

**A REPORT ON REGIONAL FLOODING  
ISSUES AFFECTING  
WASHOE COUNTY, NEVADA**

**Prepared by:**

**TRUCKEE RIVER FLOOD CONTROL PROJECT  
NEEDS COMMITTEE**

**On:**

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**VOLUME 1: REPORT**

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## LIST OF ABBREVIATIONS

|         |  |
|---------|--|
| CRS/CAV | Community Rating System / Community Assistance Visit |
| FCPNC   | Flood Control Project Needs Committee                |
| FEMA    | Federal Emergency Management Agency                  |
| FIRM    | Flood Insurance Rate Map                             |
| NDOT    | Nevada Department of Transportation                  |
| PVC     | Polyvinyl Chloride (pipe)                            |
| RCP     | Reinforced Concrete Pipe                             |
| RR      | Railroad   |
| RTC     | Regional Transportation Commission                   |
| SS      | Sewer System   |
| SSMH    | Sewer System Manhole                                 |
| TRFMA   | Truckee River Flood Management Authority             |
| WC      | Washoe County  |

# CHAPTER 1

## BACKGROUND AND PURPOSE OF REPORT

### 1.1. FCPNC Background

The Truckee River Flood Control Project Needs Committee (FCPNC) was established in 2017 pursuant to Nevada Assembly Bill No. 375 (AB 375) and Resolution 2017-8 (passed by the Truckee River Flood Management Authority Board of Directors). For reference, the full text of AB 375 is included in *Appendix A* of this report.

The main purpose of the FCPNC was to recommend the imposition of one or more tax(es), fee(s), rate(s) or charge(s) to fund the construction of an approved flood control project. The work of the committee has been focused on the following tasks:

- Before April 2, 2018, the FCPNC will prepare recommendations regarding taxes, fees, rates or any combination thereof to provide funding to the flood management authority for an approved flood management project.
- Additionally, the FCPNC will have 18 months to investigate, prepare and submit a report concerning the issue of flooding in areas of the county that are not covered by a flood protection plan.

Appointed members of the FCPNC included representatives from these organizations and entities:

- Governor's Office
- Nevada State Senate
- Nevada State Assembly
- Nevada Association of Realtors
- Retail Association of Nevada
- City of Reno
- City of Sparks
- Washoe County
- EDAWN
- Resort Association
- Chamber of Commerce
- BANN
- NV AFL-CIO
- NAIOP
- RTAA
- TRFMA

The FCPNC held a series of meetings and ultimately voted to recommend that the Washoe County Board of County Commissioners submit a question to the voters of Washoe County seeking approval of an increase of the property tax in the amount of \$0.0248 per \$100 of assessed valuation. The ballot measure was rejected by the voters of Washoe County at the General Election held on November 6, 2018.

The FCPNC met several times thereafter to investigate, prepare and submit a report on regional flooding issues per the requirements of AB 375. This report effectively concludes the work of the FCPNC.

## **1.2. Description of Known Regional Flooding Issues (not including Truckee River)**

The local history of flooding in Washoe County, Nevada has been primarily limited to overflows from the Truckee River. The sinuous and meandering condition of the original Truckee River bed and banks as discovered by the early pioneers led to a naturally occurring flood swollen area that covers a significant portion the area in Washoe County known as the Truckee Meadows. This flooded area provides natural attenuation of storm flows for the properties downstream in the Lower Truckee Canyon, parts of Wadsworth, Nevada and tribal property located near Nixon, Nevada and Pyramid Lake.

Other much more localized drainage conditions have surfaced over time as development spread throughout the county. As developments have matured and development methods improved a majority of the drainage problems have remained minor in significance and localized without much regional impact with certain exceptions.

The two major exceptions may be found in drainage related issues pertinent to the closed basins located in portions of Washoe County and to those properties that lie adjacent and nearby to the various irrigation ditches that receive water from the Truckee River at various points and convey river water through portions of both the City of Reno and Washoe County jurisdictions.

### **North Valleys**

The closed basins describe a number of drainage watersheds that all convey excess stormwater to what are normally dry lake beds located within each basin. Most have single basin sinks, some have overflows to a second basin; but the similarity is that once storm water has found its lowest point there is no riverine outlet. The basins are all relatively small and therefore do not generally accumulate enough water to maintain perennially filled lakes; since the lakes that form are typically shallow they generally dry up from one year to the next due to evaporation. Another similarity is that the lake bottoms consist of fine materials that have accumulated over the millennia, which tends to make infiltration of lake water poor or non-existent.

