Dane Co. Green Infrastructure Tour
October 3, 2023; 8:30 a.m. – 1:00 p.m.
Agenda

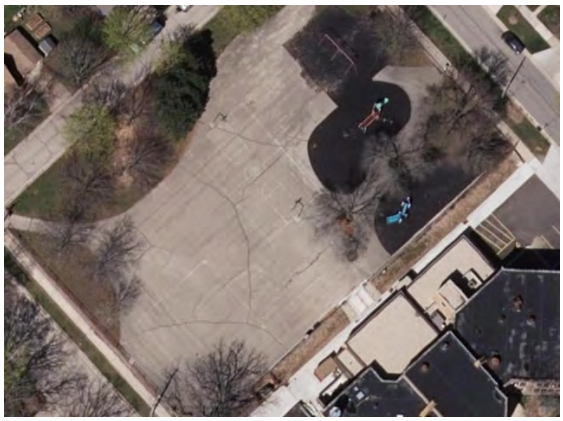
8:30a.m.	Bus departs at 8:30a.m. from **W. G. Lunney Lake Farm Shelter #2** (4330 Libby Rd, Madison, WI, 53711)
	8:35-8:55 Travel
8:55-9:15	#1 - Wingra School Project – Phil Gaebler, P.E. (City of Madison)
	9:15-9:20 Travel
9:20-9:35	#2 - Westmorland Study – Phil Gaebler, P.E. (City of Madison) -*Remain on the bus for this location.*
	9:35-9:45 Travel
9:45-10:10	#3 - First Unitarian Society (900 University Bay Drive; Madison WI 53705) – Tom Miskelly (Facilities Manager, First Unitarian Society) and Dave Weber (Owner's Representative for the Atrium Addition w/ First Unitarian Society)
	10:10-10:25 Travel
10:25-10:50	#4 - Madison Christian Community – Tom Matthews (Previous Facilities Manager at MCC Church)
	10:50-11:05 Travel
11:05-11:20	#5 - Nesbitt Heights Infiltration Cells – Rick Eilertson, P.E. (AECOM) -*Remain on the bus for this location.*
	11:20-11:30 Travel
11:30-12:00	#6 - Promega-Chapelle – Rob Montgomery, P.E. (Montgomery Associates) and Deb Hatfield, P.E. (MSA)
	12:00-12:15 Travel
Drive-by	#7 - O'Brien Solar Fields – Phil Gaebler, P.E. (City of Madison) -*Remain on the bus for this location.*
12:15-12:45	#8 - Terravessa - Ryan Stenjem, P.E. (City of Madison) and Ben Schulte, P.E. (City of Fitchburg)
	12:45-12:55 Travel
12:55p.m.	Arrive back at W. G. Lunney Lake Farm Shelter #2 (4330 Libby Rd, Madison, WI, 53711)

Green Infrastructure Bus Tour
Project Summaries

Site #1. Wingra School Project

Phil Gaebler, P.E. (City of Madison)

As part of this retrofit project, the playground adjacent to Wingra School was reimagined to improve the play experience while reducing water quality impacts. The City of Madison partnered with Wingra School (private) for this project. Wingra School owns the school building and uses the adjoining City of Madison park lands per an easement agreement. The new playground was installed prior to this project and the school added terraced gardens and an outdoor education space. The asphalt play area that remained in the park caused flooding issues in the new outdoor space. The project removed blacktop (impervious) areas, and the installed two bioretention basins. They intercept, infiltrate and route stormwater to the City's stormsewer on Western Ave via an underdrain and an overflow pipe. Bioretention captures 70% of the TSS and 47% of the TP in the drainage area. Average volume reduction is 30%.



2017 Aerial

2022 Aerial

Site #2. Westmorland Study

Phil Gaebler, P.E. (City of Madison)

The purpose of this study is to shed light on a watershed's response to the installation of a collection of green infrastructure practices. Monitoring is performed in collaboration with USGS at three locations throughout the watershed.

