

Ridgefield Pits Meeting

Restoration Alternatives

Welcome

Please mute to start

Send comments via chat

Let us know if you are having any issues

Meeting Organizer

Paul Kolp- Lower Columbia Estuary Partnership

AGENDA

- Greetings & Recap
- Designs will be developed at **three** locations 1) Ridgefield Pits 2) upstream along mainstem and two side-channels and 3) Mill- Manley confluence (thermal refuge for all species/life history stages)
- Draft Restoration Alternatives Memo- Comments
- Draft Restoration Alternatives -Poll
- Discussion
- Restoration alternatives to be advanced to the modeling phase
- Next steps and target dates- hydraulic modeling, selection of the preferred alternative(s) and preliminary designs

Restoration Alternatives

- Restoration Alternatives Memo (July)
- Common themes that emerged from Comments
 - The “**do nothing**” approach is not acceptable
 - **The Pits** are the highest priority
 - **Restoration** should rely on natural processes & acknowledge that river will move in response to sediment, hydrology and biological processes. Approaches to fix the river in one location aren’t desirable
 - **Restoration costs** should not determine future efforts
 - **Habitat**- Increase *spawning and rearing* habitat, increase the *channel migration zone* to the highest extent possible, increase *floodplain connectivity* & increase/protect *cold water* refuges

Restoration Alternatives

- **Other ideas**

- Hybrids of Alternative 2 and 3
- Open up historic channels
- Consider future efforts into Daybreak Pits Area
- Greater activation of side channel seasonally

