

## STAFF REPORT

**To:** Mayor and City Council

Agenda Item: **J.2**  
Date: **2-25-2009**

**Thru:** Charles McNeely, City Manager

J.2

**Subject : Staff Report: Presentation, discussion and potential direction to staff on the Downtown Bridge Visioning Stakeholder Process, Bridge Structure Type Alternatives and Costs, the Consequences of Various Levels of Flood Protection, and Other Alternatives Considered for the Downtown Reno Truckee River Corridor.**

**From:** Neil Mann, Public Works Director

**Summary:** This agenda item is a presentation on the Downtown Bridge Visioning public outreach and stakeholder involvement process. The presentation will summarize the public process conducted for consideration of replacing six potential downtown Reno bridges as part of the Truckee River Flood Project. Items to be addressed include levels of flood protection, bridge types, cost estimates, feasibility level engineering outcomes, implications to existing infrastructure, and other alternatives to bridge replacement that were raised during the public process. Staff seeks feedback and direction from Council on level of flood protection that will determine approximate replacement bridge elevations. Staff seeks direction from Council on a replacement structure type for Virginia Street Bridge. Staff recommends Council acceptance of this report and possible direction for a desired level of flood protection for the downtown river corridor.

**Previous Council Action:**

**February 28, 2007:** Council directed staff to conduct a visioning and outreach program with respect to possible Virginia Street Bridge alternatives.

**March 28, 2007:** Council directed replacement of the Virginia Street Bridge as the preferred flood project alternative with respect to the Truckee River Flood Projects' Locally Preferred Plan.

**April 25, 2007:** Council considered Reno's Truckee River Action project alternatives and directed staff to investigate the replacement of Lake, Sierra, and Virginia Street Bridges through feasibility Studies and to request Truckee River Flood Project funds.

**July 11, 2007:** Council approved the Interlocal Agreement with Washoe County for Reno's TRACTION project: Downtown Bridges and Visioning in the amount of \$600,000. Staff explained that the Flood Project Coordinating Committee on its May 11, 2007 meeting directed investigation for replacement of three additional bridges: Center, Arlington, and Booth Street Bridges.

**July 11, 2007:** Council approved an Agreement with CH2M Hill to conduct feasibility studies for potential replacement of six downtown bridges in an amount not-to-exceed \$600,000.

**July 16, 2008:** Council approved an Agreement with CH2M Hill to continue feasibility studies in an amount not to exceed \$185,000.

**July 16, 2008:** Council approved an Interlocal Agreement with Washoe county to reimburse to Reno \$185,000 for additional requests and analysis by the United States Army Corps of Engineers (USACE/Corps) in connection with the Truckee River Flood Project.

**September 10, 2008:** Council accepted a report on the status of the Downtown Bridge Visioning and directed a third community workshop be conducted to consider two levels of flood protection, various bridge structure types, and other alternatives to bridge replacement.

**Discussion:** Council has directed staff to conduct feasibility studies and a public visioning process for potential replacement of six downtown Truckee River bridges (Lake, Center, Virginia, Sierra, Arlington, and Booth Street) for improved flood protection as a early action, or Truckee River Action (TRAction) Project. The Flood Project Coordinating Committee, utilizing funding from the regional 1/8 cent sales tax, approved Reno's TRAction application on June 8, 2007 for \$600,000 with CH2M Hill, and augmented the funding to \$785,000 on April 11, 2008 to meet requests by the Corps of Engineers in connection with the Truckee River Flood Project.

Staff has conducted three public visioning workshops to present bridge replacement options and receive public input. At the first workshop in October 2007, staff received concerns, interests, and comments from interested stakeholders on the needs for public safety, access, mobility, and recreational uses along the river corridor. Staff presented estimates on how high new clear-span bridges would be raised to accommodate 100 year level of flood protection according to Army Corps criteria, which include four feet of freeboard (the distance between the water level during a flood and the lowest structural element on the bridge), and discussed implications of raising the bridges including impact to streets, sidewalks, business access and intersections. In general, the participants responded that the Army Corps criteria (Option 4 below) were too conservative for downtown and that bridges constructed to meet these criteria would cause negative visual and business access impacts.

The second public workshop was held on March 22, 2008. This workshop responded to concerns and comments expressed at the first workshop series and presented alternatives to the Corps' 100 year criteria (Option 4 below). Staff and consultants presented four scenarios of differing levels of flood protection and their associated costs:

- Option 1: 50 year level of flood protection plus two feet of freeboard
- Option 2: 74 year level of flood protection (equivalent to December 31, 2005 event) plus two feet of freeboard
- Option 3: 50 year level of flood protection plus four feet of freeboard, frequently referred to as 100 year level of flood protection plus two feet of freeboard, and
- Option 4: 100 year level of flood protection according to Army Corps criteria, which requires four feet of freeboard

Option 1 is the only alternative which retains the existing Center Street Bridge. The remaining system of existing bridges can pass about a 40 year event without pushing water into the downtown area.

The public expressed more interest in options 2 and 3. The participants did not feel that enough flood protection was realized in Option 1 compared to the costs of achieving 50 year level of flood protection with adequate freeboard. As in the previous workshop, there seemed little interest in pursuing Option 4.

The focus of the third workshop held October 21, 2008, was on visual simulations of flood reduction for Options 2 and 3. The public was asked to provide their preferences and comments regarding the various structure types and levels of flood protection. The simulations assisted understanding of the potential aesthetic opportunities, and potential impacts to surrounding sidewalks, roadways, and business access for these two options. Other flood reduction alternatives such as channel deepening, channel widening, upstream detention, and lift/mechanical bridges were also discussed. Staff does not recommend these other alternatives to bridge replacement for purposes of flood reduction and will discuss these in accompanying presentation.

Following the third workshop, a total of 40 public comment forms were submitted to staff. There is a nearly even split among preferences expressed for below supported bridges versus above supported bridges. Thirteen respondents rated both bridge types as favorable to some degree. Ten respondents, who rated above supported bridges as 'highly favorable,' also rated below supported structures as 'favorable.' These respondents may have a preference for the above supported bridge type, but would also support the below supported structure as an acceptable alternative. Ten respondents who rated above supported bridges as favorable rated below supported structures as unfavorable. Their comments cited preference for "iconic structures" and also cited reduced opportunity for debris build-up.

The bridge decks for above supported structures are about 6" lower than the below supported structures, which reduces the impacts to raising sidewalks and roadways, but may somewhat limit the view up and down the river. There were 13 respondents who rated the below supported structure as favorable to some degree, while rating the above supported structures as unfavorable. The primary concern for this group appears to be impacts to the viewshed from above supported structures. The cost differential between above and below supported bridges (about \$2 million each bridge) did not seem to be a significant factor to the public in bridge type preferences.

A majority of respondents expressed the moveable or lift bridges as an unfavorable option. Those in this majority seem to have strong feelings against moveable or lift bridges due to added expense, traffic noise, practicality, and aesthetics.

There is also a relatively even split with regard to preference of a level of flood protection. However, the majority in this category (15 respondents) identified Option 3 as "highly favorable and ranked Option 2 as "favorable", leading to a conclusion that the preference is for Option 3,

but Option 2 would be acceptable. Most comments perceived that it is worthwhile to spend a little more in order to obtain greater protection. Those who expressed an opposition to Option 3 appear to be concerned with a larger bridge abutment footprint and maintaining existing river access. Conceptual renderings of how accesses would be perpetuated may prove helpful in mitigating these concerns.

Selection of Options 1, 2, or 3 will not likely result in reducing the 100 year floodplain on Flood Insurance Rate Maps as these options do not meet minimum FEMA flood reduction requirements (outside 100 year floodplain) and Corps' minimum freeboard requirements (four feet of freeboard). Therefore, if options 1, 2, or 3 are selected, there may not be any reduction in flood insurance rates to properties that currently pay flood insurance. While respondents from the third workshop's survey stated that potential flood insurance savings was an important consideration to some degree, we are not sure of how many of those respondents currently pay flood insurance. Up until that point, the public had not expressed a great deal of concern about flood insurance requirements.

Staff recommends Option 3, a 100 year level of flood protection with 2 feet of freeboard to set the elevation for the four bridge replacements (potentially five with Arlington which is not part of the Flood Project). Because this is nearly analogous to a 50 year level of flood protection with four feet of freeboard and meets minimum Corps freeboard criteria, staff understands the Corps could fully support bridge design based on these criteria. Corps staff of the City's preference will be beneficial as staff works with and through the Truckee River Flood Project to justify a federally eligible flood project in the downtown. Floodwalls would not have to be raised except where there is a "dip" or plunge in the floodwalls. At these locations, the floodwalls would require leveling. The engineering feasibility study concludes that sidewalks could be raised at these locations to minimize view impacts and does not anticipate causing access or pedestrian issues. These associated costs are included in the cost estimates. This flood reduction option would assist Corps eligibility for a downtown Flood Project segment, would reduce the flood damage/inundation area in a 100 year flood, would not require additional floodwall height except leveling as above, but would not affect or reduce the existing flood insurance requirements.

Staff seeks Council's preference and direction for a Virginia Street Bridge structure type. Staff recommends an above supported structure which would result in about a ½ foot lower bridge deck and corresponding reduction in roadway and pedestrian impacts. A structure type selection for this bridge is requested at this time in order to commence environmental work as soon as possible. All downtown bridges would not have to be the same structure, and could be decided as they are considered for design.

Additional public workshops may be necessary to discuss aesthetic treatments and guidelines for the selected structure type as each individual bridge is considered for replacement. In addition to the workshops, staff is conducting outreach to downtown stakeholders including the Downtown Improvement Association, Citizens Advisory Committee to Redevelopment, Nevada State Historic Preservation Office (SHPO), and the Historic Resources Commission. Federal Highway Administration will lead discussions with SHPO during the design phase of the Virginia Street Bridge replacement.

Attached are survey and comment summaries from all three workshops.

**Financial Implications:** There are no financial obligations of this motion at this time. The financial considerations of the recommendations are tied to the construction costs of future bridge replacements and associated appurtenances including roadways at the time of design and construction and the overall Flood Funding requirements.

**Recommendation:** Staff recommends:

- Council select Option 3, 50 year level of flood reduction with 4 feet of freeboard in the downtown Truckee River corridor for all future bridge replacements from and including Booth Street to and including Wells Avenue,
- Council select an above supported bridge for the Virginia Street Bridge replacement, and
- Council direct staff to work with the Truckee River Flood Project to amend the Locally Preferred Plan to include these decisions.

