



Whitney Ranch Channel Replacement Project

Request for Conditional Letter of Map Revision

May 2020





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FEMA

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5/25/2020

JACOBS



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May 20, 2020

LOMC Clearinghouse
3601 Eisenhower Avenue, Suite 500
Alexandria, VA 22304-6426

Subject: CLOMR Request for the Whitney Ranch Channel

Attention: LOMC Manager

The purpose of this request for CLOMR is to lay the groundwork for a Letter of Map Revision (LOMR) in order to clarify and/or correct the existing Community Panel Number 32003C 2583F, effective date November 16, 2011, to reflect the proposed flood control improvements for the Whitney Ranch Channel Replacement Project located within Clark County, Nevada. Refer to Figure 1 – Vicinity Map in Appendix B-1.

Proposed improvements include approximately 4,562 linear feet of storm drain infrastructure, designed to remove current Special Flood Hazard Area (SFHA) Zone A, described by FEMA as areas with 1% annual chance floodplain, between Whitney Mesa Estates and the Pittman Wash Channel within the city of Henderson, Nevada. Additionally, the project includes reconstruction of the Whitney Ranch Channel confluence with the Pittman Wash Channel and approximately 730 linear feet of open-channel infrastructure to tie-in to the existing Pittman Wash Channel along the west side of Stephanie Street between Sunset Road and U.S. 95. Refer to Figure 2 – Project Area Map in Appendix B-2.

Two (2) Letter of Map Revisions (LOMRs) revised two (2) Zone A fingers within the Whitney Mesa Estates. LOMR Case No. 13-09-1966P (issue date July 18, 2013), shows the Whitney Mesa Estates South hydraulic conveyance facilities contain 1% annual chance (100-year) flood discharge from the Arroyo Grande Wash from Sunset Road flooding source through the Whitney Mesa Estates development. Likewise, LOMR Case No. 14-09-2535P (issue date September 18, 2014), shows the Whitney Mesa Estates Channel hydraulic conveyance facilities contain 1% annual chance (100-year) flood discharge from the Whitney Wash flooding source through the Whitney Mesa Estates development. The LOMRs for the Whitney Mesa Estates Zone A fingers are not reflected in the effective FIRM Community Panel Number 32003C 2583F. Therefore, excerpts from the LOMR determination documents issued by FEMA are enclosed with this request for a CLOMR. The revised special flood hazard areas from the two LOMRs are shown on *Figure 3-Updated Effective FIRM* in Appendix B-3.

The following listed information supporting this request for a CLOMR is enclosed. This request for CLOMR is based on the proposed storm drain improvements consisting of reinforced concrete pipe, reinforced concrete box, and reinforced concrete open-channel facilities that will convey the 1%

annual chance storm event flows from two flooding sources tributary to the Zone A fingers within the Whitney Mesa Site east to the Pittman Wash.

- ◆ Figure 1 – Vicinity Map
- ◆ Figure 2 – Project Area Map
- ◆ Figure 3 – Updated Effective FIRM
- ◆ Figure 4 – Work Map: Proposed Condition
- ◆ Figure 5 – Work Map: Pittman Channel WSPGW Station Correlation
- ◆ Figure 6 – Revised / Annotated FIRM
- ◆ FEMA Forms
- ◆ Credit card information to pay the amount of \$6,500.00 to the National Flood Insurance Program has been included with this submittal.
- ◆ Hydraulic Modeling Computations
- ◆ Site Photographs
- ◆ Field Survey Information
- ◆ Environmental analysis and supporting documentation to demonstrate the project's compliance with Endangered Species Act (ESA)
- ◆ Excerpts from Relevant Studies
- ◆ As-Built Plans and Exhibits
 - Whitney Mesa Estates – Channel As-Built Survey L.O.M.R. As-Built Exhibit, Wallace-Morris Surveying, Inc., Jason G. Kline 04/04/13
 - Whitney Mesa Estates – South Topographic As-Built Survey L.O.M.R. As-Built Exhibit, Wallace-Morris Surveying, Inc., Craig L. Morris 03/29/13
 - Pittman Channel Phase 1 Construction Drawings, Black & Veatch, Dana V. Reel, 09/04/90
- ◆ Certification of the plan set specifically for substantial conformance
- ◆ Electronic Files on disk (Aerial topography, Survey data, References, GIS Files, and WSPGW Models)

Project Description

The Whitney Ranch Channel was originally constructed in the late 1980s by American West Development Inc. to provide flood protection for the adjacent Whitney Ranch Development. The concrete-lined trapezoidal open channel is approximately 3,300 feet long and is located within a 30'-wide flood control easement that extends from the natural area within the Whitney Mesa Site to the

Pittman Wash Channel at Stephanie Street, with corrugated metal arch culverts at the Galleria Drive and Whitney Ranch Drive roadway crossings. Some repairs/improvements have been made to the channel since the initial construction; however, the almost 30-year-old facility is generally in poor condition and in need of significant repairs. Deficiencies observed along the channel alignment include large cracks, spalling, undermined concrete panels, several locations of exposed steel reinforcement, and uncertain stability of the adjacent retaining and property walls. Shallow surface water flows were observed in the channel bottom.

