



To: City of Baraboo – Parks and Recreation Committee
From: Marcus Rue, PE and Leah Rhodes, PE
Subject: Oak Street Overlook Design Project
Date: February 8, 2023

The City of Baraboo would like to develop an overlook and an ADA pathway connection from the City's downtown area to the City's Riverwalk through the existing Oak Street right-of-way and use of the remaining roadway abutment. MSA Professional Services was selected by the City to complete a study to conceptualize the overall site to develop an overlook and connection.

Three primary objectives were set prior to considering the site development study focused on providing off-street parking, a scenic overlook of the Baraboo River, and an ADA access pathway between Oak and Water Streets. In December 2022, MSA concluded the Oak Street Overlook Park concept plan project. (Final concept plan for the site is attached in Exhibit A.) The concept plan included a site topographic survey, an ADA accessible walkway from Oak Street to the Kiwanis Park area, off-street parking, preliminary geotechnical site investigation, and existing abutment inspection. The overall topographic survey covers the existing right-of-way and the surrounding City lots to provide the City with information that can be utilized to develop site amenities. The existing site plan can be found in Exhibit C. Upon completion of the topographic survey, the information was used to review ADA accessibility between the upper portion of the site by the intersection of Oak Street and First Street to the lower portion of the site and off-street parking by Water Street. Additionally, structural engineers were consulted with on the existing structure and the proposed scenic overlook and retaining wall recommendations.



Figure 1. Former bridge abutment for Oak Street looking north from Water Street (note the slope failure along the east side of structure)



Figure 2. View of the Baraboo River from the top of the overlook looking southwest

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February 8, 2023

The study included a review of the feasibility of using the existing bridge abutment for the scenic overlook area. After an early on-site inspection of the existing structure by MSA's structural engineer, it was determined that the existing abutment is not structurally sound in its current condition, and re-use of the abutment is not recommended. Structural deficiencies noted on the existing abutment include:

- Tipping of the eastern wall.
- Gaps between blocks due to mortar failure, resulting in a loss of fill material.
- Vertical "stair-step" cracking, indicating movement and settlement.
- Weathering and failure of some existing blocks.



*Figure 3. Example of failure along east side of the existing structure
(note the gap between the concrete slabs and multiple generations of repairs)*

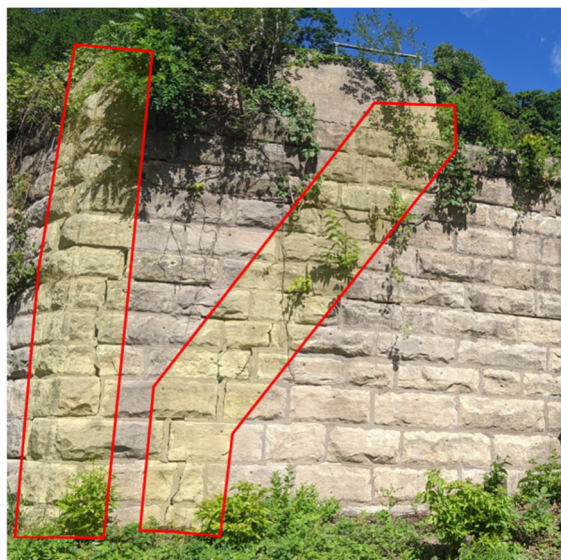


Figure 4. Example of stair step cracking present along southeast corner of structure

February 8, 2023

[illegible]

Upon reviewing the site and working with City staff, MSA developed the attached proposed site concept that meets the project goals. Per the project goals and site investigations, below are the site parameters, observations, and recommendations that were utilized to develop the concept plan:

- An on-site inspection of the existing bridge abutment was completed by a structural engineer. It was determined that extensive re-use of blocks in their existing configuration was not recommended.
 - In the portions of the abutment wall that remain intact, approximately 5-10% of the existing blocks failed when tested with a hammer in the field. Additionally, the blocks at the southwest corner transition point are structurally unsound due to the vertical and diagonal cracking extending through the blocks, making those blocks unable to be reused for structural applications.
 - It was observed that the overall abutment has structurally failed as it currently stands. The eastern wall shows evidence of tipping, likely made worse by the concrete sidewalk on top of the abutment and site erosion around the structure.

MEMO

February 8, 2023

The poor soil layers below the abutment may also be contributing to differential settlement around the structure.

- The existing abutment is unsafe to the public and shall be protected to prevent further access to the site currently.



