

Technical Memorandum

Update to Arroyo de la Laguna Hydraulic Grade Line Analysis

Subject: Update to Arroyo de la Laguna Hydraulic Grade Line Analysis TM

Prepared For: Dexter Yee, Ed Cummings, Jim O-Toole

Prepared by: Nuria Bertran-Ortiz

Reviewed by: Randy Raines

Date: March 9, 2006

Reference:

1 Purpose

The purpose of this Technical Memorandum (TM) is to update the attached Draft TM dated October 20, 2004 and submitted as part of the Administrative Draft Stream Management Master Plan (ADSMMP). The previous Draft TM is attached to this appendix.

2 Updates

Updates to the Reach 8 floodplain discussion in the Hydraulic Grade Line Analysis Draft TM are required based on recent communications with the City of Pleasanton (City).

As discussed in the Draft TM, the Valley Trails and Del Prado neighborhoods are low lying areas that were considered to be in the Federal Emergency Management Agency (FEMA) 100-year floodplain. However, based on a recently approved Letter of Map Revision (LOMR) for the Valley Trails neighborhood, the floodplain area shown on page 3 of the Draft TM is outdated. This LOMR was approved by FEMA in August of 2005 (FEMA 2005). Additional efforts by the City and Del Prado residents have been conducted since then to remove the Del Prado neighborhood from the FEMA floodplain. FEMA has approved the recent Letters of Map Amendments (LOMAs) submitted by property owners and as a result, this floodplain area will be removed in the next Flood Insurance Rate Map (FIRM). A figure depicting the area in question is shown below.



¹The area of Pleasanton located within the dotted yellow line will be removed from the 100-year event FEMA floodplain due to recently filed LOMAs not yet reflected in the FEMA floodplain map (City of Pleasanton, February 2006).

It is important to note that flows used to develop the current FEMA floodplain, Valley Trails LOMR, and Del Prado LOMAs were based on present day conditions. These flows are expected to increase due to increases in impervious surfaces as the valley is developed to general plan buildout (basis for SMMP). As a result, the designation of this area as being in or out of the FEMA floodplain under future build-out conditions is still to be determined. For additional discussion on the analysis of water surface elevations along Arroyo de la Laguna for SMMP conditions, refer to the attached Draft TM (Arroyo de la Laguna Hydraulic Grade Line Analysis).

DRAFT Technical Memorandum



Arroyo de la Laguna Hydraulic Grade Line Analysis

Subject: Arroyo de la Laguna Hydraulic Grade Line Analysis

Prepared For: Dexter Yee, Ed Cummings, Jim O-Toole

Prepared by: Nuria Bertran-Ortiz

Reviewed by: Randy Raines

Date: October 20, 2004 (last modified December 9, 2005)

Reference:

1 Introduction

This Technical Memorandum (TM) presents an analysis of water surface elevations (WSEs) or hydraulic grade line (HGL) along Arroyo de la Laguna (ADLL) for SMMP conditions (HEC-RAS HGL). In addition, this HGL will be compared with the HGL presented in Zone 7's 1966 Master Plan (Green Book HGL).

A previous TM, written by RMC, and dated January 7, 2004, described the existing models and modifications made to those models to determine the impact of the future Bernal Bridge on WSEs under SMMP conditions. A copy of this TM has been attached as a reference. Five HEC-2 model files were originally provided to RMC by Zone 7 staff, including three models for ADLL and separate models for Alamo Canal and Arroyo Mocho. These models were used by RMC to model the WSEs along ADLL from the confluence with Alameda Creek to the confluence with Arroyo Mocho. The model was used to determine the impact of the future Bernal Bridge on the WSEs during the estimated SMMP peak flows at build-out conditions with 5,000 acre-feet of regional storage at Chain of Lakes. The flow rate along ADLL, at the Bernal Bridge, was estimated to be 18,730 cubic feet per second (cfs). It is important to note that cross section data, including bottom channel elevations, for the HEC-RAS modeling was originally obtained from the 1975 Flood Insurance Study. Some cross sections were updated to include 1998 surveyed cross sections between Verona Bridge (Station 178+22) and Bernal Avenue Bridge (Station 306+03).

2 HGL along ADLL under SMMP Conditions (HEC-RAS HGL)

Water surface elevations along ADLL were obtained by running the HEC-RAS "ADLL SMMP Flow Updated Geometry" plan. This plan incorporates channel geometries consistent with the addition of the proposed Bernal Avenue Bridge and recent erosion of the ADLL channel south of the bridge. Flow rates at the bridge were increased to reflect SMMP flows of 18,730 cfs. The water surface profile is shown on Figure 1. Figure 2 shows the remaining freeboard in the channel. Freeboard was calculated at each cross-section by subtracting the water surface elevation from the lowest top of bank elevation (i.e. either east or west bank elevations). The hydraulic data used to develop these graphs has been attached to this TM and is shown in Table 1.

Findings

A description of the WSEs obtained from the HEC-RAS model run follows. As seen in Figure 2, there were four areas of the profile where the WSE was above the lowest top of bank elevation. These areas included:

- Reach immediately upstream of the Interstate 680 bridge crossing (Station 333+45)

The HEC-RAS cross section for this station is shown on Figure 3. As seen in this figure, the station has a block retaining wall on the east bank of the channel. From field observations, this retaining wall was determined to represent the concrete structure at the confluence of ADLL and Arroyo del Valle. The HEC-RAS east bank elevation was misrepresented because it was placed at the bottom of this concrete structure. The west bank is shown to have a higher elevation. However, after field verification, both banks were determined to be approximately at the same elevation. The HEC-RAS model is therefore misrepresenting the station cross section. As a result, it was determined that the WSE was most likely not below the east bank elevation.

- Reach immediately downstream of the proposed Bernal Avenue Bridge (Station 306+03 to 298+12)

As shown on Figure 2, there are four stations where the freeboard is negative, or the WSE is above the lowest top of bank elevation. Cross sections of these stations are shown on Figures 4 through 7. The low bank elevations appear to result from limited survey data since these cross sections do not extend to the top of bank. This appears to be exacerbated at Station 300+62 (Figure 6) where the west bank elevation is shown to be 9.6 feet below the east bank elevation. However, as shown on the figure, the cross section for this station is cut off on the west bank. The HEC-RAS model is therefore misrepresenting the station's cross sections. As a result, it was determined that the WSEs were most likely not below the top of bank elevations.

- Reach immediately upstream of the railroad bridges (Station 165+90 to 129+50)

Areas above the railroad bridges have WSEs slightly above the over bank station elevations. However, the floodwaters would not extend beyond the limit of the floodplain which covers the SFPUC property. As a result, it was determined that the Phase 1 SMMP Interim Report recommendation to allow floodwaters onto the SFPUC property was adequate.

- Reach immediately upstream and downstream of the Niles Canyon Road Bridge (Station 40+80 to 33+55)

The station with the most pronounced flooding problem is Station 35+60. The cross section is shown on Figure 8. This station is approximately 125 feet upstream of the Niles Canyon Bridge. As shown on Figures 2 and 8, the WSE is approximately 10 feet above the west top of bank elevation. This station is in the vicinity of the Sunol Glen Elementary School. After field verification, it was determined that construction of a levee was necessary to prevent flooding along the west bank of ADLL. The levee would start on the west bank at the Niles Canyon Bridge and would continue upstream for 1,000 feet. Details on this levee were incorporated into the R.10-5 project table.

As seen on Figure 2, the reach along the Del Prado and Valley Trails neighborhoods (from the Interstate 680 crossing to the confluence with Arroyo Mocho) has a freeboard ranging from -1.58 to 9.19 feet. The freeboard for this section of ADLL is also shown on Figure 9. Valley

Trails and Del Prado are low lying areas that have experienced flooding problems in the past. As shown below, the current FEMA 100-year floodplain used to extend beyond Del Prado neighborhood to areas in the Valley Trails neighborhood between Arroyo Mocho and Pleasanton Canal.



This area was recently removed from the floodplain following a Letter of Map Revision (LOMR) approved by the Federal Emergency Management Agency (FEMA) in August of 2005 (FEMA, 2005). The LOMR was based on modifications to the Bernal Avenue bridge abutment, new topographic data, and new hydraulic analyses. Flows used to conduct the LOMR hydraulic analyses were based on present day conditions. These flows are expected to increase due to increases in impervious surfaces as the valley is developed to general plan buildout. As a result, and as shown in figures 1 and 2, this area may still be subject to flooding under future build-out conditions.

The HEC-RAS WSEs along this reach were compared to pad elevations for homes situated in the Valley Trails neighborhood. Pad elevation data was obtained from Zone 7 staff and is shown in Table 2. Out of 422 homes in the Valley Trails neighborhood, 155 homes were found to have pad elevations below the HEC-RAS HGL. The list of houses with pad elevations below HEC-RAS WSEs is shown in Table 2. Pad elevations for homes in the Del Prado neighborhood were not available. However, the elevation obtained from USGS maps ranged from 308 to 324 feet suggesting that some houses in Del Prado are also below the HEC-RAS HGL.

According to the Federal Register (44 CFR Part 65.10, October 2003), at least three feet of freeboard above the 100-year flood profile elevations are required to remove areas from the

FEMA 100-year floodplain. As seen in Figure 9, freeboard depths for this reach range from -1.58 to 9.19 feet, with most stations having less than 2 feet of freeboard. Based on the hydraulic profile for this reach, FEMA's three foot requirement will not be met unless the existing floodwall is reinforced or a new floodwall is constructed. The floodwall would have to provide at least three feet of freeboard above the 100-year flood profile elevations.

The SMMP Phase 1 Interim Report recommended construction of a two to four-foot tall flood wall along 5,000 feet of channel. As seen in Figure 9, a four-foot high flood wall would provide adequate protection except at Station 333+45 where the station has a block retaining wall on the east bank of the channel. As described in the first bullet point above, the HEC-RAS model is misrepresenting the station cross section and it was determined that the WSE was most likely not below the east bank elevation. In addition, the SMMP Phase 1 Interim Report recommended pump stations to drain storm water out of the neighborhoods located below the WSEs. Therefore, a two to four-foot tall flood wall extending along 5,000 feet of channel in combination with the drainage pumps will be adequate to protect the Valley Trails and Del Prado neighborhoods from flooding under SMMP 100-year storm flows.

3 Green Book HGL along ADLL

Profiles of the hydraulic grade line for Zone 7 channels were provided to RMC by Zone 7 staff. HGL data was obtained by reading the elevations shown on the ADLL HGL profile sheet including bottom channel, water surface, and top of bank elevations. This data was incorporated into an MS Excel spreadsheet and is shown in Table 3. The Green Book HGL profile was then graphed and compared to the HEC-RAS profile. The Green Book water surface or HGL profile is shown on Figure 10.

Findings

A comparison of the HEC-RAS and Green Book HGL profile follows. Both profiles are shown on Figure 11. As seen on this figure, the HEC-RAS HGL is generally above the Green Book HGL. Differences between the HEC-RAS and Green Book WSEs varied from -2 feet to +10 feet. The most pronounced WSE differences occurred from Station 240+00 to 370+00. This represents the reach along ADLL starting immediately downstream of the Line B21-1 confluence to the Pleasanton Canal confluence. The area which may be most affected by this rise in the HGL is the Del Prado neighborhood. As previously mentioned, a four feet tall floodwall and a drainage pump station have been recommended for this reach.

The HEC-RAS HGL upstream of Station 370+00 is shown to be below the Green Book HGL. This reach represents ADLL along the Valley Trails neighborhood. As previously mentioned, the HEC-RAS and Green Book WSEs along this reach were compared to pad elevations for homes situated in the Valley Trails neighborhood. Out of 430 homes in the Valley Trails neighborhood, 155 homes were found to have pad elevations below the HEC-RAS HGL. In comparison, 401 houses were found to have pad elevations under the Green Book HGL.

In contrast, the HEC-RAS bottom channel elevation is generally below the Green Book bottom channel elevation. This suggests the channel from Verona Bridge (Station 178+22) to Bernal Bridge (Station 306+03) has incised from the time Green Book cross sections were taken (1966) to the time HEC-RAS updated cross sections were taken (1998). The channel upstream of Bernal Bridge has been improved to Zone 7 Green Book standards. The channel downstream of Verona Bridge was incising from the time Green Book cross sections were taken (1966) to the time cross sections were taken for the 1975 Flood Insurance Study.

4 Conclusions

The following conclusions can be drawn from the findings presented above.

1. As discussed in Section 1, two areas were found to have WSEs above top of bank elevations: the area above the railroad bridges and the area immediately upstream and downstream of the Niles Canyon Bridge.
 - The area above the railroad bridges is located in the SFPUC property. Floodwaters would not extend beyond the limit of the floodplain. Therefore it was determined that the Phase 1 SMMP Interim Report recommendation to allow floodwaters onto the SFPUC property was adequate.
 - The area immediately upstream and downstream of the Niles Canyon Bridge is in the vicinity of the Sunol Glen Elementary School. After field verification, it was determined that construction of a levee was necessary to prevent flooding along the west bank of ADLL. This recommendation has been incorporated into Project R.10-5.
2. As discussed in Section 1, Valley Trails and Del Prado are low lying areas that have experienced flooding in the past. According to the Federal Register (44 CFR Part 65.10, October 2003), at least three feet of freeboard above the 100-year flood profile elevations are required to remove these areas from the FEMA 100-year floodplain. As shown on Figure 2, most stations along this reach have less than 2 feet of freeboard. As a result, a two to four-foot high flood wall and drainage pump stations were recommended to remove these areas from the floodplain.
3. As described in Section 2, the estimated HGL under SMMP conditions will be generally higher than the Green Book HGL. The most pronounced difference in HGL occurs from Station 240+00 (Line B21-1 confluence) to Station 370+00 (Pleasanton Canal confluence). The drainage pumps recommended for the Del Prado and Valley Trails neighborhoods will need to be designed based on this new HGL.
4. Further investigation of local neighborhood storm drainage systems along ADLL is needed to assess the effects of this increase in the HGL. The City of Pleasanton will be informed at the next one-on-one meeting between the Zone 7 team and City of Pleasanton staff.