This project proposes to remove and replace the existing Whitney Ranch Channel with storm drain facilities designed to fully contain the 100-year storm event flows.

The approximately 0.9-miles of project improvements are featured in the Clark County Regional Flood Control District's (CCRFC) 2018 Las Vegas Valley Flood Control and Master Plan Update (MPU) as proposed Whitney Wash–Duck Creek facility numbers WWDC 0001, 0016, 0031, 0034, 0053, 0056, and 0070 between the existing Whitney Mesa Estates 9' × 5' reinforced concrete box (RCB), MPU facility WWDC 0084, and the Pittman Wash Channel, MPU facility Pittman Wash–Duck Creek (PTDC 0096). The project also includes reconstruction of MPU facility WWDC 0000, the confluence with the Pittman Wash Channel, and reconstruction of a portion of the Pittman Wash Channel, MPU facility PTDC 0096, to tie-in the proposed improvement with the existing Pittman Wash Channel along the west side of Stephanie Street between Sunset Road and U.S. 95.

Additional hydraulic conveyance facilities included with this project consist of (1) an approximately 50-foot local storm drain extension of the 72" reinforced concrete pipe (RCP) storm drain that outlets from the Whitney Mesa Estates Development south of the MPU alignment, (2) an approximately 710-foot local storm drain extension of the existing 48" RCP storm drain that outlets along the eastern boundary of the Whitney Mesa Estates Development south of the MPU alignment, (3) an approximately 160-foot 9' × 5' RCB local storm drain to convey the flow from a junction structure with 54" RCP and 72" RCP connections south of the MPU alignment within the Whitney Mesa Site north to the 20' × 5' RCB confluence along the MPU mainline, (4) an approximately 80-foot local storm drain extension of the 24" RCP storm drain that outlets from the Whitney Mesa Estates Development north of the MPU alignment, (5) extension of pipes located within drainage easements within Whitney Ranch Development residential subdivisions to connect to the MPU mainline, (6) swales and drop inlets within the 30' to 40'-wide public drainage easement to convey and intercept surface flows conveyed within the easement, (7) an approximately 300-foot local storm drain collection facility to collect flow from a low point in Galleria Drive and convey it south to the MPU mainline, and (8) an approximately 350-foot local storm drain collection facility to collect flow from a low point in Whitney Ranch Drive and convey it south to the MPU mainline..

The proposed storm drain improvements are located within City of Henderson-owned property and public right-of-way.

Proposed storm drain and channel improvements, hydraulic modeling, and mapping in support of this request for CLOMR are based on the North American Vertical Datum of 1988 (NAVD88). The improvement plans for the project are included on the data CD enclosed in Appendix E-5. The improvement plans include profiles and detail sheets for the hydraulic conveyance facilities

summarized on the MT-2 Form 3 enclosed with this request for CLOMR. The proposed improvements will connect at the upstream end in order to convey flow from the Whitney Mesa Estates Channel and Whitney Mesa Estates South hydraulic conveyance facilities east to the Pittman Wash Channel. The proposed improvements will replace the existing Whitney Ranch Channel trapezoidal channel in order to increase the capacity of the system and safely convey the 1% annual chance (100-year) flood discharge flows. Upstream to downstream, the proposed storm drain improvements are described below:

