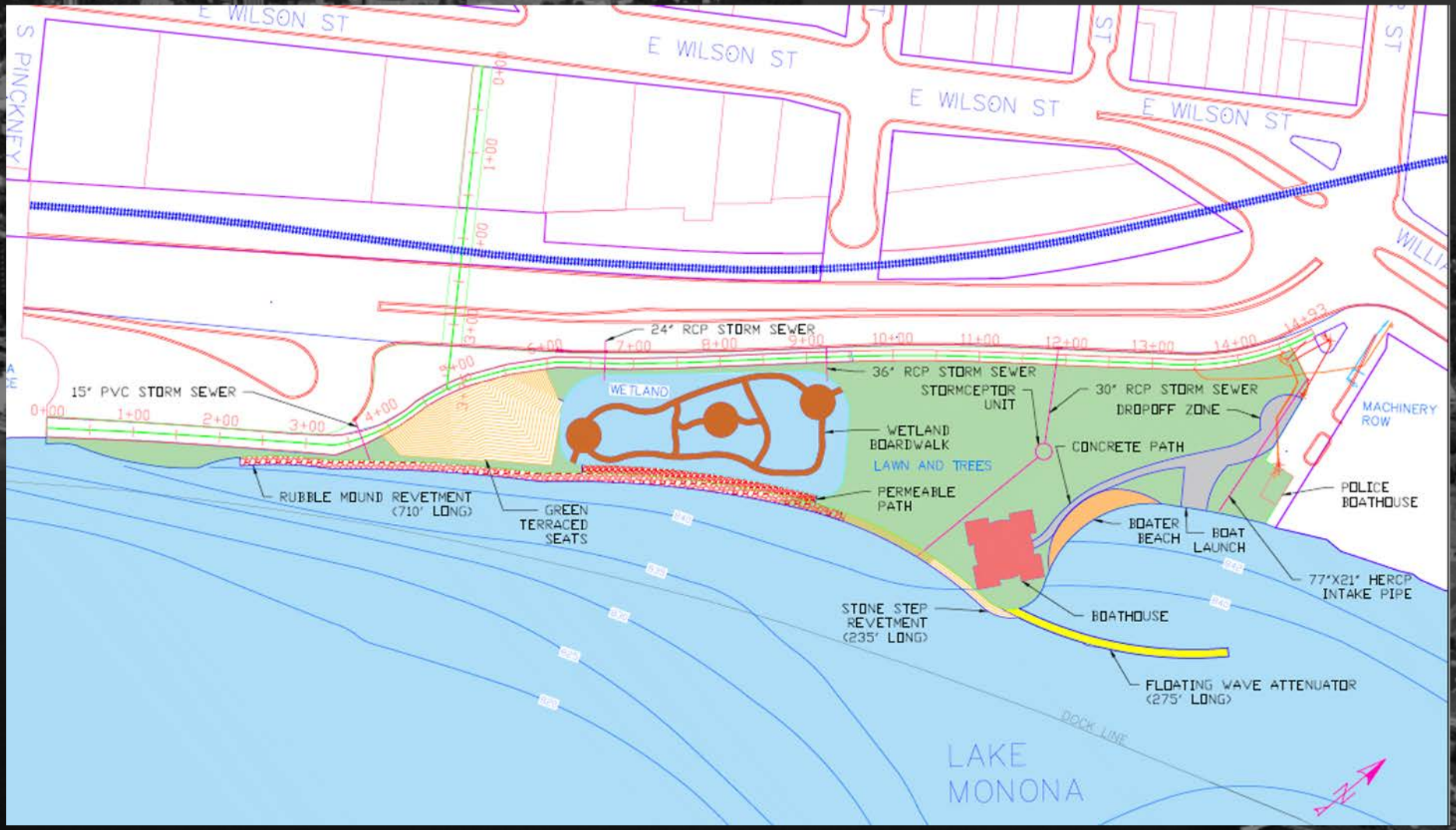
Law Park Revitalization Project

Final Design Presentation
April 20th, 2017

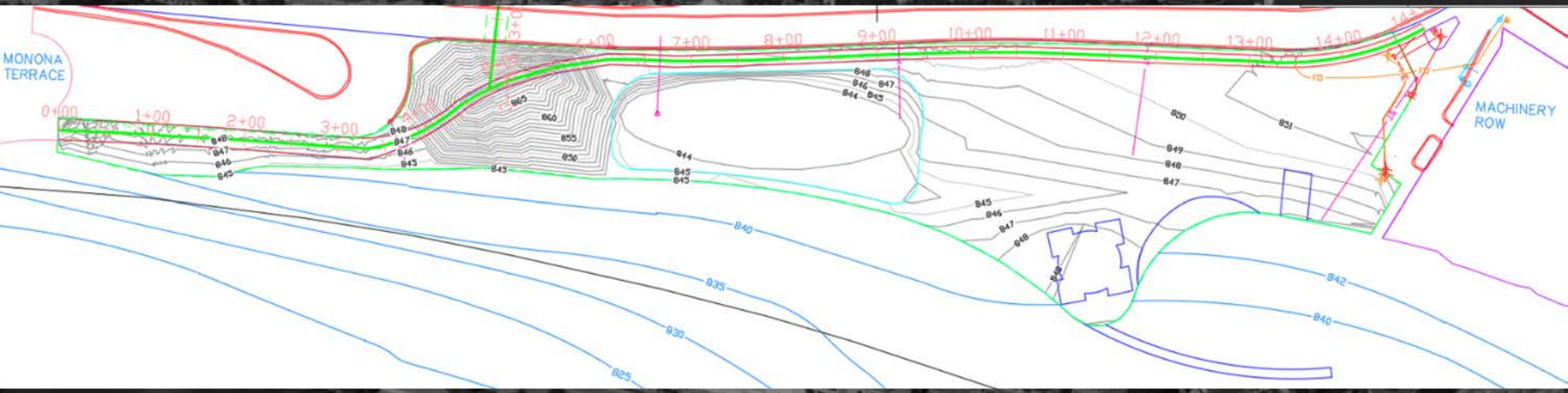

State Capitol
Butler St
Hancock S
Wilson Street
John Nolen Drive
Monona Terrace
Existing Law Park
Lake Monona
N
500'

