PROJECT CONCEPT
TOWN OF BROADWAY
LINVILLE CREEK BANK STABILIZATION

Location Description
38.611806, -78.800889
Linville Creek corridor from Turner Avenue southward through the Heritage Park expansion area (proposed Lions Club Park area).

Project Purpose
Stabilize Linville Creek banks, protect existing infrastructure, and manage sediment movement.

Additional Information Needed
- Survey of sewer system to determine if aerial 12" sewer line can be lowered or otherwise relocated to enhance protection
- Evaluate erosion extent and rate
- Incorporation into design of proposed Lions Club Park
- Coordination with Norfolk Southern Railroad - active line parallel to stream channel, railroad embankment is the stream bank in sections

Background
Linville Creek south of Turner Avenue (upstream) has nearly vertical, eroded banks averaging approximately 6 ft in height along the Town-owned parcel slated for the future Lions Club park (**Figure 1**, **Figure 2**). There is a narrow strip of riparian vegetation remaining on the western bank that is only sporadically present on the eastern bank where the channel is bounded by the railroad. There is observed sediment deposition and bar formation at the Turner Avenue bridge (**Figure 3**), supporting the need for a defined low-flow channel to ensure efficient sediment transport and flow under the bridge to minimize accumulation of debris.

The largest structural restrictions to design are the Turner Avenue bridge and the exposed existing sewer line crossing the stream (**Figure 4**). Currently, the sewer line is reinforced with metal bracing on the upstream sides to protect the pipe from floating debris. Further survey and study should be performed to determine if this sewer line can be lowered or otherwise moved prior to finalizing any stream bank restoration design to limit the number of disturbances to the site.

After passing under Turner Avenue, Linville Creek flows north along Heritage Park, which currently features a turfgrass-covered floodplain bench and bank (**Figure 5**). A lack of deeply rooted vegetation leaves the bank susceptible to erosion.



Figure 1. Map of Linville Creek in the proximity of Turner Avenue.



Figure 2. Photo of Linville Creek south of Turner Avenue, along site of future Lions Club Park. Photo taken facing south. Railroad tracks on far side of Creek obscured by trees in the foreground.

