

# PCOP WEBINAR

## COST ENGINEERING IN THE PLANNING PHASE

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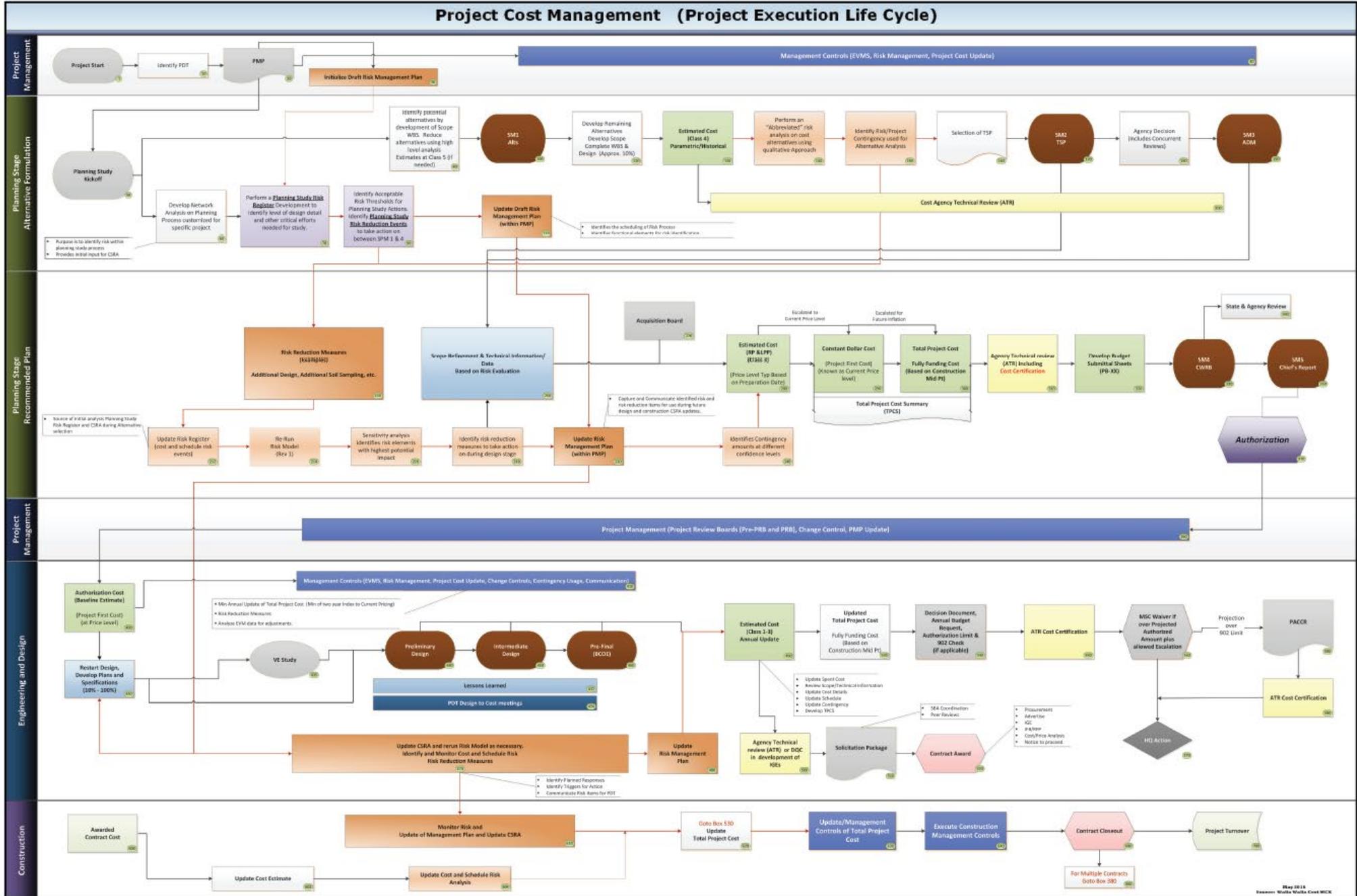


