



DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, NORTHWESTERN DIVISION
PO BOX 2870
PORTLAND OR 97208-2870

REPLY TO
ATTENTION OF

CENWD-RBT

08 SEP 2015

MEMORANDUM FOR Commander, Kansas City District (CENWK-PM-CJ /Michael Chirpich)

SUBJECT: Review Plan (RP) Approval Missouri River Levee System (MRLS) L-385 Rolling Gate Closure Gap Q1 Project.

1. References:

a. Review Plan for the Missouri River Levee System (MRLS) L-385 Rolling Gate Closure Gap Q1 Project.

b. EC 1165-2-214 Civil Works Review, 15 December 2012.

2. Reference 1.a. above has been prepared in accordance with reference 1.b. above.

3. The RP has been coordinated with the Business Technical Division, Northwestern Division, U.S. Army Corps of Engineers, which is the Review Management Organization for the plan. The Review Plan includes District Quality Control and Agency Technical Review.

4. I hereby approve this RP, which is subject to change as circumstances require, consistent with the study development process and the Project Management Business Process. Subsequent revisions to this RP or its execution will require written approval from this office.

5. For further information, please contact Mr. Douglas Putman, P.E. at (503) 808-3883.

Encls

A handwritten signature in black ink that reads "Scott A. Spellmon".

SCOTT A. SPELLMON
BG, USA
Commanding



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, KANSAS CITY DISTRICT
635 FEDERAL BUILDING
601 E 12TH STREET
KANSAS CITY MO 64106-2824

CENWK-ED

27 August 2015

MEMORANDUM FOR Commander, Northwestern Division, USACE, ATTN: Mr. Douglas Putman.

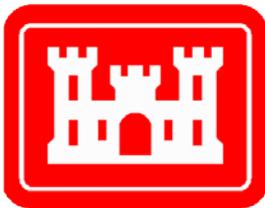
SUBJECT: Missouri River Levee System (MRLS) L-385 Rolling Gate Closure Gap Q1 Review Plan (P2#323566)

1. The review plan for the Missouri River Levee System (MRLS) L-385 Rolling Gate Closure Gap Q1 repair project is attached for Northwestern Division's review and approval. The review plan was prepared in accordance with EC_1165-2-214 and uses RMC's review plan template for ATR for implementation documents and other work products in accordance with the EC policy memo dated 15 December 2012.
2. The point of contact for this memorandum is the project manager, Michael Chirpich at (816) 389-3452.

DAVID L. MATHEWS, P.E.
Chief, Engineering Division
Kansas City District

**Review Plan
U.S. Army Corps of Engineers
Northwest Division
Kansas City District**

**Missouri River Levee System
(MRLS) L-385
Rolling Gate Closure Gap Q1**



**US Army Corps
of Engineers®**

August 2015

1. PURPOSE AND REQUIREMENTS

1.1 PURPOSE

This Review Plan is intended to ensure a quality-engineering project is developed by the U.S. Army Corps of Engineers – Kansas City District (NWK) and is developed for the L-385 Rolling Gate Closure Gap Q1. This Review Plan was prepared in accordance with Engineering Circular (EC) 1165-2-214, “Civil Works Review Policy” and provides a value added process that assures the correctness of the information shown. It is imperative that vertical teaming efforts are proactive and well coordinated to assure collaboration of the report findings, conclusions, and recommendations, and that there is consensus at all levels of the organization with the recommended path forward. This Review Plan describes the scope of review for this project and is included in the Project Management Plan (P2 #323566). All appropriate levels of review are included in this Review Plan and identifies the skill sets needed in the reviews and the objective of the review and the specific advice sought, thus setting the appropriate scale and scope of review for the individual project.

1.2 GUIDANCE AND POLICY REFERENCES

- ER 5-1-11, USACE Business Processes
- EC 1165-2-214, Civil Works Review Policy, 15 DEC 2012
- ER 1110-2-1156, Safety of Dams – Policy and Procedure, 31 MAR 2014
- ER 1110-1-12, Quality Management, 31 MAR 2011

1.3 REQUIREMENTS

This Review Plan is developed in accordance with EC 1165-2-214, which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products by providing a seamless process for review of all Civil Works projects.

1.4 REVIEW MANAGEMENT ORGANIZATION

The U.S. Army Corps of Engineers – Northwest Division (NWD) is the Review Management Organization (RMO) for this project.

