

FHWA

Risk Based Cost Estimate

Reviews

2010 Capacity Building Workshop

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FHWA-Resource Center

Construction & Project Management Team

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Overview

- FHWA Policy
- FHWA Procedures
- Risk Based Estimating Issues
- Issues/Lessons Learned



Financial Plans (SAFETEA-LU)

Financial Plans required at the following thresholds:

Consider all costs - Engineering, Construction, ROW, Utilities...
in Year of Expenditure (YOE) Dollars

- **Over \$500 Million**

Major Project –Financial Plans (SAFETEA-LU) Requires concurrence from FHWA’s HQ

- **\$100 to \$500 Million**

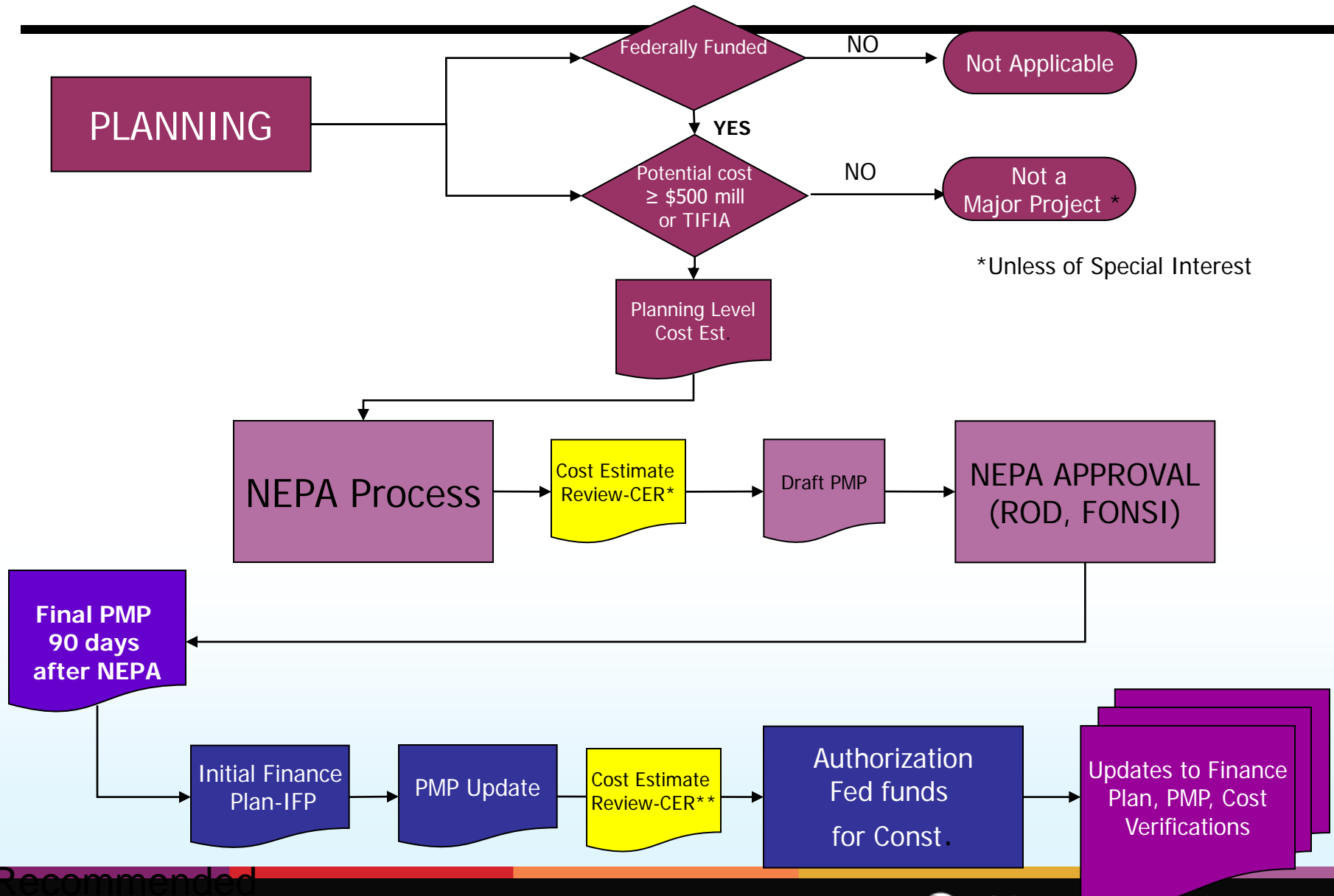
Required, however review is at FHWA Division’s discretion