In 2020, the GI practices listed below were installed as part of the Toepfer, Holly, Euclid and St Clair street reconstruction project (see **Attachment 1**):

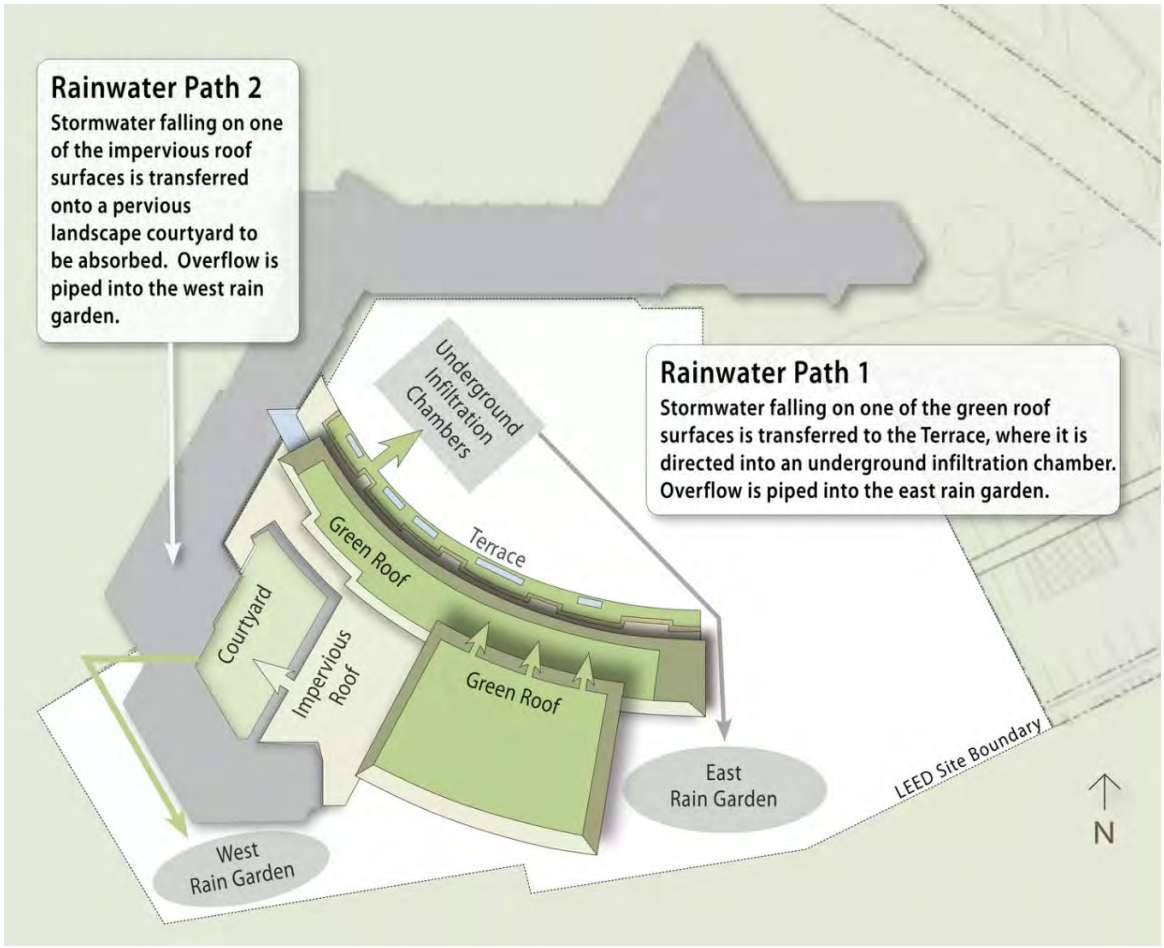
- **Pervious Pavement**: Sited within the street on Euclid Ave and St. Clair St.
- **Terrace Rain Gardens**: Installed by the City and maintained by the homeowner (homeowner responsible for an installation cost-share of $100).
- **Rock Cribs**: Sited in suitable terraces to infiltrate driveway and sidewalk stormwater runoff. Concrete sidewalk panels were replaced with pervious sidewalk panels, and a rock crib was buried in the adjacent terrace. A foot of topsoil was placed on top of the rock crib and restored to turf grass. From a visual and maintenance perspective, the terrace looks similar to areas where a rock crib is not installed.

Since then, the City has been working with homeowners to install additional GI practices on private property such as rain barrels, rain gardens, redirecting downspouts, and incorporating native landscaping on their property.

Site #3. First Unitarian Society Meeting House

Tom Miskelly (Facilities Manager, First Unitarian Society) and Dave Weber (Owner's Representative for the Atrium Addition)

The First Unitarian Society Meeting House is a national landmark and is one of Madison's best known Frank Lloyd Wright buildings. An atrium addition was completed in 2008 and boasts LEED Gold status. The addition features several stormwater facilities including a green roof, rain gardens, and an underground infiltration facility (see image below). The green roof was planted with 13 native, drought-tolerant sedum species. The sedums were planted in trays filled with engineered soil, and the trays were installed on a thermal plastic membrane. The green roof does not have downspouts and instead, allows water to flow off of the entire length of the roof onto a stone-filled terrace below. Water percolates through the stone and enters underdrains which direct water to an underground infiltration chamber. During heavy rains, any overflow from the underground chambers is directed to an east rain garden. The addition also has a smaller impervious roof which flows onto a courtyard behind the building. Water from this area is conveyed to a western rain garden.



