2023 STORMWATER MANAGEMENT PLAN UPDATE

CITY OF DE PERE

TMDL WRITTEN PLAN

October 30, 2023

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A. Introduction

The City has been issued a Wisconsin Pollutant Discharge Elimination System Number (WE-S050075-02) to discharge storm water from the Wisconsin Department of Natural Resources (WDNR). Part of the permit requirements include the following Permit Conditions:

Permit Section 1.5.4.5: The permittee shall submit a TMDL Written Plan to the Department by March 31, 2018.

> *1.5.4.5.1 Recommendations and options for storm water control measures that will be considered to reduce the discharge of each pollutant of concern.*
>
> *1.5.4.5.2 A proposed schedule for implementation of the recommendations and options identified under Section 1.5.4.5.1*
>
> *1.5.4.5.3 A cost effectiveness analysis for implementation of the recommendations and options identified under section 1.5.4.5.1.*

In accordance with these requirements, the City has prepared the 2018 Long Term Storm Water Management Plan. This plan was created through a review of the following City plans:

- City of De Pere Comprehensive Stormwater Management Plan, January 1999, by Earthtech
- City of De Pere Nonpoint Pollution WinSLAMM Analysis, March 2008, by Earthtech
- 2015 Stormwater Management Planning, City of De Pere, October 21, 2016, by R.A. Smith National
- 2018 Stormwater Management Plan

These plans included recommendations for future facilities which were reviewed for the 2018 Plan and updated with this 2023 Plan. Several of the recommended facilities from the earlier reports have been constructed. Recommendations not constructed were re-evaluated and those still deemed feasible included in this report. Several new system upgrades have been identified and included.

A list of previously identified facilities that were determined as not feasible have been included in Appendix C.

B. Storm Water Basin Review

1) City Drainage Basin Overview

The City of De Pere is located within three different federally defined hydraulic unit codes 12 (HUC-12) drainage basins. These basins are defined as the Ashwaubenon Creek, Lower Fox River Mainstream, and East River per the report titled *Total Maximum Daily Load and Watershed Management Plan for Total Phosphorous and Total Suspended Solids in the Lower Fox River Basin and Lower Green Bay*, *March 12, 2012,* by the Cadmus Group, Inc. (TMDL Report)

The City's WinSLAMM model has been divided into four different basins based on the HUC-12 discharge location. The basins are as follows:

- AC – Ashwaubenon Creek
- ER – East River
- FE – Fox River East (East side of City)

- FW – Fox River West (West side of City)

For permitting purposes, FE and FW are both part of the Lower Fox River Mainstream basin.

Each basin is divided into sub-basins based on discharge to receiving waters. As new treatment facilities are added, additional sub-basins are created.

The City has different total suspended solids (TSS) and total phosphorous (TP) reduction requirements for each basin per the TMDL Report. The allocations are based on the Total Maximum Daily Load and Watershed Management Plan for Total Phosphorous and Total Suspended Solids.

The City maintains mapping for the storm sewer system along with drainage basins, HUC-12 boundaries, storm water management facilities and outfalls. The updated maps have been included in Appendix A.

2) 2015 City Model

The City updated the storm water management plan, which was completed in 2016. The plan titled 2015 Stormwater Management Planning, re-analyzed the basins to include recent improvements in the storm water management system. A summary of the regulatory requirements and current reduction percentages in the City for TSS and TP by basin is provided below, which is the same as Table 2 from the City's 2015 report.

TABLE 2 – 2015 RESULTS FOR EXISTING CONDITIONS

	Ashwaubenon Creek	East River	Lower Fox River Mainstem	Total
Area (acres)	1,592	1,253	3,009	5,854
Total Phosphorus No controls (pounds/year)	987	728	1,838	3,553
TP With Controls (pounds/year)	379	198	1,283	1,860
Percent TP Reduction	61.6%	72.8%	30.2%	47.7%
TMDL Required Percent Phosphorus Reduction	40.5%	40.5%	40.5%	NA
Additional TP Removal Required (pounds/year)	(209)	(235)	189	NA
Total Suspended Solids No Controls (pounds/year)	514,581	321,619	866,773	1,702,973
TSS With Controls (pounds/year)	181,261	85,223	541,590	808,074
Percent TSS Reduction	64.8%	73.5%	37.5	52.5%
TMDL Required Percent TSS Reduction	52%	52%	72.2%	NA
Additional TSS Removal Required (pounds/year)	(65,738)	(69,154)	300,280	NA

Based on the 2015 Report, the City is meeting regulatory requirements for TSS and TP reduction in basins AC and ER. Over the past cycle term, the City focused construction of ponds for existing development in the FE and FW basins.

3) Upgrades/Modifications to the Existing to Model

Over the last several years, there have been many upgrades/modifications to the model. Each year, staff evaluates updates to the model including basin boundary changes based on new storm sewer installation, and new pond construction to serve existing development and for new development. A summary of the larger changes since the 2015 report is as follows:

- Basin AC051 – Storm water pond constructed north of Main Avenue for Lawrence Drive extended.
- Basin AC100 – The existing pond has been extended to provide additional service to agricultural land that is being developed. This area was in the 2015 model.
- Basin AC160 – Pond constructed for new development. Previously agricultural.
- Basin AC200 – Storm water pond constructed for new development. Previously agricultural.
- Basin AC210 – Storm water pond constructed for new development. Previously field. The pond treats some of the flow from Basin AC100 and additional acreage not previously treated.
- Basin FE070 – Storm water management pond constructed on City property off Front/Franklin/Fulton Streets. This pond treats existing residential and commercial/business development.
- Basin FE190 – Storm water management pond constructed in Optimist Park to serve existing development.
- Basin FE275 – Flow from new development in the basin directed to storm water pond in basin FE260.
- Basin FE290 – Storm water management pond was constructed north of the future Profit Place extension. Previously agricultural.
- Basin FW200 - Converted dry detention ponds to wet ponds off Matthew Drive. This pond serves existing industrial development.
- Basin FW280 – Storm water management pond constructed off Fortune Avenue. Previously agricultural.
- Basin FW290 – Storm water management pond constructed off Richco Road. This pond serves existing industrial and new industrial development.
- Basin FW310 – New storm water pond constructed for new development off Lost Dauphin Road. Previously agricultural.
- Overall City – When impacted by construction, inlets are being replaced with catch basins in areas of the City where regional treatment is not an option.

The model is updated yearly for TSS in a tabular spreadsheet. Table 3 below provides a summary of the status. The tabular review for each sub-basin and HUC-12 are included in Appendix A.