Final Design Drawings/Analysis

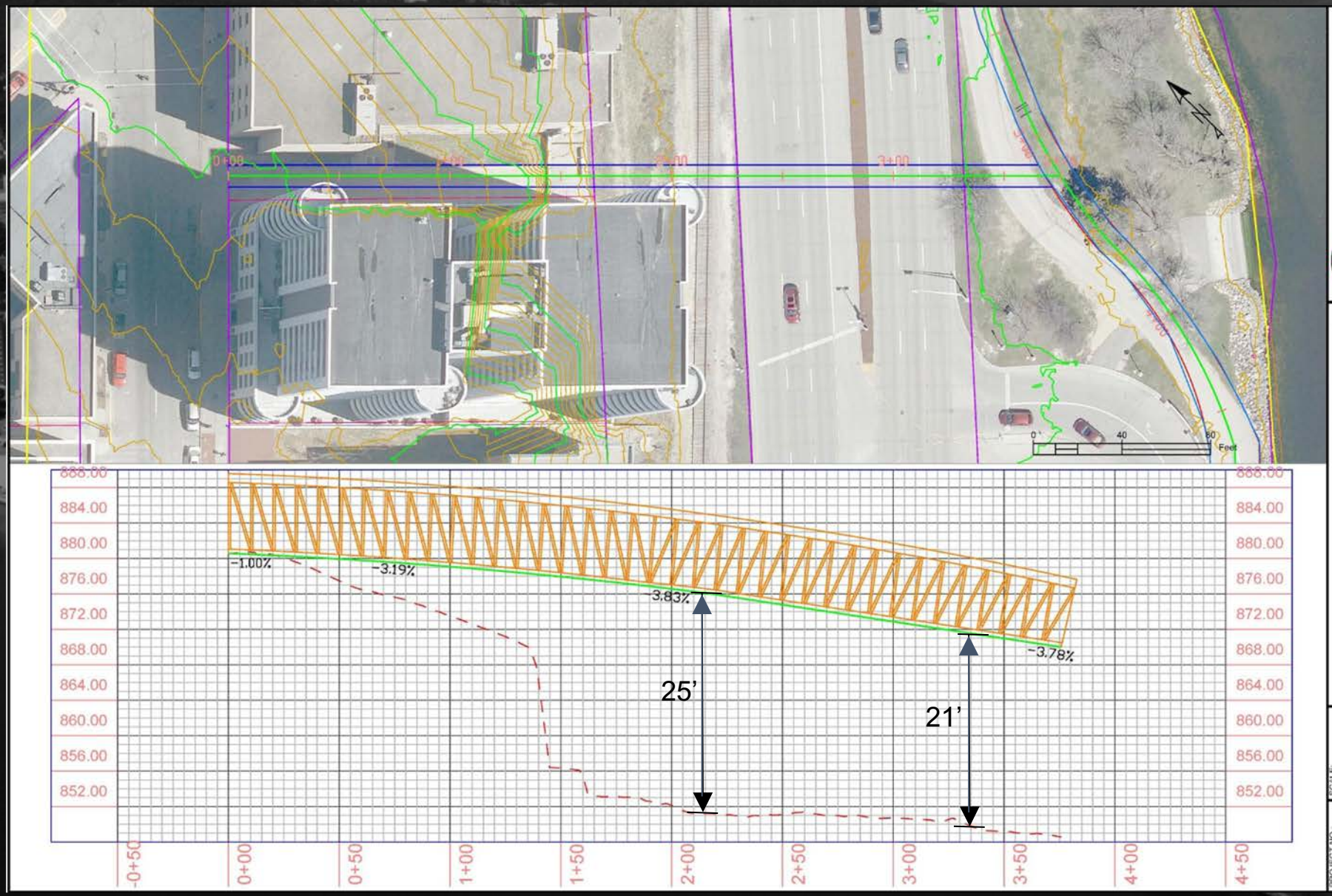
Proposed Site Plan



Grading Plan



Geometric Constraints

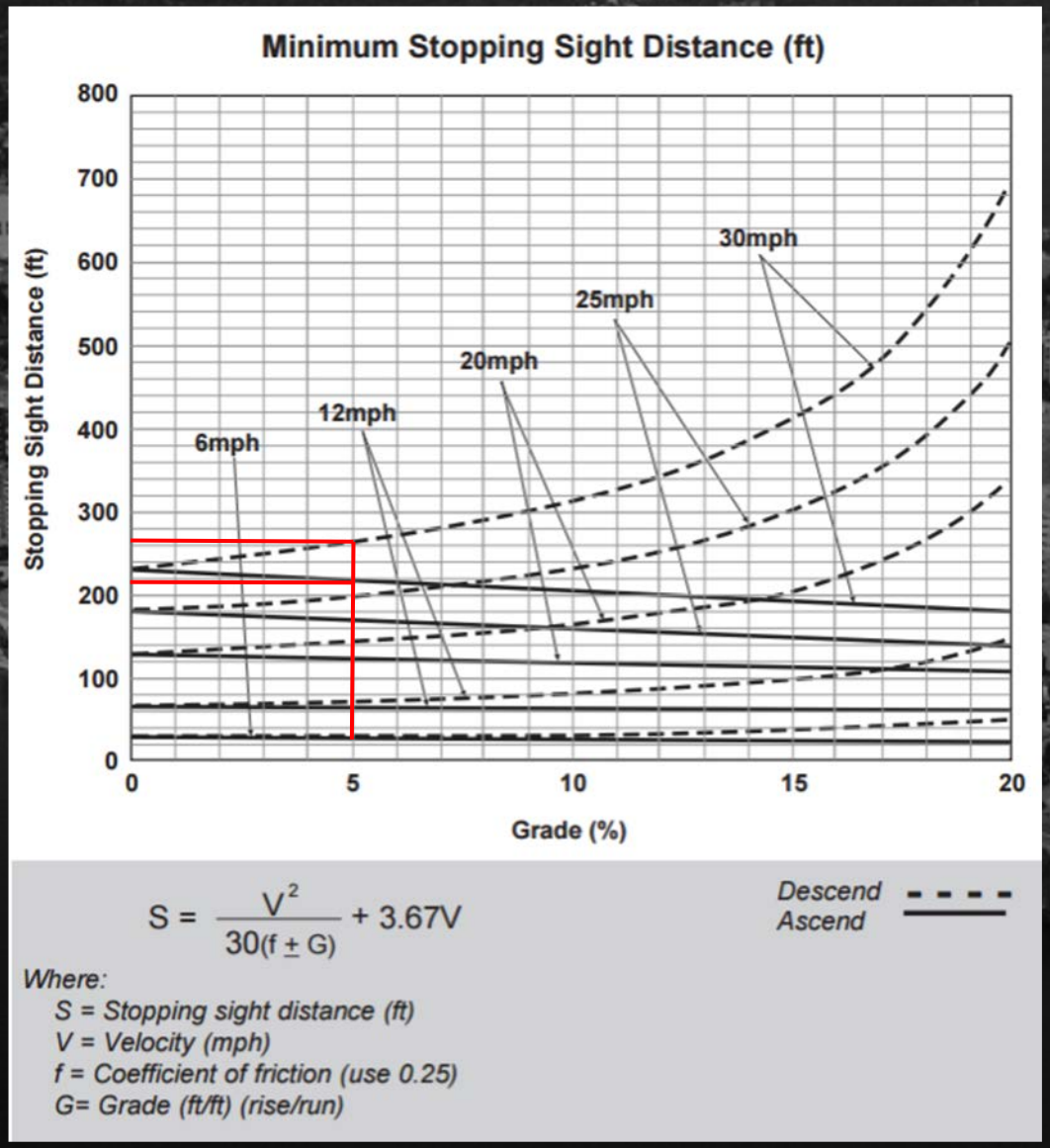


WAST ENGINEERING
130 N PROSPECT AVENUE
MADISON, WI, 53726

LAW PARK REVITALIZATION
MADISON, WI

PROJECT NO: 207
SCALE: 1" = 40'
DATE: 3/14/17
REVISION:
SHEET NO: C-503

Stopping Sight Distance



- SSD ascent: 210’
- SSD descent: 260’

$$S = \frac{V^2}{30(f \pm G)} + 3.67V$$

$$S_{ascent} = \frac{(30mph)^2}{30((0.25) + (.05))} + 3.67(30mph) = 210\ ft$$

