

Scene 51 · MS4 Assessment

Black Branch 2

City of Lebanon TN

36.16874, -86.27227 · Generated October 22, 2026

OVERALL SCORE

3.2

Poor



Front: Looking downstream (direction of travel) from inside a large concrete box culvert. The downstream opening reveals a narrow stream channel with shallow water continuing through a wooded area with mostly bare deciduous trees and early spring green growth. Small rock fragments and sediment deposits visible at the culvert outlet. The stream narrows significantly beyond the culvert opening.

Right: The right side view shows the interior right wall (right bank when facing downstream) of a large concrete box culvert. The wall is cast-in-place concrete with visible panel joints, green algae/moss growth on the lower half, and orange-brown staining on upper portions. A circular weep hole is visible near the base of the wall. Beyond the culvert edge, bare deciduous trees and some herbaceous vegetation are visible on the right bank.

Back: Looking upstream (back toward the approach) from inside the concrete box culvert. The view shows the culvert extending upstream with the inlet opening visible in the distance. Shallow brown water flows across the concrete floor. A person wearing a Petzl helmet and safety gear (the survey team member) is visible on the right side. The left culvert wall shows green algae growth and orange-brown staining. Light enters from the upstream opening where debris accumulation and vegetation are partially visible.

Left: The left side view shows a survey team member wearing a yellow Petzl helmet, safety harness, and wading gear standing inside the concrete box culvert near the left wall. The left wall is cast-in-place concrete with heavy green algae/moss growth on the lower half and orange-brown mineral staining above. A circular weep hole is visible near the base of the wall. The concrete floor beneath is covered with a thin layer of sandy-brown sediment and shallow water.

Assessment Scores

Component	Score	Visual	Rating
Channel Condition	2		poor
Hydrologic Alteration	3		Poor
Sediment Deposition	4		Fair
Left Bank Stability	7		Good
Right Bank Stability	7		Good
Left Vegetative Protection	3		Poor
Right Vegetative Protection	3		Poor
Riparian Canopy Cover	2		Poor
Floodplain Vegetation	2		Poor
Water Appearance	4		Fair
Nutrient Enrichment	7		Good
Epifaunal Substrate	-		-

Urgency: MEDIUM TERM 6 12 MONTHS

Detailed Observations · Scene 51

Scene 51 captures a concrete box culvert road crossing near the end of Black Branch 251. The stream passes through an approximately 8-10 foot wide by 5-6 foot tall cast-in-place concrete box culvert with moderate sediment deposition on the floor and shallow turbid flow. The culvert completely eliminates all natural channel, habitat, and riparian functions at this location. The structure is in fair condition with minor weathering, algae/moss growth on lower walls, and orange-brown mineral staining. While the water quality appears acceptable (no evidence of illicit discharge, contamination, or severe nutrient enrichment), the habitat value is essentially zero within the culvert. This is a critical point of habitat fragmentation that may impede fish passage during low flow conditions. For MS4 compliance, the culvert weepholes should be monitored during dry weather screening, and sediment accumulation should be periodically assessed for maintenance needs.

Primary Stressors

channelization, sedimentation, riparian loss, barriers

Channel Assessment

Metric	Score	Notes
Channel Condition	2	The stream at this location is entirely enclosed within a concrete box culvert, representing complete channelization at this point. The natural channel has been replaced with an engineered structure. Score of 2 reflects that while the culvert itself is not actively downcutting, the channel is 100% concrete-modified at this location. Downstream of the culvert, some natural channel characteristics appear present.
Hydrologic Alteration	3	The box culvert constrains flood flows and disconnects the stream from its floodplain within the crossing. The culvert dimensions appear adequate for low to moderate flows but the structure inherently alters the natural hydrologic regime. Some incision may be present based on the depth of the culvert below grade.
Sediment Deposition	4	Moderate sediment deposition observed across approximately 60-80% of the culvert floor. Fine sand and silt deposits 1-2 inches thick indicate active sediment transport from upstream. The flat concrete floor promotes deposition during low flow conditions. Score reflects moderate to heavy deposition within the culvert structure.

Bank Assessment

Side	Stability	Veg. Protection	Erosion	Notes
Left	7	3	0_percent	Left bank is entirely engineered concrete within the culvert. Transitions to natural bank conditions downstream of culvert outlet. Algae growth line on concrete wall indicates normal water level approximately 2 feet above current flow.
Right	7	3	0_percent	Right bank conditions essentially identical to left bank - full concrete wall within culvert transitioning to natural bank downstream.

Riparian Assessment

Metric	Score/Value	Notes
Canopy Cover	2	The concrete box culvert provides complete shade within its interior, but this is artificial shade from an engineered structure, not natural canopy. Beyond the culvert, early spring bare deciduous trees provide minimal shade. Overall canopy cover is very low for this reach location.
Left Buffer Width	under 10ft	Score: 3/10
Right Buffer Width	under 10ft	Score: 3/10
TDEC 30ft Buffer Met?	L: No / R: No	The box culvert represents a complete elimination of riparian buffer at this location. This is expected for a road crossing but should be documented. The road surface above contributes impervious surface runoff directly to the stream. Buffer restoration is limited to areas upstream and downstream of the culvert.

Water Quality & Infrastructure · Scene 51

Water Quality Indicators

Metric	Score	Notes
Water Appearance	4	Water is moderately turbid with a brown coloration suggesting suspended sediment. Visibility appears to be approximately 0.5-1 foot based on the ability to partially see the concrete floor through the water. The turbidity may be elevated due to recent precipitation. No sheen, scum, or film observed on the water surface.
Nutrient Enrichment	7	Algae: minor
Manure/Waste	10	No evidence of manure, waste, or livestock access observed within or near the culvert. No waste discharge pipes visible. No sewage odor indicators.
Surface Contamination	-	Sheen: No · Foam: No · Odor: none

Stormwater Infrastructure

No outfall detected at this location.

Instream Habitat

Metric	Score	Notes
Epifaunal Substrate	-	

Stream Characteristics

Field	Value
Stream Type	perennial
Gradient	low_flat

Management Recommendations

Action	Priority	Timeline
Add this box culvert to the outfall/infrastructure inventory for Black Branch 251	high	30_days
Conduct dry weather screening at culvert weepholes to verify no illicit connections to subsurface drainage	medium	90_days
Document road drainage connections to the culvert from the road surface above	medium	90_days
Assess sediment accumulation for maintenance scheduling	medium	annual

Terrain360 · terrain360.com/trail/black-branch-2/scene/51/analysis