TABLE 3 – CURRENT TSS REDUCTIONS

	Ashwaubenon Creek	East River	Lower Fox River Mainstem	Total
Area (acres)	1,706	1,252	3,131	6,089
Total Suspended Solids No Controls (pounds/year)	555,682	330,155	911,060	1,796,897
TSS With Controls (pounds/year)	181,585	82,649	524,798	789,032
Percent TSS Reduction	67.3%	75.0%	42.4%	56.1%
TMDL Required Percent TSS Reduction	52%	52%	72.2%	NA
Additional TSS Removal Required (pounds/year)	(85,142)	(75,825)	271,523	NA

C. TMDL Long Term Options

There are several different practices that the City is utilizing to meet the long-term plan for the TMDL requirements. A summary of these practices and the order with which the practices will be applied are as follows:

1) Allocating TSS and phosphorous reductions from the AC and ER basins to the FE and FW basins. The City is treating TSS and phosphorous above the current TMDL requirements for these two basins. Under current rules, additional treatment can be allocated to basins FE and FW.

2) Construct new storm water treatment facilities in untreated areas of basins FE and FW. One of the primary tools the City is using to meet the TSS reduction requirements is constructing retrofit facilities within existing developed areas. The emphasis for this approach is existing developed areas of basins FE and FW. In addition to developed areas, there are agricultural areas within the FE and FW basins that will be converted to urban development. The developed areas will be treated to a minimum of 80% TSS and 30% phosphorous reductions.

3) Construct new storm water treatment facilities in untreated areas of basins AC and ER. Similar to the discussion above, new storm water facilities are being constructed in basins AC and ER. Under the current rules, treatment attained in these basins can be allocated to the FE and FW basins. However, due to the uncertainty of the regulatory environment, the allocation treatment to basins can always change. In these basins, additional treatment from the conversion of agricultural lands to urban development, and the improved treatment will be allocated to basins FE and FW.

Retrofitting facilities for developed and untreated storm water is not proposed unless it is part of ongoing development/redevelopment or a construction project. There is risk for the City to install these facilities and then lose the ability to apply treatment to the other basins. If the City were guaranteed that waste reduction from retrofit storm water facilities would be grandfathered in for any regulatory changes in allocating between basins, the City will make retrofit facilities in basins AC and ER a priority. There are a few improvements proposed in the AC basin in this report that are part of construction projects.

4) Construct catch basins in areas without regional treatment capabilities. The City used inlets for storm water collection in City Streets. Catch basins are being installed in areas of the City that are not going to an existing or proposed regional facility.

5) Advanced leaf collection. The City has been proactive in fall leaf collection. Six to eight passes are made through the City each fall. We have created a new collection system that is completed by a vacuuming truck that cleans the entire gutter as the truck travels from leaf pile to leaf pile.

6) Advance street sweeping. The City has a very active street sweeping program. Street sweeping is a community priority for aesthetic purposes. The street sweeping frequency was modified several years ago to also address storm water management requirements. Additional sweeping will be evaluated in areas where regional ponds are not constructed.

7) Private site redevelopment. Redevelopment has occurred and will continue to occur throughout the City. Per the City's ordinance, redeveloped sites that do not discharge to a regional facility are required to reduce the total suspended solids load by 40%. Redevelopment of private sites will provide short term treatment for areas where future retrofit facilities can be constructed. The sites will provide long term treatment for basins that are not included in a regional facility. Although this will be a small portion of the City's long-term plan, it will nonetheless help to show continued improvement. The City has not been including credit for private site reductions in the model.

As noted above, the City currently is exceeding the TMDL requirements for the AC and ER basins. The excess treatment will be allocated toward deficiencies in the FE and FW basins. We are hoping to update the model for all private development in the next permit cycle.

8) Adaptive management partnering. The Green Bay Metropolitan Sewerage District (GBMSD) is considering an adaptive management project in the Ashwaubenon Creek basin to address their phosphorous needs. There will be a reduction of TSS in conjunction with the phosphorous reduction. The TSS will be available to customers who have TMDL reductions requirements in the Lower Fox River. The City has had discussions with GBMSD regarding the potential adaptive management project and provided a letter of support to GBMSD for the project.

No action is proposed currently.

9) Nutrient trading outside of the City. Under the current regulatory environment, water quality trading is permitted between various entities. The WDNR has created a guide for trading that includes a detailed formula calculating trading credits based on many items such as source distance, risk factor of practice, etc. This along with the challenges for obtaining long-term trading credits make this tool less effective at the current time. This will be considered in the future as the long-term plan is implemented.

No action is proposed currently.

D. Plan of Action Discussion

Below is a summary of the overall City's approach to meet the TMDL requirements for phosphorus and TSS limits.

1) **Allocating TSS and Phosphorous reductions from the AC and ER basins to the FE and FW basins.** Based on the results from the City's 2015 Report, the following additional treatment is obtained and will be allocated to the lower Fox River.

	Ashwaubenon Creek	East River
Additional TP Removed (pounds/year)	209	235
Additional TSS Removed (pounds/year)	85,142	75,825

With the phosphorous allocation, the City will be exceeding the TMDL requirements by 255 pounds/year.

	TP Summary (pounds/year)
Additional TP Removal Required (pounds/year)	189
Subtract Ashwaubenon Creek Basin TP (pounds/year)	(209)
Subtract East River Basin TP (pounds/year)	(235)
Remaining TP Removal Required (pounds/year)	(255)

Allocating the TSS reduction to the Fox River Basins will still leave the City 110,556 pounds per year.

	TSS Summary (pounds/year)
Additional TSS Removal Required (pounds/year)	271,523
Subtract Ashwaubenon Creek Basin TSS (pounds/year)	85,142
Subtract East River Basin TSS (pounds/year)	75,825
Remaining TSS Removal Required (pounds/year)	110,556

2) Construct new storm water treatment facilities in untreated areas of basins FE and FW.

One of the primary approaches to meet the TMDL requirements is the construction of storm water management facilities within existing developed areas. Due to clay soils in De Pere, the primary focus is the construction of ponds. As noted earlier, the City is not meeting the TMDL requirements for the Lower Fox River Mainstream basin (Basin FE and FW). The construction of retrofit facilities will continue to focus on these basins. Potential storm water management facilities in the FE and FW basins have been identified based on previous reports and additional facilities identified in the City. With the additional treatment, the City will exceed the TMDL requirements by 137,598 pounds/year.

	TP Summary (pounds/year)
Additional TSS Removal Required (pounds/year)	271,523
Subtract Ashwaubenon Creek Basin TP (pounds/year)	85,142
Subtract East River Basin TP (pounds/year)	75,825
Additional Facility Treatment (pounds/year)	248,154
Remaining TP Removal Required (pounds/year)	(137,598)

A chart summarizing the facility locations is included in Appendix B. The City is anticipating meeting the TSS removal requirements once the facilities are constructed.