$$S_{descent} = \frac{(30mph)^2}{30((0.25) - (.05))} + 3.67(30mph) = 260\ ft$$

Horizontal Curve Radius

Smallest radius on our site is 215’

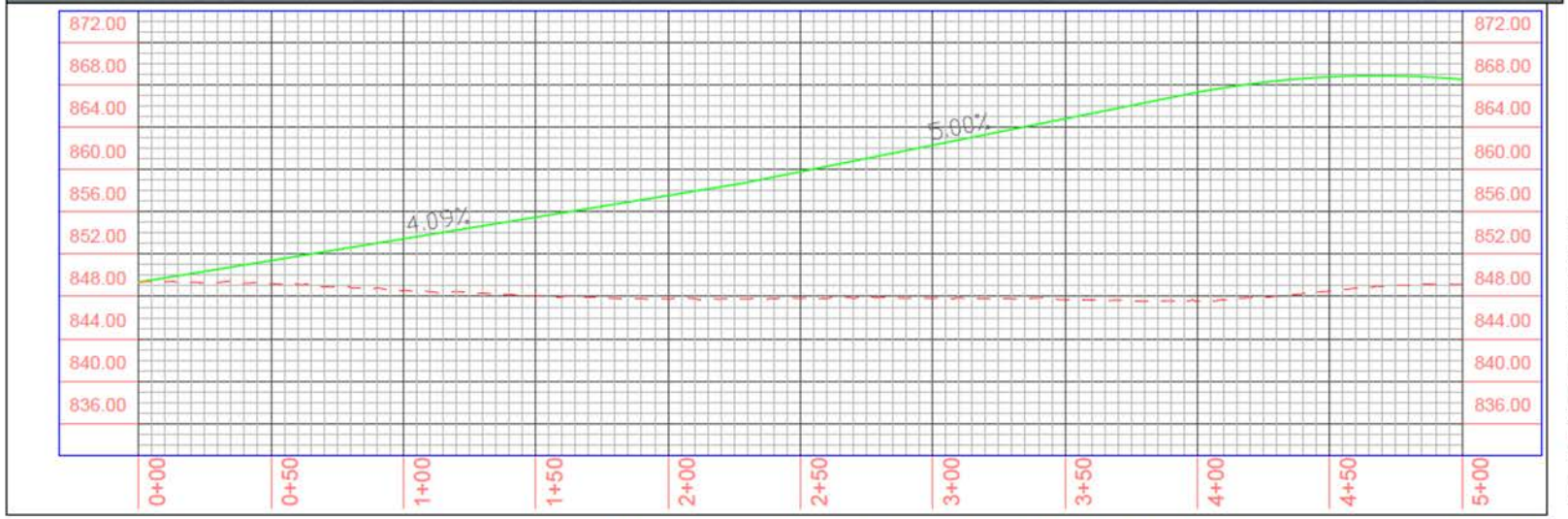
Table 4-1: Desirable Minimum Radii for Paved Shared Use Paths

Based on 20° Lean Angle Design

Speed (V)		*Minimum Radius (R)*	
mph	*(km/h)*	*ft*	*(m)*
18	(29)	60	(18)
20	(32)	74	(22)
25	(40)	115	(35)
30	(48)	166	(50)
Special conditions (e.g., topography constraints):			
12	(20)	27	(8)
14	(23)	36	(11)
16	(26)	47	(15)

