TRI SAGE CONSULTING
Monthly Report
Carson Truckee Water Conservancy District

May 6, 2014

MONTHLY ACTIVITIES

1) Follow up with USACE on status of Virginia Street Bridge encroachment authorization.
2) Running updated TRFMA 14,000cfs flow model and producing water surface profiles for the determination of flood walls and downtown sections from Arlington to Lake Street; included both existing conditions and also profiles with the new Virginia Street Bridge design incorporated.
3) Field inspection of river channel River Inn to McCarran and side channel upstream of Kietzke Lane.
4) Call with USACE and Ron Penrose 4/25/14 to discuss floodwall status, encroachment permit for Virginia Street Bridge, inspection issues and SWIF.
5) Meeting with TRFMA, City of Reno and HDR to discuss USACE model validation requests and information regarding the model's observed high water elevations.

UPCOMING ACTIVITIES

1) Semi- Annual River inspection (continued) and review of debris removal work for 2014.
2) Continued pursuit of the Virginia Street Bridge Project USACE authorization for encroachment Permit and issue permit to City of Reno;
3) Evaluate through sensitivity analysis shoaling deposit growth in downtown that would push 14,000cfs flows out of the banks and to report findings to USACE.
4) Survey of areas downstream of Keystone Avenue bridge for HEC-RAS Modeling of possible shoal/problem area where water leaves the channel at 14,000cfs;
5) Evaluate additional needs for model updates upstream of Keystone Avenue and downstream of Lake Street.
6) Run 14,000cfs steady state HEC-RAS flow model to establish water surface elevations along key river locations to evaluate issues; especially complete sections upstream and downstream of downtown.
7) Continued coordination with USACE regarding 14,000cfs model outcomes and evaluation of channel walls in downtown Reno and appropriate application/confirmation of SWIF process eligibility;
8) Continued coordination with City of Reno for 1) Flood Response evaluation and incorporation of Interim Risk Reduction Measures into their plan, 2) Flap-gate Installation needs and project, 3) Vegetation Variance for trees along channel- not

expected to be necessary due to interim order, 4) Box Culvert facility evaluation and potential removal project;

9) Draft Vegetation Variance Application for Trees in Vegetation Free Zone if applicable under SWIF; confirm eligibility with USACE.
10) Finalize the Equipment Access/Entry Point Documentation and Mapping for the District Jurisdiction;

SUMMARY REPORT

Upon following up with the USACE regarding the Virginia Street Bridge encroachment permit authorization, Tri Sage was informed that the USACE had to determine if the walls in downtown Reno were indeed floodwalls or if they were channel walls prior to processing the application. A floodwall determination would require this permit to go to headquarters for authorization, while a channel wall determination would allow for review at the regional level. USACE wanted runs from the updated model to make this determination based on the water surface elevation compared to the horizontal surface. The engineer completed updates to the model for both the existing condition and also the condition with the insert of the new Virginia Street Bridge and profiles were sent to the USACE. The USACE then requested the updated model used to generate the data and subsequently has requested information regarding the model validation and genesis of the Observed High Water data in the model. Tri Sage has worked with TRFMA and their consultant HDR to provide the requested information from the work that HDR has completed for TRFMA. At this writing we are awaiting USACE Modeling review of this information to see if they will regionally authorize the issuance of the Virginia Street Bridge Encroachment Permit which has previously been approved by the CTWCD.

The information provided to the USACE is also a key factor to USACE's general determination of the status of the walls in downtown Reno and how that will ultimately impact the CTWCD inspection issues and the SWIF application. Upon initial review and per our call with USACE, the only section of walls that will likely be considered "floodwalls" under the definition will be the walls upstream and downstream of the City of Reno West Street Plaza area; this determination is due to the fact that at 14,000cfs, the water surface elevation in this area is above the horizontal surface elevation (although it is not above the openings in the parapet railings). USACE has indicated an interest in amending the Martis Creek Agreement to more clearly identify the floodwalls as distinguished from channel walls. Based on this wall assessment, CTWCD will not be eligible for a SWIF as only projects with Floodwalls are eligible; however a SWIF may not be necessary in light of the interim order referenced below. Furthermore, if the walls are categorized as channel walls and not floodwalls, then there is no vegetation free zone requirement for these walls so this inspection issue is eliminated.

On the call with USACE on April 25, 2014, USACE informed CTWCD (Lori and Ron) of the "Interim Policy for Determining Eligibility Status of Flood Risk Management Projects for the Rehabilitation Program Pursuant to Public Law (P.L.) 84-99" which sets rehabilitation eligibility based on inspection ratings. Under this interim policy, only specified criteria must have either and "Acceptable" or "Minimally Acceptable" ratings in order to maintain eligibility; while less critical criteria may be rated "Unacceptable" and still maintain eligibility. Vegetation along Floodwalls and in Channels is one factor that no longer impacts eligibility under this interim

order and all "channel" related criteria no longer impact eligibility under this order. USACE has indicated that the April 24, 2013 inspection report, which has yet to be issued by USACE, may now be issued under this interim order and that the currently "Unacceptable" rated items in that inspection are NOT criteria under the interim order for loss of rehabilitation eligibility. Thus, issuance of this report will not impact the CTWCD's rehabilitation eligibility.

The Status of USACE inspection issues is noted below:

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. USACE has requested we perform analyses to determine how large these deposits can grow before the flow is forced out of the banks; this is being analyzed. There is a new area of possible shoaling identified downstream of Keystone Avenue Bridge that may be the cause of 14,000cfs flows leaving the banks along Riverside Drive; this area will be surveyed and deposits evaluated to get data for further evaluation in the model.
2) Flap-gates- Now that we have model water surface elevations in the downtown areas, the City of Reno will evaluate each penetration relative to the water surface elevation at 14,000cfs. 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.
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; 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 will become a moot point.
4) Idlewild Box Culvert/Bank Erosion- the model needs to be evaluated and updated in this section; additional survey data is required as the model contains minimal cross-sections in this reach. Once the model is updated with additional survey data, it will be run to determine the impact of the box and the need for removal. It is anticipated that this box will need to be removed to reduce the erosion of the Idlewild Drive bank. USACE is awaiting evaluation results and proposed solutions for this reach.
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. 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. Additional survey data will be collected at the sections below the Keystone Avenue Bridge where the water leaves the channel at 14,000cfs and at the Idlewild box culvert as well as other sections where

the modeling efforts may require additional sections. The modelers will analyze the box culvert and also perform sensitivity on the shoaling areas to determine if and when these areas will become problematic to the flow. The City of Reno will work to address the flap-gate needs as well as the Interim Risk Reduction Measures for the West Street Plaza. At this time it is anticipated that work will need to be done to remove deposits in the river near Keystone Avenue and to remove the box culvert at Idlewild Drive. The exact requirements of these potential projects are still under evaluation.

The semi-annual inspection has begun to identify issues and debris that should be removed during 2014 prior to the winter flows. It is anticipated that this requirement will be substantially less than the project completed in late 2013. The inspection will be completed in the next few weeks once the peak run-off for the spring has passed and the report will be prepared for USACE in compliance with the Martis Creek Agreement.

RECOMMENDATION

It is recommended that the Board of Directors continue to pursue the inspection/evlauation items as outlined in this report. It is further recommended that the Board reserve funding for potential projects until the evaluation of the channel deposits below the Keystone Avenue Bridge and the box culvert are complete and determination is made of project needs and timelines.