

Statement of Findings for Executive Order 13690 Floodplain Management

Cuyahoga Valley National Park

Zielinski Court Visitor's Center

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Introduction:

Executive Order 13690 established the Federal Flood Risk Management Standard (FFRMS), to increase resilience against flooding and help preserve the value of natural floodplains and to ensure that projects funded with taxpayer dollars last as long as intended. Executive Order 13690 amends its predecessor, Executive Order 11988. The FFRMS gives federal agencies to select one of following approaches for establishing the flood elevation and hazard area they use in siting, design, and construction:

- the elevation and flood hazard area that result from using a climate informed science approach that uses the best-available, actionable hydrologic and hydraulic data and methods that integrate current and future changes in flooding based on climate science. This approach will also include an emphasis on whether the action is a critical action as one of the factors to be considered when conducting the analysis;
- the elevation and flood hazard area that result from using the freeboard value, reached by adding an additional 2 feet to the base flood elevation for non-critical actions and by adding an additional 3 feet to the base
- the area subject to flooding by the 0.2 percent annual chance flood; or
- the elevation and flood hazard area that result from using any other method identified in an update to the FFRMS.

This Statement of Findings document is in compliance with National Park Service Director's Order #77-2 Floodplain Management and Procedure Manual #77-2 for fulfilling Executive Order 13690.

Located just off W. Boston Mills Rd in Peninsula, Ohio and south of the Cuyahoga River, Zielinski Court was built in 1905 as the setting of the local commercial store. The Court is composed of compacted crushed gravel and is roughly 225' long and 15' wide. The site currently contains three historic structures that are currently used as residencies as well as an out building. Each structure is two stories and the available space ranges from approximately 3,500 sf to 850 sf.

South of Zielinski Court is the track for the Cuyahoga Valley Scenic Railroad. Situated between these track and Riverview Road further to the south, is an undeveloped area roughly 3 acres in size. It is the intent of CVNP to utilize this parcel as parking for the Visitor's Center. An accessible asphalt parking lot will accommodate cars and buses. Wayfinding signage will direct visitors to all points within the park, small gathering spaces and informational kiosks are also being considered.

Due to its location, the Zielinski Court site is appropriately situated as the new Visitor's Center for Cuyahoga Valley National Park. It is located adjacent to the Historic route of the Cuyahoga Valley Scenic Railroad and Towpath Trail and is found at the entry point to one of the CVNP main roads. Visitors can access this by car, bicycle, train and foot.

It is known that the Cuyahoga River frequently exceeds its banks during large rain events. A previous Statement of Findings for the Boston Mills Area, determined that there is no knowledge of any flooding events that have effected NPS structures in the Peninsula area. The most current Federal Emergency Management Association (FEMA) flood maps were reviewed and the proposed project is located within Zone A. FEMA designates areas where no detailed hydraulic study had been performed to determine specific base flood elevations (BFE) as Zone A. No base flood elevations or depths are shown on the FEMA mapping, rather inundation limits that are approximate based on the available 10' contour

mapping at the time the maps were created. These floodplain limits were established in the early 1970's and have not been revised since. Referencing the current FEMA map of the area of interest illustrates it is possible to have errors in the estimation.



For the purpose of this report a yellow star has been placed on the map to the left at a location that FEMA designated as a high point – based on the floodplain delineation. The actual existing topography of this area is a deep and wide drainage way and should be shown within the area of inundation.

Figure 1: FEMA Map number 39153C0043E Panel 43 of 295

Justification for the Use of the Floodplain

Although located within Zone A of the FEMA Flood Map, the Zielenski Court property is ideally suited for development as the Visitor's Center for the CVNP. As previously stated, the site's proximity to historic trails and modes of transportation as well as the Cuyahoga River and positioned at the Park's 'front door', makes Zielenski Court a perfect location to welcome and inform park visitors.