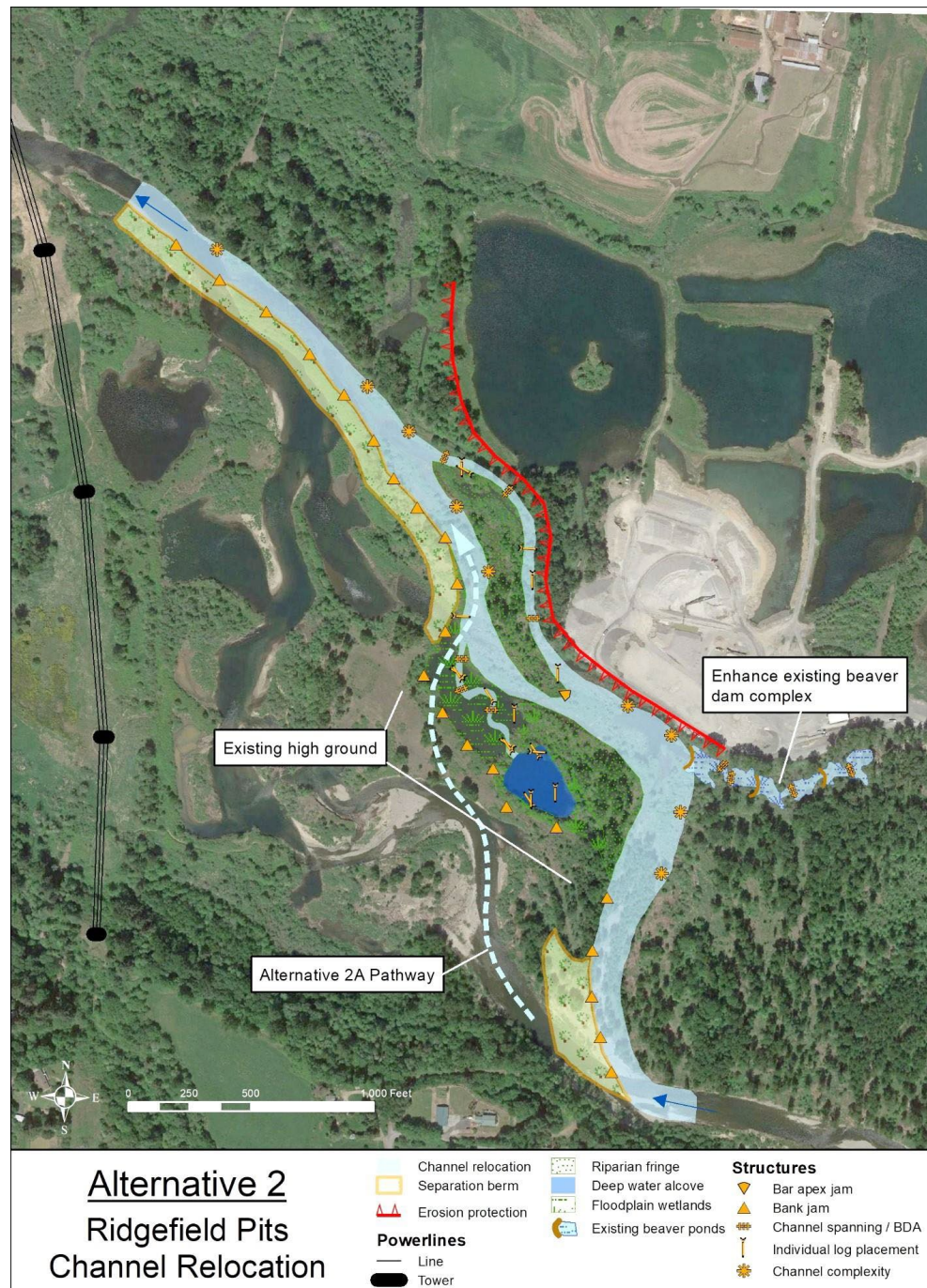
- **Concerns**

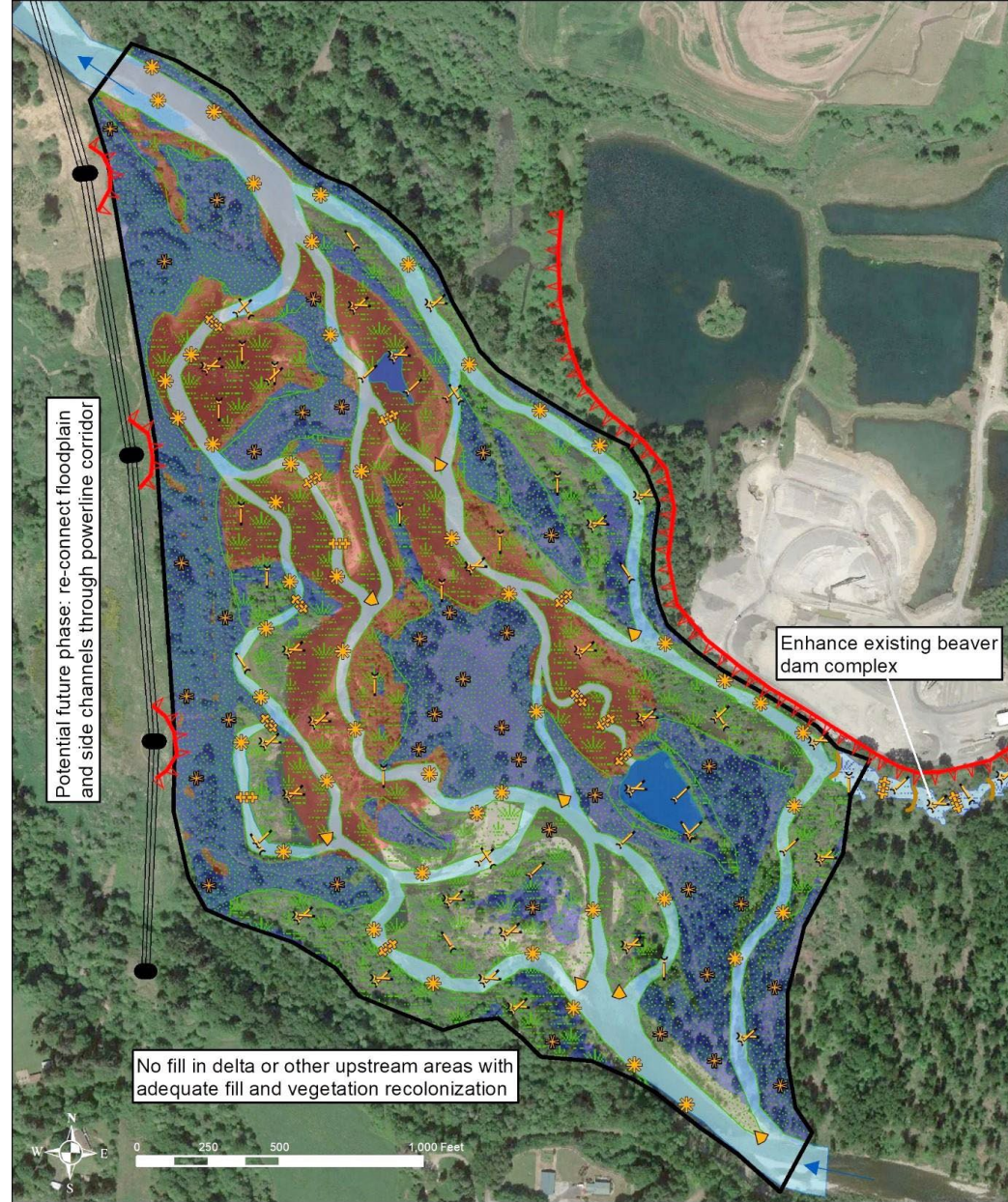
- Erosion along cliff's needs to be accounted for
- Trying to create a single thread channel has been problems
- Sedimentation rates are high
- Width:depth ratios are high
- Warm river temperatures
- Don't rely on engineering strategies to bring in cold water
- How to plant/ensure better future riparian conditions