First Unitarian Society Site Layout

Site #4. Madison Christian Community

Tom Matthews (Previous Facilities Manager at MCC Church)

As part of their commitment to being good stewards of the environment, Madison Christian Community (MCC) collects rainwater that falls on their building's roof and directs it to a 2,500-gal cistern. The harvested rainwater is piped downhill (using gravity) to nearby gardens where it is made available for irrigation. The property has two garden areas. The northern gardens are community garden plots, which are available to people in the neighborhood and church members. In 2001, a Madison Area Food Pantry Garden was added to the south. The food pantry garden includes a hoop house and areas for growing vegetables, raspberries, strawberries, asparagus, flowers, herbs, rhubarb and fruit trees. The garden provides 5,000-6,000 pounds of food that is delivered to Madison west side food pantries. Water from the cistern is practical for dispensing into a container and drip watering individual plants. However, the water does not have enough pressure to be practical for spray watering from a hose. For this reason, and to allow for watering during times of drought, gardeners also have access to potable City water. The property also features large native prairie areas which are tended to by volunteers.

Madison Community Church Site Layout

Site #5. Nesbitt Heights Pond and Infiltration Cells

Rick Eilertson, P.E., ENV-SP (AECOM)

The Nesbitt Heights pond and infiltration cells are regional facilities that were constructed to treat stormwater from the Orchard Pointe plat. Its watershed extends north to McKee Road and includes the Target shopping center and Quarry Ridge Retirement Community. The infiltration area was designed as cells for two primary reasons: a) to concentrate maintenance needs in the upstream (west-most) infiltration cell, and b) to work with the natural topography. Water from the pond is directed to Cell #1 (the western-most cell), where it is spread throughout the cell via a perforated concrete pipe at ground level. When water reaches approximately 6 inches, it enters a standpipe and is sent to Cell #2. This process is repeated in each cell. Any excess water from Cell #3 is directed to a wetland (natural kettle) to the east. To date, no known overflows from the kettle have occurred since the stormwater facilities were constructed in 2007. The Nesbitt Heights

regional stormwater facilities have undergone a series of retrofits since the original installation, which are outlined in **Attachment 2**.

Clogged Outlet Structure – Cell #1

Piping Failure – between Cell #3 & Wetland

Site #6. Promega-Chapelle

Rob Montgomery, P.E. (Montgomery Associates) and Deb Hatfield, P.E. (MSA)

The Chappelle site is in a closed depression watershed. The City of Fitchburg assigned a site-specific standard control of 100% of increased runoff volume for specified runoff analysis year. The plan included peak discharge control using detention basins, and water quality control using infiltration areas and permeable pavers. Runoff volume reduction analysis concluded that infiltration facilities alone could not meet the site-specific criteria, so Promega, based on previous experience and site-specific standards, chose to meet the stormwater volume reduction goal using stormwater capture and reuse (see **Attachment 3a**). The runoff mass balance analysis indicated the reuse supply would be about 2.9 million gallons / ~9 months (for the 1981 analysis period). The reuse system includes pumping from the detention pond, two filtering steps, and chlorination (see **Attachment 3b**). Treated stormwater is available for reuse for landscape irrigation, toilet flushing, and use in cooling towers. Reuse water is most valuable in the cooling towers (see **Attachment 3c**).

Promega-Chapelle Site Layout

Site #7. O'Brien Solar Fields

Phil Gaebler, P.E. (City of Madison)

The O'Brien Solar Farm is a solar field seeded with native plants. The project complied with stormwater management requirements by planting native deep rooted grasses and forbs below the panels and pollinator friendly native prairie species around the perimeter.

22 acre site with dual sided tracking solar panels

TSS was removed by modeling filter strips downstream of the various land uses (solar panel areas, parking areas, etc). With the final stabilization of the site a dense filter strip will be present and provide a higher level of treatment than presented in the calculation. Occasional mowing or vegetation management will occur using small scale farm or landscaping equipment to prevent

vegetation that may eventually shade the panels. Wisconsin now has a guidance document for ground mounted solar arrays which can be found at the link below.

https://dnr.wisconsin.gov/sites/default/files/topic/Stormwater/public_comment/Draft_Post-Construction_Storm_Water_Management_for_Ground-Mounted_Solar.pdf

Site #8. Terravessa

Ryan Stenjem, P.E. (City of Madison) and Ben Schulte, P.E. (City of Fitchburg)

