REVIEW PLAN

for

ENGINEERING AND DESIGN PRODUCTS

LICK RUN, ALLEGHENY COUNTY, PENNSYLVANIA SECTION 14 PROJECT

PITTSBURGH DISTRICT

MSC Approval Date: *14 April 2017*

Last Revision Date: *None*

US Army Corps of Engineers ®

TABLE OF CONTENTS

LIST OF TABLES

LIST OF PLATES

1. PURPOSE AND REQUIREMENTS

a. Purpose. This review plan defines the scope and levels of review required for the engineering and design (E&D) products for the *Lick Run, Allegheny County, Pennsylvania Section 14 Project.*

b. References. This review plan is prepared in accordance with regional business process QMS 08504 LRD. Additional references include:

(1) Engineering Regulation 415-1-11, Biddability, Constructability, Operability, Environmental and Sustainability (BCOES)
(2) Engineering Regulation (ER) 1110-1-12, Quality Management, 30 Sep 2006.
(3) Engineering Circular (EC) 1165-2-214, Civil Works Review, 15 December 2012.
(4) Engineering and Construction Bulletin (ECB) No. 2016-9 Civil Works Review, 04 March 2016.
(5) Continuing Authorities Program Section 14, Lick Run Streambank Protection Final Detailed Project Report, Allegheny County, Pennsylvania (14 April 2016)
(6) *Project Management Plan, Lick Run, Allegheny County, Pennsylvania Section 14 Project, under development.*

c. Requirements. The design and construction activities and documents for the Lick Run, Allegheny County, Pennsylvania Section 14 Project are required to be reviewed by independent technical and subject matter experts in accordance with ER 1110-1-12 and EC 1165-2-214. As established by the evaluation in this review plan, review requirements may include district quality control/assurance (DQC), agency technical review (ATR) and independent external peer (IEPR) review with EC 1165-2-214.

2. REVIEW MANAGEMENT ORGANIZATION (RMO)

The RMO is responsible for corporate oversight of the review effort established herein. For this project the RMO is the Great Lakes and Ohio River Division (LRD). The RMO will work with the Project Deliver Team to develop the review charge and organize the necessary independent review teams. Contact information is listed in paragraph 11.

3. PROJECT SCOPE AND PRODUCTS

Project Description and Scope of Work. The streambank protection plan as recommended in the Definite Project Report (DPR, approved by LRD by memorandum dated 15 June 2016) addresses two areas, noted as upstream and downstream, consisting of a concrete block wall in the upstream (96 FT) and downstream (295 FT) sections, rip rap in the downstream section (140 FT) and grout filled bags in the downstream location (144 FT). These are shown in Plates 1 and 2 and anticipated construction details excerpted from the DPR are noted below. The implementation phase non-Federal Sponsor is the Pleasant Hills Authority (PHA), who also served as the non-Federal Sponsor during the DPR phase. Additional details on the recommended plan in the DPR are noted below.

(1) Pre-cast Concrete Block Wall: Approximately 400 feet of the existing bank will be graded to the appropriate ratio down to bedrock. A concrete leveling pad will be poured along the wall alignment to provide a stable and level foundation as well as prevent any undermining of the wall. Once this pad is established, the precast concrete blocks connected with a tongue-

and-groove system could be placed. A granular drainage layer wrapped with geotextile will be laid along the slope side of the concrete block to reduce water surcharge on the wall. The slope remaining above the wall will be re-vegetated with native grasses and shrubs.

(2) Riprap Revetment: A riprap revetment will be used to stabilize the streambank in the downstream section only. Riprap will be installed to match the existing slope up to the 100-year water surface. A geotextile fabric will be placed between the riprap and the existing ground to reduce soil loss and maintenance from vegetation growth. Due to the steep slopes and limited space available, riprap was not considered for the upstream section.

(3) Grout-filled bags (also sometimes called concrete bags) will be used to stabilize the gabion basket system in the upstream location. These will be nylon bags placed parallel to the streambank with reinforcing bars installed vertically and horizontally. Optionally, a sheet pile wall may be driven at the base of the toe to keep the structure in place Grout-filled bags will be installed below the long-term scour depth of Lick Run, up to the second row of gabions. Grout-filled bags will provide greater rigidity and structural support for the undermined gabion revetment than riprap and were considered more viable than riprap in this section.

