P2-372925 - Maumelle Ecosystem Restoration Plan 5

Feasibility (Recommended Plan)

Abbreviated Risk Analysis

Meeting Date: 13-Jul-21

Risk Level

	Negligible	Marginal	Moderate	Significant	Critical
Very Likely	2	3	4	5	5
Likely	1	2	3	4	5
Possible	0	1	2	3	4
Unlikely	0	0	1	2	3

Risk Register

Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
Project Management & Scope Growth				**Maximum Project Growth**		**40%**
PS-1	Plan 01: No Action (NOT TSP)			Negligible	Unlikely	0
PS-2	Plan 05: Remove RC 1 (hollow)	* Potential for scope growth, added features and quantities.	Background: Removing low water crossing assuming hollow. If not hollow. This would increase effort to remove (time, level of effort, quantities). Need to coordinate with CAW to see what they ran into with downstream) water crossing. Ben (CAW) said crossing 4 was hollow. Impact: Noticable (moderate) - significant increased quanties Likelihood: unlikely (CAW has not raised any red flags bout this)	Moderate	Unlikely	1
PS-3	Plan 05: Remove RC 1 (nearby utilities)	* Potential for scope growth, added features and quantities.	Background: Nearby gas line may be a concern. River crossing. Existing power line (OH) - not very close. Need verification of exactly where it is during design phase. If an issue - likely low cost, but schedule delay and design effort increase. In theory gas line can be moved. Depth is unknown. Need to ask gas folks depth. Typ. not more than 6' deep. Gas company seem OK to work with. We will probbly be working w/in the gas line ROW. In the stream we are a good distance away, but our working area may have a higher liklihood of impacting it. Impact: moderate - more cordiantion and design effort. Gas company may require we do additional protection for gas line. Likelihood: likely - we are very close to the gas line and w/in the ROW area	Moderate	Likely	3
PS-4	Plan 05: Remove RC 1 (age of structure - historic)	* Potential for scope growth, added features and quantities. * Investigations sufficient to support design assumptions?	Background: Age of structure - not entirely sure Need to look into age of concrete? Chris to verify/confirm (SHPO stuff). Est construction timeline 1983-1994. Impact: marginal - if it does occur - it will cost some money but not excessively expensive, probably not huge impact on project timeline (we may have someone at the Corps that can help guide us) Likelihood: very unlikely	Marginal	Unlikely	0
PS-5	Plan 05: Remove RC 2 (hollow)	* Potential for scope growth, added features and quantities. * Investigations sufficient to support design assumptions?	Background: same info as RC1 (PS-2) Impact: moderate Likelihood: unlikely	Moderate	Unlikely	1
PS-6	Plan 05: Remove RC 2 (age of structure - historic)	* Potential for scope growth, added features and quantities.	Background / Impact / Liklihood: same as RC 1 (PS-4)	Marginal	Unlikely	0
PS-7	Plan 05: Open SC1	* Potential for scope growth, added features and quantities. * Investigations sufficient to support design assumptions?	Background: This includes path to get to site, notching levee, removing 3 (sets) of pipes/culverts. Some of the work may be in the vicinity of the gas pipeline. Need to get further info on pipeline ROW/location in relation to SC-1 components. See PS-3 for additional comments. Impact: moderate (it could affect coordination/schedule, minor design revisions) Likelihood: very unlikely. We are pretty sure it is significantly far away.	Moderate	Unlikely	1
PS-8	Plan 05: Restore Tributary A (plantings)	* Potential for scope growth, added features and quantities. * Investigations sufficient to support design assumptions?	Background: Includes ripping soil, planting trees. Likely (prefer to) to do plantings by hand, and watering for plant establishment. Can they use existing irrigation system to water plants? Probably not. (Existing) Irrigation system most likely unusable due to dirtwork for restoring Trib A. Also includes monitoring and adaptive management plan. Trees tend to have high survival rate. Proposed 302 trees/acre. Availability of plants - should be good unless we have significant drought (limiting source). Need to put in order 1 yr in advance. Probably need to keep trees of of gas pipeline ROW. Impact: negligable (minor concerns, small impact to project based on current approach, similar to approach in area to do way we are proposing) Likelihood: unlikely to have issues with this part	Negligible	Unlikely	0

