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Research and Development
Civil Works Research, Development, and Technology Program

FOR THE COMMANDER:

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Purpose. This engineer regulation establishes the overall policy, process, and governance mechanisms associated with the U.S. Army Corps of Engineers Civil Works Research, Development, and Technology Program across the enterprise.

Applicability. This regulation applies to all Headquarters elements, laboratories, centers, major subordinate commands, and district commands having Civil Works responsibilities. It encompasses all work conducted with appropriations provided for research, development, and technology transition activities supporting the Civil Works mission, and includes other Civil Works activities purposefully planned and aligned to support such work. The scope of the Civil Works Research, Development, and Technology Program covers deliberate activities intended to generate new knowledge and understanding; to discover and develop new products, methods, and technologies; and to transition and implement innovative solutions that improve the execution of the Civil Works mission.

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

Proponent and Exception Authority. The proponents of this regulation are the Director of Research and Development and the Director of Civil Works. The proponents have 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.

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1–1. Purpose

This engineer regulation establishes the overall policy, process, and governance mechanisms associated with the U.S. Army Corps of Engineers Civil Works Research, Development, and Technology Program across the enterprise.

1–2. Distribution statement

Approved for public release; distribution is unlimited.

1–3. References

See Appendix A.

1–4. Records management (recordkeeping) requirements

The records management requirement for all record numbers, associated forms, and reports required by this publication are addressed in the Army Records Retention Schedule. Detailed information for all related record numbers is located on the U.S. Army Corps of Engineers (USACE) Records Management Site https://usace.dps.mil/sites/INTRA-CIOG6/SitePages/Records-Management.aspx. If any record numbers, forms, and reports are not current, addressed, and/or published correctly, see DA Pam 25-403 for guidance.

1–5. Associated publications

This section contains no entries.

Chapter 2
Fundamental Concepts and Terminology

2–1. Terminology

a. Research and development (R&D) activities are defined as creative and systematic work undertaken to increase the stock of knowledge and to devise new applications using available knowledge. R&D activities represent the collection of efforts directed toward gaining greater knowledge or understanding and applying knowledge toward the production of useful materials, devices, and methods.

b. The term technology is used to denote the collection and reporting of data and application of scientific knowledge to solve practical problems, intending to create better and more efficient products, services, or processes that address specific needs. Successful completion and implementation of technology is generally the result of systematic R&D activities, although not all R&D activities are aimed at solving specific practical problems (such as basic research activities).

c. The term Civil Works Research, Development, and Technology (CW RD&T) denotes the broad spectrum of coordinated activities focused on planning, programming, budgeting, executing, discovering, developing, delivering, and transitioning (through sustaining and connecting) RD&T projects, products, services, and their resulting outcomes in support of the CW mission. The primary goal of the program is to support the generation and implementation of impactful scientific and technological advances addressing the toughest and most critical CW challenges.

2–2. Civil Works Research, Development, and Technology Program

a. Activities within the CW RD&T Program are planned and executed according to a systematic, structured, and requirement-driven process aimed at enhancing USACE's ability to deliver the CW mission.

b. Effective implementation of the program requires coordination with other CW programs, projects, or functions that may be leveraged to incorporate new technologies and innovative solutions.

c. The CW RD&T Program supports all CW business lines (navigation, flood risk management, environment, hydropower, regulatory, recreation, emergency management, and water supply) and functional areas (such as engineering and construction, homeland security, operations and regulatory, planning and policy, and programs integration).

d. The outcomes of the CW RD&T Program will benefit CW practitioners and other end users with the focus on enhancing mission delivery through advanced technologies and innovative solutions, addressing the most pressing unmet needs across the enterprise, and better preparing USACE to address future challenges.

e. These outcomes support all phases of any project life cycle, from planning through engineering, construction, operations and maintenance, and deauthorization. Additional outcomes may also support improved organizational safety, efficiency, and effectiveness. The resulting products may be developed in conjunction with or with advisement from external organizations including other federal agencies, academia, and the private sector.

2–3. Civil Works Research, Development, and Technology Program portfolios

a. The CW RD&T Program encompasses different types of activities that are grouped in different portfolios. It is important to note that some CW RD&T activities may exhibit common aspects across these portfolios. This portfolio characterization is primarily made based on the nature of the activity, the requirement generation process, the timeline for budgeting, and the expected activity duration.

b. The following portfolio characterization provides a fundamental structure for activities conducted through CW appropriations[1] specifically budgeted for RD&T transition:

(1) *CW Strategic R&D*. This includes activities aimed at addressing long-range, enterprise-level priorities identified and adopted by USACE leadership as areas needing innovation for the CW mission now and into the future.

(2) *CW Tactical R&D*. This includes activities aimed at addressing time-sensitive challenges impacting the CW mission that require rapid innovation through science and technology (S&T) as identified through field-generated requirements or other sources.

(3) *CW R&D Facilities*. This includes activities required to establish, improve, operate, and maintain specialized physical R&D facilities and special R&D equipment supporting the CW mission.

(4) *CW Technology*. This includes activities associated with technology development, data collection, and technology testing, validation, and transition to successfully prove, deliver, and sustain technological innovation in support of the CW mission.

[1] As of the date of publication, these activities are funded though the following Civil Works Appropriation Accounts: Investigations, Construction, and Operation and Maintenance.

Chapter 3
Governance of the Civil Works Research, Development, and Technology Program

3–1. Basic principles

a. The CW RD&T Program is jointly led by the USACE Directorate of Civil Works and the USACE Directorate of Research and Development through a governance structure that ensures the resulting tools and technologies support the USACE CW mission. Both organizations work in partnership to maintain a robust, rigorous, and transparent CW RD&T Program that is fully aligned to the vision and objectives established by the USACE Campaign Plan, USACE R&D Strategy, and other CW R&D strategic guidance.

b. The CW R&D Steering Committee (CWRDSC) provides overall guidance regarding the strategic and programmatic direction on matters pertaining to the CW RD&T Program.

c. The CW R&D Advisory Group (CWRDAG) provides recommendations to the CWRDSC, which help inform decision-making and play a key role in identifying R&D needs and technology transition requirements.

d. Both the CWRDSC and CWRDAG include major subordinate command (MSC) representatives.

e. The CW RD&T Program relies on requirements and partnering for technology transition from a broad array of USACE organizations (Headquarters, Divisions, Districts, centers, laboratories, field operating activities, and communities of practice [COPs]). Representatives from these USACE elements help define end products and support the development, testing, demonstration, and transition of innovative solutions developed through the program.

f. The CW RD&T Program also benefits from inputs and perspectives from subject matter experts (SMEs) across industry, academia, and related government agencies, as well as federal advisory committees and other technical advisory boards.

g. All CW RD&T Program execution activities are tracked and communicated through the Revolutionize Performance Monitoring dashboard.