Restoration Alternatives Poll

- Members ranked (H/M/L) Alternatives

	High	Medium	Low
Alternative 1	0	0	14
Alternative 2	2	1	11
Alternative 2a	3	1	10
Alternative 3	11	1	2
Alternative 3a	8	3	3
Alternative 4	6	7	1
Alternative 5	4	8	2
Alternative 6	7	6	1





Alternative 3

Full Ridgefield Pits Regrade

Powerlines

- Line
- Tower

Grading

- Grading extent
- Cut
- Fill

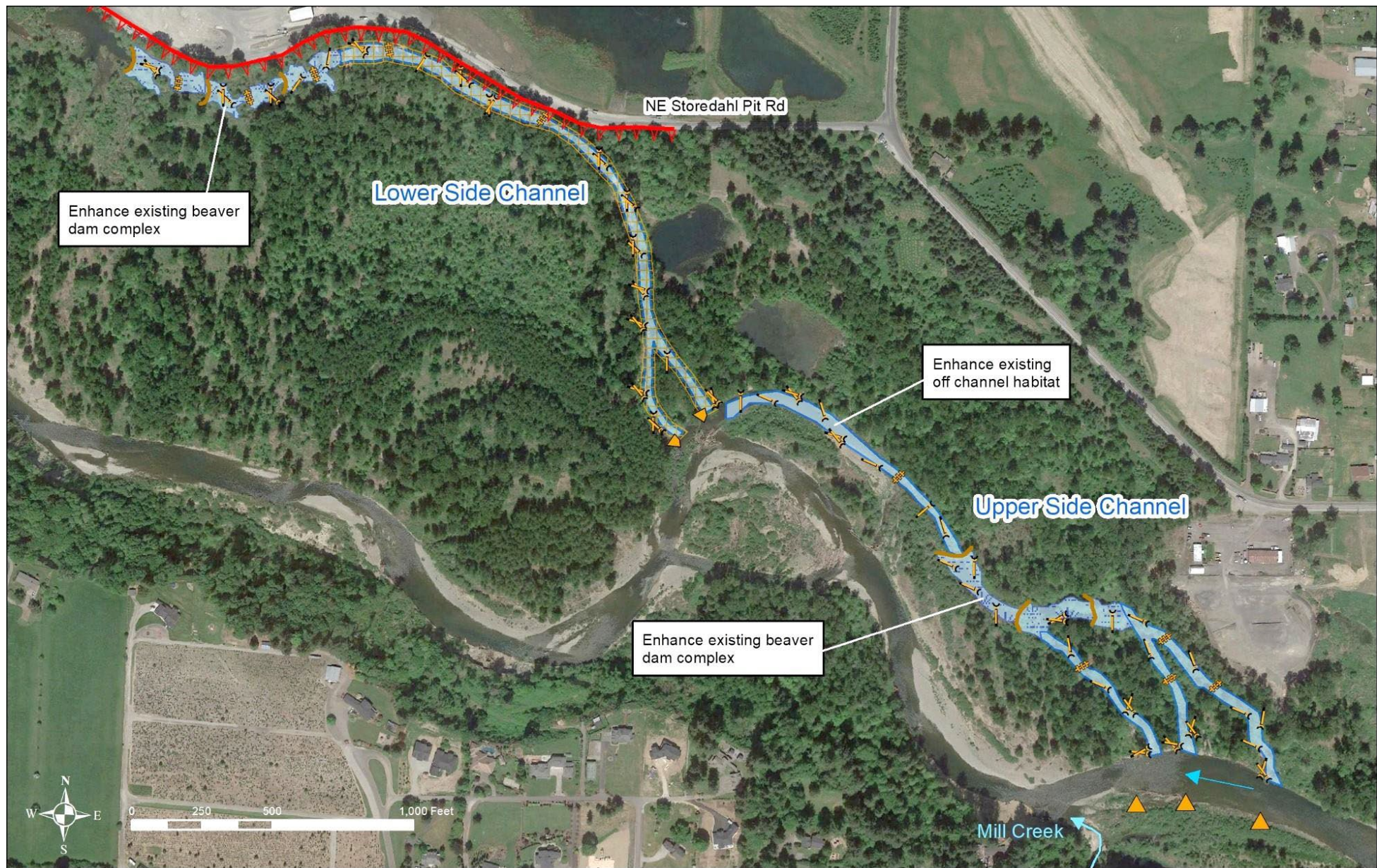
- Erosion Protection

Features

- Channels
- Riparian fringe
- Deep water alcove
- Floodplain wetlands
- Existing beaver ponds

