

City of Lathrop and City of Manteca ULDC Evaluation Frequently Loaded Levee Analysis

Prepared for: City of Lathrop & City of Manteca

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Prepared by: Ryan Dunne, EIT

Reviewed by: Mike Rossiter, PE, CFM & Dave Peterson, PE



Introduction

Frequently loaded levees are defined by the Urban Levee Design Criteria (ULDC) to be levees that experience water surface elevations of 1 ft or higher above the landside levee toe at least once a day for more than 36 days per year on average (essentially 10% of the time). Levees on segments of three streams protect RD 17 from flooding: French Camp Slough, San Joaquin River, and Walthall Slough (Figure 1). The RD 17 landside levee toe elevations were compared to stream stages expected to be exceeded once a day for more than 36 days on average (the 10% exceedance value) to identify any reaches that contain frequently loaded levees.

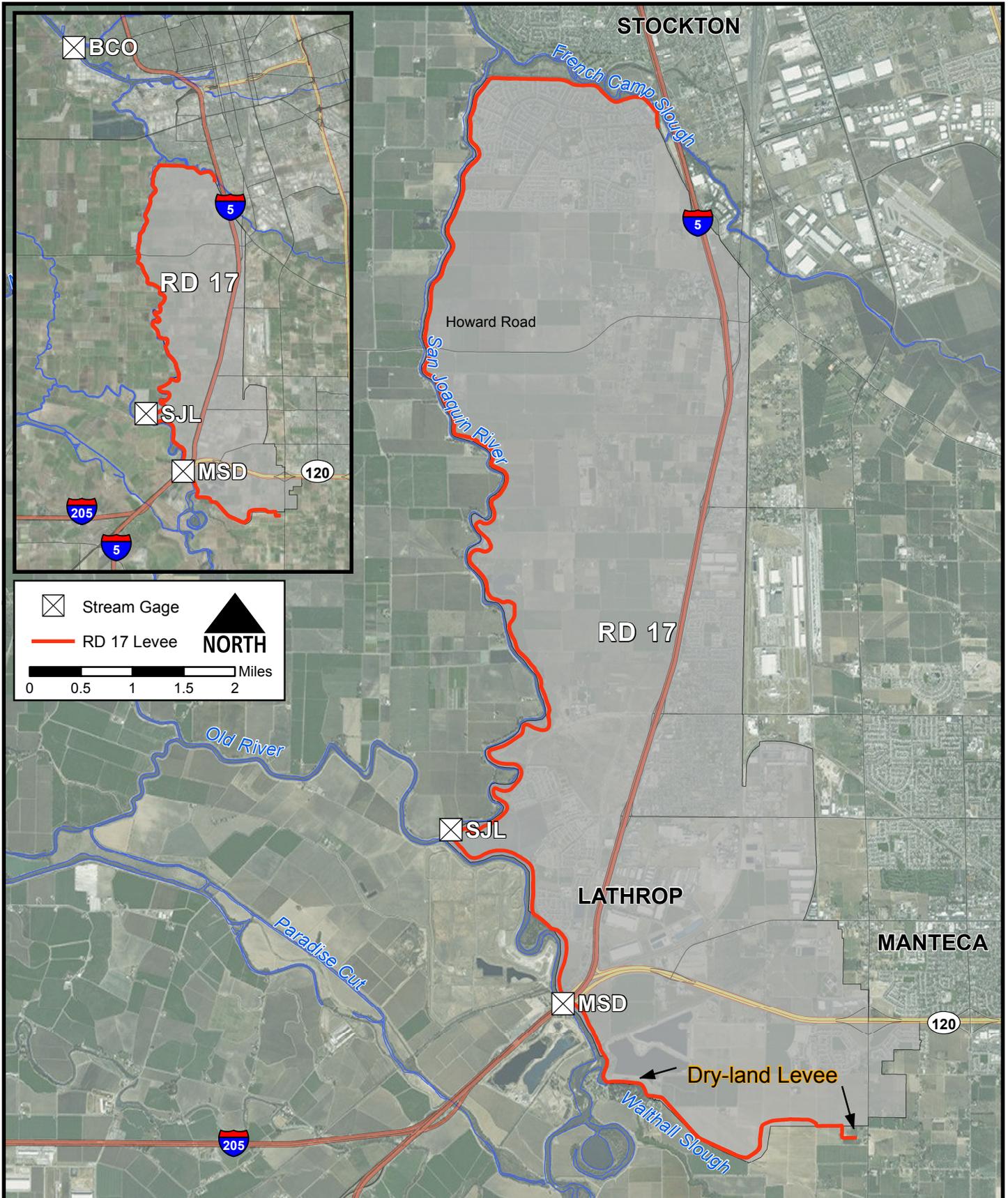
Analysis

The surveyed landside levee toe elevations were compared to stream stages that are expected to be exceeded at least once a day for more than 36 days per year on average. Stream stage data were only available at 2 locations on the San Joaquin River adjacent to RD-17. A HEC-RAS model developed for this ULDC study¹ was used to estimate the stages along the entirety of RD-17 resulting from 10% exceedance flows in the San Joaquin River.

Flow data from two gage stations² along the San Joaquin River were obtained for this analysis (Figure 1). 15-minute flow data recorded at the San Joaquin River at Mossdale (MSD) and the San Joaquin River below Old River (SJL) gage stations were sorted to determine the 10% exceedance flows. A 10% exceedance stage at the downstream limit of the HEC-RAS model was required as a boundary condition. Daily maximum stage data from the Burns Cutoff (BCO) Gage station were used to find the 10% exceedance stage at this location. The Burns Cutoff gage is approximately 500 ft from the downstream boundary of the San Joaquin River in the HEC-RAS model. Data collected prior to water year 2006 used the US Engineering Datum, while data collected during and after water year 2006 used the North

