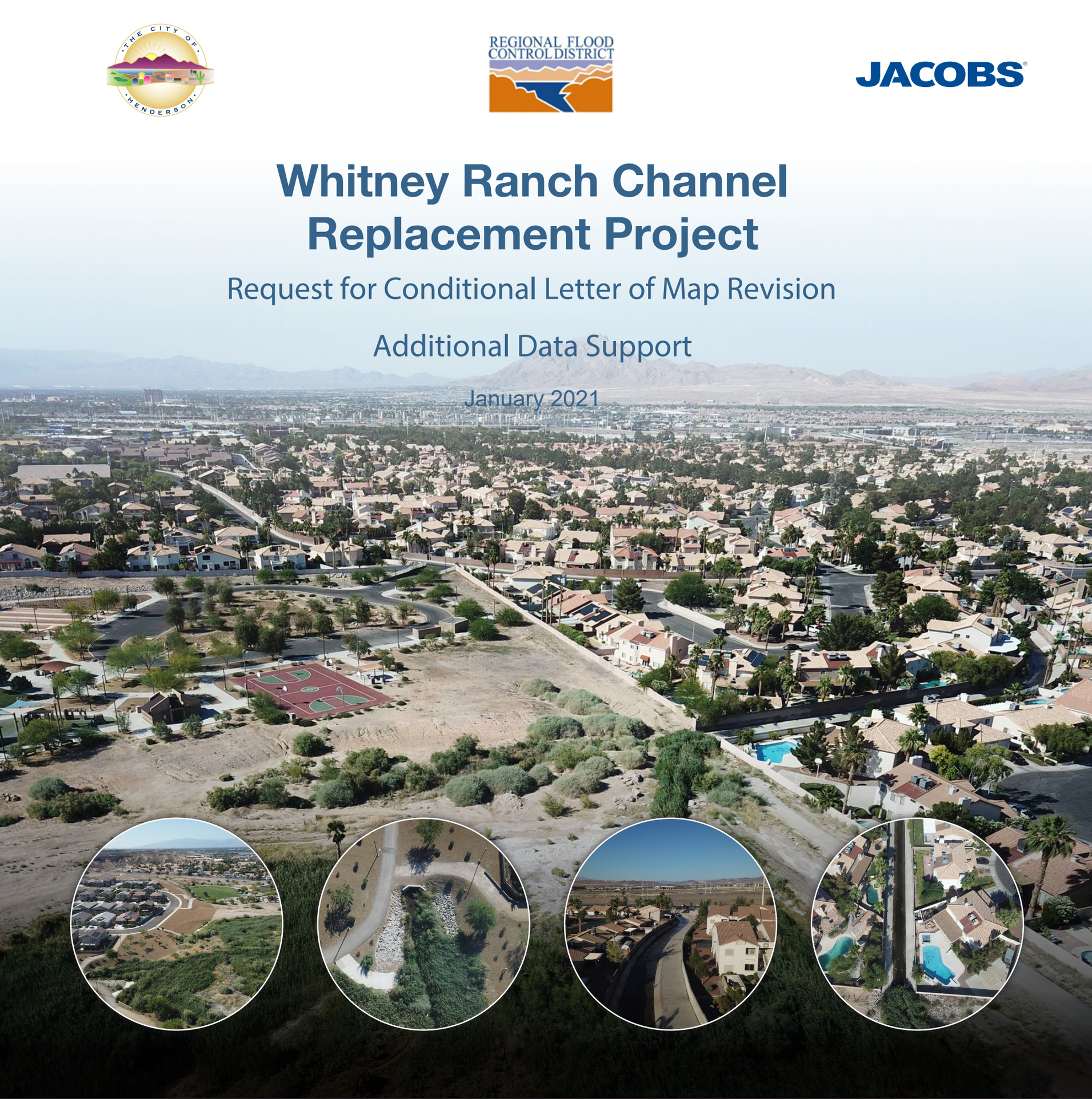
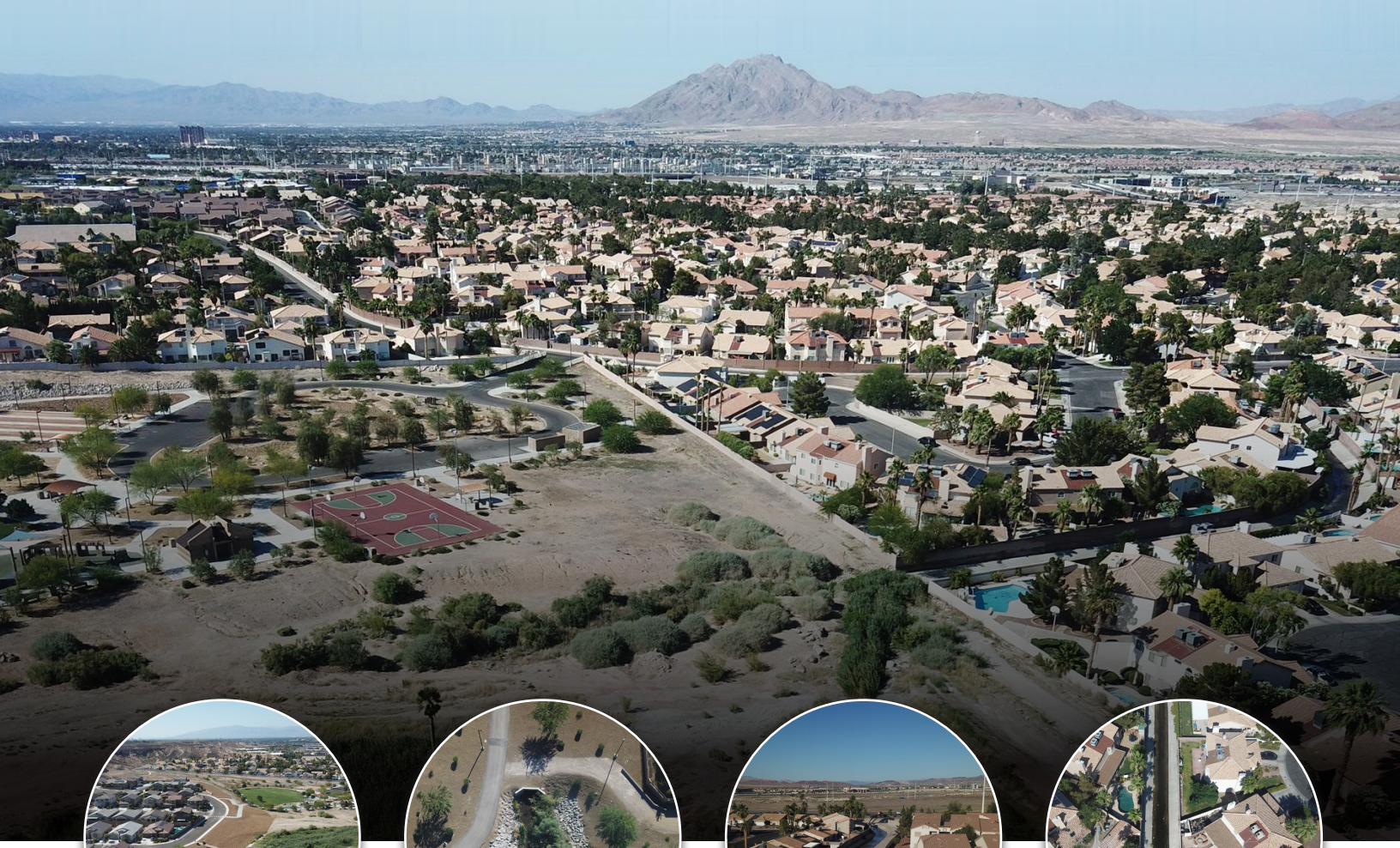
Whitney Ranch Channel Replacement Project