**Proposed Motion:** I move to approve the staff recommendation.

## TRAction Workshop #1 - Comment Summary

### Aesthetics

Would like to see public art incorporated.

Art on the underside of structures.

Lights could take away from the City.

Raising street grades will take away from town feel.

More vegetation would be better (all scales-trees, baskets, shrubs, etc.).

Tranquil setting.

Use stormwater as part of features.

Historical gardens/island at Post Office.

Booth to Arlington is a great experience.

Views of river should be preserved.

Promenade concept is good.

Bridges at Wingfield are nice.

Create visually interesting places along river.

Make the bridges landmarks.

Art deco elements at Center Street Bridge nice, modern but historic.

Eclectic OK but should work together – cohesiveness.

Use bridges as opportunity to make a “statement.”

I like a strong visual statement.

Keep “visual access” to the river.

DeLongchamp Design (Post office/Riverside lofts).

Make sure it fits with historic architecture.

Park-like settings.

Zone C is most traditional area.

Landscaping is critical in all zones.

Variety is good.

Not all bridges should block view-shed.

Maybe some structures should be more utilitarian.

Be respectful to surrounding historic elements.

Like the river walk as it is.

Like cable-stay bridge.

Incorporate decorative lighting into design.

Should be able to see river whether walking or driving.

Celebrate the bridges.

Wrought iron and stone aesthetic.

Gateway/landmark bridge.

Keep it clean.

Landscaping/old growth – natural walk.

Trees/landscape should be continued.

No wall blocking views at promenade.

Aesthetic bridges are important especially from Arlington eastward. Make a statement.

Bridges should be “airy” above so they disappear into the landscape.

Want beautiful bridges – Paris.

Contemporary bridges but borrowing from surrounding history like art deco (Riverside, Post Office, Reno Arch).

Make Virginia Street Bridge a showcase but create family of bridges in zone C.

Maintain pedestrian scale on bridges.

Bridge approaches stone – tie more.

Contemporary.

**River rock would tie in.**

**Virginia Street Bridge is the southern gateway, should consider work being done on northern gateway.**

**Celebrate the river – recreation, etc.**

**River environment is paramount, don't ruin for flood protection – keep aesthetics.**

**Virginia Street pedestrian mall? Can this tie in?**

**Walls and approach materials – make it more contemporary.**

**Use native plantings like willow, choke cherry, etc to supplement some grasses.**

**Try to avoid heavy riprap at water's edge (i.e. not put below normal flow line).**

**Environmentally friendly stream & bank habitat (restoration).**

**Access**

**With new baseball stadium coming, Lake street will see more activity.**

**Do we need all four bridges? Do we need Lake Street?**

**Fewer car bridges (more capacity on fewer bridges?)**

**Fishing access in downtown.**

**Increased bicycle access.**

**More areas for “less experienced” river users.**

**Outdoor dining.**

**More parking.**

**Tough to access Wingfield (restrooms, gear storage).**

**Make access more convenient.**

**Create environment where people stay all day.**

**Would like to see promenade/experience flow past the Siena.**

**Raise entire promenade.**

**Riverfront dining opportunities.**

**Access to river's edge.**

**I like wide sidewalks.**

**Widen bridges so that people can use during festivals, etc.**

**Maintain/restore parking on bridges .**

**Expand water activity access into zone C.**

**Expand river access in zones A & C.**

**Consider approaches and how they ramp up to structure.**

**Protect south side approach.**

**Widen bridges for events, parking – activities/ entertainment on bridge.**

**No easements for river access in zone A. Property owners should have input on this.**

**Want to be able to walk along both banks and see river.**

**Keep pedestrians close to river, but not perceived to be “elevated.”**

**Not enough access to and from the river.**

**Preserve and expand recreational access.**

**Bike access on north side of river and across river – east/west spine for bike network.**

**Continue promenade throughout – districts A through C.**

**Continue recreation and expand it.**

**More public restrooms and changing facilities.**

**Access for bikes/pedestrians is important on both sides of the river.**

**Easy pedestrian access.**

**Have no regular vehicles at river promenade – pedestrian only.**

**Close Virginia Street Bridge to vehicles or maybe close Lake Street to vehicles?**

**Island Avenue serves Park Tower building parking garage – maintain.**

**Must be able to enjoy river 365 days /year between floods.**  
**Access on foot for all non-motorized travelers.**  
**Parking for better river and recreational facility access.**  
**Walking paths beneath one or both abutments so can walk along water's edge at normal flows and see/enjoy the river, fish, etc.**  
**Fishable stream channels with access from as many banks as possible.**

### Safety

**Virginia Street Bridge should be replaced.**  
**Raise pedestrian foot bridge at Arlington.**

**Safety lighting.**

**Safety around the Lake Street area.**

**Raise floodwalls through downtown.**

**Do we need 100 year protection? 50 year protection?**

**What can be done to prevent/mitigate debris?**

**Building flood protection.**

**Use more building flood protection, like McKinley.**

**Consider ground water flooding, individual buildings need their own protection.**

**Government can only provide so much protection, then it is up to the individual.**

**Safety and pollutant issues that result from river access.**

**Assurances that 1997-size flood will be successfully conveyed through town without unnecessary property damage or loss of life (my family was flooded out in 1950 flood).**

### **Miscellaneous:**

**Green Architecture.**

**Cost-benefit will never pan out for complete replacement.**

**Screw jacks to lift ends of structure during storm event.**

**Would like to keep Arlington Bridge – how it sits; church zone; history; peaceful place; looks nice.**

**Would like to see examples of walls and wall types.**

**How will John Champion Park tie in?**

**Zones B & C should be a single zone (all entertainment and recreation in those areas).**

**Foot traffic along river walk has increased over last 2 years.**

**Move use of City Plaza – B & C one zone.**

**Zone C should extend east to new ballpark.**

**Can we modify the 1935 flood control agreement with the Basin Facilities?**

**Do we need 4 feet of freeboard?**

**Community sees river as a jewel – economic and recreational benefits.**

**What about using “jack-up” bridges?**

**How about river deepening.**

**River is irreplaceable resource for community.**

**Consider turning Virginia Street Bridge to NDOT for 95/5 match vs. ACOE – high cost.**

**Tie options to level of flood protection – tell City the options (ex: \$100M = 70 year flood protection).**

**Check 1930's agreement for upstream storage.**

**Look at mitigation “toolbox” in our study as well as constructed flood proofing.**

**Try backing into flood criteria by first deciding what is maximum raising of walls and bridges since ACOE will only pay for 50 year protection anyway (including freeboard).**

**Should look at multiple solutions.**

**Consider river deepening.**

**North Virginia plan at river – how do we coordinate.**



*TRAction Workshop #2 – Comment Summary  
Scenario #1: 50 -Year Flood Protection*

**Questions:**

- Will pedestrian paths be affected?**
- How high would the wall be adjacent to La Famiglia?**
- What happens to the river walk?**
- Are there any flood walls?**
- Has the City looked at eliminating the Lake Street Bridge?**

**Comments:**

- Under this proposal, I think we should raise Center Street as well to get it above flood level.**
- Eliminating the Lake Street Bridge could take huge costs to Lake Street Bridge improvements and move those funds to other bridges.**
- If Lake Street Bridge was eliminated, people could just cross the river at Center Street, but more traffic would come on to Center Street.**
- The Lake Street drawbridge idea is nifty and interesting.**
- Benefits of 50-year protection are not worth it.**
- 50-year – least visual impacts/less expensive / use dollars to flood proof.**
- I support the 50-year plan. Keep the Center Street Bridge. Rebuild the Lake Street Bridge; Lake Street is important for traffic flow in downtown Reno.**

*Scenario #2: 74-Year Flood Protection*

**Questions:**

- What impacts will occur to the roadways?**
- Will retaining walls be built?**
- How high will river channel walls need to be built?**
- Does this affect Baseball Stadium development?**
- Will there be retaining walls along river channel?**
- Will flood walls be required at Booth Street area?**
- What are financial impacts to businesses?**
- What are effects to the existing walkways, etc?**
- Does raising bridges keep the water in the river channel?**
- How would phasing of construction be considered if this plan was accepted?**
- If bridges are raised, does this still not keep 100-year flood in the channel?**
- Why not get rid of Lake Street Bridge?**

**Comments:**

- The City needs to look at dollars now in order to compare scenarios.**
- Before raising all bridges, look at Truckee River Agreement.**
- Would like to see modeling with existing bridges at each scenario to compare plans.**
- Preference: Scenario #2 – Replace bridges without of flood walls along the river out of concern for aesthetics. Some buildings will need flood proofing/protection measures.**

*Scenario #3: 100-Year Flood Protection*

**Questions:**

- What effects does this have on river walk?**
- With hydraulic modeling, can improvements to west be made?**
- Is City raising flood walls with a 100-year scenario?**
- Is flood proofing of buildings a better option?**

**What is cost of flood proofing versus raising bridges?**  
**What are public safety and security issues associated with raising bridges?**  
**Will sidewalks need to be raised?**  
**Can there be wall variations in conjunction with bridge elevations?**  
**Does this meet Corps of Engineers' criteria?**  
**What is the damage cost analysis?**  
**Can we eliminate a bridge?**  
**How precise are models?**  
**What are bridge elevations versus the flood elevations?**  
**Do projections take into account current changes to roads and structures?**  
**Does Arlington Bridge make any changes?**

**Comments:**

**Please consider table/lift bridges as an option.**  
**Lift bridge electronically sensorred.**  
**We heard north side walls need to be raised to 5-6' with this plan.**  
**I feel that the Scenario #3 is the best bet. Can lowering the design speeds on the roads lessen the approach lengths?**  
**100-year/2ft - All 4 bridges with walls/too obtaining/police and safety/could be issues for lack of visioning.**

Scenario #4: Corps of Engineers 100-Year Flood Protection

**Questions:**

**How does it impact redevelopment of Post Office and pedestrian access?**  
**What is elevation difference at walkways?**  
**How is bike path affected by this proposal?**  
**What are the access impacts to Island Ave. and businesses adjacent to river?**  
**Where would flood walls be required?**  
**What effect might this have on tourism?**  
**Would this scenario effectively shut down access at Siena?**  
**Would pedestrian paths be beneath bridges?**  
**Would City provide access for bicycles?**  
**Where would limits of walls be in this scenario?**  
**You are showing both methods between 2-4', are we required to use Corps of Engineer' criteria?**  
**Would we be penalized/lose funding if we don't use Corps of Engineers' criteria?**  
**Do you have any water lines or survey lines going north-south in these bridge areas?**  
**What is the idea behind the Corps of Engineers requirement of 4' instead of 2'?**

