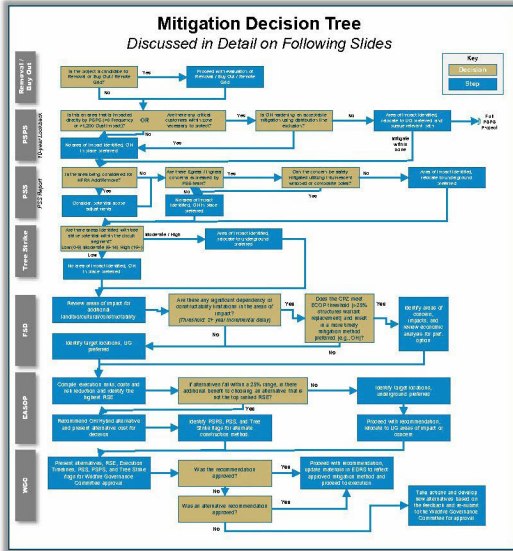


Wildfire Risk Governance Committee
System Hardening Project Approvals

February 4, 2021

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Guiding Principles

The **primary purpose** of the system hardening program is to **reduce wildfire risk**

Other risk factors will be address as targets of opportunity:

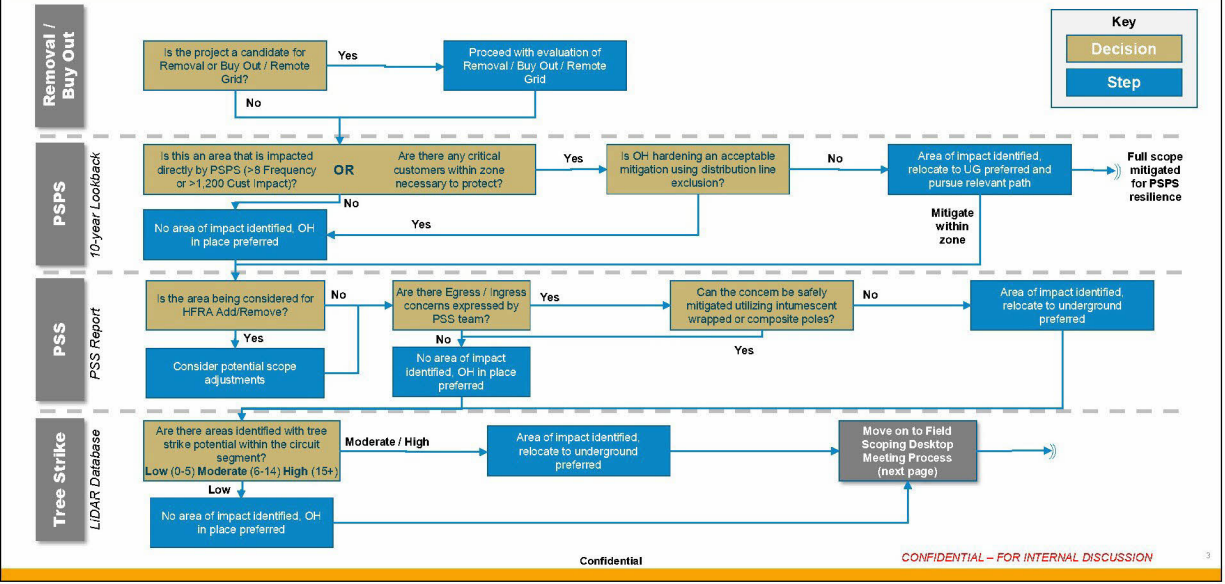
- Where possible, the selected mitigation may be enhanced to **reduce the impacts of PSPS to customers**
- **EC tag concentration can trigger a system hardening project** due to the increased risk not captured in the wildfire risk model
- All hardening **projects will address any EC tags** that fall within the scope of the job

