

APPENDIX D
Floodplain Impact Study

MEMORANDUM

TO: Benjamin Hwang, SCVWD

DATE: July 21, 2022

FROM: Larry Johnson, PE
Erika Marshall

JOB #: RAMC.01.22

SUBJECT: **16720 Monterey Road Hydraulic Impact Study**



Introduction and Purpose

Schaaf & Wheeler has been tasked by RAMCAM Group to assess the potential floodplain impacts from the proposed redevelopment at the 16720 Monterey Road in the City of Morgan Hill, California. The project is located at the northeast corner of the Monterey Road and San Pedro Avenue intersection. Potential impacts will be assessed based on the Federal Emergency Management Agency (FEMA) 100-year water surface elevations on West Little Llagas Creek. The proposed project includes the construction of a new structure and demolition of an existing structure.

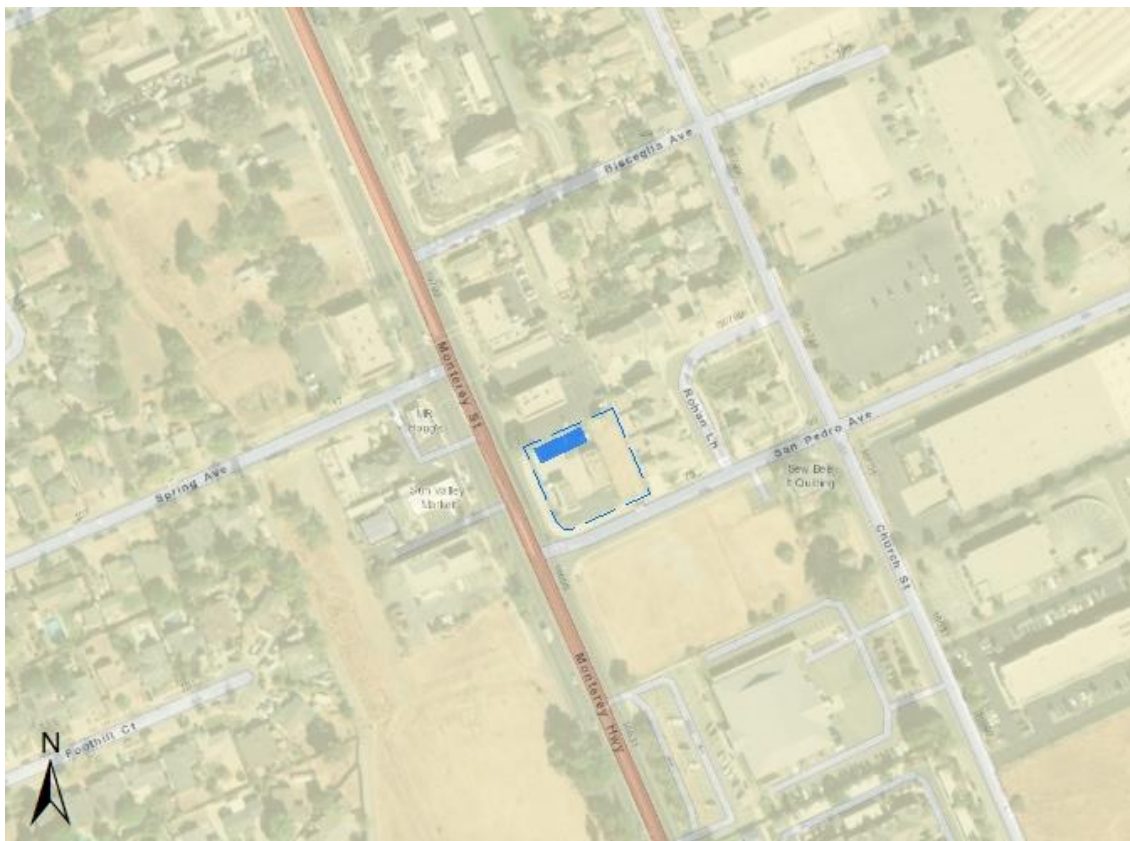


Figure 1: Study Area (proposed building shown in blue)