¹ 200-year Freeboard Analysis & Floodplain Mapping within RD17. Prepared for Cities of Lathrop and Manteca. Peterson Brustad, Inc. 23 May 2014.

² Water Data Library. Department of Water Resources. <http://www.water.ca.gov/waterdatalibrary/>



Stream Gage
 RD 17 Levee
 NORTH
 0 0.5 1 1.5 2 Miles

PETERSON . BRUSTAD . INC
 ENGINEERING . CONSULTING

 1180 Iron Point Rd., Suite 260
 Folsom, CA 95630
 Phone: (916) 608-2212
 Fax: (916) 608-2232

CITY OF LATHROP AND CITY OF MANTECA ULDC COMPLIANCE
**RD 17 VICINITY, STREAMS,
 AND GAGE STATIONS**

FIGURE
1

TECHNICAL MEMORANDUM

American Vertical Datum of 1988. A datum shift of -0.94 ft was applied to the stages recorded prior to water year 2006. The 10% exceedance stage and flows are shown in Table 1.

Table 1: Summary of flow and stage data from the San Joaquin River gage stations

Stream gage	10% Exceedance Value	Period of Record
MSD	4,340 cfs	2005-2014
SJL	10,200 cfs	2004-2011
BCO	6.84 ft (NAVD-88)	1983-2015

The HEC-RAS model was run with downstream boundaries that correspond to a 2-year tide event for streams other than the San Joaquin River, which provided a conservative estimate of the Delta pool conditions. Additional tributaries and distributaries of the San Joaquin River are also included in the HEC-RAS model, but did not have sufficient historical gage data. These streams, including French Camp Slough and Walthall Slough, were conservatively assumed to be flowing at 2-year events for the HEC-RAS model run.

Results

The results of the HEC-RAS model run are shown in Figure 2 and represent stream stages along the RD 17 levee that correspond to San Joaquin River flows that occur on average 36 times a year. The water surface profile produced by these flows is less than 1 foot above the land side levee toe at all locations along the RD 17 levees and therefore none of the RD 17 levees are considered to be frequently loaded.

