

<b>Preliminary Site Treatment Data Table for SWARM Roads</b>						
Site #	Coordinates (NAD 83)		Future Erosion (yd <sup>3</sup> )	Treatment Immediacy	Comment on Problem	Comment on Treatment
	Lat:	Lon:				
001	39.495981°	-123.392119°	32	L	An 8 in. DRC, fully rusted out. Separated within fillslope. Drains ditch and road surface from the right for 475 ft. There is a 1 ft. wide x 0.5 ft. deep x 40 ft. long gully along the outboard fillslope below the DRC outlet. Fine sediment from the road lays out in-between this and another large, past gully (8 ft. wide x 4 ft. deep), but mobilizes during large storms and delivers to the Class II creek 200 ft. downslope.	<ol style="list-style-type: none"> <li>1. Replace old DRC with an 18 in. diameter x 20 ft. long DRC.</li> <li>2. Install a 10 ft. long full round downspout to the DRC outlet.</li> <li>3. Install 2 rolling dips to the right road.</li> </ol>
002	39.496007°	-123.393932°	35	H	A diverted Class III stream and connected ditch from the right approach are conveyed through an 18 in. diameter DRC. The pipe is slightly crushed at the inlet and rusted out at the outlet. Flow in undermining the culvert, which is high and short in the fillslope. The outboard fillslope and channel are braced by rubber tires and there is an incised gully leading down to the streams natural course. The left bank beyond the outlet is becoming undercut and will fail into the gully (15 ft. wide x 2 ft. deep x 8 ft. long) and the sideslopes will adjust over time. There is a 4 ft. headcut below the tires in the outboard fillslope that will continue to migrate towards the culvert. This site has potential to wash out the road prism. This site will be taken care of with Site # 3 upgrade, but could be utilized as a critical dip for the crossing up the right road.	<ol style="list-style-type: none"> <li>1. Replace old DRC with an 18 in. diameter x 20 ft. long DRC.</li> <li>2. Install a 30 ft. long full round downspout to the DRC outlet.</li> </ol>
003	39.496027°	-123.394084°	106	HM	Stream diverts down the inboard ditch for 65 ft. to a DRC (Site #2). Site #2 may serve as a functional critical dip for this site, depending on treatment, post upgrade. Inboard ditch flow is greater than stream flow at this site. Channel 5 ft. above the crossing was recently realigned with a backhoe, creating a 2 ft. tall headcut. Right road inboard ditch is 100% hydrologically connected to this site; some road surface runoff discharges before this crossing.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Install a 24 in. diameter x 50 ft. long culvert at the base of fill.</li> <li>3. Install 5 yd<sup>3</sup> of 0.5-1.5 ft. diameter riprap to the headcut above the crossing.</li> <li>4. Install 10 yd<sup>3</sup> of 0.5-1.5 ft. diameter riprap to the outboard fillslope.</li> <li>5. Install a critical dip to the left hingeline of the crossing.</li> <li>6. Install 2 rolling dips to the right road, connected to the inboard ditch.</li> <li>7. Spoil locally (use spoils to fill in diversion gully at Site #2 to the left, and to shape the road).</li> </ol>
004	39.495750°	-123.395586°	18	L	A diverted stream flows down a spring fed ditch from the right and crosses the road through an 18 in. diameter DRC. There isn't much erosion occurring here but there is fine sediment delivery to the creek downslope. The pipe is rusting out and is set high and short in the fillslope.	<ol style="list-style-type: none"> <li>1. Replace old DRC with an 18 in. diameter x 30 ft. long DRC.</li> </ol>
005	39.496028°	-123.396292°	39	M	Stream has additional input from road surface runoff upstream. Main source of erosion here will be ditch incision to the left for 220 ft., to Site # 4. Some additional road surface/inboard ditch erosion from the right road as well.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Install a 24 in. diameter x 40 ft. long culvert at the base of fill.</li> <li>3. Rebuild the road prism by raising the road surface 2 ft. to accommodate the new culvert.</li> <li>4. Install a critical dip to the left hingeline of the crossing.</li> <li>5. Install 1 rolling dip 100 ft. up the right road.</li> <li>6. Spoil locally.</li> </ol>
006	39.510940°	-123.413166°	120	L	Stream is conveyed through a crushed culvert and flows into an on-stream pond. The left road has a ditch for its entire length that has several outs in the road, but doesn't fully disconnect the alignment. Road runoff from both approaches discharges over the outboard fillslope. The culvert is slightly high in the fill and almost 10 ft. short of the base of fill.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace the culvert with a 24 in. diameter x 40 ft. long culvert at the base of fill.</li> <li>3. Rebuild the road prism by lowering the road surface 1 ft., minimizing fillslope volume.</li> <li>4. Install 8 rolling dips to the left road, connected to the ditch.</li> <li>5. Install 1 rolling dip to the right road, connected to the ditch.</li> <li>6. Spoil locally.</li> </ol>

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007	39.510527°	-123.411251°	119	M	A 24 in. diameter culvert drains ditch runoff from the right. Culvert is set in a swale below a pond, but overflow culvert in the pond discharges flow onto the hillslope to the left at the crossing, causing hillslope instability to the left. No water seeps out of the dam face in line with the swale. Pond overflow should be in line with the swale. The culvert is set short and high in the fillslope. Evidence of scour erosion near the culvert outlet, which is covered in poison oak. The stream crossing is outsloped and road runoff washes over the outboard fillslope. The dam fill appears to have washed out in the past; it's now full of junk metal and wood. May have a pond liner. All of the pond overflow diverts down a ditch to Site #8 down the road.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace the culvert with a 24 in. diameter x 60 ft. long culvert at the base of fill.</li> <li>3. Install 10 yd<sup>3</sup> of 0.5-1.5 ft. diameter riprap to the outboard fillslope.</li> <li>4. Install a critical dip to the left hingeline of the crossing.</li> <li>5. Install 3 rolling dips to the right road, beginning 150 ft. right of the crossing.</li> <li>6. Spoil locally.</li> </ol>
008	39.511255°	-123.409658°	58	HM	A Class II stream, along with a Class III from a diversion along the right road ditch crosses the road beneath a rusted out 18 in. diameter culvert. The ditch to the right overtopped in the past and was armored with cobble, but not enough to accommodate the diverted stream flow. The ditch is headcutting and incising, which will continue overtime. Above the inlet there is a poison oak berm that forces flow in multiple directions. A wetland with surface water drains down the left ditch with little to no consequence. The right road is throughcut from this crossing to the driveway nearby.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace the culvert with a 24 in. diameter x 40 ft. long culvert at the base of fill.</li> <li>3. Install 2 rolling dips to the right road, beyond the driveway at a bend in the road.</li> <li>4. Spoil locally.</li> </ol>
