BACK TO THE FUTURE

The Planning of Willow Creek as a Campus Amenity

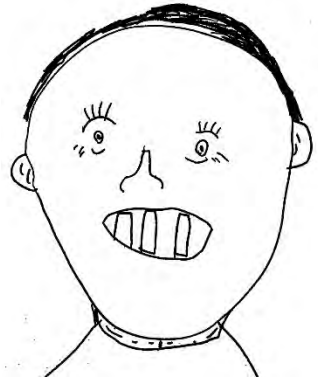
CITY OF MADISON WISCONSIN

WISCONSIN
UNIVERSITY OF WISCONSIN-MADISON

CLEAN LAKES ALLIANCE

Clean Lakes Alliance
Yahara 101 Lecture Series
0520 | 2020

Gary A. Brown, PLA, FASLA has been with the University of Wisconsin for over 34 years. After serving for 15 years with the UW System as a landscape architect and facilities planner, his travels around the state's 26-campus system brought him back to the flagship UW-Madison. He currently serves as the director of Campus Planning and Landscape Architecture, overseeing the development and implementation of the 20-year campus master plan on this spectacular 938-acre university campus. He also serves as the university's historic preservation officer, environmental affairs officer, and is the director of the university's 300-acre Lakeshore Nature Preserve. He holds a bachelor's degree in Landscape Architecture from UW-Madison and was inducted as a Fellow with the American Society of Landscape Architects in 2004 for his administrative works.



Aaron Williams, PLA, ASLA is the assistant campus planner with the University of Wisconsin-Madison in the division of Facilities Planning & Management. He provides planning and design assistance across the 936-acre UW-Madison campus, as well as zoning coordination for all major capital improvement projects. He is a graduate of the University of Wisconsin-Madison Department of Planning & Landscape Architecture with tours at Sasaki Associates (Watertown) and SAA Design Group (Madison). As a landscape architect his work is focused on the spatial tangents bridging Planner/Architect/Engineer. His approach to projects is centered around three connected concepts: A thorough understanding of 'site' to achieve a desired creation of place; Understanding the role of human occupation in a site; and the execution of plans to achieve meaningful design. He also likes birds.

Lauren Striegl, PE is a stormwater and special projects engineer with the City of Madison. She has been with the City for six years, and works primarily on stormwater hydraulic and hydrologic modeling, water quality modeling and design of unconventional stormwater treatment projects. She has a BS in Civil Engineering from UCLA and a Masters in Civil Engineering from the University of Wisconsin – Madison.

AGENDA

- Context - Campus Master Planning
- Willow Creek Before
- Willow Creek Now
- Area 1 – Sediment Removal Chamber
- Willow Creek Future
- Project Goals
- Area 2 – Corridor Focus
- Adjacent Development
- Area 3 – University Bay Focus
- Timeline and Funding

SUMMARY

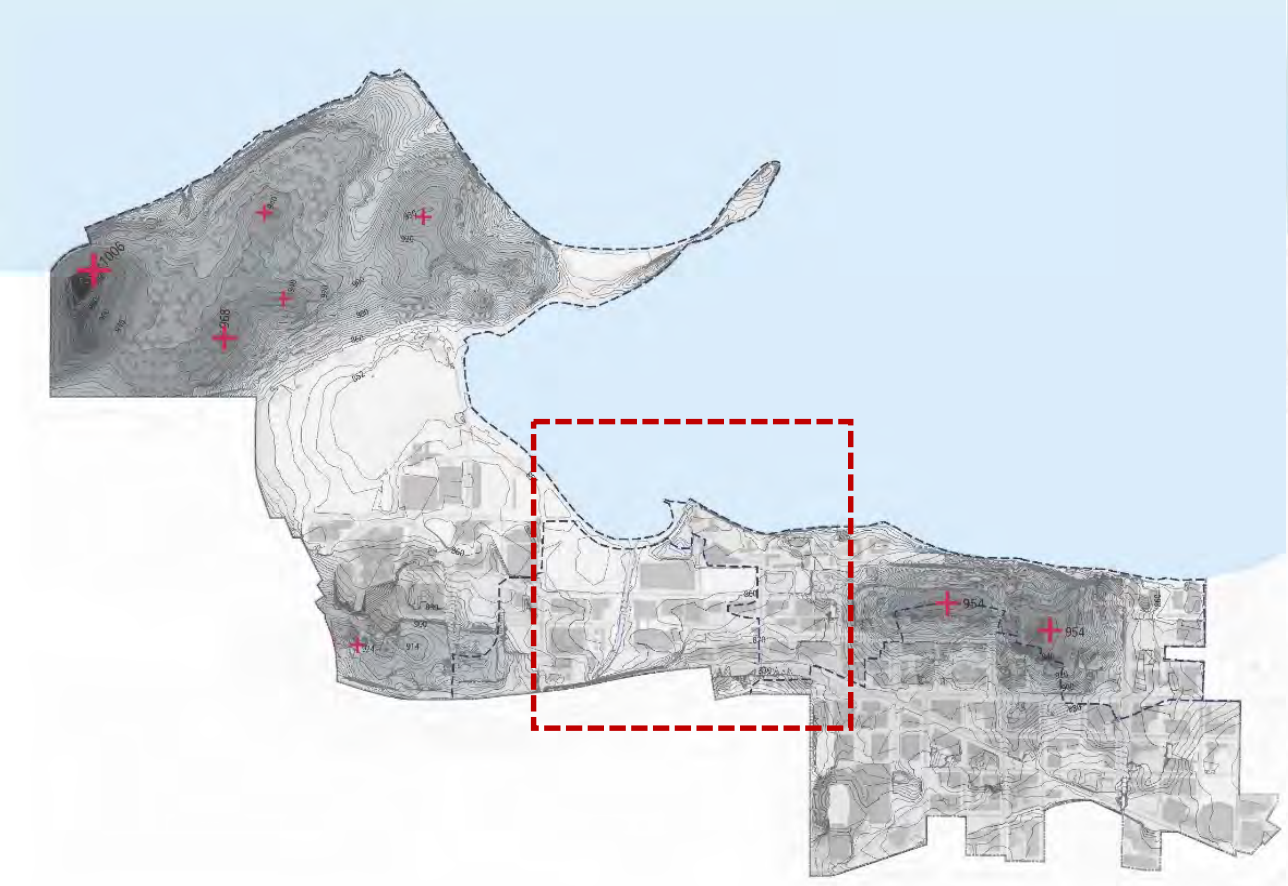
Willow Creek, an end-of-pipe water course to a 1,900 acre urban watershed, is being envisioned as a green infrastructure destination on the UW-Madison campus. Planned not solely as a storm water conveyance, but as a natural resource set within a 938-acre environment that is an integral component of the campus greenspace network. With the proposed new institutional developments, and increases in student/faculty/staff populations in the areas directly adjacent to the corridor over the course of the next six years how can the campus reorient itself to this forgotten corridor. Through area planning and creek engagement from adjacent development, Willow Creek and University Bay will be transitioned from 'back waters' of the agricultural campus, to critical infrastructural amenity to the entire community.

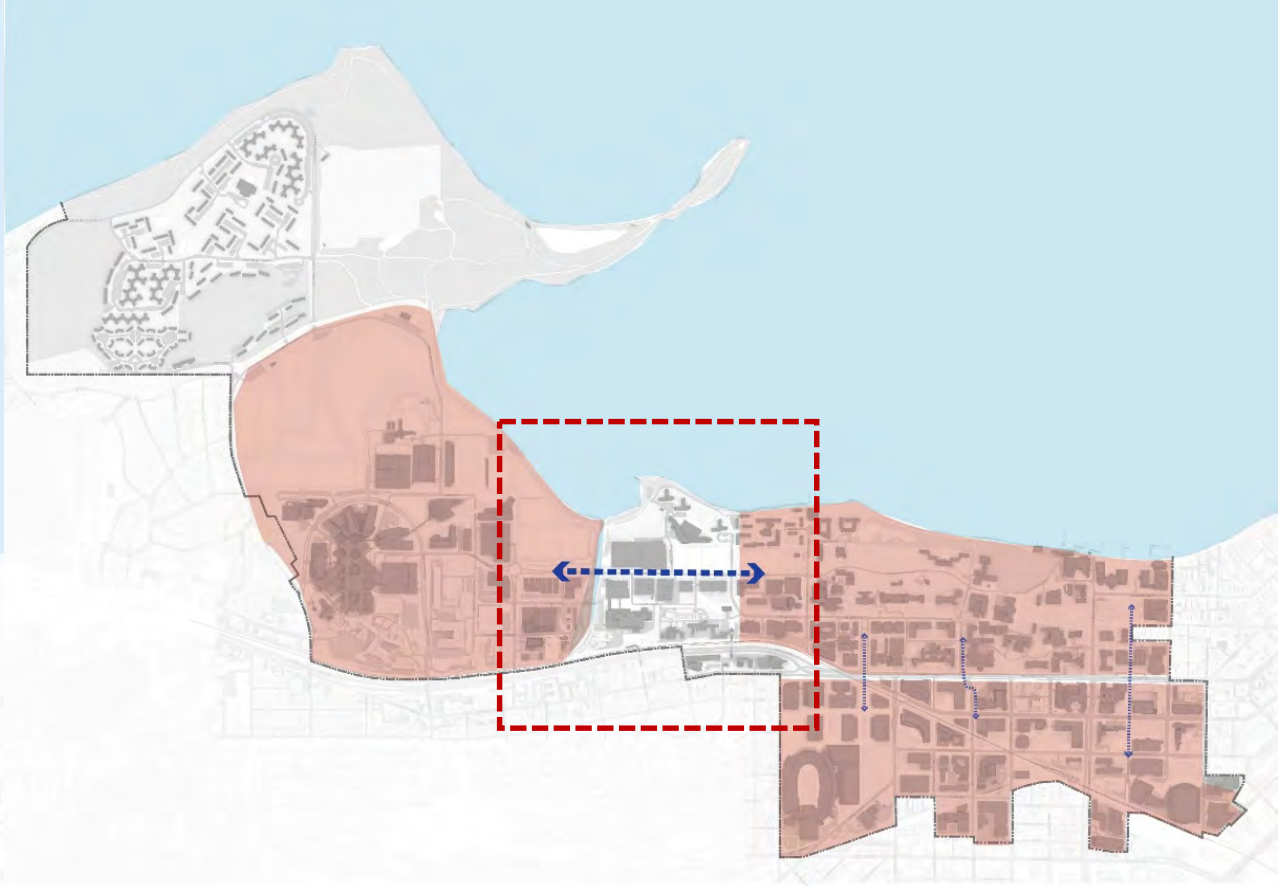
CONTEXT
CAMPUS MASTER PLANNING

CONTEXT


LAKE MENDOTA
UNIVERSITY BAY


UNIVERSITY BAY
LAKE MENDOTA
FOCUS AREA





Near West Campus – Characteristics

Topographic saddle

Alkaline soils

Saturated – Slow infiltration

High ground water

1 of 4 mound groupings

50+ tree species (74 across campus)