Note. Close inspection of the project area conducted as part of the implementation phase has led to changes to the recommended design. A preliminary design replacing the gabion basket system in the upper section with a post and panel wall has been completed. A post and panel wall is preferred due to risk of an unknown top of rock elevation. This redesign will also eliminate the use of grout filled bags. A way was found to avoid an overall cost increase by using unit costs proven by past experience using an IDIQ contract in LRH. This change was explained to the sponsor and they did not have any objections (assuming cost does not increase).

b. Engineering and Design Products. The engineering and design products to be prepared and reviewed include the following:

a. Design Documentation Report (DDR)
b. Plans and Specifications (P&S)
c. Engineering Considerations and Instructions for Field Personnel (ECIFP

c. Required Quality Reviews.

(1) District Quality Control (DQC): DQC procedures will be performed for all E&D products.

(2) Agency Technical Review (ATR): The District Chief of Engineering has determined based on Tables 2 and 3 of QMS 08504 LRD that ATR is required for the E&D products.

(3) Type II Independent External Peer Review (IEPR), Safety Assurance Review (SAR): Type II IEPR will be performed if the project is determined to pose significant life safety risks. See the IEPR determination in paragraph 7.

d. Review Charge: ATR is required and a review charge will be prepared and issued to the review team. According to paragraph 7.4 d and Table 3 of QMS 08504 LRD, the independent technical reviews will focus on the following project complexities and risks:

(1) Geotechnical parameters must be confirmed, although conservative values were assumed for the DPR analysis, actual values could impact block wall dimensions and base design. Wall foundation may also need to be lowered if scour depth is below assumed design. The District will determine if the PHA engineering firm has data to help this determination.

(2) *The condition of the gabion basket system in the upper project reach has deteriorated to the point where replacement with a block wall structure should be evaluated. This system will be replaced with a post and panel wall. This new design feature eliminates the use of grout bags intended to support the gabion basket system. The lower project reach design will remain the same.*

(3) Hydraulic impacts on structures must be confirmed, especially in light of the degree of existing scour and undercutting.

(4) Site design must be confirmed, including the access ramp that could become more complex due to permit requirements.

4. PROJECT DELIVERY TEAM (PDT)

The project delivery team members are listed in Attachment 1.

5. DISTRICT QUALITY CONTROL (DQC)

a. General. DQC will be performed for all products. DQC will include quality control and quality assurance procedures required by ER 1110-1-12 and regional QMS procedures and as supplemented herein.

b. Field Investigations. The PDT will conduct a thorough examination of the project site and the collected data documenting the existing conditions (including structures and other features, topographic surveys, geotechnical data, utility information, and environmental conditions) to accurately develop the products. When the PDT must use data collected by others, designers will be allowed sufficient time to examine the data to verify its accuracy and to determine if additional data is required.

c. Coordination. The PDT will conduct periodic coordination meetings to review status, product development matters, upcoming reviews, and conformity with quality objectives. PDT members will communicate regularly to coordinate interfaces among the design disciplines and product components. The goal is to avoid significant design and construction coordination issues. PTD members will continuously share information relating to their progress and matters which affect product development.

d. Quality Reviews:

(1) PDT Reviews. All PDT members will be knowledgeable about the critical project elements of all their PDT counterparts and will understand how their own particular project elements and work relate and affect those requirements. PDT members will also be knowledgeable of the customer objectives and will understand how their work relates to and affects those objectives. The PDT will review products to insure consistency and effective coordination across disciplines and verify the correct application of methods, validity of assumptions, adequacy of data, correctness

of calculations, completeness of documentation, and compliance with guidance, standards and customer objectives. At a minimum, the PDT members will execute product reviews in conjunction with the District Quality Control (DQC) reviews. Structural review of block wall design will be accomplished with District DQC only. In addition, hydraulic impacts to retaining walls and associated reviews including models and assumptions will be addressed by the DQC review only.

(2) Plan-in-Hand Review. At the end of product development, the PDT will conduct a final plan-in-hand review to verify all quality and customer objectives have been met. This review will be done at the project site to verify the correct application of methods, validity of assumptions, completeness of documentation, and compliance with guidance, standards, and customer objectives.