US Army Corps  
of Engineers®





# Project Cost Management (Project Execution Life Cycle)





# COST ENGINEERING MISSION



*“to focus USACE leadership on effective development, management, and control of cost estimates to ensure funds are adequately programmed, authorized and appropriated in all phases of the project. The USACE ability to provide quality project estimates is an essential element of our support to our customers and partners for the successful accomplishment of the project.”*

**Source: ER 1110-1-1300 Engineering and Design Cost Engineering Policy and General Requirements, 3 – 26 - 1993**



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# KEY DRIVERS FOR CIVIL WORKS COST INCREASES



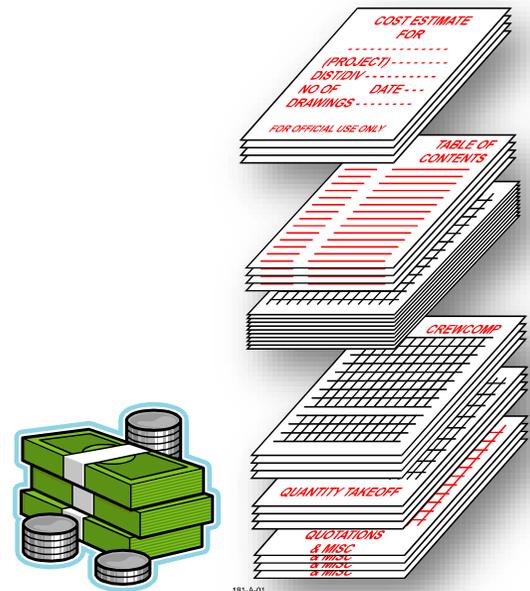


# TYPES OF COST ESTIMATES

## ER 1110-2-1302, CIVIL WORKS COST ENGINEERING



- Alternative Formulation Level (Class 4 and 5)
- Baseline/Programming Estimate (Class 3)
- Current Working Estimates (CWE) (Class 2)
- Independent Government Estimate (Class 1)





# ER 1110-2-1302



Project Phase	Project Definition Scope	Risk Level	Minimum Estimate Class
<b>Pre-Budget Development</b>	<b>Extremely Limited</b>	<b>Extremely High</b>	<b>5</b>
<b>Pre-Authorization</b>			
Reconnaissance Alternatives	Very Limited	Very High	4
Feasibility Alternatives	Very Limited	High	4
Feasibility – Federally Recommended Plan	Limited-Fair	Moderate	3
Feasibility Locally Preferred Plan	Limited-Fair	Moderate	3
Funding Request Decision Documents	Limited-Fair	Moderate	3
<b>Post Authorization(PED AND CG Phases)</b>			
Continuing Authorities Program	Limited	Moderate to High	3-4
Civil Emergency Management Program	Limited	Moderate to High	3-4
Alternative Studies	Limited	Moderate to High	3-4
Post Authorization Change Reports	Fair	Moderate	2-3
Funding Decision Documents	Limited-Fair	Moderate	3
<b>CG Phase P&amp;S</b>			
30%	Fair	Moderate	3
60%	Fair-Good	Moderate to Low	2
90%	Very Good	Low	1
IGE <100% Design (DB Contracts, ECI)	Fair-Good	Moderate to Low	2
IGE 100% Design	Very Good	Low	1
<b>Construction / Post Award</b>			
Budgets (modifications / claims)	Fair-Good	Moderate to Low	2
IGEs (modifications / claims)	Very Good	Low	1



# ALTERNATIVE LEVEL – LESS SCRUTINY



## Multiple Alternatives under Study

MCACES optional – Parametric based Class 4

Higher Level Review – Reasonable Pricing

Consistent Estimate Approach

Fair Alternative Comparisons

All Features Identified (TOTAL PROJECT COST)

Contingencies Reasonable (Abbreviated Method)



# FEASIBILITY & POST AUTHORIZATIONS



## Generally, Class 3 level or better

Quantity Basis

CEDEP and Crew-Based MCACES required

Detailed Review – Supporting Budget Request

All Features Identified

Details, Notes, Quotes, Logic, etc.