3–2. Roles and responsibilities

a. Headquarters. At the Headquarters (HQUSACE) level, the CW RD&T Program is jointly led by the USACE Directorate of Civil Works and the USACE Directorate of Research and Development. This process also includes integrating decision briefings to USACE senior leaders, including those responsible for oversight of investigations funding (Planning and Policy Chief), construction funding (Engineering and Construction Director), operations and maintenance funding (Operations and Regulatory Chief), and other CWRDSC members to ensure the appropriate level of information and awareness. The following sections outline roles and responsibilities at the HQUSACE level.

(1) *Directorate of Civil Works*. The Directorate of Civil Works' mission is to manage, staff, and supervise the execution of CW programs, including program development, design, planning, project management, engineering, construction, operations, and maintenance of USACE projects, regulatory activities, and research and development functions in support of this program and engineering, management, and technical support to non-defense government agencies. To fulfill its mission, the Directorate of Civil Works conducts the following activities:

(a) Provides programmatic (policy and budget) management, direction, and oversight for the nation's water and related environmental resources; developing and managing programs; planning, designing, constructing and operating projects for navigation improvement, flood risk management, aquatic ecosystem restoration and protection, environmental stewardship, related hydropower development, water supply, water quality control, fish and wildlife conservation enhancement of outdoor recreation, support for others, and contingency operations and emergency response.

(b) Oversees the development of CW RD&T Technology Transition Plans. These plans, which are developed, documented, and championed by the appropriate USACE organizational Product Owner in collaboration with technical experts, are critical to ensure the successful implementation and sustainment of CW RD&T deliverables and effective communication of use across the enterprise.

(c) Co-leads the CW RD&T Program in collaboration with the Directorate of Research and Development and under the guidance of the CWRDSC.

(2) *Directorate of Research and Development*.

(a) The Directorate of Research and Development's mission is to develop strategies and policies to guide R&D activities, portfolios, and programs across the USACE enterprise; support the development of CW RD&T Technology Transition Plans with the appropriate USACE organizational elements; coordinate the development of policies to facilitate S&T innovations; promote strategic communications to build increased awareness about the value of the CW RD&T Program; build and manage relationships with federal, state, industry, academic, and international partners to foster synergies across the R&D spectrum and promote collaboration with mission partners; and identify opportunities to align USACE R&D investments across USACE with Army, Department of Defense (DoD), interagency, and national strategic priorities.

(b) The Directorate of Research and Development also co-leads the CW RD&T Program in collaboration with the Directorate of Civil Works and under the guidance of the CWRDSC.

(3) *Civil Works Research and Development Steering Committee*.

(a) The CWRDSC provides strategic and programmatic guidance relevant to the CW RD&T Program, to include the top line funding levels for the Chief's Recommendation in the annual budgetary process.

(b) The CWRDSC is co-led by the Deputy Commanding General for Civil and Emergency Operations (DCG-CEO), Director of Civil Works, and Director of Research and Development.

(c) The CWRDSC Charter (Appendix B) provides additional information on mission, purpose, governance, and membership.

(4) *Civil Works Research and Development Advisory Group*.

(a) The CWRDAG is a senior-level advisory body that develops and provides recommendations to the CWRDSC for approval and subsequent implementation. The CWRDAG provides recommendations on strategic and programmatic matters, technology transition, and budget top line funding levels for the Chief's Recommendation. Each CWRDAG member representing a specific functional area, regional, or mission perspective supports their corresponding CWRDSC representative in that specialty area. CWRDAG members may also serve as Product Owners for CW RD&T Technology Transition Plans.

(b) The CWRDAG is co-chaired by the Executive Director of R&D and one CW member of the CWRDAG specifically designated by the Director of Civil Works.

(c) The CWRDAG Charter (Appendix C) provides additional information on mission, purpose, governance, and membership.

(5) *Business Line Managers*. HQUSACE Business Line Managers (BLMs) typically fulfill the role of Research Area Lead for Tactical R&D activities. BLMs also identify opportunities for and facilitate technology transition discussions when appropriate and may serve as Product Owners for CW RD&T Technology Transition Plans.

b. Major subordinate commands.

(1) MSCs play a critical role within the CW RD&T Program as they represent the driving force supporting the delivery of the CW mission. Divisions and Districts actively participate in identifying needs and constitute essential partners for the successful transition of new technologies.

(2) The CW RD&T Program leverages the MSC S&T Cadre, composed of designated representatives for each MSC, to convey requirements and support the implementation of S&T advances.

(3) The MSC S&T Cadre Charter (Appendix D) provides additional information on mission, purpose, governance, and membership.

*c. Engineer Research and Development Cente*r.

(1) The Engineer Research and Development Center (ERDC) is the premier R&D element for USACE, developing innovative solutions in support of the CW mission.

(2) ERDC manages and executes major R&D programs through Research and Development Areas (RDAs). The ERDC CW RDA contributes to the strength of the nation by providing scientific knowledge and facilitating technological innovation to address the most significant challenges related to the nation's water resources, supporting the CW mission.

(3) The ERDC CW RDA Team is led by the ERDC CW RDA Director, as assigned by the Director of ERDC, and supported by the ERDC CW Lead Technical Director. Additional members, designated by the ERDC CW RDA Director, include ERDC CW Technical Directors, ERDC CW Programs Officers and ERDC Congressional Liaisons.

(4) The ERDC CW RDA Team supports the identification of requirements, needs, and opportunities from across the USACE enterprise; development of work packages in response to those requirements; planning and execution of the corresponding R&D activities, including the development of the corresponding project management plans; and reporting of project status, financial execution, and technical results through regular briefings to USACE leadership, CWRDSC, other USACE elements and programs, Districts, Divisions, and CoPs, as necessary.