PS-9	Plan 05: Restore Tributary A (dirtwork)	* Potential for scope growth, added features and quantities. * Investigations sufficient to support design assumptions?	Background: Cultural resources concrens anytime we move dirt. Cultural resources likely will request someone be onsite when digging up site. Need to add cost for personnel to do this. Need to look into recommendaitons (SHPO). 4,500 CY of dirt moving. [Politics likely to play a role in level of concern.] Gas line may be an issue again here. Hopefuly it is deep enough no major concerns. See PS-3 for additional notes on gas line concerns. We think restoring trib A should be fairly shallow channel. We will be crossing gas line somewhere in field. May require some sort of art. conc. mattress (ACM) (or some sort of armoring) over pipeline to protect gas pipeline. May need to look at where dump trucks may need to travel (additional gravel needed?) to get dirtwork done. Impact: Moderate. Even if they find something and need to stop any work, they can continue on with different part of project (cultural stuff)[personnel and coordination]. As far as gas line - may require armoring over pipeline (larger impact) [design and coordination impact]. Can guarantee need or coordination, impact (what we need to do) variable. Likelihood: Highly Likely (one or both (cultural and gas line) will likely come into play)	Moderate	Very LIKELY	4
PS-10	Plan 05: Restore Tributary A (culvert removal, levee notch, and channel fill-in)	* Potential for scope growth, added features and quantities. * Investigations sufficient to support design assumptions?	Background: Fill in channelized ditch (ditch fill-in), culvert removal, notch levee Impact: negligable (minimal imact with any changes to this) Likelihood: possible/unlikely	Negligible	Possible	0
PS-11	Plan 05: Reforest Sod Farm	* Potential for scope growth, added features and quantities. * Investigations sufficient to support design assumptions?	Background: Similar to PS-8. Need to avoid (gas) pipeline ROW. Impact: negligable Likelihood: unlikely/possible	Negligible	Unlikely	0
PS-12	Remaining Construction Items	* Overall project concerns	Background: [Cultural Resources concerns? (probably not beyond what is already discussed above).] Concerns over getting vehicles on site? Dump trucks possibe concern. Small concern. Have considered path to get to site for all components (may need to make current assumptions more robust in areas). Impact: marginal Likelihood: possible (these could be issues due to unknown site and other conditions)	Marginal	Possible	1
PS-13	Planning, Engineering, & Design	* Design is at 20% - ish and subject to scope growth. * Sufficent Staffing/Support?	Background: [Includes design, survey, OH costs, contracting, PM,etc.] As far as cultural resources - probably need to add archeologist on site (construction, not PED). Most likely will NOT need a Cultural survey in PED. Lack of engineers, not 100% funded, competition w/higher priority projects (timing). Currently assuming going into PED in FY22. Impact: significant (lack of people resources and time) locally, could possibly be shifted to other district Likelihood: likely	Significant	Likely	4
PS-14	Construction Management	* Potential for scope growth, added features and quantities during construction due to differing site conditions.	Background: Potential of lack of personnel, weather - Significant flood could delay project/impact timeline, but likely would not derail project. Impact: marginal - Low water crossing most significat impact due to weather, but minor schedule impact. Likelihood: likely weather could impact project timeline (minor). May need to plan ahead for lack of construction personnel	Marginal	Likely	2
Acquisition Strategy				**Maximum Project Growth**		**30%**
AS-1	Plan 01: No Action (NOT TSP)			Negligible	Unlikely	0
AS-2	Plan 05: Remove RC 1 (hollow)	* Contracting mechanism is not established (likely DBB) * Limited bid competition is anticipated (likely it may be small business)	Background: Currently - Assume design (in house) bid, build. Likely not Design Build. Small business likely (increase in cost typically). This is across the board for all components (same impact and liklihood). Impact: moderate (increase in cost mostly if small business used) Likelihood: likely	Moderate	Likely	3
AS-3	Plan 05: Remove RC 1 (nearby utilities)	* Contracting mechanism is not established (likely DBB) * Limited bid competition is anticipated (likely it may be small business)	Background/Impact/Liklihood - all the same as above (see AS-2)	Moderate	Likely	3
AS-4	Plan 05: Remove RC 1 (age of structure - historic)	* Contracting mechanism is not established (likely DBB) * Limited bid competition is anticipated (likely it may be small business)	Background/Impact/Liklihood - all the same as above (see AS-2)	Moderate	Likely	3
AS-5	Plan 05: Remove RC 2 (hollow)	* Contracting mechanism is not established (likely DBB) * Limited bid competition is anticipated (likely it may be small business)	Background/Impact/Liklihood - all the same as above (see AS-2)	Moderate	Likely	3

AS-6	Plan 05: Remove RC 2 (age of structure - historic)	* Contracting mechanism is not established (likely DBB) * Limited bid competition is anticipated (likely it may be small business)	Background/Impact/Liklihood - all the same as above (see AS-2)	Moderate	Likely	3
