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Project Operation
Civil Works Maintenance Portfolio Management

FOR THE COMMANDER:

EDWARD E. BELK
Director of Civil Works

Purpose. The purpose of this engineer circular (EC) is to define and establish a consistent enterprise-wide methodology for identifying, managing, and communicating the U.S. Army Corps of Engineers (USACE) Civil Works (CW) portfolio of unaccomplished maintenance needs.

Applicability. This document is applicable to all USACE major subordinate commands (MSCs) having CW responsibilities. The procedure described in Appendix A applies to records for all valid work that is not currently in progress, completed, closed, canceled, or waiting approval.

Distribution Statement. Approved for public release; distribution is unlimited.

Proponent and Exception Authority. The proponent of this regulation is the Chief of Operations Division. The proponent has the authority to approve exceptions or waivers to this regulation that are consistent with controlling law and regulations. Only the proponent of a publication or form may modify it by officially revising or rescinding it.

Contents (Listed by chapter and page number)

Purpose • 1, *page 2*

Applicability • 2, *page 2*

Distribution Statement • 3, *page 2*

References • 4, *page 2*

Records Management (Recordkeeping) Requirements • 5, *page 3*

Overview • 6, *page 3*

Roles and Responsibilities • 7, *page 4*

Principles and Determinations • 8, *page 4*

Work Stages • 9, *page 5*

Total Maintenance Backlog Management • 10, *page 6*

Training • 11, *page 7*

Appendixes

A. Maintenance Portfolio Management Guidance, *page 8*

Table List

Table 1: Stages of Work, *page 5*

Glossary of Terms, *page 19*

1. Purpose

The purpose of this engineer circular (EC) is to define and establish a consistent enterprise-wide methodology for identifying, managing, and communicating the U.S. Army Corps of Engineers (USACE) Civil Works (CW) portfolio of unaccomplished maintenance needs.

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4. References

a. Engineer Regulation 1110-2-1302

Civil Works Cost Engineering. (Available at https://www.publications.usace.army.mil/Portals/76/Publications/EngineerRegulations/er_1110-2-1302.pdf)

b. Government Accountability Office, 2008 Report to Committee on Oversight and Government

Governments Fiscal Exposure from Repair and Maintenance Backlog Is Unclear. (Available at https://usace.dps.mil/sites/KMP-AM/Shared%20Documents/AM%20General%20Documents/Deferred_Backlog%20Files/GAO-08%20Fiscal%20Exposure%20from%20Repair%20and%20Maintanance%20Backlogs.pdf)

c. Maintenance Management Improvement Plan

Dated May 2013. (Available at <https://usace.dps.mil/sites/KMP-MM/MMIPPhases/Forms/AllItems.aspx?id=%2Fsites%2FKMP%2DMM%2FMMIPPhase%2FMMIP%20Final%20May2014%2Epdf&parent=%2Fsites%2FKMP%2DMM%2FMMIPPhases>)

d. Memorandum, CECW-CO

SUBJECT: USACE-Wide Applicability of Facilities and Equipment Maintenance (FEM) System. Dated 4 March 2011. Manual. (Available at <https://usace.dps.mil/sites/KMP-FEM/FEMUtilizationRequirementsLibrary/FEM%20Use%20Guidance%20and%20Requirements/20110304%20FEM%20National%20Applicability%20memo.pdf>)

e. Memorandum for the Commanding General, U.S. Army Corps of Engineers

SUBJECT: Implementation Guidance for Section 1154 (a) and (c) of the Water Resources Development Act of 2018, Comprehensive Backlog and Operation and Maintenance Report and Public Participation. (Available at

<https://usace.dps.mil/sites/KMP-FEM/FEMUtilizationRequirementsLibrary/FEM%20Use%20Guidance%20and%20Requirements/20110304%20FEM%20National%20Applicability%20memo.pdf>)

5. Records Management (Recordkeeping) Requirements

The records management requirement for all record numbers, associated forms, and reports required by this regulation are addressed in the Army Records Retention Schedule – Army (RRS-A). Detailed information for all related record numbers is located in the Army Records Information Management System (ARIMS)/RRS-A at <https://www.arims.army.mil>. If any record numbers, forms, and reports are not current, addressed, and/or published correctly in ARIMS/RRS-A, see Department of the Army (DA) Pamphlet 25-403, Guide to Recordkeeping in the Army, for guidance.