A short summary of each facility is as follows:

- Fox River East Basin (FE)
  - FE010 – Construct a new pond off Broadway at the north City limits when development occurs. The pond will treat to 80% TSS reduction.
  - FE030 – Construct a new pond on Parcel ED-1128-2-1 between Broadway and Lawton Place. The property is owned by St. Norbert Abbey. There is an existing storm sewer that runs through a low ravine. This will require negotiations and property acquisition. The percentage of treatment will be between 60 and 80% TSS removal, depending on the topography of the land, the property acquired, and cost. 80% TSS removal is included in this report.
  - FE050 – Reroute the storm sewer in basin FE050A on Oakdale Avenue from Ridgeway Boulevard to the proposed pond in basin FE030A. The storm sewer on Oakdale Avenue will be 15 feet deep. The proposed storm sewer work will occur when the street is reconstructed, which is scheduled in the next few years. The proposed expansion of the pond will need to be further evaluated and will be impacted by the ability to negotiate additional property for the pond, construct the storm sewer at depths that may impact the sanitary sewer, and overall project cost.
  - FE070 & FE110 – Reroute storm sewer at the corner of Wisconsin and William Street. The storm sewer modification will change 6.79 acres of untreated area from basin FE110 and move to basin FE070. Flow from the manhole at this intersection is divided between basins FE070 and FE110 via the manhole with pipes flowing both north and south. The storm sewer to the north on Wisconsin will be relayed in the future so that the low flow water is directed to the north and to basin FE070. An overflow is anticipated at the manhole so that higher flow events will still discharge to basin FE110. The storm sewer relay will be included with street construction on Wisconsin Street. With proposed development, which is not anticipated to occur for 15 to 20 years.
  - FE110 – Construct a pond in Legion Park off Charles Street. The pond is proposed to service the storm sewer off Ontario and eventually the storm sewer off Charles Street. The challenge with this project is the construction within Legion Park. The pond is proposed to be sized to treat to 60% TSS reduction due to site restrictions. This is also a high usage park with several festivals that use most of the site. Park Board approval will be required for the project to proceed. This would be a two-stage project with the pond

likely to be constructed to coincide with the reconstruction/resurfacing of Ontario Street. The storm sewer off Charles Street would be constructed in the future in conjunction with several proposed projects in the park.

- FE190 –Construct a new pond at an area bounded by Cook/Honey/Pershing/Broadway Street. The City will need to work with the Wisconsin Department of Transportation for approval of the pond.
- FE280A – This will be a pond as development occurs in the area.
- FE310 - This is a new basin located on the southern limits of the City, adjacent to STH32/57. A new pond will be constructed in this basin once development occurs. The pond will treat an area that is currently exempt from the City model due to direct discharge to the Fox River. Most of the area is in agricultural use with some residential development.

- Fox River West Basin (FW)
  - FW060 – Construct a pond off Birch Street extended, east of Sixth Street. The proposed pond will service the entire basin. The pond will also service an additional 4.92 acres of area that was exempt from the City model because of direct drainage to the Fox River. The pond is located on private property and will require City acquisition.
  - FW070 – Construct a pond on Parcel WD-365 (North of Main Avenue). This pond is located on private property. Soil borings will be required to verify a pond can be constructed at this location.
  - FW200 – There are several modifications to this basin as listed below.
    - FW200E –Phase I - Currently the storm water from basins FW200C, D, and E drain through an existing pond located at the southwest corner of Scheuring Road and the Canadian National Railroad tracks. Wet ponds have been constructed to treat areas FW200C and D. Bypassing flow from these areas improves the treatment of the sub-basin FW200E and F to approximately 80%.
    - FW200F – The storm sewer from this area drains to the swale in the back and discharges to the pond off Scheuring Road. Once the bypass is installed in Phase I above, this water will not be treated. The storm sewer in this area will be rerouted when Suburban Drive is reconstructed in this area to drain back into the pond for treatment to be treated to 80%.
  - FW280 – This basin is separated into four different sub-basins to address various treatments that are occurring in the system. This drainage basin will be remodeled in the next permit cycle. Specifically, based on the existing pond surface area, sub-basin FW280B appears to treat storm water above 80% TSS removal.
    - FW280A – This sub-basin is treated by a new pond constructed in 2016.
    - FW280B – This sub-basin is treated by an existing pond. There were some modifications to the area draining to this pond with the new construction in 2016. Some of the area was redirected to sub-basin FW280A.
    - FW280C – This area will be treated to 80% TSS reduction in the future when development occurs.
    - FW280D – This is the area of basin FW280 that is not treated.

- FW290 – A new sub-basin was added (FW290C). This is an undeveloped area that will be treated to 80% TSS when developed.

Reports generated over the years included potential additional facilities in these basins. Many other potential facilities were reviewed and deemed to not be feasible for various reasons, including cost, property acquisition, constructability, etc. A summary of these facilities by basin is included in Appendix C. The list is being maintained for tracking purposes.

3) Construct new storm water treatment facilities in untreated areas of basins AC and ER.

The City is not focusing on retrofitting facilities in the Ashwaubenon Creek and East River basins. Both basins meet the TMDL requirements for TSS and phosphorous reductions. The City will continue to construct ponds in these basins as agricultural property is converted to urban development. This will create additional credits for TSS and phosphorous reduction. Additionally, the City will look for opportunities to treat existing developed areas with redevelopment and reconstruction projects. Locations currently being considered for improvements include:

- Ashwaubenon Creek
  - AC105 – A new pond will be constructed as part of the reconstruction of Southbridge Road. The area is currently treated to 65% TSS. The new pond will treat to 80% TSS.
  - AC220 - New Basin off Lawrence Drive – Redevelopment is occurring on property located off Lawrence Drive and south of Employers Boulevard. This pond will service 7.98 acres from Basin AC100 and 15.71 acres of field.
  - AC230 - New Basin off Lawrence Drive – Redevelopment is occurring on property located off Lawrence Drive and north of Employers Boulevard. As part of this development, staff will be pursuing the installation of storm sewer to divert 49.50 acres from Basin AC090 to a new pond that will treat to 80% TSS and 34.18 acres of field. The existing pond for Basin AC090 is treating to 70% TSS reduction. Efficiencies from the pond will be improved by decreasing the area.

4) Construct catch basins in areas without regional treatment capabilities.

The City used inlets for storm water collection in City Streets. Catch basins are being installed in areas of the City that are not going to an existing or proposed regional facility. A map for areas where catch basins are being installed has been included.

Additional TSS reduction from the addition of catch basins will be included in the future.

5) Advanced Street sweeping/leaf collection

The Wisconsin Department of Natural Resources (WDNR) issued the Interim Municipal Phosphorous Reduction Credit for Leaf Management Programs. This guidance allowed municipalities to receive credit for a 17% reduction in the annual load for Total Phosphorous by street sweeping in the fall based on the parameters shown in italics below. The City's conformance to these parameters is described after each.

1. *Medium Density (2-6 units/acre) Residential (Single Family) land use without alleys. Medium Density Residential with alleys land use may be included if the alleys receive the same level of*

leaf collection and street cleaning as the streets. Areas conforming to medium density residential have been identified and shown in the map in Appendix D.