AS-7	Plan 05: Open SC1	* Contracting mechanism is not established (likely DBB) * Limited bid competition is anticipated (likely it may be small business)	Background/Impact/Liklihood - all the same as above (see AS-2)	Moderate	Likely	3
AS-8	Plan 05: Restore Tributary A (plantings)	* Contracting mechanism is not established (likely DBB) * Limited bid competition is anticipated (likely it may be small business)	Background/Impact/Liklihood - all the same as above (see AS-2)	Moderate	Likely	3
AS-9	Plan 05: Restore Tributary A (dirtwork)	* Contracting mechanism is not established (likely DBB) * Limited bid competition is anticipated (likely it may be small business)	Background/Impact/Liklihood - all the same as above (see AS-2)	Moderate	Likely	3
AS-10	Plan 05: Restore Tributary A (culvert removal, levee notch, and channel fill-in)	* Contracting mechanism is not established (likely DBB) * Limited bid competition is anticipated (likely it may be small business)	Background/Impact/Liklihood - all the same as above (see AS-2)	Moderate	Likely	3
AS-11	Plan 05: Reforest Sod Farm	* Contracting mechanism is not established (likely DBB) * Limited bid competition is anticipated (likely it may be small business)	Background/Impact/Liklihood - all the same as above (see AS-2)	Moderate	Likely	3
AS-12	Remaining Construction Items	* N/A		Negligible	Unlikely	0
AS-13	Planning, Engineering, & Design	* Contracting mechanism is not established	Background: As long as we stick with DBB, minor to no impact (unless we go to DB) Impact: Aslong as the design is internal, negligable impact to labor costs (increases would be due to other factors besides contracting methood) Likelihood: Unlikely project would be DB	Negligible	Unlikely	0
AS-14	Construction Management	* Increased oversight of 8A or small business prime contractor	Background: As long as we stick with DBB, minor to no impact (unless we go to DB) (small business is larger risk to increase cost for Const. Mgmt.) Impact: With internal design (for DBB), design product risk should be minimal Likelihood: It is likely that an 8A or smallbusiness ould increase the need for additional construction oversight	Moderate	Likely	3
Construction Elements				**Maximum Project Growth**		**15%**
CON-1	Plan 01: No Action (NOT TSP)			Negligible	Unlikely	0
CE-2	Plan 05: Remove RC 1 (hollow)	* Adverse weather events (e.g. flood) could impact construction progress * COVID-19 impacts on material availability (alternate materials needed)? * An above average rainy year is possible. * Easements (will it affect construction components?) * Cultural Resources/artifact concerns * Any risks that could reduce productivity?	Background: (e.g. problem getting material, labor, weather events impacts, easements (coord. w/ easement owners), will cultural survey/artifact concerns) - higher liklihood of schedule impact vs direct construction cost [same across the board]. Weather = v. minor delays. As far as cultural - schedule delay, but likely could shift work locaiton (minor schedule impact) Impact: moderate - Mostly a schedule risk, not so much a construction unit increase Likelihood: While possible, due to the type of construction (mostly removing items), any schedule delay due to weather would be "flashy" quick, short term, minimal delay in project. Minimal risk of cultural resources concerns in a structure built in 1980s and later	Negligible	Possible	0
CE-3	Plan 05: Remove RC 1 (nearby utilities)	* An above average rainy year is possible. * Adverse weather events (e.g. flood) could impact construction progress * COVID-19 impacts on material availability (alternate materials needed)? * An above average rainy year is possible. * Easements (will it affect construction components?) * Cultural Resources/artifact concerns * Any risks that could reduce productivity?	Background: Unsure if gas line is shallow and could be exposed. Gas line is not recent. Need to get as much info as possible on depth during design. If we don't get depth info - it could be more of a risk. It sounds like pipeline was put in BEFORE RC-1 (based on historical info). Need to check on ROW info for line. It is unlikely we would have depth issues based on this info. Impact: It would be noticable impact. They do infringe upon each other (close to each other) Likelihood: Possible, but unlikely based on current info.	Marginal	Possible	1