1. Extension of the existing Whitney Mesa Estates (Whitney Mesa Estates Channel) 9' x 5' RCB facility approximately 203 feet east to 20' x 5' RCB confluence structure with lateral connection to the proposed extension of Whitney Mesa Estates (Arroyo Grande Wash) Storm Drain.
2. An approximately 62-foot 20' x 5' RCB confluence structure.
3. An approximately 45-foot transition from 20' x 5' RCB confluence structure to 16' x 5' RCB within Whitney Mesa Site.
4. An approximately 1,458-foot 16' x 5' RCB storm drain from transition within Whitney Mesa Site to transition to 14' x 6' RCB located approximately 15 feet north and east of Galleria Drive.
5. An approximately 16-foot transition from 16' x 5' RCB to 14' x 6' RCB approximately 15 feet north and east of Galleria Drive.
6. An approximately 801-foot 14' x 6' RCB storm drain from transition approximately 175 feet north and east of Galleria Drive to transition to 14' x 7' RCB located approximately 145 feet south and west of Whitney Ranch Drive.
7. An approximately 8-foot transition from 14' x 6' RCB confluence structure to 14' x 7' RCB located approximately 145 feet south and west of Whitney Ranch Drive.
8. An approximately 367-foot 14' x 7' RCB storm drain under Whitney Ranch Drive.
9. An approximately 8-foot transition from 14' x 7' RCB under Whitney Ranch Drive to 18' x 5' RCB approximately 115 feet north and east of Whitney Ranch Drive.
10. An approximately 492-foot 18' x 5' RCB storm drain from transition approximately 115 feet north and east of Whitney Drive to transition to 20' x 6' RCB located approximately 620 feet north and east of Whitney Ranch Drive.
11. An approximately 8-foot transition from 18' x 5' RCB to 20' x 6' RCB located approximately 620 feet north and east of Whitney Ranch Drive.
12. An approximately 272-foot 20' x 6' RCB storm drain from transition located approximately 620 feet north and east of Whitney Ranch Drive to transition located approximately 895 feet north and east of Whitney Ranch Drive.
13. An approximate 8-foot transition from 20' x 6' RCB to 24' x 5' RCB located approximately 895 feet north and east of Whitney Ranch Drive.

14. An approximately 592-foot 24' x 5' RCB storm drain from transition located approximately 895 feet north and east of Whitney Ranch Drive to the confluence with the Pittman Wash confluence.

The proposed improvements include a zero-degree confluence structure to convey the flow from the Whitney Ranch Channel into the Pittman Wash Channel and reconstruction of a portion of the existing Pittman Wash Channel to accommodate the more-efficient confluence structure and transition into the existing Pittman Wash Channel upstream and downstream of the confluence. Upstream to downstream, the proposed reconstruction of the Pittman Wash Channel hydraulic conveyance facilities are as described below:

1. A 195-foot transition from the existing Pittman Wash Channel 38' x 7.5' concrete-lined trapezoidal channel to a proposed 40' x 9.5 concrete-lined rectangular channel upstream of the confluence with the Whitney Ranch Channel.
2. Approximately 50 linear feet of 40' x 9.5' concrete-lined rectangular channel within Pittman Wash Channel upstream of the confluence with the Whitney Ranch Channel.
3. Approximately 133 linear feet of 66.25' x 9.0' concrete-lined rectangular confluence structure within Pittman Wash Channel.
4. A 350-foot transition beginning at the downstream end of the confluence structure to tie into the existing Pittman Wash Channel 38' x 7.5' concrete-lined trapezoidal channel.

Hydrology

The FEMA flowrates used in LOMR Case No. 13-09-1966P and LOMR Case No. 14-09-2535P are referenced from the FEMA effective flowrates established in the CLOMR Case No. 12-09-2825R. Hydrologic calculations and information from CLOMR Case No. 12-09-2825R were reviewed, accepted, and incorporated as shown in the table below for the hydraulic analysis performed for this CLOMR request.

SUMMARY OF EFFECTIVE FLOW RATES

LOCATION	FEMA FLOODING SOURCE	FEMA EFFECTIVE FLOW RATE (cfs)_
Extension of 72" RCP Outfall from Flowing Meadow Dr. ¹	Arroyo Grande Wash	382*
Confluence of extension of 72-inch RCP Outfall from Flowing Meadow Dr. ¹ with 54" RCP	Arroyo Grande Wash	545**
Extension of Whitney Wash Channel 9'x5' RCB Storm Drain	Whitney Wash	853*
Confluence of extension of Whitney Wash Channel 9'x5' RCB with extension of 72" RCP Outfall from Flowing Meadow Dr. ¹	Whitney Wash	1,363**
Proposed Storm Drain Improvements within Whitney Ranch Channel drainage easement	Whitney Wash	1,363*

*Effective flow rate referenced from Whitney Mesa Estates CLOMR Case No. 12-09-2825R.

**Total flow includes referenced flow rate of 163 cfs coming from existing 48" RCP storm drain within southeast portion of Whitney Mesa Estates due to connection of the proposed 48" RCP storm drain extension.

¹ Previously referred to and labeled as Glen Callater Dr. in referenced LOMR Case No. 13-09-1966P as-built exhibit.

Relevant referenced hydrologic information from CLOMR Case No. 12-09-2825R is included in Appendix C enclosed with this request for CLOMR.