(5) The ERDC CW RDA Team is also responsible for coordinating all phases of the budget development process with the HQUSACE CW Program Integration Division as well as supporting responses to inquiries and data calls from the Office of the Assistant Secretary for Civil Works, Office of Management and Budget, and Congress.

d. Institute for Water Resources.

(1) The Institute for Water Resources (IWR) conducts forward-looking analysis of emerging trends and issues in anticipation of changing water resources management conditions to inform the corporate development of policies, programs, and investment decision strategies.

(2) IWR supports the CW RD&T Program by developing state-of-the-art hydrologic and hydraulic engineering methodologies, models, and management systems, and associated planning, economic analyses, and environmental methods, models, and training.

(3) IWR also provides advanced engineering risk management expertise for dam, levee, and infrastructure safety; and the development, application, and stewardship of the engineering practice involving contemporary risk-related methods and models.

e. Communities of practice.

(1) CW CoPs participate in the development of R&D needs, facilitate the identification of technological challenges within their area of responsibility, and assist in the relative prioritization of needs.

(2) CoP leads or their designees have an active role in the development of field requirements that could be potentially addressed by CW RD&T activities.

(3) CoPs also provide perspectives and recommendations in support of technology transition activities to bring new products and technologies into field practice.

f. Advisory committees and external organizations.

(1) The CW RD&T Program benefits from inputs provided by USACE federal advisory committees (such as Board on Coastal Engineering Research and Inland Waterways User Board) to inform decisions related to strategic priorities.

(2) The program may also leverage external partners (such as interagency committees, other government agencies, academic institutions, and independent peer-review panels) to gather additional perspectives on emerging technologies and their potential application to address critical problems relevant to the CW mission.

Chapter 4
Management of the Civil Works Research, Development, and Technology Program

4–1. General considerations

a. The management of the CW RD&T Program is informed by input and recommendations from technologists (such as ERDC researchers, scientists, and technical specialists), internal stakeholders (such as Divisions and Districts, centers, CoPs, other USACE elements), and external partners (such as other government agencies, academia institutions, and advisory boards).

b. This multi-stakeholder framework facilitates the development of requirements associated with current and future challenges associated with the CW mission. These requirements are subsequently matched with existing and emerging S&T solutions or are used to drive current and future CW RD&T activities.

4–2. Civil Works Strategic Research and Development

a. Strategic Focus Areas. CW Strategic R&D activities are categorized according to Strategic Focus Areas (SFAs). SFAs are long-range top priorities for innovation and solutions to problems impacting CW mission delivery and represent the highest S&T priorities for long-term investment.

(1) SFAs are documented in the CW RD&T Strategy, which is reviewed by the CWRDAG and approved by the CWRDSC.

(2) SFAs are reviewed annually by the CWRDAG to ensure alignment with the overall strategic vision of the CW RD&T Program.

(3) Each SFA is managed by an identified SFA Technologist, who is a member of the ERDC CW RDA Team and designated by the ERDC CW RDA Director.

b. Strategic Capabilities. Each SFA includes multiple lines of effort that are categorized in Strategic Capabilities required to deliver the innovation priority. Each Strategic Capability[2] represents a grouping of interrelated activities necessary to achieve a desired end state for the corresponding SFA.

(1) In general, each Strategic Capability describes a capability gap for which R&D activities can be programmed and budgeted through one or multiple (interrelated) work packages. Work packages may include multiple work units to address different aspects of the problem.

[2] The term capability used in this context differs from the budgetary term Capability as defined by the Civil Works Directorate Program Development Guidance.

(2) Strategic Capabilities are updated as needed to account for a dynamic landscape, emerging challenges, technological trends, shifts in priorities, or changes in policy. SFAs and their corresponding Strategic Capabilities provide the top-level vision guiding the planning of future R&D activities. A special CWRDAG annual meeting is conducted to review and update this critical information, which is subsequently submitted to the CWRDSC for final review and approval.

c. Development of strategic requirements. Identification of requirements requires the consideration of inputs, priorities, and opportunities identified by multiple sources, as well as a review of ongoing RD&T activities and their potential to address the strategic priorities.

(1) Developing requirements may include significant work in the form of stakeholder interviews, feedback elicitation efforts, and other mechanisms.

(2) Strategic decadal requirements for CW mission delivery improvement are defined in terms of Objectives and Key Results (OKRs). OKRs represent long-term challenges across business lines and functional areas that could be addressed through focused S&T investments. It is important to note that OKRs are not limited to R&D; they may also encompass broader areas of need such as changes to policies, processes, and procedures, among other areas required for continual agency innovation.

d. Analysis and evaluation of requirements. A special CWRDAG annual meeting is conducted to review, update, and prioritize the list of OKRs to ensure this list accurately captures the most relevant needs associated with the CW mission and to identify any high-priority OKRs that are not already budgeted and could be addressed through the CW RD&T Program.

(1) Annually, the ERDC CW RDA Team compares the current and planned scope of the CW Strategic R&D portfolio with the list of priority OKRs related to R&D needs to identify any significant gaps that could be addressed through new R&D activities.

(2) The ERDC CW RDA Team may also propose a list of Strategic R&D Concepts to address identified gaps. Each Strategic R&D Concept provides a general description of the type, potential impact, and level of difficulty of the corresponding R&D effort.

(3) The CWRDAG reviews any proposed Strategic R&D Concepts and develops a recommendation for the CWRDSC’s consideration.

e. Development of supporting work packages. After the CWRDSC’s consideration and decision on the CWRDAG recommendations, the ERDC CW RDA Team develops a draft set of work packages for consideration in the next budget year (BY) cycle (for example, BY+2).

(1) Work packages must be developed in collaboration with the corresponding Strategic R&D Product Owners (see description below) and must address the entire technology innovation life cycle as documented through the corresponding CW RD&T Technology Transition Plan.

(2) Depending on its complexity, each work package may be executed through one or more work units. The ERDC CW RDA Team is encouraged to seek the review and feedback of the relevant USACE stakeholders before completing the draft set of work packages.

f. Execution of funded work packages. Execution of SFA activities is performed according to USACE ER 5-1-11 and the CW Program Execution Guidance to include programming, monitoring, and control.

g. Strategic R&D Technology transition. Transition of CW Strategic R&D outcomes and capabilities to end users across the enterprise, as documented through Technology Transition Plans, is vital to enhance the delivery of the CW mission.