When development began to increase in this area in the early 80s, the Federal Emergency Management Agency (FEMA) had not yet created flood maps which provide guidelines as to how high maximum water surface elevations (WSE) for these annual lakes might be determined. Even without flood maps and estimated maximum water surface, local jurisdictions did have development requirements that reflected the best available information at the time. For instance, development codes required elevated finish

floors with minimal sloping away from the foundations. These requirements helped minimize the impacts seen to residential properties in the 2017 flood events, evidenced by the fact that only three homes saw flood water in the living spaces. In the late 1980s FEMA flood maps were developed and adopted by local jurisdictions, which has provided additional flood protections and standards for development.

The water year of 2017 saw significant regional flooding which impacted many areas including closed basins and impacts from overtopping irrigation ditches. During that year, our region set a new record for accumulated annual precipitation. This exposed the issues of closed basins; standing water that persists until evaporation occurs. This type of flood impact is much different than what is typically experienced since flooding does not recede shortly after the rains stop. The proposals to mitigate persistent standing water in closed basins are numerous, extremely complex and very expensive. To date, none of these proposals have been agreed to by those being impacted, the engineering community, or government.

### **Irrigation Ditches**

The second exception noted is for the irrigation ditches. The problem with the irrigation ditches is that historically they were laid out with very mild slopes in order to extend conveyance of irrigation water to the maximum amount of farm and ranch land property in the Truckee Meadows. In the process, they traverse most of the secondary naturally existing drainage channels (and creeks) in the Truckee Meadows and intercept a majority of the runoff conveyed by those channels. Additionally, the irrigation ditches only convey lesser volumes of water (sufficient for irrigating fields) which is not sufficient to move the potential large amount of storm water that gets into them during flood events. As a result, the overall local runoff conveyance patterns have been radically altered, increasing the potential for ditch overtopping and even more damaging breaches of the ditch embankments to occur. Another impact due to altering drainage patterns is that they have diverted water away from some local watersheds to others which will ultimately cause capacity problems with some of the existing drainage systems in the older parts of Reno and the Washoe County.

What compounds these problems is that development has occurred all around these ditches. This makes reworking the channels difficult and expensive. The ditches typically shut down operation in the winter when irrigation water is not in demand but this has little impact to the high amount of storm water that tries to get in.

### **1.3. Existing Flood Management Plans that Address Regional Flooding Issues**

This report on regional flooding issues was compiled using the most recent available information provided by public works officials representing the City of Reno, the City of Sparks and Washoe County. The following existing flood management plans were also reviewed prior to preparation of this report:

- City of Reno and Washoe County TMSA/FSA Water, Wastewater, and Flood Management Facility Plan, Volumes 1 and 2 (November 2007)

- Sparks Basin Stormwater Master Plan Phases I – III: Areas 1 through 11 (December 2011)

For reference, all or pertinent portions of these plans have been included in the report appendices.

#### **1.4. Purpose of Report**

Pursuant to the requirements of AB 375, the main purpose of this report is to briefly describe ongoing efforts to address known regional flooding issues within the City of Reno, City of Sparks, and Washoe County that are **not** included in the Truckee River flood control plan being developed by the Truckee River Flood Management Authority (TRFMA). The TRFMA plan is a separate effort by the local governments to address longstanding flooding issues along the Truckee River mainstem.

## CHAPTER 2

### PROPOSED PROJECTS TO ADDRESS REGIONAL FLOODING ISSUES

The cities of Reno and Sparks and Washoe County were asked to provide a list of proposed capital improvement projects that would help address known flooding issues (other than Truckee River flooding issues) within each jurisdiction.

Table 2.1, Table 2.2, and Table 2.3 provide a summary of flood control and drainage improvement projects currently contemplated by Reno, Sparks and Washoe County, respectively. Some of these projects are slated for construction within the next 5 years; others are in preliminary planning stages with no set date (or funding) for implementation.