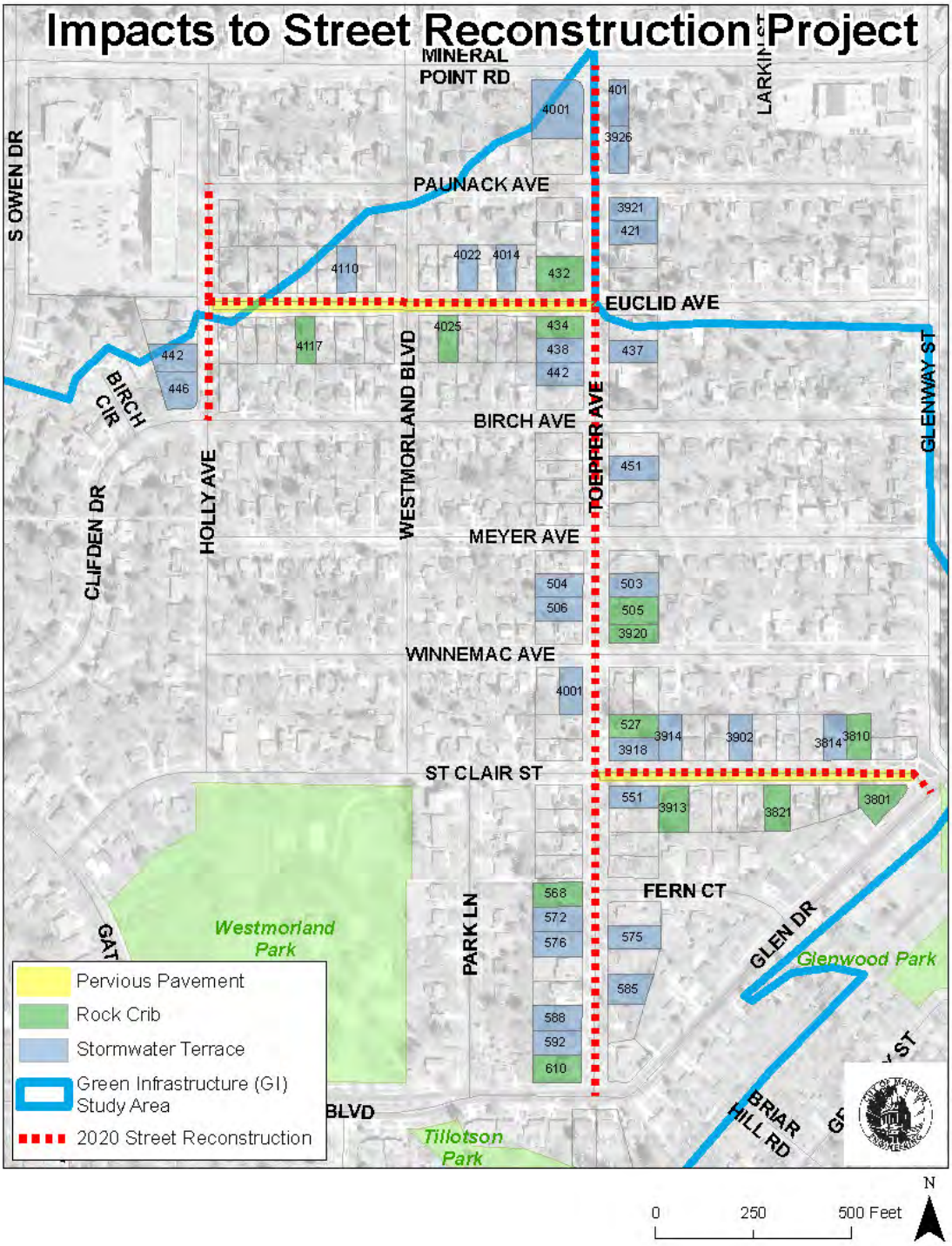
Terravessa, is a high density, 248-ac mixed use plat in the Northeast Neighborhood of Fitchburg (see **Attachment 4a**). A negotiated settlement agreement prior to the approval of the development imposed stormwater management requirements exceeding typical state and local standards. These included typical runoff peak rate, volume, and TSS controls, in addition to reducing P loading by 50% (compared to predevelopment), all verified through runoff monitoring.

To meet these design constraints and align with the developer's sustainability goals, green infrastructure played a central role in the stormwater management plan. The system design included multi-function regional basins that could be managed adaptively, combined with distributed infiltration practices throughout the plat. The regional stormwater basins incorporate wet detention, dry detention, and bioretention elements (see **Attachment 4b**). Distributed infiltration practices, such as bioretention in medians and terraces, and permeable alleys, are strategically placed throughout the development to complement the regional basins (see **Attachment 4c**). These distributed infiltration practices were designed for functional efficiency, aesthetic appeal, and to avoid utility and construction conflicts. At final build out they will provide roughly 20% of the volume control and water quality treatment at the plat level. Carefully selected, deep rooted native vegetation was integrated throughout the plat both within devoted stormwater management practices and the remaining public open space.

