Preliminary Sizing Results
VT116 Culvert AOP Assessment
Starksboro, Vermont

LocalID	Existing Structure Type	Existing Structure Length (ft)	Channel Bankfull Width (ft)	Conveyance Design Type	Conveyance Design Size (in)	Conveyance Design Fish Passage Percent	Conveyance Design Low Flow AOP Barrier Type	Conveyance Design High Flow AOP Barrier Type	AOP Improvement Notes	Improved Type	Improved Size (in)	Improved Passage Percent	Improved Low Flow AOP Barrier Types	Improved High Flow AOP Barrier Types	AOP Design Type	Changes to Inlet and Outlet Elevations*	Changes to Structure Slope	Alignment	AOP Design Percent Fish Passage	AOP Design Low Flow Barrier Type	AOP High Flow Barrier Type
1	24" round RCP	50	*3*	CPP	42	AOP not applicable. Limited habitat potential.															
2	48" round RCP	90	7	Pipe adequately sized for conveyance.	0	0	Depth	Depth, Velocity	Replace with 54" CMP. Embed 0.5'. Lower pipe elevation 1'. Decrease culvert slope from 2.1% to 1%.	CMP	54	100	None	None	7.3' x 5.3' Pipe Arch	Lower inlet 2.0' and lower outlet by 1' to reduce slope and velocity.	Decrease slope by 1.1% (PR = 1.0%, EX = 2.1%, US = 2.3%) to reduce velocities and increase depth.	No Change. Naturally Straight.	100	None	None
3	42" round RCP	90	11	CMP	72	0	Depth	Velocity	Increase pipe size to 78". Embed 1'. Lower pipe elevation 1'.	CMP	78	100	None	None	11.4' x 7.3' Pipe Arch	Lower elevation by 1' to increase water depth.	No Change. (PR = 0.7%, EX = 0.7%, US = 1.5%)	No Change. Mild Bend.	100	None	None
4	42" round CMP	80	*8*	Pipe adequately sized for conveyance.	0	0	Depth	Drop, Depth, Velocity	Replace with 48" CMP. Embed 0.5'. Lower pipe 1.5'. Decrease slope 1.2% to 2%. Lower inlet by 2.5'. Increase tailwater elevation by 1'	CMP	48	100	None	None	8.6' x 5.9' Pipe Arch	Lower inlet 2.5' and lower outlet by 1.5' to eliminate outlet drop and increase water depth. Increase tailwater elevation by 1'	Decrease slope by 1.2% (PR = 2.0%, EX = 3.2%, US = 5.0%) to increase water depth.	No Change. Naturally Straight.	100	None	None
5	48" round RCP	80	9	Box	8' x 4'	0	Depth	Depth, Velocity	Reduce slope to 1%. Lower inlet elevation by 1.6'. Embed 20%.	Conveyance Design	0	100	None	None	9.3' x 6.3' Pipe Arch	Lower inlet by 1.6' to increase water depth.	Decrease slope by 2% (PR = 1.0%, EX = 3.0%, US =0.2%) to increase water depth	No Change. Skewed to roadway, but aligned with channel. Mild Bend.	100	None	None
6	42" round CMP	125	*5*	Pipe adequately sized for conveyance.	0	AOP not applicable. Limited habitat potential.															
7	30" round RCP	75	*2*	Pipe adequately sized for conveyance.	0	AOP not applicable. Limited habitat potential.															
7a	30" round RCP	50	*2*	Pipe adequately sized for conveyance.	0	AOP not applicable. Limited habitat potential.															
8	48" round RCP	80	*4*	Pipe adequately sized for conveyance.	0	0	Depth	Depth	Increase tailwater by 1' to remove depth barrier. Use log weir or other small method.	Existing Culvert	0	100	None	None	No.	Lower elevation by 1' to increase water depth.	No Change (PR = 0.5%, EX = 0.5%, US = 4.8%).	Sharp Bend. US alignment is not perfect, but culvert length is already very long (80 ft). Skewing culvert is not recommended.	100	None	None
9	48" round RCP	75	*8*	Pipe adequately sized for conveyance.	0	AOP not applicable. Limited habitat potential.															
10	7' x 6' concrete box	85	25	Box	10' x 8'	0	Depth	Depth, Velocity	20% embedded. Reduce slope to 0.6%. Lower inlet 2.3' and lower outlet 1.8'. (High Knob Brook culvert replacement strongly desired.)	Box	18' x 10'	100	None	None	25.2' x 8.4' Low-Profile Pipe Arch	Lowered inlet 2.2' and outlet 1.6' outlet drop and reduce velocity.	Reduced slope by 0.7% (PR = 0.5%, EX = 1.2%, US = 2.4%) to reduce velocity.	Sharp Bend. Culvert located at meander bend, but generally in line with channel. No change recommended.	100	None	None
11	42" round RCP	75	*11*	CMP	54	0	Drop, Pool, Velocity	Drop, Pool, Velocity	Would require unreasonable elevation change or slope. Already has concrete step ds, so can not increase tailwater.	Conveyance Design	0	0	0	0	11.4' x 7.3' Pipe Arch	Lowered elevation by 1.8 to eliminate drop. Increased tailwater by 1'.	Reduced slope by 3.9% (PR = 1.6%, EX = 4.5%, US = 2.7%).	No Change. Naturally Straight.	0	Depth	Depth
12	18" round CMP	93	*2*	CPP	24	AOP not applicable. Limited habitat potential.															
13	78" round multi-plate	80	*8*	Pipe adequately sized for conveyance.	0	0	Depth	Drop, Depth, Velocity	Embed 1.3'. Lower elevation by 2'	Existing Culvert	0	100	None	None	12.5' x 8' Pipe Arch	Lower elevation by 2.0' to eliminate drop.	Reduce slope by 0.3' (PR = %, EX = 1.3%, US = 1.1%) to reduce velocity and increase water depth	No Change. Naturally Straight.	100	None	None
14	Bridge	31	32	Bridges beyond scope of project.	0	Bridge not applicable.															

NOTES: RCP = radial concrete pipe. CMP = corrugated metal pipe. CPP = corrugated plastic pipe