2. *Curb and gutter with storm sewer drainage systems and light parking densities during street cleaning activities.* Leaf collection activities are completed during the workday in residential areas. There is minimal street parking during these times.
3. *An average of one or more mature trees located between the sidewalk and the curb for every 80 linear feet of curb. Where sidewalk is not present, trees within 15 feet of the curb may be counted toward tree cover. Generally, this equates to a tree canopy over the street (pavement only) of 17% or greater. Field investigations or aerial photography may be used to document the tree cover.* All City trees are included in the City's GIS database. This information was used to determine tree spacing. The map showing the areas that meet this requirement is included in Appendix D.
4. *The municipality has an ordinance prohibiting residents from placement of leaves in the street and a policy stating that residents may place leaves on the terrace in bags or piles for collection.*
5. *Municipal leaf collection provided at least 4 times spaced throughout the months of October and November. Leaves may be pushed, vacuumed, or manually loaded into a fully enclosed vehicle, such as a garbage truck or covered dump truck. No leaf piles are left in the street overnight.* The city has an ordinance prohibiting the placement of leaves on the street.
6. *Within 24 hours of leaf collection, remaining leaf litter in the street must be collected using street cleaning machines, such as mechanical broom or vacuum assisted street cleaner. A brush attachment on a skid steer is not an acceptable equivalent.* The City has an innovative approach to leaf collection. Several trucks have been converted to vacuum units. The trucks vacuum up the leaf piles. In addition, these same trucks vacuum up the leaves in the gutter between leaf piles. Finally, the sweepers are deployed around the City.

As noted previously, the City has been proactive in fall leaf collection. In the fall of 2022, the City completed four rounds of leaf collection through the City.

The estimated phosphorous removal from storm water in the FE and FW basins for areas not currently being treated by a regional facility is shown below. The calculations are included in Appendix E.

	TP Summary (pounds/year)
Additional TP Removal Required (pounds/year)	189
Subtract Ashwaubenon Creek Basin TP (pounds/year)	(209)
Subtract East River Basin TP (pounds/year)	(235)
Subtract Street Sweeping TP Reductions (pounds/year)	(17)
Remaining TP Removal Required (pounds/year)	(272)

Currently the City is meeting the phosphorous requirements. As the City constructs ponds for TSS, additional phosphorous reductions will be obtained.

E. Implementation Cost and Schedule

1) Project Costs and Funding

Estimates have been created for the proposed storm water management facilities. The costs have been based on the pond surface area, anticipated excavation, and past pond construction. In addition to the construction costs, there will be land purchase costs for several ponds located on private property. The anticipated construction costs are shown in the table below.

Wet Detention Pond	Drainage Area (Acres)	Pollutant Reduction TSS (%)	Capital Costs	Land Purchase	Construction Cost per Pound TSS Removed ($/LB)
FE010A	45.15	80%	$195,000	$60,000	$25.86
FE030	123.56	80%	$498,000	$120,000	$27.05
FE050	284.34	80%	$867,000		$33.68
FE110 Reroute to FE070	6.79	72%	$20,000		$16.85
FE110A&B	76.70	60%	$312,000		$28.01
FE190	8.10	80%	$99,030		$17.77
FE280A	65.41	80%	$397,000		$29.52
FE310	140.21	80%	$468,000		$7.73
FW060 FW070	12.70 333.92	60% 60%	$906,000	$166,000	$26.60
FW200E&F	120.02	80%	$224,000		$9.82
FW280	11.95	80%	$96,000		$21.28
FW290	29.53	80%	$101,000		$14.18

The cost per pound of TSS removed is the total being removed, and not the incremental amount from the current model. The City will be using several sources of funding for pond construction including the storm water utility, tax incremental finance district funds, developer fees, and grants. The City has used all of these sources to construct ponds over the last several years.

- **Storm Water Utility**

  Many of the facilities will be funded by the storm water utility. The funds available for pond construction will be impacted by the other activities, in particular construction projects, occurring in the year. The storm water utility funds a diverse range of projects/activities related to storm water. This includes street sweeping and leaf collection activities, equipment, storm sewer construction/replacement, and pond maintenance. The storm water utility revenue is generated via a residential user equivalent (RUE) charged against parcels in the City. The number of activities/projects funded from the storm water utility in a given year generally equals the revenue generated from the RUE. In some years when other significant construction projects occur, the revenue from the storm water utility may be allocated for storm sewer installation. For instance, in 2024, the City will be resurfacing streets in a section of the City that has poor drainage. Due to this, a significant portion of the storm water utility funds are being used to construct new storm sewer.

- **Tax Incremental Finance District (TID).**

Another source of funding that the City has used successfully in construction of ponds are TIDs. In the past several years, ponds have been built in Basin FE280 and AC051 from TID financing. Several of the proposed ponds are in existing or proposed industrial parks and/or commercial areas which are proposed to be funded by the TID.

- **Developer Funded**

  Some of the proposed facilities will be constructed for new development. These facilities will not be constructed until development occurs. The City promotes the construction of regional facilities for new development wherever practicable. If development within the basin is staggered, the pond will be built for the first development that occurs. As other areas within the basin develop, a cost will be charged based on the amount/type of storm water discharge.

- **Urban Non-Point Source and Stormwater (UNPS&SW) Construction Grants.**

  A final source of funding for the proposed facilities is Urban Non-Point Source and Stormwater (UNPS & SW) Construction Grants which can fund up to $150,000 of an approved storm water management facility. This grant is a 50/50 match with other funds. Based on the WDNR website, construction grant eligible projects include:

  - *Construction of structural urban best management practices (BMPs) including detention, wet, infiltration, or wetland basins, or infiltration trenches.*
  - *Engineering design and construction services for BMPs installation.*
  - *Land acquisition and easement purchase, including appraisal cost.*
  - *Storm sewer rerouting and removal of structures.*
  - *Streambank and shoreline stabilization.*

  The City used this grant to construct the Optimist Park pond in Basin FE190 in 2017, the Matthew Drive Pond in Basin FW200D in 2022, and the Front/Fulton/Franklin Pond in Basin FE070 in 2023. The City will be submitting construction grant applications for the urban retrofit ponds proposed to treat existing development that conforms to the above requirements.

2) Anticipated Schedule

A preliminary implementation schedule for the construction of facilities has been created. The projects have a five-year schedule to accommodate design, property acquisition, potential grant funding, and contiguous construction projects.

Wet Detention Pond	Anticipated Construction Year	Capital Costs & Land Acquisition	Funding Source	UNPS & SW Grant Eligible
FE010A	TBD	$255,000	Paid for by the developer	N
FE030	2030-2034	$618,000	Storm Water Utility	Y
FE050	2030-2034	$867,000	Storm Water Utility	Y
FE110 Reroute to FE070	2025-2029	$20,000	Storm Water Utility	Y
FE110A&B	2035-2040	$312,000	Storm Water Utility	Y
FE190	2025-2029	$99,030	Storm Water Utility	Y

FE280A	TBD	$397,000	Paid for by the developer	N
FE310	TBD	$468,000	Paid for by the developer	N
FW060 FW070	2035-2039	$1,072,000	Storm Water Utility	Y
FW200E&F	2025-2029	$224,000	TID / Storm Water Utility	Y
FW280	TBD	$96,000	Paid for by the developer	N
FW290	TBD	$89,000	Paid for by the developer	N

Notes:

1. TBD – Pond construction will occur when sites are developed.

Many of the proposed facilities are UNPS&SW grant eligible. The City will be applying for grants and the ability to obtain these grants will impact the proposed schedule. If the City is not successful in obtaining a grant for a specific project, the project may be delayed, updated, and resubmitted in the next grant cycle.