Model Configuration

Duplicate Effective Model

The existing *Effective Model* (5012013) was used to develop the duplicate effective model in HEC-RAS. The U.S. Army Corps of Engineers (USACE) Hydrologic Engineering Center's River Analysis System (HEC-RAS) computer program supersedes its HEC-2. The HEC-2 effective model file was obtained from the Santa Clara Valley Water District's website:

<https://www.valleywater.org/flooding-safety/hec-2-and-hec-ras-data-library>

The *Duplicate Effective Model* was recreated in HEC-RAS for the reach near the proposed project. This includes recreating the ineffective flow areas at the applicable cross sections. The model ties in at the downstream end south of Cosmo Avenue (XS 350) at 330.40 ft (NGVD) and at the upstream end at 5th Street (XS 392) at 343.04 ft (NGVD) per the effective FIS, see profile panels 162P – 163P (Feb 19, 2014).



Figure 2: Duplicate Effective Model Extents

There is approximately a 0.2 foot difference in WSELs between the effective and duplicative effective model. These small differences are due to the fact that HEC-RAS applies improved and more modern computational procedures that were not available when HEC-2 was developed. These changes between HEC-2 and HEC-RAS include computational differences in conveyance, bridge and culvert hydraulics, critical depth, and calculation tolerance. These computational differences will create small differences in the model results.

This duplicate effective model was used as the baseline to estimate the impact that the project would have on the water surface elevations in the West Little Llagas Creek floodplain.

Corrected Duplicate Effective Model (Current)

Although existing effective cross sections were already located upstream (XS 366) and downstream (XS 364) of the project site, four additional cross sections were interpolated into the model (XS 365.60, XS 365.20, XS 364.80 and XS 364.40) to account for additional ineffective flow areas due to buildings. The model was modified by changing the obstructions due to buildings in the left overbank. Building ineffective flow areas were calculated using a 1:1 contraction ratio and 4:1 expansion ratio at the upstream and downstream building corners respectively (see Figure 3). The blocked obstructions due to buildings and ineffective flow areas were modified to represent existing conditions. This model is considered the *Existing Model*, which the *Project Model* will be compared against.

