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ENGINEERING AND CONSTRUCTION BULLETIN

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Subject: Engineering Within the Planning Modernization Paradigm

Applicability: Guidance

1. Purpose: This ECB outlines concepts and goals, defines a philosophy, and provides interim guidance for engineering efforts associated with feasibility studies under the new Planning Paradigm (“new paradigm”) introduced in January 2011, and the 3x3x3 rule introduced in February 2012.
2. Background: The Civil Works Program is undergoing a transformation initiative to better align our project development processes with national priorities and to better address the water resources challenges and needs of the Nation. One of the transformation initiatives is Planning Modernization, which includes an effort to streamline the Civil Works planning process. To ensure an expedited, economical and focused study process, a 3x3x3 rule has been established, where studies are limited to 3 years and \$3 Million, with 3-levels of vertical team integration (District, Division and Headquarters), unless otherwise approved by the Deputy Commanding General for Civil and Emergency Operations.
3. Objective: The objective of preparing a feasibility report is to identify the recommended plan within the prescribed 3x3x3: project scope, economic benefit, and an accurate cost and schedule baseline identified with potential project risks. Analysis of specific design alternatives, selection of a final recommended technical design solution, and development of confident cost estimates, schedule products, and risk identification are part of project formulation, and are critical elements that enable informed decision making.
4. References:
 - a. Memorandum, CECW-CP, 8 February 2012, Subject: U.S. Army Corps of Engineers Civil Works Feasibility Study Program Execution and Delivery.
 - b. ER 1105-2-100, Planning Guidance Notebook, 22 April 2000, including Appendix D, Amendment #1, 30 Jun 2004, Appendix F, Amendment #2, 31 Jan 2007, Appendix G, Amendment #1, 30 Jun 2004, Appendix H, Amendment #1, 20 Nov 2007.
 - c. ER 1110-1-12, Quality Management, 21 July 2006, including Change 1, 30 September 2006 and Change 2, 31 March 2011.

d. EC 1165-2-209, Civil Works Review Policy, 31 January 2010, including Change 1, 31 January 2012.

e. ER 1110-2-1302, Civil Works Cost Engineering, 15 September 2008.

f. ETL 1110-2-573, Construction Cost Estimating Guide for Civil Works, 30 September 2008.

g. ER 1110-2-1156, Safety of Dams - Policies and Procedures, 28 October 2011.

5. Guidance: For all Civil Works studies utilizing the new paradigm as directed by reference a, Engineering & Construction (E&C) efforts will incorporate the following concepts:

a. Uncertainty and Level of Detail. The new paradigm will require increased use of critical thinking (i.e. engineering judgment) in the analysis and cost estimates supporting plan formulation and selection for both alternative level as well as final recommendation. The Project Development Team (PDT) must analyze minimum design requirements to assure functionality and life safety for the project. The PDT must also determine minimum design requirements needed to develop accurate cost and schedule information. The appropriate level of detail shall be determined with design personnel as the lead for determining design levels for function and safety, and cost personnel as the lead for the design detail requirements pertaining to cost and schedule development. Within the design effort in feasibility, the PDT will develop a work breakdown structure which sufficiently identifies the project scope, features, and tasks to a level necessary to develop an accurate baseline cost and schedule, and enables identification and management of cost and schedule risks. Each project will use a “risk register” organized by project features to assess their likelihood of impacting cost, schedule and/or function/safety. The goal is to minimize data collection and analysis for low impact features during the feasibility phase. High impact features should be carefully scoped such that data collection and analysis is commensurate with risk and adds value to the decision making process, accuracy to the cost and schedule, or reduces risk. The PDT shall work closely with the cost engineer to identify areas where design details would be beneficial to reduce uncertainty. For items with significant cost and schedule risk, mitigation strategies should be identified and/or discussed in the project’s Risk Management Plan. While this approach must not lead us to accept additional life safety risk in projects, it may be appropriate to make a risk informed decision to defer some details or analysis to the Preconstruction Engineering and Design (PED) phase, provided that proper plan formulation can be accomplished.

b. Vertical Team Integration. Feasibility studies have a target goal for completion within 18 months but no more than three years. A key to meeting this goal is vertical team integration that starts early and continues throughout the planning process. An important role of the Vertical Team is to balance and manage the level of detail necessary at various points of the process and provide accountability for those decisions. Proactive, but reasonable, vertical communication will ensure proper scoping of studies and reduce the time needed for review at key decision points.

c. Determine Federal Interest. While determination of Federal Interest may be primarily a Planning function, Engineering needs to support this activity by communicating the full range of risk and uncertainty that may impact the cost and viability of the project. Also, potential benefits beyond National Economic Development (NED) and National Ecosystem Restoration (NER) need to be considered and communicated, including life-safety considerations. Determination of Federal Interest should be done as early in the study as possible.

d. Alternative Comparison and Selection. Historically, significant effort has been expended in detailed design and cost estimates for multiple alternatives that are not carried forward in the study. The considered alternatives typically consist of common features, and features that are unique. The focus of qualitative and quantitative comparison should be on the unique features and their differences in cost, risk, and uncertainty. Other positive and negative impacts must be identified and included in the decision process for selecting the recommended alternative. This concept recognizes that there is no single “best” plan. The goal is to have a manageable number of viable alternatives, based on qualitative and quantitative technical merit, before expending efforts on pricing, and then minimizing pricing efforts to only that necessary to differentiate between the alternatives.

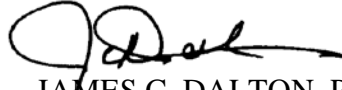
e. Funding and Resourcing. The new paradigm requires that E&C must not simply be a service provider, but relevant, proactive members of the feasibility PDT. Particularly in the early phase of a planning study, experienced senior engineering staff must be engaged to help steer the plan formulation process. The PDT cannot make the planning process shorter and less expensive without the identification and justification of the acceptance and management of risks. E&C engagement will be key as PDTs make tough choices on how to invest in the study components that buy down the risks that most impact the project decision. An aggressive schedule and increased use of collaborative, qualitative engineering that leverages local, regional and national expertise requires up-front identification of the necessary resources – funding, human, data and information. Identifying the right team members for a given study with the appropriate technical specialties, knowledge, experience and skills is essential. Virtual teams should be used where local expertise is not available or not commensurate with the project technical needs. To support project management and execution efficiencies, a critical path schedule defining the various phases and milestones must be developed to reflect the risk based analyses. The schedule must be developed to an adequate definition that enables confident management of the necessary critical and concurrent paths to at least the alternative comparison level. Schedule management must support sound judgment to realize efficiencies that lead to the best decision within a reasonable timeframe.

6. Planning modernization is a key element of improving the delivery of USACE services to the nation. E&C must play an integral role in the further development of the new paradigm, and in improving feasibility study execution and delivery. Risk informed management supported by sufficient documentation and justification is key to this effort. E&C is currently working with Planning to develop tools and procedures to improve the feasibility process. Other E&C-specific requirements may also be added as this initiative evolves. The additional guidance will then be included in an updated ER 1110-2-1150, Engineering and Design for Civil Works Projects.

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7. The point of contact for this ECB is Mr. Bob Bank, P.E., Chief, Civil Works Branch, E&C, HQUSACE, 202-761-5532, email: Robert.Bank@usace.army.mil.

A handwritten signature in black ink, appearing to read 'J. Dalton', with a long horizontal flourish extending to the right.

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