(after AASHTO Guide for the Development of Bicycle Facilities, 2012)

Shared Path Grading



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Department of Administration
Division of Facilities Development

LAW PARK
410 S BLAIR ST. MADISON, WI 53703

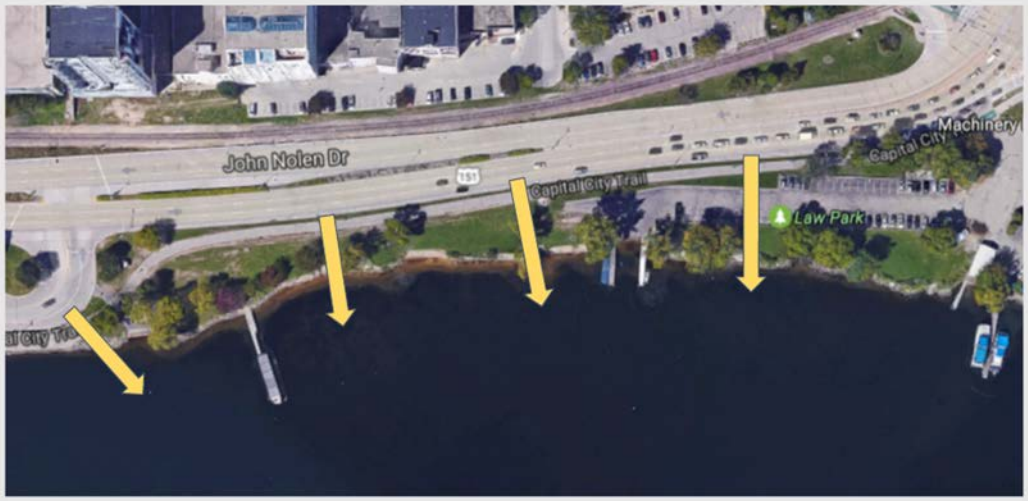
LAW PAR REVITALIZATION
CLEAN LAKES ALLIANCE
MADISON, WI

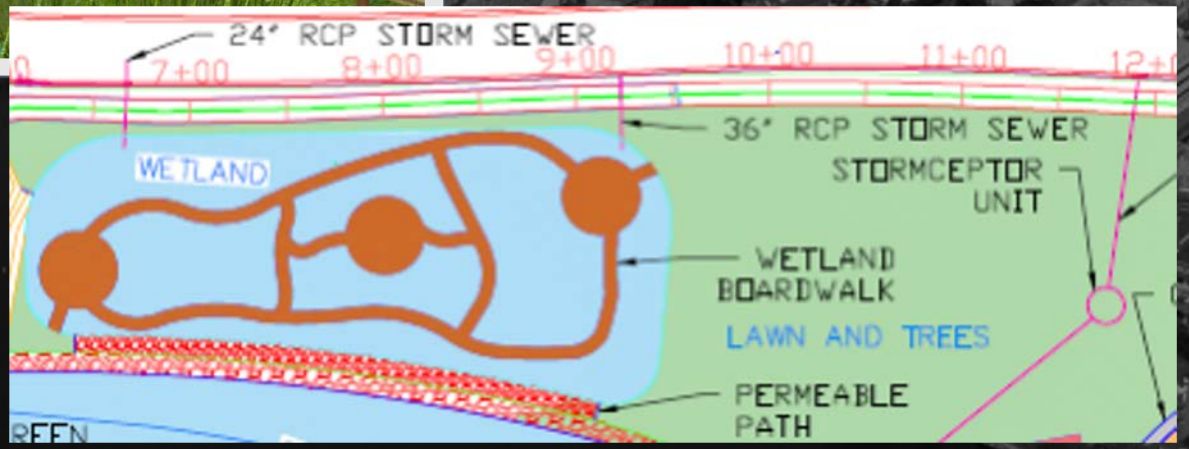
Sheet Title: SHARED-USE PATH PLAN AND PROFILE

STUDENT PROJECT DOCUMENTS

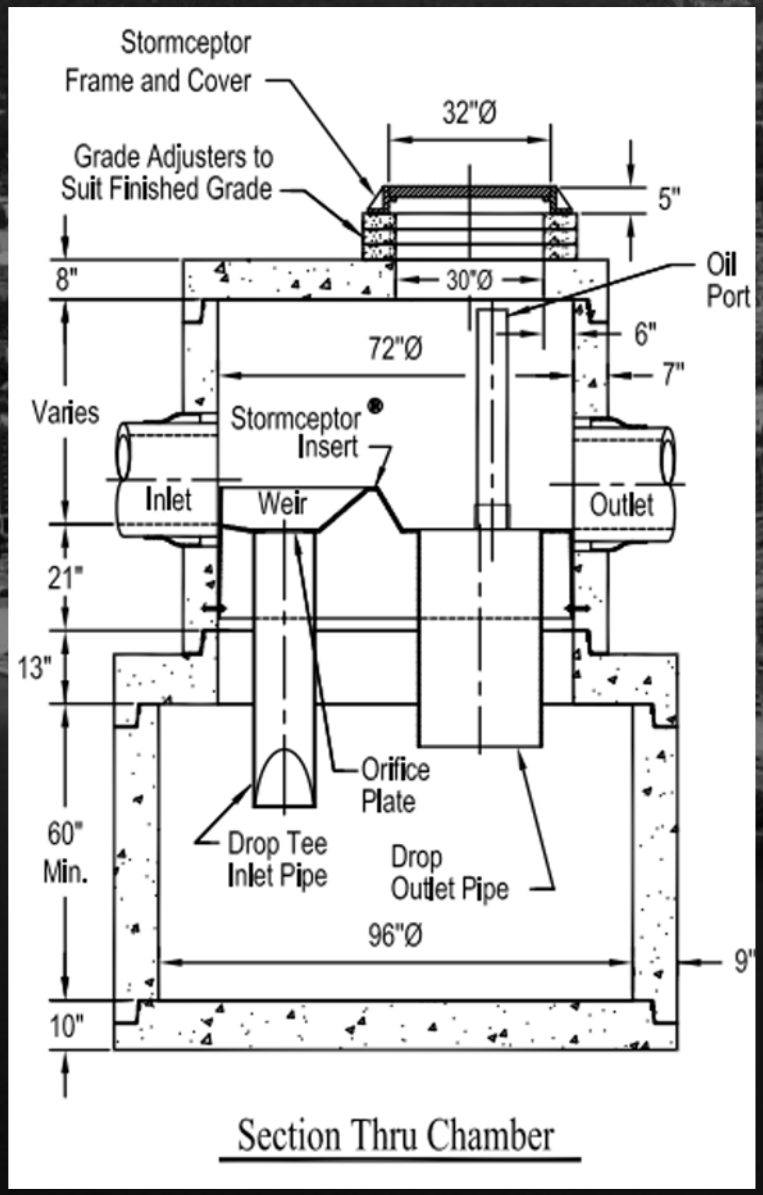
Graphic Scale	
DFD Number	270
Set Type	90% DRAWINGS
Date Issued	04/13/2017
Sheet Number	C-5.0