Schedules

Contingency Development – Risk Based (40M Formal CSRA req)

TPCS

Cost Appendix



# PROJECT SCOPE



**What are we doing?**

**Scope Definition - Identification thru:**

- Main Report & Appendices
- Design Documentation

**Documents Must Tell/Sell the Story!**



# QUANTITIES



- Project Name, Date, POCs
- Major Construction Elements
- Basis of Quantities
- Record of Quantity Development
- Check of Major Quantities
- Quantity Confidence – Relation to Risk



# ESTIMATES- KEY ITEMS



- All Features – Civil Works WBS
- Technical Basis of Cost
- Major Cost Elements – Crew Based
- Project Properties, **Notes** & Quotes
- Unit Price Details, Cost Book, LS, Allowances
- Direct & Indirect Costs (Markups)
- Adequate to Support Schedule and CSRA



# SCHEDULE CONSIDERATIONS



- Construction Schedule VS Total Project Schedule
- Major Feature Milestones
- Critical Path & Logic
- Reflects Estimate(s)
- Midpoints reflected in TPCS
- Adequate to Support CSRA



## Total Project Cost Summary

Project: **Red Monkey Project -Initial**  
 Location: Somewhere Over the Rainbow  
 District: NWW -Walla Walla District  
 POC: Callan

Report Type: **Other**  
 Contingency Development: Crystal Ball  
 CWCCIS Issue: **3/1/2014**

Authority: **CG**  
 TPCS Preparation Date: 20-Jun-14  
 Program Year: 2015

Scope Synopsis: Example TPCS for EVM team

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				TOTAL PROJECT COST (FULLY FUNDED)			
Civil Works		Risk Based				Program Price Level Date: 2015-1Q							
WBS	Feature Sub-Feature Description	COST (\$K)	CNTG (\$K)	CNTG (%)	TOTAL (\$K)	ESC (%)	COST (\$K)	CNTG (\$K)	TOTAL (\$K)	INFLATED (%)	COST (\$K)	CNTG (\$K)	TOTAL (\$K)
06	FISH & WILDLIFE FACILITIES	60,000	15,000	25%	75,000	2%	60,933	15,233	76,166	3%	62,492	15,623	78,115
	S/T	60,000	15,000	25%	75,000	2%	60,933	15,233	76,166	3%	62,492	15,623	78,115
01	LANDS AND DAMAGES	600	150	25%	750	2%	609	152	762	3%	625	156	781
	S/T	600	150	25%	750	2%	609	152	762	3%	625	156	781
30	PLANNING ENGINEERING AND DESIGN	14,700	3,675	25%	18,375	4%	15,238	3,809	19,047	6%	16,111	4,028	20,138
	S/T	14,700	3,675	25%	18,375	4%	15,238	3,809	19,047	6%	16,111	4,028	20,138
31	CONSTRUCTION MANAGEMENT	7,500	1,875	25%	9,375	4%	7,774	1,944	9,718	6%	8,220	2,055	10,275
	S/T	7,500	1,875	25%	9,375	4%	7,774	1,944	9,718	6%	8,220	2,055	10,275
<b>Totals</b>		<b>82,800</b>	<b>20,700</b>	<b>25%</b>	<b>103,500</b>	<b>2%</b>	<b>84,554</b>	<b>21,139</b>	<b>105,693</b>	<b>3%</b>	<b>87,447</b>	<b>21,862</b>	<b>109,309</b>