Structures

- Bar apex jam
- Channel spanning / BDA
- Floodplain roughness
- Individual log placement
- Channel complexity



Alternative 4

Side-Channel Reconnections

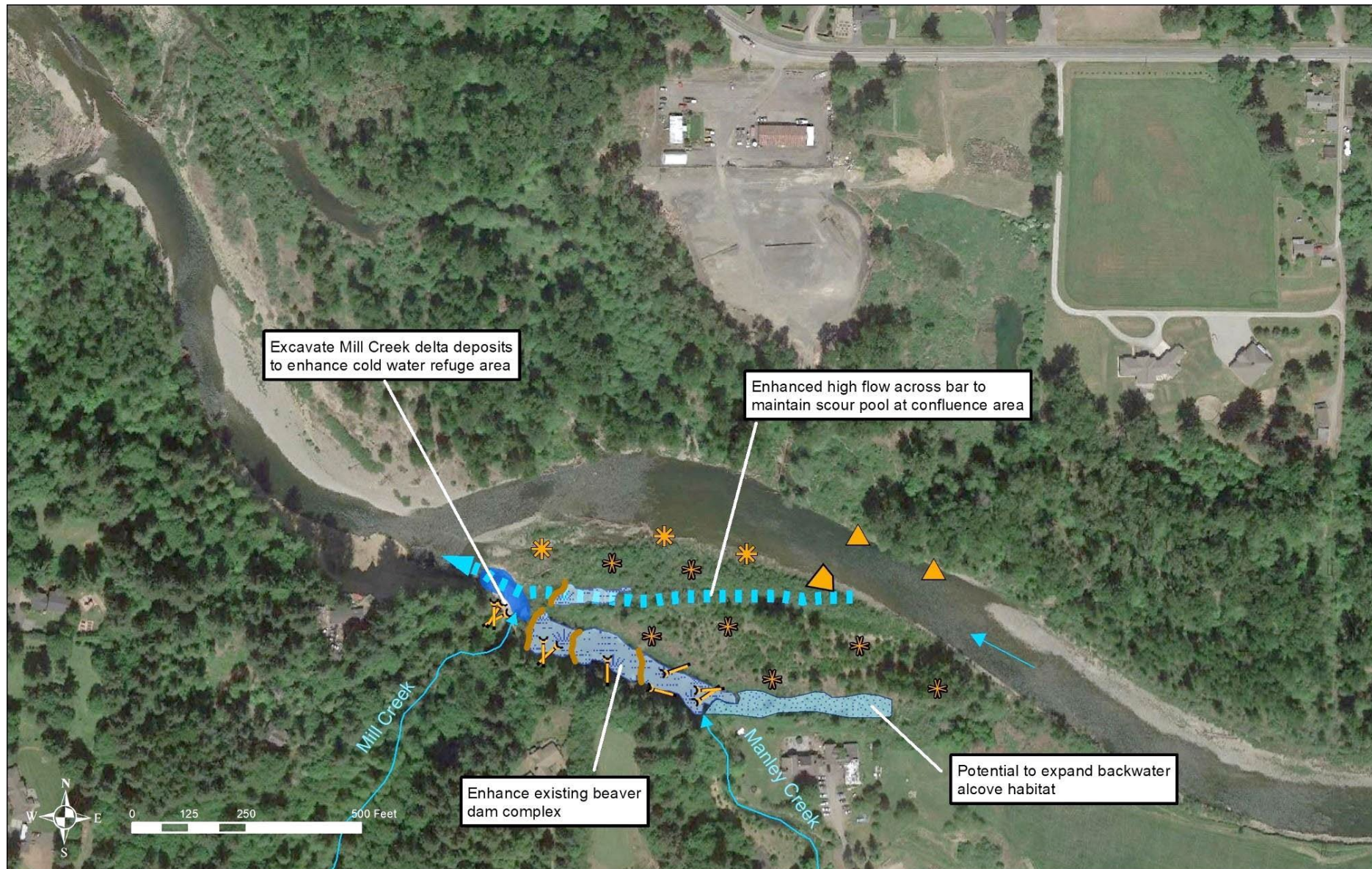
Side Channels

-  Side channel enhancement
-  Select excavation to increase connectivity
-  Existing beaver pond complex