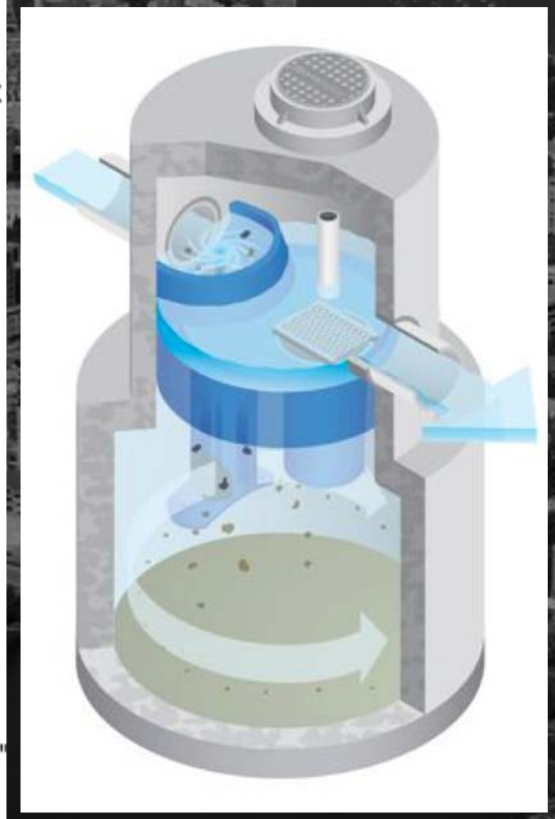
Proposed Wetland

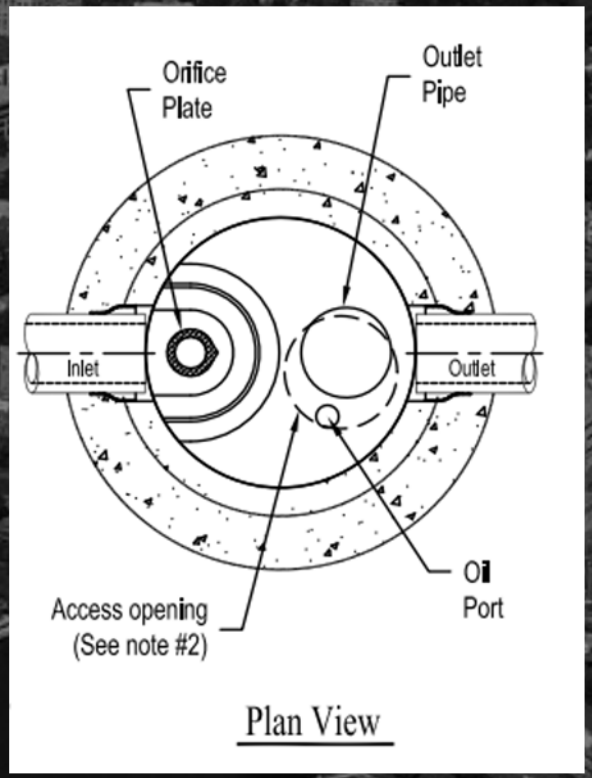




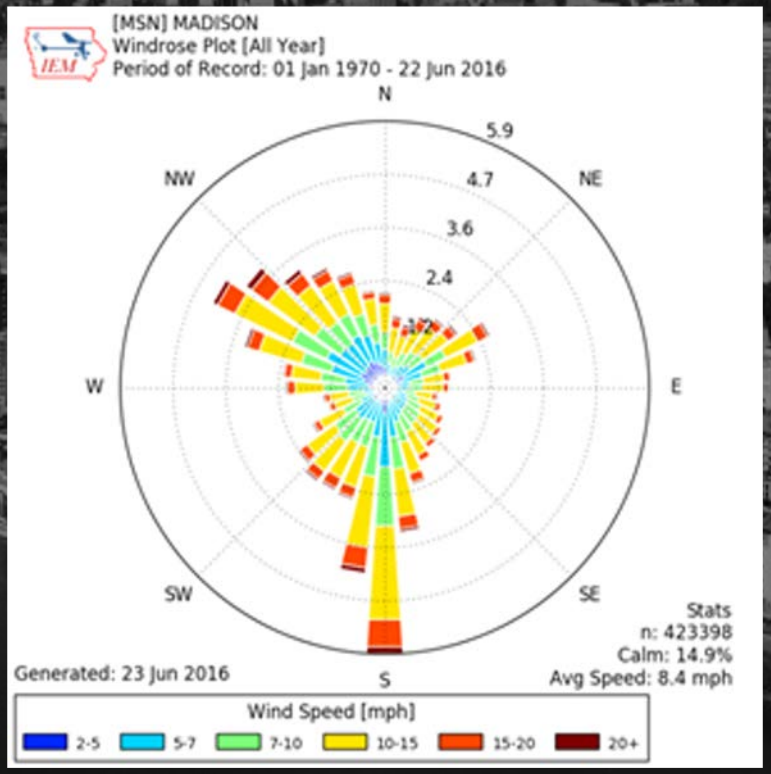
Stormceptor Unit





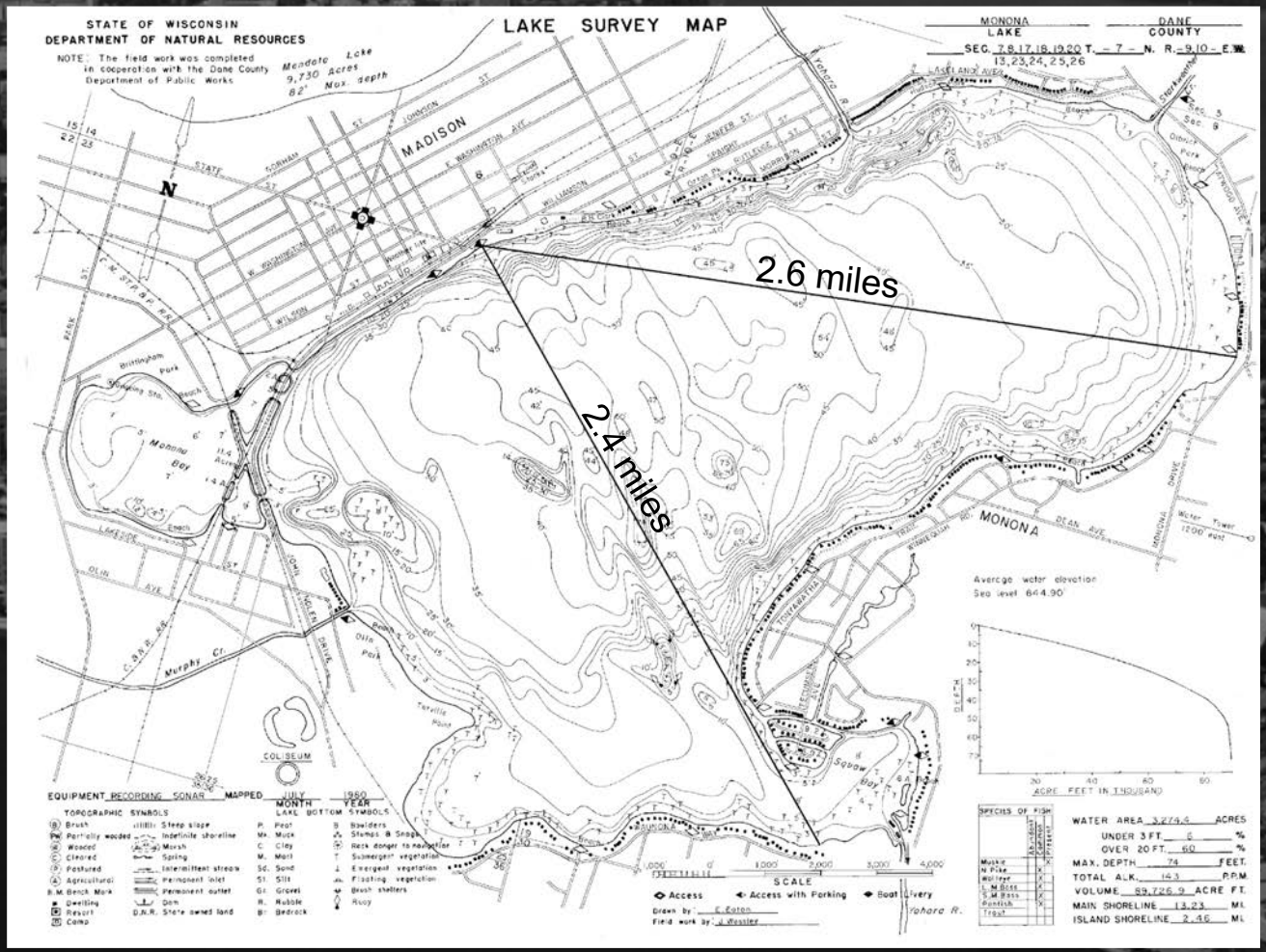


Wind to Wave Analysis



Return Period	All Directions [m/s]	E [m/s]	ESE [m/s]	SE [m/s]	SSE [m/s]	S [m/s]	SSW [m/s]	SW [m/s]
1 yr	14.1	10.6	9.8	9.9	9.8	12.5	11.4	11.3
50 yr	20.1	15.1	13	13.1	14.6	17.1	16.9	18.8
100 yr	21.2	15.8	13.5	13.9	15.1	18.6	17.9	20.5
150 yr	21.8	16.2	13.8	14.5	15.4	19.6	18.4	21.4
250 yr	22.6	16.8	14.1	15.1	15.8	21	19.2	22.7