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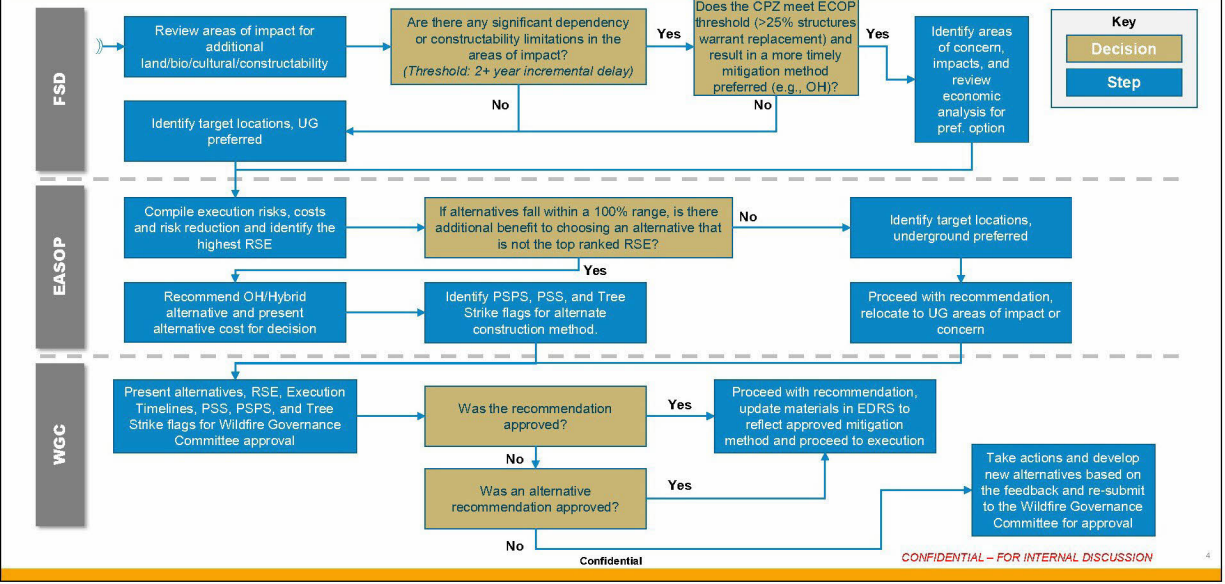
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System Harding Decision Tree (1 of 2)



System Harding Decision Tree (2 of 2)



The decision tree will be stress tested using the following mitigation level project approvals

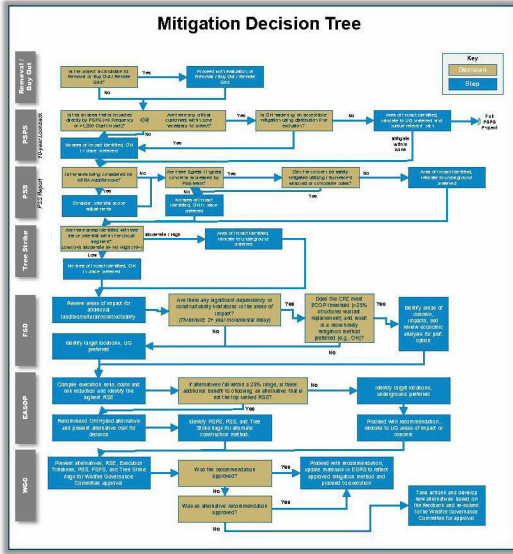
The following 3 projects are for discussion today:

Order No.	CPZ	Work Bucket	Total MAVF Core Risk Value	Mean MAVF Core Risk Rank	Recommendation	WGC Request
WGC Decision						
1	CLAYTON	ECOP	32.63	377	Hybrid (OH/UG)	Decision
2	Bucks Creek 1101CB	CWSP - Top 50	9.55	11	Hybrid (OH/UG)	Decision
WGC Inform						
3	Volta	CWSP - Top 250	13	39	OH	Inform

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Key Questions		Outcome	
PPSP	Is this an area that is impacted directly by PPS (>8 Frequency or >1,200 Cust Impact)?	Y	N
	Are there any critical customers within zone necessary to protect?	Y	N
	Is OH hardening an acceptable mitigation using distribution line exclusion?	Y	N
PSS	Is the area being considered for HFRA Add/Remove?	Y	N
	Ingress/Egress concerns identified by PSS professionals cannot be mitigated by utilizing intumescent wrapped or composite poles.	Y	N
Tree Strike	Moderate (6-14) or high (15+) strike tree potential areas in the segment.	Y	N
FSD	Are there any significant dependency or constructability limitations in the areas of impact? (Threshold: 2+ year incremental delay)	Y	N
	Does the CPZ meet ECOP threshold (>25% structures warrant replacement) and result in a more timely mitigation method preferred (e.g., OH)?	Y	N
EASOP	If alternatives fall within a 100% range, is there additional benefit to choosing an alternative that is not the top ranked RSE?	Y	N
		Hybrid Preferred	