**Table 2.1**  
**City of Reno’s Regional Drainage Improvement Needs**  
**(Beyond TRFMA Flood Project Elements)**

| Project Name  | Project Description   | Estimated Cost (construction only) | Priority Ranking | Fiscal Year* |
|---|---|------------------------------------|------------------|--------------|
| City of Reno Drainage Master Planning   | Phased master plan of City of Reno storm drain systems: evaluates remaining storm drain capacities of existing facilities and prioritizes drainage improvement projects.  | \$2,500,000                        | 1                | 2020         |
| Margrave Ditch erosion (by Reno Costco)                                       | Address erosion and property loss.  | \$1,000,000                        | 1                | 2020         |
| Matley Ln & Terminal Wy   | Stormdrain and catch basins.  | \$500,000                          | 1                | 2020         |
| Dry Creek Repairs at Reno-Tahoe International Airport (City of Reno portions) | The Dry Creek channel segment just north of the E. Peckham Ln crossing has eroded the east and west channel banks, causing property damage and channel migration. Design repairs at Dry Creek channel within City of Reno Maintenance easement at Reno-Tahoe International Airport. | \$400,000                          | 1                | 2020         |
| Truckee River Whitewater Park Repair Work                                     | Repair undermined grouted riprap in whitewater park.  | \$250,000                          | 1                | 2020         |
| Warren Estates Evaluation & Drainage Improvement Project                      | Drainage improvements in the Longwood/Hedgewood roads; new storm drain.   | \$3,200,000                        | Ongoing          | 2021         |
| Rosewood Wash Culvert Upgrades  | Stormdrain improvements and Flood Insurance Map revisions to reflect revised floodplain.  | \$2,500,000                        | 1                | 2021         |
| Stead at Silver Lake Rd   | Upsize culvert across Silver Lake Rd at RR from 24" PVC to large diameter RCB   | \$600,000                          | 1                | 2021         |



| Project Name   | Project Description   | Estimated Cost (construction only) | Priority Ranking | Fiscal Year* |
|--|---|------------------------------------|------------------|--------------|
| Autumn Hills, Offenhauser, Longley & McCarran storm drain Improvements and Detention Solutions   | Storm drain upsizing; possible detention.   | \$10,000,000                       | 1                | 2022         |
| Sagittarius Storm Drain Improvements   | Stormdrain construction/ditch relief.   | \$6,000,000                        | 1                | 2022         |
| Miscellaneous Various Storm Drain:<br>Greenridge to Moore, various "island 18", Edison Wy, Sage St yard area, California Ave, Isbell Rd, Avenida de Landa, Wedekind, Scottsdale/Clear Acre | Replace/upgrade storm drain pipe.   | \$2,500,000                        | 1                | 2022         |
| Double Diamond Levee Upgrades  | Construct levee improvements at Double R Blvd and Double Diamond Blvd to provide FEMA certified flood protection.                         | \$1,000,000                        | 1                | 2022         |
| Belford Drainage overpass at Lake Ditch  | Provide overpass/bypass such that the Belford Drainage flows will continue down the drainageway and not be intercepted by the Lake Ditch. | \$800,000                          | 1                | 2022         |
| In and Out Basins: 12th and Brookfield, 12th and Washington, Plumas & Hillcrest  | Remove in and out basins and tie to storm drain.  | \$500,000                          | 1                | 2022         |
| Miscellaneous Grading-Reggrading: Len Cir, Orange and Apple St, Hatch, Brentwood, Walker, Skyline  | Grading / Reggrading curb and gutter, ponding issues  | \$500,000                          | 1                | 2022         |
| Sadleir Southworth (Wells Ave) Area Storm Drain Improvements   | Upgrade/enlarge or provide surcharge relief system for storm drain system.  | \$350,000                          | 1                | 2022         |
| Silver Lake Apartments (City right of way)   | Construct sediment basin: high sediment loads at this location.   | \$100,000                          | 1                | 2022         |
| Irrigation Ditch Tributary Crossing Improvements   | Improve the ditch crossings at three irrigation ditches to reduce ditch failures and overtoppings.  | \$15,000,000                       | NR               | 2022         |
| Stead Storm Drain and channel improvements   | Storm drain construction and channel improvements.  | \$7,000,000                        | 2                | 2023+        |
| Aquila Ave/Krupp Cir Drainage Improvements   | Enlarge and reinforce roadside ditches, upsize/install new storm drain.   | \$6,500,000                        | 2                | 2023+        |
| Thomas Creek at South Virginia St between approximately Patriot & Gavian storm drain improvements.   | Improve storm drainage across roadways in this area.  | \$5,000,000                        | 2                | 2023+        |