Structures

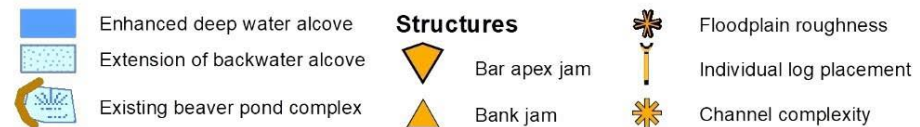
-  Bar apex jam
-  Bank jam
-  Channel spanning / BDA
-  Individual log placement

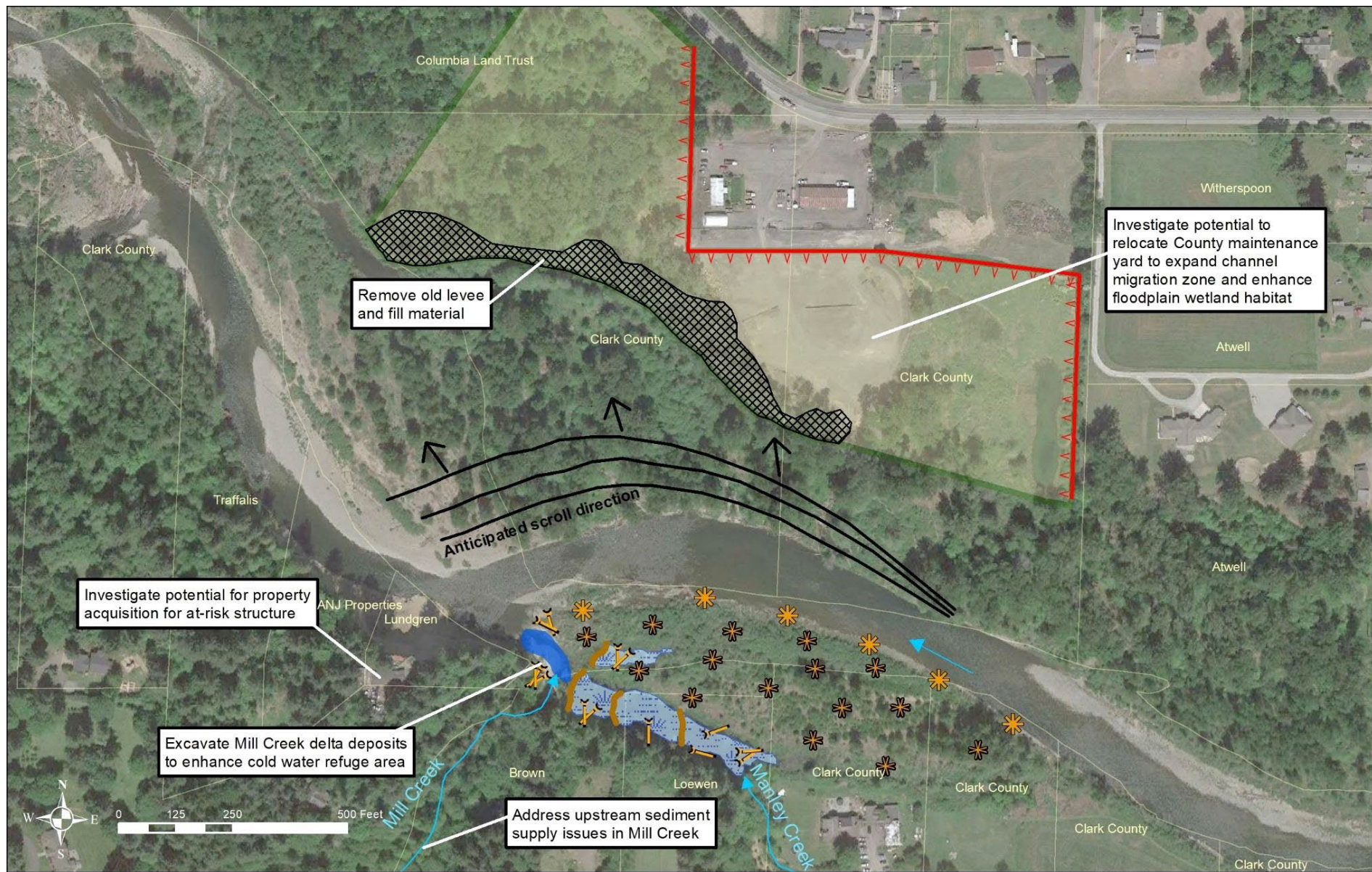
 Erosion protection



Alternative 5

Mill and Manley Confluence Enhancement





Alternative 6

Mill and Manley Area

CMZ Expansion and Floodplain Enhancement

- Potential zone for expanded CMZ & FP
- Existing levee and fill
- Enhanced deep water alcove
- Erosion protection
- Existing beaver pond complex