Figure 6. Distress and shifting of the existing structure resulting in voids and failure along the west wall



Figure 7. Distress along the southeast corner of the existing structure (note the shifting of the east wall, mortar repairs made, and cracking through blocks)



Figure 8. East wall has shifted and is beginning to fail near the top of the structure



Figure 9. Existing stone has weathered and is not structurally sound for a retaining wall of this height. Reuse of the stone for smaller walls, planters, or decorative outcroppings is recommended.

MEMO

February 8, 2023

- Due to the deterioration of the existing stones and overall settlement of the structure, it is recommended to replace the existing abutment with new retaining walls to construct the scenic overlook that would be structurally sound for public use. Existing stone abutment blocks that are deemed to be in good condition shall be considered to be reused for other small landscaping features within the site to maintain some of the site's history.
- A preliminary subsurface investigation was completed for the site consisting of soil borings and data collection for external stability, including sliding, overturning, bearing capacity, settlement, and global stability. Soil borings were completed onsite and associated logs and geotechnical report are attached in Exhibit B.
- A large amount of undocumented fill with inconsistent and low bearing capacities was recorded in the boring logs from the soil exploration near the lower portion of the wall. The geotechnical engineer recommends the fill to be removed and replaced below the proposed overlook. It is advised to use new deep foundation retaining walls at the scenic overlook area. Additionally, during the soil exploration, obstructions were encountered during drilling operations that would rule out steel sheet pile walls as a viable wall type option to develop a new overlook. Attempting to drive steel sheet piles would likely result in damage to the pile tips. The site concept proposes a new retaining wall that matches the height of the existing stone abutment but is shifted to the west to provide space for additional parking along the east end of the site and to better center the overlook along the existing right of way.
- A post-and-panel retaining wall system was selected for the site due to the amount of poor-quality fill located along the lower portion of the site and obstructions encountered during the geotechnical exploration. The post-and-panel retaining wall type offers several aesthetic options that allow for imitation of a natural stone finish that can be stained to match the native stone color of the local Baraboo Quartzite found in and around Baraboo and the Devil's Lake area. The space surrounding the overlook retaining walls can be graded and planted with a natural stone planting wall or a tiered planting system.

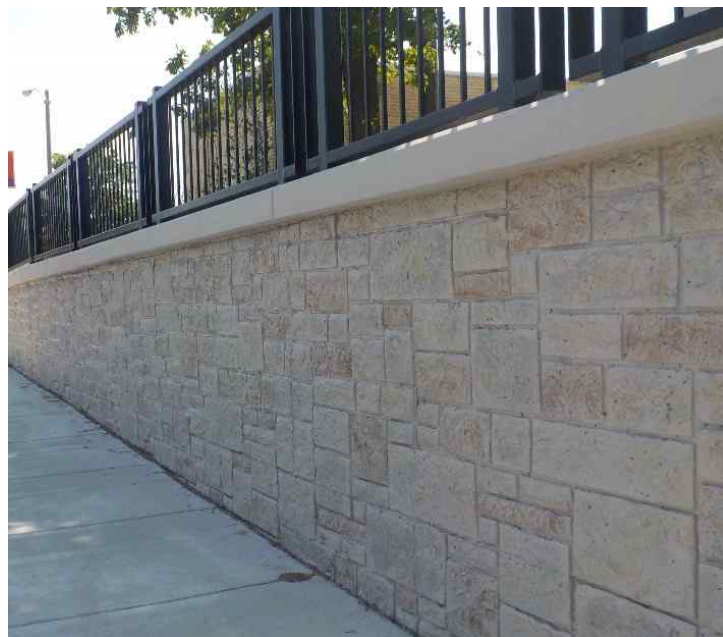


Figure 10. Example of post-and-panel wall system with stone block façade, The finish can be altered to match a natural stone look with staining and concrete forms.

MEMO

February 8, 2023

- A cable railing system with underlighting will be installed at the top of the scenic overlook and along the ADA accessible ramps to provide accent lighting. Benches will be installed and bolted down to the patio at the top of the overlook to provide a resting area while viewing from the scenic overlook.