**Comments:**

**Corps of Engineers' freeboard requirement is too much.**  
**Draw bridge/no bridge at Lake Street.**  
**100-year/4ft - No way this could be mitigated. Would change the entire river corridor/safety-not visible for police/walls are way to tall/\$100m - four bridges.**

Virginia Street Bridge Flood Impacts

**Questions:**

**Does new development cause greater downtown flooding?**  
**Would pedestrian only bridge at Virginia Street have capacity to pass flood?**  
**If Reno gets a 100-year protection what about Sparks?**  
**Can part of Virginia Street Bridge be preserved and still replace most of it?**

**Can we keep Virginia Street Bridge and put in culverts hedges for greater flow?**  
**How about replacing Virginia and Lake Street Bridges?**  
**Has City studied only replacing Virginia Street Bridge?**  
**Has City studied what would occur if Virginia Street Bridge was replaced and other bridges left?**  
**What is replacement priority?**  
**Remove and not replace Virginia Street Bridge?**  
**Has City studied what would occur if Virginia Street Bridge was replaced and other bridges left?**  
**Could a crane be on hand to clear debris and keep Virginia Street Bridge clear?**  
**There is D.A.R. plaque on the Virginia Street Bridge. What assurance can you give that the plaque will be preserved/protected and relocated to the new Virginia Street Bridge?**

**Comments:**

**Important to consider historic preservation, but also public safety too.**  
**Widen channel on north side (AT&T Bldg/others) to increase capacity – we need to think of big solutions for the next 100 + years.**  
**From historic preservation standpoint, replacing Virginia Street with pedestrian only bridge would be good-not replicating existing bridge.**  
**Consider a draw bridge.**  
**Skeptical whether existing channel will pass 100-year flood anyway even with bridge replacements.**  
**Consider replacing Virginia Street Bridge and only replacing Lake Street Bridge.**  
**Need to keep Truckee River as focal point, raised bridges would be unsightly.**  
**There have been studies for Virginia Street pedestrian bridge mall, but business owners want vehicular traffic.**  
**If water park continues, pedestrian bridge at Virginia Street might be better.**  
**Virginia Street Bridge as pedestrian bridge.**  
**Pursue possibility of no replacement of Virginia Street Bridge.**  
**I think removal of Virginia Street Bridge was the best suggestion tonight. We should consider the transportation implications, but this seems to be best for the downtown area.**  
**Keep vehicle traffic on Virginia Street.**  
**Look at removal Virginia Street Bridge & only having pedestrian traffic.**  
**My preference is make Virginia Street Bridge a pedestrian bridge. It seems to solve some flood problems and be economical.**  
**Virginia Bridge – Pedestrian Bridge/not replacing is supportable from a pedestrian perspective.**

General Questions and Comments

**Questions:**

**Is there support from above?**  
**What is the interaction between flood control and redevelopment?**  
**Where are we in decision making?**  
**Could there be 50, 75, 100-year floods in the same year?**  
**What does a 50-year event mean?**  
**How does the 100-year flood compare to 1997 flood?**

**Could 100-year flood protection be chosen if Virginia St. Bridge were made to be pedestrian and reduce other bridge heights?**

**What is time frame for this project?**

**What is decision timeline?**

**Who is going to pay for it?**

**Do we know what cost is for this?**

**Why are we looking at more water now than when the bridges were built?**

**Why would City implement this design if the Corps of Engineers does not fund it?**

**How does this design incorporate Corps of Engineers' design and funding?**

**What are the impacts of not meeting Corps of Engineers' standards?**

**If we meet the Corps of Engineers' criteria, do they pay for everything?**

**Will extra money go to flood insurance/help for impacted properties?**

**Would commercial flood insurance values change?**

**FEMA funding and the change in insurance maps?**

**Has City considered building upstream debris control structures, such as "bridge shark?"**

**Is bridge downstream adequate?**

**Can debris be collected upstream of downstream?**

**Can we clean channel?**

**Is there an option to deepen channel?**

**Can channel be widened?**

**What about debris from Arlington?**

**What about Arlington & upstream options?**

**Comments:**

**50 and 74-year plans seem most realistic.**

**This 50-year plan doesn't buy you anything.**

**74-year – no wall/bridges and abutments/all concerns effected.**

**If we are placing money into the 50 year event, we should spend more for the 75 year.**

**More excavation needed to pass 100-year floods.**

**If 100-year protection is chosen, major downtown renovations should be considered to integrate riverside structures.**

**Sundial cantilever pedestrian bridge built to match canopy over ice rink- compatible lighting.**

**A draw bridge seems elegant (perhaps at a couple of bridges).**

**Have at least the Lake Bridge be a draw or risible bridge to keep the roadways unchanged.**

**Creative solutions is key.**

**City is talking about a bike path along the river.**

**Make area much more pedestrian friendly.**

**The City should avoid flood walls between bridges if possible.**

**Are there ways to create early melting of the snow to avoid the 24-48 hour floods?**

**The City needs to clean out the river and drainage ways to help with flood problems.**

**Build debris catchers up river, several to remove major debris before it would clog our bridges.**

**Catch debris before it comes downstream.**

**Final preference will depend upon cost/benefits analysis of the alternatives.**

**Review the 2006 Downtown Reno Circulation and Parking Plan to understand future traffic conditions in downtown Reno.**

**Typical sections of 2 lanes with 12' shoulders should be reviewed for each location.**

**Please look at Truckee River Operating Agreement.**

**Concerned with a lack of urgency.**

**Skeptical of new improvements ability to actually protect.**

**The City has been slow moving in developing a program for floods.**

**Would like to see different meeting format, so I can hear better.**

**Great job so far, thanks.**

**Very informative – Thank you.**

TRAction Workshop #3 – Comment Summary

**Below-supported Bridges**

Comments For:

**Cheaper and more architectural variation.**

**Favored if only one pier and no wall between walkways at every corner.**

**Provides access for pedestrians, bike riders, roller bladders, etc. and allows good views of the river.**

**Also prefer the lower cost.**

**Structure fits in better with the river corridor. I like the architectural designs similar to what we have now. They are also less costly and allow better views of the river.**

**Preferred because it minimizes visual impact.**

**Keeps historical character and provides architectural consistency.**

**I like the bridges as they are because I like the view and history they have.**

**I favor below supported bridges with arch incorporated into the design as a nod to history and tradition.**

**Favor below supported with 3 foot freeboard.**

**I have no strong preference provided that bike travel is feasible under the bridges on at least one bank of the river with stairs or ramps up to the street.**

Comments Against:

**No columns [below-supported], I've been on those bridges during the floods of '97 and '05 w/excavator operators. We need to do the best we can do now even though these [above supported bridges] are slightly more expensive.**

**Debris and scour issues.**

**The existing below supported bridges are proven debris catchers which backs up water during floods.**

**Below supported bridges are old and out-of-date and need improvements.**

**Too much of what we have now.**

**Below supported bridge structures have serious debris problems.**

**The below-supported bridge is much less favorable even though it is less expensive.**

**Keep piers out of the river.**

## Above-supported Bridges

Comments For:

**I like the look of the cable-stay bridge, do not favor the tied-arch.**

**Needs to be built as iconic modern structure.**

**Highly favored if done as new history and not old history.**

**Least concern for debris and scour.**

**Could gain 6" of freeboard if elevation of roads kept at heights needed for below supported.**

**Reasonably pleasing design and generally practical.**

**We need modern, iconic structures.**

**Above supported has more eye appeal.**

**I like the idea that downtown Reno won't flood as severely with above supported bridges.**

**Prefer above supported with 2 foot freeboard (less obstruction = less need for freeboard).**

**I have no strong preference provided that bike travel is feasible under the bridges on at least one bank of the river with stairs or ramps up to the street.**

**The above-supported design is superior, especially the cable-stay. However, the tied-arch is a close second.**

**The new bridges should be the above-supported type and modern in design, not replicating the old bridges at all. It is the 21<sup>st</sup> century and the new bridges offer the opportunity to create iconic new images for downtown Reno. They can be designed to be above as well as transparent like the Redding, Calaveras bridge.**

Comments Against:

**Ugly, cheap looking design and obstructive to view (as per example on display board), could be considered with proper architectural elements.**

**Architectural tone would not go well with downtown feel.**

**No access for pedestrians and blocks views of river. Also higher cost.**

**The difference in height for above vs. below supported structure does not seem to be enough to warrant additional visual impact [caused by above supported].**

**In very high floods they could catch debris if water reached street-height, if raised more, could reduce debris.**

**I like the architectural design [of the above supported bridges] but does not fit well with this area.**

**Above supported bridges are interesting but worried about affects on store fronts.**

**Access to river for debris removal during flooding is a practical/functional question – above supported structures may present problems.**

## Moveable/lift Bridges

Comments

For:

**I do not want above street structures. I think they will impact views from riverside walkways. I favor lifts without above street structures.**

**If these could be designed more aesthetically they would be more favorable, especially for the heaviest floods. The pictures showed it as heavy and designed strictly for industrial uses, nearly without aesthetics.**

**Should be used at Lake Street.**

**Would be nice as an option for Lake Street.**

**You could leave the bridges at the same current levels and raise during floods.**

**Appear to be capable of accommodating 100+ year floods.**

**You haven't done enough research on draw/lift bridge designs. You have ignored the possibilities at least for Lake Street. Your work is incomplete.**

**I think the lift bridge makes the most sense. Why design for a 74 or 100-year event?  
Surely modern engineering can provide a solution using a lift type bridge.**

Comments Against:

**Too costly and unnecessary.**

**Ugly and expensive.**

**Not very conventional for cityscape. Maybe in an industrial park, but not in downtown.**

**Ugly. High operations and maintenance costs. Reliability issues.**

**Not a desirable option.**

**This design does not fit in with downtown Reno and would be very expensive. Why would we need a draw bridge?**

**Draw/lift bridges are bad for Reno area.**

**Draw/lift bridges are unneeded as we do not have large boats that travel down the river, so why pay for the maintenance?**

**Draw/lift bridges would be too noisy due to steel roadbed.**

**Draw/lift bridges are just not needed. Would be a waste of money as the only time it would be used is if the river floods.**

**Draw/lift bridges not practical for Reno.**

**Draw/lift bridge is highly unfavorable, the Truckee River is not a commercially navigable river.**

74-year Design

If City does choose this, follow-up with sand-bagging plan.