- CHIEF, COST ENGINEERING \_\_\_\_\_
- PROJECT MANAGER \_\_\_\_\_
- CHIEF, REAL ESTATE \_\_\_\_\_
- CHIEF, PLANNING \_\_\_\_\_
- CHIEF, ENGINEERING \_\_\_\_\_
- CHIEF, OPERATIONS \_\_\_\_\_
- CHIEF, CONSTRUCTION \_\_\_\_\_
- CHIEF, CONTRACTING \_\_\_\_\_
- CHIEF, PM-PB \_\_\_\_\_
- CHIEF, DPM \_\_\_\_\_

Estimated Federal Cost: 50% 54,655  
 Estimated Non-Federal Cost: 50% 54,655  

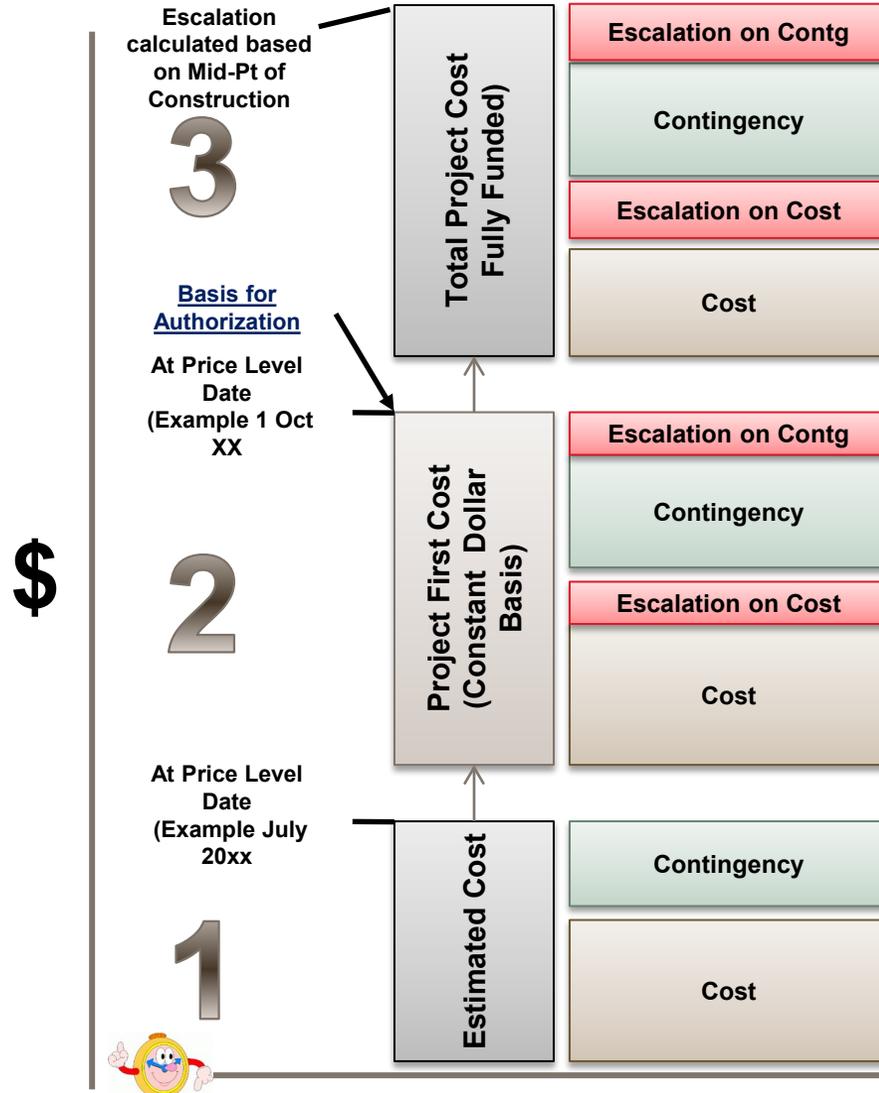

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 Estimated Total Project Cost: 109,309