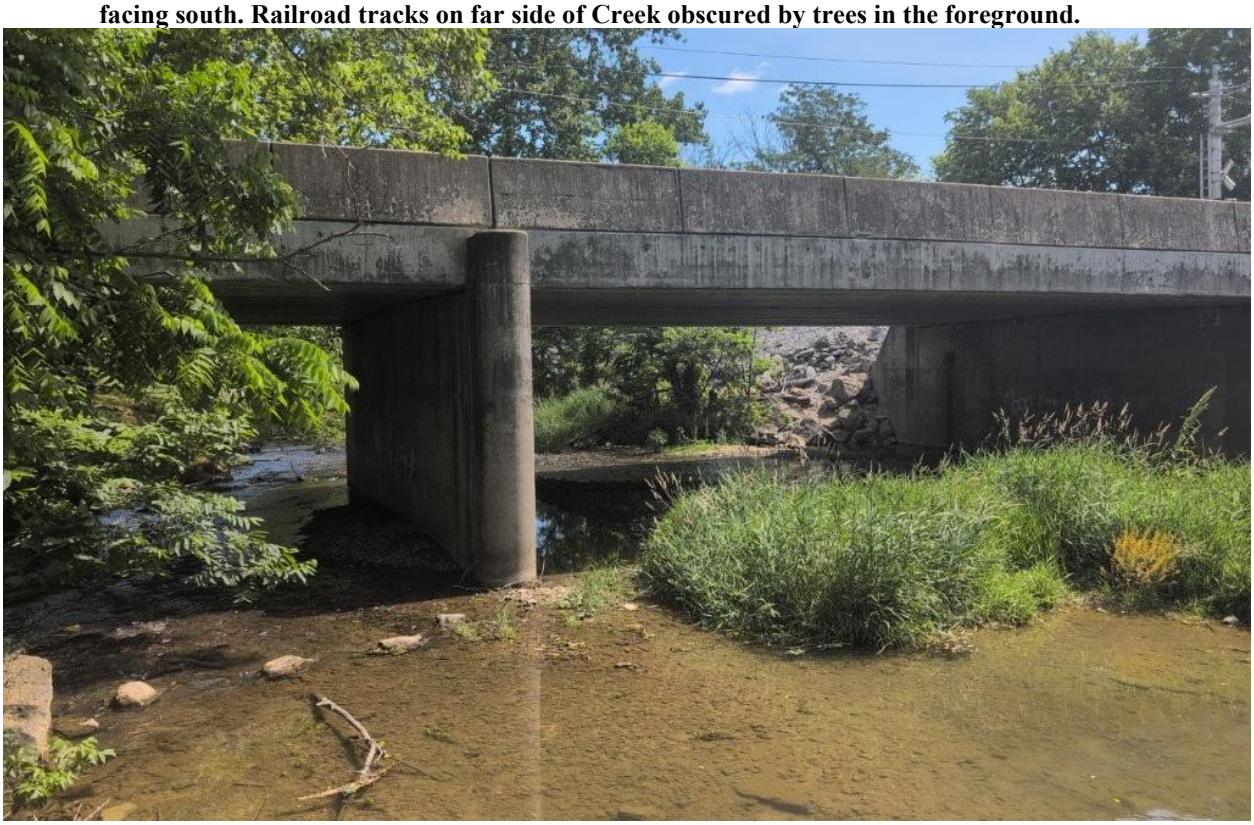

Figure 3. Photo of Turner Avenue bridge crossing Linville Creek, taken facing north. Note deposition harboring vegetative growth in center of Creek.



Figure 4. Sewer line crossing Linville Creek just upstream of Turner Avenue bridge. Photo taken from Turner Avenue bridge facing south.



Figure 5. Photo of Linville Creek along Heritage Park (walking trail visible to left), taken facing north.

Conceptual Design and Planning-Level Cost Estimate

A natural channel restoration along the approximately 500 ft of channel along the proposed Lions Club Park site would re-establish a low flow channel and inset floodplain with native riparian vegetation. The ability of flood water to be slowed and absorbed by the inset floodplain bench would reduce further erosion that has endangered utilities. Establishing a primary low-flow channel can mitigate observed sediment deposition at the Turner Avenue bridge (**Figure 3**). Ideally, this work would be incorporated into the planning stages of the proposed Lions Club Park and a full evaluation of alternatives for relocating the exposed sewer line crossing the stream (**Figure 4**).

To further increase flood protection, establishment of native riparian vegetation along the northern (downstream) section of Linville Creek along Heritage Park could be included as part of this project. Establishing native vegetation on the currently turfgrass-covered floodplain bench and bank (**Figure 5**) would increase infiltration capacity, reduce flood water velocity, and shade the stream to enhance habitat and recreation along the approximately 750 ft channel section. As both sections align with existing or proposed public parks, maintaining access to the stream in controlled locations within the native plantings should be included in the plan.

Establishing a primary low-flow channel will help restore appropriate sediment dynamics in the flow under the Turner Avenue bridge, and the installation of a stone cross vane (**Figure 6**) upstream of the bridge will guide flow and maintain channel dimension leading up to the bridge. The channel slope is currently estimated at approximately 1% based on DEM data. Based on this data and other site factors, additional grade control structures beyond that at the road bridge are not anticipated. Approximate areas of riparian and stream bank planting are highlighted in **Figure 6** and **Figure 7**. A conceptual proposed cross section is presented (**Figure 8**) based on a bankfull (channel-defining) flow estimated at 1,300 cfs. This flow estimate is based on regional curves and USGS recorded data at station USGS-01632082 on Linville Creek at Springbrook Road to the south.

Plantings along the stream bank and riparian area will feature native vegetation providing habitat and forage for wildlife as well as increasing shade to benefit the aquatic life in the stream. A variety of species should be featured, including both woody species such as black willow, silky dogwood, buttonbush, elderberry, smooth alder, common winterberry, southern arrowwood, spicebush, sweet gum, sycamore, persimmon, red oak, white oak, and willow oak, as well as a range of native herbaceous vegetation like goldenrod, boneset, thimbleweed, ironweed, path rush, squarrose sedge, foxglove, and cardinal flower.