009	39.507519°	-123.404454°	59	L	A Class II stream, along with a Class III from a diversion along the right road ditch crosses the road beneath a rusted out 18 in. diameter culvert. The ditch to the right overtopped in the past and was armored with cobble, but not enough to accommodate the diverted stream flow. The ditch is headcutting and incising, which will continue overtime. Above the inlet there is a poison oak berm that forces flow in multiple directions. A wetland with surface water drains down the left ditch with little to no consequence. The right road is throughcut from this crossing to the driveway nearby.	<ol style="list-style-type: none"> <li>1. Replace old DRC with an 18 in. diameter x 30 ft. long DRC.</li> <li>2. Install 6 rolling dips to the right road.</li> </ol>
010	39.505964°	-123.401920°	46	L	Road surface runoff concentrates in the right ditch and follows a berm/ditch that parallels a driveway and crosses the road through a rusted DRC. Flow continues down to a gully which leads to a Class III stream. Some runoff goes into a pond and some continues to the gully, but there is minimal erosion here.	<ol style="list-style-type: none"> <li>1. Install 4 rolling dips to the right road, connected to the ditch.</li> </ol>
011	39.505254°	-123.401994°	24	L	Road runoff from the left and right discharges at "outs" cut into the berm at low spots here. Fine sediment from road surface runoff and overland flow delivers to a small pond 50 ft. below the road. Pond is muddy after yesterday's rain. No erosion below the road. The left road beyond the intersection (220 ft. away) is being treated at Site #10.	<ol style="list-style-type: none"> <li>1. Install 1 rolling dip to the right road.</li> </ol>
012	39.496520°	-123.396406°	116	L	Stream is conveyed through a 30% plugged, 8 in. diameter PVC pipe across the road. The left road approach is throughcut and runoff discharges at the inlet and outlet of the crossing. Beyond the outlet there is fill in the old channel that is now grassed over, with a couple of 2 ft. tall headcuts down to the original channel. There is a low amount of fill at the crossing and the main issue is the connected left road length.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Lay back sideslopes 2:1 or to natural grade below the road and establish a 4 ft. wide channel bottom.</li> <li>3. Rebuild the road prism in preparation for armored fill installation.</li> <li>4. Install an armored fill at the crossing. <ol style="list-style-type: none"> <li>A. Excavate a broad dip through the road prism.</li> <li>B. Excavate a keyway: 6 ft. wide x 2 ft. deep x 15 ft. long.</li> <li>C. Install 5 yd<sup>3</sup> of 0.5-1.0 ft. diameter riprap to the keyway.</li> </ol> </li> <li>5. Install 8 rolling dips to the left road.</li> <li>6. Spoil locally.</li> </ol>

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013	39.493598	-123.394614°	16	ML	A 12 in. diameter plastic DRC drains 575 ft. of left ditch/road. Flow discharges into a swale and is beginning to erode a gully to headwaters of class III stream ~125 ft. downslope. Although this DRC is in good shape and may be adequate to drain the left road after rolling dips are installed, replacing the DRC with a rolling dip would be a better long term fix.	<ol style="list-style-type: none"> <li>1. Remove DRC and install 1 rolling dip in the same location.</li> <li>2. Install 2 additional rolling dips to the left road, connected to the inboard ditch.</li> </ol>
014	39.494257°	-123.397074°	52	ML	A DRC discharges road runoff into a Class II stream. The ditch to the left has plugged for about 20 ft., but the road is insloped so runoff ponds before entering the DRC. The cutbank above the inlet also has fresh erosion and could plug the pipe. Beyond the outlet there is rock for energy dissipation, but flow still reaches the creek below.	<ol style="list-style-type: none"> <li>1. Install 1 rolling dip 50 ft. up the left road connected to the ditch.</li> <li>2. Install 2 additional rolling dips to the left road.</li> <li>3. Install 1 rolling dip to the right road.</li> </ol>
015	39.495250°	-123.396852°	3	ML	An 18 in. diameter DRC drains cutbank springs below meadow and short road reach. Fine sediment is delivered via a 1 ft. wide x 0.5 ft. deep gully below the culvert outlet to a Class II stream 50 ft. below the road. The cutbank is failing into the ditch above the culvert inlet and may plug the culvert. DRC is installed short/high in the fill. The main issue here are the springs emerging from the cutbank and ongoing ditch incision and failure.	<ol style="list-style-type: none"> <li>1. Construct a drainage swale above the DRC inlet: 10 ft. wide x 2 ft. deep x 8 ft. long.</li> <li>2. Install 5 yd<sup>3</sup> of 0.5-1.5 ft. diameter riprap to the swale.</li> <li>3. Replace old DRC with an 18 in. diameter x 30 ft. long DRC.</li> <li>4. Install a 40 ft. long full round downspout to the DRC outlet.</li> <li>5. Spoil locally.</li> </ol>
016	39.495363°	-123.397042°	697	L	There is rock armor on the inboard fillslope but non on the outboard fillslope. There is a plunge pool at the outlet but the pipe is set near the base of fill. The pipe is rusty but still has a lot of life left.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 96 in. diameter x 70 ft. long culvert at the base of fill.</li> <li>3. Install 35 yd<sup>3</sup> of 1.0-3.0 ft. diameter riprap to the inboard fillslope.</li> <li>4. Install 45 yd<sup>3</sup> of 1.0-3.0 ft. diameter riprap to the outboard fillslope.</li> <li>5. Spoil locally.</li> </ol>
017	39.495172°	-123.397737°	375	L	Culvert inlet area and inboard fill are well armored with 1.0-3.0 ft. diameter riprap. Hydrologically connected right road runoff discharges at the outboard road with a 2 ft. wide x 1 ft. deep x 25 ft. long gully down the outboard fillslope to the stream. Culvert is set at the base of fill. No armor is installed to the outboard fillslope. Crossing is functional, the left sideslope at the culvert outlet has failed in the past. The treatment at Site #18, 85 ft. up the right road will disconnect the road surface runoff to this site when it is upgraded.	<ol style="list-style-type: none"> <li>1. Install a critical dip to the left hingeline of the crossing.</li> </ol>
018	39.495001°	-123.397851°	19	HM	A DRC drains the right ditch across the road and delivers to a Class II stream. The ditch has some rock in it, but it is eroding into the road prism in places. Below the outlet there is some rock placed for energy dissipation. The bed has some steps that will incise up toward the pipe and the sideslopes will lay back more over time. A diverted stream up the right road is fed through the ditch along with the ditch up the road from Site #19.	<ol style="list-style-type: none"> <li>1. Install 2 rolling dips to the right road, connected to the ditch.</li> </ol>
019	39.494255°	-123.398446°	92	HM	Stream drains a small meadow swale. The 18 in. diameter culvert at the crossing is crushed and disabled. The stream diverts down the inboard ditch for 350 ft. to a DRC, delivering to streams downslope at Site #18. Currently has substantial ditch connectivity to site from the right. The right road approach is 18% grade, the road has soft spots, evidence of erosion problems in the past, rock has been used to fortify some of the road surface and geofabric is visible in places. Active erosion along the inboard ditch may plug the culvert and cause the crossing to be overtopped. An "out" in the berm at this site discharges road surface runoff and is causing some erosion along the outboard fillslope, increasing pond turbidity below.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 24 in. diameter x 60 ft. long culvert at the base of fill.</li> <li>3. Install a critical dip to the left hingeline of the crossing.</li> <li>4. Install 2 rolling dips to the right road, the first ~100 ft. right of the crossing.</li> <li>5. Spoil locally.</li> </ol>