Only favorable for lower construction costs.

This could work if the overflow area is adjusted (i.e., buildings redesigned or raised to withstand floods) to function as an overflow floodplain.

If you have a 74-year plan and have an option of a 100-year plan, go with the 100-year while you have the finances.

Only seven more buildings appear to be flooded under present conditions at 100-year than at 74-year. Why not just armor those few buildings.

Seems better for the cost.

Highly favorable with above support and 2 foot freeboard.

If we are going to do this, with the cost and attendant traffic disruptions, we should get maximum benefit.

As long as buildings with businesses and homes have as little damage possible, I am for it.

If you are going to spend the money on a 74-year protection, why not go for 100-year design? The overall cost would be less.

1997 flood = \$700 billion in damages. Must reduce chance of catastrophic losses.

100-year Design

Only way to go. Do it right the first time.

Favorable if there are no unattractive walls and/or canalling.

If you are going to spend the money, build it correctly the first time.

Best for long-term improvement of the downtown area.

Lake Street would require the most "lift" and therefore the biggest challenge to design.

I prefer the 100 year design. The cost difference is not significant enough to build for 74 year design.

Obviously confining waters closer to the existing channel would appear to property owners.

Spend now while you have it, you never know later on what our finances will be.

The inundation map does not reflect the fact that several recent buildings were built above flood level (e.g., theater and Palladio).

I find this highly favorable except at Lake Street due to the Siena Hotel depending on transition design and cost.



Too much of a footprint.

With more technology we'd be able to design this better in the future vs. current cost/expenses.

Bridge approaches are a day-to-day issue for access to Park Tower parking garage entrances.

It really depends on how great of a bridge system you can create to save the spread of flooding in a 100-year period.

Spend now for future saving and peace of mind.

I think this should be considered at minimum.

#### Flood Insurance Considerations

Biggest consideration is flood impact.

There will likely not be much of a difference with hurricanes and floods throughout the U.S. that are going to keep costs up.

Any additional costs added to local businesses during floods hurts not only the business owners but the community as a whole.

It is important for property owners who would want compensation for their losses.

Most property owners will still need insurance or contingency funds for the 100+ year events that will occur.

Would their savings go toward funding this project?

Definitely a very important issue.

As a homeowner at Park Tower, I am very much in favor of this flood protection project.

If you are going to completely eliminate flooding, then flood insurance rates should be reduced.

Loss of life/disruption of life – very important consideration.

#### Miscellaneous Comments

**Political climate nationally due to financial crisis will bode well for infrastructure improvements.**

**This federal funding for state projects should be to Reno's advantage for the entire flood project.**

**Get it done. You'll get the most "bang for the buck" with construction industry hungry for work (if you do it soon).**

**Flood protection should take priority over attractiveness of bridge design.**

**We must improve bridges for water flow [during storm events]**

**This was not a "workshop," it was a presentation. Hardly no input.**

**Create new "history" do not try to sustain the old.**

**Keep the dollar amount in consideration compared to what the cost of clean-up would be.**

**The bridges being of historical value is definitely something this community should work hard to retain.**

**Keep current bridges and build spillways to the sides.**

**Do the worst bridge(s) first then move on.**

**Bridge design should be put out as a contest. Local artists and engineers could put forth concepts at each street for new ideas. All bridges should be different, suite the site at each street, and final designs could be voted on. Building the same bridge would make the bridges bland and boring. Look at cities such as Portland, OR who embrace their river and make the bridges icons, not eyesores.**

**Maintaining current conditions would still generate high costs with no flood impact improvements/reductions. Therefore there would be a low cost/benefit ratio.**

**Prioritize, Virginia Street first due to condition, Lake Street second due to flood impact, etc.**

**I am still not convinced that dredging/widening the channel would not allow us to have bridges at [current] street level. If we have to pay a little more to maintain views, eliminate ramps, and not impact access to the river, it is fine. We are building these bridges for the next 75-100 years and therefore should do the best job possible.**

**We need to take advantage of the river for redevelopment. Pedestrian/bike paths are ways to help do that and help with flood control.**

**The presentation was well done. Thank you for your efforts!**

**I like as much freeboard as practical. While aesthetically pleasing is nice, flood abatement is the goal.**

**Replacing bridges as currently built is highly unfavorable.**

**I attended the second meeting as well and CH2M HILL has done an excellent job presenting this information. It can be a confusing topic and I appreciate the way the information was delivered.**

**The negative impacts of dredging the river are disadvantages. Dredging is temporary, sediment fills it in, and fish/wildlife habitat is reduced. Dredging the kayaking and swimming area would degrade the recreational and aesthetic benefits (and their economic benefits). It would put the area back in the dark-ages before the arts district and public recreation were supported to improve quality of life.**

**The existing bridges are crumbling in places-flood damage, nicks, chunks broken, exposed rebar.**

**Comparing the alternatives of dredging, upstream detention, and widening the river, the disadvantages are contrary to maintaining the advantages that currently exist.**

**If possible, an overflow canal should be built to circumvent the downtown area or maybe circumvent both Reno and Sparks.**

**Widening the river would take out some of the features we've saved and which improved the general demeanor of the city (i.e., the Artists' Lofts).**

**Maybe a floodplain could be set aside through part of town for overflow; certain streets with buildings rebuilt to withstand floodwater with few or no impacts and berms or raised areas to direct flood water could serve as a type of floodplain or overflow canal?**

**I cannot comment on the 74-year versus the 100-year design because I cannot visualize what will happen with the building access to those buildings affected sidewalk ramping. The visual impact of the ramping to those buildings.**

**Final design/architectural design is critical to acceptance of the needed engineering solution.**

**I think we need to consider four different designs for the bridges.**

**I am significantly concerned with the historical structures affected by the two different designs. What you have designed clearly has not researched the affect on the existing buildings and access (ADA and otherwise). It appears it will be considered after the streets/bridges are designed. I am not convinced, I think this needs to be looked at more carefully.**

**I think property owners should bear more responsibility for self-protection.**

**Please make sure new bridges accommodate bike travel both east-west and north-south. Also provide connectivity between the two.**

**Make these bridges the best and most beautiful possible. Think long-term and quality. Look at what Redding, CA did with their pedestrian bridge.**

**I think there are other ways besides building new bridges or widening the river. One idea would be to direct the water around the bridges during a flood.**

**Graphics are accurate, however, extremely difficult to understand.**

**I enjoy downtown as it is.**

**I feel if there are different, inexpensive forms of averting flooding, why not do that before destroying bridges that have nothing else wrong with them?**

**The only advantage to maintaining current conditions is spreading out the cost over several years, although this could be negated by inflation.**

**I think weather conditions and patterns need to be considered when deciding whether or not to permanently change bridges.**

**What about the Booth Street bridge? This bridge catches debris and backs water up and causes Idlewild to flood.**

**How about requiring permeable pavement for parking lots and dry wells for downspouts to reduce run-off and enhance ground water recharge? Perhaps builders/developers could receive credits for installing these measures. Bridges are just part of the problem.**

**Reno is an eclectic community with the downtown district really evolving into an active place. We now have the Whitewater Park and art events and the new bridges should reflect this new**

**character. They should be eclectically designed and really capture the mixed character in the river district. Maybe a mix of above and below type bridges would be good, but Reno should not be afraid to make a strong design statement with these bridge replacements.**

**I would enjoy seeing the final compilation of comments, etc. I still feel strongly that there needs to be some type of design guideline for the bridge replacements to avoid a piecemeal approach.**

**The wood type of debris that ends up in the river during both normal and flood stage flows is tumbled/smooth and really good for making furniture. Furniture builders might be asked to collect this wood for the City.**

**City of Reno and  
Truckee River Flood Project  
Downtown Bridge Visioning**

**Reno City Council Meeting  
February 25, 2009**

PLACES Consulting Services Incorporated  
Reno's Landmark Architecture - Old Fashioned - Sustainable

TRUCKEE RIVER  
FLOOD PROJECT

RENO CH2MHILL

## Agenda

- Study Process
- Workshop Results
- Alternative Strategies Considered
- Review Proposed Strategy
- Staff Recommendation
- Virginia Street Bridge Project

## **Study Process**

- **3 Community Workshops**
- **Stakeholder Outreach (HRC, DIA, CAC)**
- **On-going coordination with Truckee River Flood Staff and Corps of Engineers**
- **Conceptual Engineering and Cost Estimating**
- **Final Report and Recommendations**

## **Workshop # 1 Feedback**

**100 year flood protection according to Corps criteria (4' freeboard (FB)) not acceptable: "bridges too high"**

**Desire an enhanced bridge style, river access and safety**

## **Workshop # 2 Feedback**

### **50-year flood protection w/ 2' FB**

- option allows 'keep' Center Street Bridge
- "Not enough flood protection"

### **2005 flood event w/ 2' FB (74-year protection)**

- "OK, but prefer 100 year with 2' FB"

**FEMA flood insurance relief not a driving concern**

## **Workshop # 3 Feedback**

**Survey results leaned toward a 100-year flood protection (local criteria)**

**Near even split for below supported vs. above supported structures**

**Moveable or lift bridge option unfavorable by a majority**

## **Maintain Existing Conditions?**

**Continues flood impacts and damages**

**Bridge crossings close, limited circulation**

**Debris builds and adds more floodwater**

**No changes to downtown circulation for parking, bicycle or pedestrian access**

**Replace bridges at existing roadway elevations will cause flooding**

## **Lift or Moveable Bridges?**

- Usually used where there is ship traffic
- Significant abutments
- Noisy when vehicles travel across
- Construction is about 2+ times more
- Higher maintenance and operations costs
- Concern about reliability



## **Widen the Channel?**

**Channel widened 50' on each bank**  
**Does not increase hydraulic capacity through downtown**  
**Private property impacts on both sides of river**

**Widening requires reconstruction of:**

- **Bridge abutments**
- **Roadway approaches**
- **Pathways and river access points**
- **Floodwalls and Riverwalk**
- **Utilities that parallel river**