The largest building will be redeveloped as the new Visitors Center using state of the art technology to relay information to visitors and the smaller structures will be renovated to support the Visitors Center and serve as office space. Outdoor activity and/or gathering space with interpretive exhibits and observation areas of the Cuyahoga River will be provided and fully accessible.

Across the Cuyahoga Valley Scenic Railroad track a parking lot will provide space for approximately 75 cars with appropriate circulation, gathering space and interpretation for the CVNP visitors.

The purpose of the improvements is to restore and celebrate the historic significance of the structures while utilizing the connectivity to the multi-modal environment of its surroundings. Other areas within the National Park have been utilized as Visitors Centers but not with the historic significance, connectivity or visibility as Zielenski Court holds.

Site Specific Flood Risk

As previously stated, there is no knowledge of any flooding events that have effected NPS structures in the Peninsula Area. The river channel within the vicinity of the project contains steeper banks along the left side of the river where the proposed project is to occur than the other side and it is apparent from GIS topography that just downstream of Boston Mills Road, the banks are much lower and the floodplain is much wider, which decreases the likelihood of flooding within the project area. In order to confirm these observations, Environmental Design Group performed a detailed hydrologic and hydraulic analysis in order to determine current base flood elevations and the effect, if any, that the proposed development would have on those elevations.

Hydrologic Analysis

The Third National Climate Assessment Report addresses flooding risk for many parts of the United States based on observed climate changes. Although the majority of the Midwest and Northeastern Regions of the United States have observed an increase in annual flood magnitudes (green is increasing and brown is decreasing), Figure 2 below shows that Northeastern Ohio has seen a decline in flood magnitudes from the 1920s to 2008.

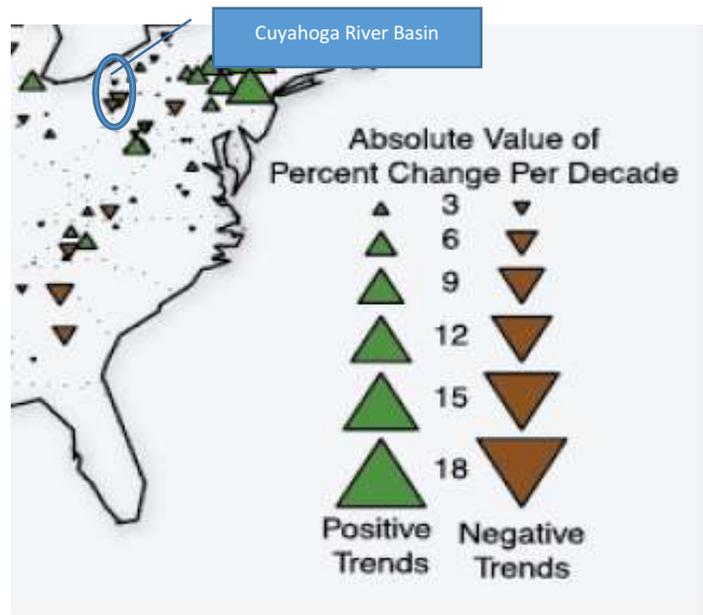


Figure 2. Trends in Annual Flood Magnitude (Figure Source: Peterson et al 2013)

River floods are basin specific and rely on multiple factors including size, precipitation, soil conditions, topography, flow obstructions (dams) and land use characteristics. The drainage area of the Cuyahoga River watershed to the stream gauge in Independence is approximately 704 square miles, while the drainage area to W. Boston Mills Bridge is 521 square miles, making up 74% of the area draining to the Independence gauge. The watershed is mainly comprised of forest (56%) with only some urban area (6%). The Cuyahoga Valley National Park is entirely contained within the watershed, making up approximately 6.5%. With these statistics, there would need to be a significant change within the other flood factors in order to affect future flooding.