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020	39.493202°	-123.401717°	239	M	Culvert is rusted out, set high and short in the fillslope and may plug soon. There are two rolling dips to the left, a driveway and 3rd Gate Road. The driveway has an erosive cutbank that feeds into a ditch and meets the ditch at 3rd Gate Road, which then passes through a DRC that discharges directly to the inlet of the crossing. The road to the right is soft and somewhat rutted, with "outs" in the road discharging some runoff onto a driveway, causing some pooling and flooding.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Use the excavator to clean perched material from the right bank below the profile bottom flag.</li> <li>3. Replace culvert with a 24 in. diameter x 60 ft. long culvert at the base of fill.</li> <li>4. Install 10 yd<sup>3</sup> of 0.5-2.0 ft. diameter riprap to the outboard fillslope.</li> <li>5. Install 1 rolling dip to the driveway ~200 ft. left of the crossing.</li> <li>6. Install 1 rolling dip to 3rd Gate Road to the left, connected to the ditch.</li> <li>7. Install 3 rolling dips to the right road.</li> <li>8. Spoil locally.</li> </ol>
021	39.494971°	-123.402619°	54	L	A 12 in. diameter plastic DRC drains 770 ft. of left ditch and road surface. The culvert inlet is torn, the outlet is plugged. Flow discharges onto gentle ground and lays out some fine sediment before eventual discharge into a pond below the road. The pond is muddy from recent rain. Turbid water delivers primarily to the stream and pond, but during large storms may initiate gully incision for ~100 ft. to the Class III stream below the culvert outlet.	<ol style="list-style-type: none"> <li>1. Install 3 rolling dips to the left road, connected to the ditch.</li> </ol>
022	39.499190°	-123.410553°	47	HM	An 18 in. diameter DRC discharges ditch flow from the right into a Class III stream. The DRC crosses a driveway off of 3rd Gate Road and is conveying the inboard ditch flow across the road.	<ol style="list-style-type: none"> <li>1. Install 4 Type 2 rolling dips to the right road, connected to the ditch.</li> </ol>
023	39.504502°	-123.417634°	105	ML	Low power stream drains a meadow swale. Outlet discharges into a big pond and is down in a 2 ft. deep hole/pool, due to filling in of the pond with sediment and brush below the culvert outlet for ~50 ft. The left road outboard ditch used to discharge into the pond, but the ditch has plugged and runoff continues down the right road past this site. 2 bullfrogs observed at culvert outlet.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 24 in. diameter x 60 ft. long culvert at the base of fill.</li> <li>3. Install a critical dip to the right hingeline of the crossing.</li> <li>4. Install 5 rolling dips to the left road; 4 on the main road and 1 on Boogy Woogy Road.</li> <li>5. Spoil locally.</li> </ol>
024	39.503075°	-123.418545°	98	HM	Near origin stream and connected left ditch conduct contribute flow to this crossing. There is a headcut above the profile top that is actively eroding and the culvert is set high and short in the fillslope. There is incision and bank erosion below the culvert outlet. The road was recently rocked.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Use the excavator to clean and transition the stream channel above the crossing.</li> <li>3. Replace culvert with a 24 in. diameter x 50 ft. long culvert at the base of fill.</li> <li>4. Install 5 yd<sup>3</sup> of 0.5-2.0 ft. diameter riprap to the outboard fillslope.</li> <li>5. Install 5 yd<sup>3</sup> of 0.5-2.0 ft. diameter riprap to the excavated area above the road.</li> <li>6. Install a critical dip to the right hingeline of the crossing.</li> <li>7. Install 2 rolling dips to Skyview road to the left of the intersection.</li> <li>8. Install 3 rolling dips to 3rd Gate Road to the right of the intersection.</li> <li>9. Install 1 rolling dip 100 ft. up the left road.</li> <li>10. Spoil locally.</li> </ol>
025	39.502555°	-123.420743°	24	M	An 18 in. diameter DRC drains 625 ft. of left ditch and delivers to the headwaters of a Class III stream 50 ft. below the outlet. DRC outlet has a 10 ft. long full round downspout that discharges into another 18 in. diameter culvert under the driveway of landowner "Shultz" house. Road surface flow discharges at an "out" and is eroding a gully under and beside the full round downspout. The left road is bermed along its entire length. Active ditch erosion here during the last storm event, and this culvert inlet has a history of plugging. Mostly ditch erosion and road surface are future delivery sources. The berm is breached in one location ~375 ft. up the left road, but is not connected to the ditch.	<ol style="list-style-type: none"> <li>1. Clean the inlet of the culvert.</li> <li>2. Enhance existing rolling dip 375 ft. up the left road, and connect it to the ditch.</li> </ol>

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026	39.503334°	-123.421984°	24	M	Stream flows into the inboard ditch and diverts down to the right for ~100 ft. before passing through a DRC. The DRC is installed short and high in the fillslope and beyond it there is a large gully leading back to the streams natural course. The diverted stream will continue to incise the ditch to the right and cause the gully below Site #27 to erode further. There are also some cutbank failures above the ditch to the right that will continue to fail as they are undercut.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Install a 24 in. diameter x 50 ft. long culvert at the base of fill.</li> <li>3. Install a critical dip to the right hingeline of the crossing.</li> <li>4. Install 3 rolling dips to the left road, connected to the ditch.</li> <li>5. Spoil locally.</li> </ol>
027	39.503527°	-123.422027°	19	M	An 18 in. diameter DRC drains 125 ft. of left ditch. Road surface discharges at an "out" breached through the outboard berm and delivers to this site also. There is a hole torn into the top of the inlet and also begins to show rust holes in the bottom of the culvert. DRC drains diverted flow from the Site #26 stream crossing and a springy swale 25 ft. up the right road. There is a large past erosion gully below the culvert outlet that connects to the stream below. The old gully is somewhat stable, though sideslopes will continue to lay back. The main source of sediment here is ditch erosion and road surface erosion.	<ol style="list-style-type: none"> <li>1. Replace old DRC with an 18 in. diameter x 30 ft. long DRC.</li> <li>2. Install a 10 ft. long full round downspout to the DRC outlet.</li> </ol>
028	39.503881°	-123.422639°	131	H	An on-stream pond discharges flow down the hillside and crosses the road through a 15 in. diameter culvert. Spring flow emerges from the base of the pond embankment and down a swale to the inboard ditch of the road to the left and flows to this site. There is a headcut above the inlet that will continue to migrate upstream if left untreated. The pipe is set askew and was placed high and short in the fill. The pipe has rusted out and the fill beneath the pipe is starting to erode along with the fillslope from the outlet to the profile bot.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 24 in. diameter x 70 ft. long culvert at the base of fill.</li> <li>3. Install 5 yd<sup>3</sup> of 0.5-2.0 ft. diameter riprap to the headcut above the top flag.</li> <li>4. Install a critical dip to the right hingeline of the crossing.</li> <li>5. Install an 18 in. diameter x 40 ft. long DRC 125 ft. up the left road at the spring.</li> <li>6. Spoil locally on the abandoned road to the left.</li> </ol>