6. Overview

USACE CW ensures the reliability of its infrastructure using various types of maintenance work. These efforts require managers at all levels to understand current and future work requirements, as well as work which is past the anticipated date and not performed; the total maintenance backlog.

a. Maintenance backlog is all work that has been approved and will eventually be performed. This includes work that has passed the date it was projected to be performed. Managers are expected to understand their maintenance backlog and communicate information about the maintenance backlog in the Facilities and Equipment Maintenance System (FEM).

b. Combining all approved work orders into a single maintenance backlog can be overwhelming due to the amount of work which ends up being captured for a typical facility. Instead, USACE CW maintains a managed maintenance backlog in a framework according to anticipated start date, work order status, and work type. This provides consistency and a basis on which to organize the maintenance backlog into logical categories for management. In a managed maintenance backlog, unaccomplished work that is not in progress will be deliberately accounted for, estimated, and scheduled.

c. Managers are required to inventory the work necessary to manage the reliability of the facility or facilities they oversee. To make this inventory useful, managers are expected to make decisions about anticipated cost, start date, work type, work category, and factors which prevent performing the work. Managers will ensure records are kept current about work plans and express appropriate levels of precision depending upon the work stage; in other words, near-term work may contain more precise maintenance planning information such as estimates and schedule. Managers are required to ensure these decisions and estimates are recorded in FEM to allow effective maintenance planning, scheduling, resource demand and workload leveling, and improve the ability to track and manage investments in reliability at the facility level and the portfolio level.

7. Roles and Responsibilities

USACE CW will maintain a three-level decentralized organization to implement this EC, comprising Headquarters USACE (HQUSACE), MSC, and District levels. The commanders at each level—HQUSACE, MSC, and District—have ultimate responsibility for ensuring compliance with the policy and procedures outlined in this EC. Each level is required to establish and maintain personnel and procedures to implement this EC.

a. Oversight. The HQUSACE CW will oversee the implementation and execution of this EC. Special attention will be given to ensure compliance with existing policies and programs.

b. Administration. CECW-CO will report the national maintenance backlog to the Director of Civil Works (DCW) annually during the third quarter of the fiscal year.

(1) The HQUSACE CW Asset Management Program Manager (AM PgM) will coordinate with the MSCs regarding the current state of their maintenance backlog as part of enterprise-level infrastructure reporting. AM PgM will develop the annual report of the maintenance backlog and ensure backlog data is routinely accessible to decision-makers through reports and data visualization applications.

(2) MSC commanders will conduct and coordinate, through the Chief of Operations Division, a review of the total maintenance backlog within the MSC. Each MSC will maintain their five-year investment and execution strategy across the region; expressed in the total maintenance backlog data in FEM. Lessons learned as well as corrective actions needed to improve the process across each MSC will be provided to the HQUSACE AM PgM.

(3) The National Maintenance Manager and the FEM Project Manager will oversee and coordinate any changes to the FEM database necessary to support this framework and ensure information can be shared and synchronized with other USACE database systems, as appropriate. The National Maintenance Manager will support MSCs and Regional Asset Managers (RAM) with the quality assurance of maintenance backlog data.

(4) District Chiefs of Operations will oversee the collection and recording of maintenance backlog data in FEM and use maintenance backlog data in the general management and oversight of projects.

(a) Operations Project Managers (OPMs) are responsible for coordinating cross-functionally between facility-level managers and Operations and Engineering Division technical staff as needed to ensure that total maintenance backlog information in FEM remains current and technically adequate as specified in applicable implementation guidance.

(b) The OPM, in concert with portfolio-level managers, is responsible for developing, managing, and maintaining visibility of the total maintenance backlog by routine quality assurance and quality checks of backlog data in FEM.

(5) Business Line Managers will use maintenance backlog data in budget development and workplan development processes.

8. Principles and Determinations

USACE CW has determined:

a. All unaccomplished valid work not currently in progress constitutes the total maintenance backlog.

b. All work activities progress through the same fundamental work stages that can be used to track work within a consistent framework for management.

c. Management action is required for work to progress between stages. As work progresses, managers have an opportunity to review and supervise decisions about scope, schedule, estimated cost, and obstacles preventing the work from advancing to the next stage. Information about schedule and the reason(s) work will not advance to the next stage provides common categories or groupings which enable backlog management. These categories make the maintenance backlog manageable and aid in reporting about the backlog.

9. Work Stages

All work progresses through stages. For complex work, these processes are appropriately elaborated and receive detailed analysis or reviews. Simple and straightforward work progresses rapidly through these stages. During emergency work, these stages are accomplished within moments involving processes in a single leader's mind. The work stages in this regulation align with the Maintenance Management Improvement Plan (MMIP) workflow. Work may remain at a particular stage for differing periods of time, depending on the complexity of the work and/or availability of resources. Standard work stages and how they align with the MMIP workflow are detailed in Table 1.