Ohio Streamstats is an online application for predicting stream flows at ungauged locations on streams. The application utilizes watershed characteristics in conjunction with observed streamflow trends to predict peak flows at ungauged sites. The 100-year and 500-year peak flows at W. Boston Mills Bridge were determined to be 18,600 CFS and 22,700 CFS, respectively, using United States Geological Survey (USGS) Ohio Streamstats application. The peak flows determined by Ohio Streamstats for this project were compared to other flood frequency data for stream gauges that are located further downstream from the study area.

USGS gauge 04208000 is located in Independence, which is approximately 13 miles and several tributaries downstream of the study area. This gauge has been collecting streamflow information for that location since the early 1920's and therefore is a great tool for observing current and predicting future trends in streamflow for this project. Statistical analysis of peak flow trends at this gauge determined that 100-year and 500-year flood discharges are 19,900 CFS and 24,400 CFS respectively, with the largest recorded discharge magnitude of 24,800 CFS (1959).

USGS gauging station 04206425 is located approximately 2.7 miles downstream in Jaite. The gauge in Jaite has been in service since 2012.

The USGS Ohio Streamstats peak flow data for the project site was comparable to the 04208000 gauge data, 13 miles and several tributaries downstream. It was determined that the peak flow values determined by USGS Ohio Streamstats was appropriate for this model as it represents any future increase in magnitude or frequency of flows.

Hydraulic Analysis

A hydraulic model was developed using Hydrologic Engineering Center's River Analysis System software (v4.1.0) The 550 feet reach of the Cuyahoga River was modeled using five cross sections. Two of the five cross sections were oriented to capture the extent of the proposed grading (Figures 4 and 5). The geometry of the river channel and of the proposed project area was developed using site survey while the Summit County GIS information was used to supplement each cross section when applicable. The Boston Mill's Road Bridge was modeled using survey information as well. Manning's n-values were determine using photographs taken during surveying and Summit County's 2015 aerial photographs.

The existing base flood (100-year) elevations (BFE) and the 500-year flood elevations within the project limits can be seen in Figures 4 through 8 below. It appears the constriction of the W. Boston Mills Rd. Bridge may cause a rise in the 500-year elevation. The BFE's in the vicinity of the proposed project are

not located within the project area, therefore any activity performed will not impact the BFE. The proposed parking lot improvements have no impact.

The channel velocities average roughly 9.51 cfs, increasing as the River flows under the W. Boston Mills Bridge and then greatly reducing downstream from the bridge as the flood plain widens.