029	39.504180°	-123.424189°	45	HM	A 15 in. diameter plastic culvert drains 470 ft. of left road, ditch and prairie slope above. There are recent signs of ditch erosion and past efforts to armor ditch have failed, causing flow to flank armor rocks (1.0-1.5 ft. diameter) and is eroding into the road bed. Ditch also plugged in several spots with recent evidence of flow spilling out onto the road. The outboard edge of the road is bermed along the entire length with many "outs" breached through the berm. The DRC outlet is shotgunned and discharges onto rock armor, but flow flanks the armor on the left and is causing erosion and undercutting of the left bank. Sediment delivers to origin of the stream 100 ft. below the road. Bedrock underlies rock armor. DRC inlet is 80% plugged and crushed.	<ol style="list-style-type: none"> <li>1. Install 2 rolling dips to the left road, the first 100 ft. up the left road and the second 300 ft. up the road. Connect both to the inboard ditch.</li> <li>2. Clean the DRC inlet.</li> <li>3. Install a 20 ft. long full round downspout to the DRC outlet.</li> </ol>
030	39.504531°	-123.425269°	36	ML	An 18 in. diameter DRC conveys ditch flow across the road and delivers to a pond 400 ft. below the road. The ditches will continue to incise and transport sediment over time. The culvert is shallow in the fill and rock armor was placed below the outlet to act as energy dissipation but appears to have a decent length of connectivity to this site through the ditch. There is a large piece of what seems to be bedrock below the outlet which increases complexity here.	<ol style="list-style-type: none"> <li>1. Replace old DRC with an 18 in. diameter x 30 ft. long DRC.</li> <li>2. Install a 10 ft. long full round downspout to the DRC outlet.</li> <li>3. Install 2 rolling dips to the left road, connected to the ditch.</li> <li>4. Install 4 rolling dips to the driveway to the right, connected to the ditch.</li> </ol>
031	39.505345°	-123.426915°	48	M	A 12 in. diameter plastic DRC crosses under a private driveway and discharges onto the hillslope above a Class II stream. There is a past erosion gully (2 ft. wide x 0.5 ft. deep x 125 ft. long) that delivers sediment to the stream below. The ditch is showing signs of erosion as well as transporting smaller sized road rock down the inboard ditch to the culvert outlet. The right road ditch drains road surface flow and prairie slopes above the road. The outboard road is bermed with frequent outs breached through the berm.	<ol style="list-style-type: none"> <li>1. Install 3 Type 2 rolling dips to the right road (3rd Gate Road), the first 100 ft. up the road and 2 more at 300 ft. and 500 ft. from the crossing, respectively. Connect dips to the inboard ditch and breach the berm at the outlet.</li> </ol>

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032	39.505889°	-123.426556°	153	L	The culvert is set about 6 ft. high and short in the fillslope but is placed on top of a boulder and discharges onto a mossy rock. Overall there is minimal erosion at this site, but the outboard fillslope is overly steep without slope protection and there is a bit of right road connectivity. The culvert might be undersized but there is a coupler at the inlet that functions as a flared inlet. Some of the right road runoff discharges above the inlet but appears minor.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 36 in. diameter x 50 ft. long culvert at the base of fill.</li> <li>3. Install 5 yd<sup>3</sup> of 0.5-2.0 ft. diameter riprap to the outboard fillslope.</li> <li>4. Install 1 rolling dip to the lower right road.</li> <li>5. Spoil locally.</li> </ol>
033	39.503944°	-123.428217°	93	ML	An 85 ft. long flat car bridge with steel decking. The left and right abutments are rock armored, and the bridge seems well engineered. The bridge crosses Class I Sherwood Creek. Left and right road approaches are hydrologically connected to the crossing and deliver road surface erosion to the stream. Mostly turbid water reaches the stream; most of the left road fine sediment in transport deposits in the meadow adjacent the stream. During recent rain a muddy plume of turbid water was observed upstream of the bridge. Icy road surface currently on the right approach with a recently cut out in the right road berm. The out discharges road surface runoff to a small 1 ft. wide x 0.5 ft. deep x 40 ft. long gully incised in the outboard fillslope leading to Sherwood Creek.	<ol style="list-style-type: none"> <li>1. Install 3 rolling dips to the left road.</li> </ol>
034	39.503384°	-123.428679°	84	HM	An 18 in. diameter plastic DRC conveys concentrated ditch flow across the road and delivers to Sherwood Creek. Up the right road, runoff is concentrated in the ditch and discharges at an out leading to a large gully. The gully parallels the road down to the driveway to the right of the bridge, where it is deposited. Flow leaves the ditch by the driveway and crosses the road to meet up with the gully from the DRC. Road drainage may be problematic due to ideal rolling dip locations being next to telephone utility poles.	<ol style="list-style-type: none"> <li>1. Install 4 rolling dips to the right road, connected to the ditch.</li> </ol>
035	39.501790°	-123.430337°	72	M	Inlet of culvert is ~30% plugged, and the outlet is buried with flow emerging from a hole nearby. The inboard ditch delivers road surface erosion and smaller road rock to the culvert inlet. The stream crossing is outsloped. Some outs have been dug through the berm. Much of the road rock, some recently added, ends up in along the outboard edges of the road.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 24 in. diameter x 50 ft. long culvert at the base of fill.</li> <li>3. Install 5 yd<sup>3</sup> of 0.5-1.5 ft. diameter riprap to the outboard fillslope.</li> <li>4. Install a critical dip to the left hingeline of the crossing.</li> <li>5. Install 1 rolling dip to the right road.</li> <li>6. Spoil locally.</li> </ol>
036	39.501152°	-123.428158°	111	M	There is a long stretch of hydrologically connected ditch to the left that delivers fine sediment to the inlet. The outboard fillslope is very steep, and road runoff discharges onto its surface, eroding a 6 ft. wide x 2 ft. deep x 10 ft. long gully in the past. Rock was placed below the outlet, but the pipe is culvert is rusting out and flow is undermining the fillslope.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 24 in. diameter x 50 ft. long culvert at the base of fill.</li> <li>3. Install 3 rolling dips to the left road, connected to the ditch.</li> <li>4. Install 1 rolling dip to the right road.</li> <li>5. Spoil locally.</li> </ol>
037	39.500078°	-123.426900°	47	ML	Culvert is plugged, and the outlet is crushed. Stream travels down well vegetated inboard ditch for 100 ft. to inlet here. Road travels along a broad swale and occupies historic channel. Low power stream is not eroding the ditch. Inlet has been cleaned, but is still plugged, with some flow seeping through the outlet.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 24 in. diameter x 40 ft. long culvert at the base of fill.</li> <li>3. Install a critical dip to the left hingeline of the crossing.</li> <li>4. Clean the right road ditch for 100 ft.</li> <li>5. Armor the ditch with 0.25-0.5 ft. diameter rock.</li> <li>6. Install 4 rolling dips to the right road.</li> <li>7. Spoil locally.</li> </ol>