Green space reduction planned 6%

Campus connector

Historic agricultural campus (fields)

1,900 acres urban drainage

Point source vs. overland rain water

Auto vs. Pedestrian scale

SITE AREAS

University Bay

Gym/Nat Adjacency

Vet Med Adjacency

UW Grounds

Willow Creek Treatment

SITE AREAS

University Bay

Gym/Nat Adjacency

Vet Med Adjacency

UW Grounds

Willow Creek Treatment

SITE AREAS

University Bay

Gym/Nat Adjacency

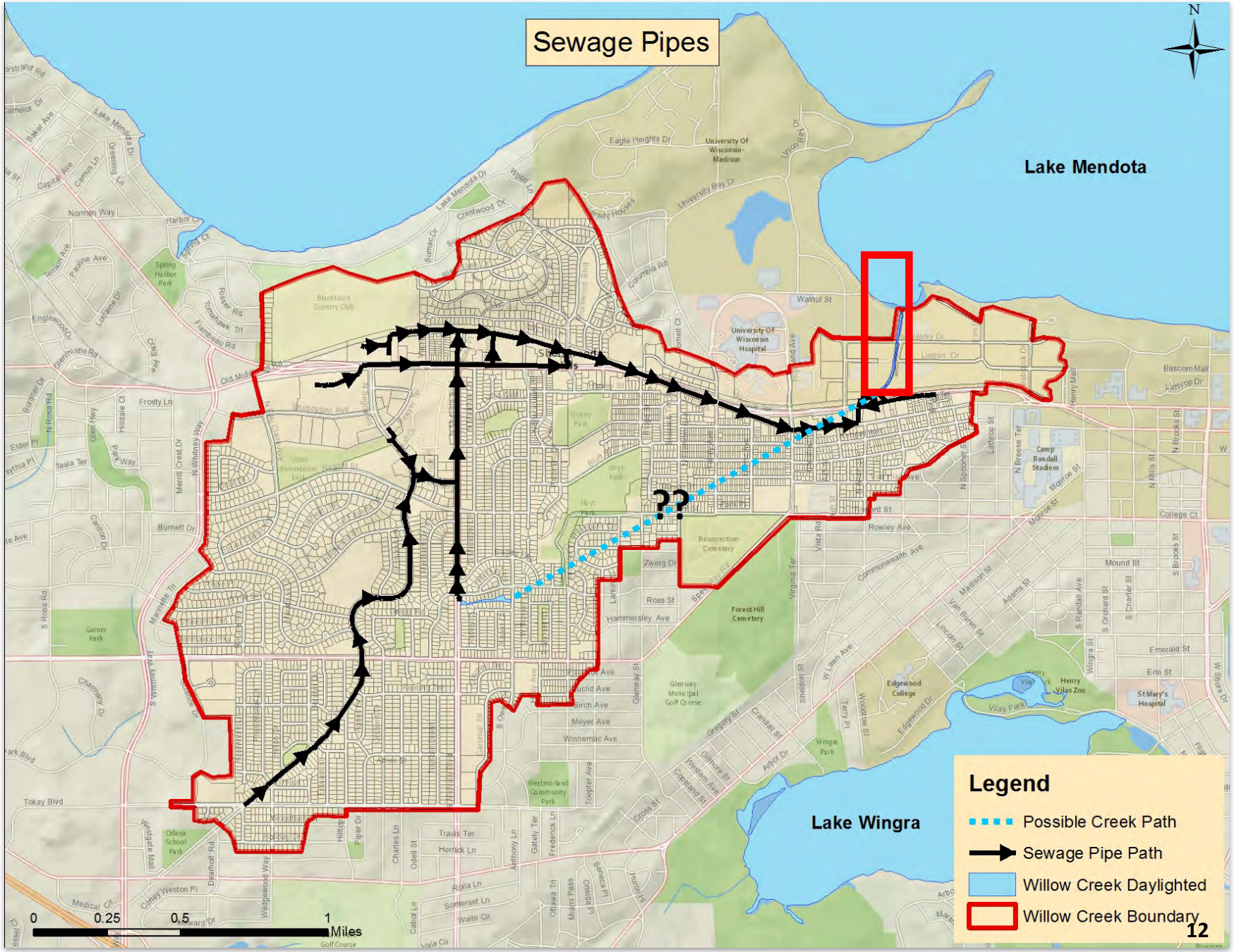
Vet Med Adjacency

UW Grounds

Willow Creek Treatment

WATERSHED

- 1,900 acres
- 134 acres – campus
- Urbanized / Built-out
- End of Pipe
- 1,500’ Daylight



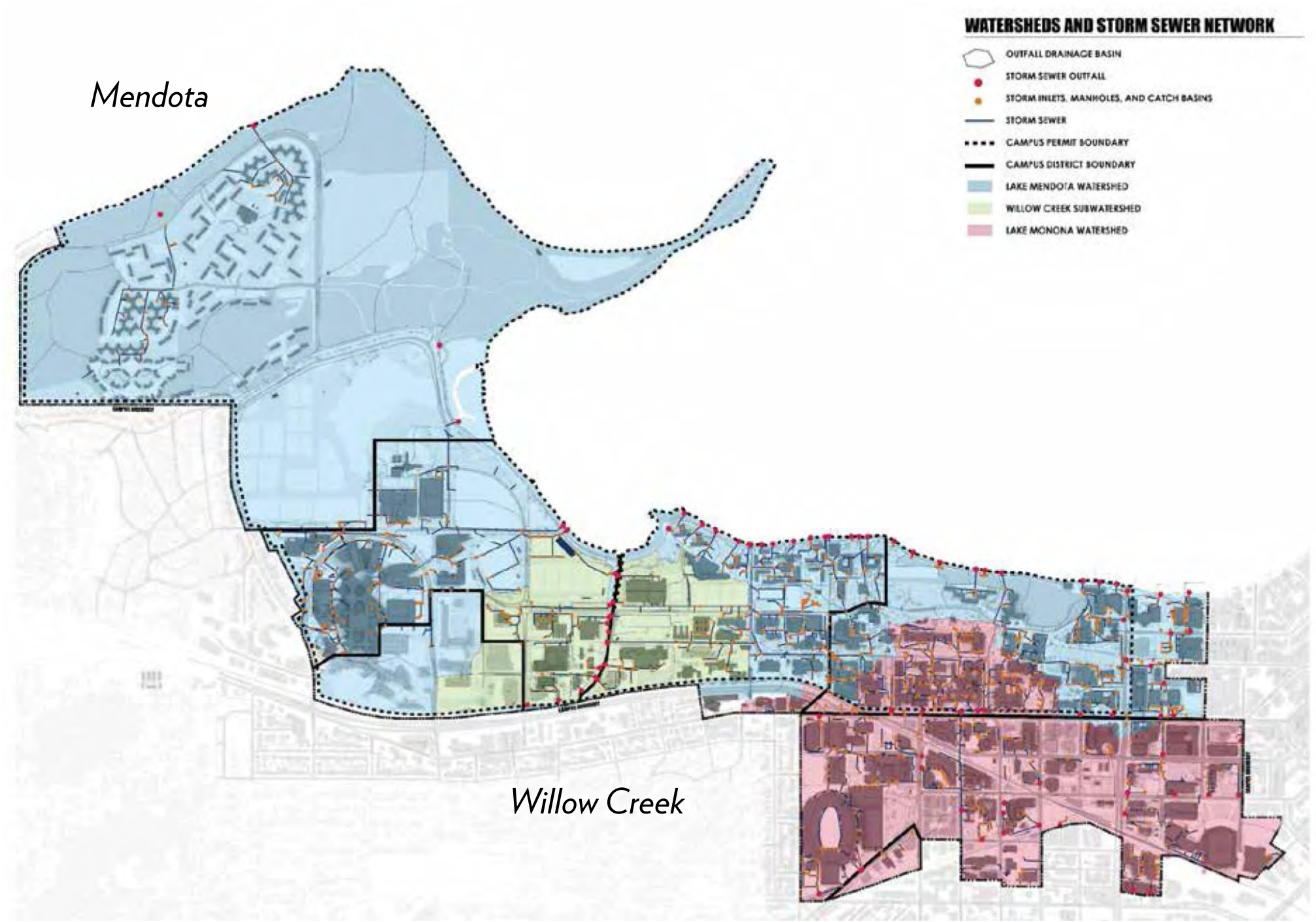

WATERSHEDS AND STORM SEWER NETWORK
OUTFALL DRAINAGE BASIN
STORM SEWER OUTFALL
STORM INLETS, MANHOLES, AND CATCH BASINS
STORM SEWER
CAMPUS PERMIT BOUNDARY
CAMPUS DISTRICT BOUNDARY
LAKE MENDOTA WATERSHED
WILLOW CREEK SUBWATERSHED
LAKE MONONA WATERSHED
Mendota
Willow Creek
Monona Bay