Table 1
Stages of Work

MMIP Workflow	Work Stages
Work Identification	A work need is identified.
Approval and Prioritization	Identified work is reviewed by the manager and a determination is made whether it is a valid need.
	The manager decides to either commit resources to begin activity on the work or to delay activity until a later date.
Planning and Estimating	If work is to progress, a determination is made regarding the need for engineering or maintenance planning support.
	Funding needs are addressed.
Procurement	Procurement of materials and services is addressed.
	Project or plant conditions are addressed.
Scheduling	Scheduling of work for execution is addressed.
Execution	When all preliminary factors are addressed, work is approved for execution.
	Execution of work begins.
	Work is completed.
Inspection/Follow-up	Completed work activities are reviewed by the manager and closed out
Closeout	

10. Total Maintenance Backlog Management

a. The total maintenance backlog may be communicated according to consistent groups based on work stage and information about schedule and the reason(s) work will not advance to the next stage. Work status indicates the reason(s) work will not advance to the next stage. These groups will enable communication and understanding among USACE CW stakeholders and leadership. Annual maintenance backlog reports will be made to the DCW to provide awareness of portfolio-level reliability issues, strategic resourcing, or work demand concerns, and as a portfolio-level metric of infrastructure health.

b. The OPM will provide routine processes at the facility level to capture information in FEM as work progresses from identification through close-out. Decisions and circumstances known to facility-level managers are key pieces of information in total maintenance backlog. Leveraging FEM and facility-level workflows, backlog information is made available to facility-level personnel and portfolio-level managers to support decision-making. The following broad areas or categories of work emerge from well-managed backlog datasets. These categories help organize the backlog into relevant groupings and give managers at all levels a framework to understand and support the work:

(1) Scheduled: Work that has a defined scope, is funded, scheduled, and ready to be executed.

(2) Ready: Work that has a defined scope, is funded, and has no current working hold conditions but is waiting to be scheduled.

(3) Working Hold: Work that has a defined scope, is funded, but is currently experiencing a conditional hold.

(4) Investment: Work that has a defined scope and cost estimate, but funding authorization is necessary to proceed. This includes cases where a funding request has been submitted in the biennial budget request, but funding has not been received; or work was identified between budget cycles and requires funding to proceed.

(5) Planning: Work that requires either engineering or maintenance planning services or a combination thereof (such as developing scope and specification, cost estimate, or coordinating resources).

(6) Full Performance: Work determined by management to provide a level of service that is higher than currently expected for the facility, including work to develop new capabilities within authorized project purposes. This is limited to work that may be postponed to a future date with minimal or no degradation to the asset, system, or mission.

(7) Life Cycle: Work that has a known scope, cost estimate, and a schedule to reflect a need that is not current but will be realized in the future. Work in this category is typically identified in the design stages and is based on the expected life span of an asset or component for the given application and environment. Life-cycle work needs are valid requirements for maintaining facility reliability, but resources are expected to be sought for this requirement in the future. The life-cycle category provides long-range forecast projections that are essential when conducting asset management planning activities such as resource leveling, aligning services, sequencing work, etc.

11. Training

Training that supports the requirements of this policy will be coordinated by HQUSACE CW. Training in using FEM applications and features to support this policy will be administered through the FEM National Support Center.

Appendix A

Maintenance Portfolio Management Guidance

A-1. Overview

The objective of this appendix is to provide a consistent enterprise process for managing the complete inventory of backlog as required in EC 1130-2-551. All valid work that is not currently in a work order status of in progress, completed, closed, canceled, or waiting approval is considered part of the total backlog. Managing this backlog is essential to effectively plan, coordinate, schedule, and execute sustainment work across a portfolio as diverse as the USACE CW. The FEM database is the USACE CW operations and maintenance (O&M) computerized maintenance management system of record, and this appendix describes how managers throughout the enterprise will use FEM to carry out their backlog management responsibilities.

A-2. Responsibilities

a. Managers throughout the enterprise have a responsibility to identify, manage, and communicate the status of work. While facility-level managers generally have a heightened awareness of the status of work which is yet to be performed; portfolio managers such as budget developers, business line managers, and other higher-level leaders, rely on the data provided in systems such as FEM for information about workload and resource demands. Facility managers will use the multiple data points described in this guidance to communicate their needs and to empower portfolio managers and leaders to properly represent and communicate the workload and resource demands of the total maintenance backlog.

b. The OPM or facility manager (hereafter the manager) has the ultimate responsibility to forecast the requirements necessary to maintain reliability of the facility or facilities they manage. The manager will ensure the local workflow process is structured and provides direction for executing that responsibility, which includes but is not limited to the timely identification of deficiencies, developing scope and budget estimates, managing target and schedule dates, and ensuring the status of work is properly communicated in FEM.

c. USACE recognizes and accepts that differences in staffing and organizational structure among Districts and operating projects/facilities may require that managers combine or divide duties when assigning to their staff the roles and responsibilities associated with work and database management. However, the ultimate responsibility remains with the manager and may not be delegated.

