

Post-Wildfire Flooding Update

October 11, 2022





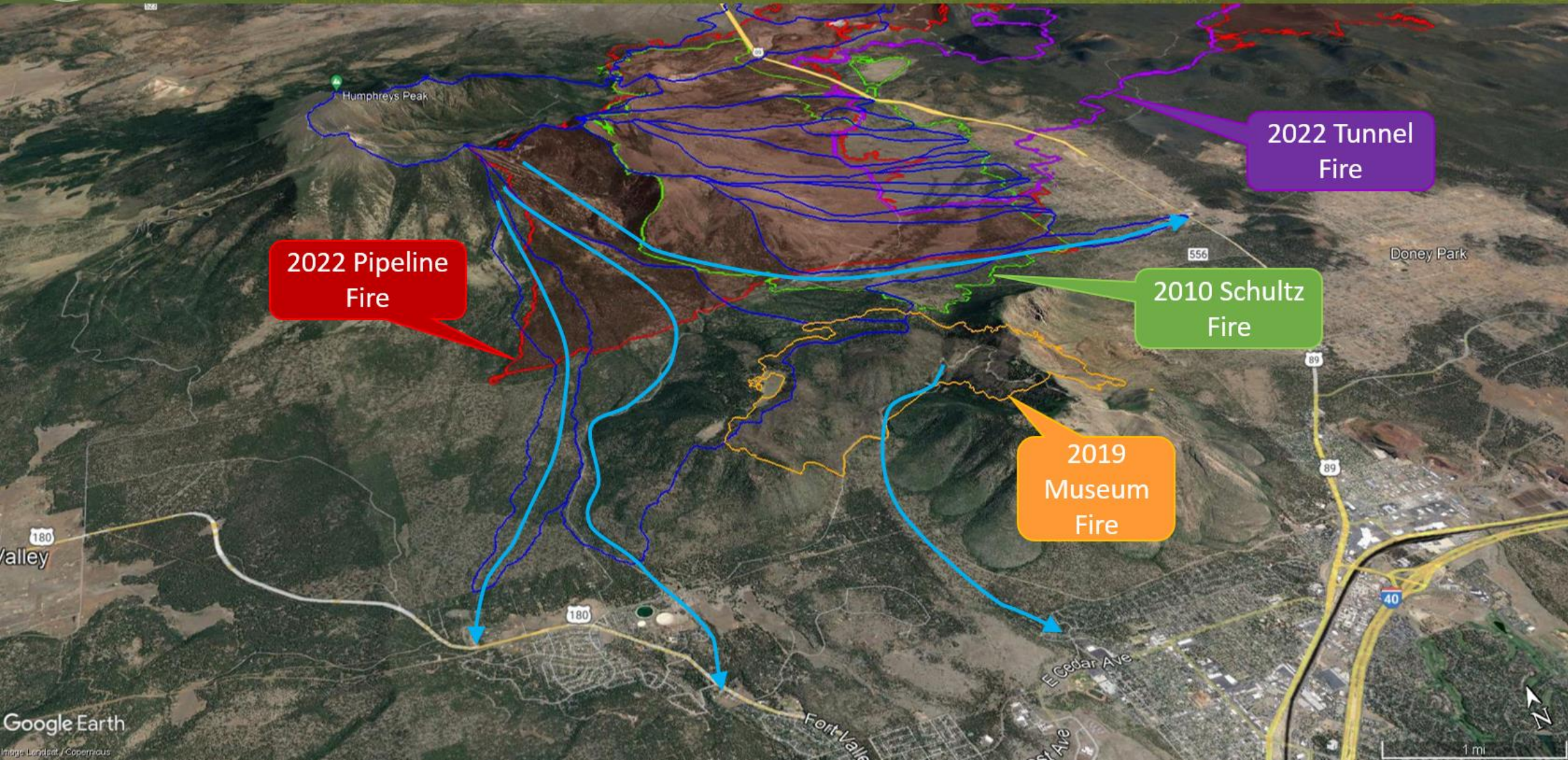
Agenda



- Museum Flood Area updates
 - 2022 monsoon season overview
 - Infrastructure projects
 - Phase 2 Feasibility Study
 - Prop 441
- Pipeline West Area updates
 - 2022 monsoon season overview
 - Infrastructure projects
 - Financial Update
- SBA Loans & communications



Flood Risk Assessment Overview



2022 Pipeline Fire

2022 Tunnel Fire

2010 Schultz Fire

2019 Museum Fire

Museum Flood Area





2022 Monsoon Season

- Risk of post-wildfire flooding in the Museum Flood Area remains high.
- Mitigation measures installed to lessen impacts of flooding – do not eliminate threat.
- Little heavy rain fell on Museum Fire burn scar in 2022, 1-year events at the 15-minute interval

| Largest Events on Museum Fire Burn Scars for 2021 | | | |
|---|--------------------------|-------------------|-------------|
| Rainfall Event Date | Rainfall Totals (Inches) | | |
| | Maximum 15 Minute | Maximum 60 Minute | Daily Total |
| 7.13.2021 | 1.02 | 1.81 | 2.17 |
| 7.14.2021 | 0.67 | 1.15 | 1.22 |
| 7.16.2021 | 0.63 | 1.38 | 1.42 |
| 7.21.2021 | 0.60 | 1.26 | 1.26 |
| 8.17.2021 | 1.14 | 3.07 | 3.35 |

| Largest Events on Museum Fire Burn Scars for 2022 | | | |
|---|--------------------------|-------------------|-------------|
| Rainfall Event Date | Rainfall Totals (Inches) | | |
| | Maximum 15 Minute | Maximum 60 Minute | Daily Total |
| 7.15.2022 | 0.67 | 1.10 | 1.14 |
| 7.27.2022 | 0.55 | 1.22 | 1.42 |
| 7.29.2022 | 0.83 | 1.06 | 1.46 |