**Reduces velocity of river flows**  
**Increases sediment deposit and build-up**

## **Dredge/Deepen the River?**

**Undertake 2' and 5' dredging**  
**Water surface reduced only slightly**  
**Fills back in following a storm event: "sediment trap"**  
**Continuous maintenance requirements**  
**Environmental mitigation: adverse impacts to habitats**  
**Does not eliminate need to replace and rehabilitate**  
**deficient bridges and flood walls**  
**Existing bridge supports and floodwall foundations**  
**could be undermined**

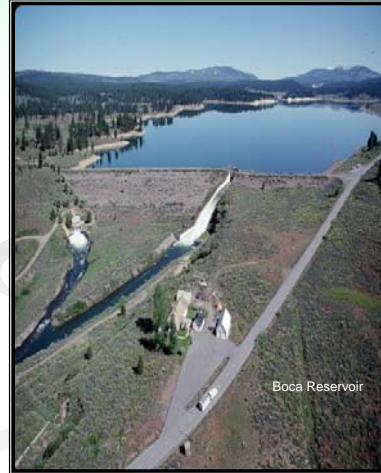


## Upstream Detention?

Increasing the existing capacity in reservoirs only benefits in extreme events (400-year flood event)

Ability to change California/Lake Tahoe operating rules institutionally complex

Fails Corps cost/benefit analysis



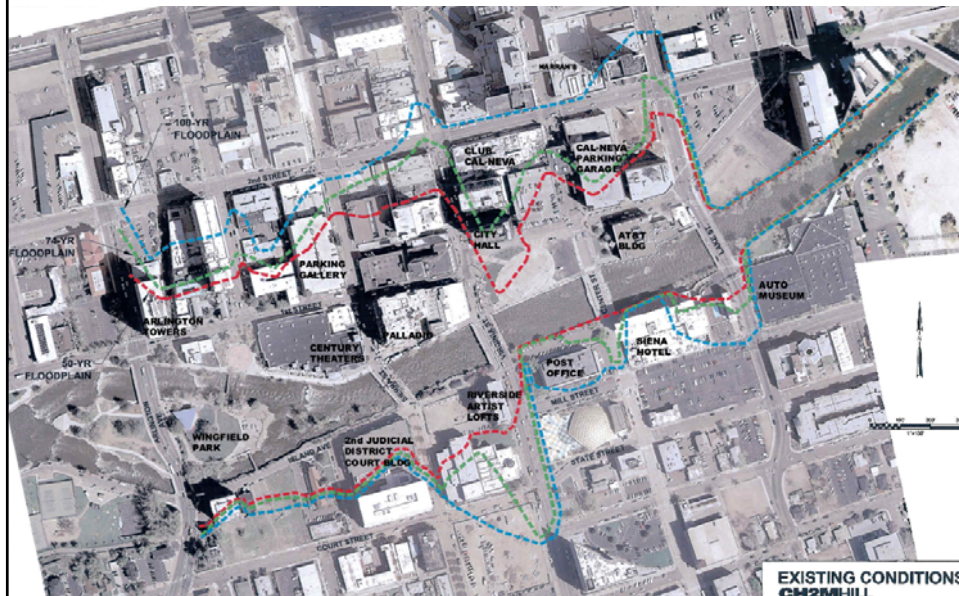
## About Arlington and Booth St. Bridges

- Arlington and Booth do not affect the flood conveyance capacity of the 'downtown reach'
- Were evaluated as part of the Visioning TRACTION Study
- Not currently in either USACE plan / not part of the Truckee River Flood Project
- Recommend replacement as needed
- Not recommended for replacement as part of the Flood Project

## Existing Bridge Conditions

Street	Approx. Bridge Capacity w/ 2' FB	USACE Plans		When Constructed	Sufficiency Rating (0=failed bridge)
		NED	LPP		
Sierra	20	Replace	Replace	1937	53.8
Virginia	20	Replace	Replace	1905	18.9
Center	50	Keep	Replace	1997	76.5
Lake	20	Replace w/ Pedestrian Bridge	Replace	1938	80.8

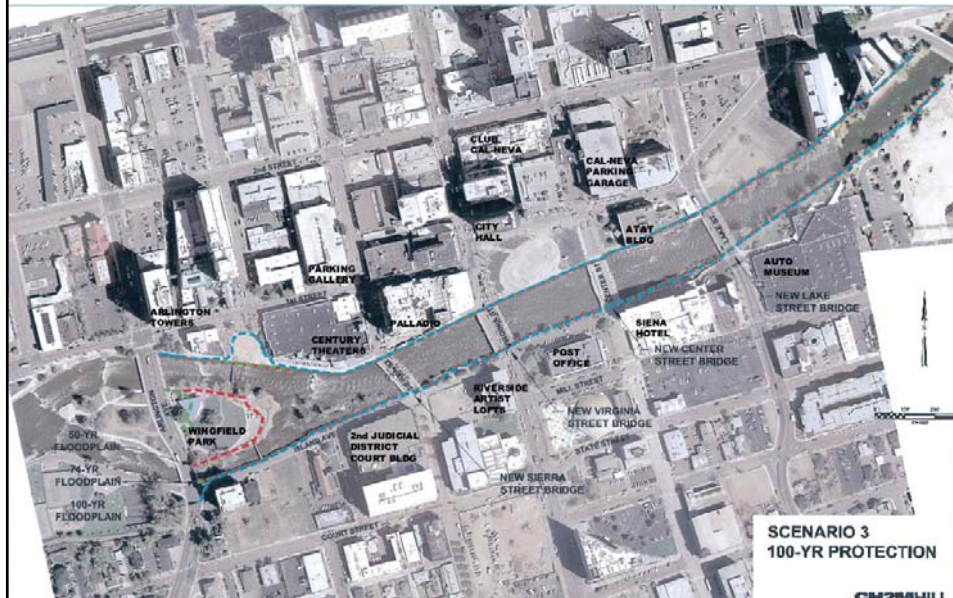
## Existing Conditions Inundation Map



## 100-Year Flood w/ 2' FB (equal to 50-yr w/ 4' FB)

Location	Bridge Raise				Cost Estimate	
	Below		Above		Below	Above
	North	South	North	South		
Sierra	2.5'	4'	2'	3.5'	\$13,660,000	\$15,560,000
Virginia	3'	2.75'	2.5'	2.25'	\$13,670,000	\$16,000,000
Center	4'	2.5'	3.5'	2'	\$13,210,000	\$15,400,000
Lake	5.25'	4.5'	4.75'	4'	\$17,240,000	\$19,380,000
				<b>Total</b>	<b>\$57,780,000</b>	<b>\$66,340,000</b>

## 100-year Inundation Map





**Above Supported Bridge  
Tied Arch Bridge in Atascadero, CA**

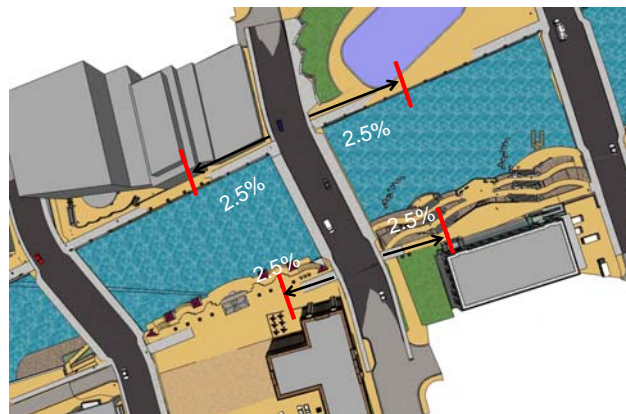


**Below Supported Bridge - Center St**

## Vertical Road Adjustments

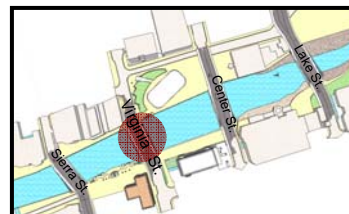
- 12 of the 16 quadrants are either undeveloped, have elevated buildings, or buildings set back from property line
- Case studies / Challenges for 4 quadrants
  - Southwest Virginia Street (Riverside)
  - Northwest Virginia Street (Masonic)
  - Southwest Lake Street (Siena)
  - Northwest Lake Street (La Famiglia)
  - Existing Pedestrian Retrofit Work

### 100 Year Flood Protection Virginia Street – Plan View



#### Key

- Extent of approach from promenade level to sidewalk using a gradient of 2.5%



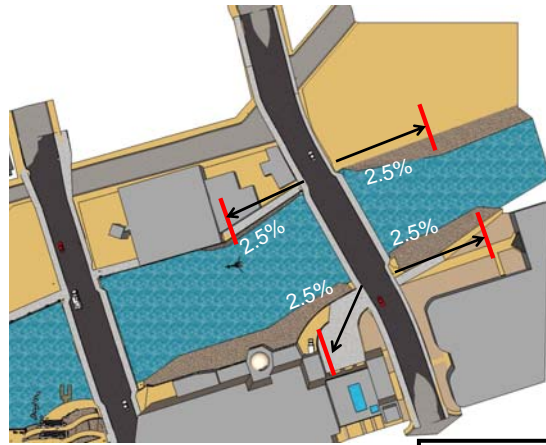
### 100 Year Flood Protection Virginia St. Looking Southwest