A-3. Procedure

Work orders will be created for all work needs. The following procedure does not entirely address the information required to generate a work order per existing guidance and instruction. However, it does address the information necessary to effectively manage and accurately communicate the inventory of backlog work consistent with this EC. Additionally, this procedure addresses certain processes and standards regarding data quality. Work order information must be entered and complete as outlined in this procedure.

a. Work Identification. Work needs will be communicated by creating a work order in FEM. The following are ways in which work may be identified by various types of personnel.

(1) Operations Personnel: Operations personnel will identify corrective maintenance in response to monitoring, inspections, and operation of equipment or systems.

(2) Maintenance Personnel: Maintenance personnel will identify work during directed inspections or when out-of-scope work is identified while performing assigned preventive maintenance (PM) or predictive maintenance (PDM) work.

(3) Inspectors: Work may be identified by individuals or agencies as the result of a directed inspection (for example, Dam Safety, Environmental Review Guide for Operations, Condition Assessments, Occupational Safety and Health Administration).

(4) Engineering: Work may be identified through failure reports, analysis, tests, or inspections. Some maintenance work may be identified during audits or changes in regulations.

(5) Waiting on Approval (WAPPR) status will be used for all work identified but not yet reviewed and validated by the responsible manager.

b. Validating Work. Identified work needs will be reviewed and substantiated only by personnel to whom management has delegated the authority to set priorities and assign work at the operating project. Work is validated by reviewing and adjusting the work order content as needed to ensure it is technically and administratively sufficient to support the requisite scope development, scheduling, and/or execution of the work. At this point, the manager will change the work order status from WAPPR to an appropriate status according to paragraph c. below. Consider the following when conducting the technical and administrative review:

(1) Verify that a work order does not already exist for the identified work. Work determined to be invalid, or a duplicate of an existing work order will be deleted or canceled, as applicable, by the designated personnel.

(2) Verify that the work order includes the information necessary to show it supports the authorized mission(s) of the project.

(3) Verify that the description of work includes the information necessary to competently define the problem or needed task.

(4) Verify that the applied work order status reflects the manager's understanding of what is preventing progress of the work or other status as appropriate. See paragraph c. below.

(5) Verify that the target start date reflects the manager's understanding of when the work is needed to be performed. See paragraph d. below.

(6) Verify that the funding estimate of cost reflects the manager's understanding of the financial commitment necessary to complete the work described. See paragraph e. below.

c. *Applying Work Order Status Codes.* Work order status codes bring order to the often-chaotic backlog by communicating the primary reason work cannot progress. The responsible manager will exercise judgment and decide if the work warrants an immediate level of effort to advance it toward completion; and then decide, among sometimes diverse causes, the primary reason this effort is not being advanced. Managers should continually evaluate facility needs to ensure the selected work order status code continues to accurately reflect the primary reason the work is not moving toward completion. The following work order status codes will be used and kept current in the work order status field by the responsible manager.

(1) *Wait Status Codes for Backlog.* FEM provides a means for managers to record and communicate their understanding about the primary need, or the wait factor, that prevents moving the work toward completion. This is work that will be performed at its scheduled start date or as soon as practicable after wait factors are cleared. For work in wait status, managers will use one of the following statuses to record and communicate the step that must be taken to advance the work.

(a) *Waiting for Engineering (WENGR):* Work that is waiting for or undergoing an engineering or design review.

(b) *Waiting for Planning (WPLAN):* Work that is waiting for or undergoing a review to determine maintenance activities requirements.

(c) *Waiting on Funding (WFUNDS):* Work that is waiting for funding before proceeding in the work order life cycle.

(d) *Waiting on Contracting (WCONT):* Work that is waiting for a contract to be developed, awarded, and/or administered.

(e) *Waiting on Plant Condition (WPCOND):* Work that is waiting for specified plant/site/facility conditions to be met before it can be scheduled.

(f) *Waiting on Material (WMATL):* Work that is waiting for materials to be procured and/or received.

(g) *Waiting to be Scheduled (WSCH):* Work that is waiting for a scheduled start date.