<b>Preliminary Site Treatment Data Table for SWARM Roads</b>						
Site #	Coordinates (NAD 83)		Future Erosion	Treatment	Comment on Problem	Comment on Treatment
038	39.490755°	-123.406879°	52	ML	There is a headcut at the inboard road that is 2 ft. deep and will continue to migrate upstream and potentially dislodge a large boulder. The right bank is relatively stable, but is slowly being undercut and will eventually fail into the creek. The road to the right failed in the past and has slumped down toward the profile bot, where material is slightly being undercut. This road alignment appears unstable, directly to the left there is a landslide feature and tension cracks, with sinkholes in the road.	<ol style="list-style-type: none"> <li>1. Lay back the left channel bank to establish a 2:1 grade: 50 ft. wide x 2 ft. deep x 10 ft. long.</li> <li>2. Spoil locally.</li> </ol>
039	39.490883°	-123.407086°	25	L	A landslide feature is perched above a swale that leads down to Sherwood Creek. There are tension cracks in the road that are mossy and an old collapse hole. The hillslope is 40% grade through the swale and it narrows before reaching the stream. Very little of this potential failure is poised to deliver fill material to the creek below.	<ol style="list-style-type: none"> <li>1. Excavate the outboard fillslope from left to right flag: 60 ft. wide x 5 ft. deep x 25 ft. long.</li> <li>2. Spoil locally against the cutbank.</li> </ol>
040	39.491185°	-123.407462°	64	HM	Culvert is rusted out and installed short and high in the fillslope. Past erosion below the outlet progresses toward the profile bot. Road to right has unstable geology and a washed out crossing.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 24 in. diameter x 60 ft. long culvert at the base of fill.</li> <li>3. Install a critical dip to the right hingeline of the crossing.</li> <li>4. Install 3 rolling dips to the left road, connected to the ditch.</li> </ol>
041	39.507468°	-123.400295°	78	ML	Outlet of culvert is short and high in the fillslope, discharging into the left bank. There is a plunge hole, and the left edge of the fillslope has failed in the past. Significant ditch flow accounts for some of the erosion activity here.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 24 in. diameter x 40 ft. long culvert at the base of fill.</li> <li>3. Install 5 yd3 of 0.5-2.0 ft. diameter riprap to the outboard fillslope.</li> <li>4. Install 1 rolling dip 80 ft. up the right road.</li> <li>5. Spoil locally.</li> </ol>
042	39.507091°	-123.400673°	34	M	A near origin stream flows down the prairie above the crossing, flowing down the cutbank to the culvert inlet. The culvert is undersized and is plugging with leaves and sediment. The cutbank will continue to headcut upslope if left untreated. The culvert is installed short and high in the fillslope.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 24 in. diameter x 40 ft. long culvert at the base of fill.</li> <li>3. Install 5 yd3 of 0.5-1.5 ft. diameter riprap to the headcut above the road.</li> <li>4. Install 15 yd3 of 0.5-1.5 ft. diameter riprap to the outboard fillslope.</li> <li>5. Install a critical dip to the left hingeline of the crossing.</li> <li>6. Spoil locally.</li> </ol>
043	39.506723°	-123.400927°	81	M	Culvert is installed short and high in the fillslope, with rock armor that extends from the outboard road to about 10 ft. below the culvert outlet. The stream is undercutting armor and the right stream bank of the outboard fillslope. Armor could start to unravel and force more flow into already undercut steep banks. Riprap doesn't progress all the way to the base of fill.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Use the excavator to lay back the right channel bank near the base of fill: 15 ft. wide x 3 ft. deep x 6 ft. long.</li> <li>3. Replace culvert with a 24 in. diameter x 50 ft. long culvert at the base of fill.</li> <li>4. Install 15 yd3 of 0.5-2.0 ft. diameter riprap to the outboard fillslope.</li> <li>5. Install a critical dip to the left hingeline of the crossing.</li> <li>6. Install 2 rolling dips to the left road.</li> <li>7. Spoil locally.</li> </ol>
103	39.486409°	-123.399248°	16	L	At-origin stream passes through the road via a culvert installed short and high in the fillslope. A small headcut 4 ft. above the road looks mossy and stable. Gentle, low power stream. No visible bed and banks in the swale above the headcut. AN 18 in. diameter DRC passes flow through the driveway above the crossing. Flow spreads out along a gentle hillslope below the road, coalescing in a defined channel 60 ft. below the base of fill. Culvert is crushed at the outlet, with a small 1 ft. wide x 0.5 ft. deep gully progressing to the base of the fillslope. Left road surface flow passes this site. Left road inboard ditch delivers very little fine sediment to the inboard of the crossing, and is vegetated. A sign marks this site as the end of first gate road.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 24 in. diameter x 40 ft. long culvert at the base of fill.</li> <li>3. Install a critical dip to the right hingeline of the crossing.</li> <li>4. Install 1 rolling dip to the left road.</li> <li>5. Spoil locally.</li> </ol>

<b>Preliminary Site Treatment Data Table for SWARM Roads</b>						
Site #	Coordinates (NAD 83)		Future Erosion	Treatment	Comment on Problem	Comment on Treatment
104	39.486611°	-123.399834°	22	L	Culvert is out of alignment with natural stream channel. Minor left bank erosion at the culvert inlet. Culvert is installed short and high in the fillslope.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace the culvert with a 24 in. diameter x 40 ft. long culvert at the base of fill.</li> <li>3. Install a critical dip to the left hingeline of the crossing.</li> <li>4. Spoil locally.</li> </ol>
105	39.487079°	-123.399821°	17	M	Stream passes through the road via undersized culvert installed short and high in the fillslope. Terrain is hummocky, potentially an earth flow. Stream incises shallowly into the fillslope below the road before turning and abruptly plunging past a large rock. Confluence with site #104 stream is just below the road. The stream is steeply incised into the hillslope above the road. Right road surface flow passes this site. Road is heavily rocked and erosion is minimal.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 24 in. diameter x 40 ft. long culvert at the base of fill.</li> <li>3. Install a critical dip to the left hingeline of the crossing.</li> <li>4. Spoil locally.</li> </ol>
106	39.487584°	-123.400802°	119	ML	Large stream and 180 ft. of left and 490 ft. of right inboard ditch flow cross the road at this site. Plastic culvert is recently installed; shotgunned outlet has eroded a scour pool amidst large boulders that are ineffective energy dissipation. The outboard fillslope is armored with 3.0-3.5 ft. diameter riprap. Riprap on the inboard fillslope drapes over the inlet of the culvert. Water pools along the road surface of the crossing. Inboard ditches are incised and will continue to erode and deliver fine sediment to the crossing.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 30 in. diameter x 50 ft. long culvert at the base of fill.</li> <li>3. Install 5 yd3 of 0.5-2.0 ft. diameter riprap to the outboard fillslope.</li> <li>4. Install 2 rolling dips to the right road.</li> <li>5. Spoil locally.</li> </ol>