UPSTREAM
(CONFLUENCE W/ ARROYO MOCHO)

DOWNSTREAM
(CONFLUENCE W/ ALAMEDA CREEK)

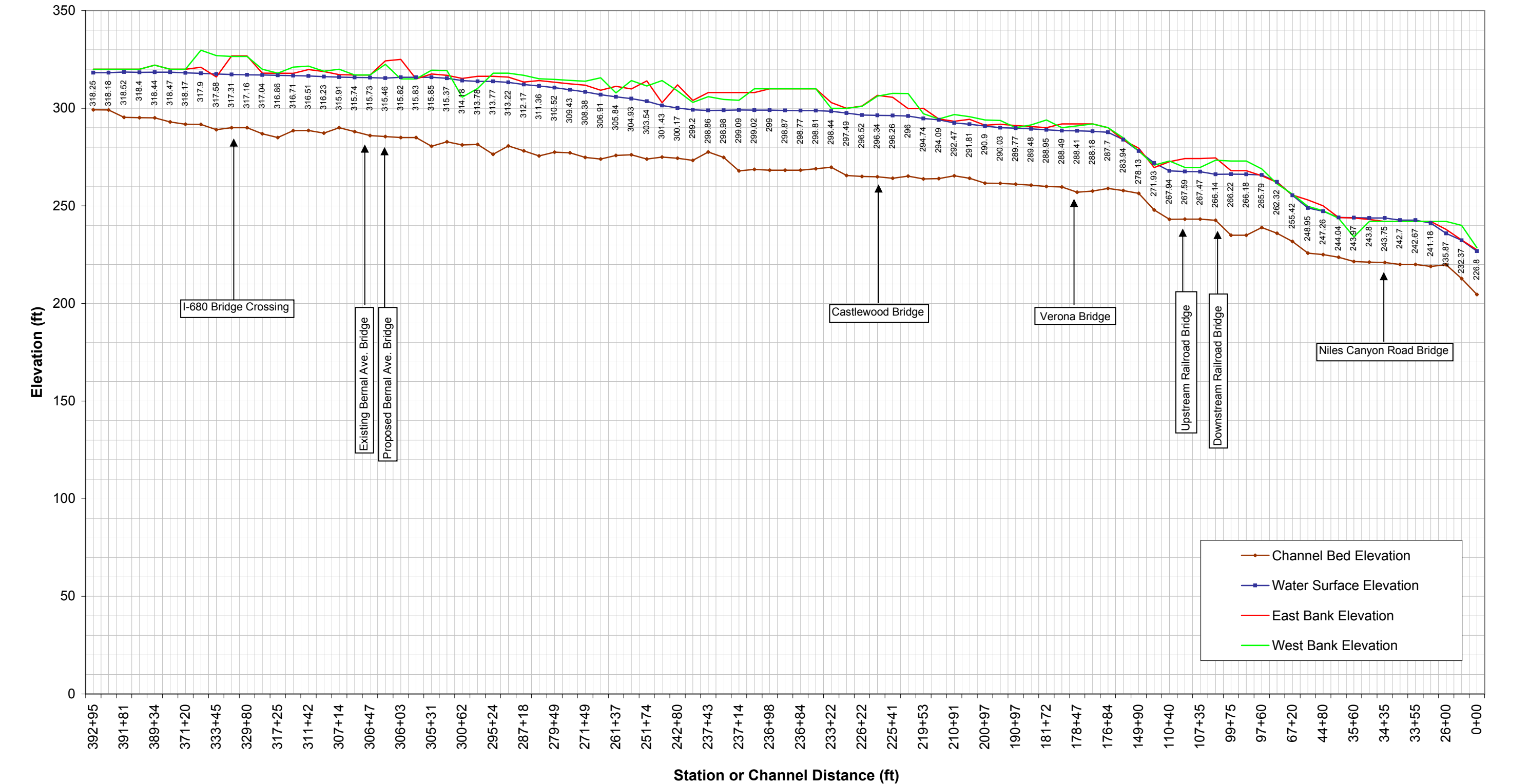


Figure 1. Hydraulic grade line along ADLL as modeled in HEC-RAS under SMMP conditions