Rainfall intensity, 2022

| Date | Area | Max 15-Min Depth Measured (Inches) | Max @ | Max Recurrence Interval (Years) |
|--------|-----------------------------|------------------------------------|--------------------------------|---------------------------------|
| 25-Jun | East Pipeline Fire | 0.51 | Thames - Brandis | 1 |
| 26-Jun | East Pipeline Fire | 0.71 | Thames / Peaceful Way | 2-5 |
| 29-Jun | East Pipeline Fire | 0.51 | Museum Fire South | 1 |
| 14-Jul | East and West Pipeline Fire | 0.71 | Government Tank | 2-5 |
| 15-Jul | East Pipeline Fire | 0.87 | Lenox-Wupatki Trails | 5 |
| 23-Jul | East Pipeline Fire | 0.98 | Government Tank | 5-10 |
| 24-Jul | East and West Pipeline Fire | 0.12 | Schultz Creek near Highway 180 | 1 |
| 26-Jul | East Pipeline Fire | 0.47 | Thames - Brandis | 1 |
| 27-Jul | West Pipeline Fire | <0.50 | Upper Schultz Creek | 1 |
| 28-Jul | East Pipeline Fire | <0.40 | Lenox-Wupatki Trails | 1 |
| 29-Jul | West Pipeline Fire | 0.71 | Upper Schultz Creek | 2-5 |
| 30-Jul | East Pipeline Fire | 0.63 | Schultz Basin 7 Upper Campbell | 2 |
| 31-Jul | East Pipeline Fire | 0.75 | Thames / Peaceful Way | 2-5 |
| 7-Aug | East & West Pipeline Fire | 0.39 | Schultz Creek Headwaters | 1 |
| 11-Aug | East Pipeline Fire | 0.39 | Lenox-Wupatki Trails | 1 |
| 13-Aug | East Pipeline Fire | 0.79 | Thames-Brandis | 5 |
| 14-Aug | East Pipeline Fire | 0.73 | Government Tank | 2-5 |
| 17-Aug | East Pipeline Fire | 0.8 | Thames-Brandis | 5 |
| 24-Aug | East Pipeline Fire | 0.4 | Thames-Brandis | 1 |
| 10-Sep | East Pipeline Fire | 0.67 | Thames-Brandis | 2 |



Close of monsoon season

Short-term Mitigation

- End of 2022 monsoon clean-up
 - Resident access
 - Pallet requests for sandbags
 - Concrete barrier removal
 - Linda Vista Barrier removal
- Winter Preparation





On-forest Alluvial Fans

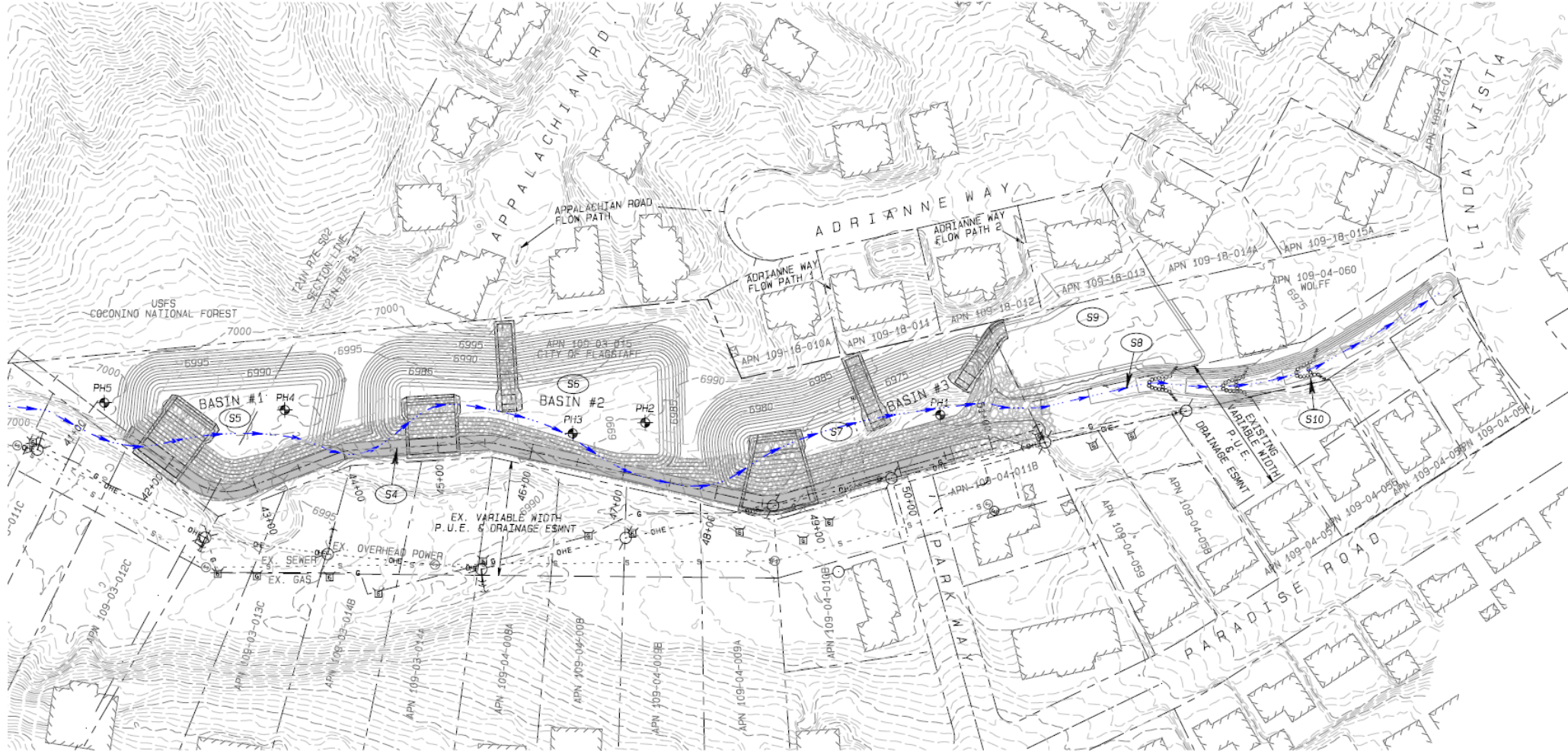
- Alluvial fans completed and functioning well;
 - West Tributary
 - Mount Elden Estates
 - End of Paradise
- New work on "north" fans
 - Two fans
 - Completed by November