Fetch Limits Waves

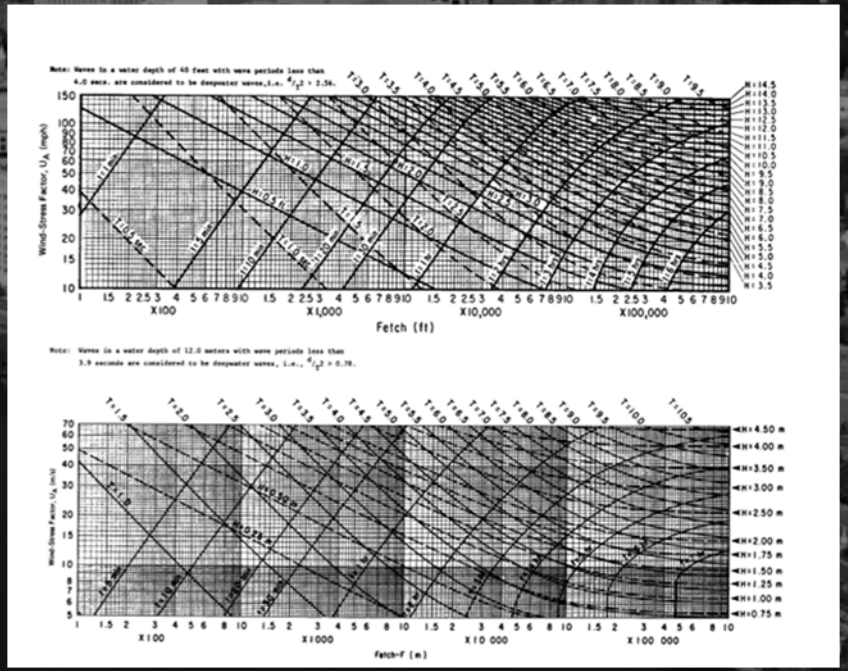


The Design Wave

3 ⅓ foot high waves coming every 3 seconds

*Not to Scale

From E – fetch 2.6 miles
H_s = 1.00 meters = 3.28 feet
T = 3.1 seconds
L = 17 meters = 56 feet



H_s - Significant Wave Height

T - Wave Period

L - Wavelength

Sizing Criteria

Hudson Criteria

$$W = \frac{w_r H_r^3}{K_D (S_r - 1)^3 \cot \theta}$$

Hudson	
Rock Density [kg/m^3]	2650
Water Density [kg/m^3]	1000
θ [°]	26.6
H_s [m]	1.00
K_D [-]	4

Wave Run-up

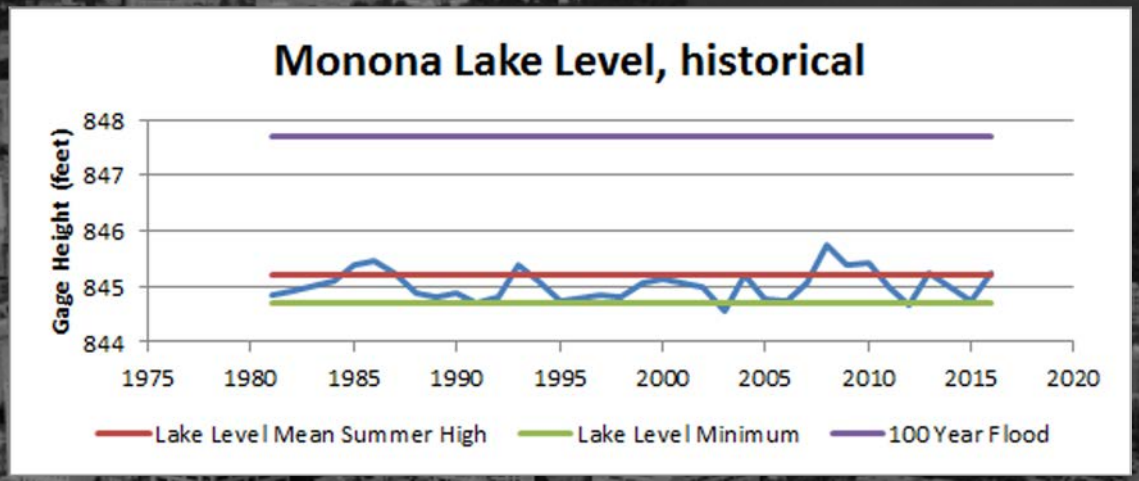
$$R_{u2\%} = \mu(A\xi + B)H_s$$

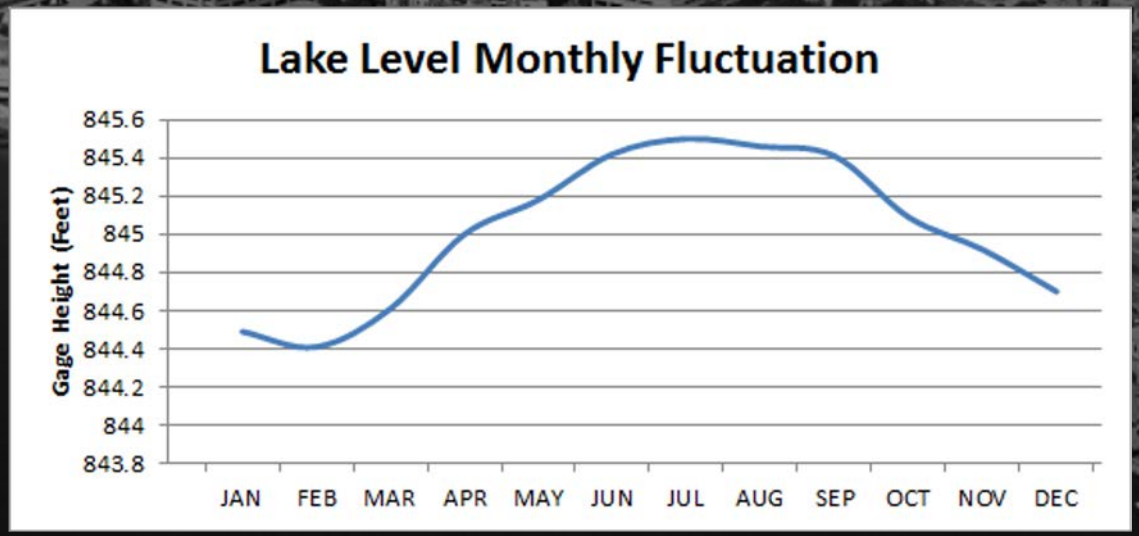
Wave Run-Up Variables	
H_s [m]	1.00
A	-0.21
B	3.39
ξ	8.5129
μ	0.55