Projects located on private property and in parks will take longer to construct. Acquisition of private property will likely take several years to obtain. The City will need to negotiate approval to conduct research and/or soil boring for the viability of the facility. After studies are completed, the City will need to negotiate the actual purchase of the site. Some ponds are proposed in parks. The City of De Pere Park Board has been cooperating with the construction of ponds in park facilities in the past. However, each park has different demands and utilizing property for ponds may not be approved by the Board.

Several of the proposed facilities will require storm sewer rerouting or occur near other construction projects. City practice is to tie construction projects together to minimize additional costs, such as pavement patches and restoration. If storm sewer rerouting is required, the project schedule for proposed pond will be adjusted to occur with the street resurfacing/reconstruction projects. Ponds near industrial parks may be scheduled with nearby grading projects.

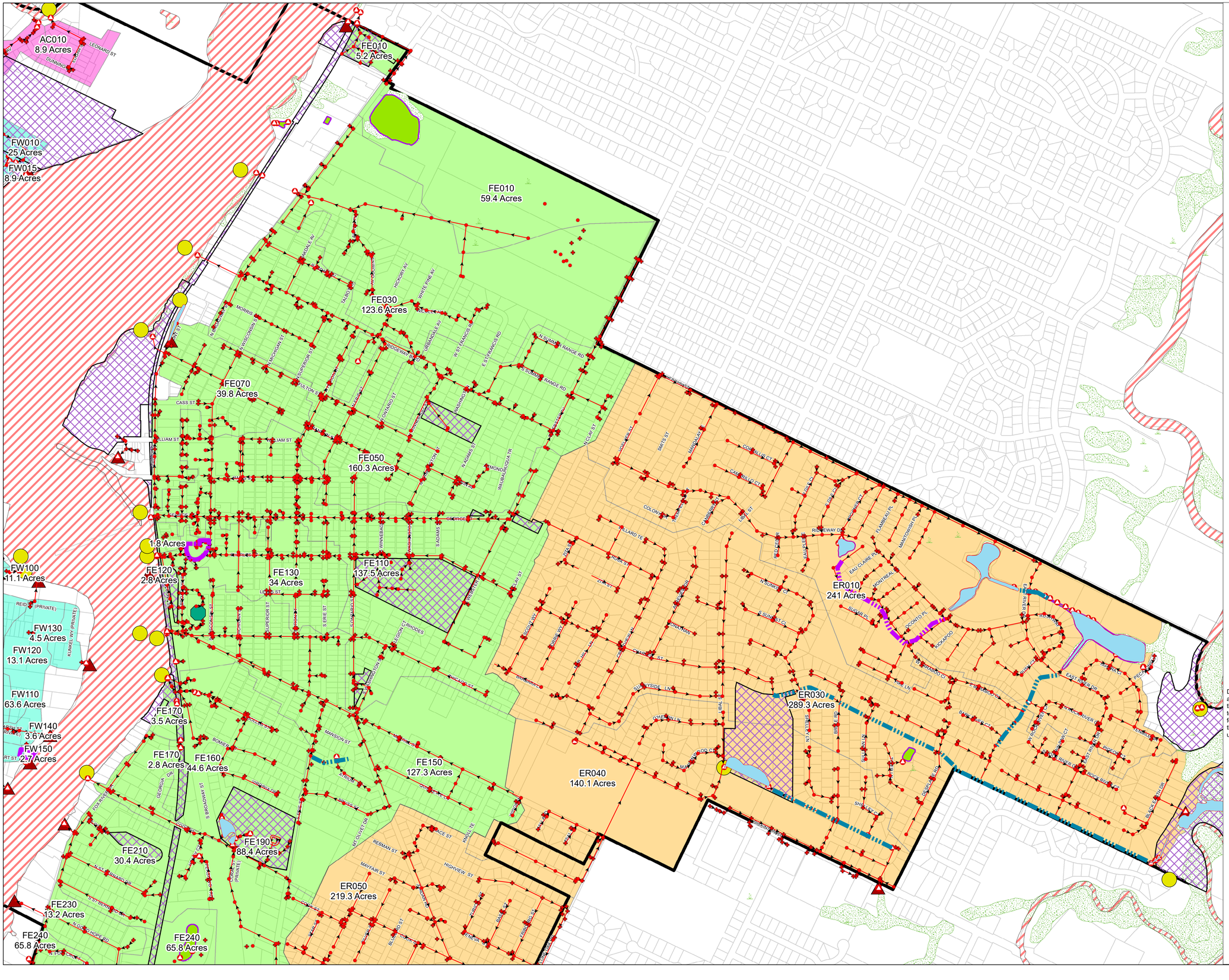
Proposed facilities associated with new development will occur when development occurs.

F. References

1) City of De Pere Comprehensive Stormwater Management Plan, January 1999, by Earthtech
2) City of De Pere Nonpoint Pollution WinSLAMM Analysis, March 2008, by Earthtech
3) 2015 Stormwater Management Planning, City of De Pere, October 21, 2016, by R.A. Smith National
4) Total Maximum Daily Load and Watershed Management Plan for Total Phosphorous and Total Suspended Solids in the Lower Fox River Basin and Lower Green Bay, March 12, 2012, by the Cadmus Group, Inc.
5) City of De Pere 2018 TMDL Plan by the City of De Pere

Appendix A: MS4 System Maps and TMDL Calculations

1) MS4 System Maps – 5 Pages
2) 2023 Ashwaubenon Creek TMDL Update
3) 2023 East River TMDL Update
4) 2023 Fox River TMDL Update



MS4 Drainage System

- Private Facilities/Swale
- City Swales
- Storm Manhole
- Storm End Wall
- Storm Catch Basin
- Collectors
- Major Outfalls
- Minor Outfalls

Publically Owned Land

- De Pere Recreational Areas
- De Pere Municipal Facilities

Natural Resources

- City Pond
- Private Storm Water Facilities
- 303(d) Impaired Waters
- WDNR Wetland Inventory (Less Than 2 Acres)
- WDNR Wetland Inventory (2 Acres or Greater)

WPDES Industrial Permits

- WPDES Industrial Permit I.D.