Image: Ayres Saint Gross

2005 PLAN

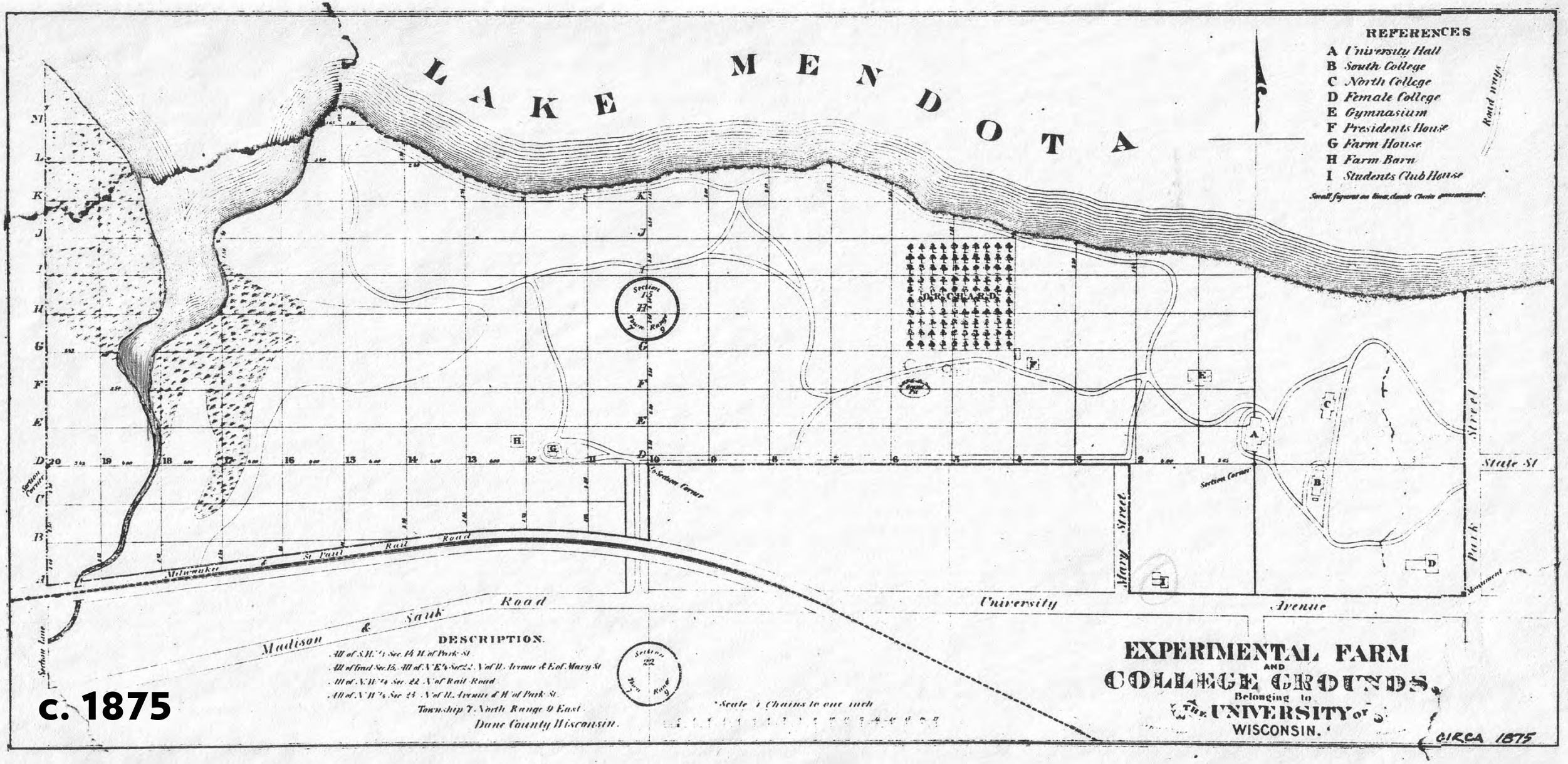
Image: SmithGroup + Hoerr Schaudt

2015 PLAN

PROJECT GOALS

- Enhanced teaching, education, and research opportunities.
- Overall coordinated development from a systems standpoint.
- Improved ecological function.
- Improved campus green space network (Lakeshore Nature Preserve).
- Improved accessibility and circulation (bike, ped, vehicle, fauna).
- Strategic activation of creek bank for user engagement.
- Address aging infrastructure and delivery through corridor.
- Improved stormwater management. Adjacent lands, riparian zone expansion, and end of pipe BMP’s. Alignment of adjacent programming with creek restoration goals.
- Address sedimentation of University Bay and improved lake limnology.

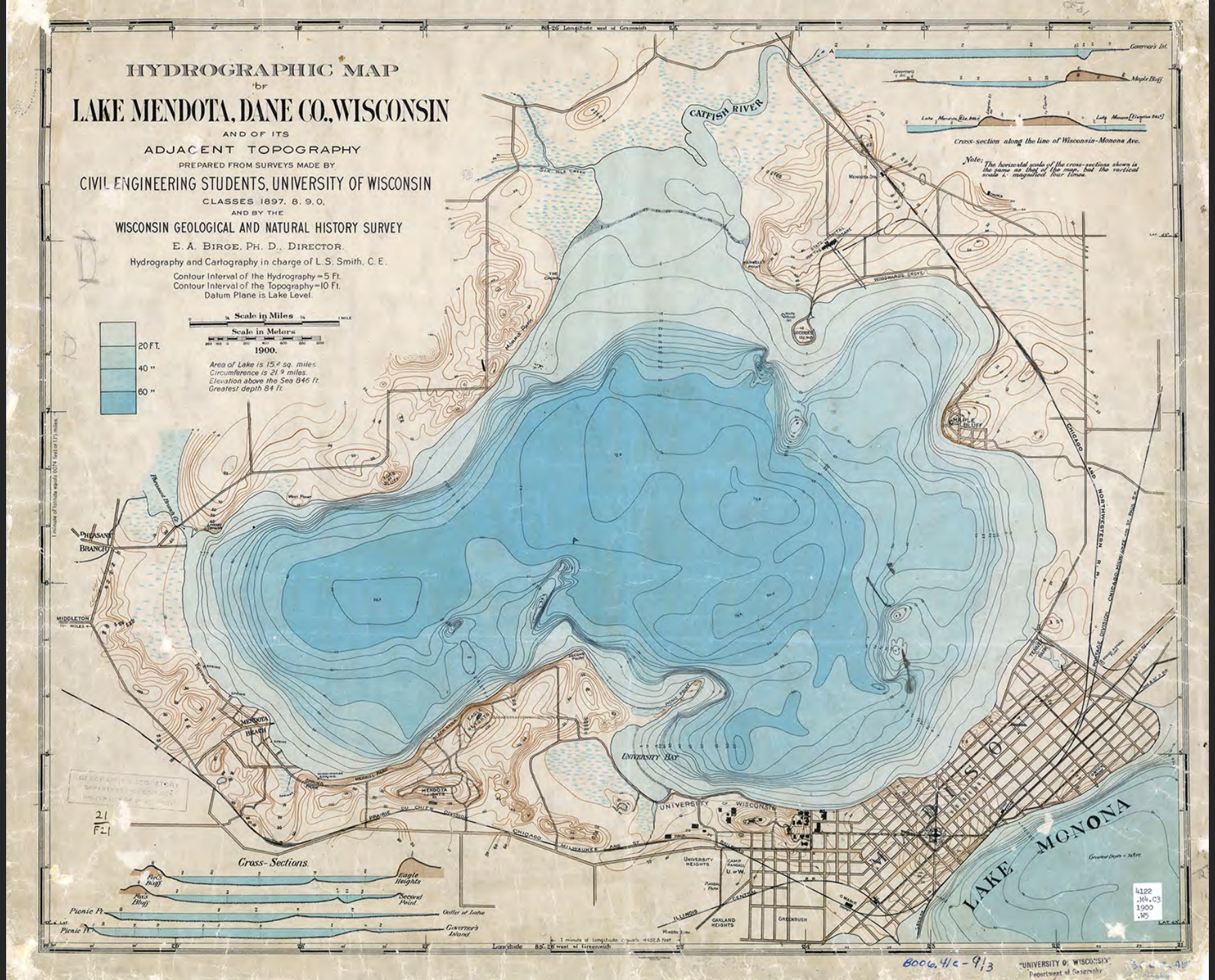
WILLOW CREEK BEFORE



c. 1875

CLP-M0002*

1897



CLP-R0002 Robinson Map Library*


SECOND POINT
PICNIC POINT
UNIVERSITY BAY
UNIVERSITY OF WISCONSIN
SAND PIT
CHICAGO MILWAUKEE AND ST PAUL RAILROAD
UNIVERSITY HEIGHTS
CAMP RANDALL U. or W.
RANDALL PARK
R. R
CENTRAL
WISCONSIN AVE
MONONA AVE
STATE
CAPITOL