(h) *Waiting to Start (WSTART):* Work that is funded, scheduled, ready to be executed, and waiting for the scheduled start date to arrive.

(2) *Other Status Codes for Backlog.* For reasons other than the impediments stated in paragraph (1) above, managers may decide that valid work should not advance or may decide to deliberately postpone initiation of valid work. For such work, managers will use one of the following statuses to record and communicate their decision.

(a) *Full Performance.* The Full Performance (FP) status will be used for work determined to be valid, but not warranting active engagement by management. This work, while valid for the facility, delivers a service or benefit that exceeds the current required level of performance. Managers should capture this work, despite its FP context, when stakeholder interest exists in the work, or the work supports an improvement to the overall performance at the facility.

- FP describes work that the manager has determined provides a service that is higher than currently expected for the facility.

- FP is work that does not currently impact the performance of the system or asset at the currently expected level of mission performance.
- FP work is valid work and has been intentionally postponed by the manager with the assurance that postponement will result in minimal or no degradation to the system, asset, or current level of mission performance.
- When management determines FP work should be pursued due to changed performance expectations for the facility, the manager will conduct maintenance planning, budgeting, coordination, and scheduling functions, and will change the work order status from FP to the status that most accurately represents the current stage of the work.

(b) *Life Cycle*. The Life Cycle (LC) status will be used when managers decide to deliberately hold or not advance valid work because it is not optimal to execute the work currently, regardless of resource availability. The key factor distinguishing LC from other status choices is that the manager is aware the work is valid, and execution is not being pursued because the asset has yet to reach the point in the life cycle where optimal return on investment is achieved.

- LC communicates forecasted work needs for the facility and is essential to all levels of management when conducting asset management planning activities such as leveling the peaks and valleys of projected facility sustainment costs, resource planning, alignment of services, sequencing work, etc.

- Managers will eventually determine that the asset/component condition is such that the LC work is no longer a forecasted need but a current need and the return on investment is now optimal.

- Managers must ensure there is ample time given for maintenance planning, budgeting, coordination, and scheduling work that is moving from LC status to a status representing a current need.

- When previously forecasted LC work is reviewed and determined to be a current need, it will be given a status to indicate the primary reason the work is not being accomplished or what prevents moving the work toward completion. See paragraph A-3c(1).

(c) *Non-Backlog Status Codes*.

- Work orders with any of the following status codes are not part of the maintenance backlog:

- Waiting on Approval (WAPPR);
- Canceled (CAN);
- Waiting on Review (WREV);
- In Progress (INPRG);
- Completed (COMP); or
- Closed; or associated statuses (CLOSE).

- The following status codes will no longer be used by the USACE CW asset management community:

- Approved (APPR); or
- Draft (DRAFT).

d. Applying Start Dates. Work orders will be prioritized, planned, and scheduled into the workload to ensure that a well-balanced selection of work is assigned, ensuring each crew is neither overloaded nor under-tasked. The manager will consider the initial job requirements and determine a reasonable expectation of when work should be scheduled and accomplished. When a work order has been determined to be valid and the appropriate status has been assigned, the target or scheduled start date will be determined as follows:

(1) *Target Start Date.* The Target Start Date (TSD) field on the FEM work order is the primary means of communicating a reasonable expectation of when work should be scheduled. TSDs are a reasonable estimate based on professional experience and/or consultation with individuals possessing special expertise such as maintenance planners or reliability engineers. The manager must have a basis to defend and be willing to accept the TSD given the information available when the TSD is or was assigned. The following requirements apply to setting a TSD.

(a) The TSD is required for all work orders except those with a WAPPR status.

(b) The TSD should be based on the asset's current condition, expected degradation, and operational demands.

(c) The TSD should account for initiating the work with consideration of return to service requirements and other variables associated with maintenance planning, scheduling, and executing the work (including but not limited to, work duration, required resources [labor, materials, services, tools], procurement lead times, operational availability of the equipment, etc.).

(d) Managers may project TSDs years into the future (for example, certain FP and LC work orders or work requiring extensive maintenance planning and scope development). When addressing work that will require long-term projections, such as certain FP and LC work, or work requiring funding beyond normal budget capabilities, managers recognize there are factors which are beyond their control, such as funding shortfalls. However, the TSD should be based on asset sustainment and reliability factors, not on uncertainties regarding the availability of funding resources.

(e) Once a TSD is determined, it will remain fixed and should be adjusted only when the manager determines conditions affecting the optimal time frame for renewal or repair has changed.

(f) A TSD reflecting a date in the past is acceptable, as it provides a critical piece of information for analyzing and improving maintenance planning and scheduling practices. It may also highlight inconsistencies or areas for improvement in certain business processes, such as budget or contract development and/or parts and material procurement.