107	39.487621°	-123.401921°	25	H	Stream approaches road and diverts right down the inboard ditch. Ditch flow and stream flow cross the road at Site #106. Road surface runoff from 75 ft. of left road discharges to the right of the crossing, with no significant erosion. The left road is bermed along its entire length.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Install a 24 in. diameter x 40 ft. long culvert at the base of fill.</li> <li>3. Install 5 yd3 of 0.5-1.5 ft. diameter riprap to the outboard fillslope.</li> <li>4. Install a critical dip to the left hingeline of the crossing.</li> <li>5. Remove berm to the left for 75 ft.</li> <li>6. Spoil locally.</li> </ol>
108	39.487820°	-123.402214°	78	ML	Culvert is installed short and high in the fill. Outlet discharges flow onto a naturally rocky channel with little evidence of scour erosion. 2 ft. diameter and larger rocks within the stream channel above and below the road. Culvert is bent within the fill, exhibiting a steeper grade along the inboard side. Small berm along the inboard road above the culvert inlet. The stream channel below the crossing is bedrock.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 36 in. diameter x 40 ft. long culvert at the base of fill.</li> <li>3. Install 15 yd3 of 0.5-2.0 ft. diameter riprap to the outboard fillslope of the crossing.</li> <li>4. Install a critical dip to the right hingeline of the crossing.</li> <li>5. Spoil locally.</li> </ol>
109	39.487976°	-123.402391°	16	ML	Low power stream with a rocky channel above the road crosses via culvert. Hummocky hillslope and terrain, with little erosion evident at this site.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 24 in. diameter x 30 ft. long culvert at the base of fill.</li> <li>3. Install 5 yd3 of 0.5-1.5 ft. diameter riprap to the outboard fillslope.</li> <li>4. Install a critical dip to the right hingeline of the crossing.</li> <li>5. Spoil locally.</li> </ol>
110	39.488206°	-123.402701°	35	M	Stream approaches the road to the left and is diverted along the inboard ditch for 35 ft. to this DRC where it discharges in a large gully created by outlet erosion. The gully is ~12 ft. wide x 6 ft. deep x 5 ft. long. Past this large, bowl shaped erosion feature is a 330 ft. long gully, 4 ft. wide x 4 ft. deep. Stream flow continues to erode fill material and fine sediment as it progresses downslope. The streams original swale lies below the road 35 ft. to the left where stream flow diverts to the right, and would be a good location for future culvert installation.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace DRC with a 24 in. diameter x 40 ft. long culvert at the base of fill, in line with the stream channel above the road.</li> <li>3. Install 15 yd3 of 0.5-2.0 ft. diameter riprap to the outboard fillslope.</li> <li>4. Install 10 yd3 of 0.5-2.0 ft. diameter riprap to the headcut above the road created by the excavation.</li> <li>5. Install a critical dip to the right hingeline of the crossing.</li> <li>6. Install 1 rolling dip to the left road, connected to the ditch.</li> <li>7. Spoil locally.</li> </ol>



<b>Preliminary Site Treatment Data Table for SWARM Roads</b>						
Site #	Coordinates (NAD 83)		Future Erosion	Treatment	Comment on Problem	Comment on Treatment
111	39.488900°	-123.403358°	38	M	Two streams course down a hummocky, springy hillslope to the road. Right-most stream is anastomosed on the hillslope above the road, shallowly defined, then coalescing into two clearly defined channels at high flow. Second stream is shallowly defined, perpendicular to the road base. Both streams flow into the inboard ditch and divert left for 35 ft. before passing through road fill at a macropore or buried DRC. Channel below the road is well defined and vegetated. Hillslope to the right is springy, with no defined ditch for 125 ft. Spring flow courses along the road surface. Inboard ditch continues beyond the flow discharge point to Site #112.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Install a 24 in. diameter x 40 ft. long culvert at the base of fill.</li> <li>3. Install 10 yd<sup>3</sup> of 0.5-2.0 ft. diameter riprap to the outboard fillslope.</li> <li>4. Install a critical dip to the left hingeline of the crossing.</li> <li>5. Cut ditch to the right for 185 ft.</li> <li>6. Install 5 yd<sup>3</sup> of 0.5 ft.-minus rock armor to the ditch.</li> <li>7. Inslope the road for 75 ft. to the right.</li> <li>8. Spoil locally.</li> </ol>
112	39.489296°	-123.403277°	92	M	350 ft. of combined ditch flow from left and right road discharges here at a rusted out DRC. Flow seeps into the saturated fillslope and discharges below the culvert outlet. 2-3 ft. diameter riprap placed around culvert outlet, obscuring past fillslope erosion. Ditch flow to the left is the culmination of many feet of concentrated road runoff and ditch flow discharging at the DRC at Site #113 up the road. Treatment of that site and associated hydrologically connected road length will have a big impact on drainage here. Currently this flow is aggressively scouring fine sediment from the inboard road and ditch, resulting in progressive incision and headcutting within the ditch. Ditch flow to the right is a combination of diverted stream flow from Site #111 and spring flow seeping out of the hillslope above the road. Treatment of Site #111 will mitigate most of the erosion within this ditch, including ongoing incision and headcut formation.	<ol style="list-style-type: none"> <li>1. Clean and cut ditch to the right for 140 ft.</li> <li>2. Clean and cut ditch to the left for 200 ft.</li> <li>3. Replace old DRC with an 18 in. diameter x 30 ft. long DRC.</li> <li>4. Install 15 yd<sup>3</sup> of 0.5-2.0 ft. diameter riprap to the outboard fillslope. Utilize the riprap available on site.</li> <li>5. Install 3 rolling dips to the left road, not connected to the ditch.</li> <li>6. Remove berm for 245 ft. to the left.</li> <li>7. Spoil locally.</li> </ol>
113	39.489621°	-123.404684°	34	H	Long right road ditch carries flow from diverted streams at Site #114 and springy hillslope. 18 in. diameter DRC passes ditch flow through the road, but is fully rusted out. Flow has incised to the base of fill; 5 ft. tall headcut below the culvert outlet leads to a long gully. Gully leads to the road below where flow enters a ditch and discharges at Site #112. This DRC is at the intersection of a driveway and this road. Can probably only fit one rolling dip along the right road. Need to be conscious of the residences along the hillslope below the road.	<ol style="list-style-type: none"> <li>1. Replace old DRC with an 18 in. diameter x 40 ft. long DRC.</li> <li>2. Install 1 rolling dip to the right road, connected to the ditch.</li> <li>3. Remove berm along the right road for 125 ft.</li> </ol>
114	39.488530°	-123.404616°	20	L	2 gullies course down the hillslope above the road conveying concentrated runoff from an old landing down a skid road to the inboard ditch of the road at this site. Flow is conveyed along the inboard ditch for 400 ft. to Site #113 down the road. This is a good location for a DRC, with potential discharge over the gentle hillslope below the road constrained by a natural swale and avoiding residential infrastructure.	<ol style="list-style-type: none"> <li>1. Install an 18 in. diameter x 30 ft. long DRC at the site location.</li> <li>2. Install 2 rolling dips to the right road, connected to the ditch.</li> <li>3. Remove berm along the outboard road for 120 ft., between the pullout left of the site and the graded flat where water tanks are installed.</li> </ol>