The extension of the Whitney Mesa Estates South facility includes a 54" RCP connection designed to convey the 1% annual chance (100-year) flood discharge flow rate of 163 cfs referenced from CLOMR Case no. 12-09-2825R from the outlet of an existing 48" RCP located within the southeast portion of the Whitney Mesa Estates development. Therefore, the extension of the Whitney Mesa Estates South facility is designed to convey a combined total flow of 545 cfs, which represents the cumulative referenced combined flowrates 382 cfs from the outlet of the existing 72" RCP and 163 cfs from the outlet of the existing 48" RCP within the Whitney Mesa Estates development.

For the Pittman Wash Channel, the FEMA adopted flowrate of 7,708 cfs from the *Pittman Wash Flood Insurance Study Clark County, Nevada*, hereinafter referred to as the Pittman Wash FIS, was reviewed and accepted for the hydraulic analysis in this CLOMR request. Relevant referenced hydrologic information from the Pittman Wash FIS is included in Appendix C-5 enclosed with this request for CLOMR. The Pittman Wash FIS HEC-1 analysis features a reference flowrate of 7,708 cfs approximately 1.8 miles upstream of the proposed improvements and reference flowrate of 7,638 cfs approximately 0.5 miles downstream of the proposed improvements. The HEC-2 analysis performed for the Pittman Wash FIS used a reference flow of 7,708 cfs through this reach of the Pittman Wash that is affected by the proposed channel improvements, hence 7,708 cfs was used as the reference flow for this CLOMR request.

Aerial Topography and Survey Data

Topographic mapping with a contour interval of 1-foot was generated by AeroTech Mapping (flight date: April 17, 2019). In addition to topographic mapping, field surveys were performed along the project limits and within the vicinity of the Whitney Mesa Park, Galleria Drive, and Whitney Ranch Drive to obtain as-built information for elements such as manholes, headwalls, drop inlets, riprap limits, utilities, and roadway components for horizontal and vertical location. The vertical control is based on NAVD88 from a local benchmark and horizontal control based on a local basis of bearing. Referenced Pittman FIS flow line has been adjusted by a factor of 2.64 feet by survey shot information at Pittman FIS Section 29+63. The surveyor conversion from local project coordinates to the North American Datum of 1983 (NAD 83) State Plane Nevada East FIPS 2701 coordinate system is provided on the data CD enclosed in Appendix E-4.

Hydraulic Modeling

Hydraulic calculations for the proposed extension of the Whitney Mesa Estates Channel, Whitney Mesa South, and Pittman Wash Channel hydraulic conveyance facilities were performed using the Water Surface Pressure Gradient for Windows (WSPGW, 2002) distributed by Civil Design Corporation. See *Appendix D – Hydraulic Models* for model outputs. The WSPGW model alignments and stationing are depicted on *Figure 4 - Work Map: Proposed Condition* and *Figure 5 - Work Map: Pittman Channel WSPGW Station Correlation*. The WSPGW model digital files are included on the data CD enclosed in Appendix E. Refer to Appendix D for a scanned copy of the referenced hydraulic models used to determine boundary conditions at the upstream and downstream FEMA floodplain tie-in locations.

Results of the detailed modeling shows FEMA effective flow rates will be contained within the proposed improvements between the Whitney Mesa Estates Channel/Whitney Mesa Estates South facilities and existing Pittman Wash Channel.

Three WSPGW models were prepared for the hydraulic analysis of the proposed hydraulic conveyance facilities. These models are labeled 1) WR_CLOMR.WSW, 2) ARROYO_G.WSW, and 3) 48IN.WSW in Appendix D. The WR_CLOMR.WSW model was prepared for the hydraulic analysis of the Whitney Ranch Channel, which includes the confluence of the Whitney Ranch Channel and Arroyo Grande Storm Drain Extension. The ARROYO_G.WSW model was prepared for the hydraulic analysis of the Arroyo Grande Storm Drain Extension, which includes the junction with the 48-inch Storm Drain Extension. The 48IN.WSW model was prepared for the hydraulic analysis of the 48-inch Storm Drain Extension. The PW_CLOMR.WSW model was prepared for the hydraulic analysis of the proposed Pittman Wash Channel hydraulic conveyance facilities, which includes the confluence of the Whitney Ranch Channel with the Pittman Wash Channel and upstream and downstream transitions to tie into the existing Pittman Wash Channel.

The WSPGW models include a Manning's n coefficient of 0.013 for the proposed concrete-lined hydraulic conveyance facilities referenced from Table 702 in the CCRFCD Hydrologic Criteria and Drainage Design Manual (HCDDM).