(1) A Strategic R&D Product Owner is designated by the CWRDAG for each CW Strategic R&D activity supporting Strategic Capabilities within a given SFA. Each Strategic R&D activity may consist of multiple work packages across the R&D life cycle.

(2) Strategic R&D Product Owners can be selected from CW Technical CoP Leads, CW Business Line SMEs, or any Headquarters, Division, District, center representatives, or field operating activity.

(3) Strategic R&D Product Owners assist in advancing specific capabilities into practice, interface with relevant stakeholders to promote technology transition, identify resources that can support or expedite the transition, and monitor that the resulting products and solutions meet the intended needs in support of the CW mission.

(4) Strategic R&D Product Owners also interface with designated field or HQUSACE senior experts to help identify opportunities to leverage demonstrations sites or other activities that may support technology transition.

(5) Technology transition efforts may leverage the support of the MSC S&T Cadre to identify opportunities to test, demonstrate, or validate emerging CW Strategic R&D outcomes and capabilities.

h. Strategic R&D Technology Transition Plans. Implementation of methods, models, products, and technologies is formalized through Technology Transition Plans.

(1) CW Strategic R&D activities supporting Strategic Capabilities within a given SFA must develop one or more Technology Transition Plans to deliver the improved capability.

(2) The corresponding Strategic R&D Product Owner will develop the plan with support from the ERDC CW RDA Team.

(3) The plan must describe the value proposition of the proposed technology or solution and outline major efforts required to implement the solution or technology into practice or make them available to the end-user community, including responsible parties for each effort. Description of the value proposition may be quantitative or

qualitative, but it must be presented in terms that allow USACE senior leadership to evaluate the potential value delivered compared to other CW investment alternatives.

i. *Strategic R&D process*. The overall process described in this section is graphically summarized in Figure 4–1.

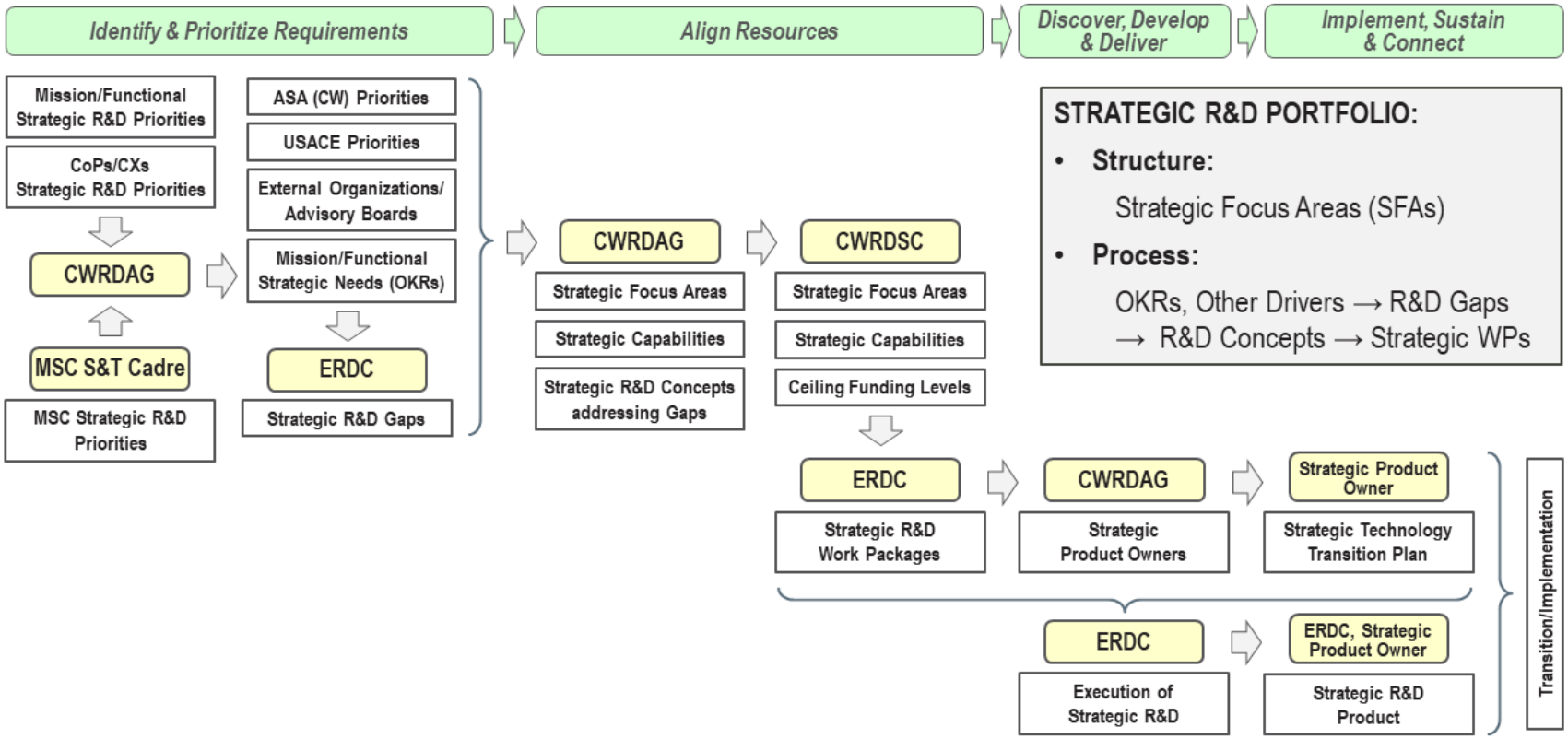

Figure 4–1. Civil Works strategic research and development process

4–3. Civil Works Tactical Research and Development

a. Tactical Research Areas. CW Tactical R&D activities are structured and managed according to a number of CW Tactical Research Areas (TRAs). They provide a convenient categorization based on the specific aspect of the CW mission associated with the challenge addressed by the activity.

(1) At a minimum, there must be three primary TRAs directly aligned to the following CW business lines:

(a) Navigation, including hydropower.

(b) Flood risk management, including water supply and emergency management; and

(c) Environment, including regulatory and recreation.

(2) Additional TRAs may be established in alignment with other CW business lines.