Figure 11. proposed railing system with lighting with day and night images

ADA Accessibility

- A 10-foot-wide multi-use path between First Street and Water Street is proposed to be concrete and ADA compliant with slopes up to a maximum 8% when railings are used. The path shall connect First Street to the upper portion of the overlook while passing through an art garden with work provided by local artists.
- The path shall then continue from the upper portion of the overlook to the lower parking area and access to the Kiwanis Park area through a ramped retaining wall system to provide ADA complaint grades/access. The ramp shall be supported by a similar post-and-panel retaining wall system that also features the same stone finish appearance as the overlook.
- Due to the almost 30-foot change in elevation between the First Street access point and the Water Street access point, the slope of the path, and the adjacent side slopes, the lighted cable railing system will extend along the ramp for secure access.
- New and existing park signage and information will be established within the space to make patrons aware of the historical nature of the site and surrounding area. Additionally, an existing monument that is on site will be relocated to a more predominate location near the top of the proposed overlook to allow users to still be able to read it.



Figure 12. Existing monument located at the entrance to the park by the corner of First Street and Oak Street

Off-Street Parking Lot (Water Street Access)

- The proposed parking lot will provide off-street parking for local businesses and patrons using the Kiwanis Park area along with potential access to future commercial and recreational developments in the area.
- In order to provide access to the path and the adjacent park, the site is proposed to be regraded to allow for additional off-street parking of 24-28 additional stalls and 2 handicap stalls with angle parking and a one-way traffic pattern through the parking lot. The traffic pattern was selected to maximize the parking within the site layout with the allotted space. The new parking lot is proposed to be asphalt pavement along with an entrance and exit driveway along Water Street.
- With the site investigations,
 - The existing sanitary sewer laterals in conflict near the development would need to be relocated to allow for the regrading of the proposed parking lot.
 - The existing storm sewer structures on the site should be able to be modified slightly to allow them to be reused as part of the new development
 - Other onsite private utilities such as telecommunications will need be relocated to maximize the parking spaces within the existing lots.

MEMO

February 8, 2023



Figure 13. Location of the proposed parking area looking west from the existing east access point

Summary

All of the above recommendations can be viewed in the attached appendices. Per the recommended site concept plan, MSA has developed a construction cost estimate for the overall project. The cost estimate is attached in Exhibit D for the City to consider for future project funding and timing to complete the proposed plan. No phasing was considered with this project, as the Parks Committee provided recommendations to consider the full project as one and bring the site into compliance for not only safe usage, but ADA accessibility. In addition, with the Concept Plan, it is planned that this site will be the beginning of the access to future commercial development along Water Street and access to future park developments.

MEMO

February 8, 2023



Figure 14. Existing structure looking south from the center of the park, note the worn path in the grass and distressed slopes along the backside of the structure



Figure 15. Existing upper portion off the park looking south from First Street July 2022