Request for Conditional Letter of Map Revision

Additional Data Support

January 2021





Whitney Ranch Channel Replacement Project

FEMA

Request for Conditional Letter of Map Revision

Additional Data Support

January 2021

PROFESSIONAL ENGINEER - STATE OF NEVADA
JAMES A. MONROE JR
EXP. 12/31/21
CIVIL
No. 17106

1/29/2021

JACOBS®

THE CITY OF HENDERSON

REGIONAL FLOOD CONTROL DISTRICT

January 29, 2021

Ms. J. Marie Benavides, STARR II
LOMC Clearinghouse
3601 Eisenhower Avenue, Suite 500
Alexandria, VA 22304-6426

Subject: **CLOMR Request for the Whitney Ranch Channel Case No.: 20-09-1507R**

Attention: Ms. J. Marie Benavides, STARR II

We are in receipt of your letter dated August 13, 2020, to Jacobs Engineering Group containing your comments on the subject request for Conditional Letter of Map Revision. Your comments are addressed individually as follows:

Comment: **"1.** The submitted application did not include a duplicate effective hydraulic model. The effective model used to produce the Flood Insurance Rate Map (FIRM) must be obtained, reproduced on your equipment, and submitted as the duplicate effective model. As stated in the instructions for Application/Certification Form 2, Section B, Hydraulics, if the effective model is not available, a model must be developed that matches within 0.5 foot the base (1 percent annual-chance) flood profile published in the Flood Insurance Study (FIS) report. This model should then be submitted as the duplicate effective model. Please submit duplicate effective hydraulic models for Arroyo Grande, Pittman Channel Wash and Whitney Ranch Channel. Please provide digital copies of the input and output files for this model."

Response: A duplicate effective HEC-RAS model for the Pittman Wash Channel within the limits of the proposed channel improvements has been included in Appendix D-5. Additionally, the HEC-RAS duplicate effective model (406PWCH_DE.PRJ) has been included on the attached CD.

The Pittman Wash Channel duplicate effective model uses an upstream boundary known water surface elevation of 1701.42', as referenced from the Pittman Wash Channel FIS HEC-2 Section 47+16, which is located approximately 1,032 feet upstream of the proposed confluence with the Whitney Ranch Channel. The downstream boundary known water surface elevation of 1688.01' is referenced from Pittman Wash Channel FIS HEC-2 Section 29+63, which is located approximately 238.4'

downstream of the proposed confluence transition to the existing Pittman Wash Channel and approximately 380' upstream of the Stephanie Street Bridge.

See the below comparison of the duplicate effective HEC-RAS calculated water surface elevations with the effective FIS HEC-2 calculated water surface elevations. Note that the FIS HEC-2 Model water surface elevation shown in the table was adjusted by 2.64' to account for datum differences.

PITTMAN WASH CHANNEL
DUPLICATE EFFECTIVE HEC-RAS MODEL VS FIS HEC-2 MODEL COMPARISON TABLE

Cross Section	Q Total (cfs)	Min Ch El (ft)	Duplicate Effective HEC-RAS Model			FIS HEC-2 Model		
			W.S. Elev (ft)	Vel Chnl (ft/s)	Top Width (ft)	W.S. Elev (ft)	Vel Chnl (ft/s)	Top Width (ft)
47+16	7,708	1695.71	1701.42	28.86	59.72	1701.42	28.86	59.72
38+96	7,708	1689.16	1694.79	27.98	60.45	1694.79	27.98	60.45
37+68	7,708	1688.00	1693.91	27.70	60.12	1693.90	27.71	60.11
36+46	7,708	1687.26	1693.21	27.25	61.38	1693.05	27.54	112.12
29+63	7,708	1681.99	1687.99	27.15	60.75	1688.01	27.02	60.84

Please also see the attached updated Request of CLOMR Letter Table of Contents and the updated Pittman Wash Channel MT-2 Form 2 in Appendix A.

An email from Jacobs Engineering Group was sent to STARR II on September 9, 2020, as a response to Comment #1 stating "a duplicate effective model for the Whitney Channel or Arroyo Grande Wash Storm Drain should not be required to address Comment #1. The Arroyo Grande portions of the channel system are closed with little to no overlap between the available existing models and proposed models. Therefore, there is very little benefit in preparing duplicate effective models for the Whitney Ranch Channel or the Arroyo Grande Wash Storm Drain."

In response to the September 9, 2020 email from Jacobs Engineering Group, STARR II further clarified in an email sent to Jacobs Engineering Group on November 17, 2020, that an existing condition model for the Whitney Ranch Channel is required so that the "effects of the proposed project may be determined." As requested by STARR II, Jacobs Engineering Group has prepared an existing condition HEC-RAS model for the Whitney Ranch Channel for comparison purposes. As mentioned in the December 10, 2020 email sent to STARR II from Jacobs Engineering Group, the "existing condition model has been prepared for the Whitney Channel between Section 110 from LOMR 14-09-2535P and confluence at Pittman Wash FIS Section 3768".

The model output using mixed flow regime and FEMA Effective flow rate of 1,363 cfs has been attached to this letter to be included in *Appendix D-6* of the CLOMR Request for the project. The HEC-RAS model digital files are included on the attached data CD.