(a) Issues or challenges not uniquely associated with a single business line can be addressed through collaboration and coordination among existing TRAs; or, alternatively, a decision can be made to group special problems or emerging issues into a new TRA specifically focused on these challenges.

(b) The designation of a new TRA must be initiated based on recommendation by the CWRDAG and approval by the CWRDSC.

b. Tactical Research Area Proponent. Each TRA is managed by a TRA Proponent, who must be a representative from the Directorate of Civil Works and designated by the Director of Civil Works.

(1) Each TRA Proponent is supported by a designated member of the ERDC CW RDA Team, as identified by the ERDC CW RDA Director.

(2) In general, the TRA Proponent for the primary TRAs (those directly aligned with CW business lines) must be the corresponding CW BLM or an appropriately designated representative.

(3) For cross-cutting TRAs (those not directly aligned with CW business lines), the Director of Civil Works will designate the TRA Proponent.

c. Development of tactical requirements. Developing requirements that guide CW Tactical R&D activities is done by identifying Statements of Need (SoNs).

(1) Each SoN describes R&D requirements and opportunities as identified by HQUSACE, Divisions, Districts, centers of expertise, CoPs, and other USACE elements.

(2) SoNs serve to communicate challenges that may impede on efficient and effective mission execution and that could be mitigated through specifically targeted short-term R&D efforts.

(3) The ERDC CW RDA Team helps develop and implement an annual enterprise-wide data call that allows USACE stakeholders to submit SoNs.

(4) The ERDC CW RDA Team also conducts an initial review (data quality and validation) of the information submitted through the SoN data call and categorizes all SoNs based on their alignment to the established TRAs.

d. Analysis and evaluation of requirements. The TRA review process is used to analyze and prioritize requirements identified through SoNs.

(1) The TRA review process is a multi-level approach intended to integrate the USACE-wide perspective of CoPs with the specific perspectives of a given TRA.

(2) A TRA review is conducted for each established TRA with the corresponding TRA Proponent providing oversight. The specific details associated with the process implementation (participants, expectations, processes, and timelines) are established annually by the TRA Proponent.

(3) Participants in the TRA review process may include relevant CoP leads, directors of centers of expertise, MSC technical leads (such as Chiefs of Operation, Chiefs of Engineering), MSC S&T Cadre members, and other USACE stakeholders as deemed appropriate by the corresponding TRA Proponent.

(4) Participants review the relevant SoNs and recommend a relative prioritization based on the potential benefits to the corresponding TRA.

(5) In some cases, SoNs may have a cross-cutting nature (with relevance to one or more of the TRAs previously established for that particular year). Cross-cutting SoNs are reviewed and prioritized separately through special discussions involving all TRA Proponents and the ERDC CW RDA Team. Individual SoNs may also be combined to consider cross-cutting as well as mission-specific CW business line priorities.

(6) SoNs represent those near-term, time-sensitive R&D challenges requiring 1 to 3 years to address for rapid innovation.

(a) Pending sufficient appropriations, top-priority SoNs would be initiated in a budget year following the completion of the corresponding TRA review (for example, BY+1 or BY+2).

(b) In some cases, funds are insufficient to support initiation in BY+1 or BY+2 because of ongoing work and/or funding availability. In those cases, top SoNs are reranked with newly submitted SoNs at a subsequent TRA review meeting as recommended by the corresponding TRA Proponent.

e. Prioritization of requirements. The CWRDAG reviews the recommended prioritization of SoNs submitted by the TRA Proponents, including those considered as cross-cutting.

(1) In arriving at a final recommendation, the CWRDAG considers ongoing CW Tactical R&D activities as well as any related activities associated with CW Strategic R&D.

(2) As the outcome of this process, the CWRDAG submits a recommendation to the CWRDSC indicating any new high-priority SoNs to support if funding is available, as well as validating the continuation of work on ongoing SoNs.

f. Development of supporting work packages. After the CWRDSC's consideration and decision on the CWRDAG recommendations, the ERDC CW RDA Team develops a draft set of work packages addressing a targeted set of SoNs to support during that particular year.

(1) The ERDC CW RDA Team is encouraged to seek the review and feedback of internal USACE stakeholders before completing the draft set of work packages.

(2) Work packages must be developed in collaboration with the corresponding Tactical R&D Product Owners (see description below) and must address the entire technology innovation life cycle.

g. Execution of funded work packages. Execution of tactical work packages is performed according to USACE ER 5-1-11 and the CW Program Execution Guidance to include programming, monitoring, and control.

h. Tactical R&D Technology transition. Implementation of CW Tactical R&D results (technologies, materials, and methods) is critical to enhance the delivery of the CW mission.

(1) The CWRDAG designates a Tactical R&D Product Owner for each CW Tactical R&D activity or group of activities leading to a new capability. In general, Tactical R&D Product Owners can be selected from CW Technical CoP Leads, CW Business Line SMEs, or any Headquarters, Division, District, center representatives, or field operating activity, although they are typically selected from the organizational elements that submitted the pertinent SoNs.

(2) Tactical R&D Product Owners assist in advancing specific capabilities into practice, interface with relevant stakeholders to promote technology transition, and monitor that the resulting products and solutions meet the intent of the original SoN.

(3) Transition of CW Tactical R&D results may leverage the support of the MSC S&T Cadre to identify opportunities to test, demonstrate, or validate the new capabilities.

i. *Tactical R&D Technology Transition Plans*. Technology Transition Plans are used to formalize the implementation of methods, models, products, and technologies.

(1) Each CW Tactical R&D activity or group of activities leading to a new capability must develop a Technology Transition Plan, as determined by the CWRDAG.

(2) The corresponding Tactical R&D Product Owner must develop the plan in collaboration with the ERDC CW RDA Team.

(3) The plan must describe the value proposition of the proposed technology or solution and outline major efforts required to implement the solution or technology into practice or make them available to the end-user community, including responsible parties for each effort. Description of the value proposition may be quantitative or qualitative, but must be presented in terms that allow USACE senior leadership to evaluate the potential value delivered compared to other CW investment alternatives.

j. *Tactical R&D process*. The overall process described in this section is graphically summarized in Figure 4–2.