“Cost to complete estimates based on reasonable assumptions as determined by the Secretary (FHWA)”

Reasonable assumptions = Risk based analysis



Basic Major Project Process



*Unless of Special Interest

* Recommended

** Required

Cost Estimate Review Objective

Conduct an unbiased risk-based review to verify the accuracy and reasonableness of the current total cost estimate to complete **THE Project** and to develop a probability range for the cost estimate that represents the project's current stage of design.



Long Term Objective

Spread risk based estimating technology to DOTs so they can do their own reviews in the future.

- WSDOT doing their own reviews
- CALTRANS in the process of getting there

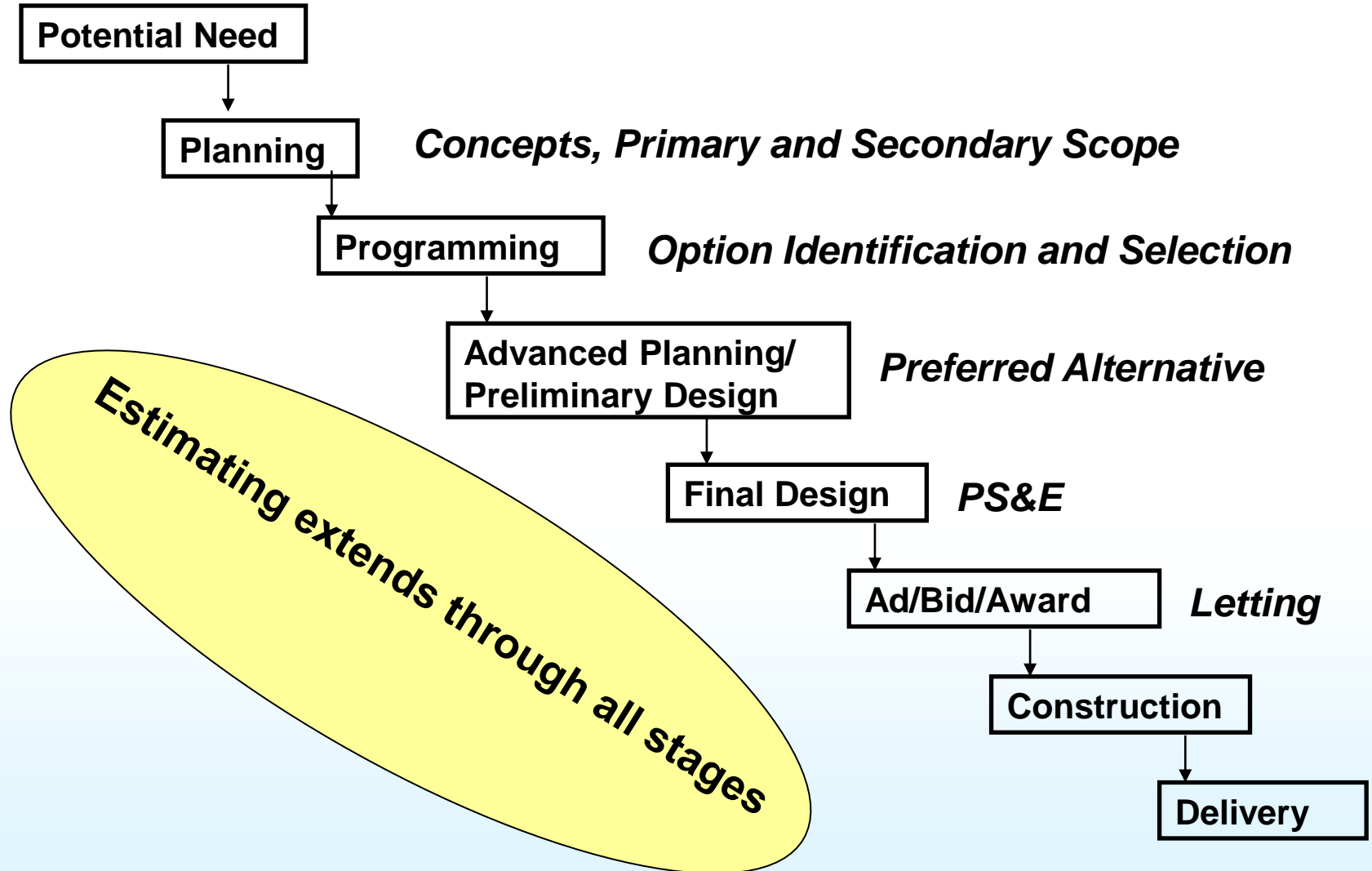


Basis of Review

- Review based on estimates provided by the Project Team in advance with revisions made during the review
- Review to determine the reasonableness of assumptions used in the estimate
- Not an independent FHWA estimate
- Review based on input from Subject Matter Experts
- FHWA does not verify quantities and unit prices



Project Estimate Development



Cost Estimating Key Principles

- Process must be transparent
- Should include all project costs
 - Ex: NEPA work, design, right of way, public outreach, project management, construction
 - Include soft costs
- Expressed in Year of Expenditure Dollars
 - Assign a realistic inflation rate per year
 - Usually 3-4% per year