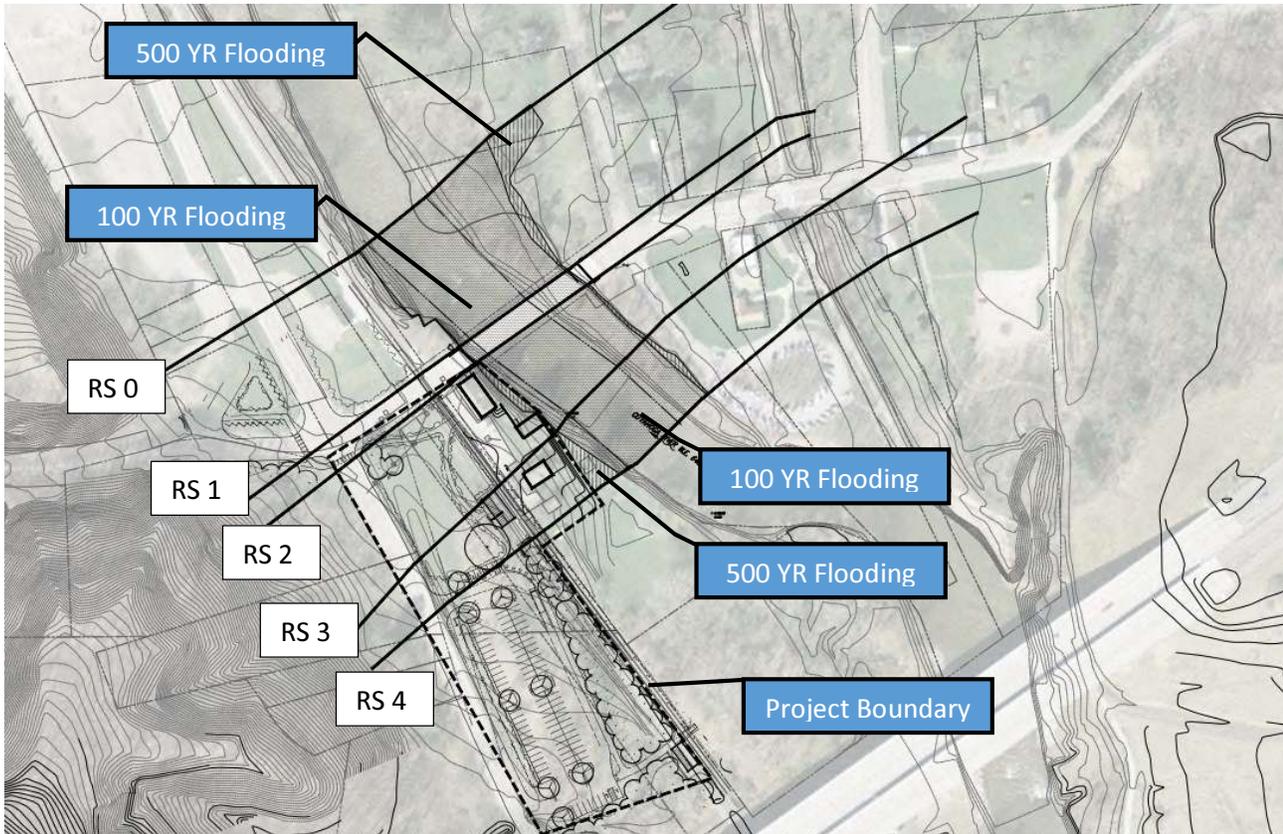


Figure 3: Project boundary - HEC-RAS information

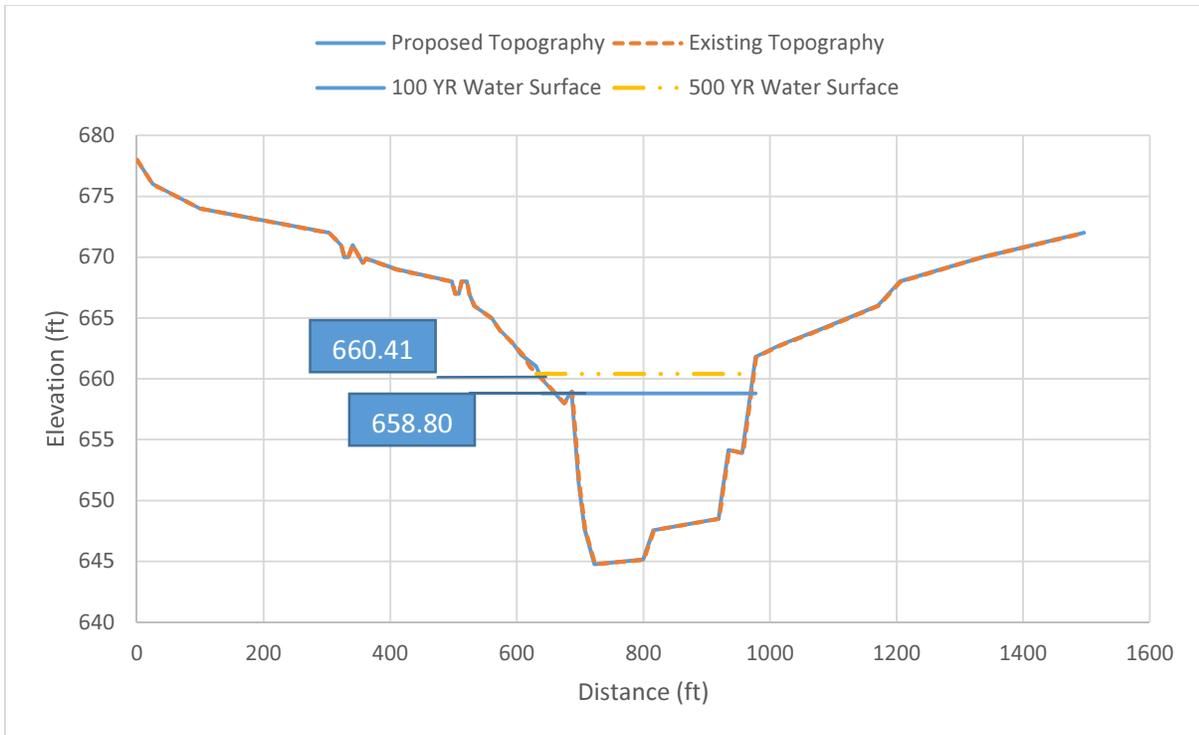


Figure 4: Existing vs Proposed River Station 4

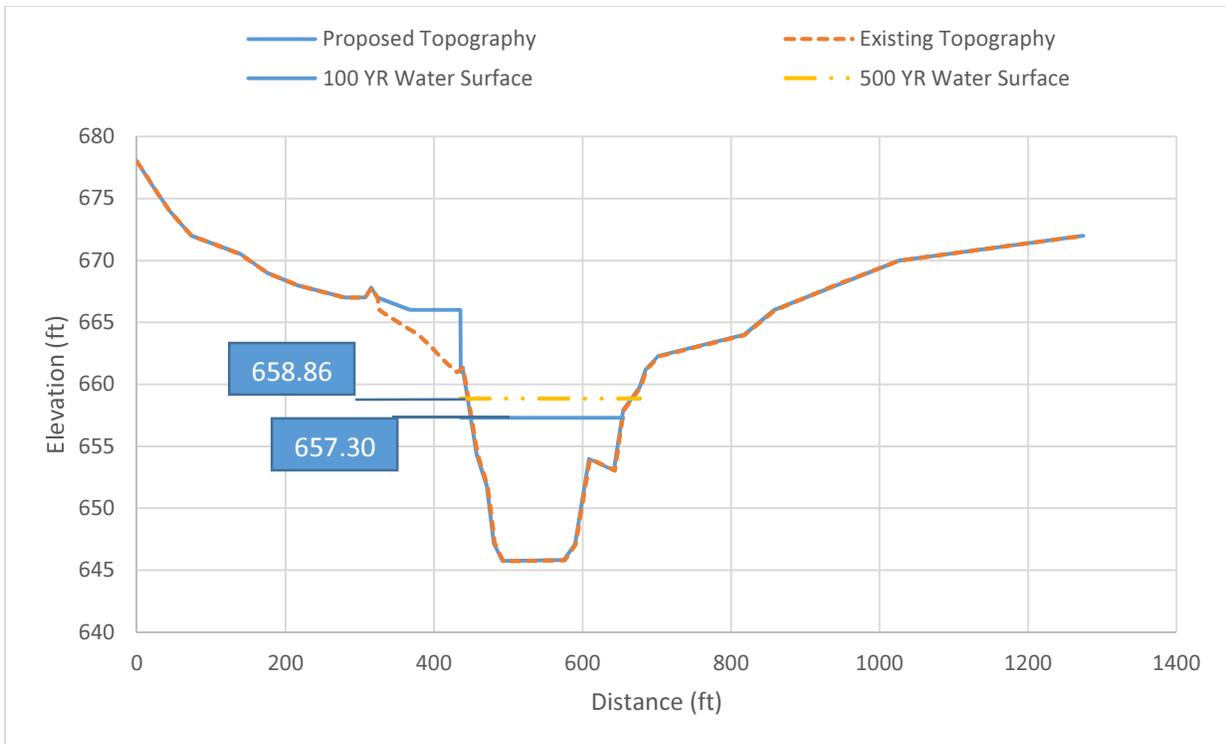


Figure 5: Existing vs Proposed River Station 3

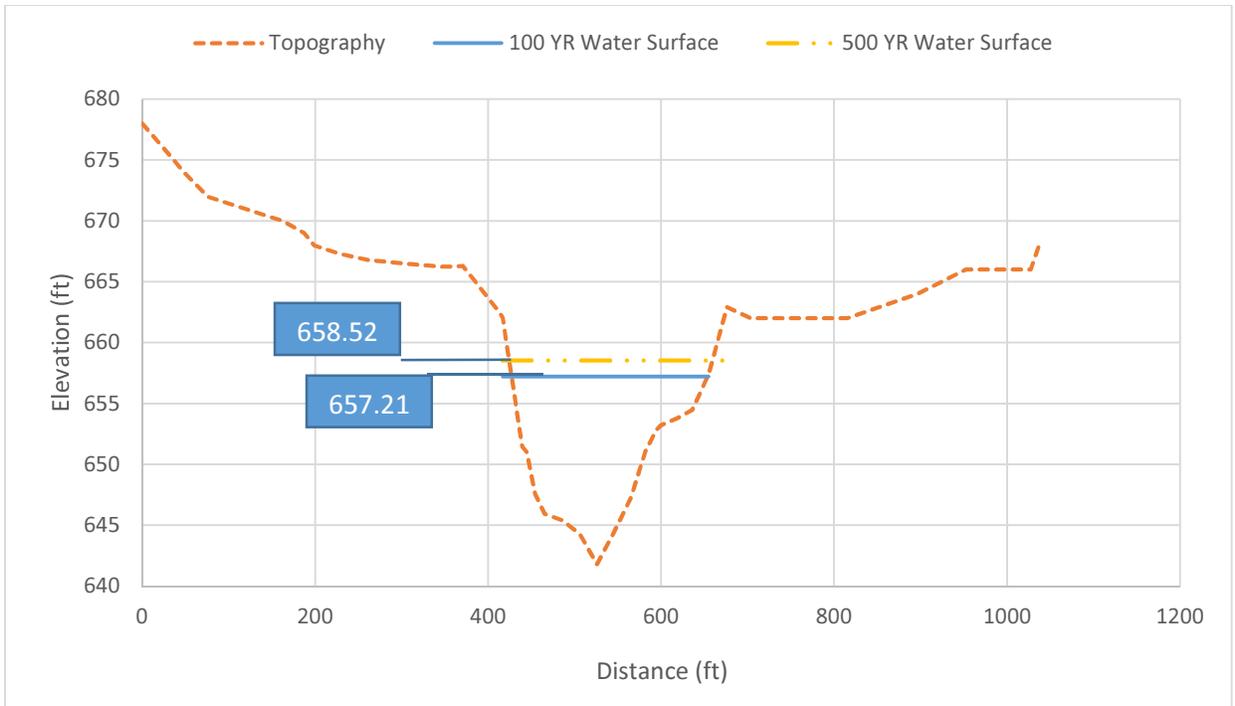


Figure 6: Existing vs Proposed River Station 2

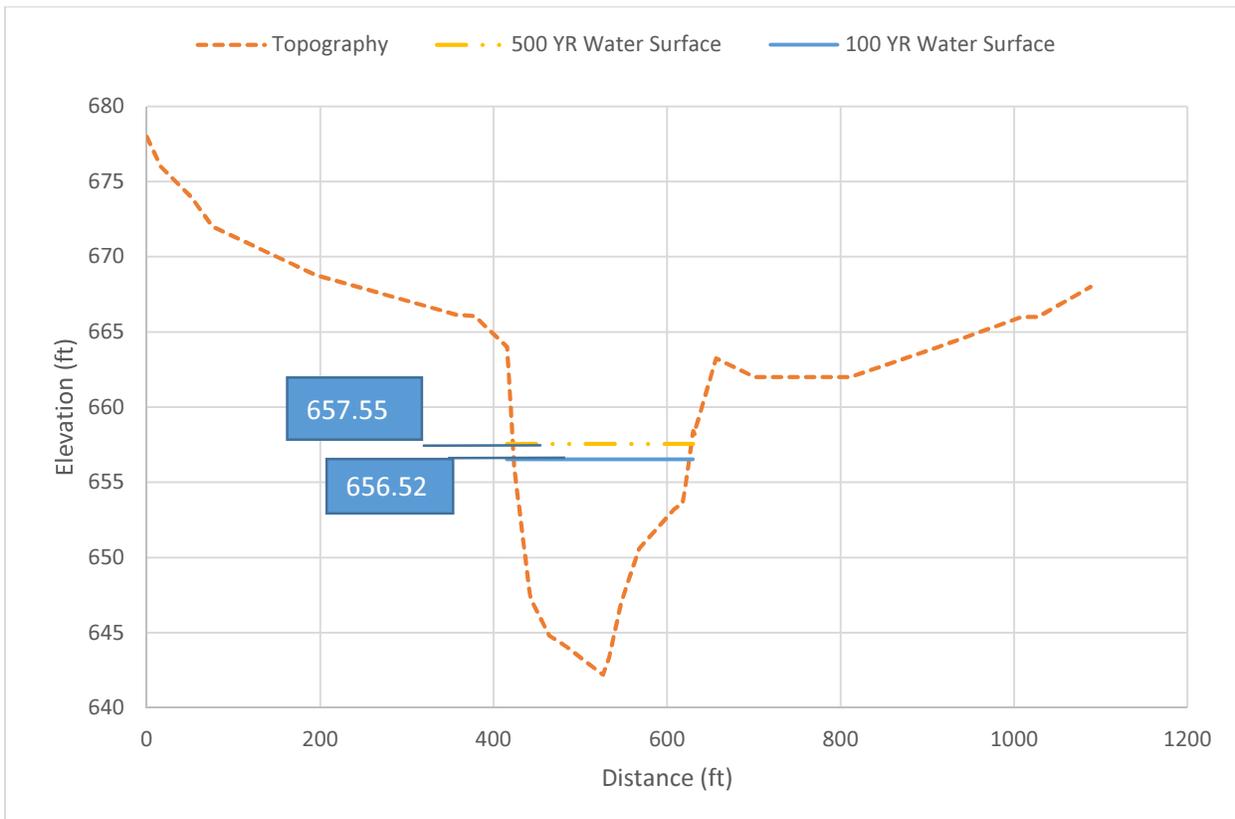


Figure 7: Existing vs Proposed River Station 1

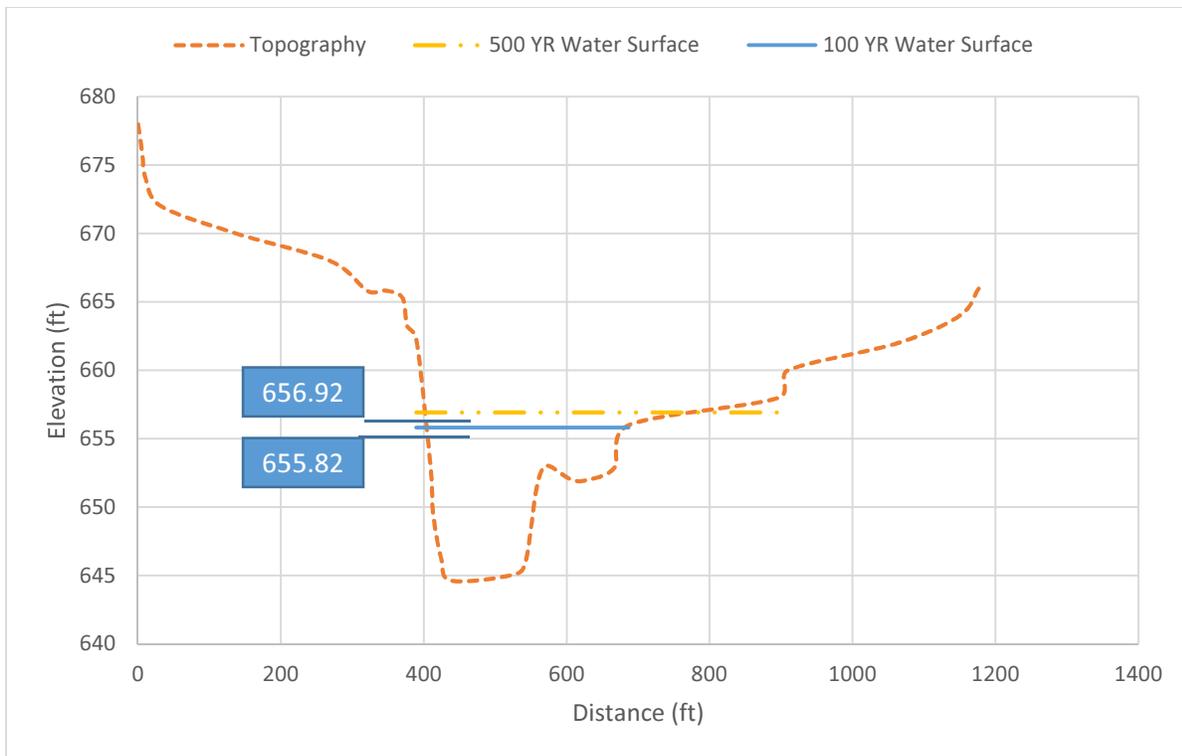


Figure 8: Existing vs Proposed River Station 0

Flood Emergency – Warning and Evacuation