2. PROJECT DESCRIPTION AND INFORMATION

MRLS L-385 is located on the left bank of the Missouri River from mile 371.4 to 376.5 in southeastern Platte County, Missouri. The project consists of the Riverside System and the Quindaro System. The project was authorized by the Flood Control Act of 1944 (P.L. 534, 78th Congress 2nd Session) as part of the comprehensive flood control plan for the Missouri River basin.

The L385 Rolling Gate Closure Gap Q1 was constructed in 2004 as part of the larger L385 Quindaro Bend flood damage reduction project. Subsequent to project completion, deficiencies were discovered. A design deficiency exists at Rolling Gate Closure Gap Q1 located at Levee Station QL 12+15 of the Quindaro System of MRLS L-385. The gap through the levee provides access for the Burlington Northern Sante Fe (BNSF) Railway lines and the InterContinental Engineering-Manufacturing Corporation (Intercon) paved access. Crossings are skewed with the levee alignment. The rolling gate closure gap structure is pile supported and the opening is 66-feet wide.

At the crossing, each set of train rails is supported by a precast block sitting on the top of the pile supported foundation of the rolling gate. At the end of the precast, the support abruptly changes from a very rigid support provided by the precast and pile foundation below to a much more flexible support provided by ties and ballast. This abrupt support change has caused a significant dynamic action and has led to failure of the concrete below the rails within the precast slots. The concrete below the rail bearing plates has pulverized and the rails have dropped.

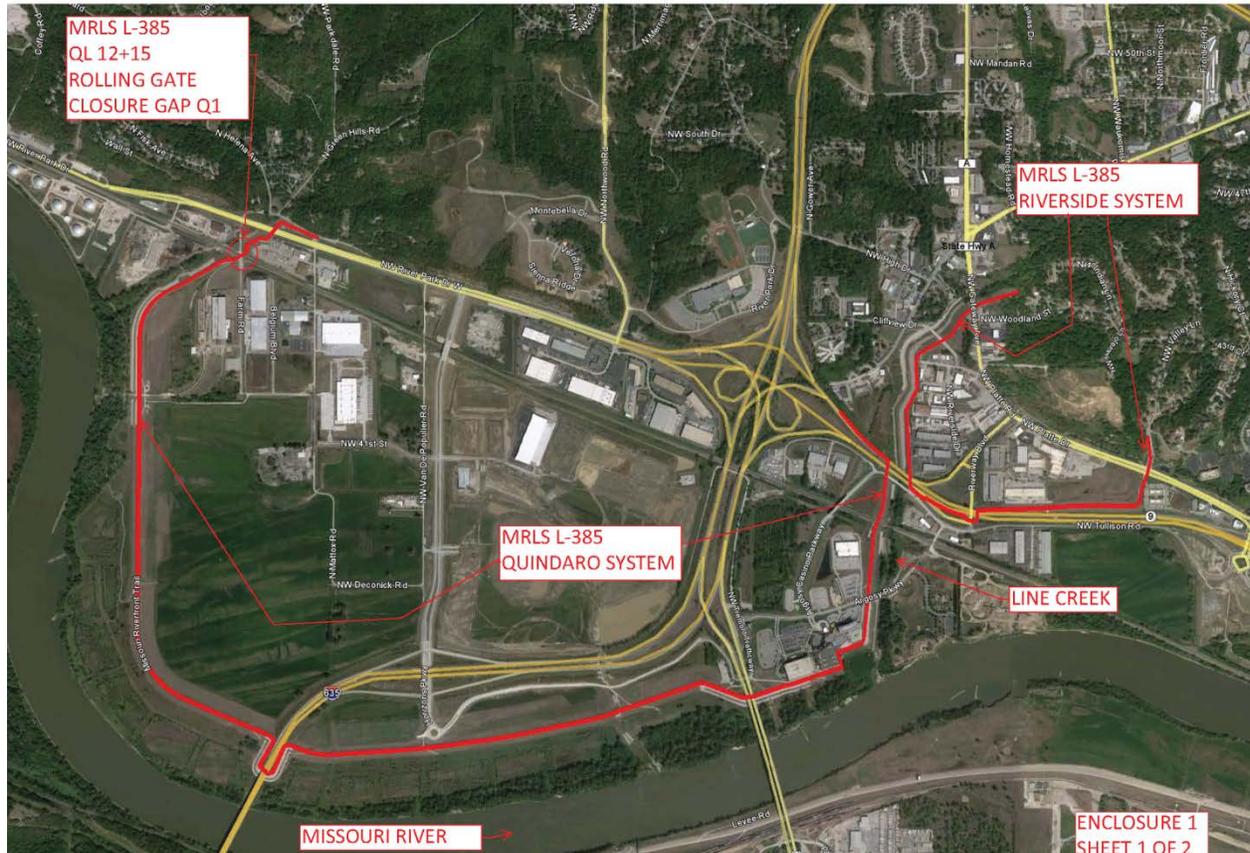
These are heavily trafficked mainline rails. The deterioration of the track support within the precast slots has created a serious clearance issue between the trains and the top of the precast which poses an increased risk of train derailment and further damage to the rolling gate structure.