Confluence of the Whitney Ranch Channel and Pittman Wash Hydraulic Analysis

The configuration of the Whitney Ranch Channel and Pittman Wash is based on design criteria outlined in Chapter 4 Section 4-4 of the U.S. Army Corps of Engineers Manual 1110-2-1601 (EM 1110-2-1601). Referenced excerpts from EM 1110-2-1601 have been included on the data CD enclosed in Appendix E. The Whitney Ranch Channel 24'x5' RCB storm drain includes a 200-foot radius upstream of the confluence to provide a 0-degree angle of junction intersection. Proposed Pittman Wash Channel hydraulic conveyance facilities include a 195-foot transition from the existing 38' bottom width x 7.5'-deep trapezoidal concrete-lined channel with 2 to 1 side slopes to a 51-foot long 40'-wide x 9.5'-deep concrete-lined rectangular channel parallel to the proposed Whitney Ranch Channel 24'x5' RCB upstream of the connection to the confluence structure. At this location, the channel changes to a 66.25'-wide x 9.0'-deep concrete-lined rectangular channel confluence structure which

continues downstream for 133 feet, followed by a 350-foot long transition from the confluence structure back to the existing 38' bottom width \times 7.5'-deep trapezoid channel with 2 to 1 side slopes. The proposed confluence configuration provides an angle of junction intersection less than 12-degrees and Froude number greater than 1.13 (Refer to the PW_CLOMR.WSW WSPGW model results in Appendix D) per the requirements outlined in EM 1110-2-1601.

Boundary Condition and Floodplain Tie-in Locations

Whitney Ranch Channel (WSPGW Reference Model – WR_CLOMR.WSW) Upstream: The floodplain tie-in location is at the downstream end of the existing 9'x5' RCB modeled as part of LOMR Case No. 14-09-2535P. The WSPGW model upstream boundary condition is referenced from HEC-RAS Station 200, which is located approximately 583.71' upstream of the outlet of the existing 9'x5' RCB.

Whitney Ranch Channel (WSPGW Model WR_CLOMR.WSW) Downstream: The floodplain tie-in location is at the connection to the confluence with Pittman Wash Channel and downstream boundary condition is referenced from the Pittman Wash Channel WPGW model (PW_CLOMR.WSW) at Station 52+71.60, which is located at the outlet of the proposed 24'x5' RCB at the upstream end of the proposed Whitney Ranch Channel confluence with the Pittman Channel.

Arroyo Grande Storm Drain Extension (WSPGW Model ARROYO_G.WSW) Upstream: The floodplain tie-in location is at the downstream end of the existing 72" RCP presented in LOMR Case No. 13-09-1966P and modeled as part of Case No. 12-09-2825R. The WSPGW model upstream boundary condition is referenced from WSPGW Station 11+87.28, which is located at the manhole approximately 161.28 feet upstream of the proposed connection to the 72" RCP.

Arroyo Grande Storm Drain Extension (WSPGW Model ARROYO_G.WSW) Downstream: The floodplain tie-in location is at the connection to the confluence with the Whitney Ranch Channel and downstream boundary condition is referenced from the Whitney Ranch Channel WSPGW model (WR_CLOMR.WSW) at Station 11+34.24.

Pittman Channel (WSPGW Model PW_CLOMR.WSW) Upstream: The floodplain tie-in is at the connection to the existing Pittman Wash Channel approximately 247 feet upstream of the proposed confluence with the Whitney Ranch Channel. The WSPGW model upstream boundary condition is referenced from the Pittman Wash FIS HEC-2 Section 47+16 which is located approximately 1,032 feet upstream of the proposed confluence with the Whitney Ranch Channel.

Pittman Channel and Pittman Channel Downstream: The floodplain tie-in is at Pittman Wash FIS HEC-2 Section 28+63 which is located approximately 821 feet downstream of the proposed confluence with the Whitney Ranch Channel.

Mapping

The proposed improvements analyzed for this CLOMR request, including the extension of the Whitney Mesa Estates Channel/Whitney Mesas Estates South hydraulic conveyance facilities and the

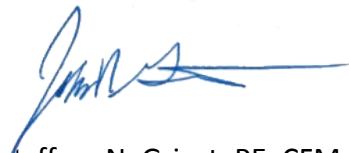
reconstructed Pittman Wash Channel, will contain the 1% annual change discharge within the top widths as calculated in the WSPGW models.

The proposed FIRM revisions are shown on *Figure 6 – Revised / Annotated FIRM*.

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.



Jeffrey N. Griest, PE, CFM
Project Manager

Encl.

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