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Zero-Rise Certification

HEC-RAS Analysis Report

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Project Narrative

The following is a Zero-Rise analysis for the improvements on the floodway shown on the permit plans. Refer to table-1 for a list of the structures in the floodway. The parcel map is included for landowner identification purposes in (***Appendix 1***).

See Table-1 on Certification page for a list of structures in floodway

It is the intent of the owner to place structures in the floodway. The interpolated river section chosen to run the model includes all structures per Table-1 and see site plan C-100 for details.

The proposed project is in the floodway Per Water Management District Effective Flood Information Report (***Appendix 2***), therefore this Zero-Rise report shall prove that the proposed structures will not obstruct flows or increase the one percent annual chance of flood elevations by more than 0.01 feet.

The following steps and methodologies were used as specified in the Suwannee River Water Management District's *Environmental Resource Permit Applicant's Handbook Volume II.*

1. Obtain the current effective District model.

The latest update of the Suwannee River Effective Flood Information, along with GIS data for two cross-sections encompassing the project area were obtained from the website and shown in (***Appendix 2).***

2. Run the current effective model.

The model was run with SRWMD existing cross sections and the results show a match of the current effective model.

3. Add the pre-development cross-sections of channel and overbank geometry.

A new interpolated cross-section was cut at the proposed site location, (***Appendix 3***) and the model was run for pre-development cross-sections. The results show a match of the current effective model (***Appendix 4***).

4. Run the model with the existing, permitted, and proposed floodway encroachments.

The interpolated section was modified to account for the proposed structures. The simulation output shows that the water surface profile is not more than 0.01 feet greater than the pre-development water surface profile. A report of the HEC-RAS output is shown in (***Appendix 4)***.

5. Additional Information: HECRAS Model-Obstruction Design Methods and Techniques

Part One: Design Methods

Adam Collins Engineering, Inc. uses one of two known methods to account for blocked obstructions in HECRAS:

1. Incorporate the structure representing the blocked obstruction into the station elevations corresponding to the structure's station location within the HECRAS cross section existing condition model.

    a. At the existing condition model bank station (this station should represent the existing grade and its elevation at this location within the cross section) where the proposed structure will be located, add a new station (station is referring to the numerical value representing the x-axis of the cross section) directly adjacent in the proper direction that is .01 units different.

    ex. If the proposed project exists on the left side of the river channel in the HECRAS model cross section and you locate the first station of your structure (beginning with the landward side of the structure), you would add .01 to the new adjacent station and. Then locate the waterward side of the structure and corresponding existing grade station and elevation and add.01 units to the station

    b. For each new station added to the cross section, an elevation representing the y-axis of the cross section must be input as well. For the elevation, input the structure's highest point of elevation or the 100 year flood elevation for the cross section, whichever of the two is greater.

2. Use HECRAS's Blocked Obstruction feature in the Cross Section Editor and follow instructions given in the input dialog box to model the structure as a blocked obstruction within the cross section.

Part Two: Design Techniques

Dependent upon the specific project, site, and structure conditions, several techniques to model the obstructions created by structures may be used. These techniques are most often used to simplify the model in a conservative manner. The techniques written in this section do not represent all possible techniques used within the industry, nor do they suggest any technique is more accurate or a better representation of an obstruction than the others

1. Combining Structures-Combining two or more structures to create a single cumulative structure in the HECRAS model. This could be for reasons such as the structures overlap each other in their relation to location within a one-dimensional cross section, or they

are so close to each other that it does not make a difference in terms of the models calculated output whether the structures are modelled as two closely located structures or one cumulative structure.

This is also the case in scenarios where stairs and other egress features attached to residential structures (i.e., boardwalks, decks, etc.) that are in the direction that extend further out across the cross section, rather than into the cross section and accounted for within the obstruction shadow created by the residential structural, etc.

2. Equivalent Shape Modification- Some project sites may have structures that create an obstruction with a shape that is either not possible, or rather, not easy to design in the model. In these scenarios, modifying the structure's shape to better represent a more equivalent structure within the model may be used.

   Ex. A deck at top of bank has stairs that lead down to the edge of water. From a cross sectional view, this would create an obstruction with a triangular shape. However, the HECRAS Blocked Obstruction feature does not allow the user to input single obstructions with different elevations on it's two sides, only a single elevation can be input for a single obstruction. In this scenario, a more rectangular obstruction will be used to represent the stairs that is more or equal to the actual cross sectional obstruction area created by the stairs. In most cases, the obstruction area used in the model will be greater than the actual obstruction created by the structure.

Note: See (Interpolated*) Proposed River Mile Cross Section graph illustrated in report and corresponding legend to identify method(s) and technique(s) used in HECRAS model

Appendix 1

PROPERTY INFORMATION

Appendix 2

EFFECTIVE FLOOD INFORMATION REPORT

Appendix 3

RIVER MILE DIAGRAM

Appendix 4

HEC-RAS MODEL TABLE RESULTS

Appendix 5

HEC-RAS MODEL CROSS SECTION: ILLUSTRATED

Appendix 6

HEC-RAS MODEL CROSS SECTION DATA: EXISTING

Appendix 7

HEC-RAS MODEL CROSS SECTION DATA: PROPOSED