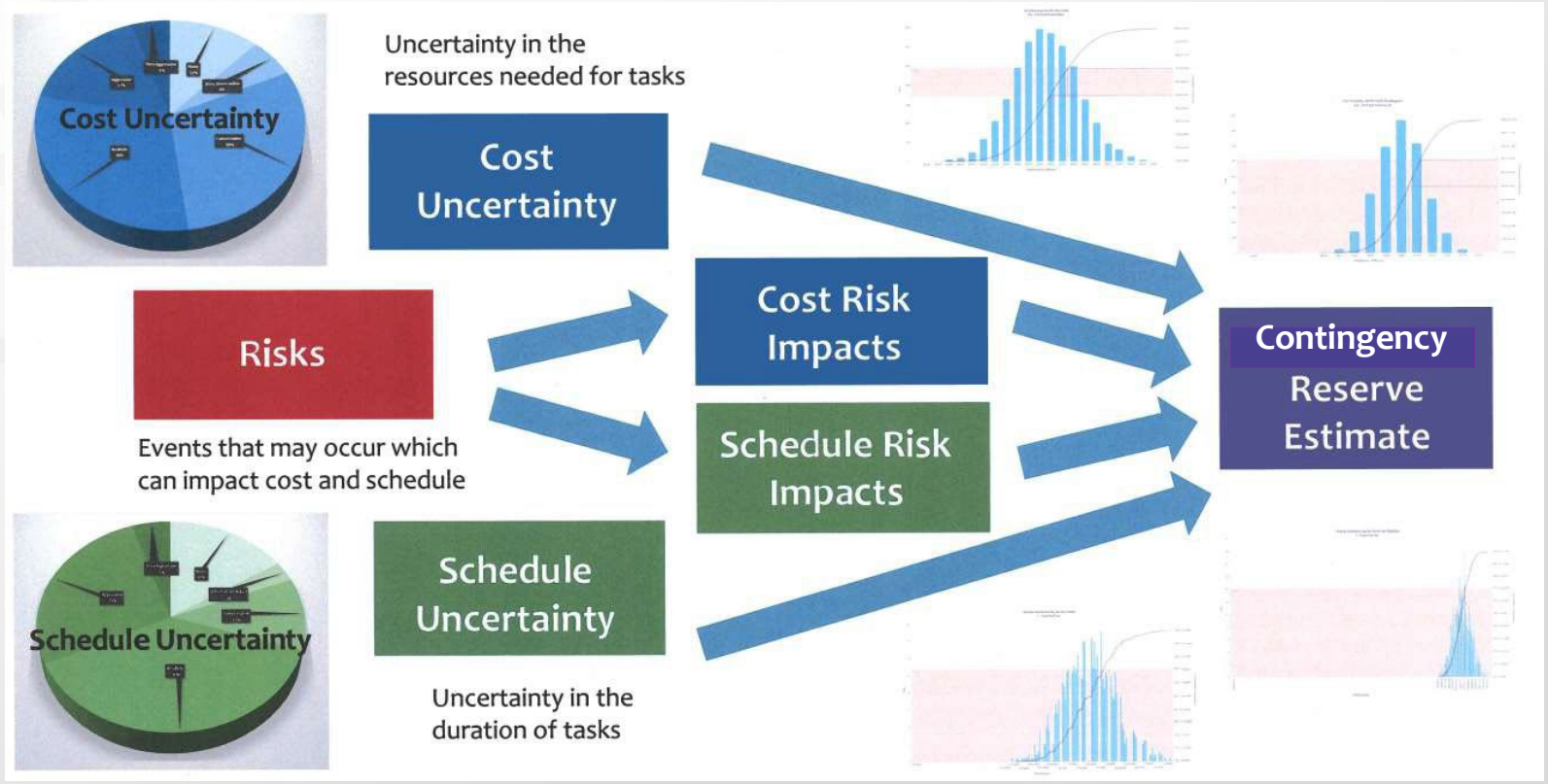
Cost Uncertainty
Uncertainty in the resources needed for tasks
Cost Uncertainty
Risks
Events that may occur which can impact cost and schedule
Cost Risk Impacts
Schedule Risk Impacts
Contingency Reserve Estimate
Schedule Uncertainty
Schedule Uncertainty
Uncertainty in the duration of tasks