(g) For preventive and predictive maintenance activities, the TSD is typically provided during scheduling actions.

(2) *Scheduled Start Date.* This date is required for all work orders when moving them into the WSTART status.

(a) Rigorous maintenance planning and scheduling efforts can and will better define and detail the job requirements prior to setting a scheduled start date.

(b) The scheduled start date field on the FEM work order is the primary means of communicating when the work is scheduled to start.

e. *Funding Estimates.* Successfully managing and communicating backlog is directly tied to consistency, accuracy, and thoroughness when estimating and recording the cost of work. Thorough and accurate estimates representing the complete cost of work provide one of the key benefits when managing the total backlog; the opportunity for resource leveling at the facility and portfolio levels. For this reason, all associated work costs, such as service, contract, materials, and labor costs; as well as engineering and design efforts, plans and specifications, real estate, environmental, and any other direct or indirect management costs are all to be estimated and recorded. All work orders documenting valid work will have an estimated cost entered in the Plans tab.

f. When a parent-child relationship exists between two or more work orders, managers will be careful to ensure that no task or resource estimates appear on more than one of the related work orders. For the purposes of meeting the requirements of the total backlog policy, managers will determine the appropriate level of detail for estimates, recognizing two broad categories of cost estimating detail as follows:

(1) *Rough Order of Magnitude.* A rough order of magnitude (ROM) is an estimate developed early in the life of a work order. The manager will generally base the estimate on maintenance activities of similar type and magnitude to provide an initial estimate of the total cost of the maintenance activities. At this early stage, there is generally insufficient information available, and the effort required to develop a more detailed estimate would not yet yield a positive return on investment. Therefore, it is reasonable for these estimates to have a high level of uncertainty. A ROM is:

(a) Determined early in the concept stages of a project and therefore a larger variance or margin of error is acceptable.

(b) Developed using previous knowledge and experience regarding level of effort and costs associated with similar type maintenance activities.

- The manager may base this level of estimate on the knowledge of individuals with experience performing maintenance and understanding the associated costs.

- The manager should rely on individuals with practical knowledge about the circumstances of the maintenance activities site and conditions of the maintenance activities being estimated.

(c) An estimate meant to provide decision-makers with the information necessary to determine an approach for moving forward with the project.

(d) Applied to work orders in the following statuses:

- Full Performance (FP);
- Life Cycle (LC);
- Waiting for Engineering (WENGR); or
- Waiting for Planning (WPLAN).

(2) *Cost Estimate.* As maintenance planning and engineering efforts improve and better define the design and conditions of the work, the associated estimate should reflect the improved information. This more detailed estimate of the total cost of a unit of work is typically expressed as a likely cost, for which the basis of the estimate is documented. The manager relies on the following factors when making a detailed Cost Estimate for maintenance:

(a) Uses information acquired during the maintenance planning and scoping efforts and should engage an analogous estimating method.

- (b) Uses inflation-adjusted historical data for similar work when available.
- (c) Documents estimated costs associated with specific components of total work package rather than summary or a bulk cost roll-up.
- (d) Is conducted by individuals with experience performing maintenance, familiar with the maintenance situation and its total costs, and with practical knowledge about the circumstances of the work site and conditions being estimated.
- (e) The cost estimate method is applied to work orders in the following statuses:
- Waiting on Funding (WFUNDS);
 - Waiting on Contracting (WCONT);
 - Waiting on Plant Conditions (WPCOND);
 - Waiting on Material (WMATL);
 - Waiting to be Scheduled (WSCH); or
 - Waiting to Start (WSTART).
- g. *Work Types*. Corporate and Command work types will be recorded in the applicable field of the work order. The manager must ensure proper categorization of work to support reporting and enable accurate tracking of maintenance trends. The following are available work types:
- (1) *Corporate Work Type*. Corporate work types will be assigned based on the activity and will be recorded in the Corporate Work Type field to identify whether the effort documented in the work order represents operations, maintenance, or capital work activities as described below:
- (a) Capital (C): Those activities needed to preserve the existing infrastructure, including all capital costs for replacements, additions, efficiency improvements, and retirement of facilities.
- (b) Maintenance (M): Those activities needed to preserve the existing infrastructure, including all expensed costs for preventive, predictive, corrective maintenance, repair, renewal, and rebuild of facilities and equipment.
- (c) Operations (O): Work that is integral to providing authorized benefits to the public. Operations includes facility operations necessary to keep equipment, assets, and facilities functioning at a particular service level, including general supervision and engineering associated with operations.
- (2) *Command Work Types*. Command work types will be recorded in the Command Work Type field on the FEM work order and are assigned strictly by activity. The manager must exercise judgment when selecting the appropriate command work type from the list below:
- (a) Repair Maintenance (RM): Actions initiated in response to finding a failed asset or component, or in response to observed or measured conditions of an asset or component that indicate failure is imminent.
- (b) Rebuild Maintenance (RBM): The complete disassembly and repair/replacement of all worn or unserviceable parts or components, using original manufacturer tolerances and specifications to restore an asset, as nearly as possible, to original or like-new condition, in appearance and/or performance and life expectancy.