Figure 2. CW Tactical R&D Process

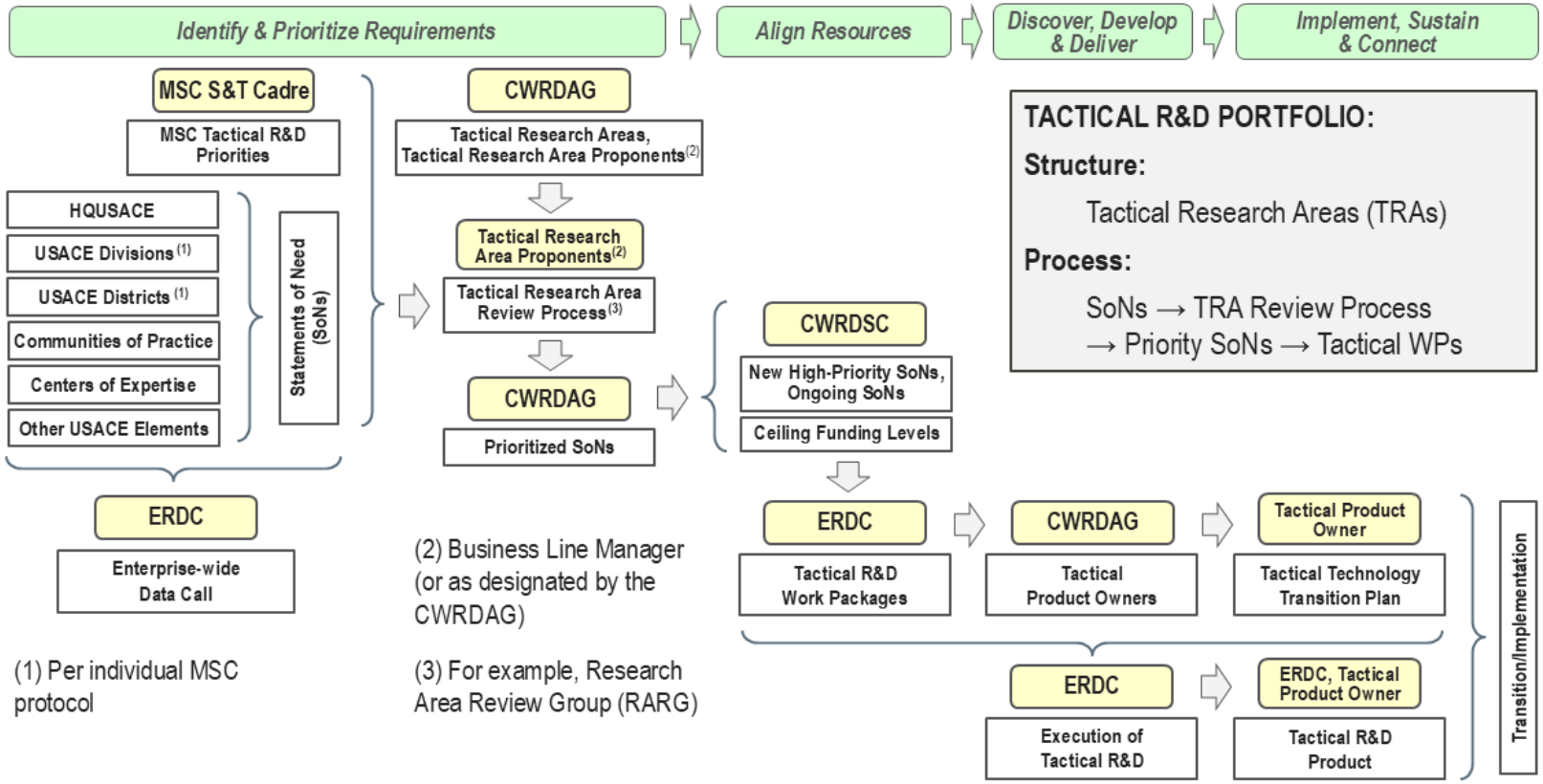

Figure 4–2. Civil Works tactical research and development process

4–4. Civil Works Research and Development Facilities

a. The CW R&D Facilities portfolio includes facilities specifically supporting the CW RD&T Program to help consolidate data, best practices, methods, and novel technologies and accelerate their transition into practice for adoption across the enterprise.

(1) As of Fiscal Year (FY) 2025, the only directly-funded facility supporting the CW RD&T Program is the USACE Field Research Facility in Duck, North Carolina, which conducts coastal data collection and unique field equipment operations as part of Coast Field Data Collection activities.

(2) This category could eventually include other types of R&D facilities and R&D equipment, based on direction from the CWRDSC and subject to future appropriations.

b. The ERDC CW RDA Team oversees this portfolio in alignment with the governance principles outlined in this ER. Specifically, decisions regarding current or future CW R&D Facilities are advised by the CWRDAG and guided by the CWRDSC to address specific CW RD&T Program needs.

4–5. Civil Works Technology

a. HQUSACE proponents oversee and guide the CW Technology programs to deliver data and technologies; support validation, demonstration, and technology transition; and communicate best practices and lessons learned for innovation in support of the CW mission.

b. The corresponding HQUSACE proponents also oversee this portfolio in alignment with the governance principles outlined in this ER.

Chapter 5
Notional Planning Cycle for the Civil Works Research, Development, and Technology Program

5–1. General considerations

a. The planning cycle for each category in the CW RD&T portfolio is aligned with the CW budget formulation process.

b. An enterprise-wide capability will be formulated across a rolling 5-year planning horizon (BY+1[3] to BY+5) consistent with the appropriate Program Development Guidance.

c. Work Packages are continuously developed and stored in the Civil Works – Integration Funding Database (CW-IFD), which is the integrated data set for supporting budget allocations and related funding decisions. CW-IFD includes data used to support the following processes: budget development, work plan development/allocation strategy, documentation and decisions on funding emergency repairs, and authoritative data on project authorization/cost to facilitate life cycle cost management, deauthorization, and portfolio management.

5–2. Civil Works Strategic Research and Development planning cycle

Planning of CW Strategic R&D activities follows the annual budget formulation process of the broader CW program.

a. New activities.

(1) Technologists review organizational requirements—categorized as CW OKRs— and the defined organizational backlog across the three primary accounts (investigations, construction, and operation and maintenance) annually in March for BY+3.

(2) Based on this review, a set of CW R&D Concepts are developed to address the capability gap at the national level. Each concept reflects an idea to address the gap and provides a qualitative estimate of and aggregate level of difficulty (cost, time, resources, complexity, etc.).