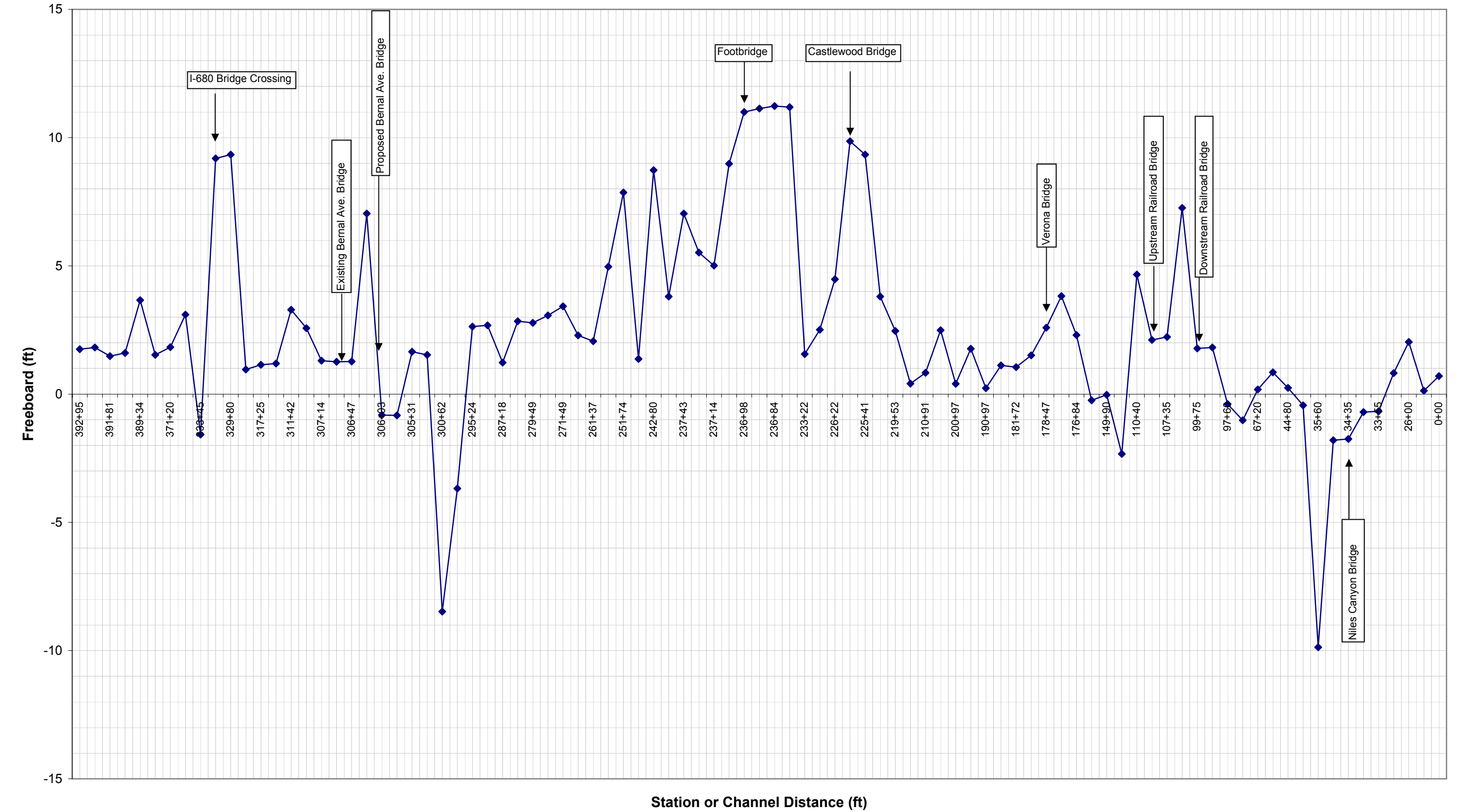


Figure 2. Freeboard along ADLL as modeled in HEC-RAS under SMMP conditions

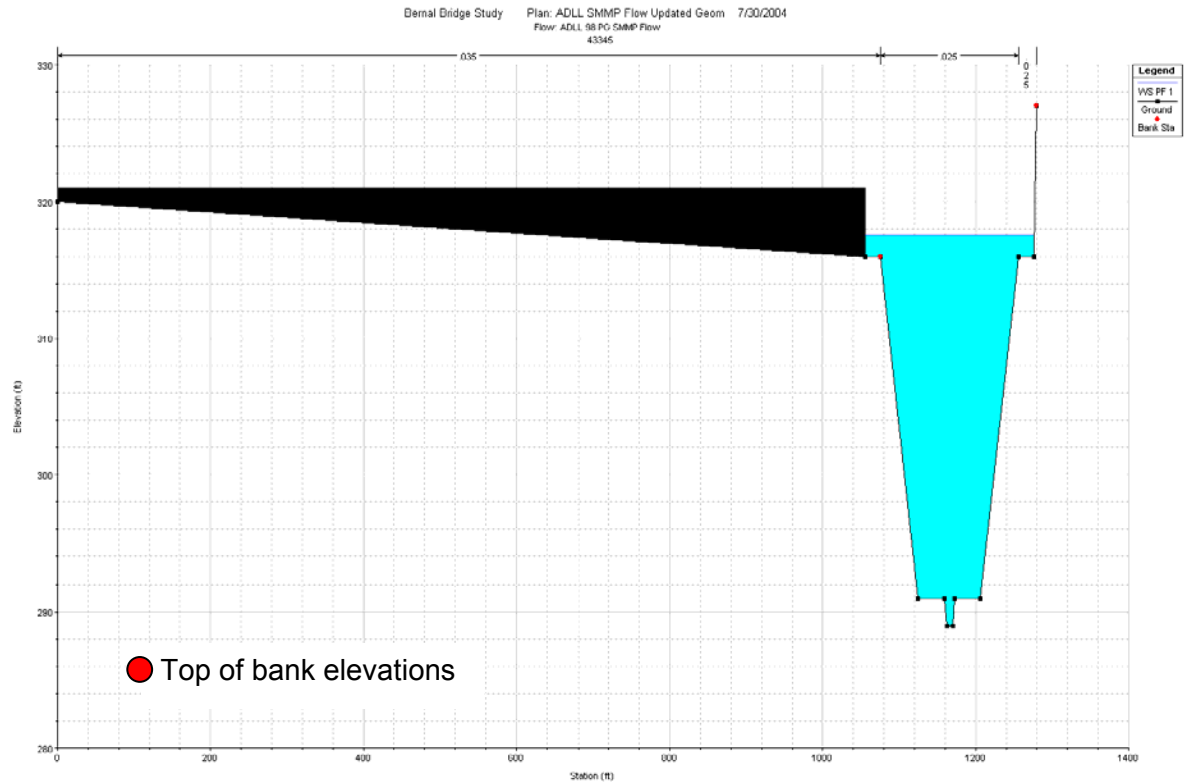


Figure 3. Station 333+45 HEC-RAS cross section

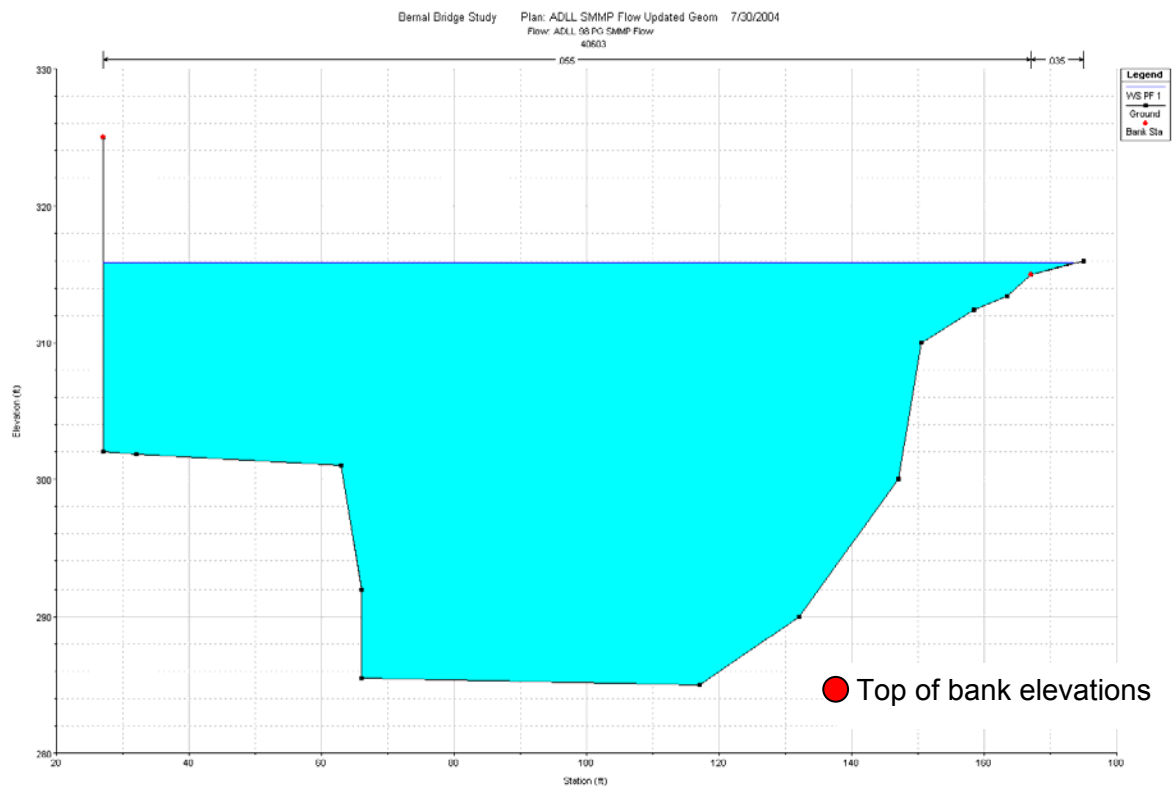


Figure 4. Station 306+03 HEC-RAS cross section

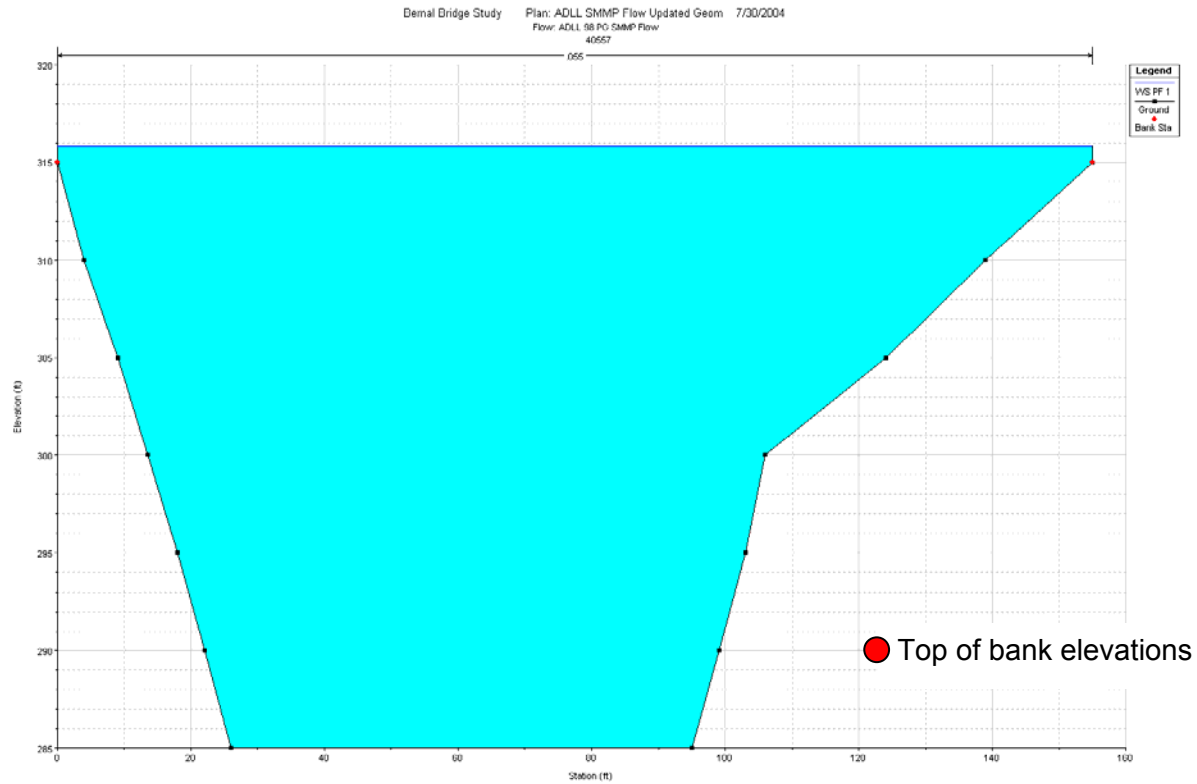


Figure 5. Station 305+57 HEC-RAS cross section

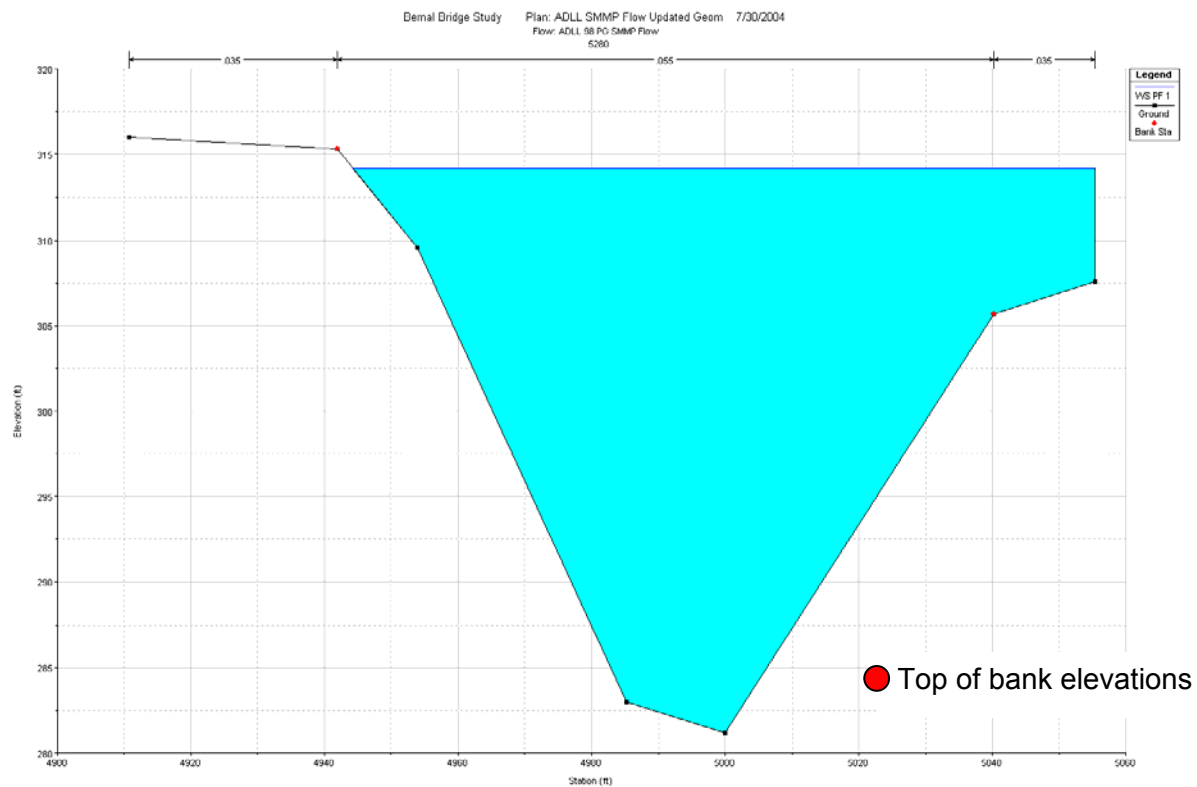


Figure 6. Station 300+62 HEC-RAS cross section

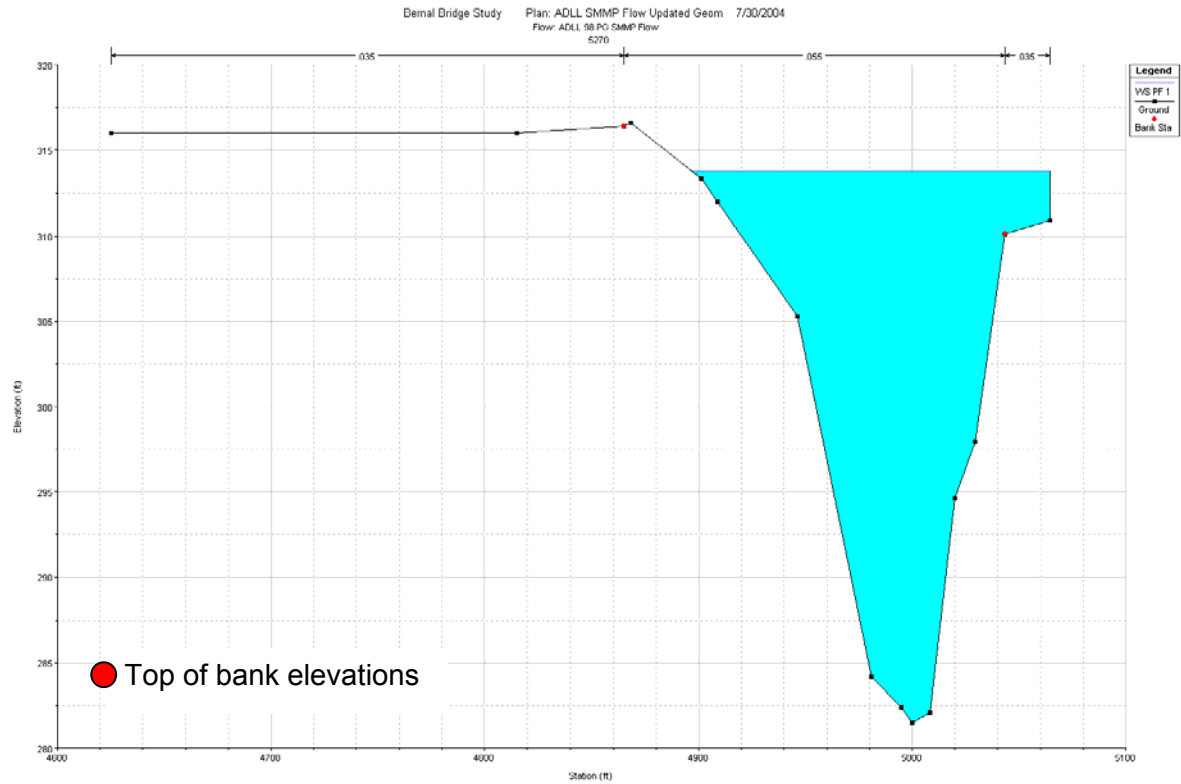


Figure 7. Station 298+12 HEC-RAS cross section

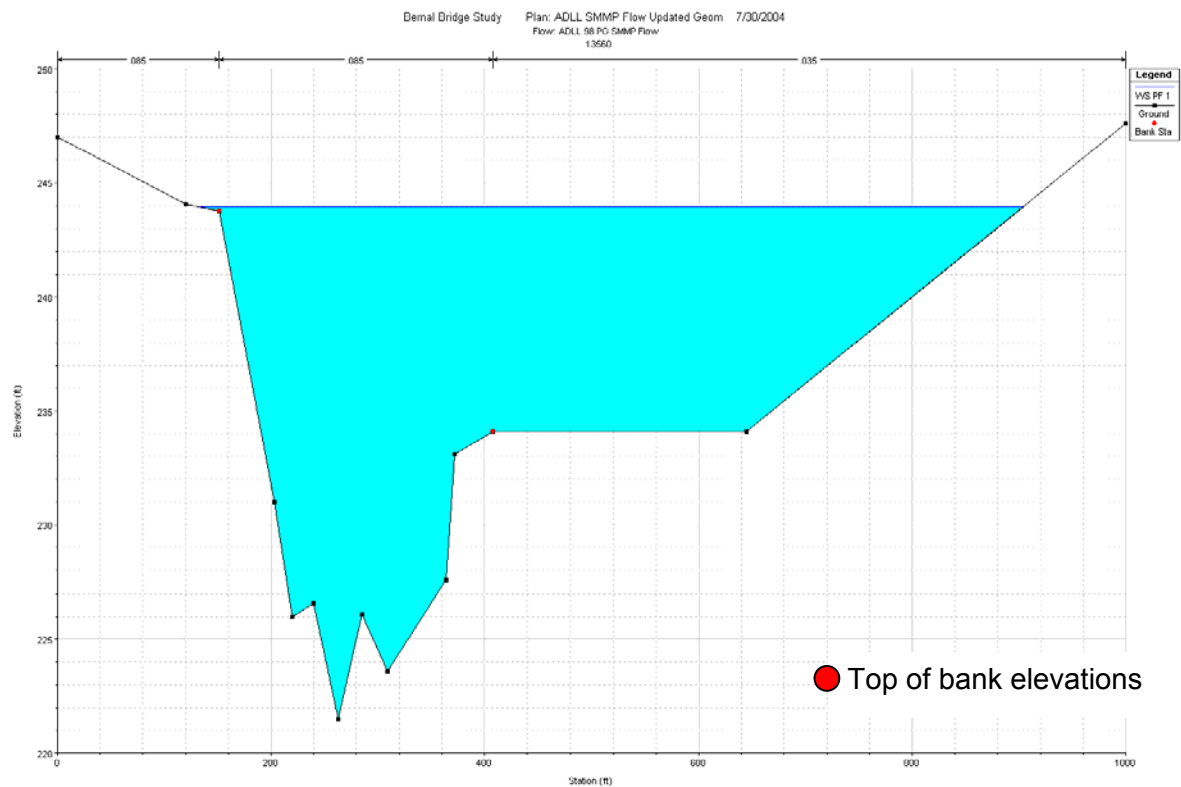


Figure 8. Station 35+60 HEC-RAS cross section

UPSTREAM
(CONFLUENCE W/ ARROYO MOCHO)

DOWNSTREAM
(I-680 CROSSING)

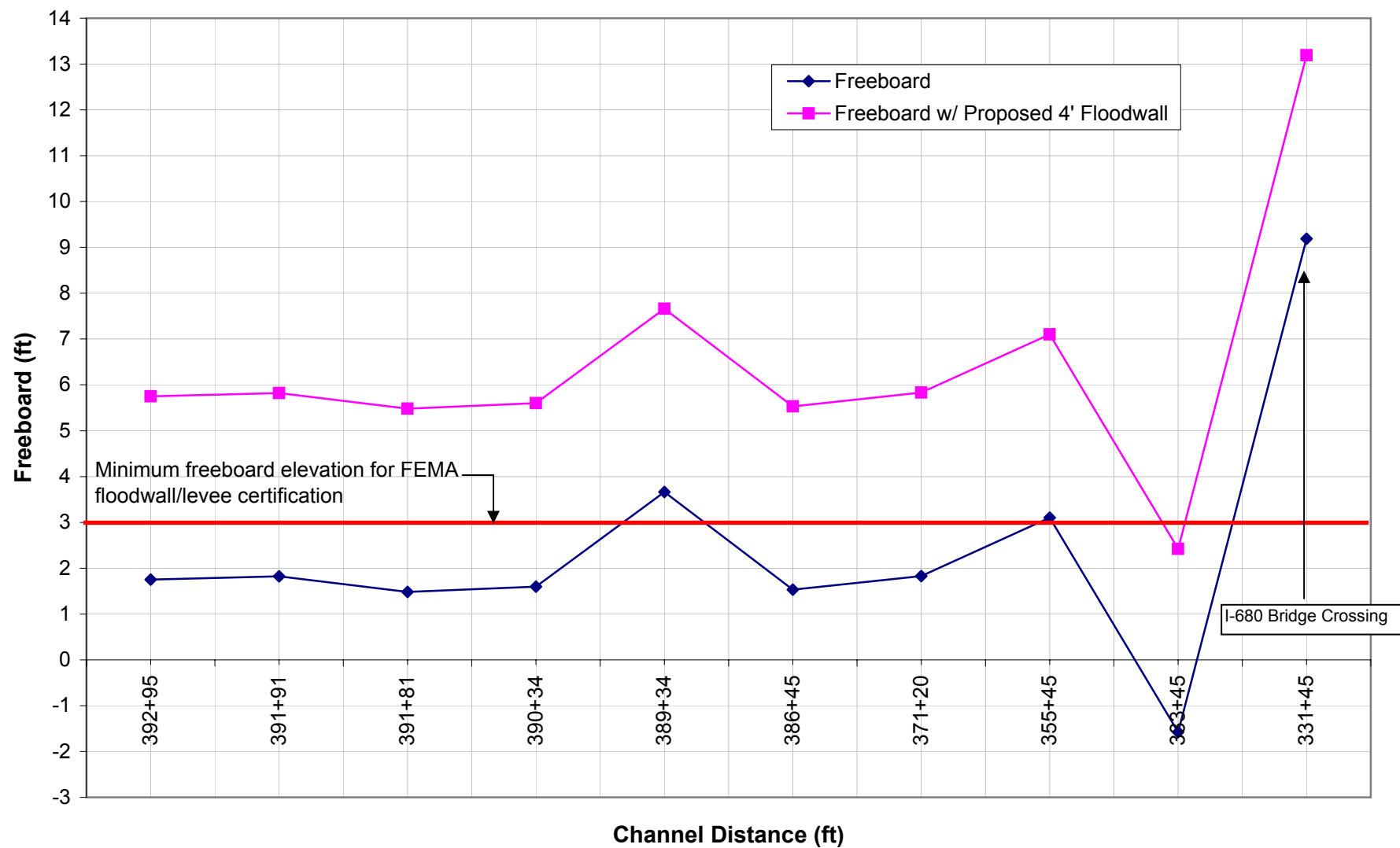


Figure 9. ADLL hydraulic grade line along the Valley Trail and Del Prado neighborhoods as modeled in HEC-RAS under SMMP conditions