Spent Cost as of: 20-Jun-14	<u>Cost (\$k)</u>	<u>Contingency (\$k)</u>	<u>Totals (\$k)</u>
Project First Cost for Report:	\$84,554	\$21,139	\$105,693
Total Project Cost used to provide Sponsor information:	\$87,447	\$21,862	\$109,309



# Cost Definitions\*



**Total Project Cost** is the Constant Dollar Cost **FULLY FUNDED WITH ESCALATION** to the estimated at midpoint of construction. Total Project Cost (or Total Cost of Construction of GNFs when discussing navigation projects) is the cost estimate used in Project Partnership Agreements and Integral Determination Reports. Total Project Cost is the cost estimate provided non-Federal sponsors for their use in financial planning as it provides information regarding the overall non-Federal cost sharing obligation. See the enclosed tables for more detail of what is or is not included in the Total Project Cost.

Project Costs used in Chief's Reports and other decision documents is the Constant Dollar Cost at current price level. This cost estimate will serve as the basis for providing the cost of the project for which authorization is sought and will be referred to as the **PROJECT FIRST COST**.

The Project First Cost should include, among other things, an estimate of: (i) preconstruction engineering and design costs; (ii) construction costs, including both Federal costs and non-Federal sponsor in-kind contributions, as applicable; (iii) LERRD values; and (iv) contingencies.

**Constant Dollar Cost (Price Level)** is the Estimated Cost **BROUGHT TO THE EFFECTIVE PRICE LEVEL**. The effective price level for Constant Dollar Cost (shown in MONTH YYYY format) is the date of the common point in time of the pricing used in the cost estimate. Constant Dollar Cost does not include future inflation. Constant Dollar Cost at current price levels is the cost estimate used in feasibility reports and Chief's Reports

**Estimated Cost (Price Level)** is the initially developed cost estimate which includes contingencies. The effective price level date for Estimated Cost (shown in MONTH YYYY format) is usually the date of preparation of the cost estimate.

The estimate may be comprised of cost estimates with varying price level dates.

This information is used for the estimate development backup.

\* Reference ER 1110-2-1302 and Corps of Engineers Civil Works Cost Definitions and Applicability



# EFFECTS FROM SMART PLANNING



Identify Solution (Chief's Report) MS#5

- Define the Technical Scope Basis
- Identify sufficient funds to complete project