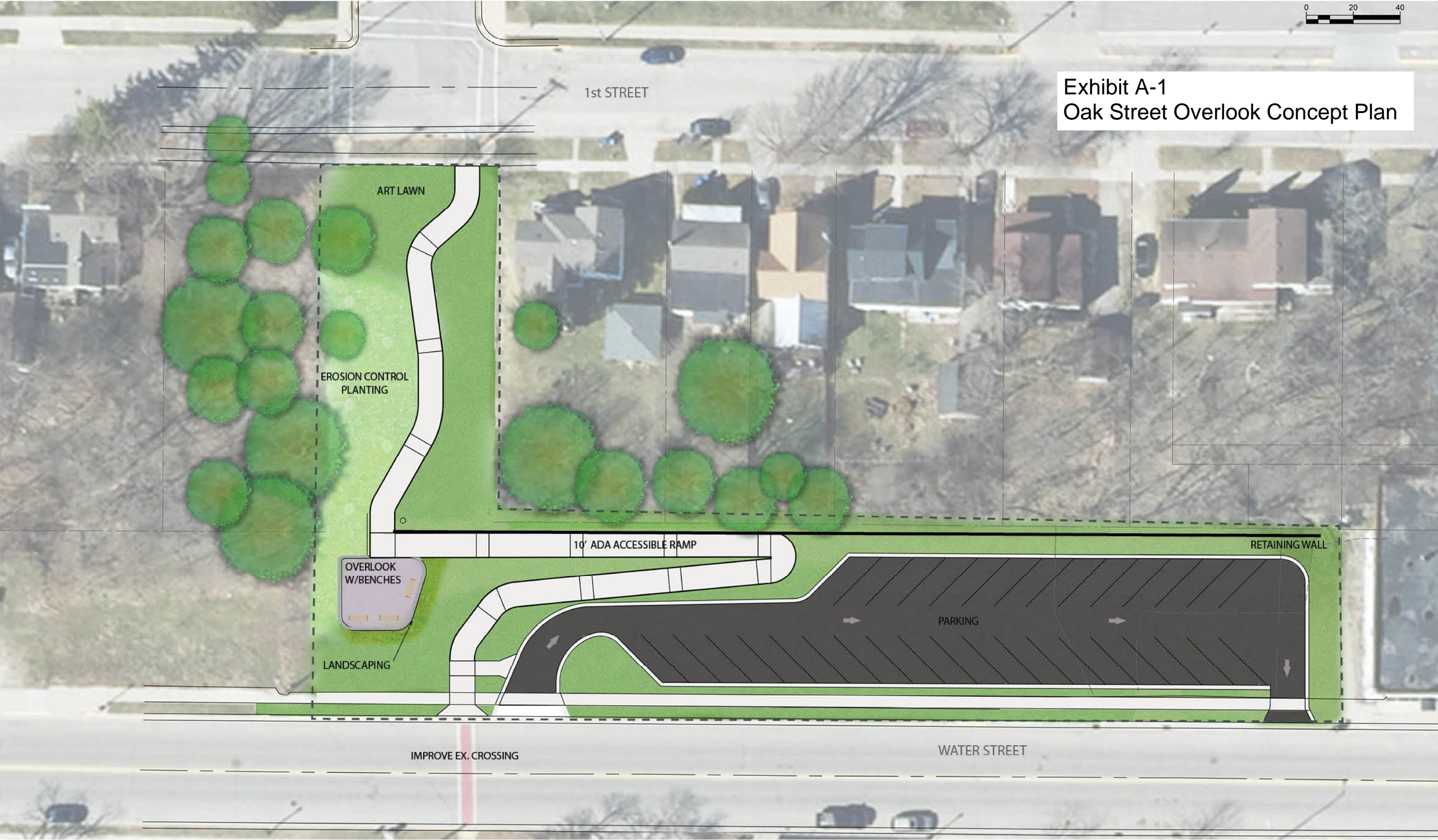


Exhibit A-1
Oak Street Overlook Concept Plan

Oak Street Overlook
Concept Plan

Baraboo, WI
12.2022

LEGEND
- - Project Boundary

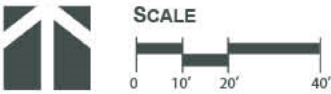
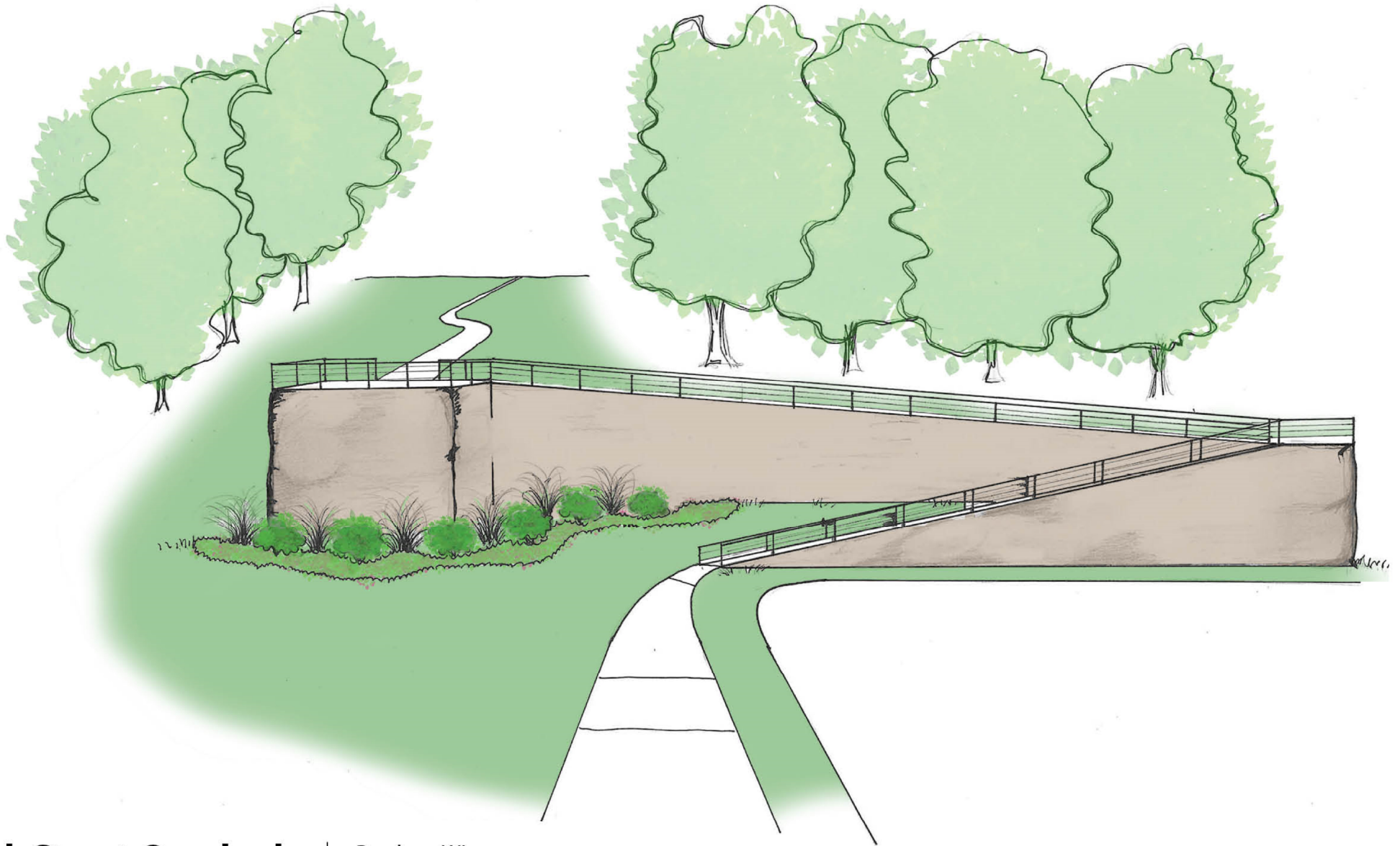