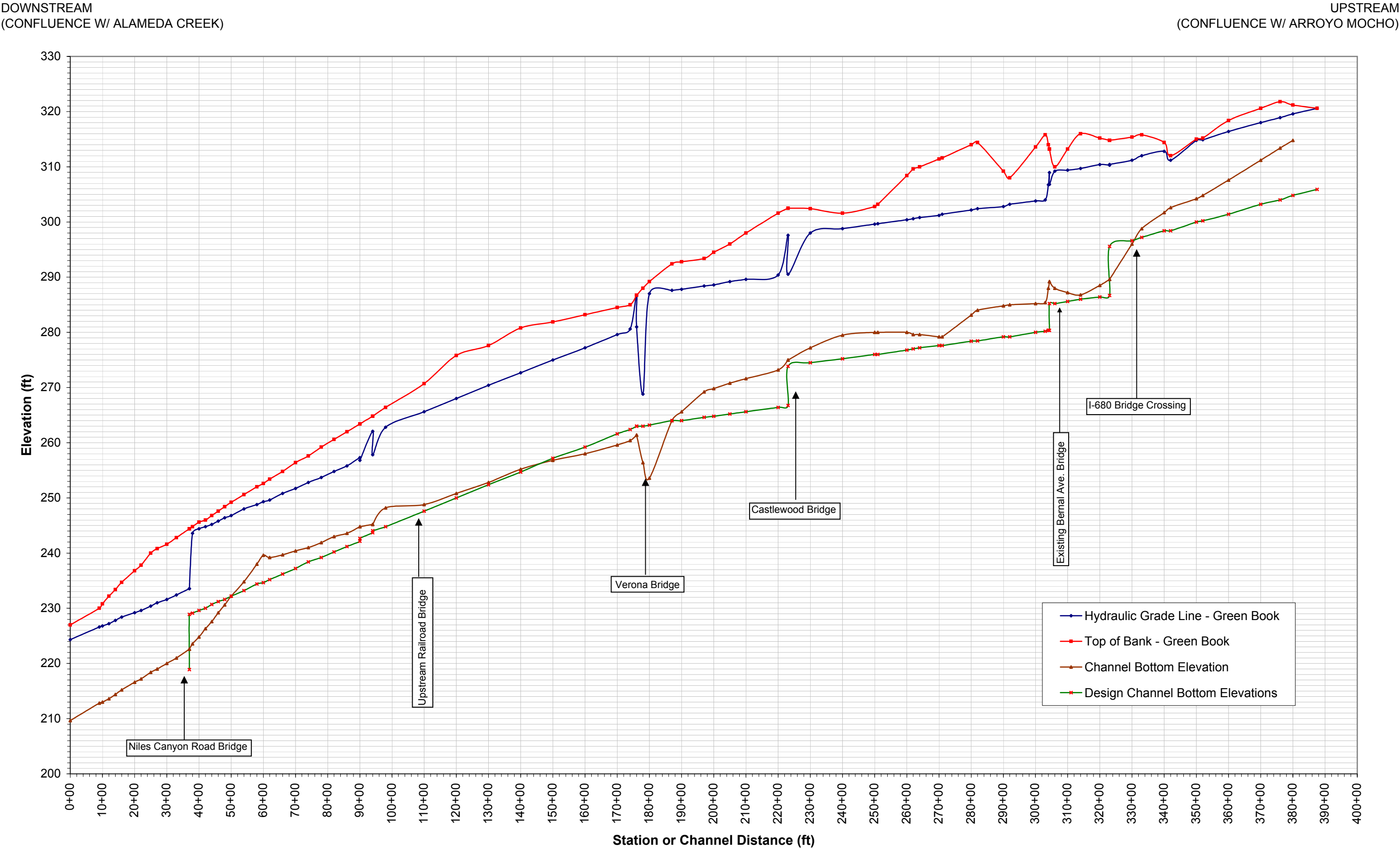


Figure 10. Hydraulic grade line along ADLL as presented in the Green Book

DOWNSTREAM
(CONFLUENCE W/ ALAMEDA CREEK)

UPSTREAM
(CONFLUENCE W/ ARROYO MOCHO)

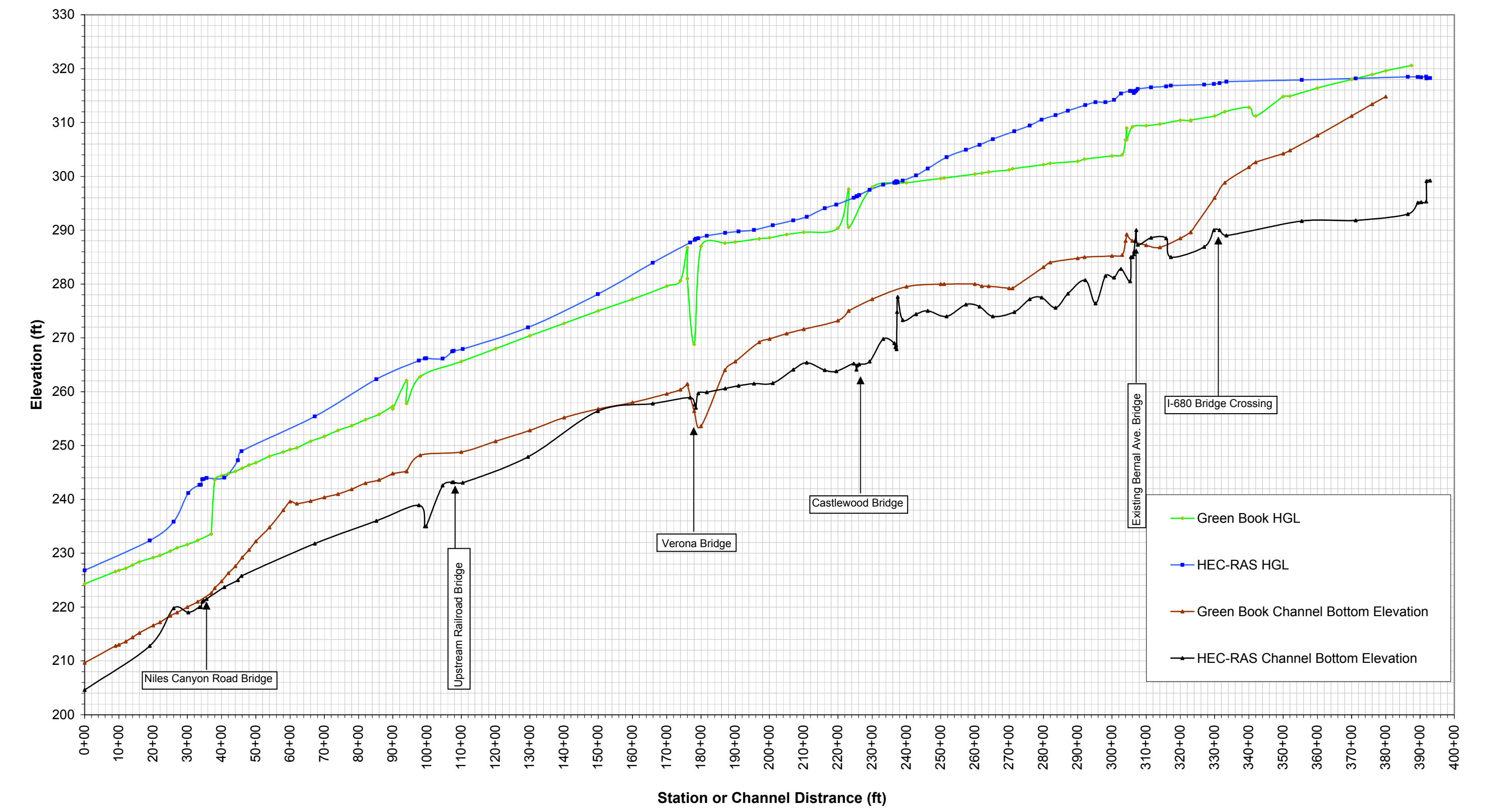


Figure 11. Comparison between the HEC-RAS and Green Book HGLs

Attachments



Technical Memorandum

To: File
Prepared by: Jeff Lewandowski, P.E.
Reviewed by: Randy Raines, P.E.
Date: January 7, 2004
Subject: Internal Technical Memorandum
Zone 7 – Arroyo de la Laguna Hydraulic Model Review
FIS Model, 1998 Revisions, and Proposed Bernal Bridge

Introduction

This memorandum is for internal use as a summary of HEC-RAS model modifications and preliminary analysis of the Arroyo de la Laguna (ADLL). Five HEC-2 model files were provided to RMC by Zone 7 staff, including three models for ADLL and separate models of Alamo Canal and Arroyo Mocho. These models were used by the City of Pleasanton to model the impact of the existing Bernal Bridge abutment and the construction of the future Bernal Bridge on water surface elevations under current estimated peak flows. These models were used by RMC to model the water surface elevations along ADLL from the confluence with Alameda Creek to the confluence with Arroyo Mocho. The model was used to determine the impact of the future Bernal Bridge on the water surface elevations during the estimated peak flows at buildout conditions.

Work Performed

1. Imported five HEC-2 models into HEC-RAS. The models were obtained from the City of Pleasanton and included:

- ADLLFIS – The model recreated from information used in the 1975 FIS
- ADLL98E - The ADLLFIS model updated to include 1998 surveyed cross sections between Verona Road Bridge and the Bernal Avenue Bridge
- ADLL98PG – The ADLL98E model with the addition of the proposed Bernal Avenue Bridge. The channel cross sections in this model were renumbered to match channel stationing, which allowed direct comparison to the ADLLFIS model results.
- ALAMO – The model of the Alamo Canal
- MOCHO – The model of the Arroyo Mocho channel

2. Calculated and compared the 100-year flood water surface elevations upstream of Bernal Avenue under current 100-year flood conditions without storage on Arroyo Mocho and buildout 100-year flood conditions with upstream storage on Arroyo Mocho. The channel geometry model including both the existing and proposed bridges on Bernal Avenue was used in this calculation. The Arroyo de la Laguna flow at Bernal Bridge was estimated at 17,000 cfs during the 1975 FIS (current 100-year flood conditions). Recent master planning efforts for flood control have included flow estimates of greater than 25,000 cfs at the Bernal Avenue bridge due to changes in the upstream watershed. One of the master planning alternatives included storm water storage in the quarry area along Arroyo Mocho, which reduced the peak flow at the Bernal Bridge to about 18,730 cfs (buildout 100-year flood conditions). This peak flow condition of 18,730 cfs was modeled for comparison with the 17,000 cfs flow condition at the Bernal Bridge. The additional flow will cause the water surface upstream of the Bernal Avenue bridge to rise 1.13 feet above the 17,000 cfs flow condition. The higher water surface has an elevation of 315.74 feet, which is about 1.38 feet lower than the flooding water surface elevation determined by the FIS model and currently shown on the FIRM. As a result, 5,000 AF of upstream storage at the Chain of Lakes would result in flooding at future 100-year flows to be similar to the 100-year flow and water surface elevations developed as part of the 1975 FIS.

The water surface elevations upstream of Bernal Avenue bridge at the different modeled conditions are shown on Table 1.

Table 1. Comparison of Flooding Water Surface Elevations Upstream of Bernal Bridge.

Condition	Model Plan Name	100-Year Bernal Bridge Flow Rate (cfs)	Water Surface Elevation Upstream of Bridge (feet)
Assumed 1975 FIS Model Geometry	ADLL FIS Study	17,000	317.12
FIS Model Geometry with Updated Survey Cross Sections Between Bernal Avenue and Verona Road	ADLL 98E	17,000	314.44
ADLL 98E with Proposed Bernal Bridge	ADLL 98 PG	17,000	314.61
ADLL 98 PG with Peak Flow Based on Buildout Flow Conditions and 5,000 Acre-Feet of Upstream Storage on Arroyo Mocho	ADLL SMMP Flow	18,730	315.74

Key Issues

- The current 100-year water surface elevations along Arroyo de la Laguna upstream of Verona Bridge are lower than those shown on current Flood Insurance Rate Maps (FIRMs). In the 1998 update model, the 100-year water surface elevations along the Arroyo de la Laguna upstream of Verona Bridge are up to 3 feet lower than the 1975 Flood Insurance Study (FIS) model. The 1975 FIS model water surfaces are used in the current FIRM.
- The Arroyo de la Laguna water surface upstream of the Bernal Avenue bridge is 2.7 feet lower than identified previously in the 1975 FIS model. This reduction in flooding depth is due to the lowering of the channel bed by erosion between the Bernal Bridge and Verona Bridge. Depth of erosion

varies, but generally ranges between 4 and 5 feet. The amount of erosion was documented through comparison of the 1975 channel invert elevations and the 1998 surveyed channel invert elevations.