The abrupt support change condition that has led to the damage being addressed is unique to this crossing due to the skew. Ideally rail crossings at closure structures are oriented perpendicular to the levee alignment minimizing the abrupt transition from rigid to flexible. In this case, the angle between the train rails and the gate sill prevents the use of ties for several feet which lead to the use of the precast block supports.

The scope of this project is to contract out to an AE firm the design of a solution that corrects the track settlement issues, and maintains the operability of the rolling gate closure. The AE firm selected will have experience in the design and construction of rail and related structures. The design will meet all current guidance, regulations, and requirements, and ensure continued operation in the future with minimal O&M costs to the sponsor and be closely coordinated with both BNSF and the Riverside Quindaro Bend Levee District (RQBLD).

This project includes the generation of construction drawings, specifications, design documentation, and possible updates to the existing Operations and Maintenance Manual and Record Drawings. All items will be reviewed in accordance with this Review Plan.

Refer to Figure 1 below for a project location map.



3. REVIEW REQUIREMENTS

3.1 DISTRICT QUALITY CONTROL

District Quality Control (DQC) consists of quality assurance reviews, in-progress reviews, and chiefs' reviews. The Quality Assurance Team (QAT) will perform quality assurance reviews of the AE design products at the various design stages of the project. The quality assurance review will consist of Quality Assurance (QA) reviews of the products provided by the AE. During the QA, every member of the PDT will review the products. Reviews will be required after all product submissions by the AE.

The contractor is responsible for the quality of all work performed. The contractor measures that quality through the contractor's own quality control (QC) program. QC is work output, not workers, and therefore includes all work performed under this contract regardless of whether the work is performed by contractor employees or by

subcontractors. The contractor's Quality Control Plan (QCP) will set forth the staffing and procedures for self-inspecting the quality, timeliness, responsiveness, customer satisfaction, and other performance requirements in the Performance Work Statement. The contractor will develop and implement a performance management system with processes to assess and report its performance to the designated government representative.

The government representative(s) will monitor performance and review performance reports furnished by the contractor to determine how the contractor is performing against communicated performance objectives. The contractor will be responsible for making required changes in processes and practices to ensure performance is managed effectively

The Quality Assurance Plan for the design phase of the project will include the following review procedures:

- Review of the AE's QCP and procedures
- Approve the AE's QCP.
- QA Team Review of the AE Design and QC process
- Review at submissions documentation of the QC process by the AE
- Biddability, Constructability, Operability, Environmental, Sustainability Compliance Review
- Technical and Legal Review Certification

The QA Team will be responsible for:

- Review the QC process conducted and supplied QC documentation by the AE
- Provide constructive documented comments on the design process as it pertains to the specific discipline.
- Review each document and deliverable prepared by the AE.
- Verify that designs, conclusions and recommendations are in accordance with accepted USACE technical guidance and methodology.
- Certify that the product has been adequately reviewed and all comments have been sufficiently addressed.
- Completing the QAT Certification form for each major product.

The Levee Safety Program Manager (LSPM) will provide a review of all submittal packages and be invited to all pertinent project meetings to ensure he is fully aware of the improvements and decision process.

Select section, branch, and division level chiefs in Engineering, Construction and Project Management will review the documentation, analysis, and decision-making

process in the documentation to verify the plans, specifications, and design documentation are correct and accurately reflect current policy and guidance in accordance with Engineering Regulation (ER) 415-1-11.