Other Mapped Features

- Municipal Boundary
- Parcel Lines

TMDL Watershed Basins

- Fox East Basins
- East River Basins
- Fox West Basins
- Ashwaubenon Creek Basins

1 inch = 500 feet

N
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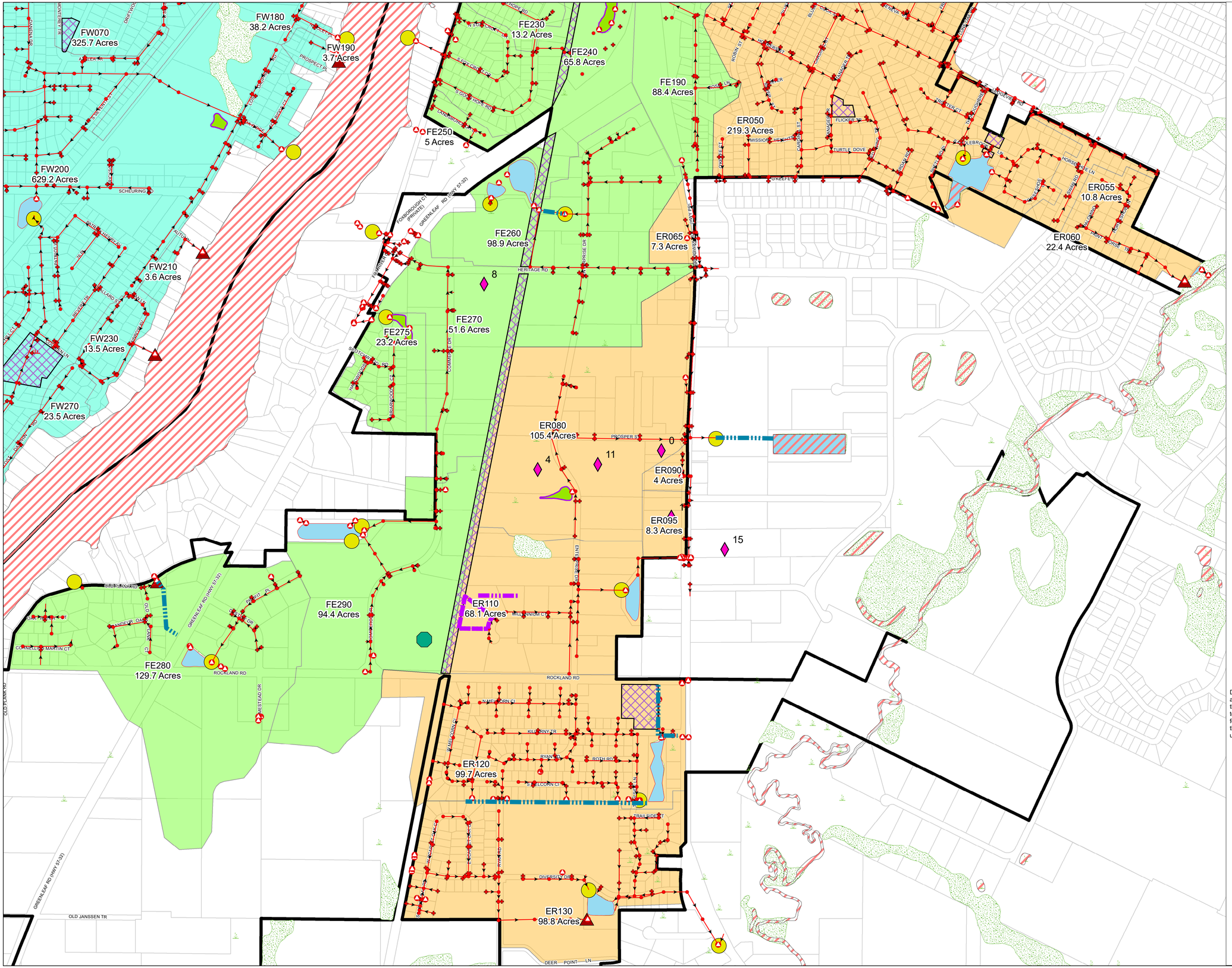
DE PERE SM

MS4 SYSTEM
UPDATED 10/2023

STORM SEWER MANAGEMENT PLAN
CITY OF DE PERE
BROWN COUNTY, WISCONSIN



MS4 Drainage System

- Minor Outfalls
- Major Outfalls
- Storm Manhole
- Storm End Wall
- Storm Catch Basin
- Collectors
- City Swales
- Private Facilities/Swale

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W E
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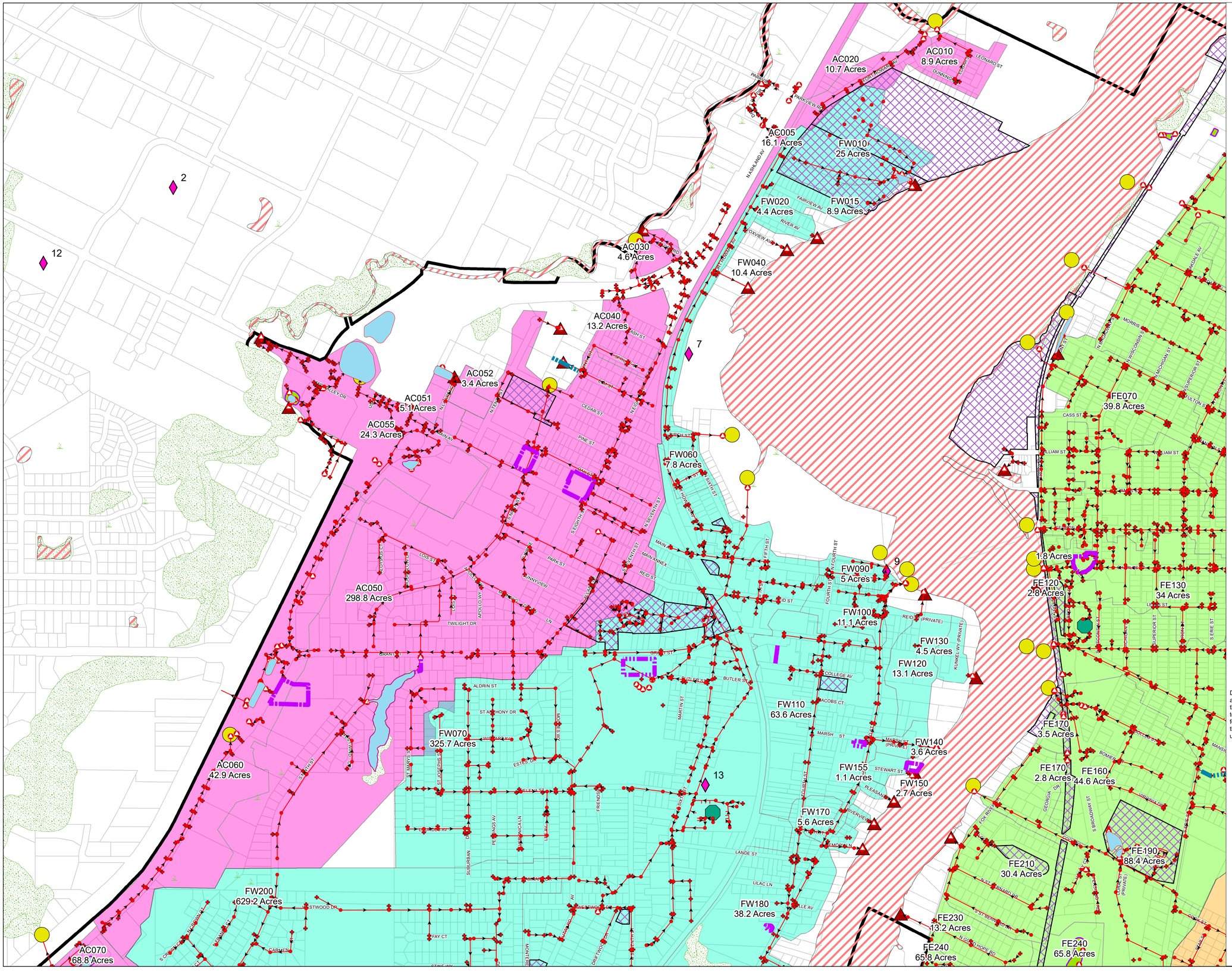
DE PERE SM