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Decision: ECOP Top 20% - PM [REDACTED] – Clayton [REDACTED] H01

Clayton 2212 (1.42 Miles)		No System Hardening	Overhead Hardening	Under-grounding	Hybrid
Project Scope Risk Reduced After Mitigation		-	1.48	2.36	1.99
Project Scope Residual Risk Value		2.39	0.91	0.03	0.40
Overall Miles Installed		-	1.42	3.15	2.82
OH System Hardening Cost ([REDACTED]/mile)		-	[REDACTED]		
UG System Hardening Cost ([REDACTED] mile)		-	[REDACTED]		
Line Removal Cost		-	[REDACTED]		
Total Capital Cost		[REDACTED]	[REDACTED]		
Average O&M Cost (per year)		[REDACTED]	[REDACTED]		
NPV @ 6.8% discount rate		[REDACTED]	[REDACTED]		
Primary Filter	\$ NPV per unit of risk (RSE)	-			
	PSS Preference (Ingress/egress/fire history)	Not Preferred	Satisfactory	Preferred	Satisfactory
Secondary Filter	Strike Tree Potential	Moderate Fall-in Risk	Low Fall-in Risk	N/A	Low Fall-in Risk
	Ingress/Egress – Preferred option	Moderate	Not Preferred	Preferred	Satisfactory
	PSPS Mitigation (26 Customers)	26 / 26 (0%)	26 / 26 (0%)	26 / 26 (0%)	26 / 26 (0%)
	Execution timeline (2021, 2022, 2022+)	-	2021	2022+	2022+

Recommended

Supporting Detail for Recommended Alternative (EDRS Routing 2021-02769):

- Public Safety Specialist: Surrounded by grass oak. Population density is low. The area around this project has some fire history. Preference for action to be taken based on increased risk of ignition on tagged equipment.
- Strike Tree Potential: 636 total strike potential trees in the CPZ, LOW (0-5) tree strike potential in this segment does not suggest UG hardening is required.
- Egress Considerations: This road is not a main thoroughfare on a daily basis but is a route of egress for citizens from the Clayton Valley area when fire impacts the Clayton Valley area. The road is used for ingress for fire and emergency services from the south.
- PSPS Mitigation: No mitigation potential due to limited scope of this hardening project; no critical / essential customers in this segment. To achieve PSPS reductions, additional scope would have to be included.
- Execution Timeline (Land/Bio/Cultural/Constructability): OH hardening could be accomplished by 12/31/2021; 1.2 miles of CA red-legged frog habitat, CA tiger salamander, and Alameda Whipsnake; Pre-activity survey for cultural constraints (more significant impact for UG options); UG options include additional cost for easements, soil conditions, & expected bio risk.

Key Decision – Approval to Execute ECOP projects

Approval Status	PENDING
------------------------	---------

Decision Detail
Request that this scoped project is approved as a Hybrid (OH/UG) hardened facilities as determined by the Field Scoping Team.
EDRS – 2021-02769

Concerns and Mitigations

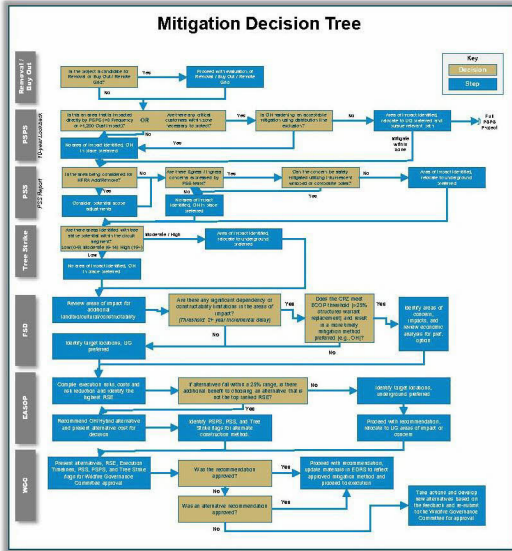
Approvals	
[Redacted]	