Exhibit A-2
Sketch Concept Plan



Oak Street Overlook
Concept Sketch

Baraboo, WI



Exhibit B
Soil Boring Logs




Legend
✚ Denotes Proposed Boring Location

- Notes:**
1. Base map Google Maps
 2. Locations are approximate.

Scale: Reduced



Job No. C22445		BORING LOCATION EXHIBIT
Date: 9/2022		Oak Street Overlook 100 1st Street Baraboo, WI



LOG OF TEST BORING

Project Oak Street Overlook
115 Water Street
Location Baraboo, WI

Boring No. **B-1**
Surface Elevation (ft) _____
Job No. **C22445**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N		qu (qa) (tsf)	W	LL	PL	LOI
1		12	M	9	8± in. TOPSOIL (OL)					
2		10	M	3	FILL: Brown Fine to Medium Sand, Some Gravel, Scattered Clay					
3		12	M	19	Medium Stiff, Brown Lean CLAY, Little Sand (CL)	(0.75)				
4		16	M	24	Medium Dense, Brown Fine to Medium SAND, Some Silt and Gravel, Scattered Cobble/Boulders (SM)					
5		16	M	24						
6		2	-	50/2"	Very Hard Drilling and Very Dense Below About 18 ft					
					End of Boring/Auger Refusal at 21 ft on Possible Cobble/Boulder or Bedrock					
					Backfilled with Bentonite Chips					

WATER LEVEL OBSERVATIONS					GENERAL NOTES				
While Drilling	<input checked="" type="checkbox"/> NW	Upon Completion of Drilling			Start	10/25/22	End	10/25/22	
Time After Drilling					Driller	ADC	Chief	KD	Rig CME-55
Depth to Water					Logger	DB	Editor	AJB	
Depth to Cave in					Drill Method	2.25" HSA; Autohammer			
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.									

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



LOG OF TEST BORING

Project Oak Street Overlook
115 Water Street
Location Baraboo, WI

Boring No. B-2A
Surface Elevation (ft) 843±
Job No. C22445
Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks		SOIL PROPERTIES					
No.	TYPE	Rec (in.)	Moist	N			Depth (ft)	qu (qa) (tsf)	W	LL	PL	LOI
							Offset 10'E of B-2 and Blind-Drill (without Sampling) to 13.5 ft to Resume SPT Sampling.					
1		0	-	50/1"			Very Dense, No Recovery at 13.5 ft End of Boring/Auger Refusal at 13.5 ft on Unknown Obstruction Backfilled with Bentonite Chips Offset 5'NE to B-2B.					

WATER LEVEL OBSERVATIONS					GENERAL NOTES	
While Drilling <input checked="" type="checkbox"/> NW	Upon Completion of Drilling <u>NW</u>				Start <u>9/14/22</u> End <u>9/14/22</u>	
Time After Drilling					Driller <u>ADC</u> Chief <u>KD</u> Rig <u>CME-55</u>	
Depth to Water					Logger <u>DB</u> Editor <u>AJB</u>	
Depth to Cave in					Drill Method <u>2.25" HSA; Autohammer</u>	
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.						