- The current bed elevations of the Arroyo de la Laguna channel downstream of Verona Bridge to the confluence with Alameda Creek were not measured during the 1998 survey, and have been assumed to be equal to those used in the 1975 FIS. This reach may have experienced degradation or aggradation.
- The proposed additional Bernal Avenue bridge will increase the upstream flooding depth by about 0.17 feet under the current lower channel thalweg conditions downstream of Bernal Avenue. This water surface is 2.51 feet below the flooding water surface elevations determined by the FIS and currently shown on the FIRM. The reduction in water surface elevation appears to result from the measured bed erosion between Bernal Bridge and Verona Bridge.
- The expected increase in 100-year flow to 18,730 cfs on Arroyo de la Laguna when using upstream storage on Arroyo Mocho under future conditions will cause the water depths upstream of the existing and proposed Bernal Avenue bridges to increase by 1.13 feet. This water surface is 1.38 feet below the flooding water surface elevations determined by the FIS and currently shown on the FIRM. Again, the reduction in water surface elevation appears to result from the measured bed erosion between Bernal Bridge and Verona Bridge.

3. Revised the ADLL98PG geometry file by moving the right and left overbank stations to higher elevations along the cross section. The right and left overbank station were generally placed at the edge of the main channel, and were assumed to represent the limits of the main channel Manning's n value. These overbank stations defined the main channel Manning's n, but were below the 100-year water surface elevation. When viewed on the channel hydraulic profiles, the low elevations of the overbank station implied significant flooding could occur along those reaches. In some areas, the flooding areas were very limited, due to the much higher ground elevations a short distance from the edge of the channel. To provide a more representative channel overtopping elevations, the right and left overbank stations were moved to higher elevations within the cross section. The channel Manning's n values were not changed from the original values. To maintain the original values, a horizontal variation in Manning's n values was used to match the Manning's n between the original overbank station values.

Although the overbank stations had higher elevations, the flooding limits in the model did not change. Four areas of the profile have overbank elevations lower than the water surface elevation.

- Upstream of Paloma Road bridge - Areas upstream of the Paloma Road bridge have water surface elevations above the overbank station elevation, but currently extend to the limit of the floodplain. The 500-year floodplain limits are only slightly larger than the 100-year limits, indicating the edge of the floodplain was reached.
- Upstream of Railroad bridge Areas upstream of the railroad bridges have water surface elevations above the overbank station elevation, but currently extend to the limit of the floodplain. The 500-year floodplain limits are only slightly larger than the 100-year limits, indicating the edge of the floodplain was reached.

- Downstream of Bernal Bridge - The low overbank section downstream of the Bernal Bridge appears to result from limited survey information taken only near the channel. Upstream and downstream cross sections near Bernal Bridge which extend greater distances from the channel include ground at much higher elevations.
- Upstream of I-680 Bridge - The low section upstream of the I-680 bridge has a blocked conveyance area on the east side of the cross section, which may represent the block retaining wall in that area.

Table 1. HEC-RAS hydraulic data for SMMP conditions

Ch Dist	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl	RS	Ch Dist
392+95	16290	299.2	318.25	302.49	319.43	0.00071	8.7	1872.62	136.58	0.41	49295	39294.9
391+91	16290	299.1	318.18		319.35	0.000709	8.7	1872.44	136.31	0.41	49191	39190.9
391+81	16290	295.3	318.52		319.2	0.000329	6.58	2476.57	153.27	0.29	49181	39180.9
390+34	17000	295.2	318.4		319.14	0.00036	6.89	2469.03	152.81	0.3	49034	39033.9
389+34	17000	295.1	318.44		319.08	0.000314	6.39	2660.59	166.37	0.28	48934	38933.9
386+45	17000	293	318.47		318.96	0.00022	5.62	3023.07	174.86	0.24	48645	38644.9
371+20	17000	291.8	318.17		318.63	0.000196	5.43	3128.89	174.03	0.23	47120	37119.9
355+45	17000	291.7	317.9		318.31	0.000193	5.11	3325.61	201.69	0.22	45545	35544.9
333+45	17000	289	317.58		317.92	0.000146	4.7	3645.81	221.57	0.2	43345	33344.9
331+45	18730	290	317.31		317.87	0.000229	5.98	3130.15	169.24	0.25	43145	33144.9
329+80	18730	290	317.16	304.82	317.72	0.000598	6.03	3104.86	168.64	0.25	42980	32979.9
326+95	18730	286.9	317.04		317.58	0.00041	5.87	3189.19	211.39	0.27	42695	32694.9
317+25	18730	285	316.86		317.24	0.000232	4.92	3809.23	222.02	0.21	41725	31724.9
315+86	18730	288.5	316.71		317.19	0.000363	5.52	3395.73	230.11	0.25	41586	31585.9
311+42	18730	288.6	316.51		317.01	0.000417	5.7	3286.3	233.93	0.27	41142	31142.1
307+55	18730	287.3	316.23		316.84	0.000395	6.3	2972.38	171.69	0.27	40755	30754.6
307+14	18730	290	315.91		316.79	0.000652	7.53	2485.73	148.67	0.32	40714	30713.6
306+80	18730	288	315.74		316.76	0.000659	8.09	2315.45	121.96	0.33	40680	30679.6
306+47	18730	286	315.73		316.73	0.000669	8.04	2330.59	124.86	0.33	40647	30646.6
306+42	18730	285.5	315.46		316.7	0.002899	8.96	2091.05	108.25	0.36	40642	30641.6
306+03	18730	285	315.82	305.26	316.44	0.001289	6.31	2968.54	146.56	0.24	40603	30602.6
305+57	18730	285	315.83		316.36	0.001002	5.83	3211.49	155	0.23	40557	30556.6
305+31	18730	280.5	315.85		316.32	0.000858	5.48	3420.32	166.24	0.21	40531	30530.6
302+68	18730	282.8	315.37		316.02	0.00138	6.46	2901.33	161.57	0.27	40268	30267.9
300+62	18730	281.2	314.18		315.55	0.002913	9.49	2003.93	111.13	0.38	40062	30061.6
298+12	18730	281.5	313.78		314.75	0.002554	7.96	2384.58	168.04	0.35	39812	29811.6
295+24	18730	276.4	313.77		314.2	0.000824	5.24	3576.33	264.46	0.25	39524	29524.1
292+24	18730	280.7	313.22		313.87	0.001297	6.47	2893.11	213.25	0.31	39224	29224.1
287+18	18730	278.2	312.17		312.99	0.002365	7.26	2579.1	179.5	0.34	38718	28717.8
283+55	18730	275.6	311.36		312.22	0.001905	7.41	2527.34	138.02	0.31	38355	28355.3
279+49	18730	277.5	310.52	287.95	311.31	0.002517	7.12	2632.11	150.12	0.3	37949	27949
275+99	18730	277.2	309.43		310.28	0.003421	7.39	2533.13	177.22	0.34	37599	27599
271+49	18730	274.8	308.38		308.99	0.002217	6.27	2985.78	195.77	0.28	37149	27149
265+24	18730	274	306.91		307.58	0.002259	6.58	2847.51	174.55	0.29	36524	26524
261+37	18730	275.8	305.84		306.62	0.002664	7.1	2636.62	159.74	0.31	36136	26136.5
257+37	18730	276.2	304.93		305.6	0.002299	6.56	2855.45	181.4	0.29	35736	25736.5
251+74	18730	274	303.54		304.25	0.002487	6.78	2762.2	194.98	0.32	35174	25174
246+24	18730	275	301.43		302.55	0.003747	8.5	2204.35	127.4	0.36	34624	24624
242+80	18730	274.4	300.17		301.31	0.00348	8.56	2189.03	175.12	0.43	34280	24280.2
238+93	18730	273.3	299.2		300.19	0.002241	7.98	2347.57	169.38	0.38	33893	23892.7
237+43	18730	277.6	298.86	283.04	299.84	0.002434	7.93	2362.87	190.43	0.4	33743	23742.7
237+24	18730	274.8	298.98		299.74	0.001677	6.98	2682.21	197.55	0.33	33724	23723.9
237+14	18730	267.9	299.09		299.67	0.001132	6.1	3070.2	195.66	0.27	33714	23713.9
236+99	18730	268.7	299.02		299.64	0.001437	6.34	2956.53	217.73	0.3	33699	23698.9
236+98	18730	268.3	299		299.64	0.001483	6.44	2910.48	219.96	0.31	33698	23697.9
236+85	18730	268.3	298.87		299.52	0.001526	6.5	2881.89	218.95	0.32	33685	23685.4
236+84	18730	268.3	298.77		299.51	0.001561	6.93	2702.8	162.28	0.3	33684	23684.4
236+47	18730	269	298.81		299.42	0.001213	6.28	2980.68	227.51	0.31	33647	23646.9
233+22	18730	269.8	298.44		299.02	0.001214	6.11	3063.91	204.64	0.28	33322	23321.9
229+22	18730	265.6	297.49		298.29	0.002835	7.16	2616.55	180.59	0.33	32922	22921.9
226+22	18730	265.1	296.52	275.95	297.32	0.00371	7.18	2606.84	161.6	0.32	32622	22621.9
225+66	18730	264.9	296.34		297.09	0.003898	6.94	2699.3	185.78	0.32	32566	22565.6
225+41	18730	264.1	296.26		297.02	0.003763	6.99	2678.29	170.9	0.31	32541	22540.6
224+59	18730	265.2	296		296.76	0.002753	7.03	2664.61	174.16	0.32	32459	22459.3
219+53	18730	263.8	294.74		295.4	0.002516	6.49	2885.71	195.66	0.3	31953	21953
216+16	18730	264	294.09		294.55	0.002181	5.44	3442.32	329.38	0.3	31615	21615.5
210+91	18730	265.4	292.47		293.21	0.00289	6.88	2720.5	153.13	0.29	31090	21090.5
206+97	18730	264.1	291.81		292.28	0.001684	5.51	3398.91	192.75	0.21	30697	20696.7
200+97	18730	261.6	290.9		291.28	0.00155	4.95	3786.28	223.85	0.21	30097	20096.7
195+47	18730	261.5	290.03		290.43	0.001527	5.11	3667.98	201.67	0.21	29547	19546.7
190+97	18730	261.1	289.77	270.83	289.96	0.000608	3.53	5310.49	349.47	0.16	29097	19096.7
187+09	18730	260.6	289.48		289.7	0.000729	3.74	5014.16	354.89	0.15	28709	18709.2
181+72	18730	259.9	288.95		289.21	0.001166	4.05	4625.9	372.32	0.2	28172	18171.7
179+22	18730	259.7	288.49		288.84	0.001761	4.75	3939.53	318.87	0.24	27922	17921.7
178+47	18730	257	288.41		288.72	0.001234	4.5	4160.28	222.14	0.18	27847	17846.7
178+22	18730	257.6	288.18		288.45	0.001193	4.17	4493.38	353.94	0.21	27822	17821.7
176+84	18730	258.9	287.7		288.2	0.00238	5.69	3292.39	284.87	0.28	27684	17684.2
165+90	18730	257.8	283.94		284.64	0.004649	6.85	2830.82	275.87	0.32	26590	16590
149+90	18730	256.4	278.13		278.57	0.003078	5.31	3527.29	489.2	0.29	24990	14990
129+50	18730	247.9	271.93		272.3	0.00305	5.15	4478.9	888.42	0.25	22950	12950
110+40	18730	243.1	267.94	254.58	268.17	0.001585	3.84	4877.08	465.03	0.21	21040	11040
107+75	18730	243.2	267.59		267.81	0.001151	3.74	5004.57	298.8	0.16	20775	10775
107+35	18730	243.2	267.47		267.69	0.001179	3.77	4966.68	298.8	0.16	20735	10735
104+55	18730	242.6	266.14		266.97	0.006752	7.3	2566.83	214.79	0.37	20455	10455
99+75	18730	235	266.22		266.32	0.000337	2.52	7435.69	297.89	0.09	19975	9975
99+35	18730	235	266.18		266.28	0.000339	2.52	7424.15	297.86	0.09	19935	9935
97+60	18730	238.9	265.79		266.12	0.003219	4.6	4091.86	416.58	0.25	19760	9760
85+20	18730	236	262.32		262.59	0.002514	4.12	4547.41	440.5	0.23	18520	8520
67+20	18730	231.8	255.42		256.03	0.00566	6.26	2991.93	277.61	0.34	16720	6720
45+80	18730	225.8	248.95		249.18	0.002002	3.86	4854.17	431.76	0.2	14580	4580
44+80	18730	225	247.26	232.37	248.61	0.019198	9.35	2003.83	245.97	0.58	14480	4480
40+80	18730	223.7	244.04		244.7	0.005434	6.51	2884.02	313.92	0.36	14080	4080
35+60	18730	221.5	243.97		244.08	0.000369	2	7434.36	771.34	0.09	13560	3560
34+75	18730	221.2	243.8		244.01	0.001535	3.68	5167.05	528.05	0.18	13475	3475
34+35	18730	221	243.75		243.95	0.001317	3.69	5566.15	858.65	0.17	13435	3435
33+95	18730	220	242.7		242.94	0.001893	3.93	4847.82	672.4	0.2	13395	3395
33+55	18730	220	242.67		242.87	0.001401	3.59	5306.94	720.59	0.18	1	