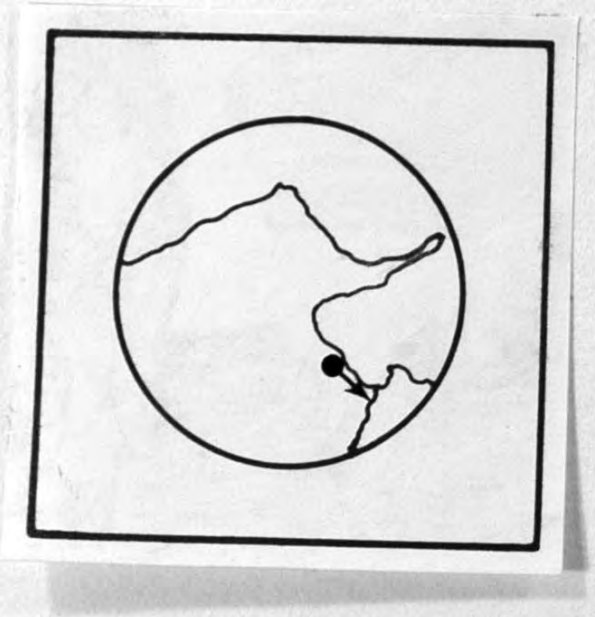
1908

1908

K30-H3

1914

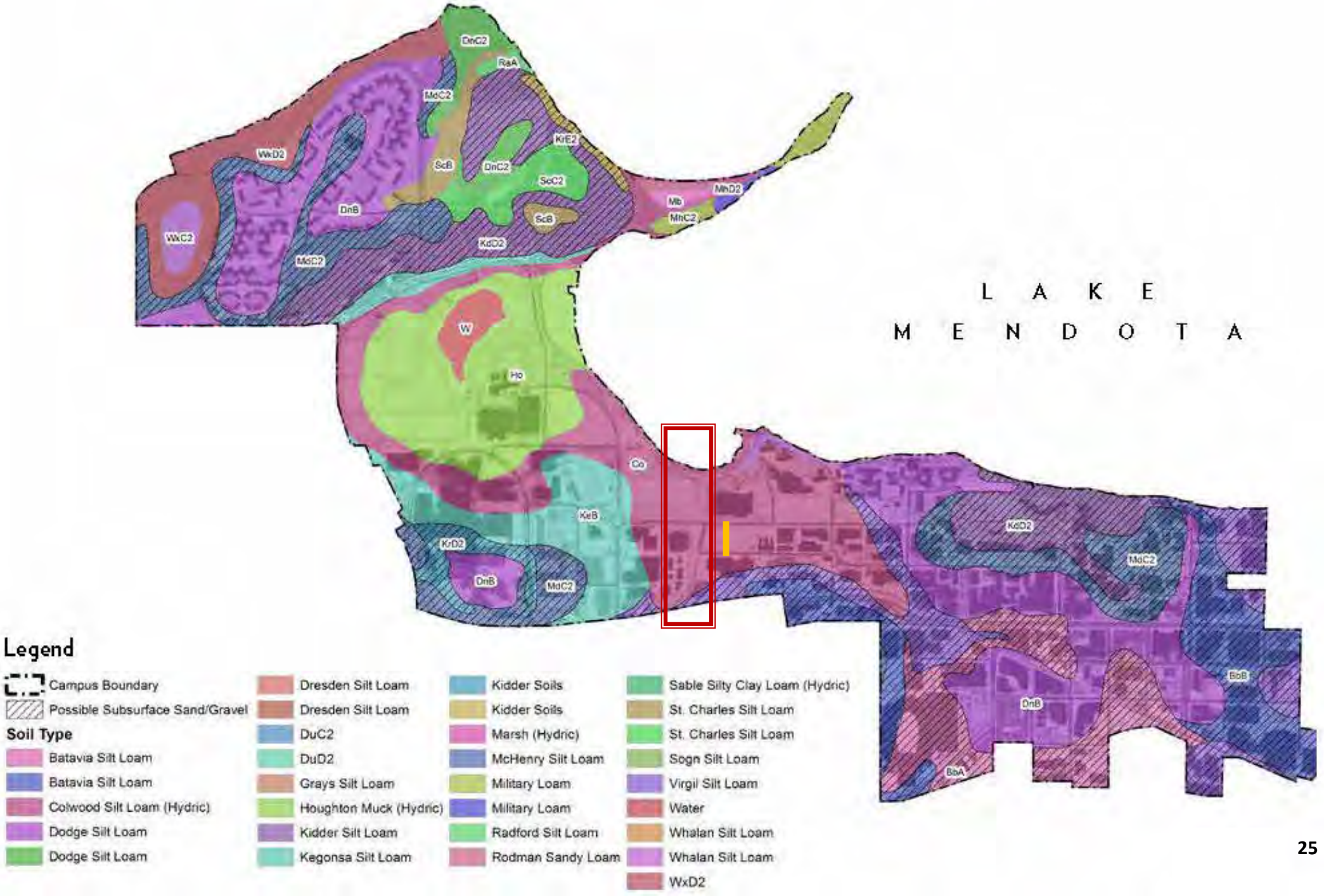
1920s



1937

*CLP-M0007**

Colwood Silt Loam
Hydric
Poor Infiltration



WILLOW CREEK NOW

2018

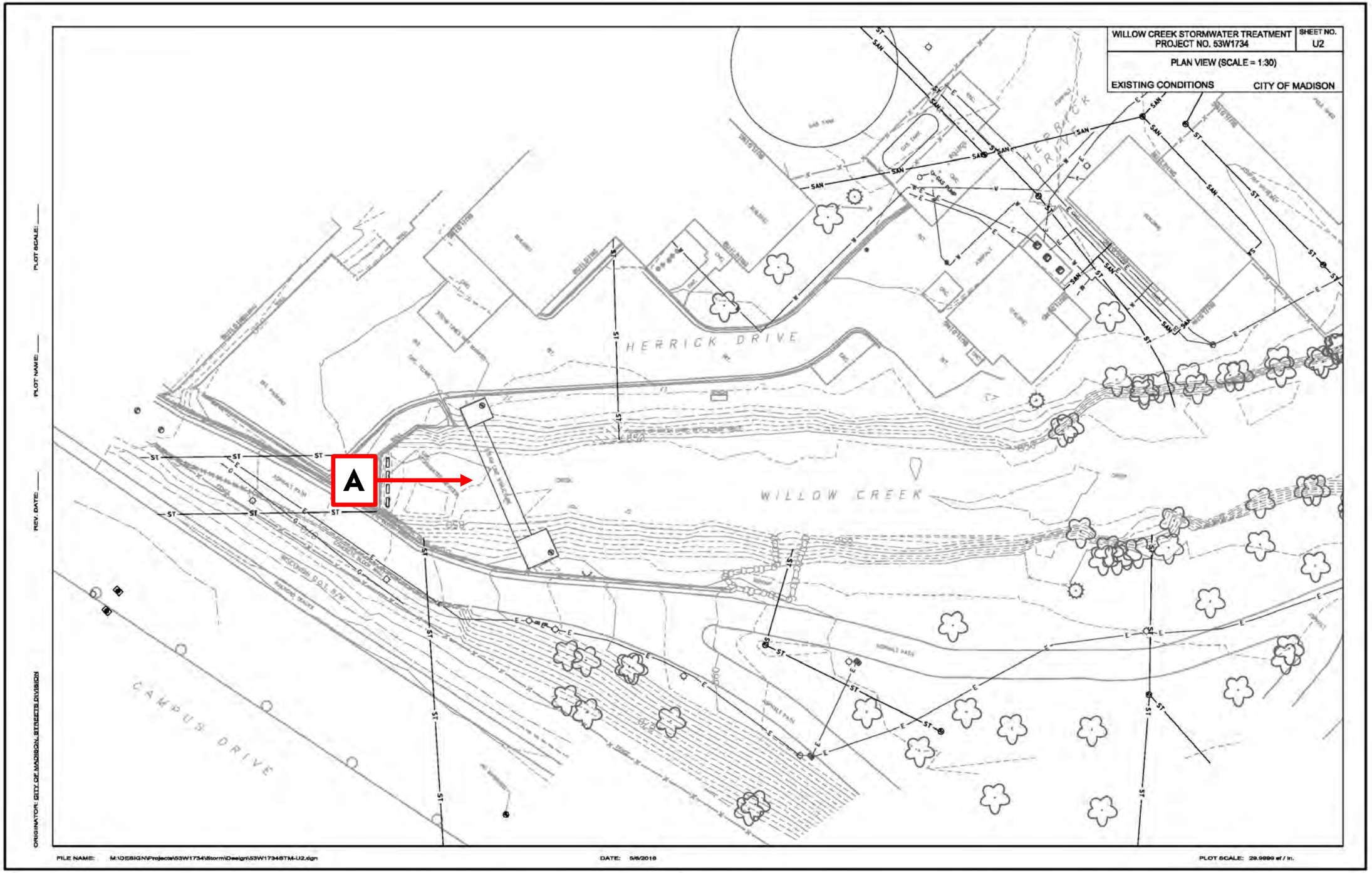
Willow Creek today

Hoerr Schaudt

AREA 1
SEDIMENT REMOVAL CHAMBER

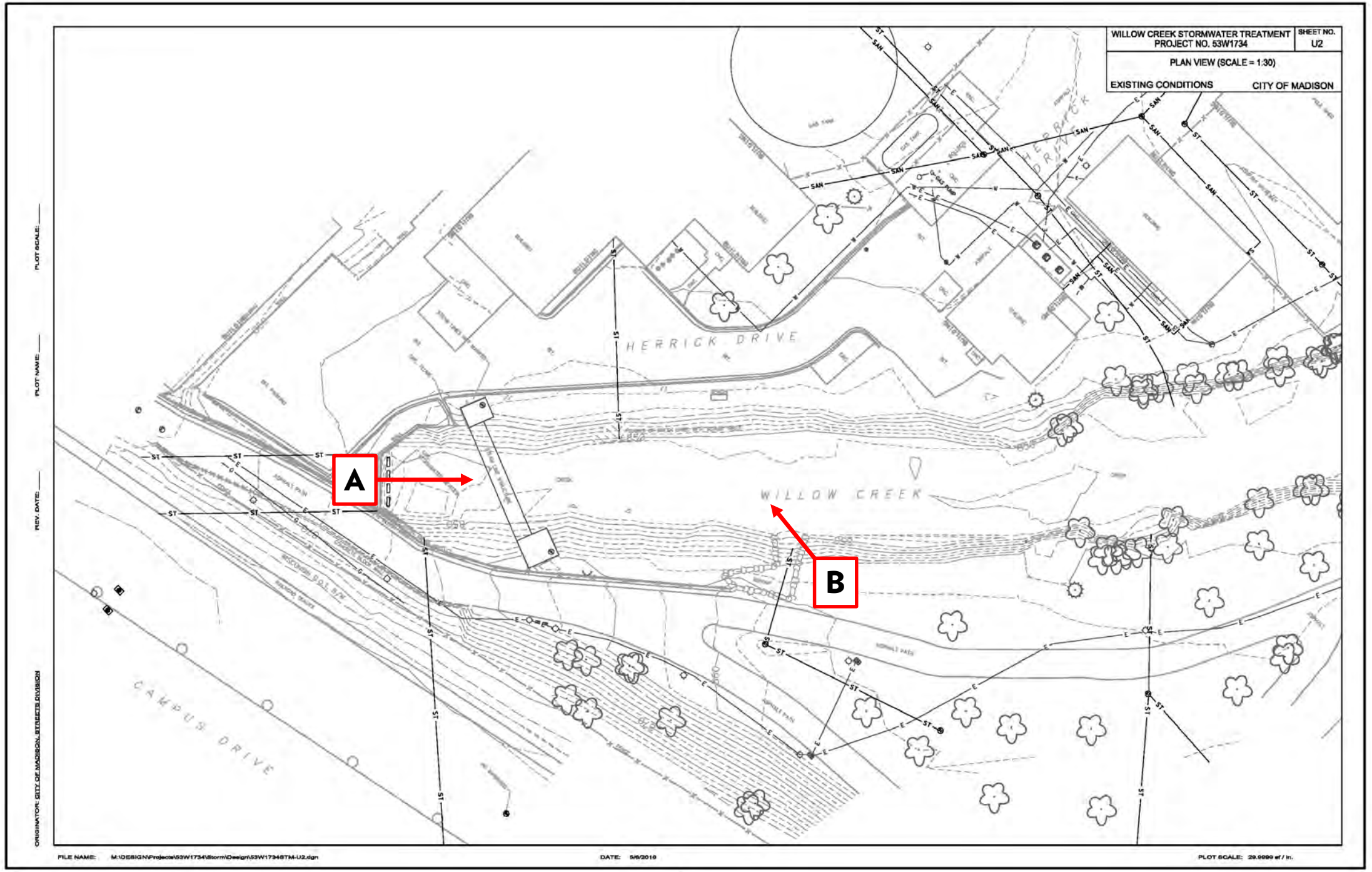
IN THE BEGINNING…

PHOTOS TAKEN 12/10/2015


WILLOW CREEK STORMWATER TREATMENT
PROJECT NO. 53W1734
SHEET NO.
U2
PLAN VIEW (SCALE = 1:30)
EXISTING CONDITIONS
CITY OF MADISON
HERRICK DRIVE
WILLOW CREEK
CAMPUS DRIVE
A
PLOT SCALE:
PLOT NAME:
REV. DATE:
ORIGINATOR: CITY OF MADISON, STREETS DIVISION
FILE NAME: M:\DESIGN\Projects\53W1734\Storm\Design\53W1734STM-U2.dgn
DATE: 5/8/2018
PLOT SCALE: 29.9999 sf / in.

EXISTING CONDITIONS (PRE-2016)

A. **Downstream (NE) from the top of storm sewer outfall**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PLOT SCALE: 29.9999 sf / in.

EXISTING CONDITIONS (PRE-2016)

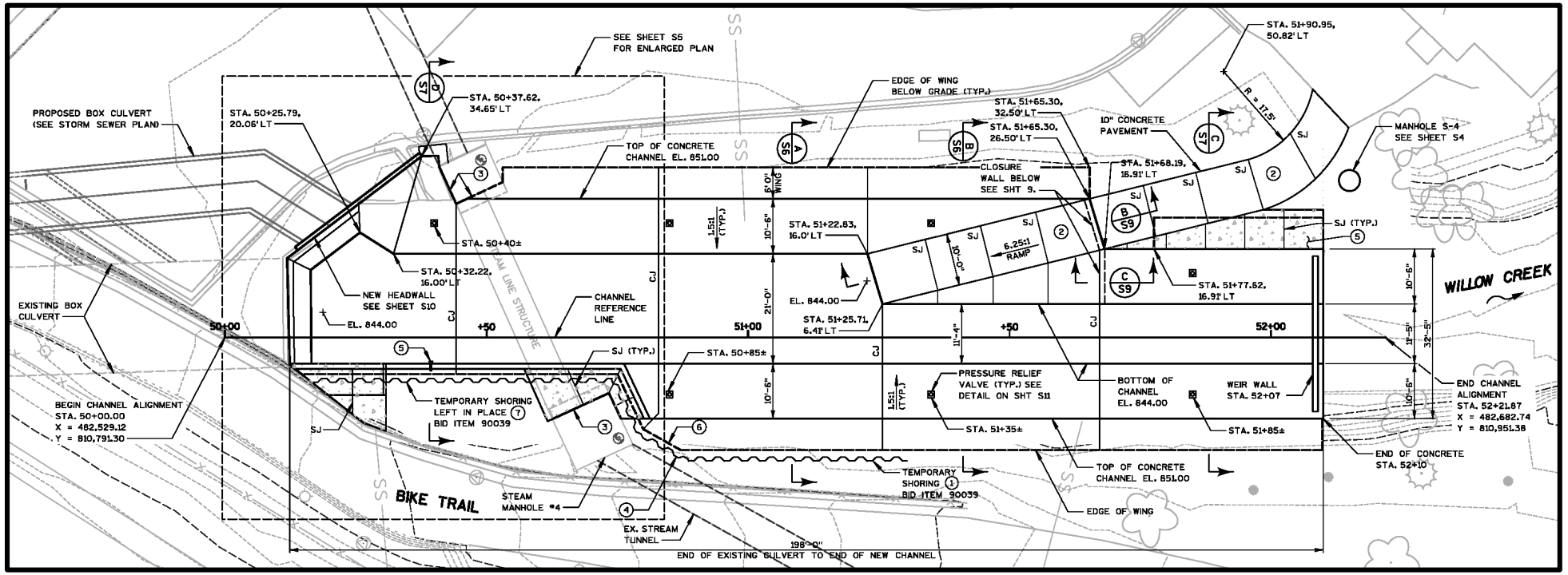
B. View from southeast bank, looking at UW Facilities lot