*Potential for Reduced Technical Information*

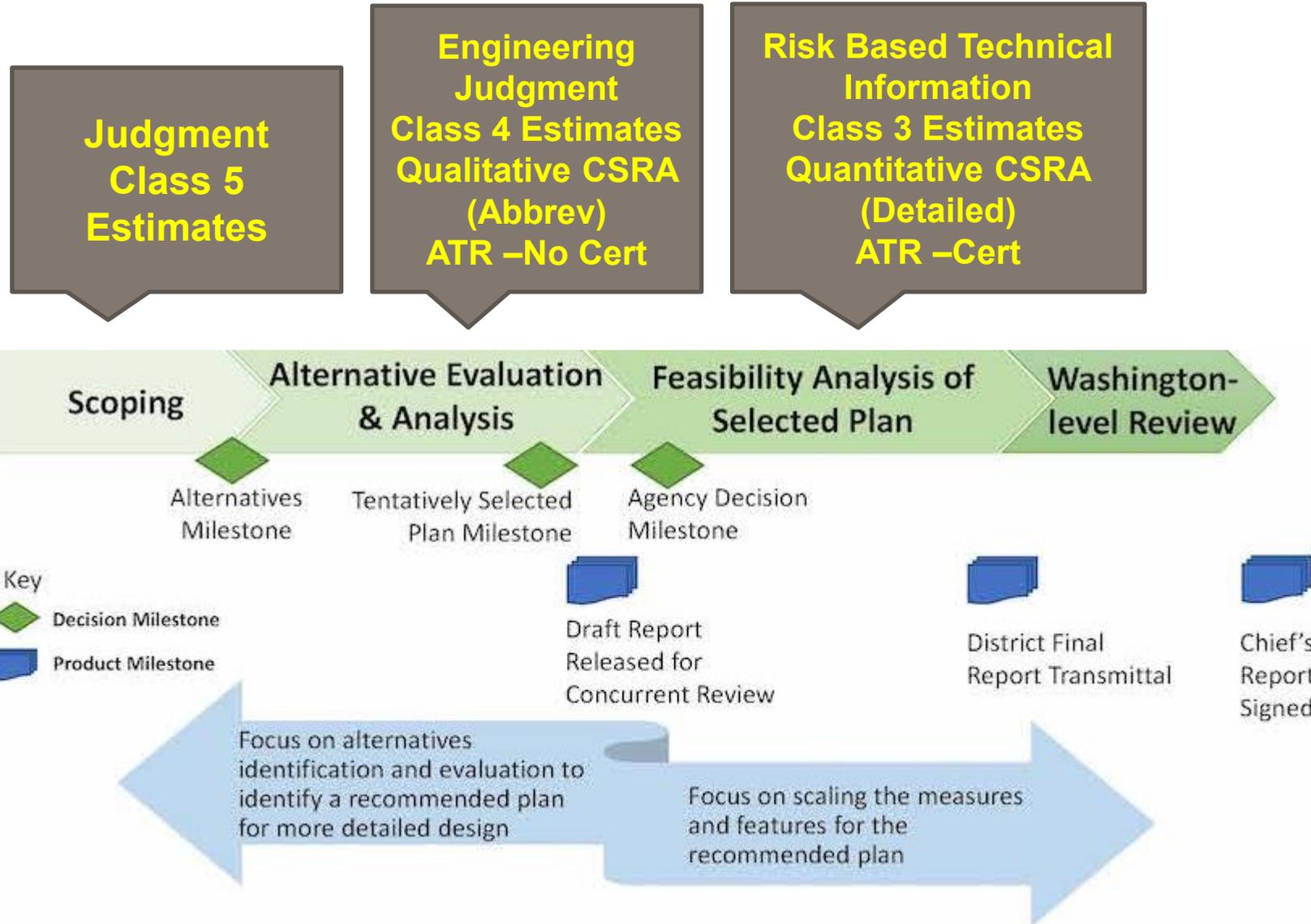
*Relies on Properly Identifying Risk*

*B/C Ratio Impacts*

*Will the Process and Project Withstand Scrutiny?*



# ESTIMATES/COST RISK IN PLANNING CYCLE





# COST ATR IN FEASIBILITY



## **Alternatives Milestone through Tentatively Selected Plan:**

- Cost ATR Review, No Cost Cert, Reviewer coordinated thru Cost MCX
- This review is a concurrent review with TSP development. Key focus of review is to assure alternatives have been properly developed for comparison basis. This aids in vertical team approval.

## **Agency Decision Milestone through District Transmittal of Final Report:**

- Cost ATR Review, Cost Cert Required, Thru Cost MCX

## **Between District Transmittal of Final Report and Project Authorization:**

- Re-Cost Cert (if changes), Thru Cost MCX





# KEYS TO SUCCESS FOR FEASIBILITY



Spend the time...Nail down scope

Ensure all parties are on the same page

Define Options, Schedules, Restrictions

Always show the Total Project Cost –Even for Alternatives!

Sort out the common features early!

**MAKE SURE YOU HAVE A COMPLETE, EXECUTABLE PLAN!!**



# STUDY PAST ISSUES / LESSONS LEARNED



**Study Schedule:** Everyone on the PDT cannot finish on the same day.

**Always present a TOTAL PROJECT COST (even for alternatives comparison)**

**Start Early on the “Common Elements”**

**Make sure the plan is “complete” and buildable – TEAM EXPERIENCE!**

**Walk in the right direction vs. Run in any direction.** Don't skimp on the high value process!  
**ESPECIALLY DQC.** Follow the plan, update, communicate, and keep moving!