(3) Quality Control (QC) Reviews. Informal technical checks and reviews will be performed during product development. These reviews will include checking basic assumptions and calculations. Formal DQC reviews will be performed at the 50% and 90% design levels. DQC reviews will be performed by qualified personnel generally from each technical discipline involved with the work. DQC team members are listed in Attachment 1.

(4) Quality Assurance (QA) Reviews.

(5) Biddability, Constructability, Operability, Environmental, and Sustainability (BCOES) Reviews. BCOES reviews will be performed in accordance with ER 415-1-11. BCOES reviews will be conducted at the concept and final design stages and after ATR is completed. A BCOES backcheck will also be performed to verify that comments have been resolved. The BCOES review team will consist of experienced personnel qualified to review each of the BCOES areas. BCOES review team members are listed in Attachment 1.

e. Certifications. Upon completion of reviews and resolution of all comments, DQC and BCOES will be certified by signature of the responsible personnel.

f. Documentation. DQC and BCOES reviews will be certified when all comments have been resolved and before ready to advertise. The project manager or technical lead will prepare and execute DQC and BCOES certification forms for signature by DQC and BCOES reviewers, respectively.

6. AGENCY TECHNICAL REVIEW (ATR)

a. General. ATR will be performed by USACE technical experts. The technical disciplines and associated ATR team members are selected based on the review charge.

b. Required Disciplines. Based on the review charge in paragraph 3.d, the technical discipline and expertise required for the ATR team are shown in Table 1.

Table 1. ATR Team Technical Disciplines and Expertise	
Technical Disciplines	Expertise Required
ATR Leader – Geotechnical Engineer	*Experience in design of precast concrete modular retaining wall systems along a stream channel. Likely wall failure modes include*

	overturning and internal bulging. General slope stability is a concern during construction excavation down to bedrock. Wall will be designed based on limited available geotechnical data; experience in determining appropriate design assumptions for given wall system.

c. ATR Team. ATR members are listed Attachment 1. All team members are from outside the home District. The ATR leader is from outside the Great Lakes and Ohio River Division.

d. Coordination. The PDT will collaborate with the ATR team to perform the review and resolve comments. The Technical Lead and the ATR Team Leader will be the main coordination points of contact. The Technical Lead will provide a package of the review documents and DQC records to the ATR team to start the review.

e. Documentation. The Projnet (DrChecks) program will be used mange ATR reviews. Comments should be limited to those that are required to ensure adequacy of the product. The four key parts of a quality review comment will normally include:

(1) The review concern – identify the product's information deficiency or incorrect application of policy, guidance, or procedures;

(2) The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not been properly followed;

(3) The significance of the concern – indicate the importance of the concern with regard to its potential impact on the plan selection, recommended plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, Federal interest, or public acceptability; and

(4) The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers must take to resolve the concern.

In some situations, especially addressing incomplete or unclear information, comments may seek clarification in order to then assess whether further specific concerns may exist.

The ATR documentation in DrChecks will include the text of each ATR concern, the PDT response, a brief summary of the pertinent points in any discussion, including any vertical team coordination (the vertical team includes the district, RMO, MSC, and HQUSACE), and the agreed upon resolution. If an ATR concern cannot be satisfactorily resolved between the ATR team and the PDT, it will be elevated to the vertical team for further resolution in accordance with the policy issue resolution process described in ER 1110-1-12. Unresolved concerns can be closed in DrChecks with a notation that the concern has been elevated to the vertical team for resolution.

At the conclusion of each ATR effort, the ATR team will prepare a review report summarizing the review. Review reports will be considered an integral part of the ATR documentation and shall:

- Identify the document(s) reviewed and the purpose of the review;
- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions;
- Identify and summarize each unresolved issue (if any); and
- Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

f. Certification. ATR will be certified when all ATR concerns are either resolved or referred to the vertical team for resolution and the ATR documentation is complete. The ATR Leader will prepare a Statement of Technical Review certifying that the issues raised by the ATR team have been resolved (or elevated to the vertical team). A Statement of Technical Review must be completed to conclude each ATR. A model Statement of Technical Review is included at Attachment 2.