(c) Modification (MM): Maintenance activities with a focus on reducing or eliminating the required maintenance of an asset and/or resulting in an extension of asset life expectancy; that involve a change or modification in the fit, form, or function of the asset/component.

(d) Operation (OP): Activities performed that support operating the project and meeting the project's congressionally funded purpose/mission.

(e) New Construction (NC): The installation or procurement of a new system or asset that previously did not exist.

(f) Other (OS): Activities undertaken to perform maintenance activities for or support the needs of outside agencies or others not associated with the operating projects/facilities Operations and Maintenance (O&M) program.

(g) Preventive and Predictive Maintenance (PM/PDM):

- PM is the recurring and scheduled care, servicing, and inspection of assets (facilities, equipment, and components) for the early detection of developing failures.
- PDM is a maintenance strategy involving continuous or periodic non-invasive monitoring, measuring, or testing to determine the actual condition of an asset.
- PMs and PDMs are generally part of the scheduled and ready backlog and therefore are important to consider for the purposes of work management. However, preventive and predictive maintenance will NOT generally be included in reporting requirements because they are recurring, have assigned cycles, and should be completed as scheduled or closed indicating why they were not completed.

h. Parent and Child Work Order Relationships. Parent-child work orders identify work that is relational in nature and provide a means for specifying independent work activities (child) within a cumulative work order (parent). Managers will strive to ensure that work activities are separated, as necessary, to accurately reflect the total backlog and that the combined estimated and actual cost of the child work activities is reflected on the parent work order.

(1) The following are guidelines indicating when a parent-child relationship should be established in managing the total backlog:

(a) When the process for completing a work need involves separate activities, each with their own end product or terminus.

(b) When there is a specific task or work activity, which is a critical path element to the progress of the overall work effort.

(c) When a system, asset, or component has a complex work need and there is a desire to separate and independently track the work, while preserving the association of the work.

(d) When a system, asset, or component has several existing work needs and there is a desire to associate the overall effort while preserving the independent work activities.

(2) Following the above guidelines, managers are required to relate the work orders in a deliberate parent-child relationship, if any of the following occur:

(a) There are specific pre-construction services required for a separable support element of the work (such as studies, design, or scoping, plans and specifications).

(b) There is specific technical support or services required to refine or improve the initial ROM estimate, to a developed cost estimate suitable for submitting a funding request.

(c) Individual tasks or work activities included in a common work effort require different funding sources.

(d) Asset failure reporting is required for a specific portion of a work effort.

(e) The work order is tied to a work package that spans multiple years, and the funding for each year will be requested separately in the budgeting process. In this case, the activities associated with each funding year will be contained in a child work order.

A-4. Records

The following records will be available in FEM at a local, regional, and national level for use in assessing the implementation of this policy:

a. *Work Order Data Required by This EC.* The content of these data points will populate a comprehensive report showing the information for all work orders coded with a status indicating valid backlog work in FEM:

- Work order description;
- Work order status;
- Corporate work type;
- Command work type;
- Work category code;
- Target start date (as applicable);
- Scheduled start date (as applicable); and
- Estimated cost of labor, material, services, and tools.

b. *Divisions of Backlog.* Proper attention and a disciplined approach when assessing the existing workload will enhance facility level backlog management and provide portfolio managers visibility of current and emerging needs at a facility or in a portfolio of facilities. A report from FEM querying work order status and target or scheduled start dates will yield data that can be used to sort the backlog into common work stages. The following divisions in the total backlog are common in infrastructure management, are a by-product of well-managed data, and will be used throughout the enterprise to communicate the total backlog.

(1) **Scheduled:** Work has a defined scope and is funded, scheduled, and ready to be executed. Scheduled work will have a FEM work order status code **Waiting to Start (WSTART)**, a defined scope and cost estimate, and a **SCHEDULED** start date that does not exceed the two-year fiscal window (FY+2 window).