The existing condition HEC-RAS model consists of 27 cross sections at key locations along the approximately 3,340 foot-long channel alignment. Refer to the attached Figure 7 – Existing Condition HEC-RAS Model. The cross sections were cut using 1-foot contour interval aerial topography provided by AeroTech Mapping (flight date: April 17, 2019). These locations of the cross sections include the following:

- Begin and end of channel transitions.
- Point of Curve (P.C.) and Point of Tangent (P.T.) locations.
- Upstream and downstream face of bridge/culvert crossings.

The existing condition HEC-RAS model assumes the entire FEMA effective flow rate is conveyed within the HEC-RAS sections and does not include an analysis of break out flow either north or south of the channel. Cross sections include the width of the easement and extend across the easement from face of adjacent property wall to face of adjacent property wall.

Manning's n values used for the channel are referenced from Tables 702 and 801 of the *Clark County Regional Flood Control District Hydrologic Criteria and Drainage Design Manual* (HCDDM). A copy of Tables 702 and 801 from the HCDDM have been included in the attached Appendix D-6. The entire width of the channel including the overbank areas are concrete-lined. A Manning's n value of 0.013 was utilized for the overbank areas and main channel. A Manning's n value of 0.024 was utilized for the existing 14'X8.75' corrugated metal arch pipe crossings at Galleria Drive and Whitney Ranch Drive.

Expansion and contraction coefficients for gradual transitions between cross sections and bridges have been utilized in the model according to the *HEC-RAS River Analysis System Hydraulic Reference Manual.* An excerpt from the HEC-RAS Manual has been attached that shows coefficients for gradual transition under supercritical flow conditions, and coefficients for subcritical flow conditions at gradual transitions and typical bridge sections.

The upstream boundary condition water surface elevation of 1726.99' was referenced from the approved HEC-RAS Whitney Mesa Estates CLOMR model at FIS Section 110. The downstream boundary condition was referenced from the approved Pittman Wash Channel HEC-2 model at the confluence located at FIS Section 37+68. The downstream boundary water surface elevation was adjusted by 2.64' to account for datum differences.

As expected, due to inadequate capacity of the existing channel at the Galleria Drive and Whitney Ranch Drive culvert crossings, the model results show flow within the

overbank areas and flow depths above the channel walls upstream of the Galleria Drive and Whitney Ranch Drive.

Comment: **"2.** Please submit detailed, draft maintenance plans for the proposed channelization along Whitney Ranch Channel, per Section 65.6.a.12, which refers to 60.3.b.7 of the National Flood Insurance Program regulations. Please ensure that these draft plans are certified and signed by a registered professional engineer."

Response: Please see the Clark County Regional Flood Control District (CCRFCD) Operations and Maintenance Manual included on the attached CD that covers the proposed (CCRFCD) Master Planned Facilities including the Whitney Ranch Channel and Pittman Wash Channel.

Comment: **"3.** It appears that the tie-in cross section 5222.11 between Pittman Channel – Phase 1 – Plan and Profile" is not included in the proposed WSPG model. Please verify that the cross section numbering is correct, or provide an updated model."

Response: Cross Section 5222.11 is the approximate location (based on station correlation) of the existing tie-in between the Pittman Wash Channel and Whitney Ranch Channel. Please note that Cross Section 5222.11 was used to correlate the projected WSPGW alignment and the FIS HEC-2 alignment and should only be used as a reference point. The existing tie-in corresponds to Cross Section 37+68 in the HEC-RAS duplicate effective model and FIS HEC-2 effective model included in Appendix D-5 and C-5, respectively. The tie-in between the Pittman Wash Channel and Whitney Ranch Channel will now be located approximately 50 feet downstream of Cross Section 5222.11 at Cross Section 52+71.60 with the proposed confluence configuration.

Comment: **"4.** Our review revealed that the water surface elevations (WSELs) of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) may increase more than 1.0 foot as a result of the proposed project. Please provide evidence that the project will meet all requirements of Section 65.12 of the National Flood Insurance Program regulations, including:

a. Documentation that individual legal notices have been sent to all property owners affected by the proposed increases in base flood WSELs.

b. Certification that no structures are located in the areas that would be impacted by the increases in base flood WSELs; and
c. An evaluation of alternatives that would not result in an increase in BFE of more than 1.0 foot."