CE-4	Plan 05: Remove RC 1 (age of structure - historic)	* An above average rainy year is possible. * Adverse weather events (e.g. flood) could impact construction progress * COVID-19 impacts on material availability (alternate materials needed)? * An above average rainy year is possible. * Easements (will it affect construction components?) * Cultural Resources/artifact concerns * Any risks that could reduce productivity?	Background: It is a historic structure - unsure exactly what we will find around it (not the structure itself, but what is around it), could affect construction. Structure looks to be less than 50 years. Impact: marginal (noticable impact to construction, but only surrounding stuff) Likelihood: possible	Marginal	Possible	1
CE-5	Plan 05: Remove RC 2 (hollow)	* An above average rainy year is possible. * Adverse weather events (e.g. flood) could impact construction progress * COVID-19 impacts on material availability (alternate materials needed)? * An above average rainy year is possible. * Easements (will it affect construction components?) * Cultural Resources/artifact concerns * Any risks that could reduce productivity?	Background / Impact / Liklihood: same as CE-2	Negligible	Possible	0
CE-6	Plan 05: Remove RC 2 (age of structure - historic)	* An above average rainy year is possible. * Adverse weather events (e.g. flood) could impact construction progress * COVID-19 impacts on material availability (alternate materials needed)? * An above average rainy year is possible. * Easements (will it affect construction components?) * Cultural Resources/artifact concerns * Any risks that could reduce productivity?	Background / Impact / Liklihood: same info as CE-4	Marginal	Possible	1

CE-7	Plan 05: Open SC1	* An above average rainy year is possible. * Adverse weather events (e.g. flood) could impact construction progress * COVID-19 impacts on material availability (alternate materials needed)? * An above average rainy year is possible. * Easements (will it affect construction components?) * Cultural Resources/artifact concerns * Any risks that could reduce productivity?	Background: No major concerns over weather (short downtime). Heavy machinery in area could be a concern for cultural resources - possible. We will be crossing the gasline easment here. May be able to take that into acount during PED. Where we are digging into the levee more of a CR concern than the pipe removals. Levee constructed prior to 1940 Impact: Moderate impact for culteral resources (could delay project if artifacts found), minimal weather impact, moderate impact if easment concerns with utilities within project area Likelihood: Culteral Resources impact possible due to age of levee (and other existing construction component locations), minimal impact due to weather	Moderate	Possible	2
CE-8	Plan 05: Restore Tributary A (plantings)	* An above average rainy year is possible. * Adverse weather events (e.g. flood) could impact construction progress * COVID-19 impacts on material availability (alternate materials needed)? * An above average rainy year is possible. * Easements (will it affect construction components?) * Cultural Resources/artifact concerns * Any risks that could reduce productivity?	Background: Most likely cutural resources could cause schedule impact schedule. Weather will be flashy (over quickly). Hand planting. Typical panting depth 18" (ripping). Would be good to have cultural resourced person on site during plantings. Do we need a CR survey prior to? CAW has done a bunch of these types of things - perhaps look to them for guidance on approach. Impact: Easement more likely an impact. Hopefully could be identified during design to reduce/eliminate construction impact. CR impact moderate if artifacts found. Likelihood: Easement concerns liklihood can likely be mitigated during design, CR not very likely in plantings area (as this area has been used as a sod farm)	Moderate	Possible	2
CE-9	Plan 05: Restore Tributary A (dirtwork)	* Adverse weather events (e.g. flood) could impact construction progress * COVID-19 impacts on material availability (alternate materials needed)? * An above average rainy year is possible. * Easements (will it affect construction components?) * Cultural Resources/artifact concerns * Any risks that could reduce productivity?	Background / Impact / Liklihood: Similar to CE-8 backround/concerns, but may be digging deeper, more moving dirt around. :	Moderate	Possible	2
CE-10	Plan 05: Restore Tributary A (culvert removal, levee notch, and channel fill-in)	* Adverse weather events (e.g. flood) could impact construction progress * COVID-19 impacts on material availability (alternate materials needed)? * An above average rainy year is possible. * Easements (will it affect construction components?) * Cultural Resources/artifact concerns * Any risks that could reduce productivity?	Background / Impact / Liklihood: similar to CE-7	Moderate	Possible	2
CE-11	Plan 05: Reforest Sod Farm	* Adverse weather events (e.g. flood) could impact construction progress * COVID-19 impacts on material availability (alternate materials needed)? * An above average rainy year is possible. * Easements (will it affect construction components?) * Cultural Resources/artifact concerns * Any risks that could reduce productivity?	Background / Impact / Liklihood: see CE-8	Moderate	Possible	2
