

City of Broken Arrow

Drainage Advisory Committee



PROJECT REPORT

DATE:	July 11, 2025
NAME	Sarah Walters, Stormwater Project Manager
ADDRESS / LOCATION	Liberty Trail along Creek Turnpike, west of S. Elm St.
WATERSHED	Elm Creek
ESTIMATE	\$350,000
CASE NO.	25-016

DESCRIPTION

The Liberty Trail that runs along the north side of the Creek Turnpike in Broken Arrow has a segmental block retaining wall that has visible signs of distress and protentional failure, per an evaluation completed by McGuire Civil Engineering Services, LLC in May of 2025. A pronounced bulge has developed in a section of the wall, where several blocks have dislodged from the earth fill behind them. The wall is located downslope from the turnpike approximately 35 feet away, with no evident drainage infrastructure to intercept runoff from the road. Runoff flows appear to be flowing directly toward the wall. The wall also does not have any weep holes or a 12-inch gravel backfill zone, which are standard design requirements. The approximate length of the wall is 1,000 linear feet and the height varies from 8 inches to 7.5 feet in height.

Staff is requesting \$350,000.00 for construction funds.

Case No. 25-016

BENEFIT

Replace the potentially failing wall that poses a public safety hazard.

RECOMMENDATION

Approve the request for expenditure of \$350,000 to replace the retaining wall.

COMPLETED BY: Sarah Walters

DATE: 7/11/2025

City of Broken Arrow

Drainage Advisory Committee



APPLICATION

DATE:	7-11-2025
OWNER NAME:	City of Broken Arrow
PHONE NUMBER:	918-259-2400
EMAIL ADDRESS:	swalters@brokenarrowok.gov
OWNER MAILING ADDRESS:	485 N. Poplar, Broken Arrow, OK 74012
ADDRESS OF PROPERTY WITH DRAINAGE PROBLEM:	See Map
LOCATION OF DRAINAGE ISSUE ON PROPERTY:	Along Liberty Trail, north of the Creek Turnpike and west of S. Elm Pl. in Elm Creek Drainage Basin

DESCRIPTION OF PROBLEM: (*PHOTOS SHOULD ACCOMPANY APPLICATION)

