

International Boundary and Water Commission

United States and Mexico

United States Section

4191 N. Mesa, El Paso, TX 79902



Design Report Requirements

USIBWC Directive SD.II.01031-M-1 Appendix E

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The purpose of this document is to present criteria and guidelines for design reports submitted to USIBWC. Whenever construction is on, next to, or can negatively affect a USIBWC structure, a Design Report that addresses the following for the design of the project is required. Each design discipline shall have a different section in the Design Report.

1. Required Reports.

- A. Please contact our Realty Office (realty@ibwc.gov) to discuss which requirements apply to your project. Do not wait until you are ready to construct you project to finally contact USIBWC. Contact us well in advance so we can discuss our requirements.
- B. Design reports may include a general design report, drainage report, geotechnical report, hydraulic report, hydrology and hydraulic report, seepage report, etc.
- C. USIBWC will use sound engineering judgment to determine which reports are required. For example, if a Proponent wishes to place a conduit 5 feet below the our levee, a seepage analysis will be required. But if the Proponent wishes to place a conduit 25 ft under the levee, it is unlikely a seepage analysis will be required because seepage caused by the conduit at that depth would be minimal. Now if the conduit will be 15 feet below the foundation of the levee, a seepage analysis may be required based on site and project conditions. Every situation is evaluated individually to ensure that USIBWC structures are protected while minimizing the work required by Proponents.
- D. See "*Appendix F-Hydraulic Modeling Methodology*" for guidance on Hydraulic Modeling Reports and hydraulic modeling.

2. General Information.

- A. Description of project
- B. Explanation of project purpose
- C. Map showing project area
- D. Coordinates of project location
- E. Project background information

3. Calculations.

- A. Manual and/or computer based calculations shall accompany narratives to support technical analyses. Each set of calculations shall start with a summary sheet, which shows all assumptions, referenced applicable codes and standards, and lists the results and conclusions.
- B. Calculations shall include engineering sketches as an aid to understanding by reviewers.
- C. The calculations for each submittal shall be cumulative, so that the final submittal contains all calculations for the project.
- D. Calculations submitted at early stages of the project must be revised appropriately to reflect the final design.
- E. Calculations shall clearly show the factors of safety achieved with the design.
- F. Calculations must refer to code, paragraph of code used, standards, and reference books used for specific portion of calculation. Refer to drawing number where the results of the calculations have been used. Example: number and sizes of rebar used in reinforced concrete members.

4. Design Loads.

- A. Final design criteria.
- B. Final loads.
- C. Loading conditions and critical cases.

5. Structural Analysis.

- A. Provide structural analysis of all structural components either within or affected by the final design elements.
- B. Embankment Protection.
 - (1) Demonstrate that no appreciable erosion of the structure can be expected.
 - (2) Demonstrate that anticipated erosion will not result in failure of the structure directly or indirectly through reduction of the seepage path and subsequent instability.
 - (3) The factors to be addressed in such analyses include, but are not limited to: expected flow velocities (especially in constricted areas), expected wind and wave action, impact of debris, slope protection techniques, duration of flooding at

various stages and velocities, embankment and foundation materials, alignment, bends, and transitions, and side slopes.

C. Foundation and Structural Stability.

- (1) Demonstrate that the structure is stable with anticipated design loading.
- (2) Slope stability analysis during dry periods, flood periods, and rapid draw down must be addressed.

D. Seepage Analysis.

- (1) The analyses provided shall evaluate expected seepage during loading conditions associated with the design flood and shall demonstrate that seepage into, through, or under the foundation or structure will not jeopardize structural or levee stability.
- (2) The factors that shall be addressed in the analyses include: depth of flooding, duration of flooding, foundation/structural geometry and length of seepage path at critical locations, foundation/structural materials, subgrade compaction, other design factors affecting seepage (such as drainage layers), and any other design factors affecting foundation/structural stability.

E. Settlement.

- (1) This analysis must address subgrade loads, compressibility of subgrade soils, age of the structure, and construction compaction methods. Identify if settlement of the structure will negatively affect the adjacent structure's stability or the levee's ability to protect from floods.
- (2) Detailed settlement analysis using procedures such as those described in U.S. Army Corps of Engineer's EM 1100-2-1904 must be submitted.

F. Geotechnical Test Results. Provide copies of all geotechnical testing performed.

G. Geotechnical Bore Logs.

- (1) Maps must be provided showing the location of all boreholes and sampling.
- (2) Provide copies of all bore logs.

H. Interior Drainage. When the possibility exists for water to exist on the landside of the levee, analysis must be provided ensuring that embankment protection as well as embankment and foundation stability are not affected with 1 foot of water standing or flowing. If there is an adjoining canal or similar drainage feature, the structural analysis shall take into account the different flow conditions in the canal or drainage feature in the analysis.

6. Assumptions. The Design Report shall clearly detail all assumptions made by the designers.

7. Certification.

- A. The Design Reports shall contain a certification stating that the project will not negatively affect any USIBWC structure.

- B. If project encompasses, impacts, or in any way affects a USIBWC levee or other flood control structure, the Design Report shall contain a certification stating that these portions of the project work meet 44 CFR §65.10(b).
8. **Final 100% Document.** The final Design Report shall be signed and stamped by a professional engineer licensed to practice in the state where the work will be performed.
9. **USIBWC Resources and Information.** Requirements for work, forms, and standard drawings are available on USIBWC's website at www.ibwc.gov/resources-info/.
- A. The following documents are available for download on that site:
- (1) Appendix A - Design and Construction Requirements for All Projects
 - (2) Appendix B - Land Boundary Project Requirements
 - (3) Appendix C - Requirements for Projects on or Affecting a USIBWC Flood Control Structure
 - (4) Appendix D - Minimum Levee Testing Requirements
 - (5) Appendix E - Design Report Requirements
 - (6) Appendix F - Hydraulic Modeling Methodology
 - (7) Appendix G - Reseeding USIBWC Property
 - (8) Appendix H - Floodplain Requirements
- B. Please contact our Realty Office (realty@ibwc.gov) to discuss which requirements apply to your project. Do not wait until you are ready to construct your project. Contact them well in advance so they can discuss our requirements.

Approved:

**RAMON
MACIAS**

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January 30, 2024

Ramon Macias, III, P.E. Engineering
for
Dr. Maria-Elena Giner, P.E.
Commissioner

Date