CE-12	Remaining Construction Items	* N/A		Negligible	Unlikely	0
CE-13	Planning, Engineering, & Design	* Construction modifications are anticipated as part of work.	Background: Shoud not affect initial design (easements should be done concurrently with proposed PED timeline), but slight delay on schedule if mods during construction Impact: see backround above Likelihood: concerns that would impact time/cost are not likely (some mods should be anticipated and accounted for in cost/schedule for PED)	Negligible	Unlikely	0
CE-14	Construction Management	* Construction modifications are anticipated as part of work.	Background: due to short construction durations, delays would impact project (timeline) would be noticable but minor Impact: See above Likelihood: See above	Marginal	Possible	1
Specialty Construction or Fabrication				**Maximum Project Growth**		**50%**
SC-1	Plan 01: No Action (NOT TSP)			Negligible	Unlikely	0
SC-2	Plan 05: Remove RC 1 (hollow)	* Not anticipated	* Not anticipated	Negligible	Unlikely	0
SC-3	Plan 05: Remove RC 1 (nearby utilities)	* Not anticipated	* Not anticipated	Negligible	Unlikely	0
SC-4	Plan 05: Remove RC 1 (age of structure - historic)	* Not anticipated	* Not anticipated	Negligible	Unlikely	0
SC-5	Plan 05: Remove RC 2 (hollow)	* Not anticipated	* Not anticipated	Negligible	Unlikely	0
SC-6	Plan 05: Remove RC 2 (age of structure - historic)	* Not anticipated	* Not anticipated	Negligible	Unlikely	0
SC-7	Plan 05: Open SC1	* Not anticipated	* Not anticipated	Negligible	Unlikely	0
SC-8	Plan 05: Restore Tributary A (plantings)	* Not anticipated	* Not anticipated	Negligible	Unlikely	0

SC-9	Plan 05: Restore Tributary A (dirtwork)	* Possible ACM or similar for armoring over gas line (where trib A crosses)	Background: Not really specialty construction (for Articulated Concrete Mattress (ACM)). Only significant concern is over correct installation. Impact: could increase time if not installed correctly Likelihood: unlikely (should be able to direct correct installation with design documents)	Marginal	Unlikely	0
SC-10	Plan 05: Restore Tributary A (culvert removal, levee notch, and channel fill-in)	* Not anticipated	* Not anticipated	Negligible	Unlikely	0
SC-11	Plan 05: Reforest Sod Farm	* Not anticipated	* Not anticipated	Negligible	Unlikely	0
SC-12	Remaining Construction Items	* N/A		Negligible	Unlikely	0
SC-13	Planning, Engineering, & Design		*not anticipated	Negligible	Unlikely	0
SC-14	Construction Management		*not anticipated	Negligible	Unlikely	0
Technical Design & Quantities				**Maximum Project Growth**		**20%**
T-1	Plan 01: No Action (NOT TSP)			Negligible	Unlikely	0
T-2	Plan 05: Remove RC 1 (hollow)	* Quantities based on Google Earth; site visit. * Sufficient investigations to develop quantities, e.g. topography, bathymetry, soil survey, etc.? * Additional investigations needed? e.g. above ground and below ground, any existing design plans, geotechnical. * Assumed hollow existing structure, only concrete demo accounted for.	Background: Going off of what CAW has stated. It is likely that it is hollow. Unlikly to be solid just due to economics to build. It would be a good idea to confirm assumption Impact: If it is solid - cost and time (quantities, method of construction, time) would need to be revised. Likelihood: Not likely based on current knowledge (what we have been told and economics to build)	Significant	Possible	3
T-3	Plan 05: Remove RC 1 (nearby utilities)	* Quantities based on Google Earth; site visit. * Sufficient investigations to develop quantities, e.g. topography, bathymetry, soil survey, etc.? * Additional investigations needed? e.g. above ground and below ground, any existing design plans, geotechnical. * Assumed hollow existing structure, only concrete demo accounted for.	Background: see discussions above on utilities. We have not yet coordinated with gas company on this project - so impact is unknown, but likely minor Impact: Depending on the utility - the impact could be noticable (moderate), but if this is investigated during design, the possible impacts should be reduced (vs. if we are suprosed in the field with a utility that has not been coordinated with). Likelihood: Minor as long as it is investigated during design and there is good documentation of utility locaitons.	Moderate	Possible	2
T-4	Plan 05: Remove RC 1 (age of structure - historic)	* Quantities based on Google Earth; site visit. * Sufficient investigations to develop quantities, e.g. topography, bathymetry, soil survey, etc.? * Additional investigations needed? e.g. above ground and below ground, any existing design plans, geotechnical. * Assumed hollow existing structure, only concrete demo accounted for.	Background / Impact / Liklihood: n/a for design/quantities :	Negligible	Unlikely	0
