TRI SAGE CONSULTING
Monthly Report
Carson Truckee Water Conservancy District

July 3, 2015

MONTHLY ACTIVITIES- May-June 2015

1) Finalize Virginia Street Bridge Encroachment Permit with USACE Flood Branch.
2) Completed Semi-Annual Inspection, draft final report and distribute.
3) Evaluate Shoaling deposits upstream of Kietzke Bridge & Right Bank upstream of Wells Ave.
4) Review City of Reno approach/proposal/progress for Flap-Gate requirements on channel penetrations.
5) Using Historical Survey provided by the City of Reno, compare to the current model/survey along Riverside Drive to establish whether channel bathymetry has changed; compare survey with the Martis Agreement Plates.
6) Emails with USACE regarding 408 Permit requirements for temporary channel diversions.
7) Research temporary flood control measures and request budget level pricing.

UPCOMING ACTIVITIES

1) Evaluate and update model sections near Kietzke Bridge for evaluation of shoaling deposit.
2) Evaluate temporary flood control measures including cost, storage, installation requirements and options for West Street Plaza and Riverside Drive.
3) Evaluate additional needs for model updates upstream of Keystone Avenue to State Line and downstream of Lake Street to Glendale Bridge; possibly needed for upcoming 408 Encroachment evaluations.
4) Run 14,000cfs steady state HEC-RAS flow model to establish water surface elevations along key river locations to evaluate issues; complete sections upstream and downstream of downtown.
5) Schedule a meeting with USACE Regulatory Branch (July 2015) to discuss project work including debris removal, shoaling deposits and box removal.
6) Schedule a meeting and with USACE Flood Control Branch (Sept-Oct 2015) regarding inspection issues, West Street Plaza, 14,000cfs model outcomes and evaluation of channel walls in downtown Reno and appropriate application/confirmation of SWIF process eligibility.
7) Continued coordination with City of Reno for 1) Flood Response evaluation and incorporation of Interim Risk Reduction Measures into their Flood Response plan, 2) Flap-gate Installation needs assessment and project and 3) Vegetation Variance for trees along channel- not expected to be necessary due to interim order.
8) Draft Vegetation Variance Application for Trees in Vegetation Free Zone if applicable under SWIF; confirm eligibility with USACE.
9) Finalize the Equipment Access/Entry Point Documentation and Mapping for the District Jurisdiction;

SUMMARY REPORT

Tri Sage continues as time permits to review temporary flood control measures that might be used along Riverside Drive and at the West Street Plaza areas to contain flood flows. The City of Reno has hired a consulting firm to perform the Flap-Gate requirement analyses in order to address the USACE inspection issue; work is progressing well on this project.

The Virginia Street Bridge Encroachment Permit has been executed by USACE and the bridge removal is progressing well. This project encroachment is periodically being monitored for the District.

During the Semi-Annual inspection, two shoaling deposits were noted for evaluation. The first deposit is just upstream of the Kietzke Lane Bridge, and is not depicted in the current model. The model will be updated in this section and run to evaluate the water surface elevations with this shoal in place. The second shoal deposit, which seems to have grown, but may just be due to the low river levels was identified on the Right bank between Second Street and Wells Avenue. The model indicates that the water surface elevation just exceeds the prior bank configuration; however, a field review indicates that the water levels at a 14,000cfs event will stay within the banks now that the re-track project berm is in place.

The City of Reno transmitted a channel survey dating back to 1957 to the District and this information has been used to compare the channel bathymetry along Riverside Drive in order to continue to asses if the channel configuration has changed in this section causing the water to over-top the berms. The preliminary findings indicate that the channel configuration is very similar between 1957 and 2014 so it would appear that such channel changes are not the source of the over-topping. In addition, this 1957 survey information has been compared to the Martis Creek Agreement profile plates and was found to correspond well. The next step is to compare the current model with the Martis profiles; this work is in process and once completed a full report showing all findings will be issued to the Board. The purpose of this work is to determine if there were changes to the channel, if the Martis Agreement was inaccurate or if there was another cause of the over-topping currently being modeled and confirmed in the 2005/2006 flood event.