3.2 AGENCY TECHNICAL REVIEW

An Agency Technical Review (ATR) is mandatory for all implementation documents (including supporting data, analyses, environmental compliance documents, etc.). The objective of ATR is to ensure consistency with established criteria, guidance, procedures, and policy. The ATR will assess whether the analyses presented are technically correct and comply with published USACE guidance, and that the document explains the analyses and results in a reasonably clear manner for the public and decision makers.

The four key parts of a quality review comment will normally include:

- The review concern. Identify the product's information deficiency or incorrect application of policy, guidance, or procedures;
- The basis for the concern. Cite the appropriate law, policy, guidance, or procedure that has not been properly followed;
- 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
- The probable specific action needed to resolve the concern. Identify the action(s) that the reporting officers must take to resolve the concern.

At the conclusion of the 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.

3.2.1 ATR Team Expertise

The ATR team shall be chosen based on each individual's qualifications and experience with similar projects. Specifically for this project, the reviewers should be familiar with the design and operation of flood control structures notably rolling gate closures and their foundations. Therefore, this ATR team shall consist of a structural and geotechnical engineer. All members are required to have a minimum of five years of experience in design of similar projects, be a licensed engineer, and registered in CERCAP.

The draft charge question for the ATR team is do the implementation documents maintain the operability of the rolling gate closure and maintain the level of protection of the overall MRLS L-385 project.

The ATR for this project is to be conducted by the St. Paul District (MVP). The reviewers are identified and listed below. The ATR will be in compliance with EC 1165-2-214. Comments from the ATR team will be captured, resolved, and backchecked via DrChecks. After resolution of the comments, and in accordance with NWK BQP 7.3.01, an ATR Certification will occur. Certification requires that the reviewers have witnessed the resolution of their comments sufficiently and accurately addressed on the contract documents. Disputes and significant unresolved ATR concerns will be handled in accordance EC 1165-2-214. A site visit will not be scheduled for the ATR team.

The ATR reviewers from MVP include the following:

- ATR Lead/Structural Engineer – Tim Grundhoffer
- Geotechnical Engineer – Kurt Heckendorf

3.2.2 ATR Lead

The ATR team lead shall be a senior professional with extensive experience in preparing Civil Works documents and conducting ATRs. The lead shall have the necessary skills and experience to lead a virtual team through the ATR process.

The ATR lead for this review is Tim Grundhoffer. Tim is a licensed structural engineer at MVP and has extensive experience designing and reviewing projects of similar nature and magnitude. Tim has experience on the L-385 project. Tim will also serve as the structural engineering reviewer.

3.3 INDEPENDENT EXTERNAL PEER REVIEW DETERMINATION

An Independent External Peer Review (IEPR) is required for some implementation documents under certain circumstances. IEPR is the most independent level of review and is applied in cases that meet certain criteria where the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision, as described in EC 1165-2-214, is

made as to whether an IEPR is appropriate. Type I IEPR, which is conducted on project studies, is not applicable to the this project as it is in the implementation phase.

The MRLS L-385 Quindaro Levee System is currently in the review process for a Screening Level Risk Assessment. The Q1 rolling gate was rated M and is expected to perform as designed during operation. Mainline BNSF tracks cross the levee in this location. Heavy traffic and a skewed crossing has created a flexible-rigid transition across the Q1 structure. The flexible-rigid transition and heavy cyclic loading have damaged the concrete transition across Q1. Work on the Q1 Rolling gate structure will be coordinated with the BNSF railroad concerning the closure of the tracks. In discussion with the railroad they are currently only allowing a 6 hour closure period for one set of tracks. Therefore, the period in which the rolling gate rails will be out of service will be limited.