In 2012 the CVNP issued the Flood Response Plan, a standard operating procedure to conduct a risk assessment of Park conditions, evacuate Park visitors if necessary and secure all Park lands during a flooding emergency. The Plan details priority areas, relaying safety messages and press releases during such events.

There is adequate evacuation time in the event that major flooding would occur within the area of Zielinski Court, as the area lies well above the 100-year and 500-year flood water surface elevation. If evacuation of the site becomes necessary, the 2012 Flood Response Plan reduces risks to visitors and Park workers.

Geomorphic Considerations

The Cuyahoga River along the study area is relatively straight and well vegetated. Stream characteristics as this generally do not indicate the potential for erosion, sediment deposition or channel adjustment. The contraction caused by the W. Boston Mills Rd Bridge, as it spans the River causes velocities to increase but no degradation on the River is visible. Once downstream of the Bridge the Riverbanks lower and the floodplain opens open. There are signs of sediment deposition on a slight outside upstream meander of the site that may have resulted from bridge pier scour of the I-271 Bridge. Otherwise, this section of the Cuyahoga River has been stable for a very long time.

Floodplain Regulation

The design and development techniques intended for the Zielinski Court restoration will be low impact, focusing on protection of historic and natural resources. Although the Zielenski Court is designated as Zone A, all floodplain development regulations will be observed.

Summary

The historic Zielinski Court is ideally located in the Cuyahoga Valley Park to welcome and inform visitors. The Hydrologic and Hydraulic analysis of the site as it relates to the Cuyahoga River Floodplain illustrates no negative impact to the current flood levels or future flooding events, as the 100-year and 500-year flood levels are below the project area. The peak flows used in the HEC-RAS model of the Cuyahoga River considered the potential for future fluctuations due to climate changes and the tendency for changes in magnitude and frequency of rainfall events. Based on the size and the make- of the Cuyahoga River, there would need to be a significant change in the basin characteristics to impact flooding potential of the Cuyahoga River within the study area.

In the unlikely event of flooding, the 2012 Cuyahoga Valley Nation Park Flood Response Plan includes the Zielinski Court area. If a flood emergency occurs, Park responders following the standard operating procedures can assess the risk.