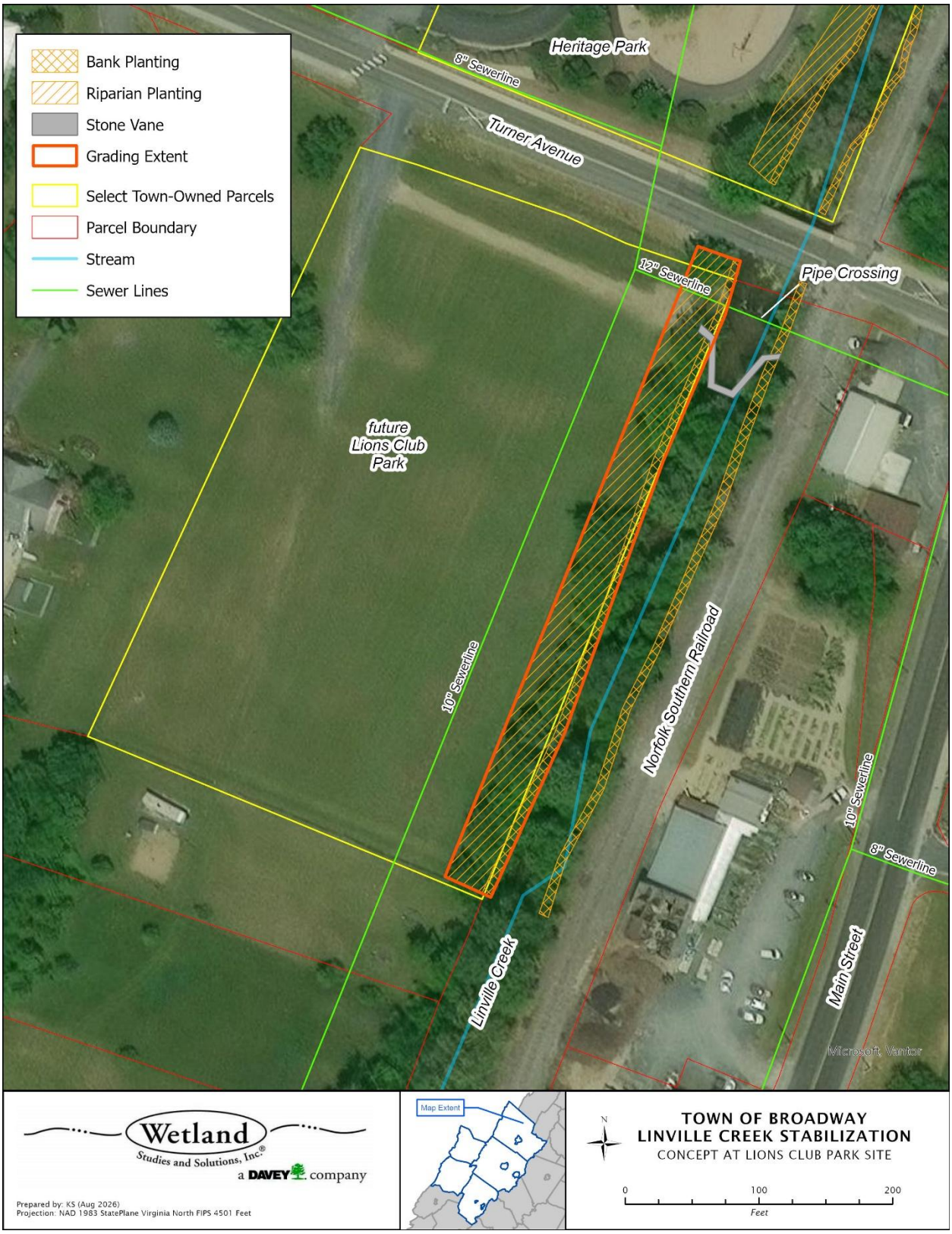

Figure 6. Conceptual layout of improvements at the future Lions Club Park site.