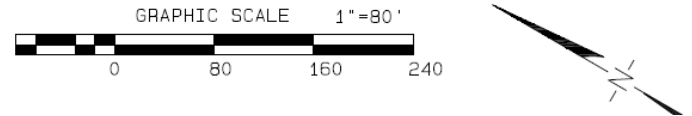
8/7/22, West Tributary



Parkway Basins



OVERVIEW MAP
SPRUCE WASH - PARK SITE SEDIMENT BASINS





Parkway Basins

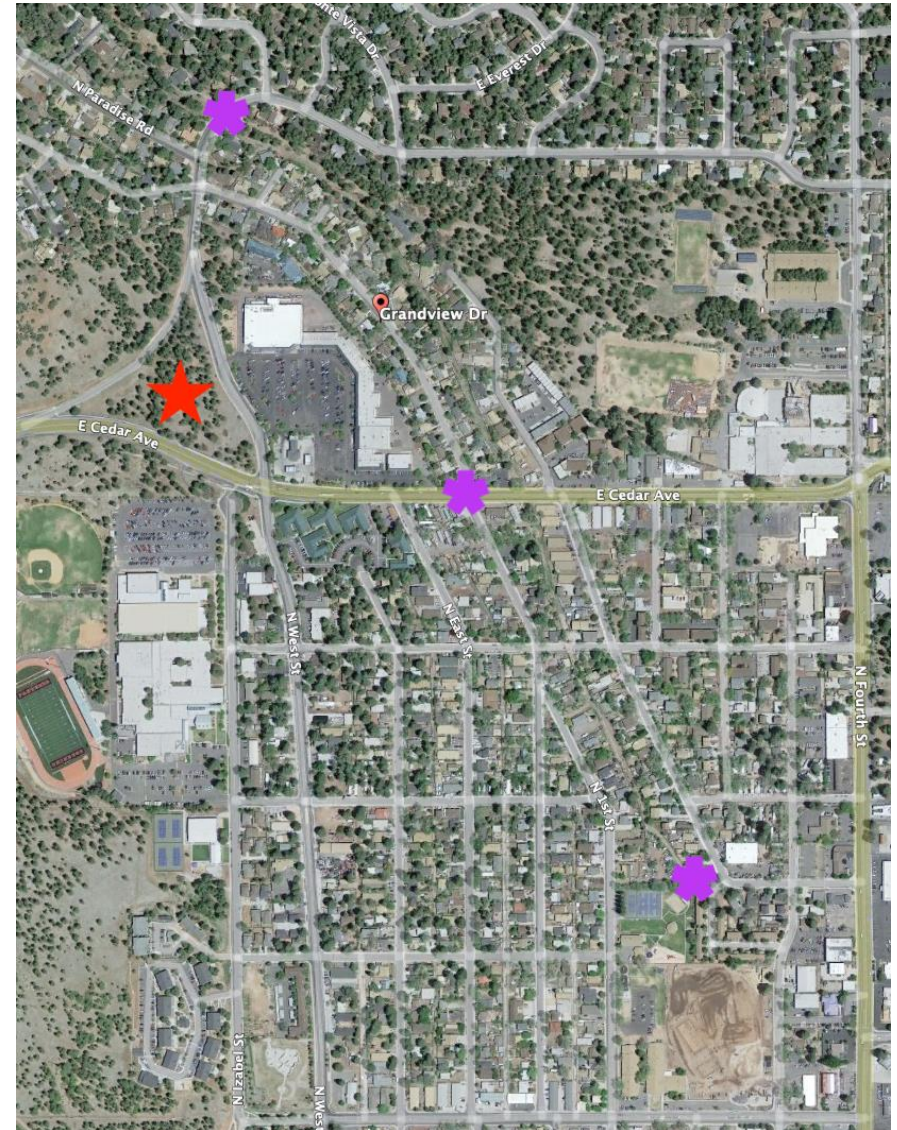


- Utility relocates scheduled for this fall.
- Tree removal would occur this fall.
- Construction in spring.
- Project will reduce sediment into Sunnyside and Grandview



Phase 2 Feasibility Study

- Peak Engineering
 - Proposed projects for reducing flood impacts:
 - Grandview Drive Improvements
 - West/Cedar Basin Development: "The Wedge"
 - Linda Vista & Cedar Avenue Crossing Upgrades
 - Channel Improvements
 - Arroyo Seco Inlet Modifications





Phase 2 Feasibility Study

- Peak Engineering & JE Fuller
 - Hydraulic modeling
 - Show benefit of completed projects: Killip Regional Detention Basins, Dortha Crossing and Dortha Channel
 - Show benefit of proposed projects
 - Identify sequencing of proposed projects
 - Inform policy for assessing impacts (future Council discussion)

Strong alignment with the bond education campaign and providing good detail to inform the community and move the best projects to final design and construction.