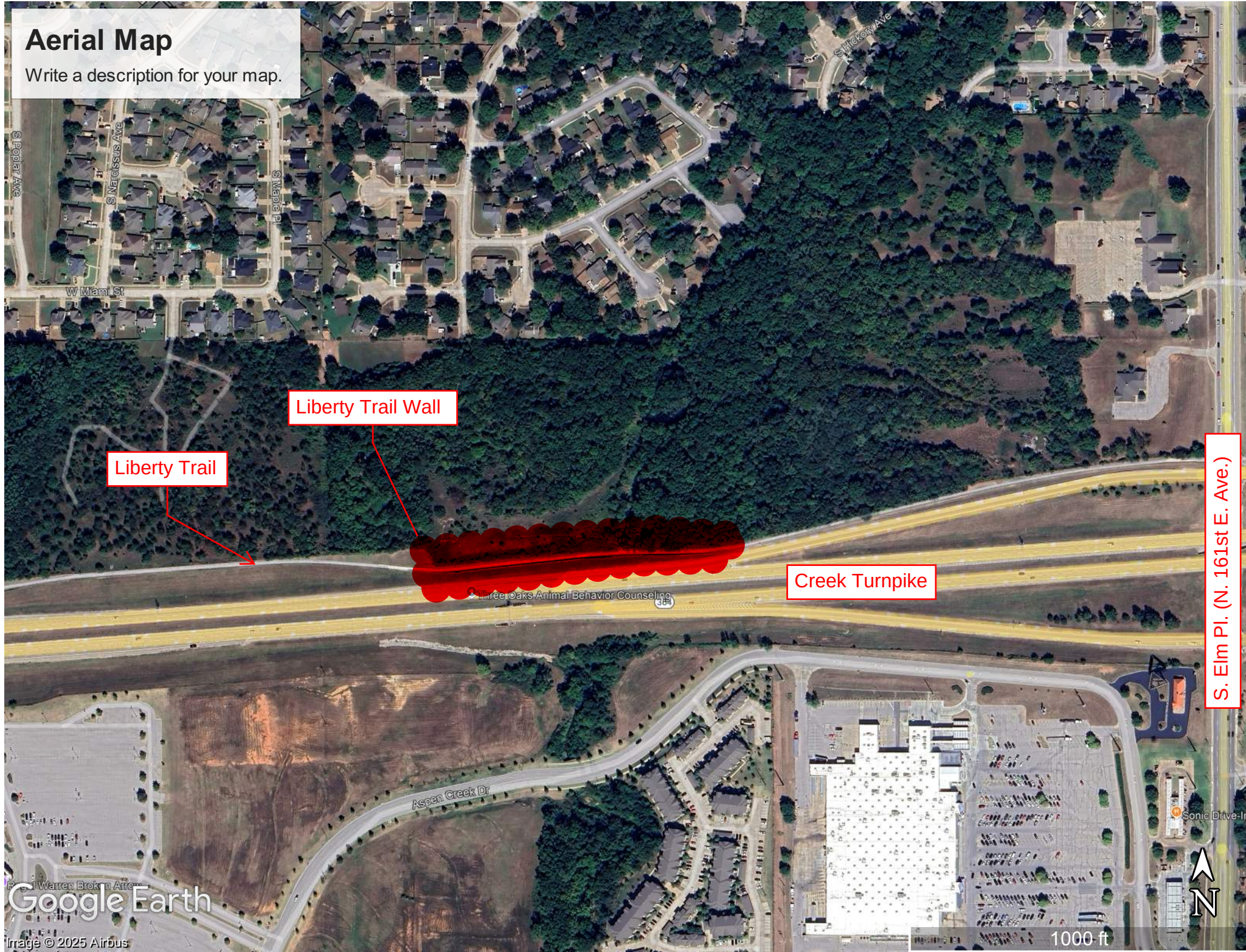
The existing segmental block retaining wall along Liberty Trail on the north side of the Creek Turnpike is failing per a structural report by McGuire Engineering Services LLC that was conducted in May of 2025. Drainage does not appear to be accounted for when this wall was constructed. The existing wall is approximately 1000 feet long and varies 8 inches to 7.5 feet in height. The wall was originally constructed in 2002/2003.

Signature: Sarah Walters, P.E.

RETURN TO STORMWATER DIVISION MANAGER'S OFFICE, PO BOX 610 Broken Arrow, OK 74013

Aerial Map

Write a description for your map.