| Project Name  | Project Description  | Estimated Cost (construction only) | Priority Ranking | Fiscal Year* |
|---|--|------------------------------------|------------------|--------------|
| 7495 South Virginia near Huffaker School  | Repair/replace section of system in the center of South Virginia.                                      | \$300,000                          | 2                | 2023+        |
| Lemmon Dr near intersection of Military Rd  | Stabilize and regrade 800 feet of roadside ditch on west side of Lemmon Dr.                            | ?                                  | 2                | 2023+        |
| Detention Basins: Thomas Creek at Zolezzi Detention Basin, Evans Creek at Ballardini Ranch, Evans Creek, Dry Creek @ Huffaker | Regional detention opportunities.  | \$20,900,000                       | 3                | 2023+        |
| Galena Narrows Detention Basin  | Detention at Galena Narrows.   | \$2,000,000                        | 3                | 2023+        |
| Whites Creek at Thomas Rd Detention Basin   | Detention at Whites Creek.   | \$1,800,000                        | 3                | 2023+        |
| Vine St Culvert Upgrades  | Install parallel 66" and 72" RCP storm drain.  | \$1,800,000                        | 3                | 2023+        |
| Thomas Creek at Ventana Pkwy  | Detention at Ventana Pkwy.   | \$1,750,000                        | 3                | 2023+        |
| Evans Creek Block "N" storm drain Improvements at I-80 to River   | Triple 7' x 5' RCB.  | \$1,750,000                        | 3                | 2023+        |
| Manzanita Park Wash (With Excavation)   | Detention basin in Dry Creek/Boynton watershed. (BCA Ratio 1.82)                                       | \$1,500,000                        | 3                | 2023+        |
| Whites Creek Flow Split   | Construct flow split.  | \$430,000                          | 3                | 2023+        |
| Edison Wy Area  | Storm drain and roadside ditch improvements  | \$400,000                          | 3                | 2023+        |
| Horse Creek Channel Improvements Military Rd to Lear  | Channel improvements from Military Road to Lear Blvd to stabilize low flow channel and pyramat lining. | \$350,000                          | 3                | 2023+        |
| East Fork Chalk Creek at Sapphire Ridge Development   | Address erosion through channel improvements.  | \$100,000                          | 3                | 2023+        |
| Yori Park Retention Basin   | Improve retention basin.   | \$50,000                           | 3                | 2023+        |
| Thomas Creek: Structures, Culverts, Flow Splits, Irrigation Ditch Bypass Structures   | Channelization/storm drain project to direct flows (alluvial fan characteristics).                     | \$10,000,000                       | NR               | 2023+        |
| Dant Wash: Culverts   | Eastshore Dr 3-10'x4', Brinkby Ave to Eastshore, 5x3' box, Moana private driveway.                     | \$8,600,000                        | NR               | 2023+        |
| Boynton Slough: Culverts  |  | \$8,600,000                        | NR               | 2023+        |
| Galena Wash: Channel/Culverts   | Between Wedge Pkwy – 36 inch CMP, Galena High and Wedge Pkwy (older study – still applies?).           | \$6,450,000                        | NR               | 2023+        |

| Project Name  | Project Description   | Estimated Cost (construction only) | Priority Ranking | Fiscal Year* |
|---|---|------------------------------------|------------------|--------------|
| Virginia Foothill Wash: Channel, Culverts and Debris Basins                   | Mira Loma Rd - Steamboat Creek. T5', D2', Rancho Verde Dr, debris basin site.   | \$5,800,000                        | NR               | 2023+        |
| Swan Lake/Silver Lake Flooding: Partial Solutions                             | Creating flood volume mitigation.   | \$5,000,000                        | NR               | 2023+        |
| Black Springs Wash: Culvert and Channel work                                  | Leather Ln, Cassilis Dr, Silver Lake Rd box, Old 395.   | \$2,600,000                        | NR               | 2023+        |
| Black Springs Wash: Channel and Culverts                                      | Tholl Dr-Military Rd, Wise Ave, Leather Ln.   | \$2,500,000                        | NR               | 2023+        |
| Paymaster Wash: Channel   | US 395 Silver Lake Rd: 2 12'x3', upsize existing 36" US 395.  | \$2,500,000                        | NR               | 2023+        |
| Anderson Wash: Culvert  | US 395. 4'  | \$2,000,000                        | NR               | 2023+        |
| Alum Creek: Channel and Ditch Modification                                    | 500' U/S of McCarran - Mayberry Dr T50', B25', D5'; ditch or natural channel, Last Chance Ditch west of West McCarran.                | \$1,750,000                        | NR               | 2023+        |
| Evans Creek-Modify Head Gates, Channel Improvements and Structures            | East McCarran 7-12'x10', Longley Ln 7-12'x10', airport runway 34R 5-12'x10', Peckham Ln 4-12'x10.                                     | \$1,650,000                        | NR               | 2023+        |
| Lemmon Valley Wash: Culvert   |   | \$1,200,000                        | NR               | 2023+        |
| Rosewood Wash (Phase 2): Discharge Structures, Channel Improvements, Culverts | Last Chance Ditch between Barnes and Belford, Corey Dr and Rainna, enlarge channel from 1000' upstream of Arlington to Arlington Ave. | \$1,000,000                        | NR               | 2023+        |
| Aspen Glen Dr and White Fir St or Ambrose Park: Structure                     | Intake restriction structure of excess flow discharge.  | \$275,000                          | NR               | 2023+        |
| Dandini Wash: Structure   | E of Valley Rd, N of Manogue High School (need to confirm).   | \$170,000                          | NR               | 2023+        |
| <b>Total Estimated Cost – All Reno</b>  |   | <b>\$159,425,000</b>               |                  |              |