**Risk Register Development and “Ranges” of cost** - Were alternatives compared fairly and how much do they overlap?

**Quality of PDT Meeting, Risk Identification, and Quantification**

**Non-Compliant Designs-** “We will get a waiver”



# STUDY PAST ISSUES / LESSONS LEARNED



**Let's kick the decision to PED ?? What did you say you were going to do?**

**Mitigation of project risks - How much \$? How long? Residual Risks?**

**Sponsor Generated/Provided cost - Quality? Accuracy?**

**COSTS PROVIDED BY OTHERS (non cost estimators)**

Make sure you understand what the cost represents and assess the risk accordingly! --Real Estate, State DOT and other local/state agencies, NEPA EIS implications.

**DON'T ESTIMATE THRU NEGOTIATION WITH THE SPONSOR**

**Maintain a decision/change log - How did we get here?**

**Everyone can be late on product delivery except for Cost and Econ.**

**Don't be afraid to ask for help early!**



# AREAS WHERE WE CAN IMPROVE



Identify critical unknowns / issues to be resolved -- Issues that could significantly change the outcome or technical solution post authorization

Outline a plan to address critical issues in PED and Construction

Is the technical solution driving the cost, or is the cost driving the solution?

What truly is right / optimal for the funding profile of the project?



# POST AUTHORIZATION UPDATES AND THE BUDGET CYCLE



Total project cost estimates presented for budget or funding requests must have an estimate preparation date within two years of the date of submission

For active projects, the cost products must be updated annually as identified above and include spent costs within TPCS. For projects that are currently not active and are attempting to seek funds to become active, the product submittal must follow the requirements from above.



# AGENCY TECHNICAL REVIEW & COST CERTIFICATION



## AGENCY TECHNICAL REVIEW CERTIFICATION REQUIRED FOR:

- USACE Civil Works Decision Documents
- Annual Budget Submission
- HQ/Division Request
- DVA Program (EGPMP)

**COST: \$3-15K**  
**TIME: ~1-4 Weeks**  
**Quality and District Responsiveness are key drivers**

## HOW DO I GET A COST CERTIFICATION?

- PCX Agency Technical Review (ATR) Lead or Project Manager contacts MCX ATR Coordinator
- MCX ATR Coordinator matches reviewer availability and skill set to the project
- Products and funding are sent to MCX and reviewer
- Comments in DrChecks
- At review completion, MCX issues certification and archives documents and cert on SharePoint

**REVIEWS ARE PERFORMED BY TRAINED AND CERTIFIED REVIEWERS ACROSS USACE.**

**(~99 Certified Reviewers for ~300 projects per year.)**





# COST ATR GOALS



- Ensure Accurate Baseline Cost Estimate
- Forecast Incremental Funding / Annual Needs
- Monitor and Management of Budget & Risks
- Minimize Reprogramming Actions / PACR



# AGENCY TECHNICAL REVIEW & COST CERTIFICATION



## Required Submissions for Cost ATR:

- 1) Report
- 2) Estimate w/ supporting backup
- 3) Schedule
- 4) CSRA
- 5) Funding