7. TYPE II INDEPENDENT EXTERNAL PEER REVIEW (IEPR), SAFETY ASSURANCE REVIEW (SAR)

a. Risk Informed Decision. The Pittsburgh District Chief of Engineering has assessed the Lick Run Section 14 project and determined that a Type II IEPR Safety Assurance Review is not required. The project will not pose a significant threat to human life (public safety).

8. REVIEW SCHEDULE AND BUDGET

The schedule and budgets for reviews are shown in Table 2.

Table 2. Review Schedule and Budgets

Review	Planned Start Date	Planned Finish Date	Budget ($)
Design Report DQC			[redacted]
Design Report ATR			[redacted]
BCOES			[redacted]

9. PUBLIC INVOLVEMENT

This review plan will be posted on the District's website for public review and input. Public comments received will be reviewed and incorporated, as appropriate, to this review plan.

10. REVIEW PLAN APPROVAL AND UPDATES

This review plan will be approved by the commander of the Great Lakes & Ohio River Division. The Review Plan is a living document and may change as the work progresses. The District will keep this review plan updated. Minor changes to the review plan since the last Division Commander approval will be documented in Table 3. In the event of substantial changes to the project (e.g. changes to the project design and construction scope and the required scope and level of review), the PDT must revise this review plan and submit it to the Division headquarters for command approval. The latest version of the review plan, with Division approval memorandum, must be posted to the District's public website.

Table 3. Review Plan Changes		
Revision Date	Description of Change	Page/Paragraph No.

11. 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]

(2) Technical Lead: [redacted]

b. ATR Leader: [redacted]

c. Review Management Organization (RMO). [redacted]

12. REVIEW PLAN COORDINATION

a. Risk-Based Type II IEPR Decision: The PDT coordinated the Type II IEPR risk-based analysis with the District Chief of Engineering. The Chief of Engineering performed the assessment and issued the Type II IEPR decision by email message dated *13 January 2017*.

b. ATR Team Leader: The PDT coordinated the review plan with the ATR leader. The ATR leader concurred with this review plan by email message from [redacted] dated *17 January 2017.*

c. Review Management Organization: The PDT coordinated this review plan with the RMO representative. The RMO concurred with this review plan by email message from [redacted] dated 26 April 17.

CONTRACTOR WORK LIMITS

COCHRANE MILL ROAD

INSTALL PRECAST CONCRETE BLOCK WALL

EXISTING GABIONS TO REMAIN

STA 8+19.5

PISTA 8+43.4

STA 8+45.0 BEGIN PRECAST CONCRETE BLOCK WALL

PC STA 8+69.1

PISTA 8+79.7

PT STA 8+90.3

8+19

8+50

9+00

9+50

10+00

10+50

11+00

PRE-CAST CONCRETE BLOCK WALL

B WALL

EXISTING CHAIN LINK FENCE TO BE REMOVED & REINSTALLED

LICK RUN

FLOW

PC STA 10+80.5

2-24" CMP FOR TEMPORARY CREEK FLOW DIVERSION

STA 11+40.0 END PRECAST CONCRETE BLOCK WALL

PISTA 11+86.4

CONTRACTOR WORK LIMITS

PLACE RANDOM FILL TO RESTORE TOP OF BANK

PLACE R-5 RIPRAP AND SLUSH GROUT BETWEEN NEW CONCRETE BLOCK WALL AND EXISTING GABIONS.

TURF REINFORCEMENT MAT

TEMPORARY ACCESS RAMP

INSTALL R5 RIPRAP

CONTRACTOR WORK LIMITS

WALLACE ROAD

LAYDOWN & STORAGE AREA

AERATION TANKS

R-5 RIPRAP

12+00

12+50

PT STA 12+71.0

STA 12+80 END R-5 RIPRAP

CONTRACTOR WORK LIMITS

13+00 PC STA 13+02.9

STA 13+20.0

PISTA 13+38.2

13+50

PT STA 13+71.8

13+77 STA 13+77.4

CLARIFIER TANK

PLEASANT HILLS SEWAGE TREATMENT PLANT

PLAN

SCALE: 1" = 20'

LEGEND

- CONTRACTOR WORK LIMITS
- PRECAST CONCRETE BLOCK WALL
- R-5 RIPRAP
- TURF REINFORCEMENT MAT

NOTES:
1. FOR SITE PLAN - UPSTREAM AREA, SEE PLATE 2.
2. FOR TYPICAL SECTIONS, SEE PLATE 3.

