04PL188

Flood Study – South Canyon Creek

Rapid City,
Pennington County, South Dakota

4030 Hall Street
W ½ of Lot 38 and All of Lots 39 – 41 of
Block 6 of Hall Subdivision

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Prepared for:
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PROPERTY

The location of this flood study is W 1/2 of Lot 38 and all of Lots 39-41 of Block 6 of Hall Subdivision, located in Government Lot 3 of Section 4, Township 1 North, Range 7 East, BHM, Rapid City, Pennington County, South Dakota.

PURPOSE

The purpose of this study is to determine the Base Flood Elevations of South Canyon Creek, as it passes along the above described property, as shown on the Flood Insurance Rate Map (FIRM) for the City of Rapid City, Pennington County, South Dakota, Community Panel 465420 0003 F with an effective date of February 16, 1996.

APPROACH

The property was surveyed and creek cross-sections were taken at a one-foot contour interval for the study area. Cross-sections of the existing flood plain were taken through the property as well as upstream and downstream of the study area. The elevations for our study are referenced to Elevation Reference Mark RM-1 as described on the existing FIRM panel. The FIRM floodplain was transposed from the existing FIRM panel onto our topographic mapping. Cross-sectional data were then taken at locations as shown on in the Appendix. Section 1.0 is located downstream and Section 4.0 is located upstream of the study area. The data was then entered into the United States Army Corps of Engineers (USACOE) River Analysis computer Model HEC-RAS. The 100-year flood conditions were then simulated for the existing site conditions.

HYDROLOGY

The estimated 100-year discharge for South Canyon Creek was originally taken from a spreadsheet program that simulates the Colorado Unit Hydrograph Procedure (CUHP) results. This resulted in a flow of 1718 cubic feet per second (cfs). Flow for the South Canyon Creek basin was then modeled using CUHP2000 to verify results. This resulted in a 100-year discharge of 1845 cfs. These results were slightly higher but within 7 %. To check these flows, we went to the Rapid City Engineering office and reviewed the study on the South Canyon Creek and Lime Creek Drainage basin. The results showed the developed flows to be 1765 cfs.

After discussions with Rich Wells PE/LS, the Rapid City Drainage Engineer, it was explained that the 1765 cfs being used was a developed flow only, this flow would not be accurate until the city had completed the storm water plans. The actual flow that should be used was 3275 cfs as written in the South Creek and Lime Creek Drainage basin study.

Both of the previously discussed 100-year flow rates have been modeled using HEC-RAS. Based on the similarity in our analysis and at the owner's request, we have modeled the

South Canyon Creek flood plain as it passes through the above referenced property at the developed flow of 1765 cfs.

HYDRAULICS

As mentioned above the 100-year flood was simulated using the Army Corps of Engineers river analysis computer model HEC-RAS. The beginning water surface elevation (Section 1.0 – downstream section) was estimated using a normal depth calculation simulating a sub-critical flow regime. The Manning's roughness coefficients (n-values) were acquired from tables listed in the HEC-RAS manual. Determination of Manning's roughness coefficients is based on the modeler's experience and actual field inspections. The following table lists the Calculated Water Surface Elevations (CWSEL) for the existing site conditions. Computer printouts for are included in the Appendix and electronic files are available upon request.

Cross-Section	CWSEL Elev.	Transposed Elev.
1.0	101.8	3377.1
2.0	99.9	3375.2
3.0	98.9	3374.2
4.0	96.7	3372.0

CONCLUSION

Based on our analysis, all buildings located on above mentioned property are not located in the 100 year floodplain. Details maps have been prepared for the flow of 1765 cfs and for 3275 cfs. Mapping for the 1765 cfs is included with this review. Mapping for the 3275 cfs modeling is available upon request.

WARNING AND DISCLAIMER OF LIABILITY

Results of this study are based on standard engineering practices. Britton Engineering and Land Surveying, Inc. makes no warranty either expressed or implied as to the work done by others and/or to any future changes that may occur within the South Canyon Creek flood plain. This study in no form or manner removes the property from the requirements of flood insurance and makes no warranty as such. For the property to be removed from the Special Flood Hazard Area the owner must acquire a Letter of Map Amendment (LOMA) of a Letter of Map Revision Based on Fill (LOMR-F) from the Federal Emergency Management Agency (FEMA).

I hereby certify that the data herein being submitted was prepared by me or under my direct supervision and that to the best of my knowledge is true and correct.

Michael Towey, E.I.T.

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