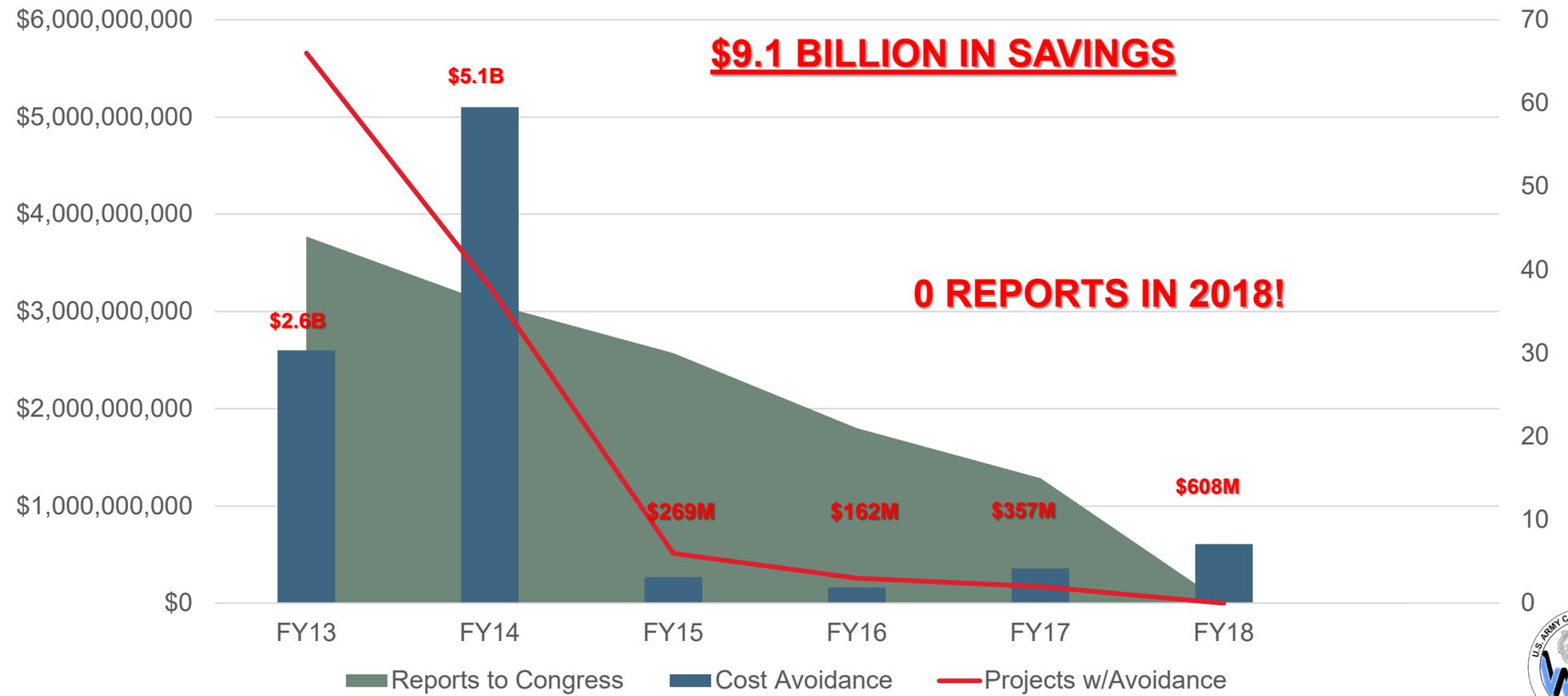


# IMPROVEMENT IN CIVIL WORKS PERFORMANCE

902 Cost Includes:

- Preconstruction engineering & design
- Construction
- Real estate
- Appropriate credit provisions of WRDA 1986, Section 104, & Public Law 90-483, Section 215

### Exceedance of 902 Cost Limit Requirements for Civil Works Projects Reported to Congress





# TYPICAL COST ATR CHALLENGES

- **Scope Development (“We will figure it out in PED”)**
- **Lack of District Quality Control**
- **Late delivery of products and or funding**
- **Late changes of estimates provided by others**
  - Lands, Damages, Relocations, Environmental
- **Change in reviewers due to Districts failing to meet milestones**
- **Discrepancies in quantities– 3d BIM vs Plans**
- **Design not to standards**
- **Efficient vs realistic funding scenarios**



**Questions?**