T-5	Plan 05: Remove RC 2 (hollow)	* Quantities based on Google Earth; site visit. * Sufficient investigations to develop quantities, e.g. topography, bathymetry, soil survey, etc.? * Additional investigations needed? e.g. above ground and below ground, any existing design plans, geotechnical. * Assumed hollow existing structure, only concrete demo accounted for.	Background / Impcat / Liklihood: same as T-2	Significant	Possible	3
T-6	Plan 05: Remove RC 2 (age of structure - historic)	* Quantities based on Google Earth; site visit. * Sufficient investigations to develop quantities, e.g. topography, bathymetry, soil survey, etc.? * Additional investigations needed? e.g. above ground and below ground, any existing design plans, geotechnical. * Assumed hollow existing structure, only concrete demo accounted for.	Background / Impact / Liklihood: same as T-4	Negligible	Unlikely	0
T-7	Plan 05: Open SC1	* Quantities based on Google Earth; site visit. * Sufficient investigations to develop quantities, e.g. topography, bathymetry, soil survey, etc.? * Additional investigations needed? e.g. above ground and below ground, any existing design plans, geotechnical.	Background / Impact / Liklihood: no changes (have enough confidence in design/quantities)	Negligible	Unlikely	0
T-8	Plan 05: Restore Tributary A (plantings)	* Quantities based on Google Earth; site visit. * Sufficient investigations to develop quantities, e.g. topography, bathymetry, soil survey, etc.? * Additional investigations needed? e.g. above ground and below ground, any existing design plans, geotechnical. * Assumed hollow existing structure, only concrete demo accounted for.	Background / Impact / Liklihood: same as T-7	Negligible	Unlikely	0
T-9	Plan 05: Restore Tributary A (dirtwork)	* Quantities based on Google Earth; site visit. * Additional investigations needed? e.g. above ground and below ground, any existing design plans, geotechnical.	Background / Impact / Liklihood: same as T-7	Negligible	Unlikely	0
T-10	Plan 05: Restore Tributary A (culvert removal, levee notch, and channel fill-in)	* Quantities based on Google Earth; site visit. * Additional investigations needed? e.g. above ground and below ground, any existing design plans, geotechnical.	Background / Impact / Liklihood: same as T-7	Negligible	Unlikely	0

T-11	Plan 05: Reforest Sod Farm	* Quantities based on Google Earth; site visit. * Additional investigations needed? e.g. above ground and below ground, any existing design plans, geotechnical.	Background / Impact / Liklihood: same as T-7	Negligible	Unlikely	0
T-12	Remaining Construction Items	* N/A		Negligible	Unlikely	0
T-13	Planning, Engineering, & Design	* Potential for modifications due to changes in quantities	Background: PED will get survey, soils, etc., coord. w gas pipeline - already accounting for these costs - so we are good Impact: Negligable increase in time/labor costs due to changes in quantities Likelihood: Unlikely as sufficient time should be determined at the beginning of the project.	Negligible	Unlikely	0
T-14	Construction Management	* Potential for modifications due to changes in quantities	Background / Impcat / Liklihood: n/a	Negligible	Unlikely	0
Cost Estimate Assumptions				**Maximum Project Growth**		**25%**
EST-1	Plan 01: No Action (NOT TSP)			Negligible	Unlikely	0
EST-2	Plan 05: Remove RC 1 (hollow)	* Assumed haul/source for site demo (conc needs to be hauled off, trees/brush can be stockpiled onsite) and gravel for temp road.	Background: Maybe concrete doesn't need to be hauled off? Could be lower cost. Needs to be investigated during design. Impact: Small enough quantities that impat would be minor Likelihood: Based on current knowledge, it is not likely, assuming concrete needs ot be hauled off is a safe, conservative assumption	Negligible	Unlikely	0
EST-3	Plan 05: Remove RC 1 (nearby utilities)	* Assumed haul/source for site demo (conc needs to be hauled off, trees/brush can be stockpiled onsite) and gravel for temp road.	Background / Impcat / Liklihood : See EST-1	Negligible	Unlikely	0
EST-4	Plan 05: Remove RC 1 (age of structure - historic)	* Assumed haul/source for site demo (conc needs to be hauled off, trees/brush can be stockpiled onsite) and gravel for temp road.	Background / Impcat / Liklihood : See EST-1	Negligible	Unlikely	0
EST-5	Plan 05: Remove RC 2 (hollow)	* Assumed haul/source for site demo (conc & pipes need to be hauled off, trees/brush can be stockpiled onsite) and gravel for temp road. *Majority of costs are due to path to get to site (clear/grub, gravel road)	Background / Impcat / Liklihood : Also assumed additional bank protection in estimate. Also see EST-1	Negligible	Unlikely	0