A BETTER WAY!

- **Concept:** utilize length of degraded channel to capture sediment, allowing for future restoration of downstream environment
- **Three parts:**
  - Concrete-lined channel bed
  - Weir wall at end of channel
  - Stabilized/restored banks above concrete channel
- **Estimated sediment capture:** 193 tons/year
  - WinSLAMM, Midwest particle size distribution
- Constructed in 2016/2017

CONCRETE-LINED CHANNEL BED

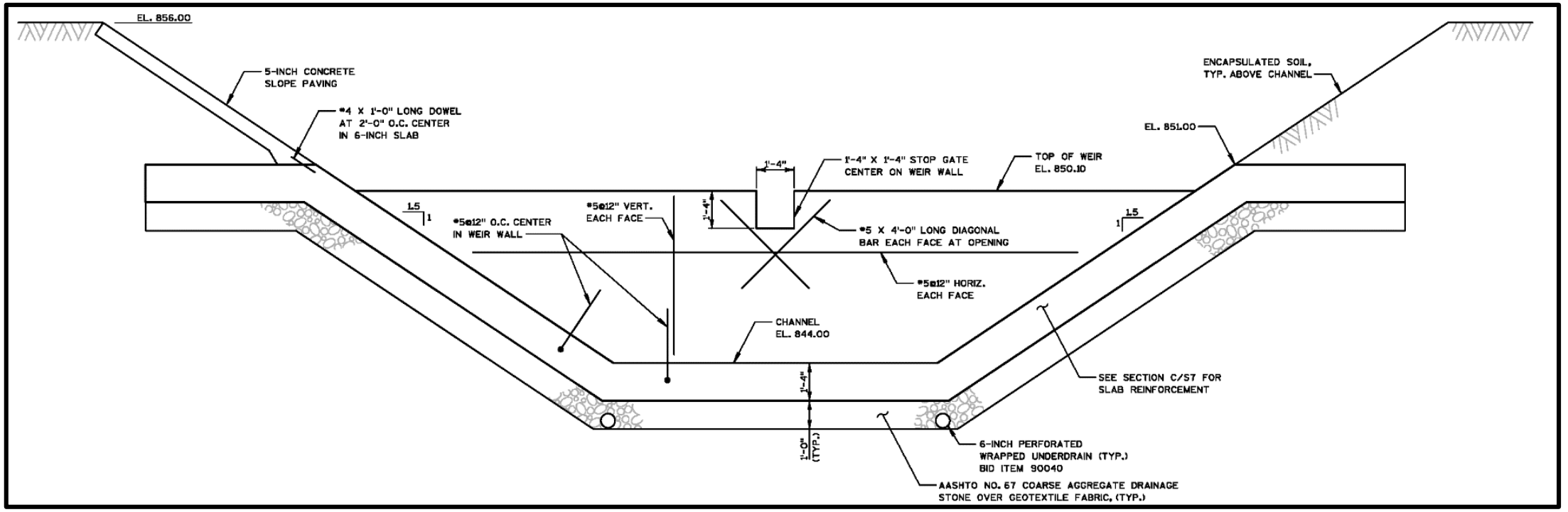
Structural design by Strand Associates



- Concrete channel depth: 7’
- Channel length: 200’
- Reinforced concrete thickness: 16”
- Includes underdrain system, pressure relief valves for maintenance

WEIR WALL

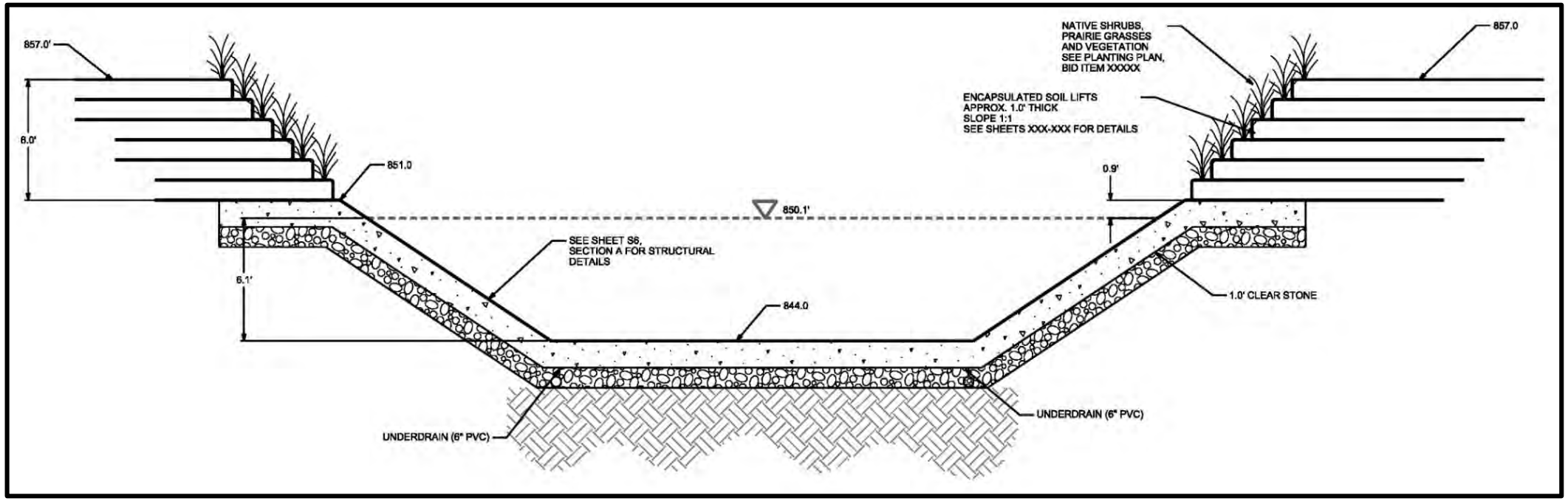
Structural design by Strand Associates



- Weir thickness: 1’
- Standing water elevation: 850.1’ (Lake Mendota summer max)
- Removable 1’ stop gate

BANK RESTORATION

Structural design by Strand Associates



- Encapsulated soil lifts above top of concrete
- Slope: 1:1
- Seeded and matted
- Landscaping above slopes

SUCCESS!