\*Fiscal Year is the planned year of construction

NR = Not Ranked

**Source:** This table was prepared using information provided by the City of Reno's Draft Five Year Capital Improvement Plan 2018/19 - 2022/23.

**Table 2.2**  
**City of Sparks' Regional Drainage Improvement Needs**  
**(Beyond TRFMA Flood Project Elements)**

| <b>Project Name</b>   | <b>Project Description</b>  | <b>Estimated Cost</b>           | <b>Fiscal Year*</b> |
|---|---|---------------------------------|---------------------|
| 19-6600 East Prater Wy Storm Drain Project: Construction                    | Storm drainage improvements to 19th St in the area of J Stt to Brunetti Wy.   | \$2,305,000                     | 2019                |
| 19-6601 Rockwood Dr & Glen Meadow Dr SD Improvements: Design                | Storm drainage improvements to existing ditch piping adjacent to Pyramid Wy south of Greenbrae Dr.  | \$200,000                       | 2019                |
| 19-6601 North Truckee Drain Lillard Box: Engineering & ROW                  | Storm drainage improvements to Rock Blvd between Greg St and Glendale Ave.  | \$350,000                       | 2021                |
| 19-6601 North Truckee Drain Lillard Box: Construction                       | Storm drainage improvements to Rock Blvd between Greg St and Glendale Ave.  | \$2,650,000                     | 2022                |
| 19-6694 North Truckee Drain Annual Cleaning                                 | Annual cleaning program for North Truckee Drain, approximately 3,000 linear feet per year. Generally located I-80 to Vintage Hills Pkwy.  | \$750,000<br>(\$150,000/year)   | 2019 - 2023         |
| 19-6690 Annual Storm Drain Street Improvement Coordination                  | <p>These appropriations are for sewer infrastructure rehabilitations in support of annual RTC Regional Road Projects. This may include removal and replacement /lining/bursting of SS main/laterals, SSMHs, and SSMH Lids.</p> <p>These appropriations are for sanitary sewer infrastructure rehabilitations in support of annual Sparks Road Ahead Projects. This may include removal and replacement /lining/bursting of SS main/laterals, SSMHs, and SSMH Lids.</p> <p>Storm drain facility repair and replacement will be coordinated with roadways slated for preventative, rehabilitation, and replacement efforts by City of Sparks, RTC, and/or NDOT.</p>   | \$1,375,000<br>(\$275,000/year) | 2019 - 2023         |
| 19-6691 Annual Storm Drain System Dam, Ditch, Flood and Drainage Structures | <p>Appropriations for this project will allow for storm drain, ditch, and channel infrastructure rehabilitation and replacements as needed and/or identified as part of the utility assessment condition program. Coordination with selected Rehab/Recon Road Work Projects as scheduled for future years shall be considered.</p> <p>Potential projects include open ditch piping improvements, North Truckee Ditch drainage improvements, Stanford Wy storm drain rerouting, and other improvements as needed.</p> <p>These funds will be set aside each year to be available to address new construction or repairs beyond the typical maintenance for the City's dams, flood structures, or possible City-wide flood protection construction or rehabilitation projects. Projects/Materials identified to use this funding will require approval by the Public Works Director and/or the City Council as necessary.</p> | \$1,000,000<br>(\$200,000/year) | 2019-2023           |