### 100 Year Flood Protection Virginia St. Looking Northwest

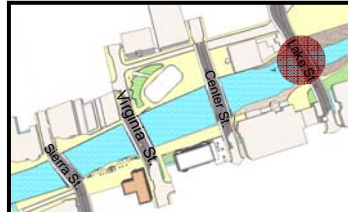


### 100 Year Flood Protection Lake Street – Plan View

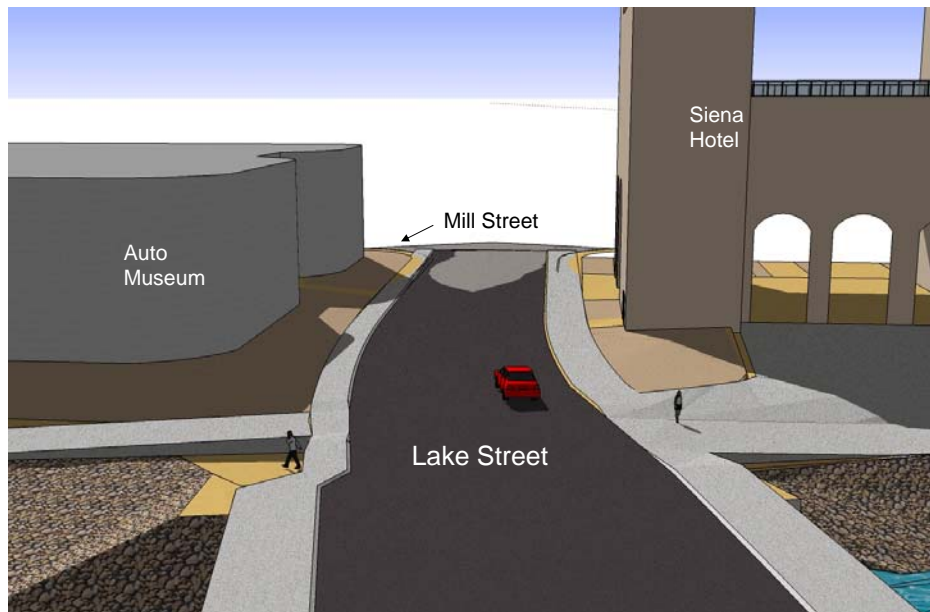


**Key**

— Extent of approach from promenade level to sidewalk using a gradient of 2.5%



### 100 Year Flood Protection Lake Street Looking South



### 100 Year Flood Protection Lake Street Looking Northwest



### Existing Pedestrian Retrofit Work





## **100-year Protection with 4' Freeboard**

**Currently the Locally Preferred Plan (LPP)**

**Corps would certify project to FEMA**

- would allow flood map changes/  
reduction in flood plain as shown on  
Flood Insurance Rate Maps

**Not preferred by Stakeholders**

- Option Reduced to 100 year w/ 2' FB in  
Workshops 2 and 3

## **Staff Recommendations**

- **Do not replace Arlington and Booth Street bridges as part of Flood Project**
- **Replace the remaining four downstream bridges to attain 100-year flood protection with 2' Freeboard (equal to 50-yr 4' Freeboard for USACE)**
- **Virginia Street Bridge – Pursue Above Supported Bridge Type and Design Workshop for bridge style**
- **Design Workshops to determine above or below supported bridge type and bridge style at remaining locations**

## **Implications of Recommendations**

- **The 100-year flood event stays in the channel**
- **No additional floodwall height in most locations**
- **Meets the Corps Risk & Uncertainty standard for 50 year flood event while achieving 100-year protection**
- **Minimizes debris responsibilities during floods**

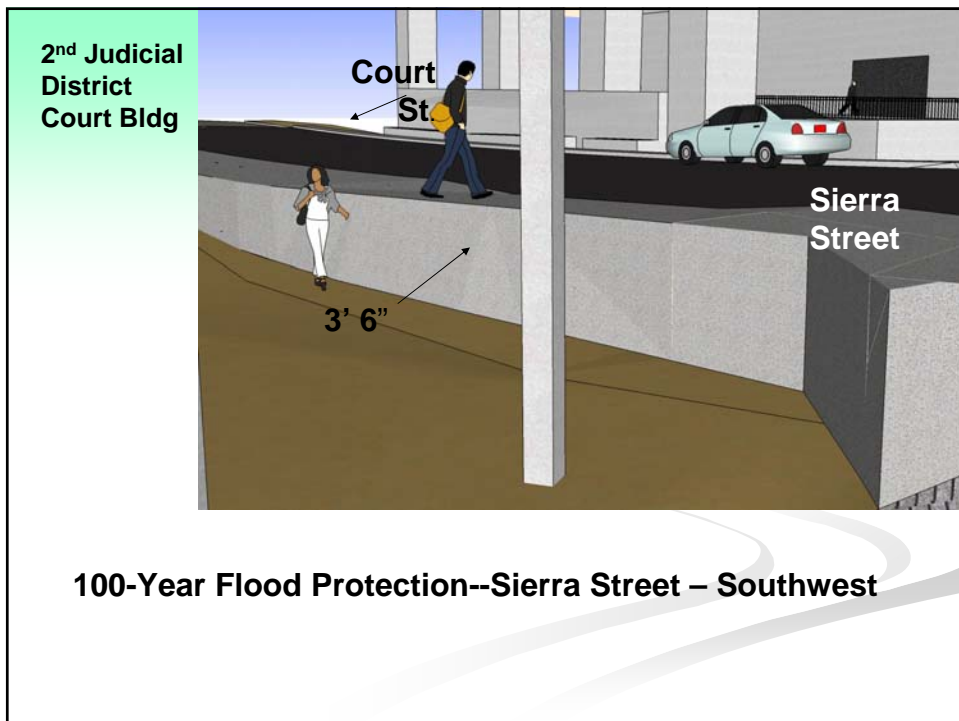
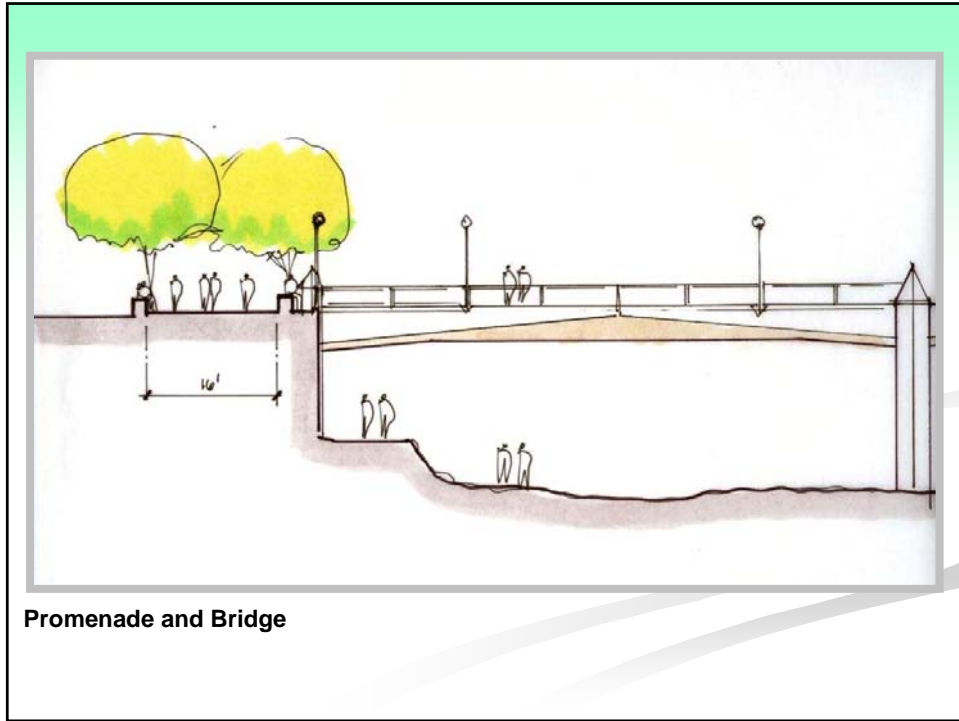
## **Implications of Recommendations (Continued)**

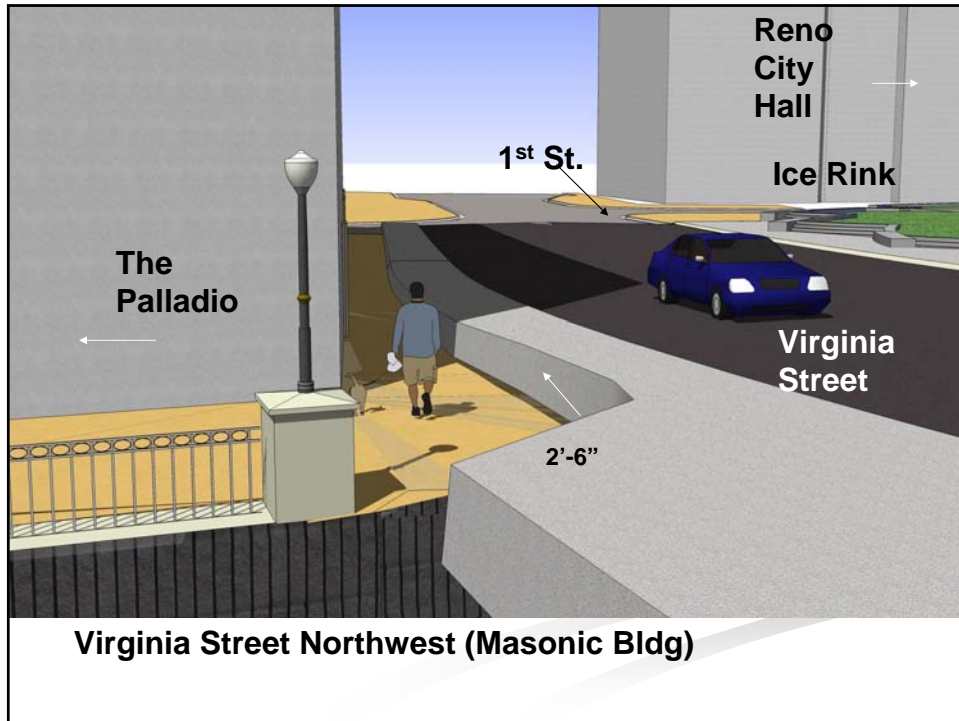
- **Solutions will meet all state roadway, bridge, pedestrian and ADA design standards**
- **Decisions today on VSB type enables maintaining current VSB schedule**
- **Does not remove properties from FEMA floodplain maps**
- **Requires an amendment of LPP criteria**
- **Above supported structure: higher construction cost, reduced impacts to streets and pathways**