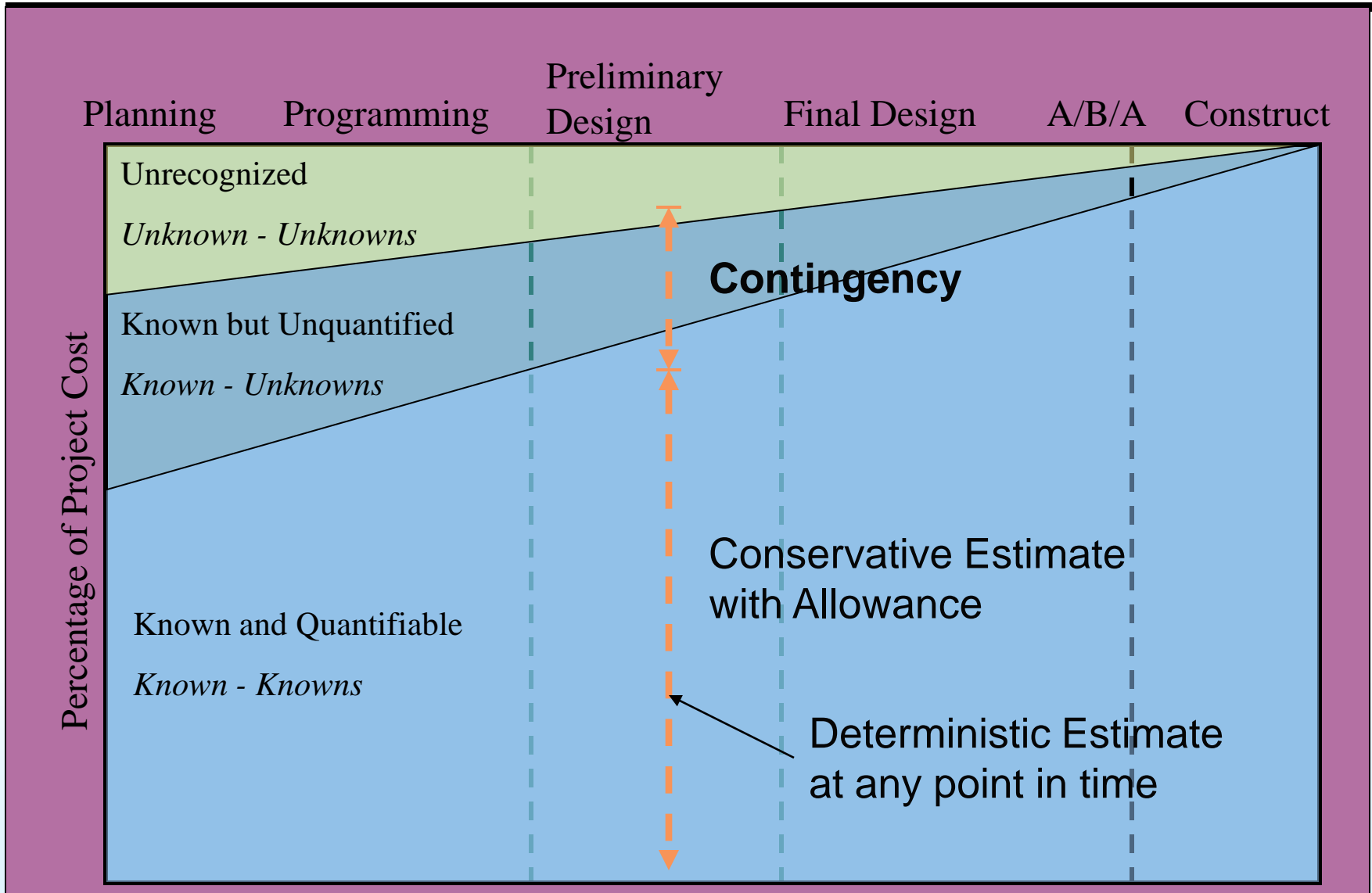