Structures

- Floodplain roughness
- Individual log placement
- Channel complexity

Modeling

- Run Alternatives 2,3, 4, 5 & potentially 6
- Model will run series of different flows and evaluate:
 - Velocities, shear stress, depths, percent of time inundated
 - Temperatures
 - Sediment competency
 - Channel stability/erosion potential
- Results will be used to evaluate and compare alternatives:
 - habitat conditions
 - physical conditions
 - Feasibility: promoting thermal refuges, channel alignments/stability, risks
- Model will be used along side other data: empirical, geomorphic, etc.
- Model validation

***We will have the opportunity to revise Alternatives and/or run variations of restoration alternatives ***

Next Steps

- **Present the results** of next model runs
- **Change/vary alternatives** if needed based on first modeling runs **or** as other important information that emerges (as needed)
- **Model revised alternatives** (as needed)
- **Present results** to the group (as needed)
- **Rank and score** Alternatives using a variety of criteria (Appendix C of Draft Alternatives Memo- see next slide)
- **Select the preferred alternatives**
- **Develop preliminary designs at three locations**, engineering plans cost. estimates, quantities.

Appendix C- Memo

APPENDIX C- Draft Restoration Goals and Actions

Table 1. Restoration alternatives by reaches. Key for accomplishing restoration objectives is located at the bottom of table.