Table 1. HEC-RAS hydraulic data for SMMP conditions

PF 1-LOB Elev (ft)	PF 1-ROB Elev (ft)	Lowest Top of Bank Elev (ft)	Remaining Freeboard (ft)
320	320	320	1.75
320	320	320	1.82
320	320	320	1.48
320	320	320	1.6
322.1	322.1	322.1	3.66
320	320	320	1.53
320	320	320	1.83
321	329.7	321	3.1
316	327	316	-1.58
326.8	326.5	326.5	9.19
326.8	326.5	326.5	9.34
318	320	318	0.96
318	318	318	1.14
317.9	321.1	317.9	1.19
319.8	321.6	319.8	3.29
318.8	319	318.8	2.57
317.21	320	317.21	1.3
317	317	317	1.26
317	317	317	1.27
324.25	322.5	322.5	7.04
325	315	315	-0.82
315	315	315	-0.83
317.5	319.5	317.5	1.65
316.9	319.3	316.9	1.53
315.3	305.7	305.7	-8.48
316.4	310.1	310.1	-3.68
316.4	318	316.4	2.63
315.9	318	315.9	2.68
313.4	316.9	313.4	1.23
314.2	315.1	314.2	2.84
313.3	314.8	313.3	2.78
312.5	314.3	312.5	3.07
311.8	313.8	311.8	3.42
309.2	315.6	309.2	2.29
311.2	307.9	307.9	2.06
309.9	314.2	309.9	4.97
314	311.4	311.4	7.86
302.8	314.2	302.8	1.37
312	308.9	308.9	8.73
304	303	303	3.8
308	305.9	305.9	7.04
308	304.5	304.5	5.52
308	304.1	304.1	5.01
308	310	308	8.98
310	310	310	11
310	310	310	11.13
310	310	310	11.23
310	310	310	11.19
302.9	300	300	1.56
300	300	300	2.51
301.1	301	301	4.48
306.6	306.2	306.2	9.86
305.6	307.6	305.6	9.34
299.8	307.5	299.8	3.8
300	297.2	297.2	2.46
294.5	294.5	294.5	0.41
293.3	296.8	293.3	0.83
294.3	295.7	294.3	2.49
291.3	294	291.3	0.4
291.8	293.7	291.8	1.77
291.1	290	290	0.23
290.6	291.5	290.6	1.12
290	294	290	1.05
292	290	290	1.51
292	291	291	2.59
292	292	292	3.82
290	290	290	2.3
283.7	284.8	283.7	-0.24
279.5	278.1	278.1	-0.03
269.6	270.9	269.6	-2.33
272.6	273	272.6	4.66
274.2	269.7	269.7	2.11
274.2	269.7	269.7	2.23
274.6	273.4	273.4	7.26
268	273	268	1.78
268	273	268	1.82
265.4	268.9	265.4	-0.39
262	261.3	261.3	-1.02
255.6	256	255.6	0.18
253	249.8	249.8	0.85
250	247.5	247.5	0.24
244	243.6	243.6	-0.44
243.8	234.1	234.1	-9.87
243	242	242	-1.8
242	242	242	-1.75
242	242	242	-0.7
242	242	242	-0.67
242	242	242	0.82
237.9	242	237.9	2.03
232.5	240	232.5	0.13
227.5	228.6	227.5	0.7

Table 2. Pad elevation data for Valley Trail homes (provided by Zone 7)

HOUSE #	STREET ADDRESS	ELEVATIOON SURVEY DATA			PAD ELEVATION CHECK		WATER SURFACE ELEVATIONS			
		PAD	FIN FLR.	GAR. SLAB	Is pad elevation below SMMP HGL?	Is pad elevation below Green Book HGL?	Station	HEC-RAS	Station	GREEN BOOK
1	3908 Petrified Forest Ct.	317.10	319.00	317.10	yes	yes	392+95	318.25	387+50	320.6
2	3696 Virgin Island Ct.	317.30	318.80	317.20	yes	yes	391+91	318.18	380+00	319.6
3	7006 Valley Trails Dr.	317.10	318.60	317.20	yes	yes	391+81	318.52	376+00	318.9
4	3911 Petrified Forest Ct.	317.10	318.90	317.40	yes	yes	390+34	318.4	370+00	318
5	3816 Hot Springs Ct.	317.10	318.60	317.20	yes	yes	389+34	318.44		
6	3721 Rocky Mountain Ct.	317.30	318.70	317.20	yes	yes	386+45	318.47		
7	3807 Mesa Verde Ct.	317.50	319.00	317.50	yes	yes	371+20	318.17		
8	3823 Mesa Verde Ct.	317.10	319.00	317.50	yes	yes				
9	3693 Virgin Island Ct.	317.20	318.70	317.30	yes	yes				
10	3708 Rocky Mountain Ct.	317.50	318.80	317.30	yes	yes				
11	7014 Valley Trails Dr.	317.60	320.10	317.40	yes	yes				
12	3816 Mesa Verde Ct.	317.40	319.10	317.60	yes	yes				
13	3737 Rocky Mountain Ct.	317.40	318.90	317.40	yes	yes				
14	3724 Rocky Mountain Ct.	317.40	318.90	317.40	yes	yes				
15	6923 Lassen St	317.50	319.10	317.70	yes	yes				
16	3839 Mesa Verde Ct.	316.60	319.20	317.70	yes	yes				
17	3684 Virgin Island Ct.	317.10	318.90	317.50	yes	yes				
18	3598 Yellowstone Ct.	317.90	320.60	317.50	yes	yes				
19	3905 Mount Mckinley Ct.	317.50	319.30	317.90	yes	yes				
20	3937 Petrified Forest Ct.	317.60	319.30	317.70	yes	yes				
21	3740 Rocky Mountain Ct.	317.50	320.20	317.50	yes	yes				
22	3809 Yosemite Ct. N	317.80	319.60	318.10	yes	yes				
23	6934 Lassen St.	317.60	320.50	317.80	yes	yes				
24	6920 Lassen St.	317.30	319.30	317.80	yes	yes				
25	3813 Hot Springs Ct.	317.40	320.30	317.60	yes	yes				
26	3598 Wind Cave Ct.	317.40	319.20	317.60	yes	yes				
27	7022 Valley Trails Dr.	317.50	318.90	317.60	yes	yes				
28	3595 Yellowstone Ct.	317.50	319.20	317.60	yes	yes				
29	3812 Yosemite Ct. N	318.00	320.10	318.20	yes	yes				
30	6909 Lassen St	318.00	320.70	317.90	yes	yes				
31	3902 Mount Mckinley Ct.	317.40	319.50	318.00	yes	yes				
32	6906 Lassen St.	317.70	319.40	317.90	yes	yes				
33	3839 Hot Springs Ct.	317.70	319.20	317.70	yes	yes				
34	3842 Hot Springs Ct.	317.60	320.30	317.60	yes	yes				
35	7044 Valley Trails Dr.	317.90	319.20	317.60	yes	yes				
36	3912 Grand Canyon Ct.	318.00	319.50	317.90	yes	yes				
37	3753 Rocky Mountain Ct.	318.00	320.40	317.70	yes	yes				
38	3672 Virgin Island Ct.	317.90	319.20	317.70	yes	yes				
39	7038 Valley Trails Dr.	317.60	319.30	317.70	yes	yes				
40	3705 Gettysburg Ct. N	318.40	321.00	318.50	yes	yes				
41	3842 Mesa Verde Ct.	317.60	319.50	318.00	yes	yes				
42	3934 Petrified Forest Ct.	317.70	319.40	317.80	yes	yes				
43	3583 Wind Cave Ct.	317.80	320.50	317.80	yes	yes				
44	3681 Virgin Island Ct.	317.30	320.50	317.80	yes	yes				
45	3585 Yellowstone Ct.	317.60	319.40	317.80	yes	yes				
46	3835 Yosemite Ct. N	317.90	319.80	318.40	yes	yes				
47	3865 Hot Springs Ct.	317.80	319.30	317.90	yes	yes				
48	3772 Rocky Mountain Ct.	318.00	319.20	317.80	yes	yes				
49	3756 Rocky Mountain Ct.	318.00	320.40	317.80	yes	yes				
50	3586 Wind Cave Ct.	317.80	319.40	317.90	yes	yes				
51	7056 Valley Trails Dr.	317.90	320.40	317.80	yes	yes				
52	7030 Valley Trails Dr.	317.50	319.10	317.80	yes	yes				
53	6948 Lassen St.	317.90	319.60	318.10	yes	yes				
54	3868 Hot Springs Ct.	317.90	319.20	317.90	yes	yes				
55	3769 Rocky Mountain Ct.	317.90	319.20	317.90	yes	yes				
56	3727 Gettysburg Ct. N	318.60	320.30	318.70	no	yes				
57	3928 Mount Mckinley Ct.	317.90	320.00	318.30	yes	yes				
58	3855 Mesa Verde Ct.	318.00	319.80	318.20	yes	yes				
59	3909 Grand Canyon Ct.	317.90	319.60	318.10	yes	yes				
60	3963 Petrified Forest Ct.	318.20	319.70	318.10	yes	yes				
61	3891 Hot Springs Ct.	317.80	319.50	318.00	yes	yes				
62	3588 Yellowstone Ct.	317.70	319.50	318.00	yes	yes				
63	3570 Kings Canyon Ct.	318.20	319.90	318.00	yes	yes				
64	3468 Zion Canyon Ct.	318.10	320.70	318.00	yes	yes				
65	3476 Zion Canyon Ct.	317.90	319.40	318.00	yes	yes				
66	3628 Hawaii Ct. S.	318.60	321.00	318.20	no	yes				
67	3705 Platt Ct. N	318.80	321.50	318.90	no	yes				
68	3894 Hot Springs Ct.	318.00	319.70	318.00	yes	yes				
69	3669 Virgin Island Ct.	317.90	319.50	318.00	yes	yes				
70	3687 Gettysburg Ct. S	318.60	320.30	318.80	no	yes				
71	3780 Yosemite Ct.S	318.00	320.70	318.30	yes	yes				
72	3545 Glacier Ct. S	319.60	322.30	319.30	no	yes				
73	3671 Platt Ct. S	318.50	320.40	319.00	yes	yes				
74	3635 Platt Ct. S	318.50	319.60	318.30	yes	yes				
75	3698 Platt Ct. S	319.10	320.30	318.90	no	yes				
76	3783 Yosemite Ct.S	318.00	319.90	318.40	yes	yes				
77	3868 Mesa Verde Ct.	318.30	321.20	318.40	yes	yes				
78	3788 Rocky Mountain Ct.	318.10	320.00	318.10	yes	yes				
79	3571 Wind Cave Ct.	317.40	319.60	318.20	yes	yes				
80	3657 Virgin Island Ct.	318.00	320.60	318.10	yes	yes				
81	3576 Yellowstone Ct.	317.80	319.50	318.10	yes	yes				
82	3573 Kings Canyon Ct.	318.00	319.80	318.20	yes	yes				
83	3565 Kings Canyon Ct.	318.20	320.90	318.20	yes	yes				
84	3484 Zion Canyon Ct.	318.40	319.90	318.20	yes	yes				
85	3614 Carlsbad Way	320.00	320.80	319.40	no	yes				
86	3601 Olympic Ct.	318.80	320.60	319.20	no	yes				
87	3616 Hawaii Ct. S.	318.60	319.80	318.40	no	yes				
88	3623 Platt Ct. S	318.50	320.80	318.40	yes	yes				
89	3684 Gettysburg Ct. S	319.10	320.20	318.90	no	yes				
90	3562 Wind Cave Ct.	317.60	319.90	318.20	yes	yes				
91	3645 Virgin Island Ct.	317.80	319.70	318.20	yes	yes				
92	3660 Virgin Island Ct.	317.80	319.70	318.20	yes	yes				
93	3648 Virgin Island Ct.	317.80	319.80	318.20	yes	yes				
94	3676 Hawaii Ct. S.	318.90	320.50	319.10	no	yes				
95	3838 Yosemite Ct. N	318.80	320.10	318.80	no	yes				
96	6962 Lassen St.	318.10	319.90	318.50	yes	yes				
97	3960 Petrified Forest Ct.	318.20	319.80	318.30	yes	yes				
98	7077 Valley Trails Dr.	318.30	319.80	318.10	yes	yes				
99	3418 Zion Canyon Ct.	318.10	320.00	318.10	yes	yes				
100	6188 Crater Lake Ct.	319.60	321.30	319.70	no	yes				
101	3615 Olympic Ct. N	319.30	320.70	319.30	no	yes				
102	3572 Olympic Ct. S	319.20	321.30	319.20	no	yes				
103	3548 Olympic Ct. S	318.60	320.30	318.50	no	yes				
104	3512 Olympic Ct. S	318.20	320.50	318.40	yes	yes				
105	3575 Olympic Ct. S	319.40	322.10	319.40	no	yes				
106	3508 Carlsbad Ct.	319.30	320.90	319.50	no	yes				
107	3637 Hawaii Ct. S.	318.60	321.20	318.50	no	yes				
108	3604 Hawaii Ct. S.	318.90	321.10	318.50	no	yes				
109	3611 Platt Ct. S	318.50	319.80	318.50	yes	yes				
110	3931 Mount Mckinley Ct.	318.40	320.20	318.80	yes	yes				
111	7069 Valley Trails Dr.	318.00	319.70	318.20	yes	yes				
112	7081 Valley Trails Dr.	318.00	319.70	318.20	yes	yes				
113	3413 Zoin Canyon Ct.	321.80	319.70	318.20	no	no				
114	3574 Wind Cave Ct.	317.80	319.60	318.30	yes	yes				
115	3564 Yellowstone Ct.	318.30	319.80	318.30	yes	yes				
116	3573 Yellowstone Ct.	318.10	319.90	318.40	yes	yes				
117	3554 Kings Canyon Ct.	318.00	319.90	318.30	yes	yes				
118	3557 Kings Canyon Ct.	318.30	319.80	318.40	yes	yes				
119	3421 Zion Canyon Ct.	318.70	320.10	318.30	no	yes				
120	3533 Carlsbad Ct.	319.50	321.40	319.60	no	yes				
121	3555 Carlsbad Ct.	319.60	322.30	319.60	no	yes				
122	3650 Platt Ct. S	318.70	319.90	318.60	no	yes				
123	3754 Yosemite Ct.S	318.60	320.00	318.60	no	yes				
124	3785 Rocky Mountain Ct.	318.20	319.90	318.40	yes	yes				
125	3547 Wind Cave Ct.	318.20	320.20	318.40	yes	yes				
126	3559 Wind Cave Ct.	318.10	319.80	318.40	yes	yes				
127	3550 Wind Cave Ct.	318.10	321.20	318.40	yes	yes				
128	3633 Virgin Island Ct.	318.40	319.80	318.40	yes	yes				
129	3636 Virgin Island Ct.	318.10	320.00	318.40	yes	yes				

Table 2. Pad elevation data for Valley Trail homes (provided by Zone 7)