It would be anticipated that work could be completed on the entire structure within a two week period. Currently the O&M manual stipulates that at a river elevation of 750.55 (as measured at the Fairfax bridge) the closure process shall begin. It is noted that a closure time of 2 hours is anticipated with the current arrangement. During construction this closure time will be significantly greater given the rolling gate rails will be out of service. The sill of the closure is at an elevation of 754.95. With this particular location along the Missouri river the railroad tracks upstream will submerged long before the closure of the gate would be required by the operation and maintenance manual. An interim plan with the sponsor and construction contractor will be needed and in place prior to construction. This plan will identify actions that will be needed by BNSF, RQBLD, and the contractor to effectively close the rolling gate. The plan will include detailed river forecast information and actions that need to be taken at the various river levels. Construction will most likely remove the current concrete sill in place that is 22" thick and this will need to be considered in the closure plan. The rolling gate will still be utilized during an emergency to close the gap if needed. During demolition of the rolling gate sill will be the most critical period in which there is a risk to the project. Once the existing sill is removed there will be a path for water to enter the levee between the pile cap and the bottom of the rolling gate. The rolling gate does not latch or anchor to the foundation and therefore will not be affected by the demolition work, other than various sections of the gate rails being taken out of service. The performance and effectiveness of the rolling gate itself to perform as designed will not be affected once the gate is closed. The rectification work will focus on the rolling gate rails and realignment of the sill plate. The gate will still handle the fully loaded conditions once it's closed. The key feature is the realignment of the sill above the pile cap. It is anticipated that the work on the sill will be accomplished in one of the 6 hour construction windows being provided by BNSF. Therefore, the risk to the project will be minimal as the Missouri River is not fast rising and detailed forecasts for the river level are available. No work will be

allowed if there is a threat of having to close the rolling gate. Methods to close the rolling gate, filling or sealing any excavations due to the construction will be included. Review and approval of this plan will be coordinated with the district levee safety manager. Once a construction closure plan is approved and an anticipated closure time is figured, the appropriate river elevation for implementation of the plan can be calculated to provide an adequate closure time.

This project includes a correction to a flood risk project foundation deficiency at Q1. The current arrangement that was built back in 2004 is causing multiple O&M issues related to both the railroad and the rolling gate. This project will correct these deficiencies. Furthermore, the project does not include the use of innovative materials or techniques, does not present complex challenges, does not contain precedent-setting methodology, or present conclusions that differ from prevailing practices. The project does not include any unique construction sequencing or scheduling challenges. The project will include the correction of the foundation deficiency between the pile supported concrete cap and the flexible ballast that supports the rails. The new arrangement will correct the current settlement at the closure gap and lessen the maintenance issues by BNSF and the RQBLD.

The project does include low life safety risks. The probability of a failure during construction of this project is unlikely. However, if a failure were to occur, the severity would be low. Failure would occur on the track that is out of service due to construction and would not interrupt service on the other existing track. Any failure during construction will need to be reviewed for overall levee safety and operability of the closure gap in case a potential flood event is to occur. There is a low risk that construction problems occur during the construction process.

The NWK Chief of Engineering has determined that the project does not pose a significant threat to human life and therefore a Type II IEPR is not necessary for this project. The decision process is document in Attachment 2 of this Review Plan.

3.4 POLICY AND LEGAL COMPLIANCE REVIEW

All documents will be reviewed throughout the project for their compliance with current law and policy. Guidance for policy and legal compliance reviews is addressed in Appendix H, ER 1105-2-100. These reviews culminate in determinations that the recommendations in the reports and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander. DQC and ATR augment and complement the policy review processes by addressing compliance with pertinent published Army policies.

4. REVIEW SCHEDULE AND COSTS

To the extent practical, reviews should not extend the design schedule but should be embedded in the design process. Reviewers should be involved at key decision points and are encouraged to provide timely over the shoulder comments.

4.1 ATR COST

The anticipated cost for the ATR is \$8,000. The team is limited to two members, with one acting as both the lead and a reviewer, to help reduce project costs.

4.2 REVIEW SCHEDULE

Quality assurance, ATRs, and BCOES reviews will be completed at the 95% submittal and all comments will be closed out with the final 100% submittal. Over the shoulded reviews will take place by both the ATR and QA teams at the 35% and 65% levels. The current schedule for the reviews is listed below. The schedule has been setup to accommodate these constraints. The Quality Assurance Team (QAT) and ATR team have agreed to this schedule.

Task	Days	Review Start	Review Complete
95% Design			
95% Submittal	0	9/10/2015	
BCOES Reviews	12	9/10/2015	9/25/2015
QA Review	12	9/10/2015	9/25/2015
95% ATR	12	9/10/2015	9/25/2015
100% Design			
100% Submittal	0	*	*
ATR Comment Closeout	5	*	*
Final BCOES Review	7	*	*
Ready to Advertise	0	*	*

* To Be Determined upon receipt of Construction funding.