EST-6	Plan 05: Remove RC 2 (age of structure - historic)	* Assumed haul/source for site demo (conc & pipes need to be hauled off, trees/brush can be stockpiled onsite) and gravel for temp road. *Majority of costs are due to path to get to site (clear/grub, gravel road)	Background / Impcat / Liklihood : Also assumed additional bank protection in estimate. Also see EST-1	Negligible	Unlikely	0
EST-7	Plan 05: Open SC1	* Assumed haul/source for site demo (conc & pipes need to be hauled off, trees/brush can be stockpiled onsite) and gravel for temp road. *Majority of costs are due to path to get to site (clear/grub, gravel road)	Background / Impcat / Liklihood: see EST-1 (should be good)	Negligible	Unlikely	0
EST-8	Plan 05: Restore Tributary A (plantings)	* Assumed haul/source for site demo (conc & pipes need to be hauled off, trees/brush can be stockpiled onsite) and gravel for temp road. *Minor amount of costs are due to path to get to site (clear/grub, gravel road) * Assume hydroseed & fertilize (no mulch) for EC along side of Trib A. * Significant portion of costs is dirtwork (trib A rehab) * Removing culverts and blocking ditches are minor cost *Replanting trees is a significant cost (includes watering for establishment), Ripping costs per Ducks Unlimited, ERDC, and CAW. *Includes monitoring and AM costs	Background: May need to include fuel cost changes, possible material market cost increases? Tree prices steady over past 20 yrs. Impact: While noticable, the impact of material pricing volitility on this type of work is negligable Likelihood: Unlikley that the changes would significantly affect price.	Negligible	Unlikely	0
EST-9	Plan 05: Restore Tributary A (dirtwork)	* Assumed haul/source for site demo (conc & pipes need to be hauled off, trees/brush can be stockpiled onsite) and gravel for temp road. *Minor amount of costs are due to path to get to site (clear/grub, gravel road) * Assume hydroseed & fertilize (no mulch) for EC along side of Trib A. * Significant portion of costs is dirtwork (trib A rehab) * Removing culverts and blocking ditches are minor cost *Replanting trees is a significant cost (includes watering for establishment), Ripping costs per Ducks Unlimited, ERDC, and CAW. *Includes monitoring and AM costs	Background / Impcat / Liklihood: see EST-8	Negligible	Unlikely	0
EST-10	Plan 05: Restore Tributary A (culvert removal, levee notch, and channel fill-in)	* Assumed haul/source for site demo (conc & pipes need to be hauled off, trees/brush can be stockpiled onsite) and gravel for temp road. *Minor amount of costs are due to path to get to site (clear/grub, gravel road) * Assume hydroseed & fertilize (no mulch) for EC along side of Trib A. * Significant portion of costs is dirtwork (trib A rehab) * Removing culverts and blocking ditches are minor cost *Replanting trees is a significant cost (includes watering for establishment), Ripping costs per Ducks Unlimited, ERDC, and CAW. *Includes monitoring and AM costs	Background / Impcat / Liklihood: see EST-8	Negligible	Unlikely	0
EST-11	Plan 05: Reforest Sod Farm	* Assumed haul/source for site demo (conc & pipes need to be hauled off, trees/brush can be stockpiled onsite) and gravel for temp road. *Replanting trees is majority of cost (includes watering for establishment), Ripping costs per Ducks Unlimited, ERDC, and CAW. *Includes monitoring and AM costs	Background / Impcat / Liklihood: see EST-8	Negligible	Unlikely	0

EST-12	Remaining Construction Items	* N/A		Negligible	Unlikely	0
EST-13	Planning, Engineering, & Design	* Changes in construction method	Background: may need to include soil survey, that would be an additional cost Impact: Additional PED cost would be minimal Likelihood: Unlikely soil survey is needed or significan change in construction method	Negligible	Unlikely	0
EST-14	Construction Management	* Changes in construction method	Background: Change in construction method , if it happens would have little to no effect on cost or schedule. Impact: minimal to none per above. Likelihood: Once design determined, construction method will be more focused, so minimal chance of being changed.	Negligible	Unlikely	0
External Project Risks				**Maximum Project Growth**		**20%**
EX-1	Plan 01: No Action (NOT TSP)			Negligible	Unlikely	0
EX-2	Plan 05: Remove RC 1 (hollow)	* Unanticipated environmental/wildlife concerns (Craig H.) ** COVID-19 (or general) impacts on personnel (availability) and schedule * Political influences, lack of support, obstacles? (PDT) * Unanticipated inflations in fuel, key materials? * Potential for market volatility impacting competition, pricing? * Funding Constraints	Background: COVID-19 is the highest risk of the external project risks. There may be a few new animal species that have habitat in the area being added to species of concern, but that would likely have only a minimal impact on project. Currently, CAW is in favor of project, and we do not anticipate any political pushback on project. Impact: (COVID-19) Potential lack of personnel to do work, potential fuel cost increases (higher liklihood, funding constraints). Material pricing volitility may have some impact on the project, but minumal. Most of the materials required for this project are not very volitile (no concrete, steel, wood). Likelihood: Possible this project could be affected, but not likely (esp. with consruction not being anticipated for more than a year)	Significant	Possible	3