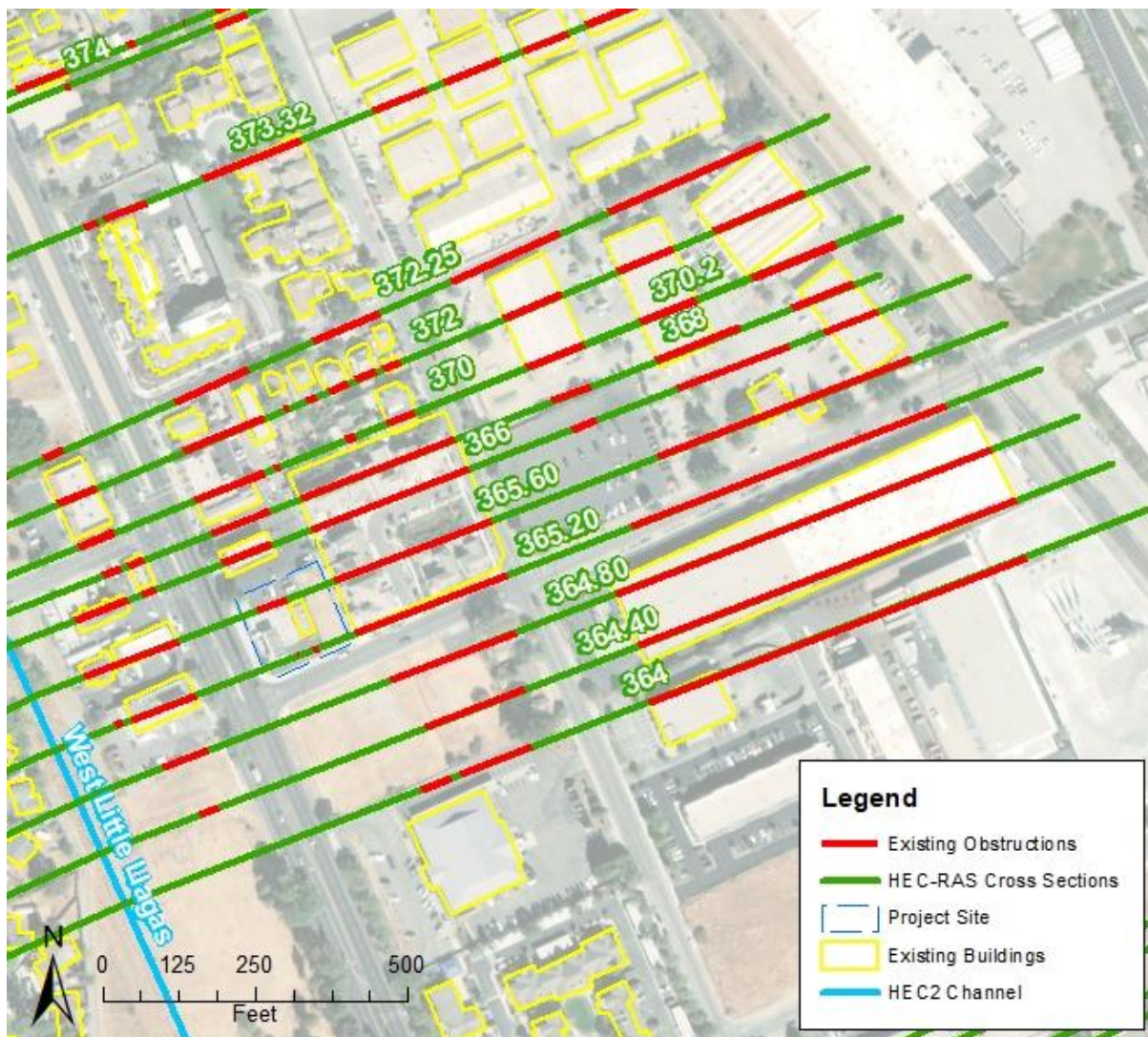


Figure 3: Current building obstructions and ineffective flow areas

Project Model

This *Existing Model* of West Little Llagas Creek was utilized to determine the hydraulic impacts of the proposed project. The model was modified by changing the obstructions due to buildings in the left overbank with the addition of the project structure. Building ineffective flow areas were calculated using a 1:1 contraction ratio and 4:1 expansion ratio at the upstream and downstream building corners respectively (see Figure 4). This model is considered the *Project Model*.



Figure 4: Proposed Project building obstructions and ineffective flow areas

Cumulative Projects Model

As an extension of the project model, other known developments within the project vicinity were included to estimate the cumulative impacts of all known development on flooding elevations. A second development on the corner of Monterey Road and San Pedro Avenue was included to determine cumulative impacts to WSE's are less than 1 foot to meet City Ordinance Criteria. The model was modified by changing the obstructions due to buildings in the left overbank with the addition of the project structure. Building ineffective flow areas were calculated using a 1:1 contraction ratio and 4:1 expansion ratio at the upstream and downstream building corners respectively (see Figure 5). This model is considered the *Cumulative Impacts Model*.



Figure 5: Proposed Project building obstructions and ineffective flow areas

Results

Project Model

Results from the *Project Model* are compared against the *Existing Model* and are summarized in Table 1 below. Figure 6 and Figure 7 plot the cross sections bounding the project site and show the blocked obstructions used to model the proposed development impacts. The Project shows a 0.20 foot impact to the West Little Llagas Creek water surface elevations. The proposed structure does not significantly increase the blocked obstructions in the left overbank of the Corrected Effective Proposed model.

Table 1: 100-yr Water Surface Elevations - West Little Llagas Creek

River Station XS	San Pedro @ Monterey		
	Existing WSEL (ft, NGVD29)	Project WSEL (ft, NGVD29)	Difference (ft)
392	343.16	343.16	0.00
390.2	342.97	342.97	0.00
390	342.97	342.97	0.00
384	342.21	342.21	0.00
382	340.87	340.87	0.00
380	340.15	340.15	0.00
376	338.05	338.05	0.00
374	338.04	338.04	0.00
373.32*	338.01	338.01	0.00
372.25*	338	338	0.00
372	337.97	337.97	0.00
370.2	337.87	337.87	0.00
370	337.28	337.28	0.00
368	336.87	336.86	-0.01
366	335.61	335.62	0.01
365.60*	335.03	334.98	-0.05
365.20*	334.27	334.47	0.20
364.80*	333.82	333.66	-0.16
364.40*	333.08	333.08	0.00
364	332.26	332.26	0.00
362	331.6	331.6	0.00
360	331.47	331.47	0.00
354	331.15	331.15	0.00
352	331.06	331.06	0.00
350	330.4	330.4	0.00

Note: Interpolated River Station XS marked with asterisk (*).