		Restoration Alternatives					
Goal	Objective	Alt 1: No action	Alt 2/2a: Relocate main channel	Alt 3/3a: Full pits regrade	Alt 4: Side-channel reconnections	Alt 5: Mill-Manley enhancement	Alt 6: Mill-Manley area CMZ expansion
Goal 1: Vegetation	1a. Create channel processes that support veg	No channel processes that support veg in Pits reach. Scour either too frequent/too infrequent to support nat. veg in other rch.	Moderate confinement will limit scrolling. Limited floodplain connectivity.	Multi-thread channels, channel scrolling, shallow water table, frequent floodplain inundation will support native vegetation	Increasing side channel connections will increase dynamic processes within them, supporting native vegetation.	Overbar flow will enhance processes that support veg, but mainstem jams may limit scrolling.	Expanding CMZ will support channel processes that support native veg.
	1b. Create a patchwork mosaic of veg types and ages	Invasive grasses and shrubs dominate Pits reach. Only a couple of stand types and age classes in other reaches.	Supported mainly in new channel corridor, not across full pits area due to continued process limitations.	Restored channel processes and dynamics will achieve patchwork mosaic over time.	Increasing side channel connections will increase veg diversity in those areas.	Only minor influence on overall vegetation conditions.	Restoring more of the CMZ and related processes will increase veg. types and ages in this area.
	1c. Provide streamside veg for key functions	Riparian veg. highly degraded in Pits rch. Streamside veg young and sparse in other rchs.	Can achieve robust riparian buffers along new channel but may need to be actively maintained. Armoring may affect river-right side at gravel processing area.	Robust vegetation along riparian stream margins, with abundant margin habitat created. Wide buffers created in pits reach.	Increased connectivity will support robust streamside veg communities.	Assume riparian work alone per occurs, creating more robust buffer in this location. Otherwise no significant impact.	Only minor impact on streamside veg, at least in the near-term.
Goal 2: Thermal Refugia	2a. Protect and enhance existing refugia	No protections or enhancements of existing refugia	Possible to achieve, assuming existing refugia can be accessed by new channel location.	Multi-thread channel network across wide valley footprint will access known (e.g. Pit 9) and potentially unknown areas of thermal refugia.	Increasing side-channel connections increases access to and quality of potential thermal refugia.	The goal is to enhance existing refugia at Mill-Manley confluence area, although there are questions about whether mainstem scrolling may enhance on its own.	Down-valley scrolling of mainstem away from Mill confluence is expected to lengthen tributary/backwater refugia area that receives cool flows from Mill-Manley.
	2b. Width-to-depth <12	width-to-depth >20	Unlikely to achieve with primarily a single-thread channel.	Multi-thread planform will allow channel sizing for individual channels to be at or below 12.	Achievable in side-channels	Slight reduction in w/d in mainstem due to jams but target not reached.	No significant short-term impact on w/d, except for long-term, where new side-channel development would help reduce overall w/d of channels.
	2c. Canopy closure >50%	Canopy closure <20%	Unlikely to achieve with primarily a single-thread channel.	Canopy closure >50% can be achieved due to multi-thread channels and robust riparian veg.	Achievable in side-channels	Not likely to achieve	No significant short-term impact on shade, except for long-term, where new side-channel development would help increase overall shade of channels.
	2d. Create new refugia via hyporheic exchange	Little-to-no refugia created via hyporheic exchange	Only moderate ability to provide hyporheic flow paths given narrower channel corridor, possibly one or two opportunities.	High sinuosity & planform complexity, and transition to coarser substrate will help activate hyporheic flow paths. New alcove and backbar habitats will be created.	Perennial side-channels will help create head gradients that create hyporheic flow paths contributing to thermal refugia areas.	Creating high-flow path is likely to encourage more low flow hyporheic flow contributing to refugia area.	Opening up CMZ will create more possibilities for channels that create hyporheic exchange, and off-channel habitats that receive cool hyporheic flows. But indirect.
Goal 3: Aquatic Habitat	3a. Sinuosity >1.3	Sinuosity ~1.2	Unlikely to achieve given narrow corridor	Sinuosity will be at or above 1.3	Sinuosity is likely to remain similar to existing side-channel alignments, which is ~1.2. However, more connectivity will allow greater future planform adjustment.	No impact on sinuosity	No direct effect, but potential long-term effect by allowing channels to more freely form over a wider CMZ.
	3b. Pools per mile >10	~1-2 pools/mi in Pits. ~7 pools/mi in upstream reach.	Possible to achieve in primary channel	Possible to achieve >10 pools/mi in primary channel as well as co-dominate and secondary channels due to high planform complexity and LW additions.	Possible to achieve in side-channels	No impact on pools/mi.	No direct effect, but potential long-term effect by allowing channels to more freely form over a wider CMZ.
	3c. Large wood targets (Fox & Bottom, NOAA)	Does not achieve any of the targets.	LW can be added to achieve targets	LW can be added to achieve targets	LW can be added to achieve targets in side-channels	LW can be added to achieve targets	LW can be added to achieve targets
	3d. Side-channel frequency 2-5 channels per cross-section	Currently 0-2 perennial channels	0-1 perennial side-channels	Multi-thread network will result in 3-5 channels per valley cross-section.	Will achieve at least low end of scale (2-3 channels).	Somewhat increases side-channels, but only at high flows.	Widening the CMZ will allow for the potential for more side-channels to form.
	3e. Channel margin length >6 times valley length	Channel margin length currently and into the future <3 times valley length	Not possible to achieve with primarily single-thread channel.	Multi-thread network will result in channel margin length > 3x valley length.	Likely to achieve or be very close to target.	No significant change in channel margin length.	Widening the CMZ will allow for the potential for more side-channels to form, thus increasing margin length.