## **Virginia Street Bridge Replacement Schedule**

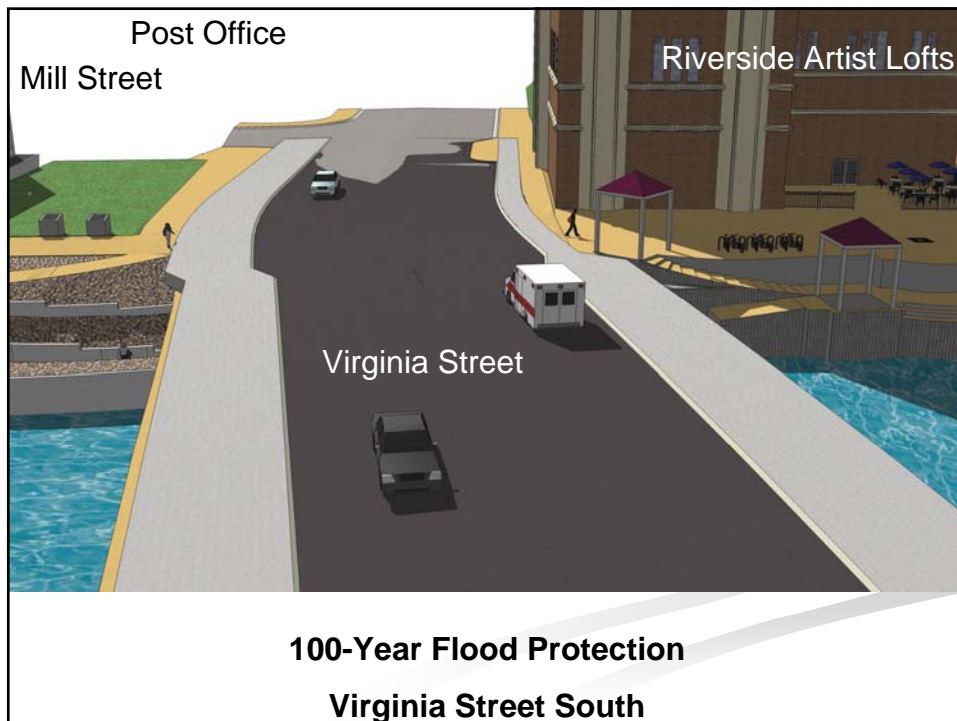
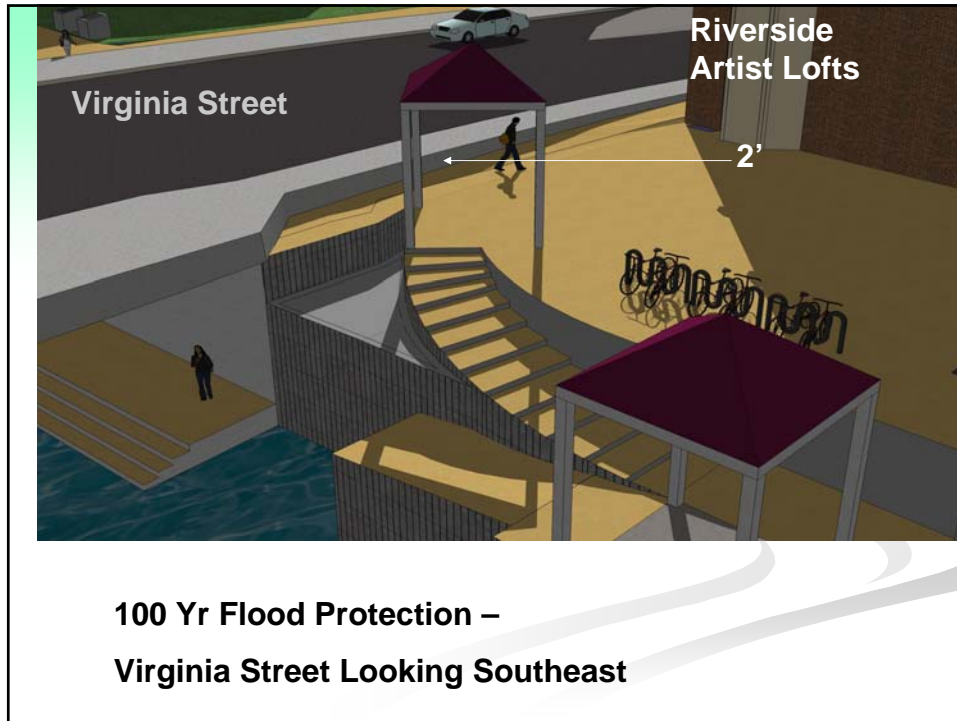
- **Complete Feasibility Study/Structure Selection-  
February 2009**
- **Funding of \$2 Million Approved by FPCC for Design  
and Environmental Permitting February 2009**
- **Update Environmental Assessment (EA) Document –  
In Progress, FHWA as lead**
- **EA release date scheduled for April 2010**
- **Preliminary Design – 2009/2010**
- **FHWA/SHPO Agreement - 1996 MOA and Section 106**
- **Final Design, Permits and Funding**
- **Bridge Construction Commences Fall 2011**

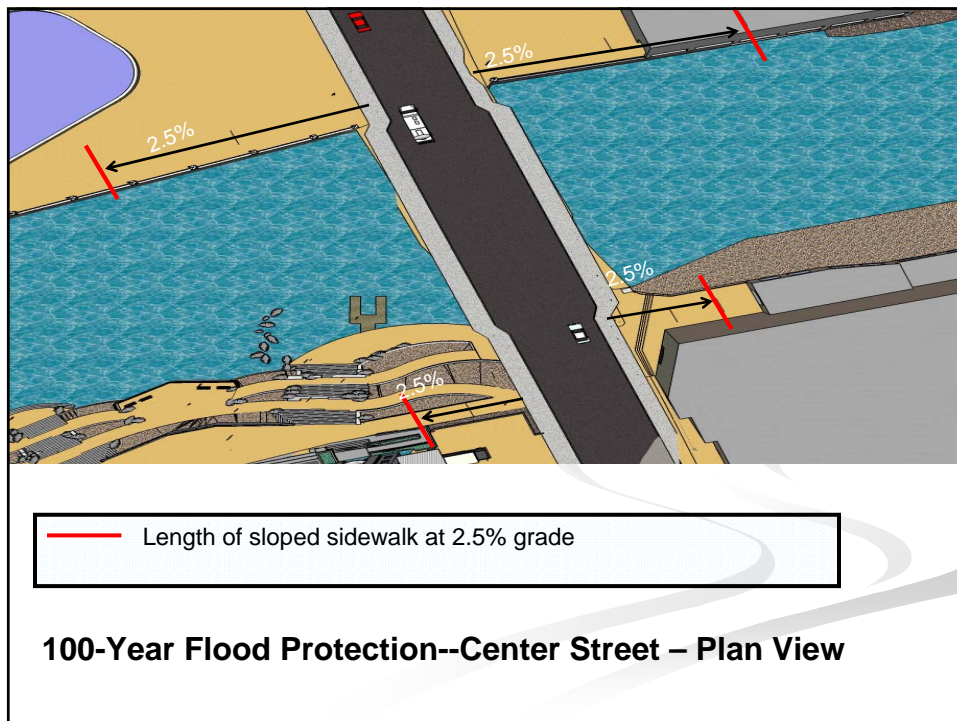
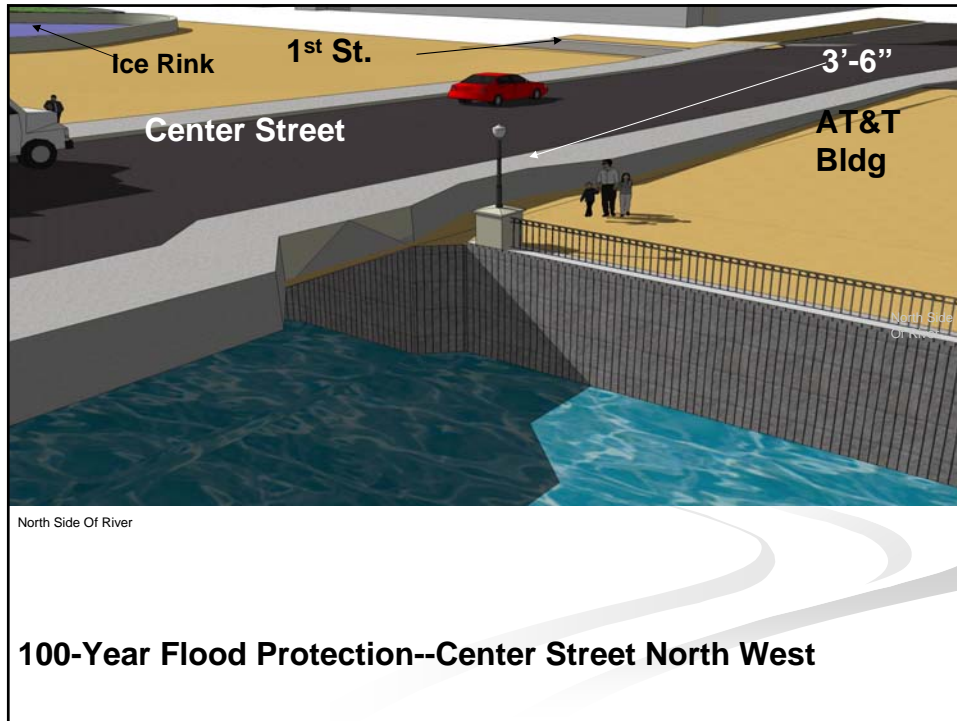
**End of Show**