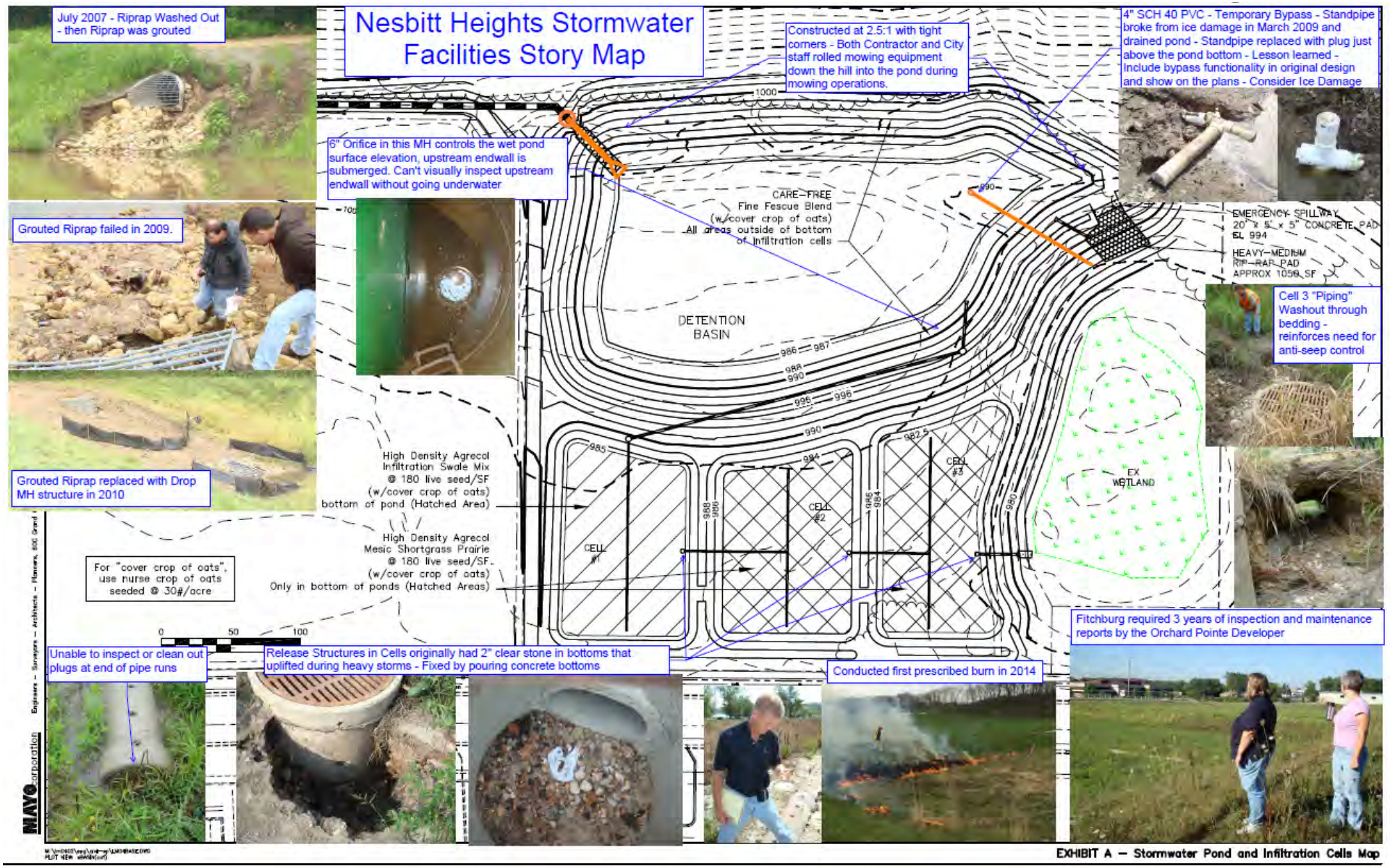
Median Bioretention Basin

Terrace Bioretention Basin

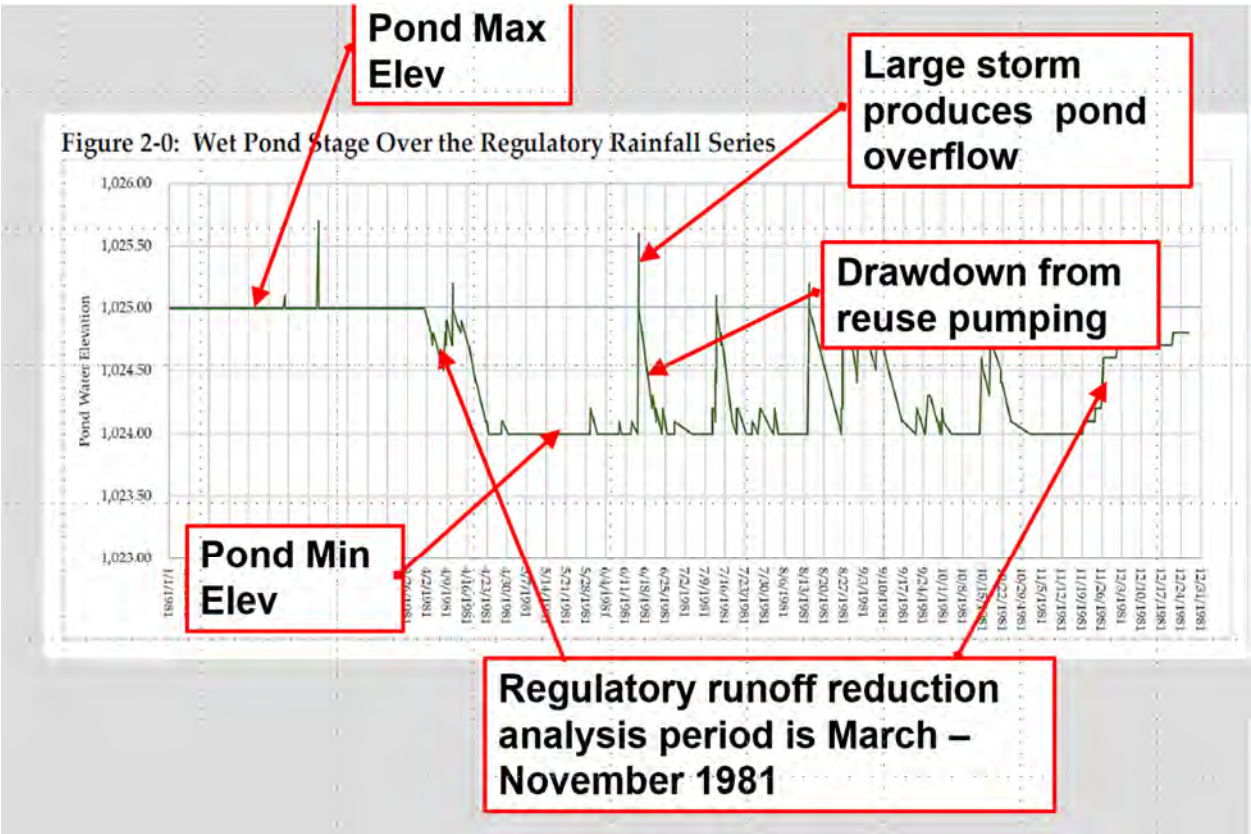
Attachment 1. Street Reconstruction Map