SCALE:1"=20'

0 10' 20' 40'

N

US ARMY CORPS OF ENGINEERS PITTSBURGH DISTRICT

MARK	DESCRIPTION	DATE	APPR.
MARK	DESCRIPTION	DATE	APPR.

DATE
SOLICITATION NO.:
CONTRACT NO.:
FILE NUMBER:
PLOT DATE: 09-AUG-2010 08:19

DESIGNED BY: L. BOSETTI
DRAWN BY: LPB
CKD BY:
SUBMITTED BY:
FILE NAME: M037o_2_882_C-IPT1.dgn
SIZE: PLOT SCALE 0.1666671'

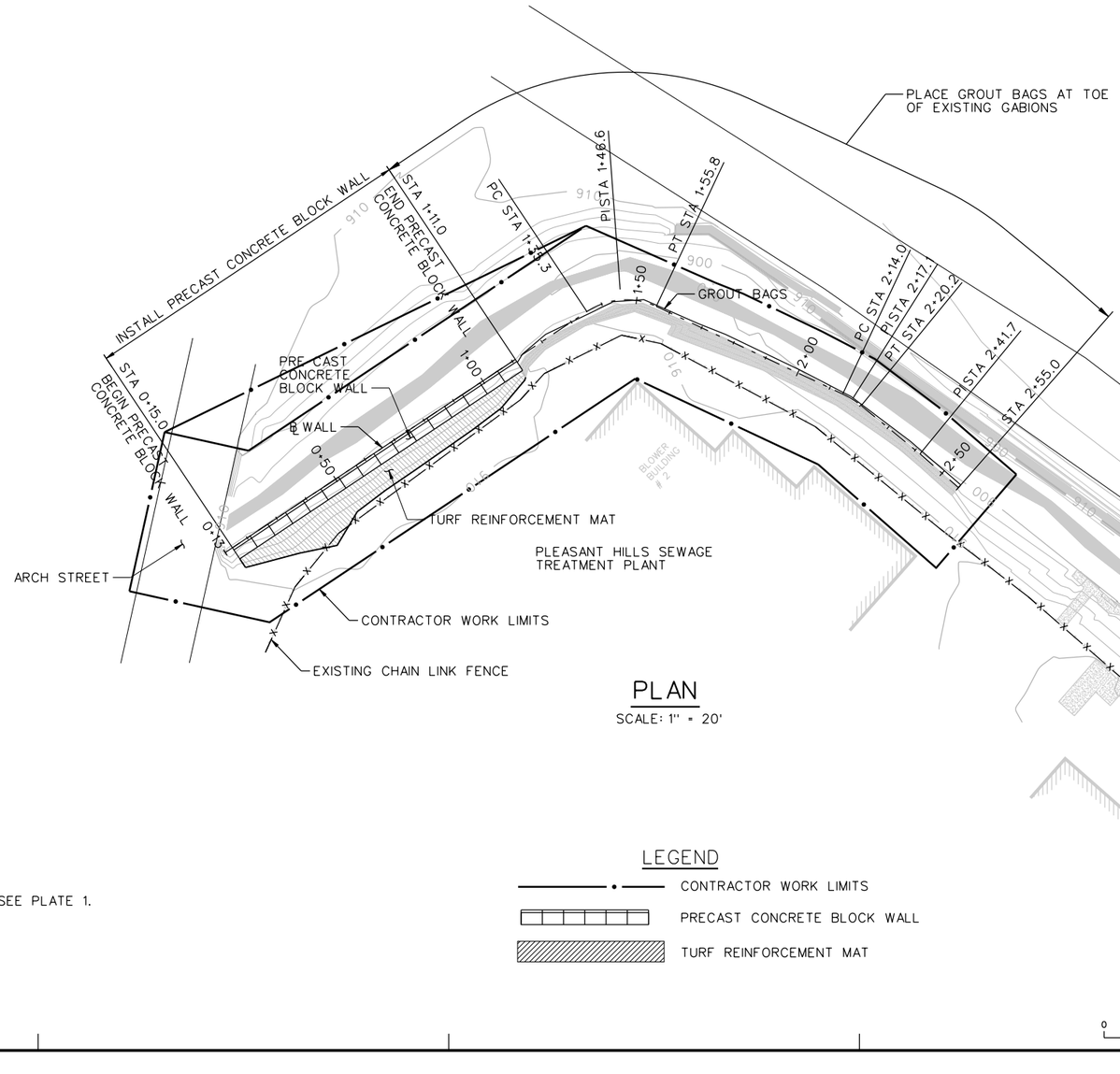
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS PITTSBURGH, PA