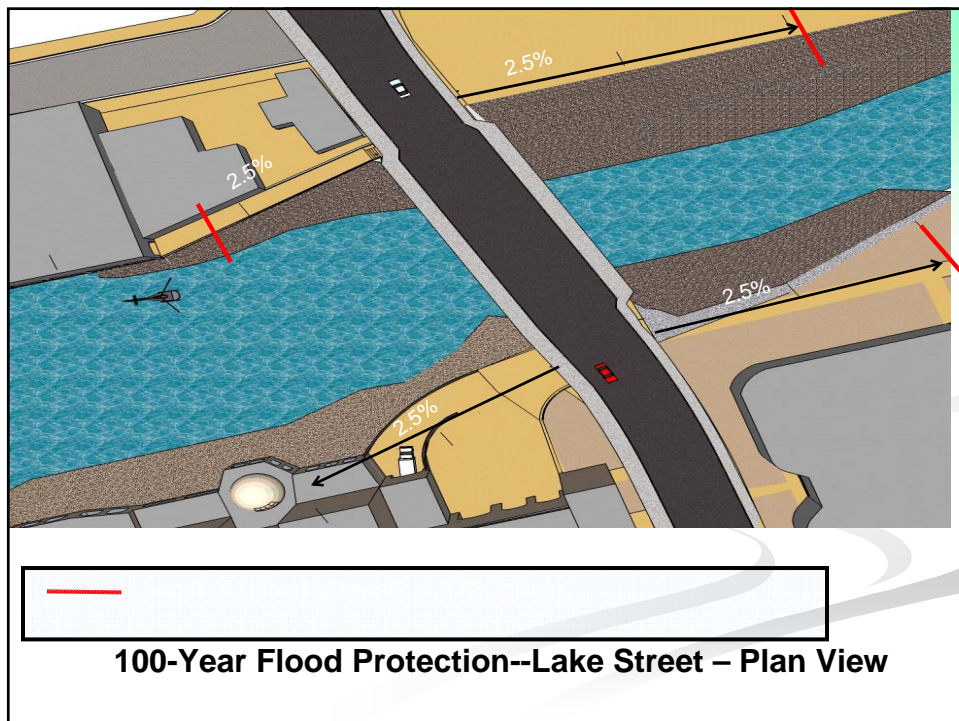
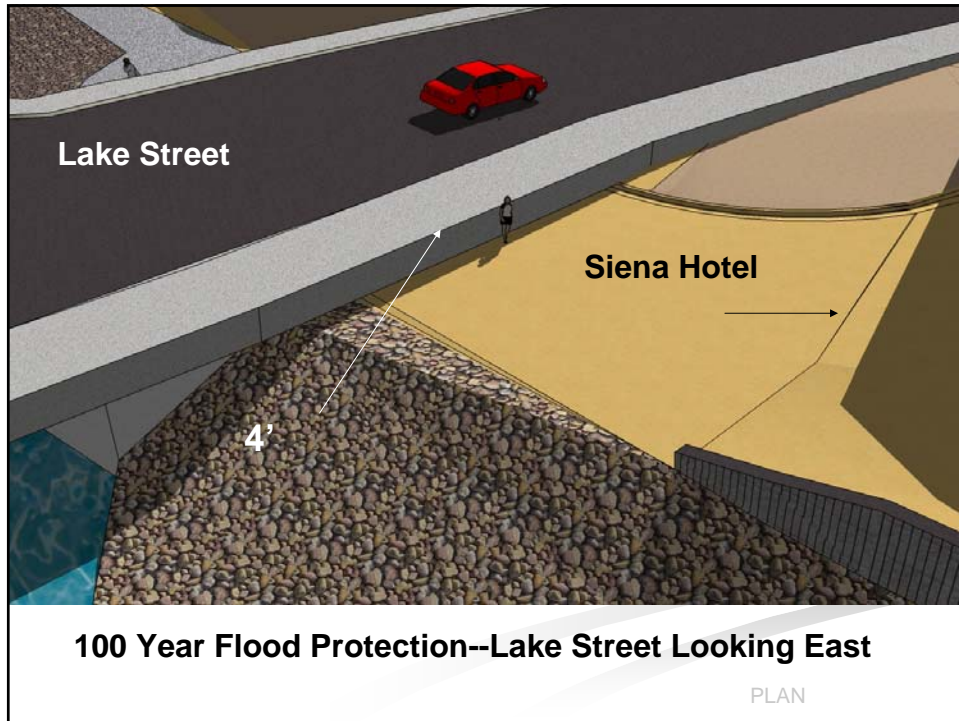




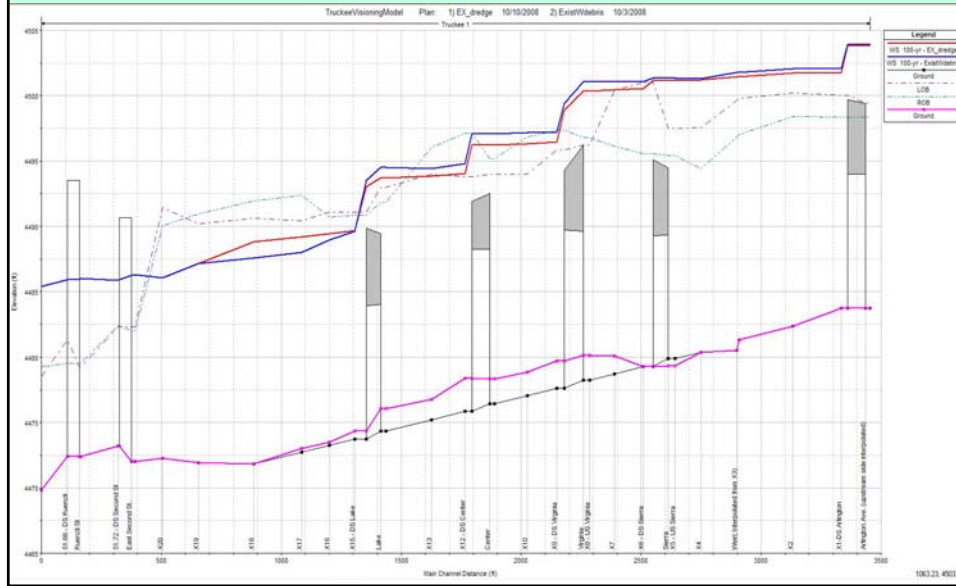




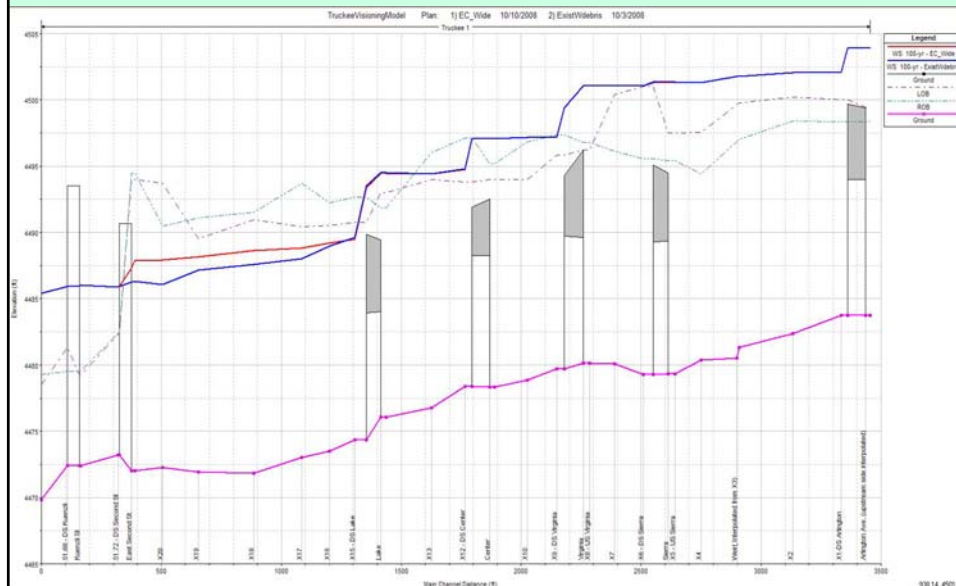




# Dredging the River



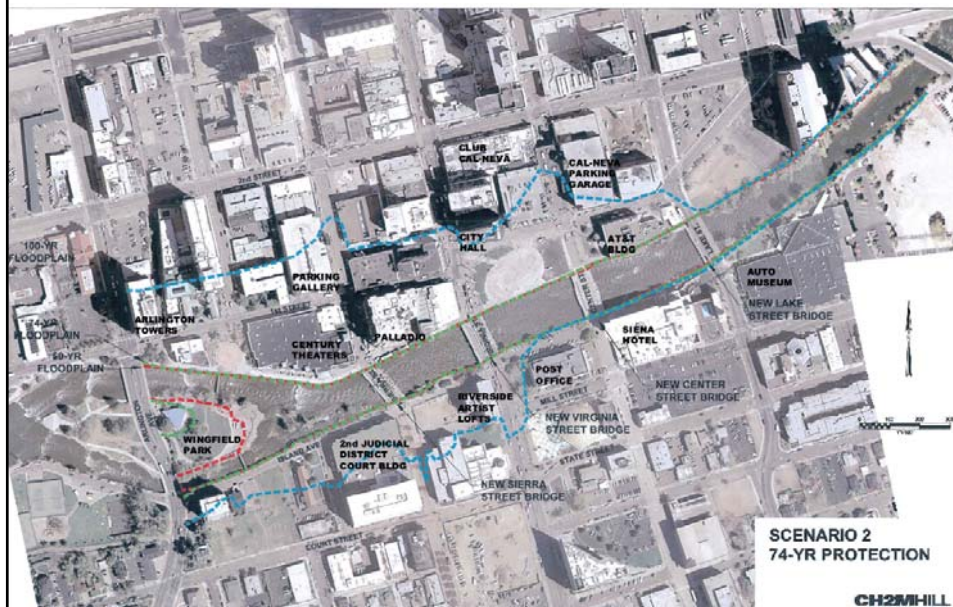
# Widening the River Channel



## 74-Year Flood Design w/ 2' FB (2005 + 2' FB)

Location	Roadway Raise				Cost Estimate	
	Below		Above		Below	Above
	North	South	North	South		
Sierra	1.25'	2.75'	.75'	2.5'	\$13,080,000	\$15,070,000
Virginia	2.25'	1.75'	1.75'	1.25'	\$13,020,000	\$15,370,000
Center	4'	1'	3.5'	.5'	\$12,510,000	\$14,850,000
Lake	4.5'	4'	4'	3.5'	\$15,640,000	\$17,820,000
				<b>Total</b>	<b>\$54,250,000</b>	<b>\$63,110,000</b>

## 74-Year Inundation Map



Location	Roadway Raise				Cost Estimate	
	Below		Above		Below	Above
	North	South	North	South		
<b>Sierra 74</b>	1.25'	2.75'	.75'	2.5'	\$13,080,000	\$15,070,000
<b>Sierra 100</b>	2.5'	4'	2'	3.5'	\$13,660,000	\$15,560,000
<b>Virginia 74</b>	2.25'	1.75'	1.75'	1.25'	\$13,020,000	\$15,370,000
<b>Virginia 100</b>	3'	2.75'	2.5'	2.25'	\$13,670,000	\$16,000,000
<b>Center 74</b>	4'	1'	3.5'	.5'	\$12,510,000	\$14,850,000
<b>Center 100</b>	4'	2.5'	3.5'	2'	\$13,210,000	\$15,400,000
<b>Lake 74</b>	4.5'	4'	4'	3.5'	\$15,640,000	\$17,820,000
<b>Lake 100</b>	5.25'	4.5'	4.75'	4'	\$17,240,000	\$19,380,000
			<b>Total 74</b>		<b>\$54,250,000</b>	<b>\$63,110,000</b>
			<b>Total 100</b>		<b>\$57,780,000</b>	<b>\$66,340,000</b>





Bridge Supported from above with Tied Arch



**Virginia Street Southwest (Riverside)**