Action Items and Validations	

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	Key Questions	Outcome		
PPSPS	Is this an area that is impacted directly by PPS (>8 Frequency or >1,200 Cust Impact)?	Y	N	9 events, UG Preferred
	Are there any critical customers within zone necessary to protect?	Y	N	
PSS	Is OH hardening an acceptable mitigation using distribution line exclusion?	Y	N	N/A
	Is the area being considered for HFRA Add/Remove?	Y	N	
Tree Strike	Ingress/Egress concerns identified by PSS professionals cannot be mitigated by utilizing intumescent wrapped or composite poles.	Y	N	HWY 70, UG preferred
	Moderate (6-14) or high (15+) strike tree potential areas in the segment.	Y	N	
FSD	Are there any significant dependency or constructability limitations in the areas of impact? (Threshold: 2+ year incremental delay)	Y	N	
	Does the CPZ meet ECOP threshold (>25% structures warrant replacement) and result in a more timely mitigation method preferred (e.g., OH)?	Y	N	
EASOP	If alternatives fall within a 100% range, is there additional benefit to choosing an alternative that is not the top ranked RSE?	Y	N	PPSPS and Ingress/Egress
				Hybrid 1 Preferred

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Bucks Creek 1101 (4.73 miles)		No System Hardening	Overhead Hardening	Hybrid 1	Hybrid 2
Project Scope Risk Reduced After Mitigation		-	4.73	4.99	4.02
Project Scope Residual Risk Value		9.55	3.63	0.13	0.61
Overall Miles Installed		4.73	[REDACTED]		
OH System Hardening Cost (\$ /risk-mile mitigated)		-			
UG System Hardening Cost (\$ /risk-mile mitigated)		-			
Line Removal Cost (\$ /risk-mile mitigated)		-			
Total Capital Cost (AACE Class 5)		-			
Average O&M Cost (per year)		-			
NPV @ 6.8% discount rate		-			
Primary Filter	\$ NPV per unit of risk (RSE)	-			
	PSS Preference (Ingress/egress/fire history)	-	Non-satisfactory	Satisfactory	Non-satisfactory
Secondary Filter	Strike Tree Potential	Moderate Fall-In Risk	Low Fall-In Tree Risk	Low Fall-In Tree Risk	Low Fall-In Tree Risk
	Ingress / Egress	Moderate	Non-satisfactory	Satisfactory	Non-satisfactory
	PSPS Mitigation (5 customers)	45 / 45 (0%)	45 / 45 (0%)	45 / 45 (0%)	45 / 45 (0%)
	Execution timeline (2021, 2022, 2022+)	-	2021	2022+	2022+
	Other (Operational Considerations, etc.)	-	-	-	-
Recommended					

Supporting Detail for Recommended Alternative (EDRS Link 2021-03744):

- **Public Safety Specialist:** Fuel types are consistent with moderate to heavy brush and mixed conifer, however the general area has been heavily fire scarred and the fire scar areas are intermixed with a significant amount of standing and down dead fuel.
- **Strike Tree Potential:** 105 total strike potential trees in the CPZ. Moderate (6-15) tree strike potential.
- **Egress Considerations:** This project crosses HWY 70 near the Bucks Creek Powerhouse and then parallels the highway for a roughly 2-mile stretch, and then runs along Storrie Rd. paralleling the Feather River on the canyon opposite side of Highway 70. HWY 70 is a main thoroughfare for ingress/egress for emergency responders and to the few residents who live in that direct area; it is also a major route for commerce both by vehicle and railroad. If Highway 70 was closed in this area it would make ingress and egress difficult; if not impossible for responders and citizens and economically be a substantial hit to commerce. There are no alternative routes within the Feather River Canyon.
- **PSPS Mitigation:** No mitigation potential due to limited scope of this hardening project; no critical / essential customers in this segment. Cannot achieve PSPS reduction due to required overhead conductor over the water crossing near the substation.
- **Execution Timeline (Land/Bio/Cultural/Constructability):** Work required during the dry season (May 15 – Oct 15) and/or biomonitoring, and potential Heli restrictions (Feb 2 – July 15) due to owl activity centers. CALTRANS ROW, easement restrictions, and 1 culturally sensitive areas in Hybrid 1. Butte work further down HWY 70 is undergrounding line consistent with the Hybrid 1 alternative.