LICK RUN
SOUTH PARK TOWNSHIP, PENNSYLVANIA
STREAMBANK PROTECTION

FEASIBILITY STUDY
SITE PLAN
DOWNSTREAM AREA

SHEET IDENTIFICATION NUMBER
PLATE 1

leroy.p.bosetti F:\Sec14 Lick Run 2008\sheet\Feasibility Study\M037o_2_882_C-IPT1.dgn



PLAN

SCALE: 1" = 20'

NOTES:
1. FOR SITE PLAN - DOWNSTREAM AREA, SEE PLATE 1.
2. FOR TYPICAL SECTIONS, SEE PLATE 3.

LEGEND

- CONTRACTOR WORK LIMITS
- PRECAST CONCRETE BLOCK WALL
- TURF REINFORCEMENT MAT

SCALE: 1" = 20'

0 10' 20' 40'

US ARMY CORPS OF ENGINEERS
PITTSBURGH DISTRICT

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

DESIGNED BY: L. BOSETTI
DRAWN BY: LPB
CKD BY:
SUBMITTED BY:
DATE
SOLICITATION NO.:
CONTRACT NO.:
FILE NAME: M0370_2_882_C-IPT2.dgn
FILE NUMBER:
SIZE
PLOT SCALE: 0.166667:1
PLOT DATE: 09-AUG-2010 08:19

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
PITTSBURGH, PA

LICK RUN
SOUTH PARK TOWNSHIP, PENNSYLVANIA
STREAMBANK PROTECTION

FEASIBILITY STUDY
SITE PLAN
UPSTREAM AREA

SHEET IDENTIFICATION NUMBER
PLATE 2

F:\Sec14 Lick Run 2008\sheet\Feasibility Study\M0370_2_882_C-IPT2.dgn
leroy.p.bosetti

ATTACHMENT 1 – TEAM MEMBERS

PROJECT DELIVERY TEAM			
Function/Discipline	Name (Last, First)	Office	Phone
Customer			
Project Manager			
Technical Lead			
Cost Engineer (required)			
Value Engineer (required)			
Geotechnical Engineer			
Hydraulics Engineer			
Environmental			
Construction			
Real Estate			
Surveyor			
Outreach Coordinator			

DQC Team Members			
Function/Discipline	Name (Last, First)	Office	Phone
Civil Engineering			
Hydraulics Engineer			
Cost Engineering			
Environmental			
Real Estate			
Surveyor			

BCOES Team Members			
Function/Discipline	Name (Last, First)	Office	Phone
Biddability			
Constructability			
Operability			
Environmental			
Sustainability			

ATR Team Members			
Function/Discipline	Name (Last, First)	Office	Phone
ATR Leader/Geoechnical			

ATTACHMENT 2 – STATEMENT OF TECHNICAL REVIEW

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the *plans and specifications and design report* for the *Lick Run, Allegheny County, Pennsylvania Section 14 project*. The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-214. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrChecks[sm].

SIGNATURE

Name Date

[redacted]

[redacted]

SIGNATURE

[redacted] Date

Project Manager

[redacted]

SIGNATURE

Name Date

Architect Engineer Project Manager[1]

Company, location

SIGNATURE

[redacted] Date

Chief of Engineering and Construction

Review Management Office Representative

[redacted]

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows: *Describe the major technical concerns and their resolution.*

As noted above, all concerns resulting from the ATR of the project have been fully resolved.

SIGNATURE

[redacted] Date

Chief, Engineering Division

[redacted]

SIGNATURE

[redacted] Date

Chief, Planning Division

[redacted]

[1] Only needed if some portion of the ATR was contracted.