MS4 SYSTEM UPDATED 10/2023

STORM SEWER MANAGEMENT PLAN
CITY OF DE PERE
BROWN COUNTY, WISCONSIN



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N
W E
S

DE PERE SM

MS4 SYSTEM UPDATED 10/2023

STORM SEWER MANAGEMENT PLAN
CITY OF DE PERE
BROWN COUNTY, WISCONSIN

AC060
42.9 Acres

AC070
68.8 Acres

AC080
4 Acres

AC090
226.4 Acres

AC100
620.1 Acres

AC105
8.3 Acres

AC106
7 Acres

AC110
6.5 Acres

AC120
4 Acres

AC130
23.2 Acres

AC160
60.3 Acres

AC210
13.8 Acres

FW070
325.7 Acres

FW180
38.2 Acres

FW190
3.7 Acres

FW200
629.2 Acres

FW210
3.6 Acres

FW230
13.5 Acres

FW270
23.5 Acres

FW280
202.2 Acres

FW290
346.7 Acres

FW300
7.6 Acres

FE280
129.7 Acres

FE290
94.4 Acres

10

14

3

6

SCHEURING RD

RED MAPLE RD

SOUTHBRIDGE RD

OLD PLANK RD

GREENLEAF RD (HWY 57-32)

OLD JANSSEN TR

ROCKLAND RD

EMPLOYERS BLVD

MS4 Drainage System

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- Fox West Basins
- Ashwaubenon Creek Basins

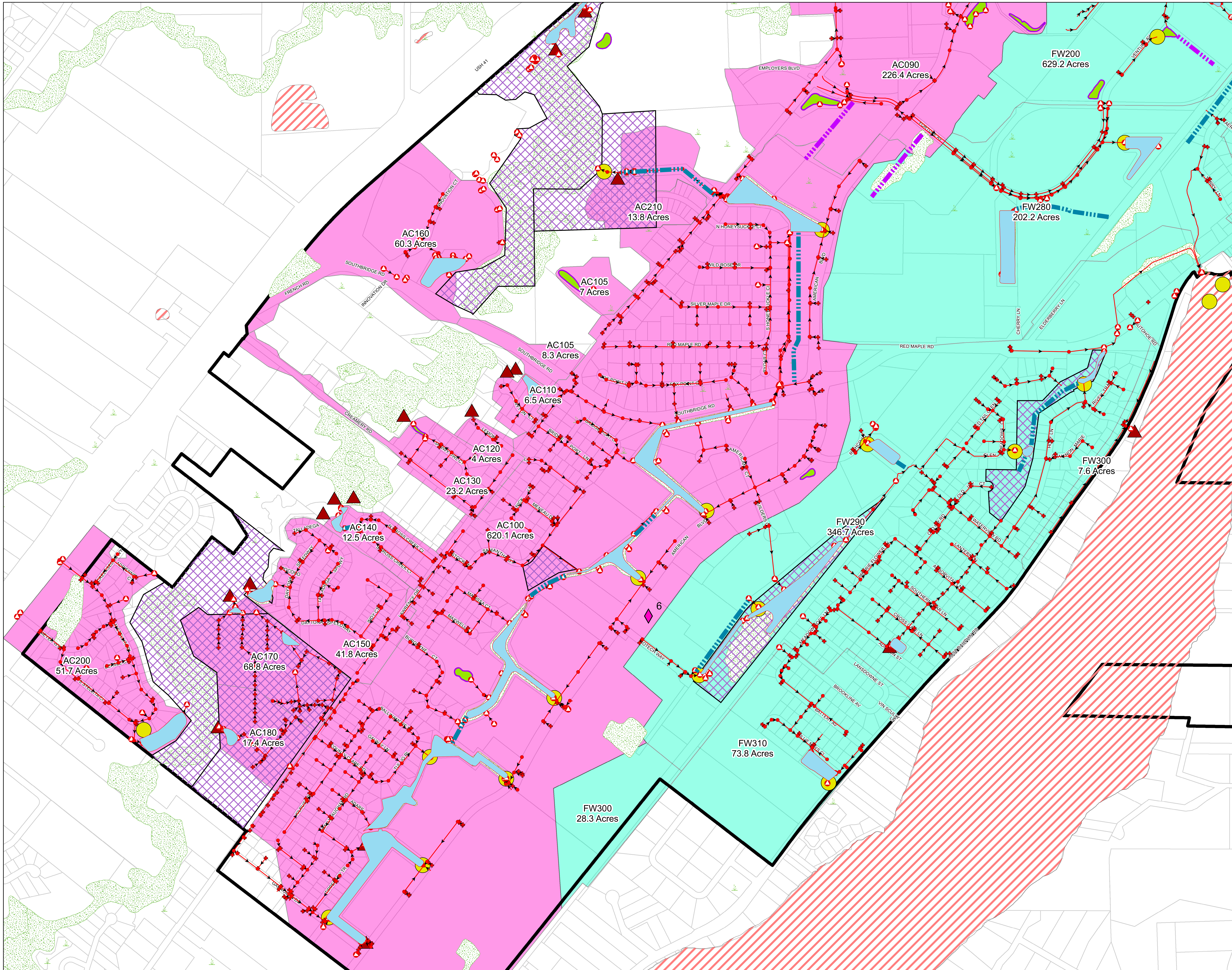
1 inch = 500 feet

N
W E
S

DE PERE SM

MS4 SYSTEM UPDATED 10/2023

STORM SEWER MANAGEMENT PLAN
CITY OF DE PERE
BROWN COUNTY, WISCONSIN



MS4 Drainage System

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1 inch = 500 feet

N W E S

Disclaimer: The property lines, right-of-way lines, and other property information on this drawing are developed or obtained as part of the County Geographic Information System or through the County property tax mapping function. The City of De Pere does not guarantee this information to be correct, current or complete. The property and right-of-way information are only intended for use as a general referance and are not intended or suitable for site-specific use. Any use to the contrary of the above stated uses is the responsibility of the user and such use is at the user's own risk.