Cumulative Impacts Model

The Project along with other known development in the project vicinity shows a cumulative 0.71 foot impact to the West Little Llagas Creek overbank water surface elevations. Results from the *Cumulative Impacts Model* are compared against the *Existing Model* and are summarized in Table 2 below.

Table 2: 100-yr Water Surface Elevations - West Little Llagas Creek

River Station XS	San Pedro @ Monterey		
	Existing WSEL (ft, NGVD29)	Cumulative Project WSEL (ft, NGVD29)	Difference (ft)
392	343.16	343.16	0.00
390.2	342.97	342.97	0.00
390	342.97	342.97	0.00
384	342.21	342.21	0.00
382	340.87	340.87	0.00
380	340.15	340.15	0.00
376	338.05	338.05	0.00
374	338.04	338.04	0.00
373.32*	338.01	338.01	0.00
372.25*	338	338	0.00
372	337.97	337.97	0.00
370.2	337.87	337.87	0.00
370	337.28	337.28	0.00
368	336.87	336.86	-0.01
366	335.61	335.62	0.01
365.60*	335.03	335.09	0.06
365.20*	334.27	334.56	0.29
364.80*	333.82	333.98	0.16
364.40*	333.08	333.79	0.71
364	332.26	332.4	0.14
362	331.6	331.59	-0.01
360	331.47	331.47	0.00
354	331.15	331.15	0.00
352	331.06	331.06	0.00
350	330.4	330.4	0.00