But…

WILLOW CREEK RESTORATION

Original restoration effort - not great!

WILLOW CREEK RESTORATION

Vegetated mat immediately post-construction (October 22, 2018)

WILLOW CREEK RESTORATION

After one growing season (August 1, 2019)

WILLOW CREEK RESTORATION

After one growing season (August 1, 2019)

REMOVAL QUANTITIES

April 2018: 305 CY sediment/debris removed

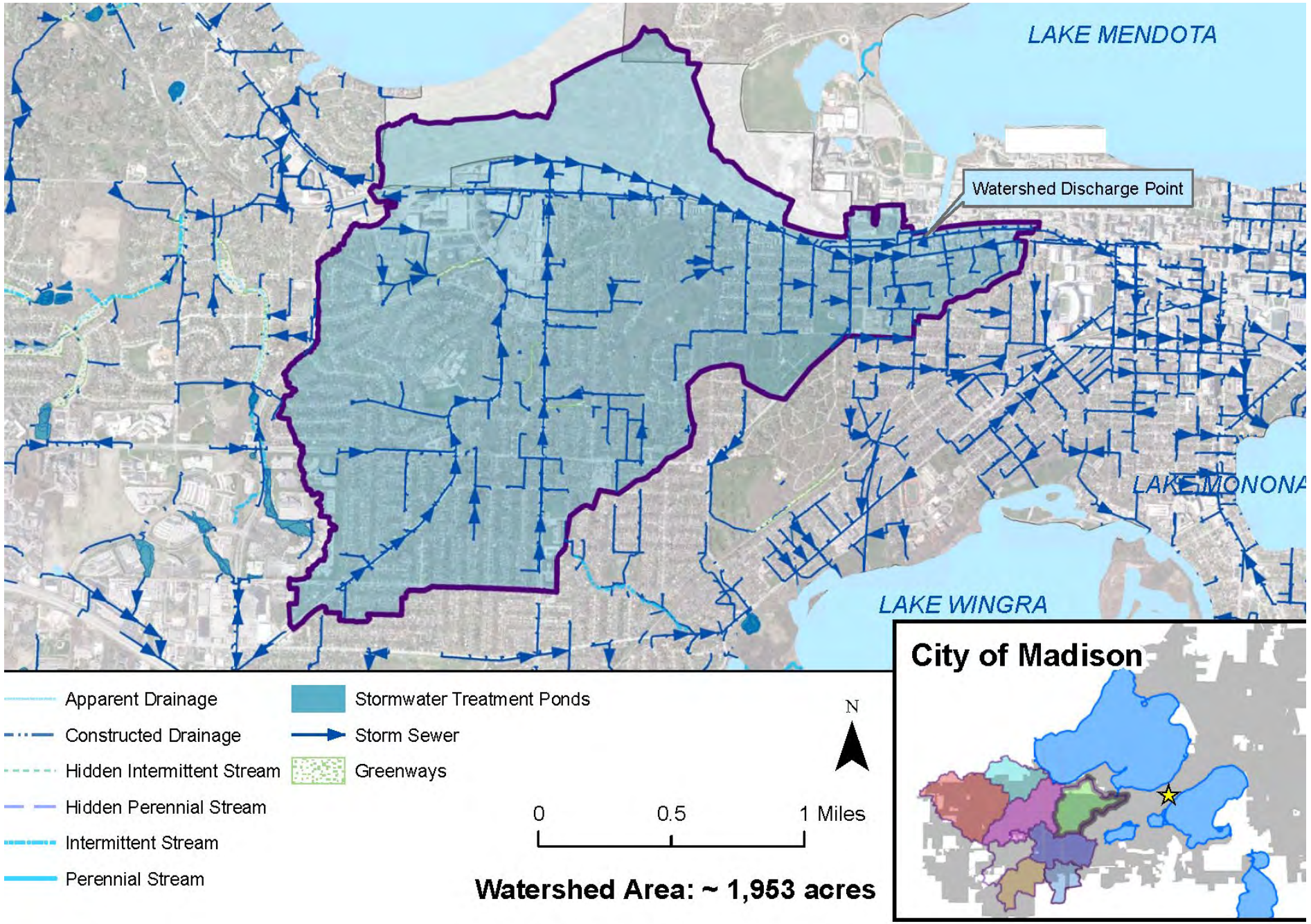
April 2020: 408 CY/451 ton sediment/debris removed

WILLOW CREEK FUTURE

PLANNING STUDIES

- City of Madison Willow Creek Watershed Study (In-progress)
- Willow Creek Master Plan Advance Planning Study (In-progress)
- Lakeshore Nature Preserve Master Plan (In-progress)
- Gym/Nat Feasibility Study (2018)
- Near West Neighborhood Stormwater Study (2017)
- Campus Master Plan Green Infrastructure & Stormwater Management Plan (2015)
- Vet/Met Feasibility Study (2015)
- Stormwater Quality Management Plan, West Campus Technical Revision (2011 Update)
- Cultural Landscape Inventory – Agricultural Campus (2011 Revision)
- Wisconsin Pollutant Discharge Elimination System (WPDES) Permit
- Stormwater Quality Management Plan (2008)

CITY OF MADISON WILLOW CREEK WATERSHED STUDY

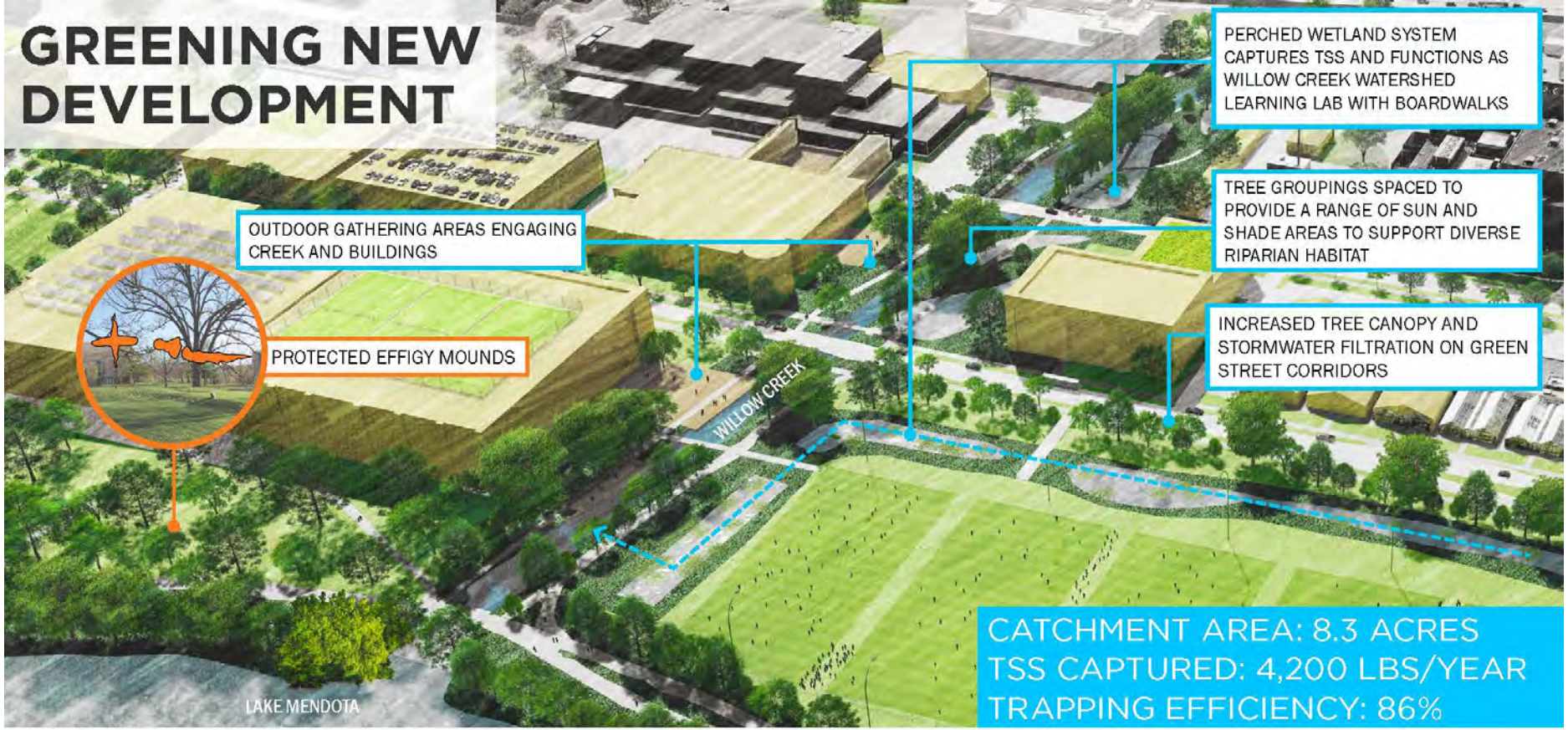


AREA 2
ADJACENT DEVELOPMENT

Image: SmithGroup + Hoerr Schaudt

2015 PLAN

Image: SmithGroup + Hoerr Schaudt


GREENING NEW DEVELOPMENT
PERCHED WETLAND SYSTEM CAPTURES TSS AND FUNCTIONS AS WILLOW CREEK WATERSHED LEARNING LAB WITH BOARDWALKS
TREE GROUPINGS SPACED TO PROVIDE A RANGE OF SUN AND SHADE AREAS TO SUPPORT DIVERSE RIPARIAN HABITAT
INCREASED TREE CANOPY AND STORMWATER FILTRATION ON GREEN STREET CORRIDORS
OUTDOOR GATHERING AREAS ENGAGING CREEK AND BUILDINGS
PROTECTED EFFIGY MOUNDS
WILLOW CREEK
LAKE MENDOTA
CATCHMENT AREA: 8.3 ACRES
TSS CAPTURED: 4,200 LBS/YEAR
TRAPPING EFFICIENCY: 86%