LOG OF TEST BORING

Project Oak Street Overlook
115 Water Street
Location Baraboo, WI

Boring No. **B-2B**
Surface Elevation (ft) **841±**
Job No. **C22445**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES					
No.	TYPE	Rec (in.)	Moist	N		Depth (ft)	qu (qa) (tsf)	W	LL	PL	LOI
					Offset 5'NE of B-2A and Blind Drill (without sampling) to 13.5 ft to Resume SPT Sampling.						
1		10	W	29	FILL: Dark Gray Silty to Clayey Fine Sand, Trace Gravel with Woody Pieces and Apparent Concrete Fragments in Tip of Sampling Spoon at 15 ft End of Boring/Auger Refusal at 16 ft on Possible Concrete Backfilled with Bentonite Chips						
WATER LEVEL OBSERVATIONS						GENERAL NOTES					
While Drilling <u>13.5'</u> Upon Completion of Drilling <u>2 Hours</u> Time After Drilling _____ Depth to Water _____ Depth to Cave in _____						Start <u>9/14/22</u> End <u>9/14/22</u> Driller <u>ADC</u> Chief <u>KD</u> Rig <u>CME-55</u> Logger <u>DB</u> Editor <u>AJB</u> Drill Method <u>2.25" HSA; Autohammer</u>					
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.											



LOG OF TEST BORING

Project Oak Street Overlook
115 Water Street
Location Baraboo, WI

Boring No. **B-3**
Surface Elevation (ft) 840±
Job No. C22445
Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES					
No.	TYPE	Rec (in.)	Moist	N		Depth (ft)	qu (qa) (tsf)	W	LL	PL	LOI
						10± in. TOPSOIL (OL)					
1		10	M	24		FILL: Brown Fine to Medium Sand, Some Gravel, Scattered Clay					
2		0	-	17		No Recovery at Sample 2 - Pushed Stone					
					5	FILL: Brown Lean Clay, Little Sand, Trace Gravel with Scattered Apparent Coal or Cinder Pieces Intermixed	(1.0)				
3		4	M	5							
4		8	M	6			(0.75)				
					10	Loose, Brown Silty Fine SAND, Little Gravel (SM)					
5		10	W	7							
					15						
6		10	W	8							
					20	Medium Dense, Brown Fine to Medium SAND, Little Silt and Gravel (SP-SM)					
7		10	W	25							
					25						
8		10	W	28							
					30						
9		14	W	22							
					35						
10		16	W	23							
					40	End of Boring at 40 ft					
						Backfilled with Bentonite Chips					
					45						
WATER LEVEL OBSERVATIONS						GENERAL NOTES					
While Drilling <u>▽ 13.5'</u> Upon Completion of Drilling <u>30 Mins.</u>						Start <u>9/14/22</u> End <u>9/14/22</u>					
Time After Drilling <u> </u>						Driller <u>ADC</u> Chief <u>KD</u> Rig <u>CME-55</u>					
Depth to Water <u> </u>						Logger <u>DB</u> Editor <u>AJB</u>					
Depth to Cave in <u> </u>						Drill Method <u>2.25" HSA; Autohammer</u>					
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.											