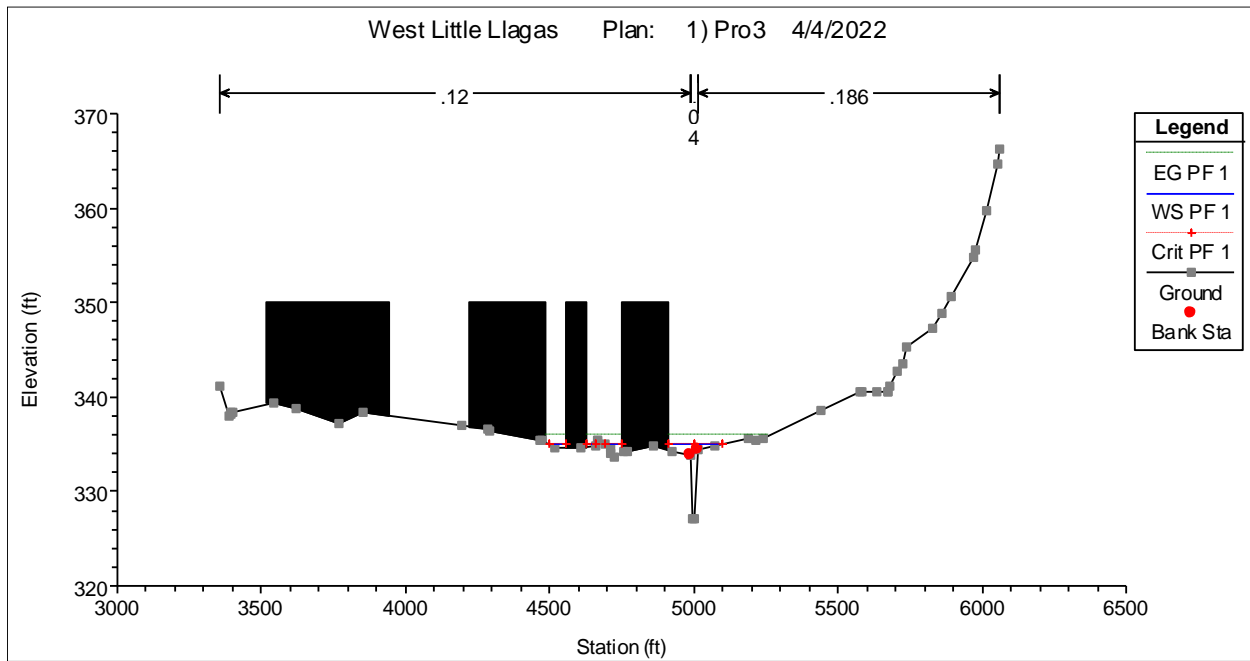


Figure 6. Project Site at XS 365.60

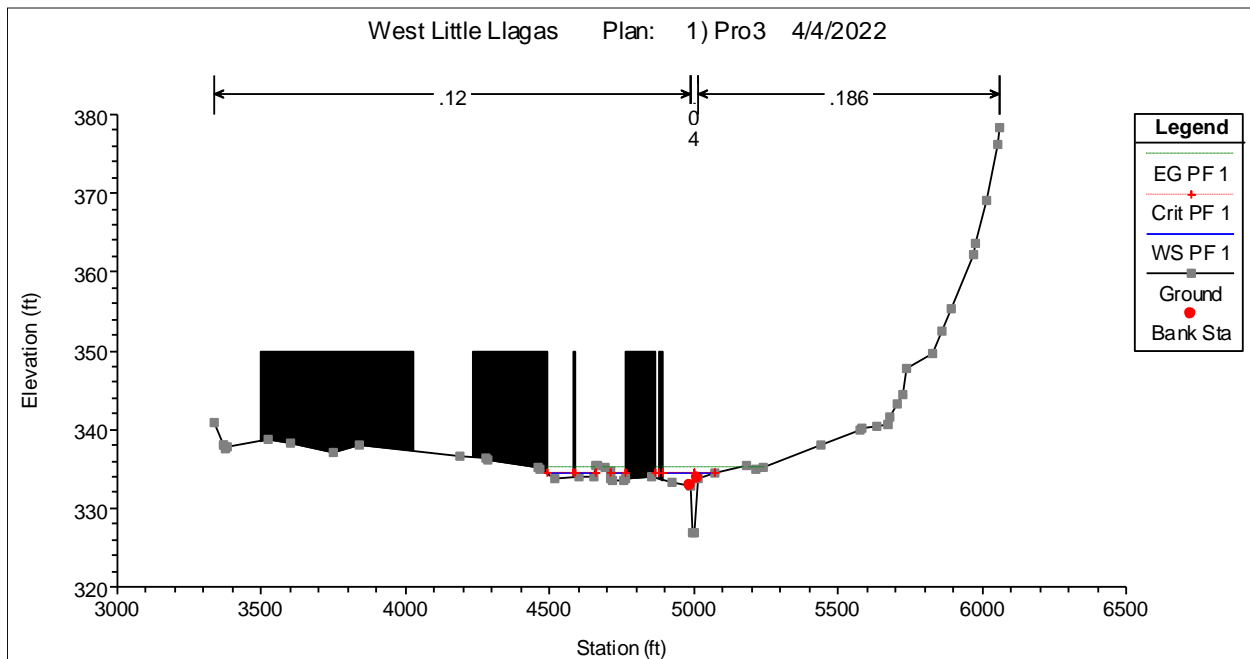


Figure 7. Project Site at XS 365.20

Conclusion

Based on our hydraulic analyses using the FIS effective model of West Little Llagas Creek, the project at 16720 Monterey Road shows no significant impact to West Little Llagas Creek. The proposed structure does not increase the modeled obstructions in the left overbank of the West Little Llagas Corrected Effective Model significantly. Schaaf & Wheeler finds the hydraulic impact to be within the City's requirements using the FIS effective model and expects no significant increase in the 100-yr water surface elevation from the proposed structure on West Little Llagas Creek at the Project Site. There is no indication that the proposed site modifications would significantly increase flood risk in the region during a 100-yr event. Similarly, cumulative impacts are found to be within the City's requirements of less than 1 foot of increase overall.