115	39.486779°	-123.403410°	176	ML	Stream flows along bedrock to the road. Stream will divert left down the inboard ditch during moderate storms. Ditch is incised, undercutting the inboard road on the way to Site #114 400 ft. downhill. Culvert installed short and high in the fill. Steep 12 ft. tall headcut from scour erosion below shotgunned culvert outlet. Channel below is bedrock. Energy dissipates and there is no erosion of the channel beyond. Outboard fillslope is unrocked. Road surface flow from the right has eroded some of the outboard road. Sediment wedge is aggraded above the inlet. Rolling dip installation to the right must consider property owner homes along the hillslope below the road. Right road is crowned and bermed along most of its length.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 36 in. diameter x 50 ft. long culvert at the base of fill.</li> <li>3. Install 1 yd<sup>3</sup> of 0.5-2.0 ft. diameter riprap to the inboard fillslope and 4 yd<sup>3</sup> to the outboard fillslope.</li> <li>4. Install a critical dip to the left hingeline of the crossing.</li> <li>5. Install 2 rolling dips to the right road, connected to the ditch.</li> <li>6. Inslope the right road for 370 ft.</li> <li>7. Spoil locally.</li> </ol>

Preliminary Site Treatment Data Table for SWARM Roads						
Site #	Coordinates (NAD 83)		Future Erosion	Treatment	Comment on Problem	Comment on Treatment
116	39.485949°	-123.402748°	34	L	3 DRC's along the right road. The first (at the site flag) is rusted out steel and should be replaced. Some erosion of the outboard edge of road near the outlet, but looks old with no erosion pending. The second DRC is steel, plugged at the inlet and should be cleaned. The third DRC was probably installed by the landowner. More than 100 ft. long, it is plastic with a concrete apron bracing the inlet. It emerges from the hillslope below at an artificially constructed wetland. The culvert discharges spring flow from the right road ditch onto riprap, with no erosion. Large diameter riprap braces the hummocky hillslope further downhill to the left and right of the culvert. Wetland is the result of the driveway/landing above the residence here, with a couple big water tanks utilizing the spring flow piped through the culvert. The road connecting these DRC's is crowned, with rills developed along the inboard and outboard sides of the road surface and minor erosion of fine sediment for much of its length.	<ol style="list-style-type: none"> <li>1. Replace DRC #1 with an 18 in. diameter x 20 ft. long DRC.</li> <li>2. Install 1 rolling dip to the right.</li> <li>3. Inslope the right road for 300 ft., from the first DRC to the residential driveway between DRC #2 and #3.</li> <li>4. Clean the inlet of DRC #2.</li> <li>5. Install 6 rolling dips to the right road beyond DRC #3.</li> </ol>
117	39.484432°	-123.403777°	47	L	715 ft. of right ditch carries fine sediment from the road surface to this DRC. DRC inlet is crushed, with a concrete headwall and a 5 in. rust line. Outlet of the DRC is perched above a 4 ft. tall headcut and scour hole. The associated gully is deeply incised: 10 ft. wide x 5 ft. deep x 650 ft. long (past erosion). The right road is bermed for most of its length.	<ol style="list-style-type: none"> <li>1. Repair the DRC inlet.</li> <li>2. Install an 18 in. diameter x 10 ft. long full round downspout to the DRC outlet.</li> <li>3. Install 4 Type 2 rolling dips to the right road, connected to the inboard ditch and breaching the outboard berm.</li> </ol>
118	39.482935°	-123.406208°	86	M	Stream is diverted down the right ditch for 230 ft. to a DRC with a full round downspout. Lots of past erosion along the outboard hillslope below the DRC outlet indicates that this isn't a great place to discharge stream flow. The old channel swale below the road where the stream intersects the road looks like an ideal place to install a culvert. The DRC inlet is crushed. Erosion of the hillslope below will continue. The inboard ditch is filling with sediment over time and stream flow may overtop the road in the future.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Install a 24 in. diameter x 60 ft. long culvert at the base of fill.</li> <li>3. Install a critical dip to the right hingeline of the crossing.</li> <li>4. Inslope the road for 230 ft. to the right.</li> <li>5. Clean the inboard ditch for 230 ft. to the right</li> <li>6. Repair the Flared DRC inlet 230 ft. to the right.</li> <li>7. Install 5 yd3 of 0.5-1.0 ft. diameter riprap as energy dissipation to the gully below the DRC outlet.</li> <li>8. Spoil locally.</li> </ol>
119	39.482351°	-123.407756°	41	L	Low power stream crosses the road through an undersized culvert installed short and high in the hillslope. Minimal erosion from outlet scour as the creek winds gently downslope.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 24 in. diameter x 40 ft. long culvert at the base of fill.</li> <li>3. Install a critical dip to the right hingeline of the crossing.</li> <li>4. Spoil locally.</li> </ol>
120	39.482067°	-123.408809°	11	L	Rusty DRC with a crushed flared inlet (detached) causing scour erosion along the outboard hillslope has resulted in a 2 ft. wide x 1 ft. deep x 160 ft. long gully leading to the inboard ditch of Sherwood road below. Sherwood road ditch flows to the left and into the creek at the bridge. The gully is well established and rocky. The inboard ditch from the left carries fine sediment to this site.	<ol style="list-style-type: none"> <li>1. Replace old DRC with an 18 in. diameter x 20 ft. long DRC.</li> <li>2. Clean the ditch to the left for 340 ft.</li> <li>3. Install 1 rolling dip to the left road, connected to the ditch.</li> </ol>
121	39.482055°	-123.409356°	24	L	180 ft. of concentrated left road runoff is causing gully erosion of the inboard ditch for 120 ft. Flow enters a 40 ft. long, 12 in. diameter plastic DRC, passing through the road fill and emerges along the inboard, discharging into the inboard ditch of Sherwood road. Some road surface runoff from 1st Gate road has eroded a network of rills along the outboard berm. This ponds up along the inboard ditch at the intersection before passing through a 12 in. diameter steel driveway culvert. All the flow continues along the inboard of Sherwood road and delivers fine sediment to a class II or Class I stream crossing nearby.	<ol style="list-style-type: none"> <li>1. Remove old DRC along the inboard ditch and dispose of properly.</li> <li>2. Replace the driveway DRC with an 18 in. diameter x 40 ft. long DRC.</li> <li>3. Remove left road berm for 180 ft.</li> <li>4. Outslope the left road and remove the ditch for 180 ft. Will need to work around powerline infrastructure.</li> <li>5. Install 1 rolling dip to the left road.</li> </ol>

<b>Preliminary Site Treatment Data Table for SWARM Roads</b>						
Site #	Coordinates (NAD 83)		Future Erosion	Treatment	Comment on Problem	Comment on Treatment
122	39.491655°	-123.412456°	88	ML	Culvert is installed short and high in the fillslope, with outlet scour along the outboard fillslope and a 5 ft. tall headcut. Left bank sidewall below the outlet is near vertical.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 30 in. diameter x 40 ft. long culvert at the base of fill.</li> <li>3. Rebuild the road prism by moving the road in 10 ft.</li> <li>4. Install 5 yd<sup>3</sup> of 0.5-2.0 ft. diameter riprap to the outboard fillslope.</li> <li>5. Install a critical dip to the right hingeline of the crossing.</li> <li>6. Spoil locally.</li> </ol>