HOUSE #	STREET ADDRESS	ELEVATIOON SURVEY DATA			PAD ELEVATION CHECK	
		PAD	FIN FLR.	GAR. SLAB	Is pad elevation below SMMP HGL?	Is pad elevation below Green Book HGL?
130	3561 Yellowstone Ct.	318.10	320.00	318.40	yes	yes
131	3429 Zion Canyon Ct.	318.20	320.10	318.40	yes	yes
132	3618 Olympic Ct. N	319.50	321.20	319.30	no	yes
133	3604 Olympic Ct. S	319.40	320.90	319.30	no	yes
134	3584 Olympic Ct. S	319.10	320.80	319.30	no	yes
135	3521 Olympic Ct. S	318.80	321.30	318.50	no	yes
136	3581 Olympic Ct. S	319.20	321.10	319.50	no	yes
137	3562 Glacier Ct. S	319.60	322.50	319.60	no	yes
138	3577 Carlsbad Ct.	319.50	322.30	319.70	no	yes
139	3625 Hawaii Ct. S.	318.50	319.90	318.60	yes	yes
140	3613 Hawaii Ct. S.	318.20	319.90	318.60	yes	yes
141	3640 Hawaii Ct. S.	318.40	320.00	318.70	yes	yes
142	3695 Platt Ct. S	319.00	320.20	318.70	no	yes
143	3647 Platt Ct. S	318.20	320.00	318.60	yes	yes
144	3614 Platt Ct. S	318.80	319.90	318.60	no	yes
145	3662 Platt Ct. S	319.00	321.20	318.70	no	yes
146	3708 Platt Ct. N	318.80	320.50	319.20	no	yes
147	3702 Gettysburg Ct. N	318.90	320.50	319.10	no	yes
148	3861 Yosemite Ct. N	318.70	320.50	319.00	no	yes
149	3817 Mammoth Cave Ct.	319.10	321.70	319.00	no	yes
150	3887 Mesa Verde Ct.	318.70	320.30	318.70	no	yes
151	3986 Petrified Forest Ct.	318.80	320.20	318.50	no	yes
152	3625 Shenandoah Ct.	318.30	319.70	318.30	yes	yes
153	3628 Shenandoah Ct.	318.40	319.80	318.30	yes	yes
154	3410 Zoin Canyon Ct.	318.30	321.00	318.30	yes	yes
155	3562 Kings Canyon Ct.	318.00	319.80	318.50	yes	yes
156	3496 Cumberland Gap Ct.	318.50	320.30	318.50	yes	yes
157	3485 Cumberland Gap Ct.	318.40	320.00	318.50	yes	yes
158	3628 Carlsbad Way	319.80	321.70	319.70	no	yes
159	3629 Olympic Ct. N	319.30	321.10	319.50	no	yes
160	3643 Olympic Ct. N	319.50	321.40	319.50	no	yes
161	3596 Olympic Ct. S	319.10	320.80	319.40	no	yes
162	3545 Olympic Ct. S	318.40	320.30	318.70	yes	yes
163	3559 Glacier Ct. S	319.40	321.00	319.70	no	yes
164	3727 Platt Ct. N	319.20	320.80	319.40	no	yes
165	3935 Grand Canyon Ct.	318.00	320.20	318.70	yes	yes
166	7101 Valley Trails Dr.	317.80	319.60	318.40	yes	yes
167	7109 Valley Trails Dr.	318.20	321.10	318.40	yes	yes
168	7113 Valley Trails Dr.	318.20	319.80	318.40	yes	yes
169	3552 Yellowstone Ct.	318.00	320.00	318.50	yes	yes
170	3546 Kings Canyon Ct.	318.20	320.10	318.50	yes	yes
171	3460 Zion Canyon Ct.	318.40	320.00	318.50	yes	yes
172	3463 Zion Canyon Ct.	318.50	320.30	318.50	yes	yes
173	3536 Olympic Ct. S	318.90	320.80	318.60	no	yes
174	3533 Olympic Ct. S	318.50	320.00	318.60	yes	yes
175	3599 Carlsbad Ct.	319.60	322.40	319.80	no	yes
176	3649 Hawaii Ct. S.	318.60	320.10	318.80	no	yes
177	3686 Platt Ct. S	319.00	320.10	318.80	no	yes
178	3871 Mesa Verde Ct.	318.20	320.20	318.80	yes	yes
179	3989 Petrified Forest Ct.	318.70	320.10	318.60	no	yes
180	3499 Cumberland Gap Ct.	318.40	320.10	318.60	yes	yes
181	3656 Carlsbad Way	319.60	321.50	319.80	no	yes
182	3632 Olympic Ct. N	319.40	321.10	319.50	no	yes
183	3560 Olympic Ct. S	318.60	320.40	318.80	no	yes
184	3524 Olympic Ct. S	318.60	320.40	318.70	no	yes
185	3576 Glacier Ct. S	319.60	321.40	319.80	no	yes
186	3573 Glacier Ct. S	319.70	321.20	319.80	no	yes
187	3652 Hawaii Ct. S.	318.60	320.40	318.90	no	yes
188	3664 Hawaii Ct. S.	318.80	321.60	318.90	no	yes
189	3688 Hawaii Ct. S.	319.70	322.10	319.50	no	yes
190	3659 Platt Ct. S	318.50	320.20	318.90	yes	yes
191	3626 Platt Ct. S	318.60	320.10	318.80	no	yes
192	3638 Platt Ct. S	318.80	320.20	318.80	no	yes
193	3730 Platt Ct. N	319.10	320.70	319.40	no	yes
194	3864 Yosemite Ct. N	318.70	320.80	319.20	no	yes
195	3840 Mammoth Cave Ct.	318.80	320.60	319.10	no	yes
196	3857 Mount Mckinley Ct.	318.80	321.90	319.10	no	yes
197	3884 Mesa Verde Ct.	318.80	320.60	318.90	no	yes
198	3938 Grand Canyon Ct.	318.50	320.40	318.80	yes	yes
199	3641 Shenandoah Ct.	318.70	321.20	318.50	no	yes
200	7093 Valley Trails Dr.	318.20	320.10	318.50	yes	yes
201	7181 Valley Trails Dr.	318.10	319.90	318.50	yes	yes
202	3535 Wind Cave Ct.	318.60	320.20	318.60	no	yes
203	3538 Wind Cave Ct.	318.20	320.20	318.60	yes	yes
204	3526 Wind Cave Ct.	318.60	321.60	318.60	no	yes
205	3621 Virgin Island Ct.	318.60	321.40	318.60	no	yes
206	3624 Virgin Island Ct.	318.10	320.00	318.60	yes	yes
207	3516 Yellowstone Ct.	318.60	320.30	318.50	no	yes
208	3540 Yellowstone Ct.	318.50	321.50	318.60	yes	yes
209	3555 Yellowstone Ct.	318.30	320.10	318.60	yes	yes
210	3543 Yellowstone Ct.	318.30	320.30	318.60	yes	yes
211	3549 Kings Canyon Ct.	318.30	320.20	318.60	yes	yes
212	3426 Zion Canyon Ct.	318.20	320.20	318.60	yes	yes
213	3434 Zion Canyon Ct.	318.50	320.30	318.60	yes	yes
214	3452 Zion Canyon Ct.	318.20	320.10	318.60	yes	yes
215	3479 Zion Canyon Ct.	318.30	320.30	318.70	yes	yes
216	3471 Zion Canyon Ct.	318.70	320.10	318.70	no	yes
217	3437 Zion Canyon Ct.	318.40	320.30	318.60	yes	yes
218	3468 Cumberland Gap Ct.	318.50	320.20	318.60	yes	yes
219	3482 Cumberland Gap Ct.	318.40	320.00	318.60	yes	yes
220	3642 Carlsbad Way	319.40	321.50	319.90	no	yes
221	3574 Carlsbad Ct.	320.00	321.60	319.90	no	yes
222	3552 Carlsbad Ct.	319.10	321.30	319.90	no	yes
223	3538 Kings Canyon Ct.	318.80	321.60	318.70	no	yes
224	3455 Zion Canyon Ct.	318.40	320.50	318.70	yes	yes
225	6174 Crater Lake Ct.	320.30	321.60	320.10	no	yes
226	3605 Glacier Ct. N.	319.70	321.20	319.80	no	yes
227	3661 Hawaii Ct. S.	319.00	321.50	319.00	no	yes
228	3683 Platt Ct. S	319.30	321.60	319.00	no	yes
229	3749 Platt Ct. N	319.60	321.20	319.60	no	yes
230	3636 Shenandoah Ct.	318.80	320.10	318.60	no	yes
231	7173 Valley Trails Dr.	318.50	320.10	318.60	yes	yes
232	3471 Cumberland Gap Ct.	318.70	320.50	318.80	no	yes
233	3602 Glacier Ct.	319.30	321.50	319.80	no	yes
234	3557 Olympic Ct. S	318.90	320.60	319.00	no	yes
235	3599 Olympic Ct. S	319.40	321.40	319.80	no	yes
236	3590 Glacier Ct. S	319.80	321.80	320.00	no	yes
237	3587 Glacier Ct. S	320.10	322.60	320.00	no	yes
238	3596 Carlsbad Ct.	319.70	321.70	320.00	no	yes
239	3530 Carlsbad Ct.	319.90	322.80	320.00	no	yes
240	3724 Gettysburg Ct. N	319.10	320.80	319.50	no	yes
241	3887 Yosemite Ct. N	319.60	322.00	319.40	no	yes
242	3814 Mammoth Cave Ct.	319.30	321.80	319.20	no	yes
243	3983 Mount Mckinley Ct.	319.20	320.80	319.30	no	yes
244	3954 Mount Mckinley Ct.	318.90	320.60	319.20	no	yes
245	3649 Shenandoah Ct.	318.50	320.20	318.70	yes	yes
246	3657 Shenandoah Ct.	319.20	321.60	318.70	no	yes
247	7187 Valley Trails Dr.	318.40	320.20	318.70	yes	yes
248	3609 Virgin Island Ct.	318.50	320.80	318.70	yes	yes
249	3612 Virgin Island Ct.	318.70	321.70	318.70	no	yes
250	3528 Yellowstone Ct.	318.70	320.10	318.70	no	yes

Table 2. Pad elevation data for Valley Trail homes (provided by Zone 7)