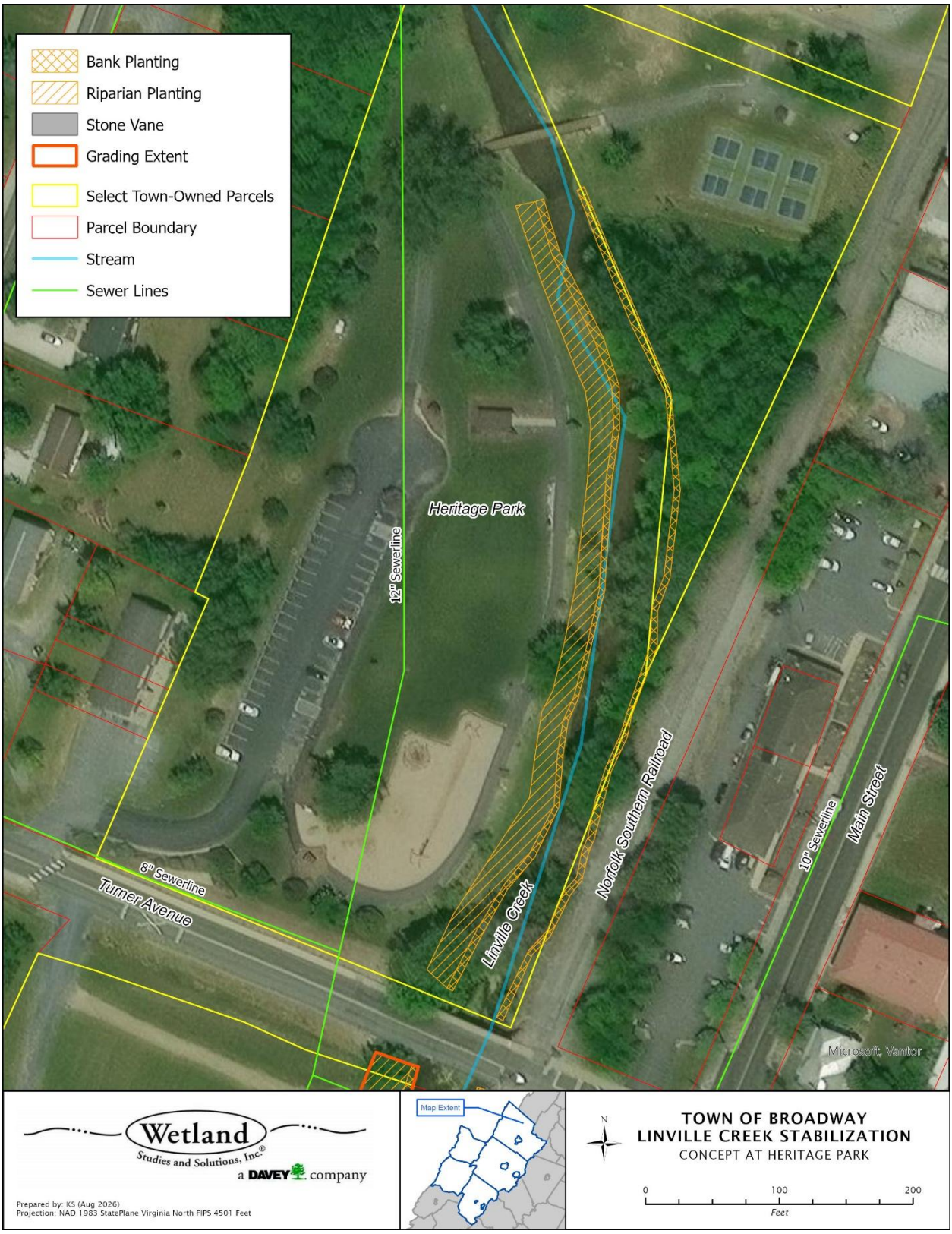

Figure 7. Conceptual layout of improvements at Heritage Park.