Key Decision – Approval to Execute CWSP Top 250 projects

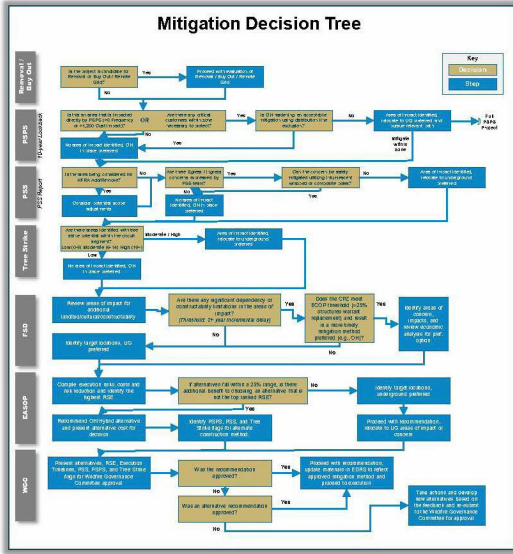
Approval Status	PENDING
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Decision Detail
Request that this scoped project is approved as a Hybrid (OH/UG) hardened facilities as determined by the Field Scoping Team.
EDRS – [2021-03744](#)

Concerns and Mitigations

Approvals	

Action Items and Validations	



Key Questions		Outcome	
PPSPS	Is this an area that is impacted directly by PPS (>8 Frequency or >1,200 Cust Impact)?	Y	N
	Are there any critical customers within zone necessary to protect?	Y	N
	Is OH hardening an acceptable mitigation using distribution line exclusion?	Y	N
PSS	Is the area being considered for HFRA Add/Remove?	Y	N
	Ingress/Egress concerns identified by PSS professionals cannot be mitigated by utilizing intumescent wrapped or composite poles.	Y	N
Tree Strike	Moderate (6-14) or high (15+) strike tree potential areas in the segment.	Y	N
	Are there any significant dependency or constructability limitations in the areas of impact? (Threshold: 2+ year incremental delay)	Y	N
FSD	Does the CPZ meet ECOP threshold (>25% structures warrant replacement) and result in a more timely mitigation method preferred (e.g., OH)?	Y	N
	If alternatives fall within a 100% range, is there additional benefit to choosing an alternative that is not the top ranked RSE?	Y	N
		OH Preferred	

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	Volta 1101 (3.55 miles)	No System Hardening	Overhead Hardening	Under-grounding	Hybrid
Project Scope Risk Reduced After Mitigation	-	-	8.06	12.87	10.79
Project Scope Residual Risk Value	13	13	4.94	0.13	2.21
Overall Miles Installed	3.55	3.55	3.55	6.66	5.29
OH System Hardening Cost (risk-mile mitigated)	-	-	-	-	-
UG System Hardening Cost (risk-mile mitigated)	-	-	-	-	-
Line Removal Cost	-	-	-	-	-
Total Capital Cost (AACE Class 5)					
Average O&M Cost (per year)					
NPV @ 6.8% discount rate					
Primary Filter	NPV per unit of risk (RSE)	-	-	-	-
	PSS Preference (Ingress/egress/fire history)	-	Satisfactory		
Secondary Filter	Strike Tree Potential	Low Fall-In Risk	Low Fall-In Risk	N/A	Low Fall-In Risk
	Ingress / Egress	LOW	Satisfactory	Satisfactory	Satisfactory
	PSPS Mitigation (19 customers)	38 / 38 (0%)	38 / 38 (0%)	38 / 38 (0%)	38 / 38 (0%)
	Execution timeline (2021, 2022, 2022+)	-	2021	2022+	2022+
	Other (Operational Considerations, etc.)	-	-	-	-
			Recommended		

Supporting Detail for Recommended Alternative (EDRS Link [2021-03779](#)):

- **Public Safety Specialist:** Fuel types are consistent with mainly grass/oak woodland, brush, and intermixed patches of conifers/Gray Pints. Area has a significant fire history but not directly in the project footprint but shows the ability of the area fuels to resist containment and become a major fire.
- **Strike Tree Potential:** 2 total strike potential trees in the CPZ, LOW (0-5) tree strike potential in this segment does not suggest UG hardening is required. Tx under-build for most of job.
- **Egress Considerations:** Evacuees have multiple ways out of the area, depending on the location of the fire. 1st responders will have 2 access roads.
- **PSPS Mitigation:** No mitigation potential due to limited scope of this hardening project; no critical / essential customers in this segment. To achieve PSPS reductions, additional scope would have to be included. 2 PSPS operations in 10-year lookback.
- **Execution Timeline (Land/Bio/Cultural/Constructability):** Work required during the dry season (May 15 – Oct 15) and/or biomonitoring. Mitigation expenses should be considered for ground disturbance. Potential permitting for multiple waterways. Tribal monitoring may be required. Cultural resources work and reporting may need be required, 1-2 days of SME time.