PERCHED WETLAND

Run it in Ditches

Run it in Pipes

Run it in Stormwater Pipes

Keep it from Stormwater Pipes

Well…just don't cause flooding

Oh…and don't pollute either

It's the Ecology, Stupid

Water is Water is Watershed

Green and Bear It

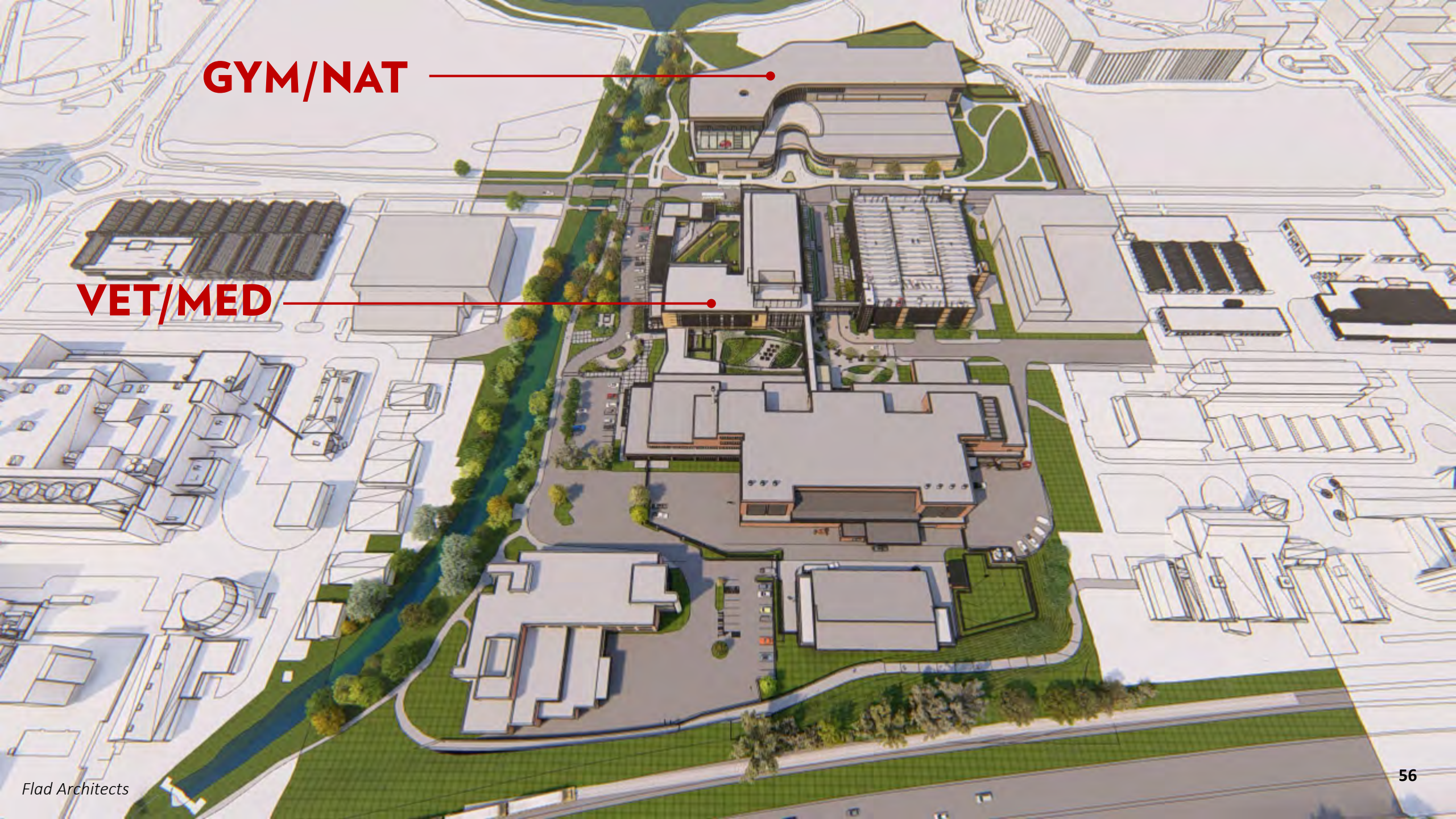
BACK TO THE FUTURE

Stormwater Paradigms, Andy Reese, June 30, 2001

WILLOW CREEK

- Hubs and Corridors = Network
- Conduits for movement
- Reduce fragmentation
- Increase diversity of hubs
- Stormwater management
- Opportunities for interaction

"Together We Can Grow Better," CRCOG and US EPA, prepared by WRT Design.



Flad Architects

Site Plan

School of Vet Med Expansion

Bid Date – Early 2021

Start Construction – 04/April 2021

Substantial Completion – 06/2023

NORTH

Flad Architects


72'-0"
36'-0"
25'-0"
70'-0"
53'-0"
38'-0"

Gym/Nat Replacement Project

Bid Date – Early 2021

Start Construction – 03/2021

Substantial Completion – 12/2022

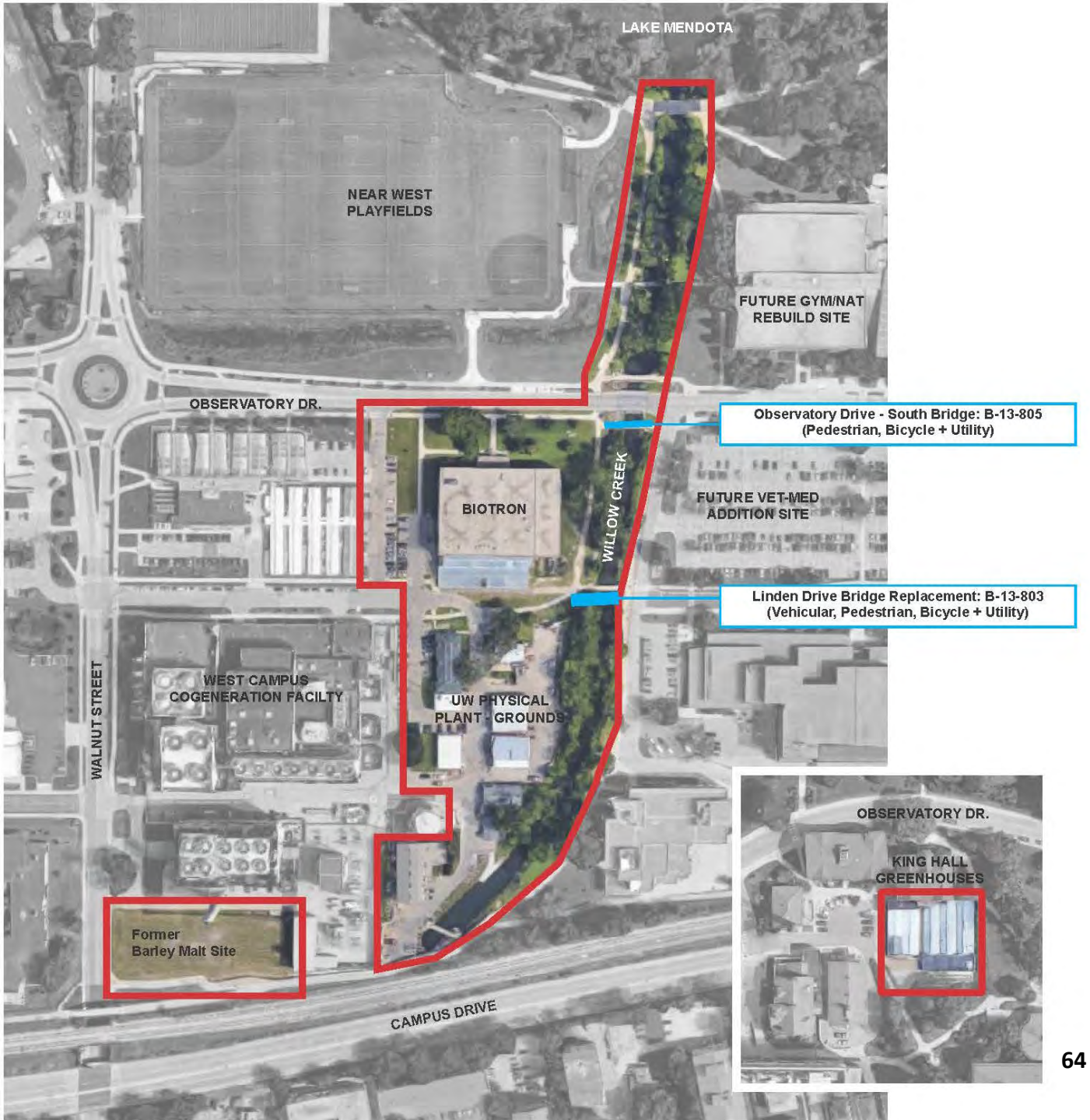
Kahler Slater Architects

ALTERNATE: STREET TREES AT ENTRY

Kahler Slater Architects & GRAEF

Hoerr Schaudt

WILLOW CREEK ADVANCE PLANNING STUDY



WILLOW CREEK ADVANCE PLANNING STUDY

PHASE 1:

- Determine project scope
- Determine resource needs
- Determine technical needs
- Determine permitting needs
- Determine public outreach opportunities
- Determine schedule & timeline

PHASE 2:

