



**US Army Corps  
of Engineers.**

Huntington District  
Great Lakes and Ohio River Division

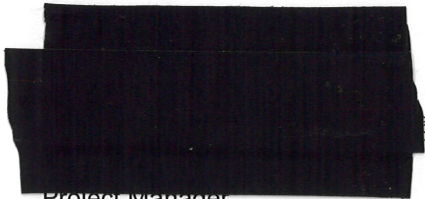
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Kanawha River, Greenbrier Street, Charleston WV

Authority: **CONTINUING AUTHORITIES PROGRAM, SECTION 14**

P2/Project Number: 451408

## Review Plan



Project Manager  
USACE, BUFFALO DISTRICT



District Engineer  
USACE, HUNTINGTON DISTRICT



Senior Regional Engineer  
Review Management Organization Representative  
USACE, Great Lakes and Ohio River Division



Regional Business Director  
USACE, Great Lakes and Ohio River Division

MSC APPROVAL DATE:

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**REVIEW PLAN  
ENGINEERING AND DESIGN PRODUCTS  
KANAWHA RIVER, GREENBRIER STREET, CAP 14  
Huntington DISTRICT**

**Current Version Date: 10 May 2024  
Mandatory Revision Date: 10 May 2027**

**1. PURPOSE AND REFERENCES**

a. Purpose. This review plan describes necessary quality reviews for engineering and design (E&D) products for the Kanawha River, Greenbrier Street, Cap 14 Project

b. References.

- (1) Engineering Regulation (ER) 415-1-11, Biddability, Constructability, Operability, Environmental and Sustainability (BCOES) Reviews
- (2) Engineering Regulation (ER) 1165-2-217, Civil Works Review Policy
- (3) Qualtrax 08504 LRD, Supplemental Quality Procedures for Civil Works (CW) Engineering and Design (E&D) Products
- (4) Project Management Plan (PMP)

2. REVIEW MANAGEMENT ORGANIZATION (RMO). The RMO for this project is the MSC (Great Lakes and Ohio River Division).

**3. PROJECT SCOPE AND PRODUCTS**

a. Project Description and Scope of Work. This project is a re-start of a prior phase of the Greenbrier project that was completed in 2021 along the Kanawha River in Charleston, WV. The “Elk Option” was not constructed during the initial phase due to lack of available funding at the time. Following the receipt of additional federal funding in 2022 and non-federal funding in 2023, this project was reopened through an amendment to the Project Partnership Agreement to review the design and complete construction of shoreline protection for the Elk Option between Haddad River Park and the Elk River in the City of Charleston, WV.

US Route (US) 60, also known as Kanawha Boulevard, is the principal secondary highway through the City of Charleston and a significant component of an integrated arterial system. US 60 is also underlain by critical public utilities including water, sewer, gas, and storm sewer lines. The area affected by streambank erosion spans approximately 9,900 linear feet (LF) and extends from Greenbrier Street to the Elk River excluding Haddad Riverfront Park. Approximately 2,000 LF of this area remains to be completed. This segment of US 60 and the underlying public utilities are in danger of failing and require immediate protection and stabilization.

Since 2014, Huntington District has monitored flood flow erosion and recessional failure site conditions resulting in the loss of hydraulic fill material and displacement of derrick stone along the lower portion of the bank. During recent flood events, Kanawha River stages have resulted in streambank erosion and saturation as recession of flood waters occurs more quickly than bank materials can drain. These conditions cause decreased shear strength and increased unit weights of bank materials. Seepage exits

the bank at openings between derrick stones, which concentrates flows and erodes the hydraulic fill. Loss of fill material has resulted in upper slope subsidence, which is encroaching on US 60 travel ways, drop inlets, and underlying utilities. Without treatment, fill material will continue to undergo flood related erosion and failure and will eventually result in US 60 and utilities being breached. Failure to protect US 60 would result in loss of access to numerous manufacturing facilities, warehouses, and the State Capitol complex. In addition, failure would impact the designated emergency detour route for Interstate 64 traffic and related access to Interstates 77 and 79 and US 119. As a result, the primary purpose of this project is to develop a viable treatment solution for the protection of US 60 and related underlying utilities serving the City of Charleston.

Project Number	451408
Business Line	Continuing Authorities Program , Section 14
Project Type	Streambank Protection
Geographic Location	Charleston, WV (38°21'09.1"N 81°38'32.6"W)
Main Project Features	Bedding and derrick stone compacted.
Estimated Construction Cost	\$2,012,000
E&D Product Delivery Method	In House Design
Construction Delivery Method	MATOC



*Figure 1 Representative slope protection work being performed during initial phase of the LRH Kanawha River, Greenbrier Street CAP 14 project. Photo location: Charleston, WV directly upstream of the current Elk Option.*

b. Products. The E&D products to be reviewed include the following:

- (1) Statement of Work
- (2) Plans
- (3) Engineering Considerations and Instructions for Field Personnel (ECIFP)

4. DOCUMENTATION OF RISKS AND ISSUES

a. Life Safety Assessment: The District Chief of Engineering has reviewed the project requirements and determined there is not a significant threat to human life if the project were to fail.

b. Technical Complexities and Risks. The project delivery team (PDT) performed a thorough risk analysis of the anticipated project design, construction, and operations activities and identified the critical technical complexities and risks listed below. Quality reviews will be planned and performed with the goal to best manage these project technical complexities and risks.