5. PUBLIC PARTICIPATION

As required by EC 1165-2-214, the approved Review Plan will be posted on the District public website ([http://www.nwk.usace.army.mil/Missions/CivilWorks/CivilWorksPrograms and Projects/CivilWorksReviewPlans.aspx](http://www.nwk.usace.army.mil/Missions/CivilWorks/CivilWorksProgramsandProjects/CivilWorksReviewPlans.aspx)). Information will be conveyed to the public through the use of press releases and media interviews, as necessary, and through the use of posting information to the Kansas City District's website. There is no formal public review planned for the plans and specifications under development .

6. REVIEW PLAN APPROVAL AND UPDATES

The MSC Commander is responsible for approving this Review Plan. The Commander's approval reflects vertical team input as to the appropriate scope and level of review for the study. Like the PMP, the Review Plan is a living document and may change as the study progresses. NWK is responsible for keeping the Review Plan up to date. Minor changes to the review plan since the last MSC Commander approval will be documented. Significant changes to the Review Plan (such as changes to the scope and/or level of review) will be re-approved by the MSC Commander following the process used for initially approving the plan. The latest version of the Review Plan, along with the Commanders' approval memorandum, will be posted on the Kansas City District's webpage and linked to the HQUSACE webpage. The latest Review Plan will also be provided to the MSC.

ATTACHMENT 1

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the construction documents for the Missouri River Levee System (MRLS) L-385 Rolling Gate Closure Gap Q1 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 DrCheckssm.

Name

ATR Team Leader

Office Symbol/Company

Date

Name

Project Manager (home district)

Office Symbol

Date

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.

Name

Chief, Engineering Division (home district)

Office Symbol

Date

Name

Dam Safety Officer² (home district)

Office Symbol

Date

ATTACHMENT 2

DOCUMENTATION OF TYPE II IEPR RISK-INFORMED DECISION

This attachment documents the vertical team's risk informed recommendation to not conduct Type II IEPR.

The following table, based on the US Army Field Manual 5-19, *Composite Risk Management*, was used to assess each identified risk.

Risk Assessment Matrix

	Risk Probability			
Risk Severity	Frequent	Likely	Seldom	Unlikely
Catastrophic	Extremely High	Extremely High	High	Medium
Critical	Extremely High	High	Medium	Low
Marginal	High	Medium	Medium	Low
Negligible	Medium	Low	Low	Low

The following table details the risks, frequency, severity, risk assessment, and how the risk contributes to the IEPR decision. The risks were developed by reviewing the IEPR triggers from EC 1165-2-214.

Based on the below assessment, it is the risk-informed decision of the vertical team that a Type II IEPR is not required for this project.

TODAY'S DATE	6-May-15	L-385 Rolling Gate Closure Gap Q1		RISK MATRIX	
UPDATED	6-May-15				
BY WHOM	MCC				
RISK IDENTIFICATION	PROBABILITY	SEVERITY	TOTAL RISK	MITIGATION/PREVENTION	
Does the project address hurricane and storm risk management and flood risk management.	SELDOM	MARGINAL	LOW	This project includes a correction to a flood risk project foundation deficiency. The current arrangement that was built back in 2004 is causing multiple O&M issues related to both the railroad and the rolling gate.	
Does the project include a Federal action justified by life safety.	UNLIKELY	NEGLIGIBLE	LOW	The life safety risks are low with the correction of the foundation deficiency.	
Does a failure in the project pose a significant threat to human life.	SELDOM	MARGINAL	LOW	The probability of a failure during this project is low. Any failure during this project will at a minimum disrupt train traffic by the BNSF RR and may cause additional concern by the sponsor for future O&M costs.	
Does the project involve the use of innovative materials or techniques where the engineering is based on novel methods, present complex challenges for interpretations, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices.	UNLIKELY	NEGLIGIBLE	LOW	This project does not contain any innovative or complex design or construction methods.	
Does the project require redundancy, resiliency, and robustness.	PROBABLE	MARGINAL	MEDIUM	The project does require the removal, replacement, and construction of both the existing railroad tracks and rolling gate closure tracks. The end product is required to withstand the constant daily train traffic and maintain the operability of the rolling gate closure without excessive O&M costs to the sponsor and BNSF.	
Does the project include unique construction sequencing or a reduced or overlapping design and construction schedule.	UNLIKELY	NEGLIGIBLE	LOW	This project does not include any unique construction sequencing or scheduling.	