Response: See below responses to Comments 4 a thru c:

a. Although there are no established BFEs within the limits of the project, the analysis performed for this project showed that there will be an increase of more than a 1.0 foot in water surface elevation within portions of the Pittman Wash Channel due to narrowing of the channel and transitions required to accommodate the width of the proposed confluence structure. Please refer to the letter from Albert J. Jankowiak, P.E., CFM, City of Henderson Land Development/Stormwater Manager, dated November 11, 2020, acknowledging the WSEL rise and stating that no structures will be affected.
b. Please refer to the letter from Albert J. Jankowiak, P.E., CFM, City of Henderson Land Development/Stormwater Manager, dated November 11, 2020, acknowledging the WSEL rise and stating that no structures will be affected.
c. Note that all flows will be contained within the proposed Pittman Wash concrete lined channel walls. The proposed confluence configuration has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements, which includes an angle of junction intersection less than 12-degrees and Froude number greater than 1.13. Note that the existing confluence configuration features an angle of junction intersection of approximately 45-degrees, and therefore does not meet the USACE requirements. Due to safety concerns and to maintain hydraulic conveyance through the confluence, it is proposed to widen the Pittman Channel to accommodate a confluence configuration with 0-degrees angle of junction intersection. The proposed confluence configuration takes advantage of the available existing right-of-way width and the configuration of the confluence has been optimized in order to minimize the length and depth of the proposed increase in water surface elevation caused by the narrowing of the main channel to accommodate the confluence and the proposed transition back to the existing trapezoidal section of the downstream Pittman Wash Channel.

Comment: **"5.** Please provide a statement from a registered professional engineer that individual legal notices were mailed to all property owners affected by any widening and/or shifting in the Special Flood Hazard Area, the area that would

be inundated by the flood having a 1-percent of being equaled or exceeded in any given year (base flood) and/or increase in base flood elevations. Please copy the community on this correspondence. **You may submit a draft copy of the notification for verification of content, prior to distribution.**"

Response: Please refer to the letter from Albert J. Jankowiak, P.E., CFM, City of Henderson Land Development/Stormwater Manager, dated November 11, 2020, acknowledging the WSEL rise and stating that no structures will be affected.

Additionally, property owners adjacent to the channel improvements impacted by the Zone A reduction (1% annual chance flood discharge now contained in proposed improved channel) will be legally notified with an official letter from the City of Henderson. A copy of the draft notification letters and exhibit are attached to this letter.

A draft letter of this letter was sent was sent from Jacobs Engineering Group to STAR II for review in an email on November 10, 2020. STARR II provided comments in an email on November 16, 2020. The draft letter has been revised in order to address STARR II comments. A copy of the email correspondence has been attached to this letter.

The draft letter sample letter has been revised to include the approximate project limits with the understanding the "effects of revision" can be found in the CLOMR request letter which is available to the public. As stated in the draft letter, "Plans and studies for the proposed project area are available for review at City Hall located at 240 Water Street, Henderson, NV 89014."

Additionally, note that the Project does not contain established BFEs. The following statements have been added to the draft letter for clarification, "The SFHA will increase along the Pittman Wash and decrease along the Whitney Wash. The SFHA increase along the Pittman Wash will be fully contained within the proposed channel wall height."

Additional Information

The attached memorandum entitled, *Whitney Ranch Channel Replacement Endangered Species Act Compliance Documentation* from Newfields dated October 7,2020 satisfies FEMA's request for U.S. Army Corps of Engineers verification of the permitting process requested by STAR II in an email sent to Jacobs Engineering Group on August 31, 2020. The October 7, 2020 memorandum has been included on the attached CD containing the updated Appendix E-3.

Jacobs Engineering Group trusts that this submittal will provide the required information to support a CLOMR for the subject project.

If you have any questions or require additional information, please do not hesitate to call us at (702) 369-6175.

Respectfully,
Jacobs Engineering Group, Inc.