(2) **Ready:** Work has a defined scope, is funded, has no current working hold conditions, is waiting to be scheduled, has a FEM work order status code **Waiting to be Scheduled (WSCH)**, a defined scope and cost estimate, and a **TARGET** start within the FY+2 window.

(3) **Working Hold:** Work has a defined scope, is funded, has a cost estimate, a **TARGET** start date, is currently experiencing a conditional hold, and has one of the following FEM work order status codes:

- Waiting on Contracting (WCONT);
- Waiting on Plant Condition (WPCOND); or
- Waiting on Material (WMATL).

(4) Investment: Work has a defined scope, a cost estimate, and a target start date, but funding authorization is necessary to proceed. Investment indicates, though management has a desire to execute, a lack of funding is the primary factor preventing progress of the work. Investment work has a FEM work order status code of Waiting on Funding (WFUNDS). In each example listed below, the WFUNDS status will show the work to be in the investment backlog until its status is changed.

(a) A budget package has been submitted, but funding has not been received.

(b) Work has been identified between budget cycles that requires funding other than common O&M to proceed, but a budget request has not been submitted.

(c) Work will be executed using common expense funds and does not require a budget submission package.

(5) Planning:

(a) Work has a draft scope, a TARGET start date, and ROM estimate but requires either engineering or maintenance planning or a combination thereof (such as development of scope and specification, cost estimate, or coordination of resources) to complete the scope, cost estimate, and finalize a TARGET start date. Planning work will have one of the following work order status codes:

- Waiting for Engineering (WENGR); or
- Waiting for Planning (WPLAN).

(b) Typically, within a four-year advance window of the actual work execution, work in the planning category will have a child work order(s) opened for development of the scope and specification, cost estimate, or coordination of resources; and associated child work order(s) may or may not be included in the total backlog. For example, if there is a child work order for engineering services that has a status code of In Progress (INPRG), this child work order is not part of total backlog.

(6) Full Performance: Work determined by management to provide a level of service that is higher than currently expected for the facility, including work to develop new capabilities within authorized project purposes. This is limited to work that may be postponed to a future date with minimal or no degradation to the asset, system, or mission. Full performance work uses the FEM work order status code FP, has a defined scope, a ROM estimate, and a TARGET start date.

(7) Total Life Cycle: Work that is scheduled to reflect a need that is not current but will be realized in the future. Work in this category is typically identified in the design stages and is based on the expected life span of an asset or component for the given application and environment. Total life-cycle work uses the FEM work order status code LC, has a defined scope, either a ROM or cost estimate, and a TARGET start date.

(a) Managers should conduct recurring reviews of all work in the life-cycle status to assess the asset/component condition and ensure the target start date reflects an optimal return on investment for the work. Attention should also be given to work having a target start date that is nearing the FY+2 window to ensure there is ample time given for maintenance planning, budgeting, coordination, and scheduling.

(b) When the manager decides to move work from a projected to a current need, managers will change the work order status to one that properly indicates the next step required for the work to progress, removing it from the LC work stage.

Glossary of Terms

Asset

Any resource, facility, area, structure, installation, or piece of equipment for which USACE has the maintenance responsibility to identify needs, prioritize work, perform maintenance, and/or track results.

Asset Management (AM)

The coordinated activity of USACE CW to realize value from assets. Realization of value involves a balancing of costs, risks, opportunities, and performance benefits.

Total Maintenance Backlog

Valid work not currently in progress, complete, closed, or waiting approval by the appropriate authority. This may include all such work which was needed in the past, as well as work planned in the near-term or long-term future.

Cost Estimate

A reliable estimate of the total cost of a unit of work, typically expressed as a likely range of cost for which the basis of the estimate is documented.

Facilities and Equipment Maintenance System (FEM)

The FEM system is the USACE CW implementation of the computerized maintenance management system IBM Maximo. The core of FEM functionality is an asset-based, work order work management system.

Facility Level

With respect to management; includes identifying, prioritizing, authorizing, managing, and controlling work activities (including maintenance), programs, and other related work, in order to maintain the general operations of a facility.

Maintenance Management Improvement Plan (MMIP)

USACE national guide for planning, executing, and documenting maintenance for both real and personal property assets.

Portfolio Level

With respect to centralized management; includes identifying, prioritizing, authorizing, managing, and controlling projects, programs, and other related work, in order to achieve specific strategic business objectives.

Rough Order of Magnitude (ROM)

A broad-based estimate with assumptions based on work of similar type and magnitude for the purpose of providing an initial estimate of the total cost of a unit of work.

Valid Work

Work that has been determined as necessary by the appropriate authority, has been planned and estimated at the level appropriate for its scope, and has been given a target start date.