| Project Name  | Project Description   | Estimated Cost                  | Fiscal Year* |
|---|---|---------------------------------|--------------|
| 19-6692 Annual Curb, Gutter, and Sidewalk Projects                | Annual funding used to replace aged curb, gutter and drainage inlets throughout the City. Locations are based on priorities of pavement management team to coincide with planned roadway preventative maintenance/rehabilitations projects.   | \$3,250,000<br>(\$650,000/year) | 2019 - 2023  |
| 19-6693 FEMA CRS/CAV  | This project is required to develop mitigation plans in response to the requirements of the City's FEMA CRS/CAV and maintain the City's rating with FEMA. This funding will also be used for issues that arise through FEMA FIRM mapping and actions to correct inconsistencies.  | \$250,000<br>(\$50,000/year)    | 2019 - 2023  |
| 19-6695 Storm Drain Outreach Maintenance Program                  | Funding to provide outreach materials to affect and improve stormwater quality. Could include items such as fliers, hiring of temporary help for maintenance of dog-poop bag stations and informational signage.  | \$75,000<br>(\$15,000/year)     | 2019 - 2023  |
| 19-6696 Annual Contingency for Emergencies                        | <p>These funds will be set aside each year to be available to address emergencies in our storm drain system or contingencies that were not anticipated. The following examples of projects that might be approved for this funding source:</p> <ol style="list-style-type: none"> <li>1. Projects to correct a blockage that has occurred or is imminent.</li> <li>2. Correct a line failure which has occurred or is imminent and poses a significant hazard.</li> <li>3. Projects identified during/after an emergency operation such as flooding or other natural disaster.</li> <li>4. Projects where grant money becomes available to cover part of the overall cost.</li> <li>5. Projects that have the opportunity to enter into a cost sharing agreement with another agency.</li> <li>6. Significant operational savings can be achieved immediately if the project/materials is completed or bought now.</li> <li>7. An unplanned road/utility project is started where we want to completed work on underground utilities.</li> <li>8. New projects of higher priority as deemed by the City Manager or City Council.</li> </ol> <p>Projects/Materials identified to use this funding will require approval by the Public Works Director and/or the City Council as necessary.</p> | \$500,000<br>(\$100,000/year)   | 2019 - 2023  |
| <b>Total Estimated Cost – All Sparks FY 2019 - 2023 (5 years)</b> |   | <b>\$12,705,000</b>             |              |

\*Fiscal Year is the planned year of construction

**Source:** This table was prepared using information from the City of Sparks’ Five Year Capital Improvement Plan 2018/19 - 2022/23.

**Note:** Recurring annual cost estimates were combined to develop a total cost estimate for all proposed projects/work over the 5-year period.

**Table 2.3**  
**Washoe County's Regional Drainage Improvement Needs**  
**(Beyond TRFMA Flood Project Elements)**

| <b>Project Name</b>                                       | <b>Project Description</b> | <b>Estimated Cost</b> | <b>Fiscal Year*</b> |
|---|----------------------------|-----------------------|---------------------|
| Rhodes Rd (Steamboat Creek Watershed)                     | Culvert                    | \$4,700,000           | Unknown             |
| <i>Subtotal WC – South Truckee Meadows</i>                |                            | <i>\$4,700,000</i>    |                     |
| Village Pkwy at Mud Springs Dr                            | Culvert                    | \$3,550,000           | Unknown             |
| Nine Mile Ct  | Debris Basin               | \$18,620,000          | Unknown             |
| Cold Springs Dr Channel                                   | Channel                    | \$550,000             | Unknown             |
| Little Valley Dr  | Culvert                    | \$470,000             | Unknown             |
| Cold Springs Dr Culvert                                   | Culvert                    | \$470,000             | Unknown             |
| Cold Springs Dr to Village Pkwy                           | Channel                    | \$6,220,000           | Unknown             |
| Village Pkwy  | Culvert                    | \$1,670,000           | Unknown             |
| <i>Subtotal WC – Cold Springs</i>                         |                            | <i>\$31,550,000</i>   |                     |
| Whites Creek at Zolezzi Ln                                | Culvert                    | \$720,000             | Unknown             |
| Bailey Creek at Toll Rd (Steamboat Creek)                 | Channel                    | \$2,750,000           | Unknown             |
| Bailey Creek at Toll Rd                                   | Culvert                    | \$780,000             | Unknown             |
| Jones Creek at Mt. Meadow Ln Area                         | Culvert                    | \$1,090,000           | Unknown             |
| Jones Creek at Callahan Ranch Rd                          | Culvert                    | \$1,330,000           | Unknown             |
| Galena Creek Narrows                                      | Detention Basin            | \$14,370,000          | Unknown             |
| Bailey Creek at Kivett Ln & Toll Rd                       | Channel                    | \$9,990,000           | Unknown             |
| Geiger Fork of Bailey Creek at Kivett Ln (Channel)        | Channel                    | \$860,000             | Unknown             |
| Geiger Fork of Bailey Creek at Kivett Ln (Culvert)        | Culvert                    | \$290,000             | Unknown             |
| Geiger Fork of Bailey Ck at Pinion Dr & Kivett Ln         | Channel                    | \$550,000             | Unknown             |
| Geiger Fork of Bailey Creek at Pinion Drive               | Culvert                    | \$290,000             | Unknown             |
| Geiger Fork of Bailey Creek at SR 341 & Pinion Dr         | Channel                    | \$2,240,000           | Unknown             |
| Geiger Fork of Bailey Creek at SR 341                     | Culvert                    | \$340,000             | Unknown             |
| Geiger Fork of Bailey Creek at Pinion Dr (Bridge/Culvert) | Bridge/Culvert             | \$340,000             | Unknown             |
| Bailey Creek at Temple Hill Rd & Kivett Ln                | Channel                    | \$2,160,000           | Unknown             |
| Bailey Creek at Toll Rd & Temple Hill Rd                  | Channel                    | \$2,010,000           | Unknown             |
| Bailey Creek at Temple Hill Rd                            | Culvert                    | \$150,000             | Unknown             |
| Bailey Creek at Private Driveway                          | Culvert                    | \$150,000             | Unknown             |
| Bailey Creek at Toll Rd                                   | Culvert                    | \$150,000             | Unknown             |
| Bailey Creek – Dam Site at Toll Rd                        | Channel                    | \$1,650,000           | Unknown             |
| Bailey Creek – Dam Site                                   | Detention Basin            | \$30,750,000          | Unknown             |
| <i>Subtotal WC South Truckee Meadows</i>                  |                            | <i>\$72,960,000</i>   |                     |
| Antelope Valley Wash                                      | Debris Basin               | \$18,450,000          | Unknown             |
| Chickadee Wash at Lemmon Dr                               | Culvert                    | \$2,500,000           | Unknown             |
| Arkansas Street Wash at Lemmon Dr                         | Culvert                    | \$920,000             | Unknown             |
| Closed basins at various locations                        | Closed Basin Flood         | \$50,000,000**        | Unknown             |
| <i>Subtotal WC – Stead/Lemmon Valley</i>                  |                            | <i>\$71,870,000</i>   |                     |