James Monroe, P.E., LEED AP, Jacobs
Design Manager

Encl.
Cc: Steven Parish, P.E., CCRFCD
Debra Yamachika, P.E., LEED AP, CCRFCD
Abigail Mayrena, P.E., CCRFCD
Todd Myers, P.E., CCRFCD
Albert Jankowiak, P.E., COH
Scott Fiedler, P.E., COH
James Monroe, P.E., LEED AP, Jacobs
Jeffrey N. Griest, PE, CFM

ATTACHMENTS

UPDATED CLOMR LETTER TABLE OF CONTENTS (ADDRESSES COMMENT #1)

UPDATED APPENDIX A FEMA FORMS (ADDRESSES COMMENT #1)

- **A-1 MT-2 FORM 1 – OVERVIEW AND CONCURRENCE FORM**
  - A-1.1 MT-2 FORM 1 ATTACHMENT – ESA COMPLIANCE
- **A-2 MT-2 FORM 2 – RIVERINE HYDROLOGY & HYDRAULICS FORMS**
  - A-2.1 MT-2 FORM 2 – WHITNEY WASH
  - A-2.2 MT-2 FORM 2 – ARROYO GRANDE WASH
  - A-2.3 MT-2 FORM 2 – PITTMAN WASH (REVISED)
- **A-3 MT-2 FORM 3 – RIVERINE STRUCTURES FORMS & ATTACHMENTS**
  - A-3.1 MT-2 FORM 3 – WHITNEY RANCH CHANNEL
  - A-3.2 MT-2 FORM 3 – WHITNEY RANCH CHANNEL ATTACHMENT
  - A-3.3 MT-2 FORM 3 – ARROYO GRANDE STORM DRAIN EXTENSION
  - A-3.4 MT-2 FORM 3 – ARROYO GRANDE STORM DRAIN EXTENSION ATTACHMENT
  - A-3.5 MT-2 FORM 3 – PITTMAN WASH CHANNEL
  - A-3.6 MT-2 FORM 3 – PITTMAN WASH CHANNEL ATTACHMENT
- **A-4 MT-2 FORM 7 – PAYMENT INFORMATION FORM**

UPDATED APPENDIX B FIGURES & HYDRAULIC WORK MAPS (ADDRESSES COMMENT #1)

- **B-7 FIGURE 7 – EXISTING CONDITION HEC-RAS MODEL**

UPDATED APPENDIX D HYDRAULIC MODELS (ADDRESSES COMMENT #1)

- **D-1 WHITNEY RANCH CHANNEL WSPGW CALCULATIONS (WR_CLOMR.WSW)**
- **D-2 ARROYO GRANDE STORM DRAIN EXTENSION WSPGW CALCULATIONS (ARROYO_G.WSW)**
- **D-3 PITTMAN CHANNEL WSPGW CALCULATIONS (PW_CLOMR.WSW)**
- **D-4 48”-INCH RCP STORM DRAIN EXTENSION (48IN. WSW)**
- **D-5 PITTMAN WASH CHANNEL HEC-RAS DUPLICATE EFFECTIVE MODEL (406PWCH_DE.PRJ)**
- **D-6 EXISTING CONDITION WHITNEY RANCH CHANNEL HEC-RAS MODEL**

UPDATED APPENDIX E DATA CD (ADDRESSES COMMENTS #1, #2, AND ADDITIONAL INFORMATION)

- **E-3 ENDANGERED SPECIES ACT (ESA) COMPLIANCE**
- **E-11 CCRFCD OPERATIONS AND MAINTENANCE MANUAL**
- **E-12 ELECTRONIC FILES**
  - E-12.1 GIS FILES
  - E-12.2 CAD FILES
  - E-12.3 HYDRAULIC MODELING

DRAFT NOTIFICATION LETTER AND EXHIBIT TO BE SENT TO AFFECTED PROPERTY OWNERS

ACKNOWLEDGEMENT FROM COMMUNITY OFFICIAL FOR PROPOSED PITTMAN CHANNEL RISE IN WATER SURFACE ELEVATIONS

EMAIL CORRESPONDENCE

Updated CLOMR Letter Table of Contents (Addresses Comment #1)

Updated Appendix A with Revised Pittman Wash Channel Form 2 (Addresses Comment #1)

Updated Appendix B with Figure 7 (Addresses Comment #1)

Updated Appendix D with D-5 Pittman Wash Channel Duplicate Effective Model (Addresses Comment #1)

Updated Appendix E Data CD (Addresses Comments #1, #2, and Additional Information)

Draft Notification Letter and Exhibit To Be Sent To Property Owners

Acknowledgement From Community Official for Proposed Pittman Channel Rise in WSELs

Email Correspondence