Key Decision – Approval of System Hardening Decision Tree

Approval Status	PENDING
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Decision Detail
<p>Request that the System Hardening Decision tree be approved to streamline the mitigation approval process. Key tenets of the decision include:</p> <ul style="list-style-type: none"> • System Hardening Team will leverage the decision tree in all mitigation scoping discussions • Any jobs clearly defined by the decision tree logic will come to the committee as an inform • All jobs which are "on the edge" or require exceptions to the decision tree will be brought to the committee for approval

Concerns and Mitigations
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Approvals	
	Support
	Support
	Support
	Support
	Support
	Abstain – Not present

Action Items and Validations	
Guiding Principles	Clearly articulate the guiding principles for the system hardening program
Continuous Improvement	As we move forward, look for opportunities to quantify (where possible) the criteria and develop a normalized scoring
RSE Threshold	Update RSE threshold to 100%
EC Tags	Clearly articulate the thresholds

EC Tag Optimization Program

EC Optimization Program Hardening Review Process

1. Review Circuit Protection Zone for potential hardening areas using the following searches/criteria:
 - a. Review EC Tags along Circuit Protection Zone for clustering of tags with the following Object Types:
 - Poles
 - Crossarms
 - Transformer
 - Insulators
 - b. Review Data for concentrations of EC Tags within the same Automatic Source Side Device (ASSD)
2. Count the total number of poles within the potential hardening zone
3. Determine the probable structure impact factor using the probable structure impact factor (table below).

TAG TYPE	PROBABLE POLES TO BE REPLACED	NOTES
Pole Replacement	1 pole	
Oil Filled Equipment Replacement	1 pole	Count only if not associated with a structure above
Splice Count	1.5 poles	1.5 if not adjacent to pole/transformer tags
Insulator / Cross Arm Replacement	0.4 poles	Count only if not associated with a structure above

EC Optimization Results

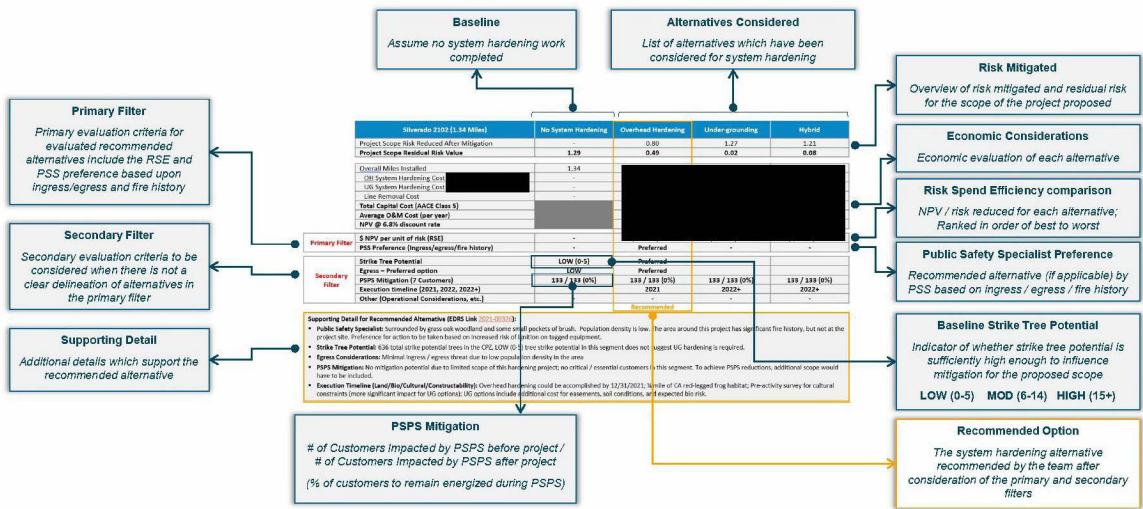
	>25% Impacted Structures	<25% Impacted Structures
>400 CPZ Priority	Consider designating entire CPZ as potential hardening Area	Review mainlines and taps for potential <2 miles hardening projects that affect greater than 50% structure impact criteria
<400 CPZ Priority	CPZ hardening criteria may <u>not</u> apply	Review mainlines and taps that meet greater than 50% structure impact and consider proposals to extend

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System Hardening Decision Framework Overview



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