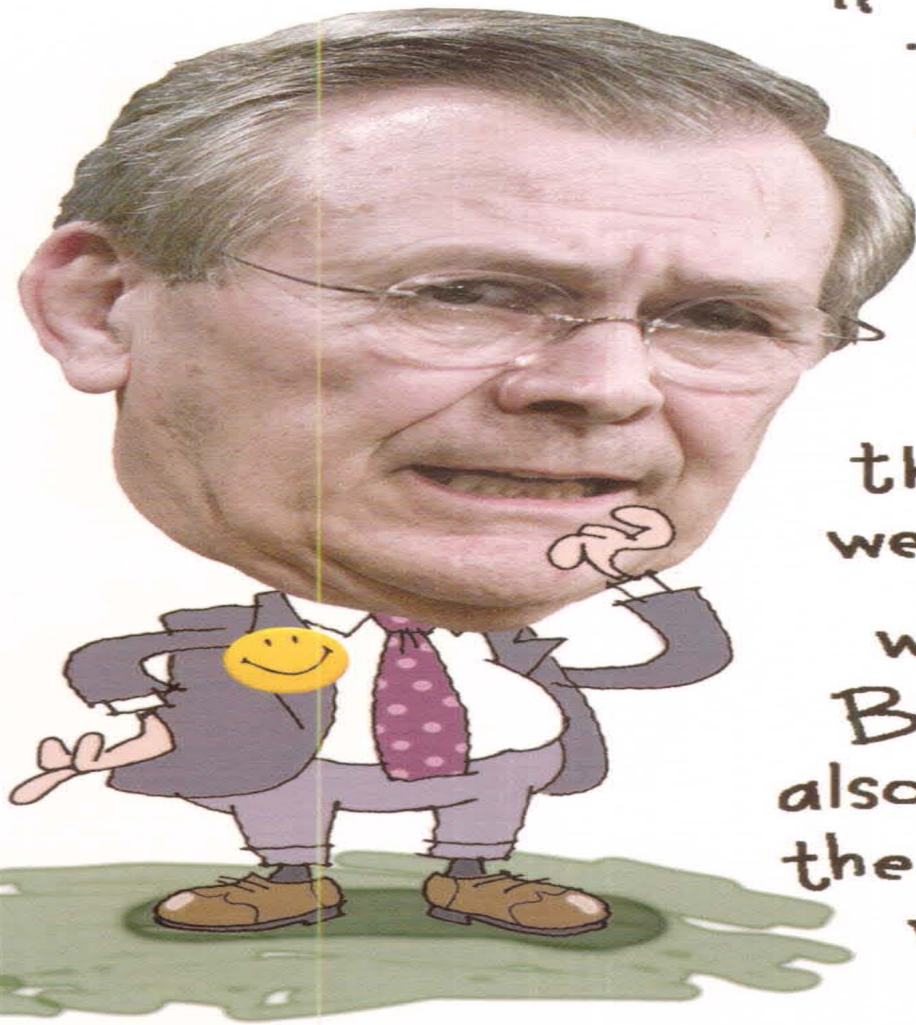
Cost Estimating Key Principles (cont.)