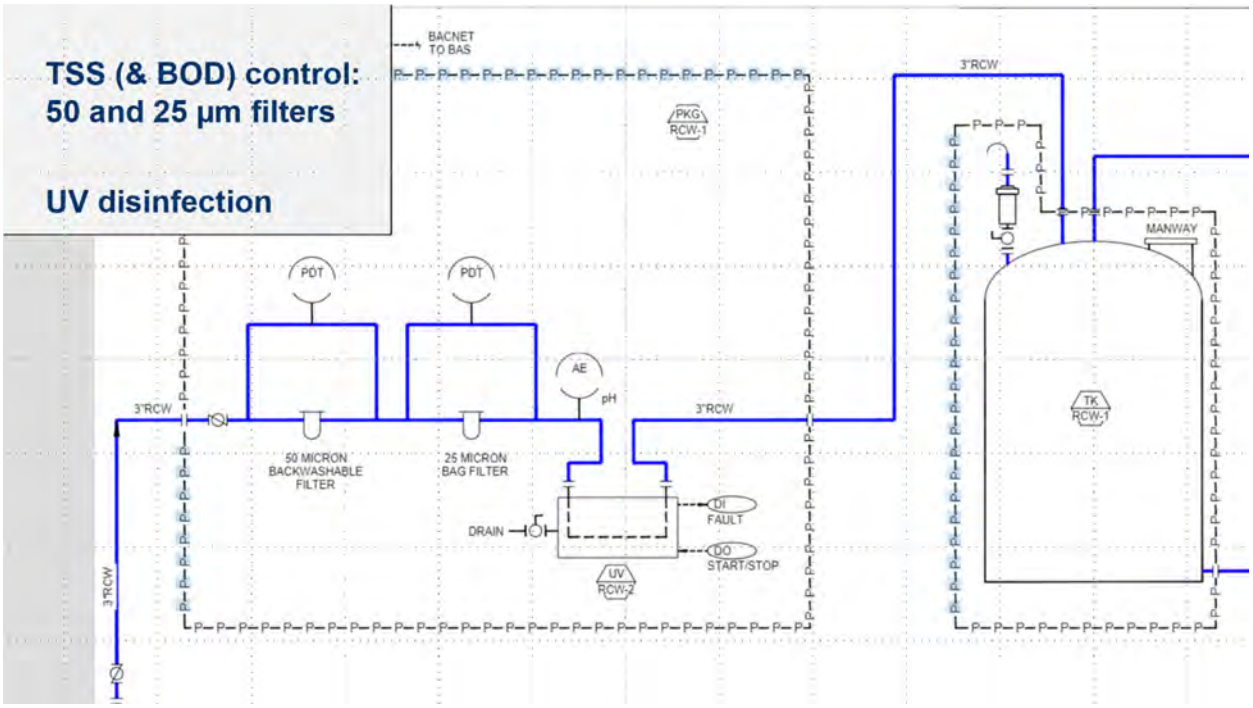
Attachment 2. Nesbitt Heights



Attachment 3a. Wet Pond Stage Over the Regulatory Rainfall Series