(3) CW R&D Concepts are subsequently sent to the CWRDAG for consideration and ranking of importance during the June timeframe. Highly prioritized CW R&D Concepts are recommended to the CWRDSC for BY+3 work package formulation in August.

[3] BY denotes “Budget Year” (the Fiscal Year corresponding to the budget being developed).

(4) Assignment of Strategic R&D Product Owners occurs with work package development during the September timeframe.

(5) Updating ongoing and initiating new work packages in CW-IFD occurs in December through March.

b. Ongoing activities.

(1) Ongoing funded CW Strategic R&D activities initiatives nearing the end of the discovery phase are evaluated by the CWRDAG during the June timeframe.

(2) Ongoing funded SFA initiatives during the delivery phase are also be reviewed by the CWRDAG during the June timeframe.

5–3. Civil Works Tactical Research and Development planning cycle

Planning of CW Tactical R&D activities is aligned with the annual cycle of the broader CW program.

a. CW Tactical R&D activities are initiated with the solicitation of SoNs throughout the calendar year, which are completed in Quarter 1 of each FY and thereafter prioritized through the corresponding TRA review process.

b. Top-ranked SoNs are planned and programmed per anticipated budget availability in preparation for execution for the next FY.

c. All SoNs and proposals are stored in a central repository managed by the ERDC CW RDA Team.

5–4. Civil Works Research and Development Facilities planning cycle

The CW R&D Facilities planning cycle follows the annual budget formulation process as outlined in paragraph 5–2 for the CW Strategic R&D portfolio.

5–5. Civil Works Technology planning cycle

The CW Technology planning cycle is dependent on the purpose and process associated with each Technology program as outlined in each justification sheet, and as guided by input from the HQUSACE proponent and champion for that Technology program.

Appendix A
References

Section I

Required Publications

Unless otherwise indicated, all Army and USACE publications are available at https://armypubs.army.mil and https://publications.usace.army.mil.

DA Pam 25-403
Army Guide to Recordkeeping

ER 5-1-11
USACE Business Process

Section II

Prescribed Forms

This section contains no entries.

Appendix B
Civil Works Research and Development Steering Committee Charter

B–1. Mission and purpose

The purpose of the Civil Works Research and Development Steering Committee (CWRDSC) is to provide strategic guidance and oversight of the overall CW RD&T Program and approve changes to CW RD&T policies, processes, and standards.

B–2. Membership

The CWRDSC is composed of the following 12 members:

a. Deputy Commanding General for Civil and Emergency Operations;

b. Director of Civil Works;

c. Director of Research and Development;

d. Director of Engineering and Construction;

e. Chief of Planning and Policy;

f. Chief of Operations and Regulatory;

g. Chief of Program Integration;

h. Chief of the Office of Homeland Security;

i. Director of the Institute for Water Resources;

j. One MSC Commander, selected by the DCG-CEO to serve up to 3 years;

k. One MSC Senior Executive Service (SES) member, selected by the Director of Civil Works to serve up to 3 years; and

l. ERDC CW RDA Director.

B–3. Governance

The CWRDSC is co-chaired by the Deputy Commanding General for Civil and Emergency Operations, Director of Civil Works, and Director of Research and Development. All CWRDSC decisions are subject to final approval by the Co-Chairs.

B–4. Process

CWRDSC members are encouraged to openly present and defend their position on all topics and make recommendations to the Co-Chairs. Whenever possible, the CWRDSC

will strive to reach consensus on all recommendations and deliberations through a consultative and collaborative process.

B–5. Meetings

The CWRDSC may meet as a plenary body or in any combination of members that is most conducive to the effective execution of its activities. The corresponding meetings will be held in a timely fashion to enable alignment with the annual budget.

B–6. Executive secretariat

The Directorate of Research and Development will provide the administrative support required for CWRDSC meetings and deliberations, including agenda development, communications, and meeting summaries.

B–7. Charter update

The CWRDSC charter will be reviewed, and updated if required, at least every 3 years.

Appendix C
Civil Works Research and Development Advisory Group Charter

C–1. Mission and purpose

The purpose of the Civil Works Research and Development Advisory Group (CWRDAG) is to provide recommendations to the Civil Works Research and Development Steering Committee (CWRDSC) regarding the overall CW RD&T Program, annual priorities, budget requests, and changes to CW RD&T policies, processes, and standards. Each CWRDAG member representing a specific functional area, regional, or mission perspective supports their corresponding CWRDSC representative in that specialty area.

C–2. Membership

The CWRDAG is composed of the following 10 members:

a. Deputy Director of Engineering and Construction;

b. Deputy Chief of Planning and Policy;

c. Deputy Chief of Operations and Regulatory;

d. Deputy Chief of Program Integration;

e. Deputy Chief of the Office of Homeland Security;

f. Director of the Water Resources Center, Institute for Water Resources;

g. Executive Director of Research and Development;

h. Two members of the MSC S&T Cadre corresponding to the MSCs participating in the CWRDSC; and

i. ERDC CW RDA Lead Technical Director.

C–3. Research Area Leads and Business Line Managers

CWRDAG deliberations may include the participation of TRA Proponents (such as CW BLMs and other designated representatives for cross-cutting TRAs), as determined by the CWRDAG CW Co-Chair.

C–4. Technical Directors, Senior Scientists, and Senior Scientific Technical Managers

CWRDAG deliberations may include the participation of ERDC Technical Directors, Senior Scientists, and Senior Scientific Technical Managers, as determined by the CWRDAG R&D Co-Chair.

C–5. External Subject Matter Experts

CWRDAG deliberations may include SMEs external to USACE on an ad hoc basis. These external participants may advise on current and emerging technologies, technology applications relevant to the CW mission, and technology implementation into field use. External SMEs should possess outstanding records or credentials in their respective disciplines, and they should not have any conflicts of interest related to the tasks they are assigned. These participants may attend portions of CWRDAG meetings as deemed necessary or may be consulted as part of separate engagements outside these meetings. External participants will not be involved in drafting CWRDAG recommendations and will not be asked to prepare or review advisory documents.

C–6. Governance

The CWRDAG is co-chaired by the Executive Director of R&D (serving as R&D Co-Chair) and a HQUSACE CW member of the Advisory Group designated by the Director of Civil Works (serving as CW Co-Chair).