123	39.491535°	-123.412839°	42	HM	Culvert rusted out internally. Fill is being winnowed out of the road prism and flow incises to natural stream grade. Small 2 ft. tall headcut at the culvert outlet. Large rocks at the outlet provide good energy dissipation with no erosion evident downstream of the crossing. The left ditch is incising a bit for 15 ft. left of the culvert inlet. Left road surface drains adequately, a rolling dip is unnecessary.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 24 in. diameter x 50 ft. long culvert at the base of fill.</li> <li>3. Install a critical dip to the left hingeline of the crossing.</li> <li>4. Spoil locally.</li> </ol>
124	39.491283°	-123.413484°	59	M	Ditch flow from left road discharges here with no visible erosion. Culvert rusted out. Low volume crossing.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 30 in. diameter x 50 ft. long culvert at the base of fill.</li> <li>3. Install 5 yd<sup>3</sup> of 0.5-2.0 ft. diameter riprap to the outboard fillslope.</li> <li>4. Install a critical dip to the right hingeline of the crossing.</li> <li>5. Install 1 rolling dip to the left.</li> <li>6. Spoil locally.</li> </ol>
125	39.491910°	-123.414270°	82	HM	Moderate-low power stream passes through the road via a culvert installed short and high in the fillslope. Flow emerges from the fill prism at the base of a 4 ft. tall headcut. Stream gullys down to the profile bot which is bedrock. Left sidewall of channel below the road is steep, eroding slowly as the stream incises over time. Property owner's fence (adjacent stream, left) may impede excavation and is threatened by erosion of left bank. Plenty of room to move the road in 5 ft. or more, which would solve the issue. Right road surface and ditch flow delivers to the inboard/outboard of the crossing. No erosion in the ditch. Left road is the same, but ditch is gullying out for 500 ft.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 24 in. diameter x 30 ft. long culvert at the base of fill.</li> <li>3. Rebuild road prism by moving it inward 5 ft.</li> <li>4. Install 2 rolling dips to the left, connected to the ditch.</li> <li>5. Spoil locally.</li> </ol>
126	39.492383°	-123.415705°	75	ML	Culvert is rusted out and partially buried at the outlet. Stream channel has been altered from its natural course and is conveyed downslope to a pond. The pond discharges to the west of the streams original channel swale. Left road discharges over the outboard road and has created a 5 ft. wide x 3 ft. deep x 15 ft. long gully. Ditch erosion from the left is minor.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag.</li> <li>2. Replace culvert with a 24 in. diameter x 50 ft. long culvert at the base of fill.</li> <li>3. Install 5 yd<sup>3</sup> of 0.5-2.0 ft. diameter riprap to the outboard fillslope.</li> <li>4. Install 2 rolling dips to the left road.</li> <li>5. Remove berm to the left for 25 ft.</li> <li>6. Spoil locally.</li> </ol>
127	39.492716°	-123.417214°	108	M	Small, low power, low gradient stream ponds up at the culvert inlet above the road. Flow passes through sediment and emerges at the culvert outlet 5 ft. below the road. Culvert outlet is incorporated into geotextile lined pond covered with rebar and concrete. Pond outlet is filled with wood trash (pallets, etc.) and hose tubing. Pond dimensions: 15 ft. wide x 1 ft. deep x 15 ft. long. Right and left road surface flow discharges fine sediment over the outboard road of the crossing. Right and left ditch flow deliver fine sediment to the plugged culvert inlet at the crossing. The left road ditch features gully erosion. The right ditch is vegetated and flowing from emergent spring flow at the wetland adjacent to the stream crossing inboard road.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag. Remove concrete, geotextile and rebar. Haul it to a proper disposal site.</li> <li>2. Replace culvert with a 24 in. diameter x 40 ft. long culvert at the base of fill. Ensure culvert grade is steep enough for self-cleaning.</li> <li>3. Use the excavator to clean and define the channel beyond the bottom flag: remove fill and trash from the channel.</li> <li>4. Spoil locally.</li> </ol>

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Site #	Coordinates (NAD 83)		Future Erosion	Treatment	Comment on Problem	Comment on Treatment
128	39.493358°	-123.417531°	8	ML	Small spring-fed stream diverts into the road inboard ditch for 205 ft. before crossing the road. Stream flow overtops the ditch and spills onto the road during big storms. It looks like some of the wood and debris in the ditch was placed intentionally as energy dissipation.	<ol style="list-style-type: none"> <li>1. Clean and define the inboard ditch to the right for 205 ft. (ditch between this site and Site #127).</li> <li>2. Install 10 yd<sup>3</sup> of 0.5 ft.-minus rock armor to the ditch as energy dissipation.</li> <li>3. Use an excavator to clean and define the swale at the top flag and transition flow into the inboard ditch.</li> <li>4. Install 1 rolling dip to the left road.</li> <li>5. Spoil locally.12/60</li> </ol>
129	39.493972°	-123.417980°	1,360	H	Culvert shotgunned, short and high in the fillslope. Flow emerges at channel grade from beneath the fillslope, ponding in a scour hole before entering a rusty 24 in. diameter x 120 ft. long culvert piping flow through the landing beyond to a 40 ft. long half-round downspout. Culvert life is expired; rusted out and unnecessary. Culvert downspout conveys flow to the natural channel below the landing, discharging onto bedrock. A large hole at the outboard road/culvert outlet either eroded in some past event or was excavated for culvert maintenance. Rock placed at the inlet of the landing culvert. Lots of wood and poison oak buries the channel above the road for 50 ft.	<ol style="list-style-type: none"> <li>1. Excavate fill from top to bottom flag. Remove old culverts and dispose of properly.</li> <li>2. Lay back side slopes from the top flag to the inboard fillslope base 2:1 or to natural grade and establish a 4 ft. wide channel bottom.</li> <li>3. Lay back side slopes from the new outboard fillslope base to the bottom flag 2:1 or to natural grade and establish a 4 ft. wide channel bottom.</li> <li>4. Replace culvert with a 36 in. diameter x 60 ft. long culvert at the base of fill.</li> <li>5. Install a critical dip to the right hingeline of the crossing.</li> <li>6. Cut inboard ditch for 250 ft. to the left, starting 370 ft. left of the crossing and finishing just before Site #130 DRC.</li> <li>7. Install 3 rolling dips to the left, connected to the ditch.</li> <li>8. Endhaul spoils to the left.</li> </ol>
130	39.495380°	-123.418740°	38	L	An 18 in. diameter DRC conveys spring flow from buried poly-line. Very little erosion in the long left road ditch. Poly-line is connected to a PVC well 210 ft. up the left road in the ditch. An active gully leads to the PVC pond setup: 1.5 ft. wide x 0.5 ft. deep x 120 ft. long. The DRC is rusted at the inlet and still conveys flow. At the outlet is a 3 ft. wide x 3 ft. deep x 4 ft. long gully with a headcut. DRC is set at 2% grade and ditch flow doesn't appear to ever overtop the road here.	<ol style="list-style-type: none"> <li>1. Replace old DRC with an 18 in. diameter x 20 ft. long DRC.</li> <li>2. Clean and define ditch to the left for 1000 ft.</li> <li>3. Install 5 rolling dips to the left, connected to the ditch.</li> </ol>
<b>TOTAL VOLUME (yd<sup>3</sup>)</b>			<b>6,581</b>			