	3f. Existence of zero velocity refuge areas	Few zero velocity areas at high flows	Possible to achieve by taking advantage of existing pits for off-channel high flow refuge.	Complex channel network will result in numerous zero velocity areas during high flow.	Likely to achieve by introducing more flow into off-channel and floodplain areas.	No significant change	Widening CMZ will allow for the potential for more side-channels, backwater channels, alcoves, and floodplain wetlands that retain quiescent water during high flows.
Goal 4: CMZ and Floodplain Connectivity	3g. Floodplain habitats >8 acres/mi	Currently estimated at ~3 acres/mi, but varies among reaches	Unlikely to be able to achieve given limited floodplain extent.	Possible to achieve floodplain habitats > 8 acres/mi. due to extensive floodplain wetlands & off-channel areas	Is likely to significantly improve access to and occurrence of floodplain habitats but may not fully achieve.	Slight increase from enhancement of beaver dam complex & scouring of Mill confluence, but only minor. Target not achieved.	Widening CMZ will allow for the potential for more side-channels, backwater channels, alcoves, and floodplain wetlands with connectivity to the main channel.
	4a. Remove hydromodifications	Existing hydromodifications remain	Levee would need to be constructed to prevent re-avulsion into pits. Armor needed at gravel processing area.	Berms surrounding pits will be removed. Armor protection of gravel processing area will need to stay and possibly be strengthened.	No hydromodifications will be removed and some armoring, such as at the County maintenance yard and along the Storeahil Pit Rd., may need to be strengthened.	Existing hydromodifications remain	This alternative will remove a levee and create set-back protections to the extent needed depending on landowner participation (TBD).
	4b. AVW/ACW >6	AVW/ACW <2 in Pits. AVW/ACW ranges 3.5-8.5 in Daybreak rch; 3.5 in Mill-Manley area.	AVW/ACW = ~1-2 is significantly below target conditions.	AVW/ACW > 6, even with all channels confined, in widest part of pits. Less width downstream due to powerline towers.	No change in channel confinement.	No change in channel confinement, which would remain high in this area.	Current AVW/ACW = 3.5; restored would be ~3
	4c. Overbank flow > 1 mo/yr	No overbank flow in Pits reach for even large floods. Overbank flow only every 1-2 years for Daybreak reaches	Possible to meet inundation target, but only within the limited new floodplain area.	Designs for channel sizing and floodplain elevation will accomplish overbank flow >1 month per year, on average.	Partially achieves objective by connecting side-channels at lower flows.	Overbank flows across bar likely to increase, but likely not to full extent of target.	Larger floodplain allows for greater inundation, and future side-channels that receive flows more frequently, no significant short-term influence on rates or duration.
Goal 5: Channel Dynamics and Sediment	5a. Depositional channels	Pits are depositional. U and L Daybreak are close to equilibrium, with deposition and transport zones.	Single-thread channel with limited floodplain and with a desire to prevent re-avulsion will need to be approximately at equilibrium (bedload in a bedload out)	Pits reach will remain very depositional due to high sinuosity (therefore low gradient) and high floodplain connectivity.	Side-channels will remain depositional, but no significant increase.	No change in depositional features of channels. Likely more scour at Mill confluence area. Deposition on bar expected to continue.	Allowing for and encouraging mainstem scrolling and side-channel development will somewhat increase depositional conditions.
	5b. Natural bank erosion rates	No significant bank erosion in Pits. 7-8 ft/year in U and L Daybreak reaches.	Natural rates of bank erosion will be limited by confining features on each side of new stream corridor.	Banks will be supported by native vegetation, without in-dred channels and hydromodifications, except for abutting gravel processing area with armor.	Introduction of more flow into side-channels likely to increase erosion and adjustment rates within side-channels.	Short-term reduction in erosion rates at mainstem jams but possible increase or no-change downstream right bank. Effect on erosion at high cliff is uncertain.	Current scrolling along bank with mature native veg. would be allowed to continue and be encouraged.
	5c. Bed substrate >70% gr-silt; <15% fines for spawn	Dominated by fines in Pits reach. >70% gravel-cobble in Daybreak reaches.	Likely to achieve	Likely to achieve	Unlikely to have significant effect on bed substrate. Possible coarsening due to greater flow introduced but also possible more suspended load introduced as well.	No significant change. Substrate assumed to remain coarse.	No significant change. Substrate assumed to remain coarse.
Goal 6: Human Uses and Risks	6a. Do not increase property or structure risk	Existing risk remains	Likely to achieve. May need to supplement armor to protect gravel processing area and downstream private property.	Likely to achieve. May need to supplement armor to protect gravel processing area and downstream private property.	Armor along County yard and Storeahil Pit Rd.	Effect on high cliff erosion is uncertain. Angle of attack is more parallel, so could be less, but more flow introduced towards upstream side of bank.	Effect on high cliff erosion is uncertain. Allowing for and encouraging down-valley scrolling is expected to eventually move mainstem away from eroding cliff.
	6b. Avoid Daybreak Pits avulsion	Avulsion is possible in the future; however, in pits reach channel is locked in for the foreseeable future. Overbank flows from up-valley are possible avulsion-source.	This does confine the channel to a location closer to the Daybreak Pits, possibly adding risk of avulsion during very large flood.	Low potential for avulsion- lower overall stream and floodplain elevation & high conveyance of large floods. Overbank up-valley flow still a possible avulsion-source.	No significant impact on Daybreak Pits avulsion risk, unless avulsion were to occur within downstream side-channel.	No increased risk from work in this area. Risk remains the same.	No increased risk from work in this area. Risk may reduce due to greater conveyance at large floods, reducing potential for overbank flows in north floodplain that could enter Pits.
Goal 6: Human Uses and Risks	6c. Consider recreational user risks	Existing risk from large wood	Possible to achieve	Possible to achieve, though multi-thread network and abundant LW could make for challenging boat navigation.	Possible to achieve	Possible to achieve	Possible to achieve

KEY

	Very much accomplishes objective
	Somewhat accomplishes objective
	Does not accomplish objective