S. Elm Pl. (N. 161st E. Ave.)

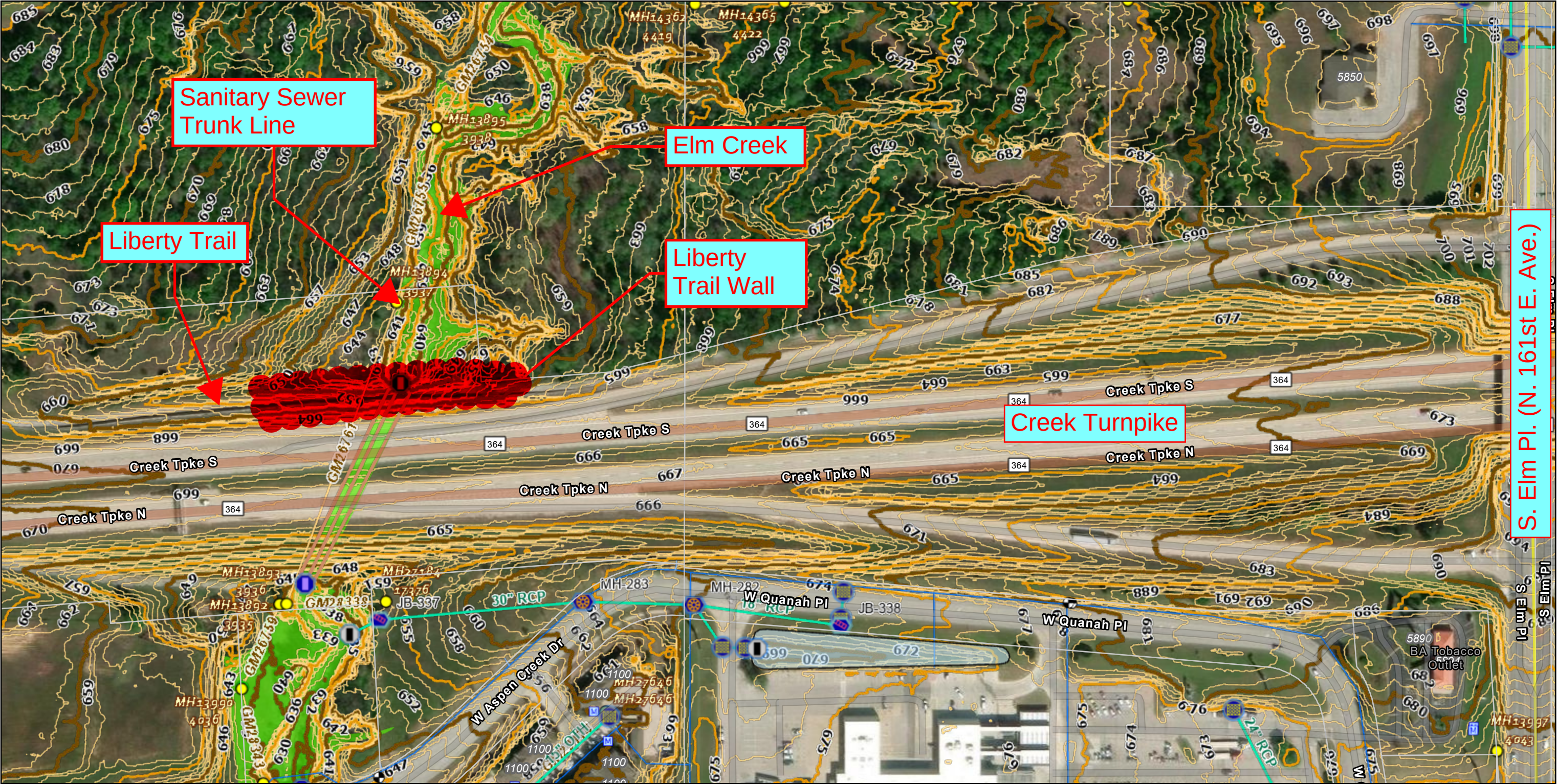


1000 ft

Google Earth

Image © 2025 Airbus

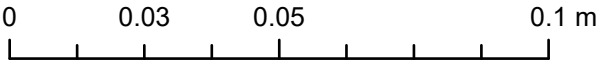
Stormwater Utility Map



7/18/2025 7:36 AM

BA_Contours_2017	Culvert	Trench Drain	Pipe	Pipe Inlet
Type	Unknown	Slotted Drain	Unknown	Channel
1 FT	Pipe Culvert		Gravity	
5 FT	Pipe Arch Culvert		Force Main	
10 FT	Box Culvert		Perforated	
Sections (PLSS)	Arch Culvert			
Address Points	Bridge Culvert			
Contours_1ft_Bridge		Open Channel	BMP Inlet	BMP Point
Detention Pond	Unknown	Unknown	Unknown	Unknown
		Aqueduct Channel	Apron Inlet	Detention
		Spillway Channel		Dry Basin
		Natural Channel		Treatment
		Ditch Channel		
		Roadside Gutter		

This map's utility information is for general purposes only. The City of Broken Arrow makes no warranties regarding its accuracy, completeness, or reliability. Use of this information is at risk.



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NO SWALE ATOP
WALL TO DIRECT
RUNOFF AROUND
WALL.

SILT FROM RUNOFF
ACCUMULATING
BEHIND BLOCKS.

NO GEOGRID
REINFORCEMENT
VISIBLE.

NO DRAINAGE
GRAVEL BEHIND
BLOCKS.