| Project Name                                      | Project Description                   | Estimated Cost       | Fiscal Year* |
|---|---------------------------------------|----------------------|--------------|
| Sun Valley Wash #1                                | Culvert                               | \$510,000            | Unknown      |
| Sun Valley Wash #2                                | Culvert                               | \$510,000            | Unknown      |
| Sun Valley Wash at Sun Valley Dr                  | Channel                               | \$510,000            | Unknown      |
| Sun Valley Wash #3                                | Culvert                               | \$590,000            | Unknown      |
| Sun Valley Wash #4                                | Culvert                               | \$510,000            | Unknown      |
| Sun Valley Wash #4                                | Channel System                        | \$6,110,000          | Unknown      |
| Sun Valley Wash at 9 <sup>th</sup> Ave            | Culvert                               | \$510,000            | Unknown      |
| Sun Valley Wash #5                                | Culvert                               | \$780,000            | Unknown      |
| Sun Valley Wash at 8 <sup>th</sup> St & Leon      | Channel                               | \$850,000            | Unknown      |
| Sun Valley Wash at Pit Ln & Side Hill Dr          | Channel                               | \$2,640,000          | Unknown      |
| Sun Valley Wash at Leon St & First Ave            | Channel System                        | \$2,770,000          | Unknown      |
| Sun Valley Wash #6                                | Culvert                               | \$950,000            | Unknown      |
| Sun Valley Wash #7                                | Culvert                               | \$1,020,000          | Unknown      |
| Sun Valley Wash #8                                | Culvert                               | \$1,710,000          | Unknown      |
| Sun Valley Wash #10                               | Channel                               | \$1,650,000          | Unknown      |
| <i>Subtotal WC – Sun Valley</i>                   |                                       | <i>\$21,620,000</i>  |              |
| Dog Valley Creek 800FT UPST of Bridge St          | Channel                               | \$2,350,000          | Unknown      |
| Dog Valley Creek at Bridge St                     | Bridge                                | \$1,290,000          | Unknown      |
| Dog Valley Creek (Bridge St – Truckee River)      | Channel                               | \$1,210,000          | Unknown      |
| North Flat Wash (Old Hwy 40 – Truckee River)      | Channel                               | \$1,020,000          | Unknown      |
| Dry Creek at Panorama Dr                          | Culvert                               | \$1,860,000          | Unknown      |
| Dry Creek at Frost Ln                             | Culvert                               | \$550,000            | Unknown      |
| Dry Creek at Dieringer Dr                         | Culvert                               | \$1,460,000          | Unknown      |
| Dry Creek at Lakeside Dr                          | Culvert                               | \$1,120,000          | Unknown      |
| Dry Creek at Timothy Dr                           | Culvert                               | \$1,210,000          | Unknown      |
| Dry Creek at Holcomb Ln                           | Culvert                               | \$1,020,000          | Unknown      |
| North Hidden Valley Wash Dam Site                 | Detention Basin                       | \$9,640,000          | Unknown      |
| South Hidden Valley Wash Dam Site                 | Detention Basin                       | \$3,440,000          | Unknown      |
| South Hidden Valley Wash Irrigation Ditch         | Ditch/Tributary Crossing Improvements | \$5,000,000          | Unknown      |
| <i>Subtotal WC – Truckee Meadows</i>              |                                       | <i>\$31,170,000</i>  |              |
| <b>Total Estimated Construction Cost – All WC</b> |                                       | <b>\$248,470,000</b> |              |