LOG OF TEST BORING

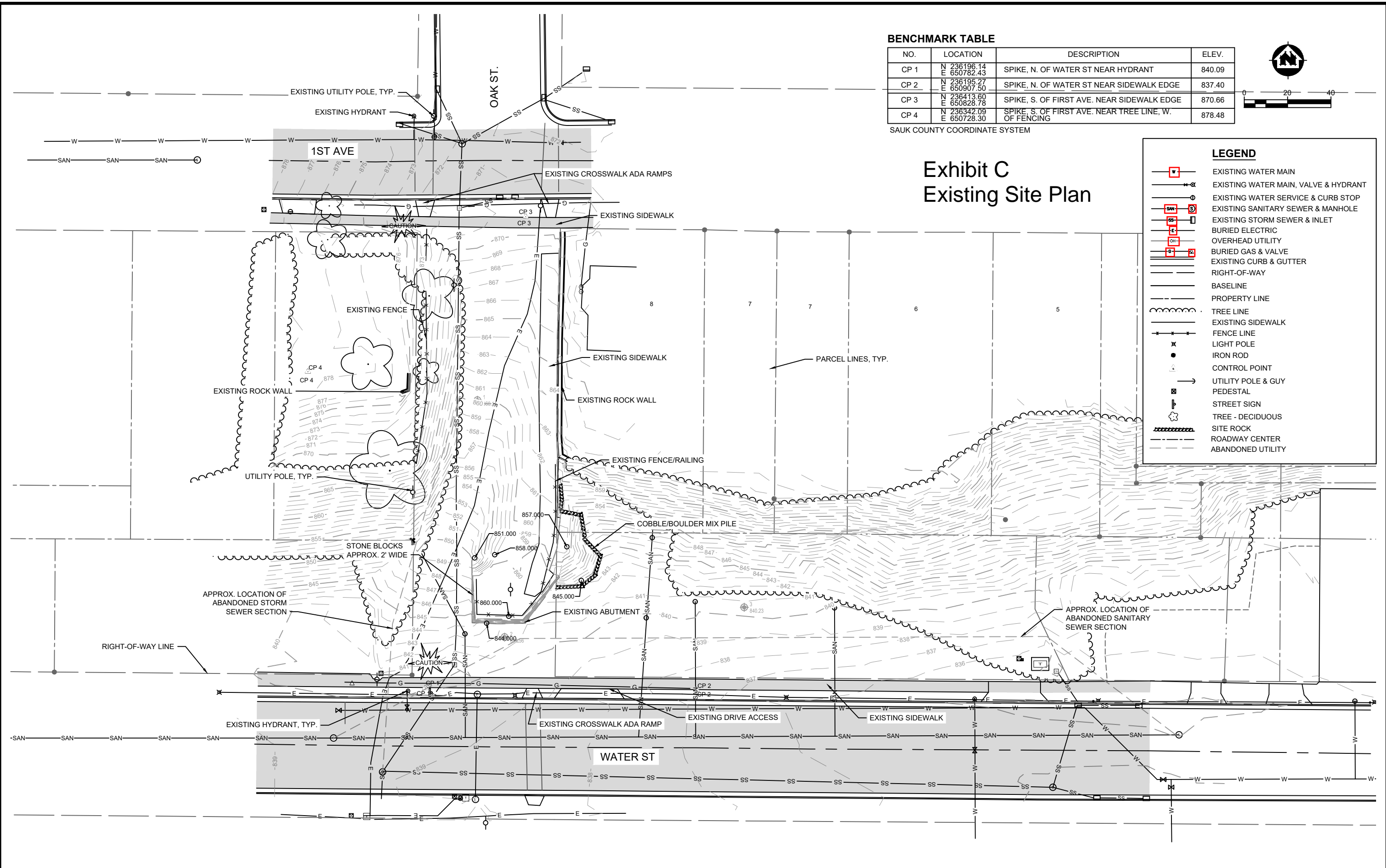
Project Oak Street Overlook
115 Water Street
Location Baraboo, WI

Boring No. **B-4**
Surface Elevation (ft) _____
Job No. **C22445**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES						
No.	TYPE	Rec (in.)	Moist	N		Depth (ft)	qu (qa) (tsf)	W	LL	PL	LOI	
1		10	M	7	3± in. TOPSOIL Fill FILL: Brown Sandy Lean Clay, Little Sand, Trace Gravel with Scattered Apparent Coal or Cinders Pieces							
2		12	M	1								
3		10	M	5								
4		12	M/W	6	Very Loose to Medium Dense, Brown Fine to Medium SAND, Some Silt and Gravel, Scattered Cobble/Boulders (SM)							
5		6	W	12								
6		18	W	4	Loose to Medium Dense, Light Brown Fine to Medium SAND, Little Silt, Some Gravel, Scattered Cobbles (SP-SM)							
7		18	W	8								
8		2	W	12	Very Dense, Brown Fine to Medium SAND, Some Silt and Gravel, Scattered Cobble/Boulders (SM)							
9		6	W	50/3"								
					End of Boring/Auger Refusal at 36.5 ft on Possible Cobble/Boulder or Bedrock							
					Backfilled with Bentonite Chips							

WATER LEVEL OBSERVATIONS				GENERAL NOTES	
While Drilling	<u>13.5'</u>	Upon Completion of Drilling	<u>30 Mins.</u>	Start	<u>10/25/22</u> End <u>10/25/22</u>
Time After Drilling				Driller	<u>ADC</u> Chief <u>KD</u> Rig <u>CME-55</u>
Depth to Water			<u>8'</u>	Logger	<u>DB</u> Editor <u>AJB</u>
Depth to Cave in			<u>16'</u>	Drill Method	<u>2.25" HSA; Autohammer</u>
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.					