McGuire Civil Engineering Services, LLC

Fayetteville, AR
(479)-414-8130
mcguire@cesnwa.com

April 28, 2025

Maddy Scheel
Project Manager
Engineering & Construction Department – Broken Arrow, OK
485 N. Poplar Ave.
Broken Arrow, OK 74012

Subject: Liberty Trail retaining wall evaluation – Broken Arrow, OK

Dear Mrs. Scheel,

1. Introduction

At the request of Mrs. Maddy Scheel, a structural assessment was conducted on May 22, 2025, to evaluate the condition of an existing segmental block retaining wall located along the Liberty Trail. This trail runs parallel to the Creek Turnpike (Highway 364) in southern Broken Arrow, Oklahoma. The evaluation was prompted by visible signs of distress and potential failure within the retaining wall system.

2. Existing Conditions

The retaining wall is constructed of standard 8-inch sand-colored segmental concrete block units, forming a mechanically stabilized earth (MSE) system. Field observations revealed the following notable conditions:

- A pronounced bulge has developed in a section of the wall, where several blocks have dislodged from the earth fill behind them. (pictures at end of report)
- The wall exhibits significant undulations and surface irregularities that appear to exceed acceptable service tolerances.
- A chain-link fence installed atop the wall is contributing to instability, as its weight and lateral forces are causing separation in the upper block courses.

3. Analysis and Findings

The observed deformations and structural distress are most likely the result of water infiltration and inadequate construction practices. Key findings include:

- The wall is located downslope from a highway approximately 35 feet away, with no evident drainage infrastructure to intercept runoff from the road. Surface water appears to be flowing directly toward the wall.
- Sediment accumulation behind the wall, as seen in the bulged section, suggests prolonged water migration and silt deposition are exerting pressure on the wall face (see Figure 1).

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- The wall lacks essential drainage provisions such as weep holes and a 12-inch clean gravel backfill zone, both of which are standard design requirements.
- No geogrid reinforcement was observed. This is a critical omission, particularly for retaining walls exceeding 4 feet in height, as it compromises lateral earth support (see Figure 2 for a standard geogrid-reinforced wall cross-section).

These factors indicate that the wall was constructed below accepted industry standards, and the resulting structural deformation is primarily due to water-related pressures and insufficient reinforcement.

4. Recommendations

Based on the site observations and structural assessment, the following corrective actions are recommended:

- **Demolish and reconstruct** the existing wall using a segmental block retaining wall system that complies with current industry standards and best practices.
- **Reuse existing block units** that remain in good structural condition to reduce material costs.
- **Install a surface drainage swale** along the top of the wall to intercept and redirect stormwater runoff from the turnpike, thereby minimizing water accumulation behind the wall.

Sincerely,



Christian McGuire, P.E
McGuire Civil Engineering Services, LLC

Attachments: site photos & illustrations



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Figure 1: Bulge in wall

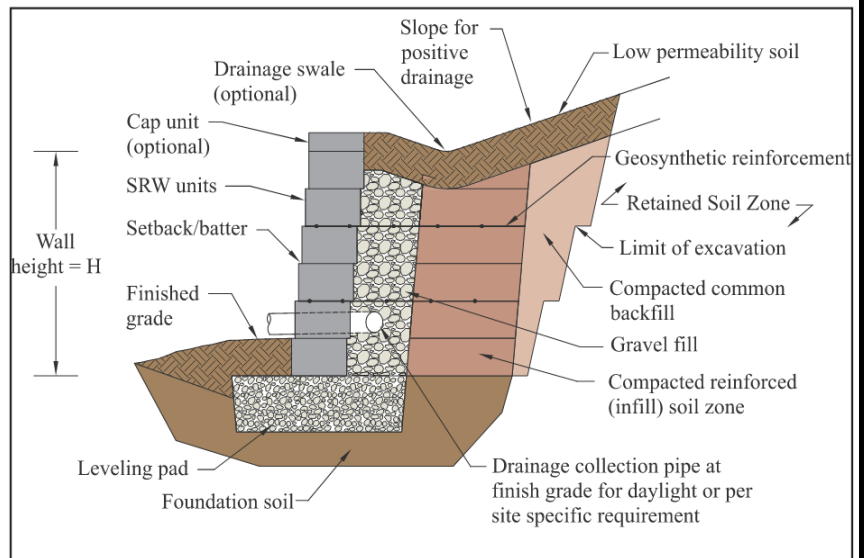


Figure 2: Typical MSE Wall