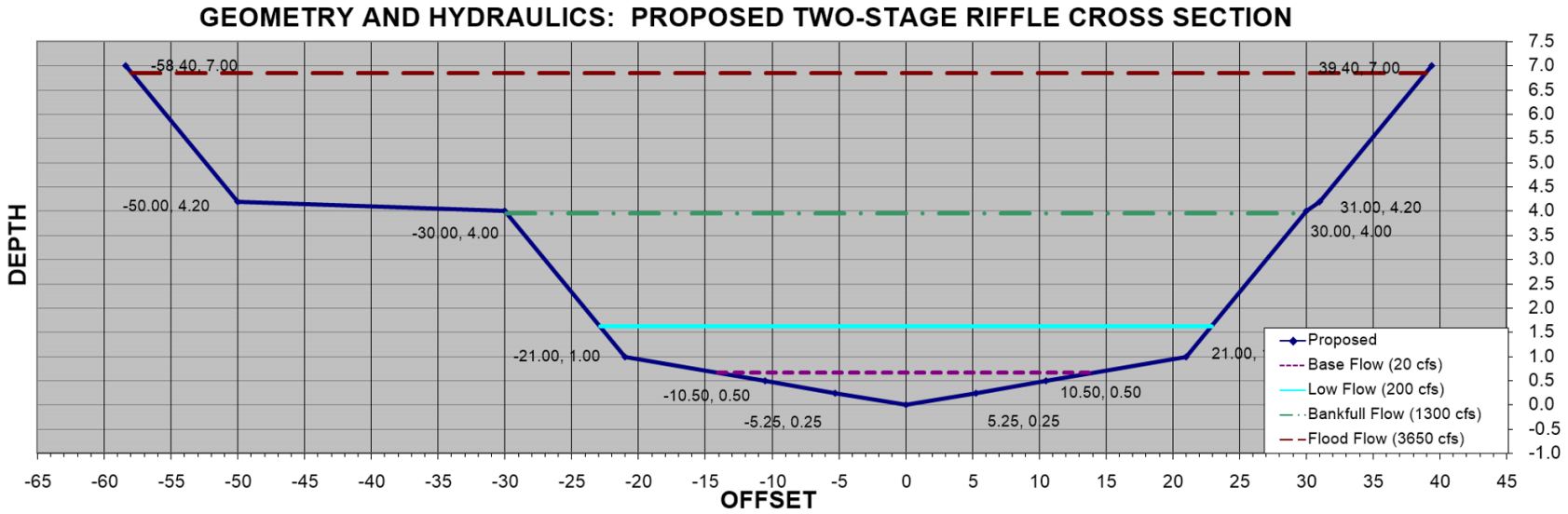

Figure 8. Conceptual cross section, facing downstream (note lack of cut bankfull bench to right representing railroad embankment).

ITEM/DESCRIPTION	QTY	UNIT	UNIT COST	ITEM SUB-TOTAL	EXTENDED SUB-TOTAL
Design					**$72,000**
Channel and Utility Survey	1	LS	$18,000	$18,000	
Natural Channel Design	1	LS	$40,000	$40,000	
Permitting	1	LS	$14,000	$14,000	
Construction Oversight and Inspections					**$15,000**
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Access and Erosion/Sediment Control					**$22,200**
Temporary Construction Entrance	1	EA	$4,500	$4,500	
Super Silt Fence	300	LF	$9	$2,700	
Deck Mats	150	LF	$100	$15,000	
Construction					**$218,100**
Stakeout	1	LS	$16,000	$16,000	
As-Built Survey	1	LS	$16,000	$16,000	
Mobilization	1	LS	$25,000	$25,000	
Clearing	0.35	AC	$30,000	$10,500	
Grading – rough	0.35	AC	$7,000	$2,450	
Grading – fine	0.35	AC	$9,000	$3,150	
Cross Vane	1	EA	$45,000	$45,000	
Excavation and Hauling	1000	CY	$100	$100,000	
Planting – Lions Club Park					**$53,600**
Native Seed and Natural Fiber Matting	1,700	SY	$12	$20,400	
Live Stakes (both banks)	1000	EA	$10	$10,000	
Stream Edge Planting (both banks, tubelings)	1000	EA	$8	$8,000	
Stream Bank Planting (both banks, tubelings)	1300	EA	$8	$10,400	
Riparian Planting (single bank, 30' buffer, tubelings)	600	EA	$8	$4,800	
Planting - Heritage Park					**$68,200**
Native Seed and Natural Fiber Matting	1,700	SY	$12	$20,400	
Live Stakes (both banks)	1500	EA	$10	$15,000	
Stream Edge Planting (both banks, tubelings)	1500	EA	$8	$12,000	
Stream Bank Planting (both banks, tubelings)	2000	EA	$8	$16,000	
Riparian Planting (single bank, 20' buffer, tubelings)	600	EA	$8	$4,800	
Contingency					**$134,730**
TOTAL ESTIMATED BUDGET					**$583,830**

Assumptions

- Watershed (via StreamStats 8/5/2026) is 45.7 sq miles (29,228 acres).
- Sewer relocation project is not included in this evaluation.
- Appropriate amount and type of bed material assumed available on-site for any in-stream restoration.
- Cost estimate developed in 2026, appropriate escalation should be applied if considering these values in the future.
- Town ownership of the parcel eliminates the need for easement or property acquisition, and the existing access to Turner Avenue will be reinforced as appropriate to serve as the construction entrance.

Recommended Next Steps

Evaluate compatibility with the planned Lions Club Park and decide on pursuit of funding.

References

USGS. StreamStats v4.33.0. Accessed online 5 August 2026.