		ELEVATIOON SURVEY DATA			PAD ELEVATION CHECK	
HOUSE #	STREET ADDRESS	PAD	FIN FLR.	GAR. SLAB	Is pad elevation below SMMP HGL?	Is pad elevation below Green Book HGL?
251	3531 Yellowstone Ct.	318.70	320.60	318.80	no	yes
252	3541 Kings Canyon Ct.	318.40	320.70	318.80	yes	yes
253	3499 Isle Royal Ct.	319.10	320.60	318.90	no	yes
254	3679 Hawaii Ct. S.	319.10	320.60	319.10	no	yes
255	3757 Yosemite Ct.S	318.60	320.30	319.10	no	yes
256	3731 Yosemite Ct.S	318.90	320.50	319.10	no	yes
257	6976 Lassen St.	319.30	320.60	319.10	no	yes
258	3454 Cumberland Gap Ct.	318.70	320.60	318.90	no	yes
259	3478 Isle Royal Ct.	319.20	321.80	318.90	no	yes
260	3619 Glacier Ct. N.	320.00	321.30	320.00	no	yes
261	3646 Olympic Ct. N	320.20	322.20	319.80	no	yes
262	3506 Glacier Ct. S	318.80	320.50	319.00	no	yes
263	3667 Hawaii Ct. S.	318.60	320.30	319.20	no	yes
264	3661 Gettysburg Ct. S	319.10	320.60	319.20	no	yes
265	3752 Platt Ct. N	319.60	321.10	319.70	no	yes
266	3749 Gettysburg Ct. N	319.30	321.10	319.70	no	yes
267	3890 Yosemite Ct. N	319.30	320.90	319.50	no	yes
268	3980 Mount Mckinley Ct.	319.40	322.10	319.30	no	yes
269	3529 Wind Cave Ct.	318.50	320.50	318.80	yes	yes
270	3492 Isle Royal Ct.	318.90	320.50	319.00	no	yes
271	3616 Glacier Ct. N.	320.20	321.60	320.00	no	yes
272	3657 Olympic Ct. N	320.30	321.60	320.00	no	yes
273	3647 Glacier Ct. (N)	320.30	322.00	320.20	no	yes
274	6025 Big Bend Ct.	320.20	322.00	320.40	no	yes
275	3703 Hawaii Ct. N	319.90	321.50	320.00	no	yes
276	3927 Mount Rainier Ct.	319.00	320.80	319.40	no	yes
277	3930 Mount Rainier Ct.	319.50	320.90	319.40	no	yes
278	3961 Grand Canyon Ct.	319.00	320.60	319.20	no	yes
279	3644 Shenandoah Ct.	318.70	320.30	318.90	no	yes
280	7119 Valley Trails Dr.	318.70	320.20	318.90	no	yes
281	7167 Valley Trails Dr.	318.80	320.30	318.90	no	yes
282	3615 Virgin Island Ct.	318.50	320.40	318.90	yes	yes
283	3519 Yellowstone Ct.	318.70	320.40	318.90	no	yes
284	3522 Kings Canyon Ct.	319.00	320.60	319.00	no	yes
285	3530 Kings Canyon Ct.	318.80	320.40	319.00	no	yes
286	3533 Kings Canyon Ct.	318.60	320.60	319.00	no	yes
287	3443 Cumberland Gap Ct.	318.50	320.90	319.00	yes	yes
288	3728 Yosemite Ct.S	319.10	320.50	319.30	no	yes
289	3481 Isle Royal Ct.	319.30	320.80	319.10	no	yes
290	6160 Crater Lake Ct.	320.50	322.60	320.50	no	yes
291	3633 Glacier Ct. N.	320.20	322.30	320.20	no	yes
292	3563 Olympic Ct. S	319.50	322.00	319.30	no	yes
293	3548 Glacier Ct. S	319.10	320.80	319.30	no	yes
294	3520 Glacier Ct. S	319.40	322.00	319.20	no	yes
295	3706 Hawaii Ct. N	319.60	321.30	320.00	no	yes
296	3843 Mammoth Cave Ct.	319.20	321.00	319.70	no	yes
297	3908 Mount Rainier Ct.	319.40	320.90	319.50	no	yes
298	7195 Valley Trails Dr.	318.50	321.00	319.00	yes	yes
299	3514 Wind Cave Ct.	318.60	320.50	319.00	no	yes
300	3525 Kings Canyon Ct.	319.20	320.80	319.10	no	yes
301	3457 Cumberland Gap Ct.	319.00	320.60	319.10	no	yes
302	3464 Isle Royal Ct.	319.40	320.80	319.10	no	yes
303	3495 Isle Royal Ct.	319.30	320.80	319.20	no	yes
304	3467 Isle Royal Ct.	319.20	320.80	319.10	no	yes
305	3630 Glacier Ct. N.	320.00	321.70	320.20	no	yes
306	3534 Glacier Ct. S	318.90	322.20	319.40	no	yes
307	3517 Glacier Ct. S	318.70	320.90	319.40	no	yes
308	3531 Glacier Ct. S	319.30	321.30	319.40	no	yes
309	3987 Grand Canyon Ct.	319.30	321.00	319.40	no	yes
310	3450 Isle Royal Ct.	319.20	321.00	319.20	no	yes
311	3453 Isle Royal Ct.	319.40	321.00	319.20	no	yes
312	3691 Hawaii Ct. S.	319.00	320.50	319.50	no	yes
313	3949 Mount Rainier Ct.	319.60	321.10	319.60	no	yes
314	3665 Shenandoah Ct.	319.30	321.70	319.10	no	yes
315	7127 Valley Trails Dr.	318.70	320.50	319.10	no	yes
316	3507 Yellowstone Ct.	318.70	320.90	319.10	no	yes
317	3504 Yellowstone Ct.	318.90	320.60	319.10	no	yes
318	3502 Wind Cave Ct.	318.80	320.80	319.10	no	yes
319	5999 Bryce Canyon Ct.	320.20	323.30	320.60	no	yes
320	3660 Olympic Ct. (N)	321.30	321.80	320.30	no	no
321	3793 Platt Ct. N	320.40	321.60	320.20	no	yes
322	3869 Mammoth Cave Ct.	319.20	321.40	319.90	no	yes
323	3866 Mammoth Cave Ct.	319.80	321.20	319.80	no	yes
324	3964 Grand Canyon Ct.	319.40	321.20	319.50	no	yes
325	3673 Shenandoah Ct.	319.70	320.70	319.20	no	yes
326	3652 Shenandoah Ct.	319.20	320.70	319.20	no	yes
327	3517 Wind Cave Ct.	318.60	320.80	319.20	no	yes
328	3514 Kings Canyon Ct.	318.90	320.60	319.20	no	yes
329	3517 Kings Canyon Ct.	318.40	320.70	319.20	yes	yes
330	3440 Cumberland Gap Ct.	319.30	321.00	319.30	no	yes
331	3429 Cumberland Gap Ct.	318.90	320.90	319.30	no	yes
332	3386 Harpers Ferry Ct.	319.20	320.90	319.40	no	yes
333	3658 Gettysburg Ct. S	319.40	320.90	319.60	no	yes
334	3771 Gettysburg Ct. N	319.90	321.60	320.10	no	yes
335	6990 Lassen St.	319.20	321.00	319.60	no	yes
336	3644 Glacier Ct. N.	320.50	321.90	320.40	no	yes
337	6146 Crater Lake Ct.	320.70	322.40	320.80	no	no
338	6171 Crater Lake Ct.	320.60	322.10	320.80	no	no
339	6185 Crater Lake Ct.	320.00	322.00	320.70	no	yes
340	6028 Big Bend Ct.	320.50	322.40	320.80	no	yes
341	6042 Sequoia Ct.	319.60	321.40	319.50	no	yes
342	3635 Gettysburg Ct. S	319.60	320.90	319.70	no	yes
343	3722 Hawaii Ct. N	319.90	322.90	320.30	no	yes
344	3771 Platt Ct. N	319.80	321.40	320.30	no	yes
345	3768 Gettysburg Ct. N	320.10	321.60	320.10	no	yes
346	3746 Gettysburg Ct. N	319.50	321.50	320.10	no	yes
347	3952 Mount Rainier Ct.	320.00	321.80	319.80	no	yes
348	3990 Grand Canyon Ct.	319.30	321.10	319.60	no	yes
349	7131 Valley Trails Dr.	319.20	320.80	319.30	no	yes
350	7199 Valley Trails Dr.	319.00	320.60	319.30	no	yes
351	3505 Wind Cave Ct.	318.60	320.80	319.30	no	yes
352	3399 Harpers Ferry Ct.	319.50	321.00	319.50	no	yes
353	3719 Hawaii Ct. N	320.20	321.80	320.50	no	yes
354	7217 Valley Trails Dr.	319.30	320.80	319.40	no	yes
355	3506 Kings Canyon Ct.	319.50	322.20	319.40	no	yes
356	3439 Isle Royal Ct.	319.40	320.80	319.50	no	yes
357	6051 Big Bend Ct.	320.80	322.30	320.80	no	no
358	3609 Gettysburg Ct. S	320.30	322.90	319.80	no	yes
359	3774 Platt Ct. N	319.90	321.70	320.30	no	yes
360	3895 Mammoth Cave Ct.	319.90	321.60	320.10	no	yes
361	6132 Crater Lake Ct.	320.70	322.70	321.00	no	no
362	6054 Big Bend Ct.	320.80	322.30	320.90	no	no
363	3738 Hawaii Ct. N	319.90	321.60	320.50	no	yes
364	3681 Shenandoah Ct.	319.80	321.10	319.50	no	yes
365	3415 Cumberland Gap Ct.	319.60	322.50	319.50	no	yes
366	3426 Cumberland Gap Ct.	319.30	321.10	319.60	no	yes
367	3422 Isle Royal Ct.	319.30	321.00	319.60	no	yes
368	3436 Isle Royal Ct.	319.80	321.10	319.60	no	yes
369	3372 Harpers Ferry Ct.	319.60	322.50	319.70	no	yes
370	3658 Glacier Ct. (N)	321.20	322.90	320.90	no	no
371	3735 Hawaii Ct. N	320.70	322.00	320.70	no	no
372	3790 Gettysburg Ct. N	320.10	321.80	320.40	no	yes
373	3892 Mammoth Cave Ct.	319.50	321.50	320.20	no	yes
374	6172 Everglades Ct.	320.70	322.60	321.00	no	no
375	6056 Sequioia Ct.	320.30	321.40	319.80	no	yes
376	6080 Big Bend Ct.	320.90	322.40	321.00	no	no
377	6014 Sequoia Ct.	319.80	321.60	319.80	no	yes
378	3796 Platt Ct. N	320.50	323.10	320.60	no	yes
379	3971 Mount Rainier Ct.	320.10	321.60	320.10	no	yes

Table 2. Pad elevation data for Valley Trail homes (provided by Zone 7)

		ELEVATIOON SURVEY DATA			PAD ELEVATION CHECK	
HOUSE #	STREET ADDRESS	PAD	FIN FLR.	GAR. SLAB	Is pad elevation below SMMP HGL?	Is pad elevation below Green Book HGL?
380	3974 Mount Rainier Ct.	320.10	321.70	320.10	no	yes
381	7137 Valley Trails Dr.	319.20	320.90	319.60	no	yes
382	7161 Valley Trails Dr.	319.40	321.10	319.60	no	yes
383	7221 Valley Trails Dr.	319.50	321.10	319.60	no	yes
384	3503 kings Canyon Ct.	319.40	322.30	319.60	no	yes
385	3375 Harpers Ferry Ct.	319.80	321.70	319.80	no	yes
386	3996 Mount Rainier Ct.	320.10	322.90	320.20	no	yes
387	7143 Valley Trails Dr.	319.60	321.20	319.70	no	yes
388	3425 Isle Royal Ct.	319.70	321.20	319.80	no	yes
389	3389 Harpers Ferry Ct.	319.80	321.20	319.90	no	yes
390	3361 Harpers Ferry Ct.	319.80	321.70	319.80	no	yes
391	6077 Big Bend Ct.	321.20	322.50	321.10	no	no
392	3606 Gettysburg Ct. S	320.10	321.90	320.10	no	yes
393	3358 Harpers Ferry Ct.	320.30	321.60	319.90	no	yes
394	3347 Harpers Ferry Ct.	320.00	321.70	319.90	no	yes
395	6028 Sequoia Ct.	319.40	321.80	320.00	no	yes
396	3632 Gettysburg Ct. S	320.00	322.70	320.20	no	yes
397	7149 Valley Trails Dr.	319.40	321.30	319.80	no	yes
398	7155 Valley Trails Dr.	319.40	321.20	319.80	no	yes
399	7223 Valley Trails Dr.	319.60	321.40	319.80	no	yes
400	3408 Isle Royal Ct.	320.00	322.80	319.80	no	yes
401	3751 Hawaii Ct. N	320.70	322.30	321.00	no	no
402	3412 Cumberland Gap Ct.	319.30	321.70	319.90	no	yes
403	5962 Bryce Canyon Ct.	321.20	322.80	321.40	no	no
404	6084 Sequoia Ct.	320.10	322.10	320.10	no	yes
405	3754 Hawaii Ct. N	320.40	322.20	321.00	no	yes
406	7229 Valley Trails Dr.	319.90	321.80	320.00	no	yes
407	3344 Harpers Ferry Ct.	320.00	321.00	320.20	no	yes
408	3411 Isle Royal Ct.	320.00	321.80	320.10	no	yes
409	3330 Harpers Ferry Ct.	321.00	322.00	320.30	no	no
410	6010 Acadia Ct.	320.30	323.50	320.30	no	yes
411	7235 Valley Trails Dr.	320.00	321.80	320.40	no	yes
412	7239 Valley Trails Dr.	320.00	321.90	320.40	no	yes
413	6098 Sequoia Ct.	320.20	322.70	320.60	no	yes
414	6013 Acadia Ct.	320.30	322.40	320.60	no	yes
415	6029 Acadia Ct.	320.90	322.60	320.70	no	no
416	7241 Valley Trails Dr.	320.60	322.20	320.60	no	no
417	3302 Harpers Ferry Ct.	320.50	322.00	320.60	no	yes
418	5934 Bryce Canyon Ct.	322.20	323.60	322.10	no	no
419	5920 Bryce Canyon Ct.	322.30	323.60	322.10	no	no
420	6045 Acadia Ct.	321.10	322.70	320.80	no	no
421	3316 Harpers Ferry Ct.	320.50	321.20	320.80	no	yes
422	7292 Valley Trails Dr.	321.20	323.30	321.30	no	no
TOTAL # OF HOUSES:					155	401

Table 3. Green Book hydraulic data

Green Book Hydraulic Grade Line				
Station	Channel Bottom Elevation	Design Channel Bottom Elevation	HGL	Top of Bank
	(ft)	(ft)	(ft)	(ft)
387+50		305.9	320.6	320.6
380+00	314.8	304.8	319.6	321.2
376+00	313.4	304	318.9	321.8
370+00	311.2	303.2	318	320.6
360+00	307.6	301.4	316.4	318.4
352+00	304.8	300.2	314.9	315.2
350+00	304.2	300	314.8	315
342+00	302.6	298.4	311.2	312
340+00	301.7	298.4	312.8	314.4
333+00	298.8	297.2	312	315.8
330+00	296	296.6	311.2	315.4
323+00	289.6	295.58	310.44	314.8
323+00	289.6	286.69	310.28	314.8
320+00	288.5	286.4	310.4	315.2
314+00	286.8	286	309.7	316
310+00	287.2	285.6	309.4	313.2
306+00	288	285.2	309.2	310
304+32	289.2	285.2	306.8	313.2
304+32	289.2	280.36	308.95	313.2
304+00	288	280.4	306.76	314
303+00	285.4	280.2	304	315.8
300+00	285.2	280	303.8	313.6
292+00	285	279.2	303.2	308
290+00	284.8	279.2	302.8	309.2
282+00	284	278.45	302.4	314.4
280+00	283.14	278.41	302.16	314
271+00	279.2	277.6	301.4	311.6
270+00	279.2	277.6	301.2	311.4
264+00	279.6	277.2	300.8	310
262+00	279.6	277	300.6	309.6
260+00	280	276.8	300.4	308.4
251+00	280	276	299.7	303.2
250+00	280	276	299.6	302.8
240+00	279.5	275.2	298.8	301.6
230+00	277.2	274.5	298	302.4
223+10	275	273.85	290.52	302.5
223+10	275	266.77	297.6	302.5
220+00	273.2	266.4	290.4	301.6
210+00	271.6	265.6	289.6	298
205+00	270.8	265.2	289.2	296
200+00	269.8	264.8	288.6	294.5
197+00	269.2	264.6	288.4	293.4
190+00	265.6	264	287.8	292.8
187+00	264	264	287.6	292.4
180+00	253.6	263.2	287	289.2
178+00	256.4	263	268.8	288
176+00	261.4	263	281	286.75
176+00	261.4	263	286.75	286.75
174+00	260.4	262.4	280.6	285
170+00	259.6	261.6	279.6	284.5
160+00	258	259.2	277.2	283.2
150+00	256.8	257.2	275	281.9
140+00	255.2	254.68	272.68	280.8
130+00	252.8	252.4	270.4	277.6
120+00	250.8	250	268	275.8
110+00	248.8	247.6	265.6	270.7
98+00	248.2	244.8	262.8	266.4
94+00	245.2	244.06	257.81	264.8
94+00	245.2	243.69	262.06	264.8
90+00	244.8	242.65	256.81	263.4
90+00	244.8	242.15	257.31	263.4
86+00	243.6	241.2	255.8	262
82+00	243	240.2	254.8	260.6
78+00	241.9	239.2	253.7	259.2
74+00	241	238.4	252.8	257.6
70+00	240.4	237.2	251.7	256.4
66+00	239.7	236.2	250.8	254.8
62+00	239.2	235.2	249.6	253.4
60+00	239.6	234.65	249.3	252.6
58+00	238	234.4	248.8	252
54+00	234.8	233.2	248	250.6
50+00	232.2	232.2	246.8	249.2
48+00	230.6	231.6	246.4	248.4
46+00	229.2	231.2	245.8	247.6
44+00	227.6	230.7	245.2	246.8
42+00	226.3	230	244.8	246
40+00	224.8	229.6	244.4	245.6
38+00	223.54	229.1	243.6	244.8
37+00	222.6	228.9	233.56	244.4
37+00	222.6	218.9	233.56	244.4
33+00	221		232.4	242.8
30+00	220		231.6	241.6
27+00	219		231	240.8
25+00	218.4		230.4	240
22+00	217.2		229.6	237.8
20+00	216.6		229.2	236.8
16+00	215.2		228.4	234.7
14+00	214.4		227.8	233.4
12+00	213.6		227.2	232.2
10+00	213		226.8	230.8
9+00	212.8		226.6	230
0+00	209.65		224.31	227