(1) Ensure correct erosion protection stone sizing - inadequate sizing, particularly at toe of slope and tie-ins, could result in additional erosion and bank instability.

5. REVIEW EXECUTION

a. Project Delivery Team (PDT): PDT members are listed in Attachment 1. PDT members will work collaboratively with review team members to ensure effective performance of the planned quality reviews.

b. District Quality Control (DQC): DQC is required for all products. Follow DQC procedures in Chapter 4 of ER 1165-2-217 and District local work instructions. The Engineering Technical Lead and DQC Lead will collaborate to oversee and ensure effective DQC performance.

c. Biddability, Constructability, Operability, Environmental, Sustainability (BCOES): BCOES reviews are required for all products. Follow BCOES review procedures in ER 415-1-11 and District local work instructions.

d. Agency Technical Review (ATR): ATR is required for all products and shall follow ATR procedures in Chapter 5 of ER 1165-2-217. ATR will address the technical complexities and risks described in sub-section 4.b. Required senior technical disciplines and expertise needed for ATR are described in Table 1. Assigned ATR team members are listed in Attachment 1. ATR members in engineering disciplines are verified as certified in the Corps of Engineers Review and Certification Access Program (CERCAP) [[Command Training Plan & CERCAP Tool \(CTP\) - PROD v2.5.2 - Home \(army.mil\)](#)]. The PDT and ATR team leaders and members will collaborate to oversee and ensure effective review execution.

Technical Discipline	Expertise Required
Geotechnical Engineer, ATR Leader	The geotechnical engineering reviewer should have senior expertise with the design and construction of bank stabilization features for civil works projects. The reviewer shall be CERCAP Certified Level 1 or 2.

e. Safety Assurance Review (SAR): As evidenced by signature approval of this review plan, the District Chief of Engineering has determined that the performance of a Safety Assurance Review (SAR) will not benefit the project.

f. Review Charge. Reviewers will refer to and perform ATR per Section 5.7 of ER 1165-2-217, Objectives, Scope and Review Criteria. Reviewers shall check to confirm the project engineering and design addresses the technical complexities and risks described in Section 4.b.

6. REVIEW SCHEDULE AND BUDGETS. The schedule and budgets for reviews are shown in Table 2. BCOES reviews will not be scheduled performed concurrently with DQC and ATR review periods.

Table 2. Review Schedule and Budgets			
Review Activities	Start Date	Finish Date	Budget (\$)
BCOES – Concept Design		12 September 2018	
DQC – Final Design - Phase 1*		11 April 2019	
ATR – Final Design – Phase 1*		03 June 2019	
BCOES – Final Design – Phase 1 *		03 June 2019	
DQC – Final Design	04 March 2025	04 April 2025	\$6,000
ATR – Final Design	05 April 2025	16 May 2025	\$4,000
BCOES – Final Design	30 June 2025	21 July 2025	\$4,000
BCOES - Backcheck	22 July 2025	28 July 2025	\$2,000

Note: This project is an extension of an original design completed and fully reviewed during 2019. The original work was constructed without major changes.

7. REVIEW DOCUMENTATION. The ATR leader will prepare and submit an ATR report per Section 5.10 of ER 1165-2-217. The ATR report with certification form will be provided to the approval signatories, including the RMO representative. Review documents will be stored with the official project records.

8. REVIEW PLAN POINTS OF CONTACT. Questions and comments relating to this review plan can be directed to the following points of contact:

a. District Project Leaders

(1) Project Manager: [Redacted] Project Manager, Buffalo District,

(2) Engineering Technical Lead [Redacted] Geotechnical Engineer, Huntington District,

b. Review Management Organization (RMO) Representative: CELRD-ECD, [Redacted]

9. APPROVED AND RECOMMENDED BY:

[Redacted Signature]  
District Chief of Engineering

**ATTACHMENT 1 – TEAM MEMBERS**

<b>PROJECT DELIVERY TEAM</b>		
<b>Function/Discipline</b>	<b>Name (Last, First)</b>	<b>Office</b>
Customer – City of Charleston	[REDACTED]	City Engineer
Project Manager		CELRB-PMP-M
Technical Lead		CELRH-EC-GW-G
Cost Engineer (required)		CELRH-EC-TC
Value Engineer (required)		CELRH-ECT-Q
Geospatial Lead (required)		CELRH-EC-TG
Real Estate (required)		CELRH-RE-P
Environmental Analysis		CELRH-PMD-R
Construction		CELRH-EC-GW-G
<b>DQC REVIEWERS</b>		
<b>Function/Discipline</b>	<b>Name (Last, First)</b>	<b>Office</b>
DQC Lead (Geotechnical)	[REDACTED]	CELRH-ECG-G
<b>BCOES REVIEWERS</b>		
<b>Function/Discipline</b>	<b>Name (Last, First)</b>	<b>Office</b>
Biddability	[REDACTED]	CELRH-CT
Constructability		CELRH-ECC
Operability		CELRH-ECG-G
Environmental		CELRH-PM-PD-R
Sustainability		CELRH-ECG-G
<b>ATR REVIEWER</b>		
<b>Function/Discipline</b>	<b>Name (Last, First)</b>	<b>Office</b>
Geotechnical Engineer / ATR Leader	[REDACTED]	CELRH-MXG**
Note **: The RMO representative made a risk-informed decision to assign an ATR Leader from within the MSC.		