Coastal Design

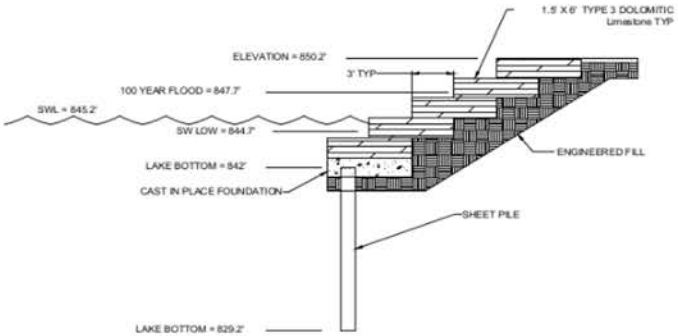
No-overtopping Crest Height (above waterline)	Hudson size, M50	Hudson size, D50
1.626 m = 5.33 ft	151 kg = 333 lbs	0.385 m = 1.26 ft

Lake Monona Levels

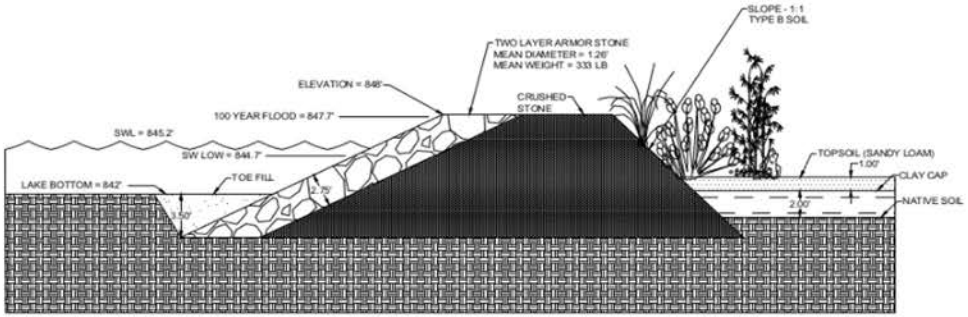




Shoreline Protection



1 STONE STEP REVETMENT CROSS SECTION
SCALE: NTS



NOTES: SWL = SEA WATER LEVEL
ARMOR STONE DESIGNED TO HUDSON CRITERIA (USACE) FROM DESIGN WAVE
TOE DESIGNED TO WITHSTAND SCOURING
CRUSHED STONE CONSIDERED TYPE B SOIL, PER OSHA, SLOPE 1:1
TOPSOIL HAS BETWEEN 4% AND 20% ORGANICS. CLAY CONTENT LESS THAN 15% AND PH BETWEEN 6.5 AND 8.4

2 PERMEABLE RUBBLE MOUND REVETMENT AND WETLAND CROSS SECTION
SCALE: NTS

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Drawn Title: COASTAL CROSS SECTIONS

STUDENT PROJECT DOCUMENTS
The concepts, drawings and written materials provided here were prepared by students in the Department of Civil & Environmental Engineering at the University of Wisconsin-Madison as an activity in the course CEE 575 Senior Capstone Design. These do not represent the work products of licensed engineers. These are not for construction purposes.

OPD Number	207
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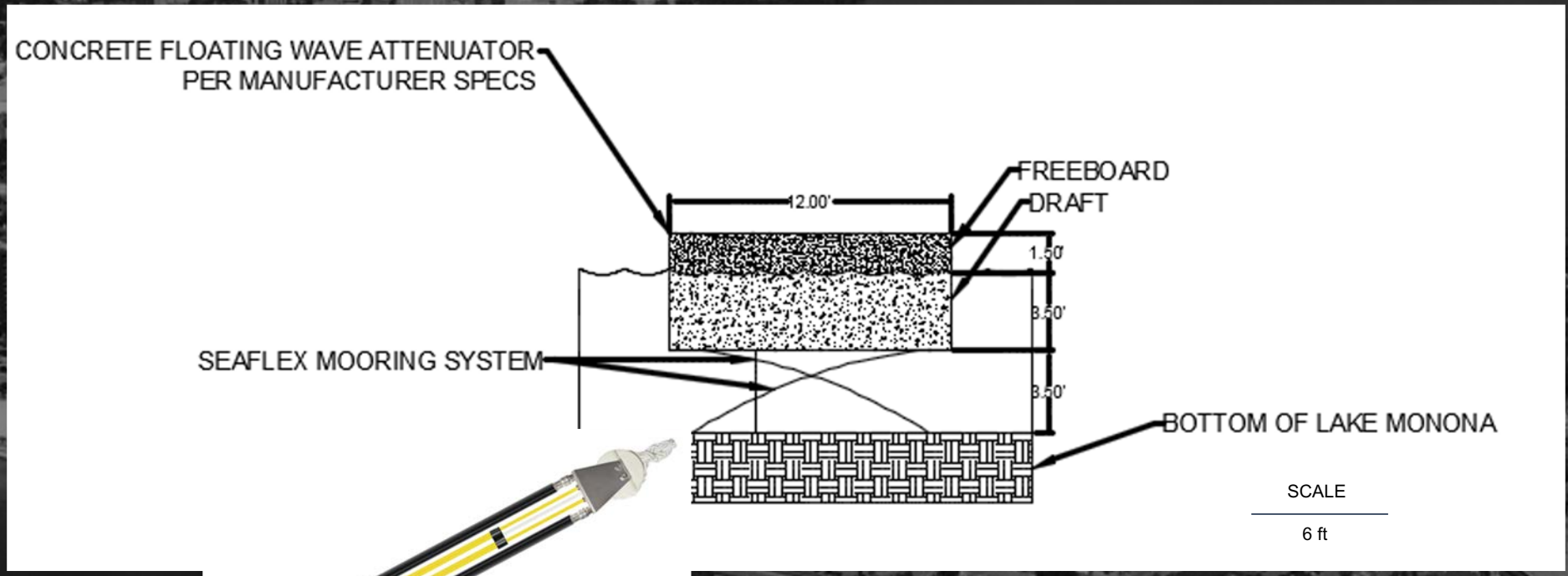
Floating Wave Attenuator



Pipe Pile End Bearing Capacity