Prop 441

- Prop 441 would fund a series of projects to increase stormwater capacity in the Spruce Wash, including:
 - Channel improvements from Paradise to the Killip Retention Basins
 - Continued improvements towards Route 66
- Total cost is \$26,000,000

Flagstaffbonds2022.com

Propositions 441 and 442

are ballot measures that would authorize issuing general obligation bonds to fund infrastructure improvement projects and create rental and homeownership opportunities.



**PROJECTED TO BE FUNDED
WITHIN CURRENT TAX RATE.**



PROP 441

WILDFIRE, FLOOD, AND WASTEWATER INFRASTRUCTURE BOND

Will invest \$57 million dollars in infrastructure improvements to respond to wildfires, help lessen the impacts of flooding and capacity issues at the wastewater treatment facilities in Flagstaff.

PROP 442

RENTAL AND HOMEOWNERSHIP OPPORTUNITIES BOND

In 2020, the Flagstaff City Council declared a housing emergency in response to rising costs and limited supply. If approved, \$20 million dollars will be dedicated to creating rental and homeownership opportunities for Flagstaff residents.



Learn more, scan the QR code or visit flagstaffbonds2022.com. Props 441 & 442 were recommended for the November 8, 2022 election by the Flagstaff Citizen Bond Committee.



Pipeline West Flood Area



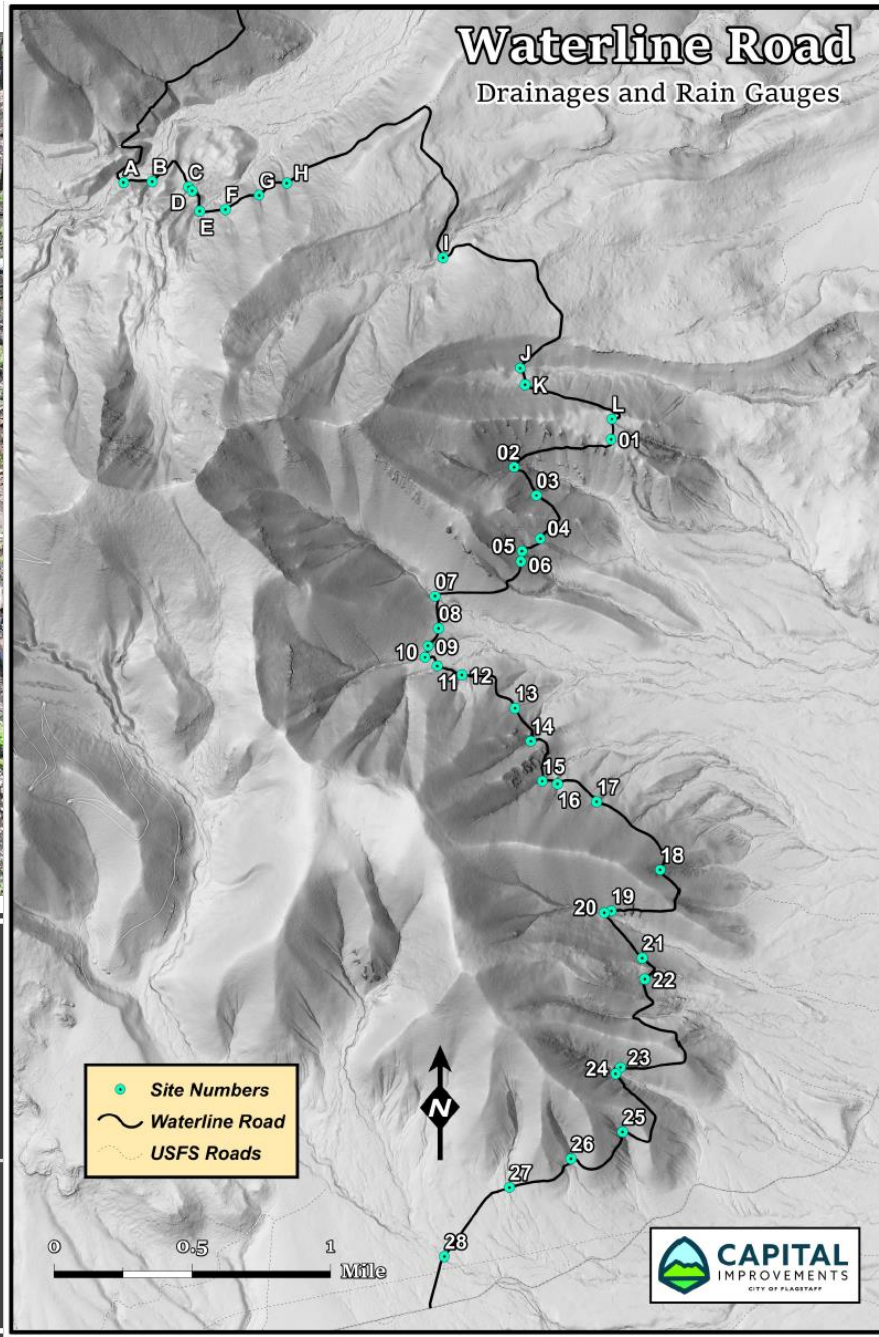


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Inner Basin Pipeline





Long-term Projects

Immediate mitigation projects

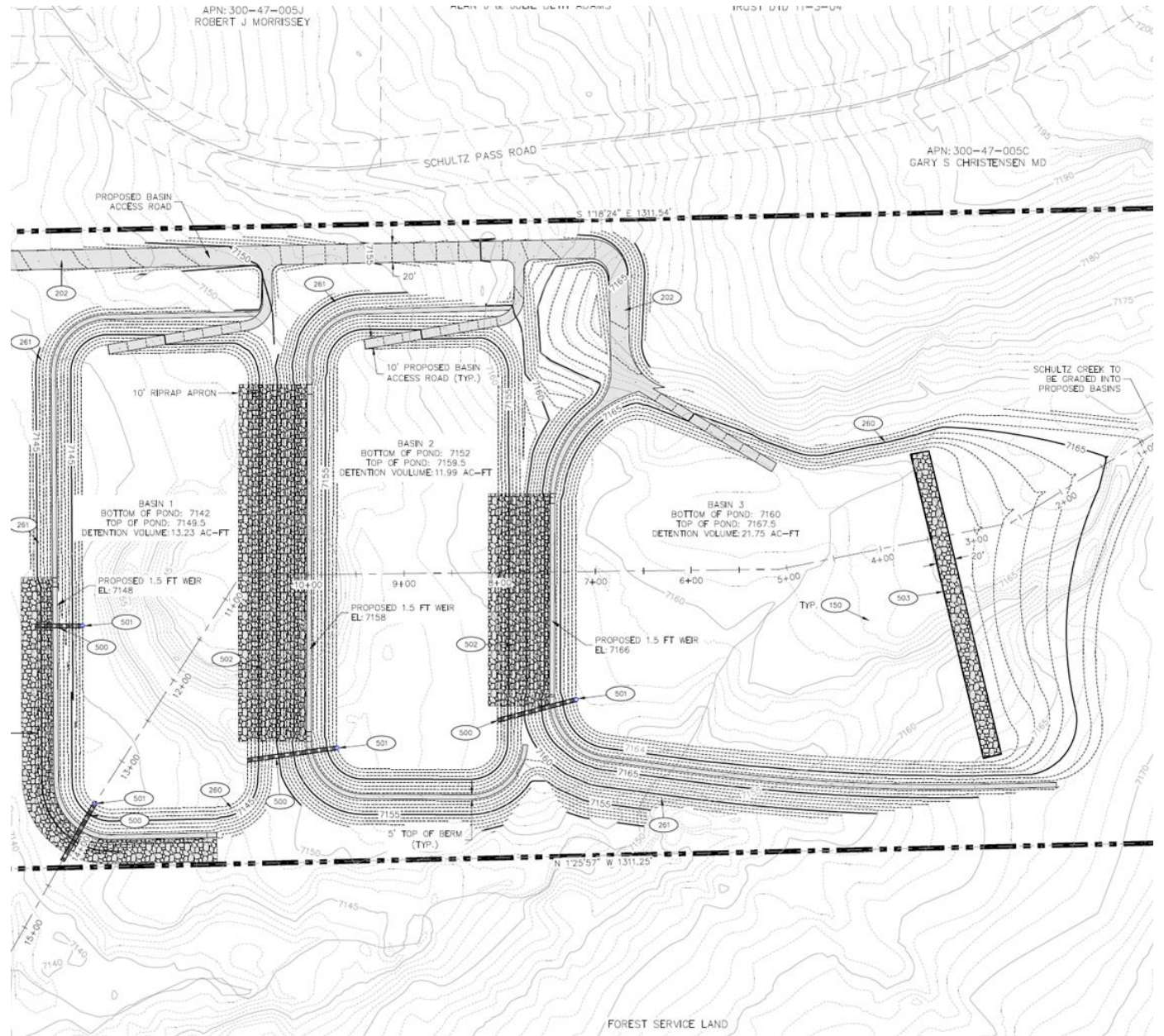
- 20-acre Schultz Creek Sediment & Detention Basins
- Schultz Creek Downstream Channel Stabilization

Long-term mitigations

- Box culvert improvements at Hwy 180
- Inner basin Pipeline repairs and mitigations

Schultz Creek Detention Basins

- 20-acre City owned Parcel
- Incorporating trail access, trailhead parking, historic interpretation, and landscaping.





Schultz Creek Detention Basins



- Complete by 10/26
- Functionally complete with work continuing on stabilization, concrete headwalls and overflow weir structures.