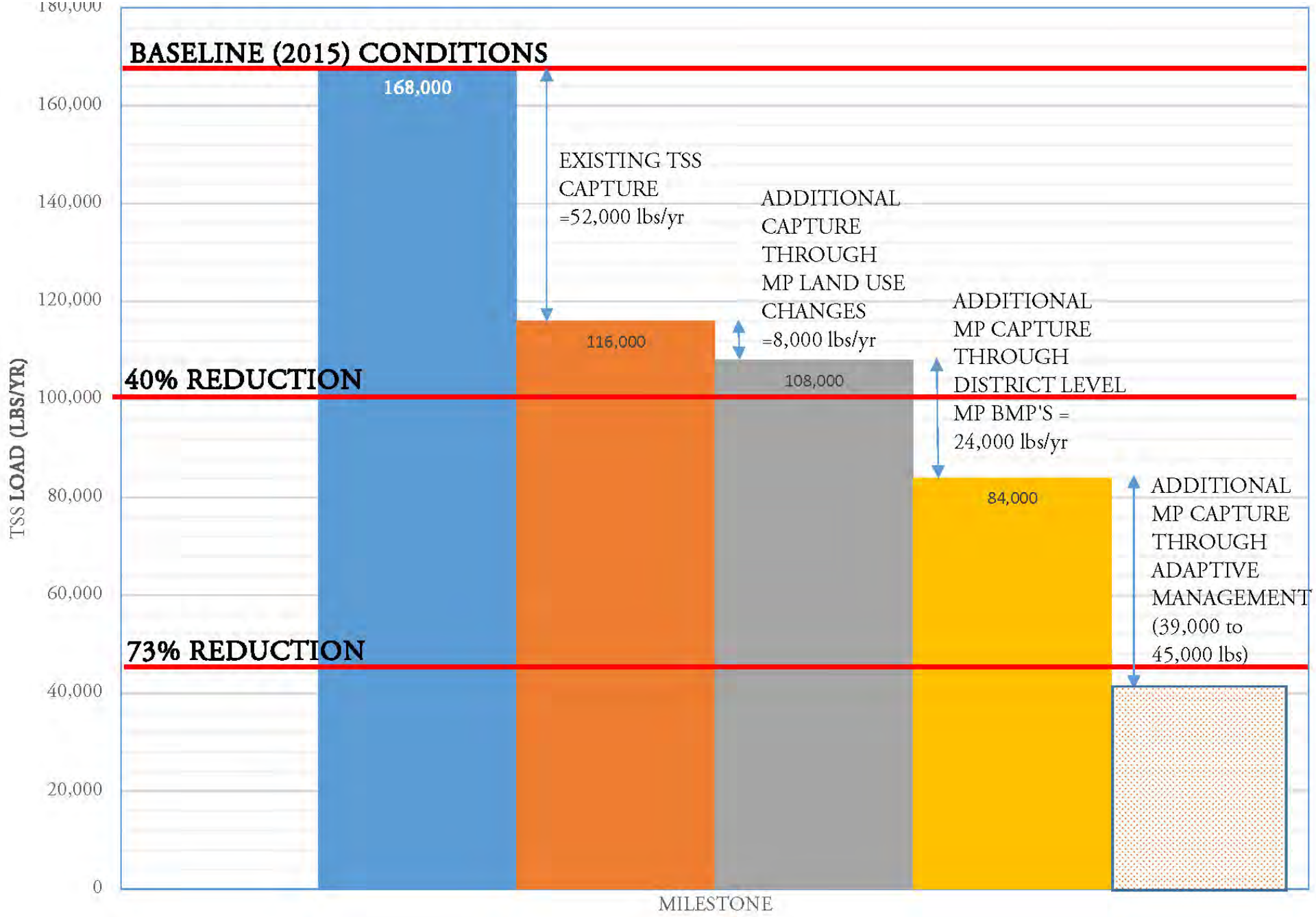
- Preliminary Design Documents

PHASE 3:

- Final Design Documents

CITY OF MADISON 'NEW' STORMWATER ORDINANCE

- Requirements for minimum building opening elevations (852')
- UW not required to meet stormwater ordinance, but we do seek to meet and exceed the ordinance on each project.
- Redevelopment will continue to have no detention requirements but UW will incorporate it if we are aware of downstream capacity issues.
- City's Redevelopment requirement is 60% from new pavement or 40% from the entire site. UW campus goal will continue to be 80% TSS removal on all sites to meet our overall campus permit goals
- UW is interested in matching the City's new requirements for Redevelopment sites for reducing 10-year peak flow rate and volume and to use Green Infrastructure if the redevelopment has proposed impervious cover exceeding 80% of the existing site impervious cover.
- Overall, more detail in stormwater planning at the initial Advance Planning phase so that enough funding and space is given to BMPs.


BASELINE (2015) CONDITIONS
40% REDUCTION
73% REDUCTION
168,000
116,000
108,000
84,000
EXISTING TSS CAPTURE =52,000 lbs/yr
ADDITIONAL CAPTURE THROUGH MP LAND USE CHANGES =8,000 lbs/yr
ADDITIONAL MP CAPTURE THROUGH DISTRICT LEVEL MP BMP'S = 24,000 lbs/yr
ADDITIONAL MP CAPTURE THROUGH ADAPTIVE MANAGEMENT (39,000 to 45,000 lbs)
TSS LOAD (LBS/YR)
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
MILESTONE

AREA 3
UNIVERSITY BAY

PHASE 3


Willow Dr
Willow Dr
Willow Dr
© 2012 Microsoft Corporation
Pictometry Bird's

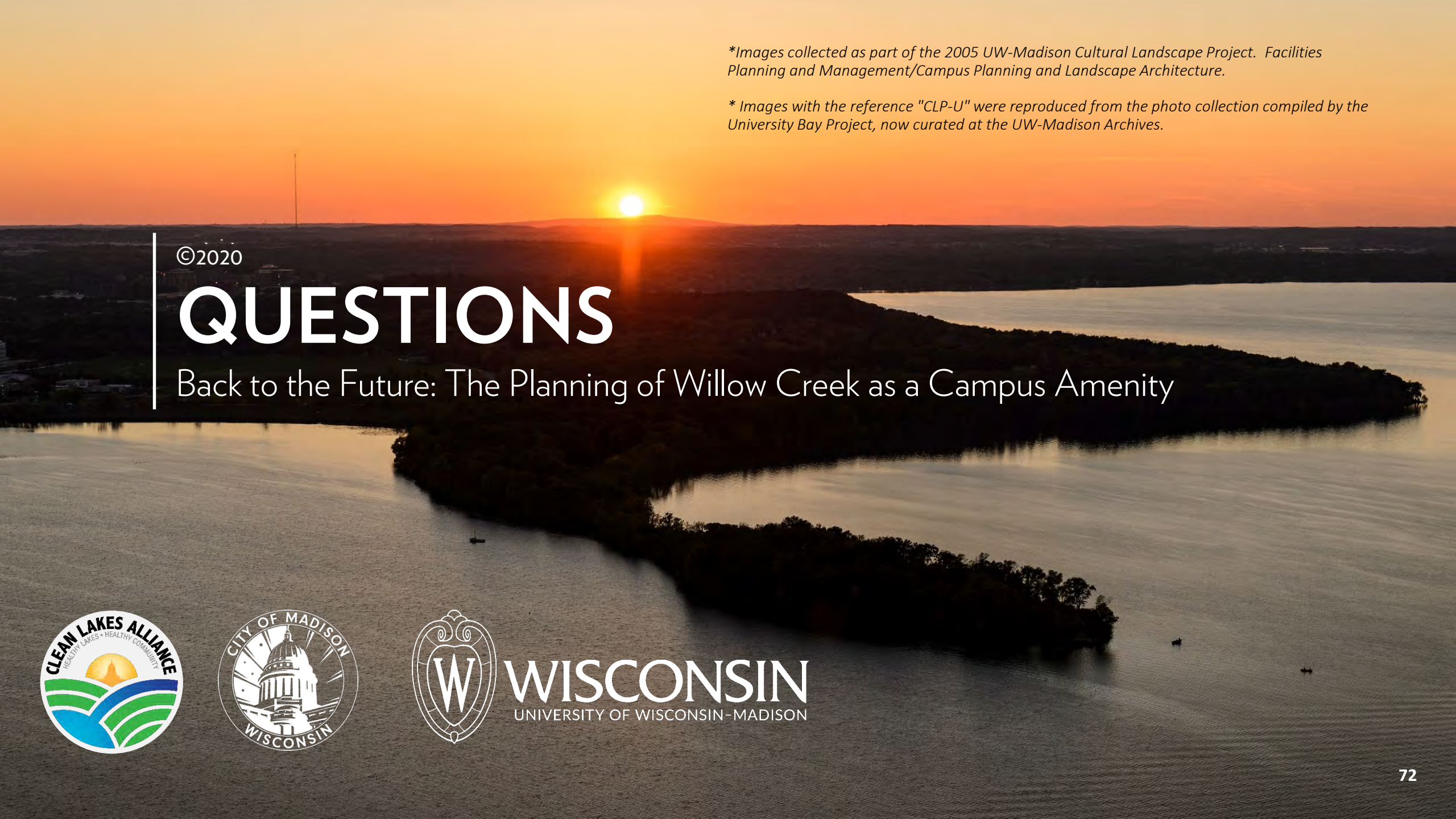
PHASE 3

60,000 SF?
2’ depth?
5,000 CY dredge?


SECOND POINT
PICNIC POINT
UNIVERSITY BAY
UNIVERSITY OF WISCONSIN
WISCONSIN AVE
MONONA AVE
CAPITOL
STATE
CHICAGO MILWAUKEE AND ST PAUL RAILROAD
UNIVERSITY HEIGHTS
CAMP RANDALL U. or W.
RANDALL PARK
R. R
CENTRAL
SAND PIT

*Images collected as part of the 2005 UW-Madison Cultural Landscape Project. Facilities Planning and Management/Campus Planning and Landscape Architecture.

* Images with the reference "CLP-U" were reproduced from the photo collection compiled by the University Bay Project, now curated at the UW-Madison Archives.



QUESTIONS

Back to the Future: The Planning of Willow Creek as a Campus Amenity

CLEAN LAKES ALLIANCE
HEALTHY LAKES + HEALTHY COMMUNITY

CITY OF MADISON WISCONSIN

WISCONSIN
UNIVERSITY OF WISCONSIN-MADISON