- Use best information available
- **Document** assumptions & key changes
- Developed by a team of experts
- Account for risk and uncertainty
 - Early estimates usually contain a larger degree of uncertainty



Principle 1 - Components of Cost Uncertainty



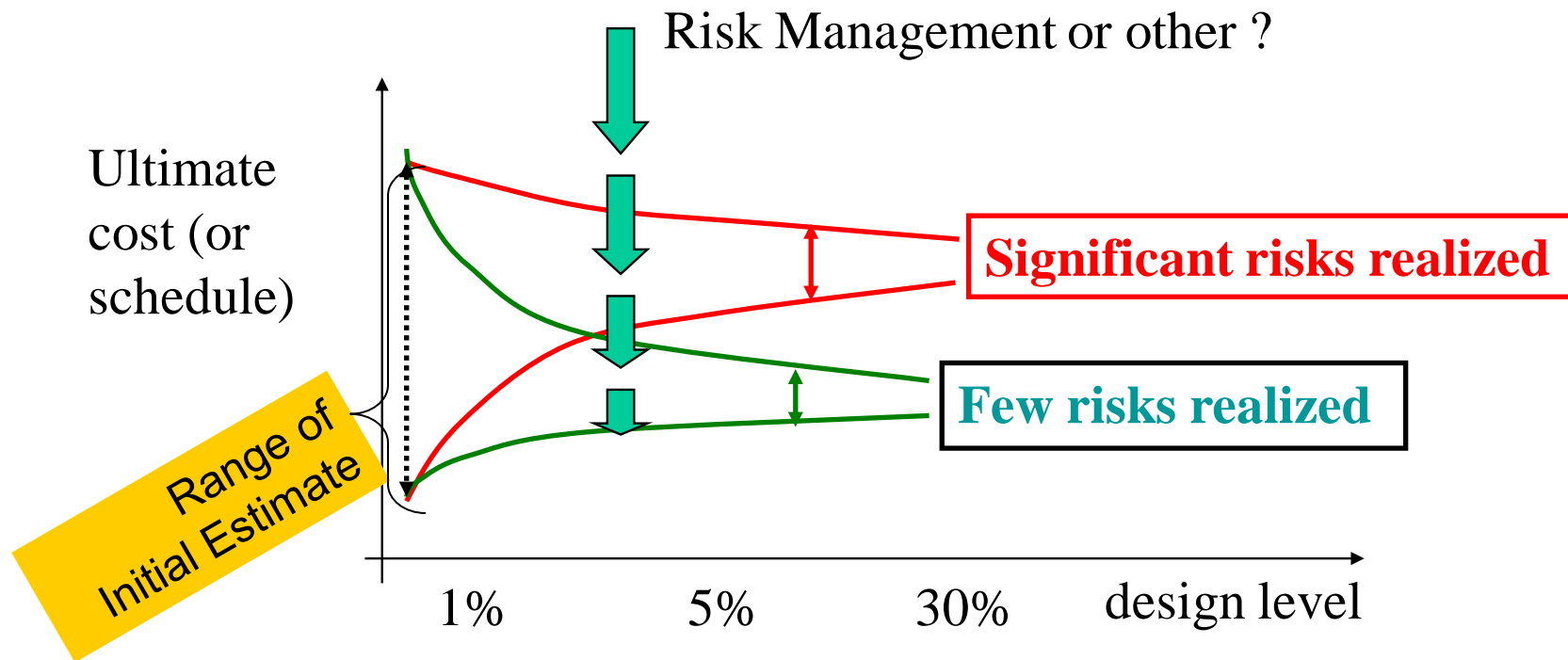


"...there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns—the ones we don't know we don't know."