C–7. Process

a. CWRDAG decisions are achieved through open discussions and two-third majority consensus of the members listed in paragraph C–2. A quorum for decision-making meetings is achieved with the participation of at least two-thirds of those members. Deliberations may include the participation of TRA Proponents and ERDC Technical Directors, Senior Scientists, and Senior Scientific Technical Managers. Participants are encouraged to openly present and defend their position on all topics.

b. Whenever possible, the CWRDAG will strive to reach the required consensus on all recommendations and deliberations through a consultative and collaborative process. If the CWRDAG cannot reach a two-third majority consensus on a recommendation to the CWRDSC, an issue paper will be developed outlining the issue, describing all the different positions, and providing any additional amplifying information to inform and support the CWRDSC decision-making process.

C–8. Meetings

The CWRDAG may meet as a plenary body or in any combination of members that is most conducive to the effective execution of its activities, as jointly determined by the CWRDAG Co-Chairs. The corresponding meetings must be held in a timely fashion to enable alignment with the annual budget development process and ensure the CWRDAG is able to support the CWRDSC decision-making process. Meetings will be conducted in person and/or virtually as noted in the corresponding calendar announcements. Meeting agendas and read-ahead packages must be distributed to all members 2 business days prior to each meeting.

C–9. Executive secretariat

The Directorate of Research and Development will provide the administrative support required for CWRDAG meetings and deliberations, including agenda development, communications, and meeting summaries.

C–10. Charter update

The CWRDAG charter will be reviewed, and updated if required, at least every 3 years.

Appendix D
Major Subordinate Command Science and Technology Cadre Charter

D–1. Mission and purpose

The purpose of the Major Subordinate Command Science and Technology Cadre (MSC S&T Cadre) is to serve as a forum for coordination between HQUSACE and MSCs for strategies, policies, and activities related to the effective incorporation of S&T advances to improve program and project delivery for Divisions and Districts. The goal is to avoid duplication of efforts, foster synergies and collaboration, leverage existing technology innovations efforts, and maximize the value of a coordinated approach to reduce project risks through new technologies and scientific knowledge.

D–2. Membership

The MSC S&T Cadre is composed of 10 members, including one designated representative for each MSC as well as one representative from the Directorate of Research and Development as designated by the Director of Research and Development. More than one individual can be designated to represent an organization. However, a primary representative must be identified in this case.

D–3. External Subject Matter Experts

The MSC S&T Cadre may invite SMEs (internal or external to USACE) as ad hoc participants.

D–4. Governance

The MSC S&T Cadre is chaired by a representative of the Directorate of Research and Development and designated by the Director of Research and Development.

D–5. Process

MSC S&T Cadre members are encouraged to openly present and defend their position on all topics. MSC S&T Cadre decisions must be achieved by two-third majority consensus of its members. A quorum for decision-making meetings is achieved with the participation of at least two-thirds of the members. Whenever possible, the MSC S&T Cadre will strive to reach the required consensus on all recommendations and deliberations through a transparent and collaborative process.

D–6. Participation in other governance bodies

Members representing the MSC S&T Cadre on other governance bodies, such as the CWRDAG, will periodically report back on relevant issues and elicit MSC S&T Cadre feedback to capture collective perspectives on key topics and information requests.

D–7. Meetings

The MSC S&T Cadre will meet at least on a monthly basis, although more frequent meetings may be required to support the annual technology innovation cycle. Meetings will be conducted in person and/or virtually as noted in the corresponding calendar announcements. Meeting agendas and read-ahead packages must be distributed to all members 2 business days prior to each meeting.

D–8. Executive secretariat

The MSC S&T Cadre Chair must designate an MSC S&T Cadre Secretary responsible for agenda development, communications, meeting minutes, and creating/maintaining any required knowledge management systems. The MSC S&T Cadre Secretary will maintain an updated roster. All products developed by the MSC S&T Cadre will be posted on a shared repository for easy access and reference.

D–9. Charter update

The MSC S&T Cadre charter will be reviewed, and updated if required, at least every 3 years.

Appendix E
Data Collection and Technology Sustainment Programs

E–1. Context and relevance

Some data collection and technology sustainment activities not directly supported by specifically designated R&D funds serve as important mechanisms to provide access and maintain new products, technologies, and innovations developed through the CW Strategic and Tactical R&D portfolios. A successful CW RD&T Program relies on effective coordination with these important activities in order to incorporate new technologies and innovative solutions into CW projects.

E–2. Examples

This sustaining role may include workshops, demonstrations, and expertise to implement R&D outcomes and results into CW practice. These activities may include national data collection (such as national wave buoy and hindcast wave data), site-specific demonstrations (such as the Regional Sediment Management demonstration program), monitoring innovative project designs to document and share lessons learned (such as Monitoring Completed Navigation Projects) and reporting of data and knowledge gained as required for CW mission support. Examples of these types of activities include:

a. Coastal Ocean Data Systems,

b. Dredging Operations Technical Support,

c. Monitoring Completed Navigation Projects,

d. Regional Sediment Management,

e. Water Operations Technical Support, and

f. A portion of resources within the Coastal Inlets Research Program specifically designated for Coastal Inlet Operational Technical Support.

Glossary of Terms

Acronym	Definition
BLM	Business Line Manager
BY	Base Year
CFDC	Coastal Field Data Collection
CoP	Community of Practice
CW	Civil Works
CW-IFD	Civil Works – Integration Funding Database
CWRDAG	Civil Works Research and Development Advisory Group
CWRDSC	Civil Works Research and Development Steering Committee
DA Pam	Department of the Army Pamphlet
DCG-CEO	Deputy Commanding General for Civil and Emergency Operations
DoD	Department of Defense
ER	Engineer Regulation
ERDC	U.S. Army Engineer Research and Development Center
FY	Fiscal Year
HQUSACE	Headquarters, U.S. Army Corps of Engineers
IWR	Institute for Water Resources
MSC	Major Subordinate Command
OKR	Objective and Key Result
PID	Program Integration Division
R&D	Research and Development
RD&T	Research, Development, and Technology
RDA	Research and Development Area
S&T	Science and Technology
SES	Senior Executive Service
SFA	Strategic Focus Area
SME	Subject Matter Expert
SoN	Statement of Need
TRA	Tactical Research Area
USACE	U.S. Army Corps of Engineers