BENCHMARK TABLE

NO.	LOCATION	DESCRIPTION	ELEV.
CP 1	N 236196.14 E 650782.43	SPIKE, N. OF WATER ST NEAR HYDRANT	840.09
CP 2	N 236195.27 E 650907.50	SPIKE, N. OF WATER ST NEAR SIDEWALK EDGE	837.40
CP 3	N 236413.60 E 650828.78	SPIKE, S. OF FIRST AVE. NEAR SIDEWALK EDGE	870.66
CP 4	N 236342.09 E 650728.30	SPIKE, S. OF FIRST AVE. NEAR TREE LINE, W. OF FENCING	878.48

SAUK COUNTY COORDINATE SYSTEM

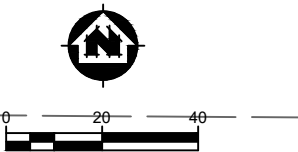


Exhibit C
Existing Site Plan

LEGEND

- EXISTING WATER MAIN
- EXISTING WATER MAIN, VALVE & HYDRANT
- EXISTING WATER SERVICE & CURB STOP
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING STORM SEWER & INLET
- BURIED ELECTRIC
- OVERHEAD UTILITY
- BURIED GAS & VALVE
- EXISTING CURB & GUTTER
- RIGHT-OF-WAY
- BASELINE
- PROPERTY LINE
- TREE LINE
- EXISTING SIDEWALK
- FENCE LINE
- LIGHT POLE
- IRON ROD
- CONTROL POINT
- UTILITY POLE & GUY
- PEDESTAL
- STREET SIGN
- TREE - DECIDUOUS
- SITE ROCK
- ROADWAY CENTER
- ABANDONED UTILITY

PROJECT DATE:	DRAWN BY:	OEM	NO.	DATE	REVISION	BY:
	DESIGNED BY:	Init				
	CHECKED BY:	Init				

PLOT DATE: 2/8/2023 8:34 AM, G:\00\00035\00035150\CADD\Construction Documents\00035150 Existing Site Plan.dwg



ENGINEERING | ARCHITECTURE | SURVEYING
FUNDING | PLANNING | ENVIRONMENTAL
1230 South Boulevard, Baraboo WI 53913
(608) 356-2771 www.msa-ps.com
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OAK STREET OVERLOOK
CITY OF BARABOO
SAUK COUNTY, WISCONSIN

EXISTING SITE PLAN

PROJECT NO:
00035150
SHEET
G-102

Exhibit D

Oak Street Overlook Estimate

ESTIMATE OF PROBABLE COST

CITY OF BARABOO, WI

Oak Street Overlook Project

ESTIMATE YEAR:

2022

ITEM NO.	DESCRIPTION	QTY.	UNIT	UNIT PRICE	TOTAL PRICE
1	Retaining Walls	1	LS	\$550,000	\$550,000
2	Retaining Wall ADA Ramp And Structue Backfill	1	LS	\$700,000	\$700,000
3	Railing With Lighting	1	LFS	\$780,000	\$780,000
4	Asphalt Pavement	300	TON	\$150	\$45,000
5	Concrete Curb and Gutter	800	LF	\$30	\$24,000
6	5-inch Concrete Sidewalk with Base	6,045	SF	\$10	\$60,450
7	Base Course	1,250	TON	\$20	\$25,000
8	Pavement Markings and Signage	1	LS	\$8,000	\$8,000
9	Unclassified Excavation	1	LS	\$80,000	\$80,000
10	Storm Sewer	1	LS	\$25,000	\$25,000
11	Utility Relocations (Sanitary)	1	LS	\$35,000	\$35,000
12	Site and Turf Restoration	1	LS	\$7,500	\$7,500
13	Landscaping	1,500	SF	\$12	\$18,000
14	Erosion Control	1	LS	\$7,500	\$7,500
15	Clearing and Grubbing	1	LS	\$20,000	\$20,000
16	Mobilization, Bond and Insurance	1	LS	\$200,000	\$200,000
CONSTRUCTION SUBTOTAL =					\$2,585,450
				Contingency 20% =	\$517,090
				Engineering, Permitting, Construction Admin. 15% =	\$465,381
TOTAL COST:					\$3,567,921

Note: Local Art shall be procured by City or local Artist. Cost is unknown at this time. Benches for the project will be provided by the City's Memorial Bench Program.