180 Improvements



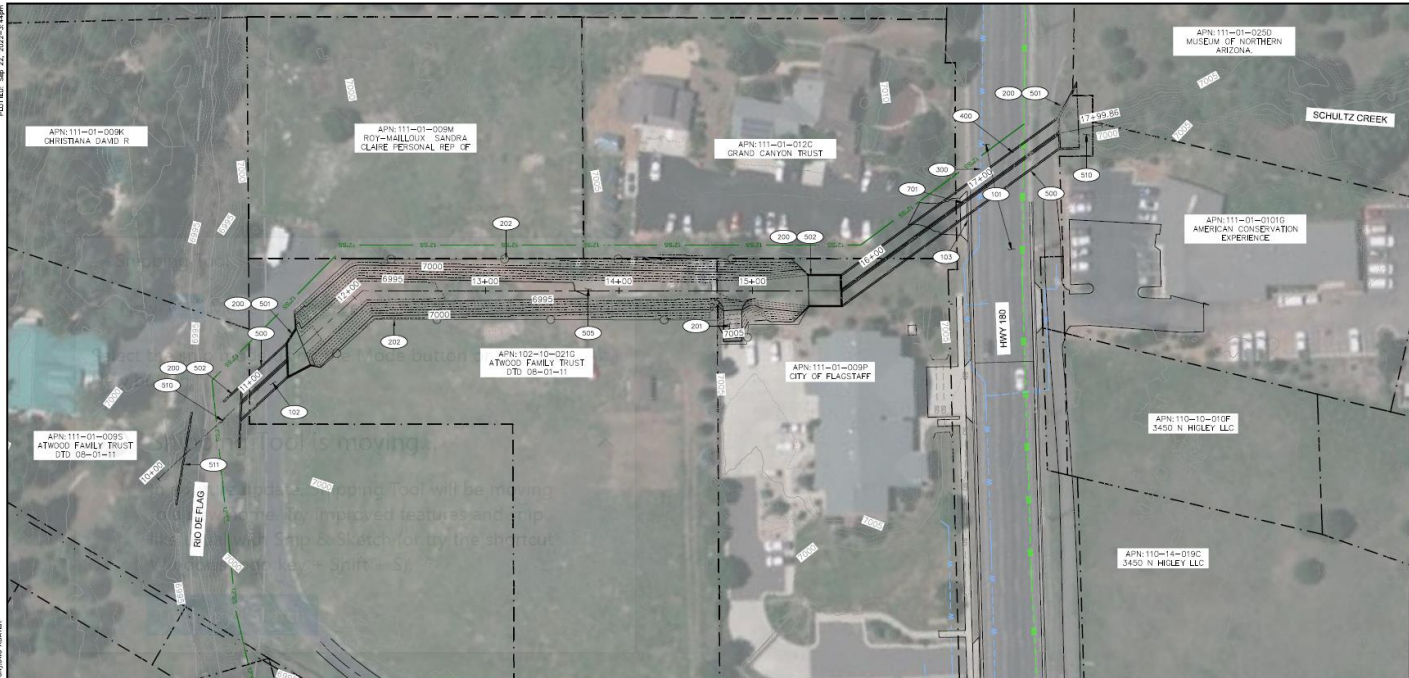
- The City has contracted with SWI to provide options and conceptual designs for an improvement of the culvert at Hwy 180.
- Considerable hurdles including multiple jurisdictions, private property owners, funding, and utility conflicts.
- After several meetings the options have been narrowed to two viable concepts.
- Both concepts allow for ~950 CFS which would fully contain the flow within channel from a 100-year event.



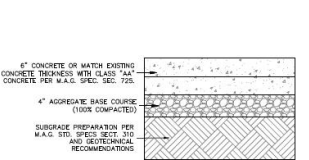
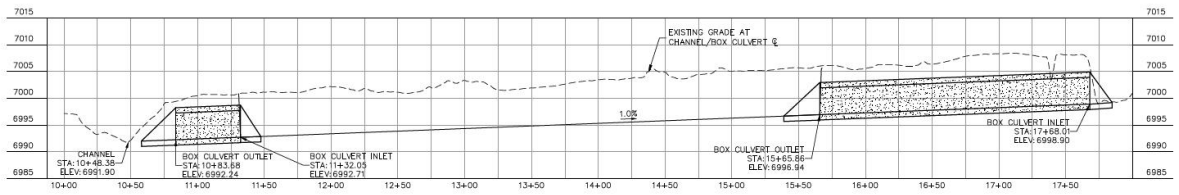
180 Improvements - Option 1



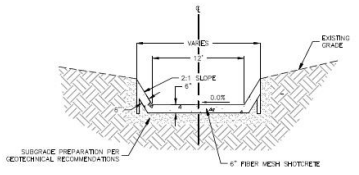
PLANTING: SEE PLAN. METEOROLOGICAL DATA: SEE PLAN. CONSTRUCTION: SEE PLAN. MATERIALS: SEE PLAN. CONTRACTOR: SEE PLAN. CITY OF FLAGSTAFF: SEE PLAN.



- ### CITY IMPROVEMENT KEYNOTES
- 100 5,100 CY EARTHWORK (CUT)
 - 101 500 SY DEMO AND REPLACE HWY 180 ROAD SECTION
 - 102 350 SY DEMO & REPLACE LOCAL ROAD SECTION
 - 103 1 LS DEMO & DISPOSE OF EXISTING BOX CULVERT AND CAP EXISTING STORM DRAIN PIPE
 - 200 280 LF INSTALL GUARD RAILING
 - 201 500 SF CONSTRUCT CONCRETE STRUCTURAL SECTION PER DETAIL '1' FOR MAINTENANCE RAMP
 - 202 850 LF INSTALL PROTECTION FENCING AND ACCESS GATE
 - 300 1 LS VERTICALLY REALIGN 20" DUCTILE IRON WATER MAIN
 - 400 1 LS REALIGN EXISTING SEWER MAIN
 - 500 246 LF INSTALL DOUBLE 8'X5' PRECAST BOX CULVERT
 - 600 2 EA INSTALL INLET HEADWALL
 - 700 2 EA INSTALL OUTLET HEADWALL
 - 800 18,100 SF CONSTRUCT SHOTCRETE CHANNEL PER DETAIL '2'
 - 900 500 SY INSTALL ROCK RIP-RAP PROTECTION
 - 1000 70 LF CONSTRUCT CHANNEL BANK PROTECTION WALL
 - 1100 1 LS DRY UTILITY RELOCATIONS
 - 1200 41,100 SF PROPERTY ACQUISITIONS FOR EASEMENTS