The following section is repeated from prior reports*(updates in Italics*):
Notably, the USACE has yet to issue their inspection report from April 2013. As a reminder, the USACE criteria for rehabilitation funding and notifications changed late in 2013 such that the CTWCD inspection issues are not subject to loss of the rehabilitation funding nor notification.
Since the May 2014 monthly report, no further discussion has been had with the USACE regarding the determination of "Floodwalls" versus "Channel walls" through the downtown Reno river corridor; however this is an issue that will be pursued for some resolution as it impacts other inspection issues as noted below.

The Status of USACE inspection issues are noted below and the status remains unchanged since July's Monthly report except for the removal of the Box Culvert at Idlewild Drive and other italicized sections.

1) Shoaling- the shoaling deposits identified by USACE have been included in the recent modeling and at the current stage are NOT impacting the 14,000cfs flow. The USACE requested sensitivity analyses have been performed and indicate that doubling the size of the shoaling deposits does

NOT push the waters out of the banks in any of the four areas identified during the inspection. The Keystone Avenue Bridge area has been eliminated as a shoaling deposit.

2) Flap-gates- *The City of Reno has engaged an engineer to evaluate each penetration relative to the water surface elevation at 14,000cfs through the downtown reach.* Once we have the model updated and run at the reaches upstream and downstream of the downtown areas to produce water surface elevation data, the City of Reno will continue their evaluation on the storm-drain penetrations into the channel. Tri Sage was able to get GIS data for the storm drain locations to correlate to model flow elevations.
3) Vegetation- vegetation along the walls and growing from the walls was removed by the City of Reno as part of the 2013 Debris Removal Project; however during the inspection it was noted that vegetation is developing again. *This was too minor to address in 2014 and will be cut back as part of the 2015 project work.* Potential determination of the walls as channel walls, not floodwalls means that there is no "vegetation free zone" requirement and other than the short section that the USACE might determine to be floodwalls, vegetation may become a moot point once specific determination is confirmed.
4) *Idlewild Box Culvert/Bank Erosion- the box culvert encroachment was removed in October 2014 and once the flow has an opportunity to re-establish in the unobstructed channel the bank erosion on the Right Bank will be further evaluated if necessary.*
5) Flood Response- It appears from the current modeling that the 14,000cfs water surface elevation is below the horizontal surface in all areas downtown except for the West Street Plaza area. There was no approved encroachment by the USACE or the CTWCD for this project including the removal of the walls and railings along this section of river. The USACE has requested that the CTWCD work with the City of Reno to propose Interim Risk Reduction Measures that can be reviewed and approved by the USACE and incorporated into the City's Flood Response Plan. *The City of Reno is working with the potential developer on this matter and will propose temporary measures at a minimum.* It is not clear at this writing what the requirements will be relative to the placement of plywood along the railings and walls as called for in the Martis Creek Agreement now that it is apparent from the modeling that the 14,000cfs flow is below the top of wall and below the horizontal surface in all sections except the West Street Plaza.

Next steps include the evaluation and running of the model in reaches above and below the Keystone to Lake Street areas for the determination of water surface elevations. Discussion with agencies regarding the sections along Riverside Drive Bridge where the water leaves the channel at 14,000cfs and evaluation of mitigation options. The City of Reno is working to address the flap-gate needs as well as the Interim Risk Reduction Measures(IRRM) for the West Street Plaza. Director Penrose and Tri Sage will plan a meeting with the USACE Flood Control Branch in September or October of 2015 to discuss the inspection report and associated issues; this will give time for several items to be addressed including the flap-gates and the IRRM.

RECOMMENDATION

It is recommended that the Board of Directors continue to pursue the inspection/evaluation items as outlined in this report.