—Donald Rumsfeld

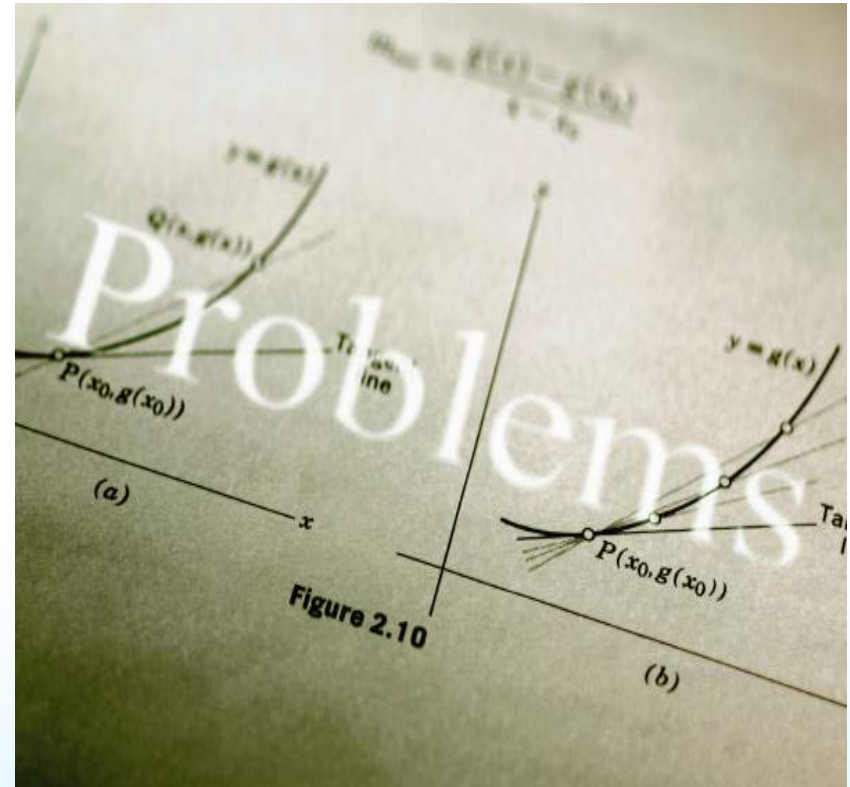
Principle 2 – The Evolution of Uncertainty

Uncertainty Decreases with Design Development



Ways to address uncertainty

- Conduct a risk analysis prior to construction
- Use risk analysis results to derive contingency values
- Report results as ranges



Capturing Soft Costs

- **Design Allowance**—(sometimes called a "Design Contingency" or a "Miscellaneous Item Allowance) percentage used for scoping & planning level estimates.
 - Money set aside for "known unknowns," for forgotten items or those too small to worry about in the initial 5-15% design level of a project. It goes to zero as the project progresses.



Capturing Soft Cost (continued)

- **Preliminary or Design Engineering percentage**—the money set aside for the design of a project. It does not include planning or scoping costs. It is often expressed as a percentage.
 - For most public agencies, preliminary engineering costs only reflect direct charges to design the project by engineering staff.



Capturing Soft Costs (continued)

- **Construction Contingency**—the money set aside for change orders or unforeseen events (*such as unsuitable soil material excavation*). It is often expressed as a percentage.
- **Construction Engineering**—the fund that pays for the contract administration of the construction project. May include office overhead or HQ overhead.



Reviewing Cost Estimates

- What to look for:
 - Has an experienced estimator been involved in the estimate development?
 - Has the estimate been reviewed by SMEs?
 - Are soft costs accounted for?
 - Is the estimate 100% complete?
 - Are major cost items included?
 - How are risks allocated?



Issues/Lessons Learned

- Contingencies:
 - Inconsistent Application of Contingencies
 - What is included? Often a percentage is used w/o much thought on what it includes.
 - Are Known-Unknowns (Allowances) included? Separate these from the Unknown-Unknowns to better account for Risk.
 - Document Assumptions



Issues/Lessons Learned

- Inflation/Escalation
 - Inconsistent Application
 - What is included? ie. CPI/PPI, Market Conditions, Number of Bidders, Short Term Material & Labor Prices, ect.
 - Recommend that DOTs keep a cost index
 - Document Assumptions



Issues/Lessons Learned

- Basis of Estimate
 - What is basis of estimate?
 - Has estimate been updated to include current market conditions
 - Document Assumptions



Cost Estimating Resources

FHWA Innovative Program Delivery Office

Website: http://www.fhwa.dot.gov/ipd/project_delivery/index.htm

- *FHWA Final Major Project Guidance*, January 2007
- *Major Project Program Cost Estimating Guidance*, January 2007
- *Financial Plan Guidance*, January 2007

CPM SharePoint Site Classroom Website

- <http://one.dot.gov/fhwa/CPMDSS/FECPM/CE/default.aspx>



Cost Estimating Resources

- Other cost estimating resources:
 - AASHTO Technical Committee on Cost Estimating
 - Transportation Estimators Association (TEA)
 - www.tea.cloverleaf.net
 - Transport Users Group (TUG)
 - www.tug.cloverleaf.net
 - NCHRP Report 574
 - NCHRP Report 8-36 (72)
 - GAO Cost Estimating and Assessment Guide



Questions?

THANK YOU!

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