CONCRETE PAVEMENT SECTION 1
NO SCALE



SHOTCRETE CHANNEL DETAIL 2
NO SCALE



PRELIMINARY
NOT FOR CONSTRUCTION,
BIDDING OR RECORDING

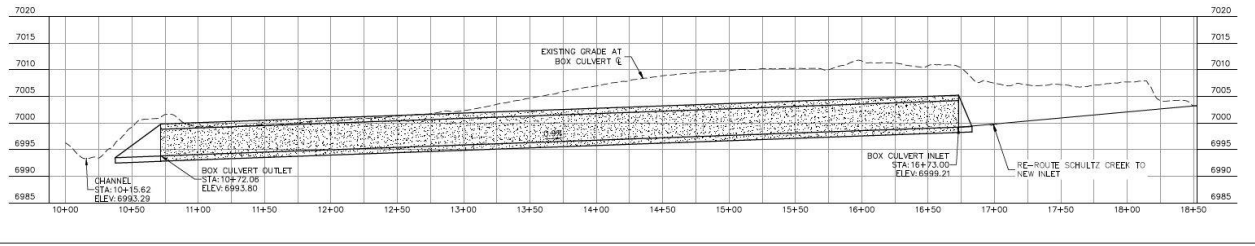
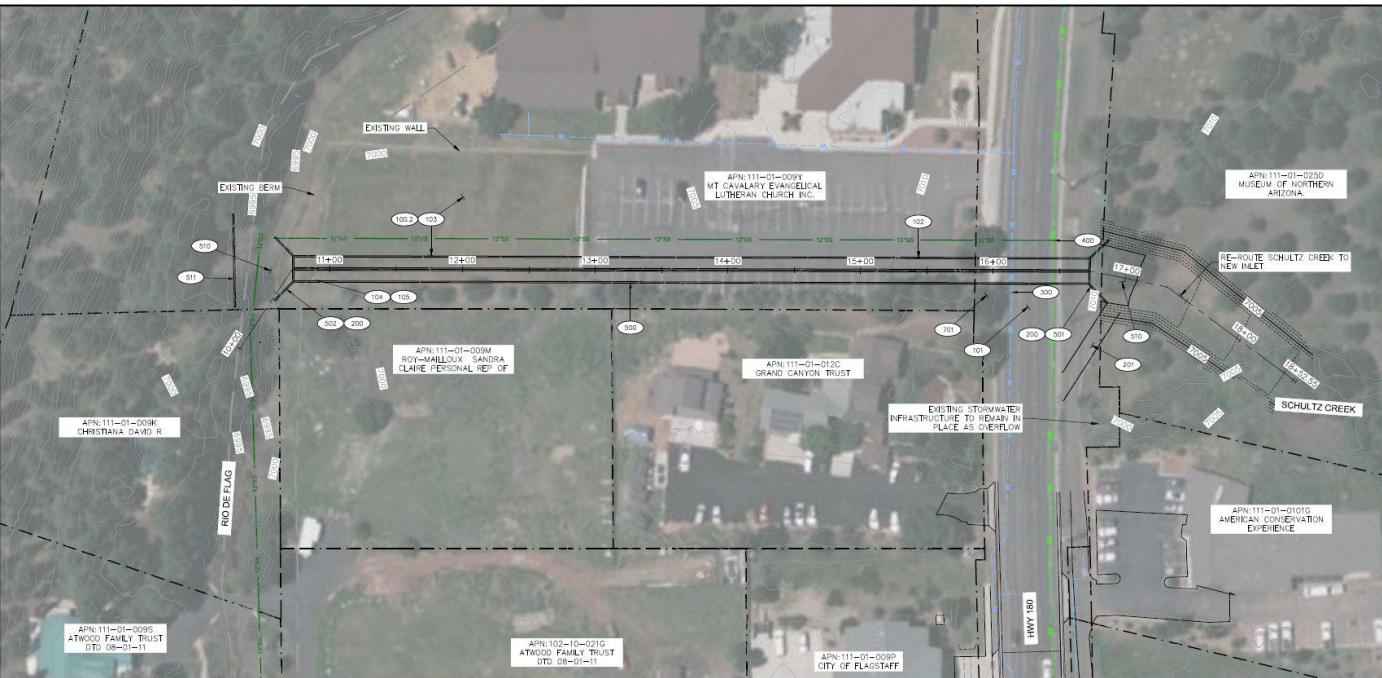
| | |
|---|---|
| OPTION 1 PLAN & PROFILE | |
| JOB NO. 180 DATE SEP 22 SCALE AS SHOWN DESIGNER: [Name] CHECKED: [Name] | FLAGSTAFF, ARIZONA HIGHWAY 180 BOX CULVERT 75 North Phoenix, Sedona, AZ 86336 928.282.1061 928.282.0000 fax www.swhi.com |
| Shepherd Weisitzer, Inc. | |
| REVISIONS NO. DESCRIPTION DATE BY | DRAWING NO. C01 SHEET NO. 1 OF 3 |