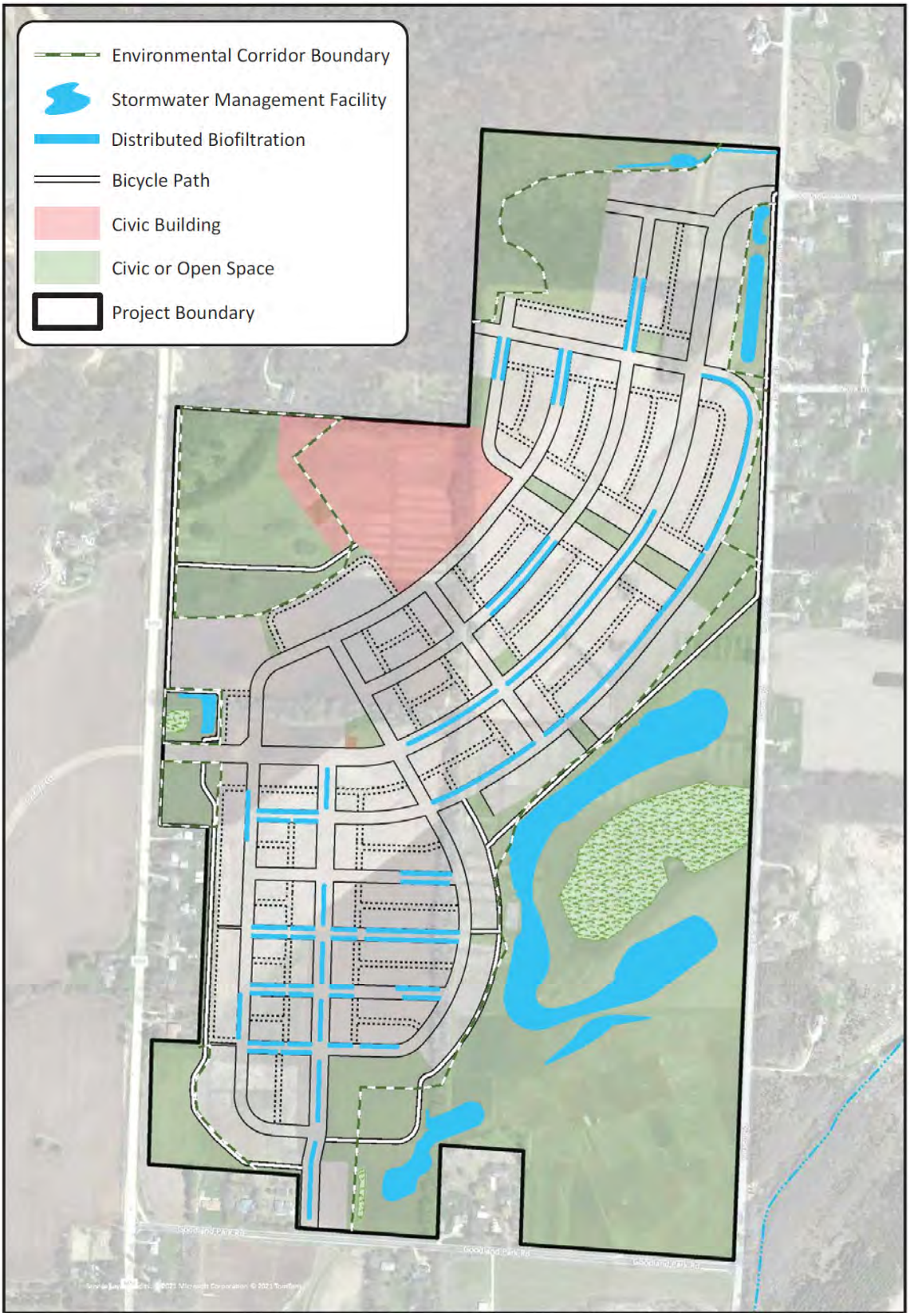


Attachment 3b. TSS Controls



Attachment 3c. Cooling Towers at Promega-Chapelle

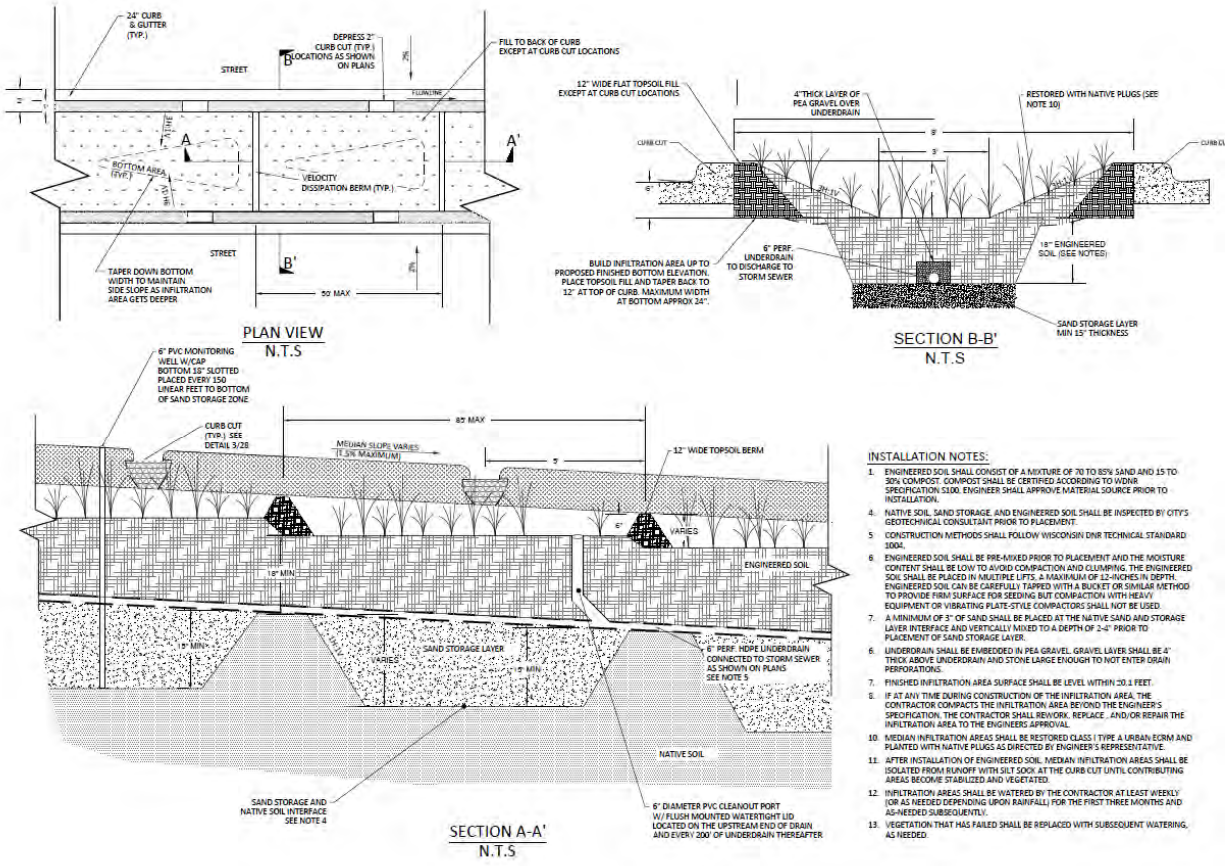
Attachment 4a. Terravessa Plat



Attachment 4b. Terravessa Large Regional Stormwater Treatment Facility

Attachment 4c. Construction Details

Median Infiltration Area



Terrace Infiltration Area