EX-3	Plan 05: Remove RC 1 (nearby utilities)	* Unanticipated environmental/wildlife concerns * COVID-19 impacts on personnel (availability) and schedule * Political influences, lack of support, obstacles? * Unanticipated inflations in fuel, key materials? * Potential for market volatility impacting competition, pricing? * Funding Constraints	Background / Impact / Liklihood: see EX-2	Significant	Possible	3
EX-4	Plan 05: Remove RC 1 (age of structure - historic)	* Unanticipated environmental/wildlife concerns * COVID-19 impacts on personnel (availability) and schedule * Political influences, lack of support, obstacles? * Unanticipated inflations in fuel, key materials? * Potential for market volatility impacting competition, pricing? * Funding Constraints	Background / Impact / Liklihood: see EX-2	Significant	Possible	3
EX-5	Plan 05: Remove RC 2 (hollow)	* Unanticipated environmental/wildlife concerns * COVID-19 impacts on personnel (availability) and schedule * Political influences, lack of support, obstacles? * Unanticipated inflations in fuel, key materials? * Potential for market volatility impacting competition, pricing? * Funding Constraints	Background / Impact / Liklihood: see EX-2	Significant	Possible	3
EX-6	Plan 05: Remove RC 2 (age of structure - historic)	* Unanticipated environmental/wildlife concerns * COVID-19 impacts on personnel (availability) and schedule * Political influences, lack of support, obstacles? * Unanticipated inflations in fuel, key materials? * Potential for market volatility impacting competition, pricing? * Funding Constraints	Background / Impact / Liklihood: see EX-2	Significant	Possible	3
EX-7	Plan 05: Open SC1	* Unanticipated environmental/wildlife concerns * COVID-19 impacts on personnel (availability) and schedule * Political influences, lack of support, obstacles? * Unanticipated inflations in fuel, key materials? * Potential for market volatility impacting competition, pricing? * Funding Constraints	Background / Impact / Liklihood: see EX-2	Moderate	Possible	2
EX-8	Plan 05: Restore Tributary A (plantings)	* Unanticipated environmental/wildlife concerns * COVID-19 impacts on personnel (availability) and schedule * Political influences, lack of support, obstacles? * Unanticipated inflations in fuel, key materials? * Potential for market volatility impacting competition, pricing? * Funding Constraints	Background / Impact / Liklihood: see EX-2	Moderate	Possible	2
EX-9	Plan 05: Restore Tributary A (dirtwork)	* Unanticipated environmental/wildlife concerns * COVID-19 impacts on personnel (availability) and schedule * Political influences, lack of support, obstacles? * Unanticipated inflations in fuel, key materials? * Potential for market volatility impacting competition, pricing? * Funding Constraints	Background / Impact / Liklihood: see EX-2	Moderate	Possible	2
EX-10	Plan 05: Restore Tributary A (culvert removal, levee notch, and channel fill-in)	* Unanticipated environmental/wildlife concerns * COVID-19 impacts on personnel (availability) and schedule * Political influences, lack of support, obstacles? * Unanticipated inflations in fuel, key materials? * Potential for market volatility impacting competition, pricing? * Funding Constraints	Background / Impact / Liklihood: see EX-2	Moderate	Possible	2
EX-11	Plan 05: Reforest Sod Farm	* Unanticipated environmental/wildlife concerns * COVID-19 impacts on personnel (availability) and schedule * Political influences, lack of support, obstacles? * Unanticipated inflations in fuel, key materials? * Potential for market volatility impacting competition, pricing? * Funding Constraints	Background / Impact / Liklihood: see EX-2	Moderate	Possible	2
EX-12	Remaining Construction Items	* N/A		Negligible	Unlikely	0

EX-13	Planning, Engineering, & Design		Background: due to telework, etc. impact not very much Impact: Minimal impact due to ability of design workforce to telework. Likelihood: Based on existing surges, COVID could impact the project	Marginal	Unlikely	**0**
EX-14	Construction Management		Background: although they need ot be onsite- outdoors is safer (COVID-19), SIOH is lightly riskier that PED Impact: Working outdoors can increase the chances of being able to socially distance, so impact is minimal Likelihood: Based on existing surges, COVID could impact the project	Marginal	Possible	**1**