180 Improvements - Option 2



FILE: PL 2022\UPBLMS PER FLOOD MITIGATION\DRAWINGS\CONSTRUCTION PLANS\HIGHWAY 180 CROSSING - OPTION 3 (INCLUDING RABR)
 PLOTTED: Sep 22, 2022 - 4:27PM



- ### CITY IMPROVEMENT KEYNOTES
- 100 6,100 CY EARTHWORK (CUT) INCLUDING CHANNEL RE-ROUTE [TRAPEZOIDAL CHANNEL, 40' BOTTOM WIDTH WITH AN APPROX. DEPTH OF 6 FEET AND 2:1 SIDE SLOPES]
 - 100.2 1,600 CY EARTHWORK (FILL) FOR MIN COVER ON BOX CULVERT
 - 101 500 SY DEMO & REPLACE HWY 180 ROAD SECTION
 - 102 2,000 SY DEMO & REPLACE LOCAL ROAD SECTION
 - 103 22,000 SF DEMO & REPLACE SOD
 - 104 100 SY DEMO STORM DRAIN
 - 105 1 EA DEMO OUTLET STRUCTURE
 - 200 100 LF INSTALL GUARD RAILING
 - 201 900 SF CONSTRUCT CONCRETE STRUCTURAL SECTION PER DETAIL 'Y' FOR MAINTENANCE ACCESS
 - 300 1 LS VERTICALLY REALIGN 20" DUCTILE IRON WATER MAIN
 - 400 1 LS REALIGN EXISTING SEWER MAIN
 - 500 600 LF INSTALL DOUBLE 8'X8' PRECAST BOX CULVERT
 - 501 1 EA INSTALL INLET HEADWALL
 - 502 1 EA INSTALL OUTLET HEADWALL
 - 510 500 SY INSTALL ROCK RIP-RAP PROTECTION
 - 611 70 LF CONSTRUCT CHANNEL BANK PROTECTION WALL
 - 701 1 EA DRY UTILITY RELOCATIONS
 - 900 47,600 SF PROPERTY ACQUISITIONS FOR EASEMENTS



PRELIMINARY
 NOT FOR CONSTRUCTION,
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180 project – Decision Matrix



| Decision Matrix | | | | | |
|------------------------|--------------------------|--|---|--------------------|-------------------------------|
| ID | Construction Cost | Management Complexity | Constructibility | City Limits | Property Acquisition |
| Option 1 | \$4.99 Million | A portion of project within City owned parcel. Coordination with multiple other property owners. | More complex closure of ADOT Hwy 180 for removal of existing box culvert and construction of new skewed box culvert | No | 41,100 sf across 4 properties |
| | | | | | |
| Option 2 | \$5.34 Million | Coordination with only 2 property owners. | Simplified closure of ADOT Hwy 180 for construction of new box culvert - existing infrastructure can remain in place and used as an overflow. Option provides no adverse impact to downstream properties. | Yes | 47,600 sf across 2 properties |

Legend

- No / Worst
-
- Yes / Best



Season wrap-up

Short-term Mitigation

- End of 2022 monsoon clean-up
 - Resident access
 - Pallet requests for sandbags (928) 213-2102
 - Concrete barrier removal
- Winter Preparations





Pipeline West Financial Update

- 2022 Pre-season mitigation (Pipeline & Museum): \$471,040
- Flood Response cost estimates: \$351,000
- Private property damage estimate: \$95,500
- Water control facilities estimate: \$15.2M
 - Inner Basin Water Line
 - Rio Channel at Stevanna Way
 - Highway 180 Culvert
 - Frances Short Pond
- NRCS EWP 25% Grant Match: \$768,041
 - Funded by Dept of Forestry and Fire Management
- Schultz Creek Basin Design: \$68,000



Small Business Administration Loans



- For flooding that occurred July 23 – August 28, 2022
- Low interest loans available for homeowners, renters, non-profits and businesses
- 11/18 deadline
- Apply online at disasterloanassistance.sba.gov/ela

SBA Loans Available for Pipeline Fire Flood Damage



Fall 2022

Low-interest federal disaster loans through the U.S. Small Business Administration (SBA) are available to **homeowners, renters, non-profits and businesses** affected by the post-wildfire flooding that occurred between July 23 and August 28, 2022.

- Homeowners may borrow **up to \$200,000** to repair or replace their primary residence.
- Homeowners and renters may borrow **up to \$40,000** to replace personal property.
- Businesses may borrow **up to \$2 million** for any combination of property damage or economic injury.

Apply online at disasterloanassistance.sba.gov/ela. For more information or assistance, call **(800) 659-2955** or email disastercustomerservice@sba.gov. For people who are deaf, hard of hearing, or have a speech disability, please dial **7-1-1** to access telecommunications relay services.

The deadline to apply for a physical damage loan is November 18, 2022.



Museum Flood Area Communications

How to stay connected



For more information and to
sign up to receive updates, visit

MuseumFloodProjects.com

Questions?

info@museumfloodprojects.com

[928-213-2102](tel:928-213-2102)



Pipeline West Communications

How to stay connected

SCAN ME



Pipeline West Community Meeting

October 24, 6pm

City Hall

For more information and to sign up to
receive updates, visit

Flagstaff.az.gov/PipelineWest

Questions?

info@pipelinewestflooding.com

[928-213-2102](tel:928-213-2102)

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