\*Fiscal Year is the planned year of construction

\*\*This is an estimate based on current discussions and is anticipated to change if a project(s) was identified

**Source:** This table was prepared using information from Table 14.1 (modified) of the City of Reno and Washoe County TMSA/FSA Water, Wastewater, and Flood Management Facility Plan (November 2007).

**Note:** The original 2007 construction cost estimates were updated to 2019 levels (3.5% inflation) and include a 40% contingency. No design, project management, or inspection costs are included. Potential needs identified should not be considered approved projects; further evaluation and analysis is required to determine viability, cost effectiveness and potential sources of funding for implementation.

## **CHAPTER 3**

### **RECOMMENDATIONS**

#### **3.1. Recommendations for Additional Flood Protection or Mitigation Measures**

At this time, the Truckee River Flood Control Project Needs Committee (FCPNC) has no recommendations for additional flood protection or mitigation measures to address regional flooding issues.

#### **3.2. Recommendations on Issues That Need Further Study and Modeling**

At its final meeting on February 14, 2019, the Truckee River FCPNC recommended that the City of Reno, City of Sparks, and Washoe County seriously consider the formation of a flood control district (per Senate Bill 175 (2009 Statutes of Nevada, Chapter 477, p. 2735)) or similar entity to address county-wide regional flooding problems.

This entity should have the ability to raise revenues to build capital projects to improve the region's flood infrastructure; and should also have the means (funds) to operate, maintain, repair and replace infrastructure over time as required.

The FCPNC also recommended that the jurisdictions develop a comprehensive flood control master plan for identifying and prioritizing capital projects to address regional flooding issues. The master plan would focus the efforts of the flood control entity and would provide the basis for funding and implementing capital improvement projects throughout the region.

The FCPNC emphasized the need for adopting a proactive approach to solving widespread flooding problems using regional governance models. Unique solutions must be developed for closed basins. Land acquisition and other preventative measures to reduce flood risk and preserve floodplain storage should be evaluated. Elected officials must be willing to publicly support efforts that address regional flooding problems. Extensive public education and outreach are required in order to gain community support for raising taxes and/or charging fees specifically for flood control improvements.

The projects listed in the accompanying table are largely known by observation only. Few, if any of these projects have been through preliminary engineering design which would identify value specific improvements to the proposed solutions as contained with the table and accurate cost estimates of the actual projects. It is common among all municipal governments that improvements to the drainage and flood related infrastructure comes after the water and wastewater infrastructure have been improved and stabilized throughout the communities. Funding for these drainage projects has not been made readily available by the federal and most state governments and so construction of the flood control projects have lagged behind. Only those projects that have a substantial detriment to the community have been addressed and for obvious reasons.



The City of Sparks has begun addressing some of its problems through a city wide flood fee, and through this, the North Truckee Drain Relocation Project has been delivered. The City of Reno is currently considering a drainage utility fee to generate funding to accomplish a significant portion of the projects as listed in the table. Washoe County currently is charging citizens in North Spanish Springs a fee for a large storm water project, but Washoe County does not have a storm water utility that would allow for funding of both infrastructure and associated operations and maintenance throughout the county.

Prior to recommending which project should receive further study, the FCPNC recommends that each of these projects be compared and prioritized based on engineering feasibility, cost and benefits provided before a list can be developed of the most likely projects to receive further consideration and perhaps further study. The scope of this report does not extend far enough to make this determination, but it does list the projects and known problems as a beginning to this ultimate process.