DE PERE SM

MS4 SYSTEM UPDATED 10/2023

STORM SEWER MANAGEMENT PLAN
CITY OF DE PERE
BROWN COUNTY, WISCONSIN

ASHWAUBENON CREEK - CITY OF DE PERE, WI
Modifications/Upgrades for TSS Reduction
2023 MS4 Annual Report
Last Update -October 24, 2023

Modifications/Upgrades to Existing Basins

	Beginning of Year Totals 2022						Calender Year 2023 Modifications						End of Year Totals (Carry to Next Year) (See Note 2)					
Basin	Area (acres) (Note 2)	Total Suspended Solids No Controls (lbs/acre/yr)	Total Suspended Solids No Controls (lbs/yr) (Note 2)	Total Suspended Solids With Controls (lbs/yr) (Note 2)	Percent TSS Reduction (Note 2)	TSS Reduction	Area Modifications (acres)	Total Suspended Solids No Controls - New Treatment Area (lbs/yr)	Modeled Percent TSS Reduction	Total Suspended Solids Reduction (lbs/year)	Additional Suspended Solids Reduction (lbs/year)	Comment - 2023 Changes	Area (acres) (Note 2)	Total Suspended Solids No Controls (lbs/yr) (Note 2)	Total Suspended Solids With Controls (lbs/yr) (Note 2)	Percent TSS Reduction (Note 2)	TSS Reduction	Comment for Next Year
AC005	16.119	477	7,694	7,556	1.8%	138							16.119	7,694	7,556	1.8%	138	
AC010	8.923	265	2,361	2,038	13.7%	323							8.923	2,361	2,038	13.7%	323	
AC020	10.718	326	3,495	3,023	13.5%	472							10.718	3,495	3,023	13.5%	472	
AC025	3.4	488	1,659	1,445	12.9%	214							3.4	1,659	1,445	12.9%	214	
AC030	4.6	488	2,247	1,957	12.9%	290							4.6	2,247	1,957	12.9%	290	
AC040	13.183	310	4,089	3,402	16.8%	687							13.183	4,089	3,402	16.8%	687	
AC050	299.958	288	86,388	54,252	37.2%	32,136							299.96	86,388	54,252	37.2%	32,136	
AC051	5.13	288	1,477	286	80.6%	1,191							5.13	1,477	286	80.6%	1,191	
AC052	3.38	0	0	0		0							3.38	0	0		0	
AC055	24.34	502	12,225	3,741	69.4%	8,484							24.34	12,225	3,741	69.4%	8,484	
AC060	50.506	489	24,719	8,133	67.1%	16,587							50.506	24,719	8,133	67.1%	16,587	
AC070	68.77	479	32,916	9,414	71.4%	23,502							68.77	32,916	9,414	71.4%	23,502	
AC080	3.999	502	2,009	701	65.1%	1,308							3.999	2,009	701	65.1%	1,308	
AC090	226.369	448	101,364	29,598	70.8%	71,766							226.369	101,364	29,598	70.8%	71,766	
AC100	620.065	263	163,073	32,615	80.0%	130,458							610.305	160,506	32,101	80.0%	128,405	Show revised AC100 in 2024
							(9.76)	-2,567	80.0%	-2,054	-2,054	Acres being treated by the new pond in Basin AC210						Add these two areas together in 2024
	15.92	263	4,187	617	85.3%	3,570							15.92	4,187	617	85.3%	3,570	
AC105	15.254	267	4,069	1,424	65.0%	2,645							15.254	4,069	1,424	65.0%	2,645	
AC110	6.497	203	1,320	254.76	80.7%	1,065							6.497	1,320	254.76	80.7%	1,065	
AC120	3.993	197	788	646	18.0%	142							3.993	788	646	18.0%	142	
AC130	23.238	235	5,466	3,110	43.1%	2,356							23.238	5,466	3,110	43.1%	2,356	
AC140	12.462	195	2,428	410	83.1%	2,018							12.462	2,428	410	83.1%	2,018	
AC150	41.82	160	6,681	1,276	80.9%	5,405							41.82	6,681	1,276	80.9%	5,405	
AC160	60.318	343	20,717	4,744	77.1%	15,973							60.318	20,717	4,744	77.1%	15,973	
AC170	68.77	479	32,916	5,958	81.9%	26,958							68.77	32,916	5,958	81.9%	26,958	
AC180	17.352	49	843	26	96.9%	817							17.352	843	26	96.9%	817	
AC190	18.64	109	2,032	248	87.8%	1,784							23.78	2,592	316	87.8%	2,276	
AC 200A	51.7	540	27,918	4,662	83.3%	23,256							51.70	27,918	4,662	83.3%	23,256	
AC210	5.14	175	899	854	5.0%	45	5.14	899	81.1%	729	684	New treatment area only	14.90	2,607	493	81.1%	2,114	Add these two areas together in 2024
							9.76	2,567	81.1%	2,082	2,082	Area from Basin 100 being treated in new pond.						
Total	1,625.08		527,163	176,875	66.4%	373,544					712		1,705.70	555,682	181,585	67.3%	374,097	

Assumptions
(1) Agricultural lands in the Lower Fox River Mainstream HUC-12 are discharging 540lbs/acre of TSS. Assume a 5% TSS reduction.
(2) Formula Based. This should not change from year to year unless acreage is changed from on HUC-12 to another or new area is added.

EAST RIVER - CITY OF DE PERE, WI
Modifications/Upgrades for TSS Reduction
2023 MS4 Annual Report
Last Update - October 23, 2023

Modifications/Upgrades to Existing Basins

	End of Year Totals 2022						Calender Year 2023 Modifications						End of Year Totals (Carry to Next Year) (See Note 2)					
Basin	Area (acres)	Total Suspended Solids No Controls (lbs/acre/yr)	Total Suspended Solids No Controls (lbs/yr)	Total Suspended Solids With Controls (lbs/yr)	Percent TSS Reduction	TSS Reduction	Additional Area Treated (acres)	Total Suspended Solids No Controls - New Treatment Area (lbs/yr)	Modeled Percent TSS Reduction	Total Suspended Solids Reduction (lbs/year)	Additional Suspended Solids Reduction (lbs/year)	Comment - 2023 Changes	Area (acres)	Total Suspended Solids No Controls (lbs/yr)	Total Suspended Solids With Controls (lbs/yr)	Percent TSS Reduction	TSS Reduction	Comment for Next Year
ER010	241.222	216	52,164	4,747	90.9%	47,417							241.222	52,164	4,747	90.9%	47,417	
ER030	289.329	207	59,872	18,800	68.6%	41,072							289.33	59,872	18,800	68.6%	41,072	
ER040	130.973	265	34,659	14,072	59.4%	20,587							130.973	34,659	14,072	59.4%	20,587	
ER050	208.635	209	43,577	9,413	78.4%	34,164							208.635	43,577	9,413	78.4%	34,164	
ER055	10.819	202	2,188	1,794	18.0%	394							10.819	2,188	1,794	18.0%	394	
ER060	22.444	192	4,308	1,055	75.5%	3,253							22.444	4,308	1,055	75.5%	3,253	
ER065	7.053	430	3,031	2,667	12.0%	364							7.053	3,031	2,667	12.0%	364	
ER080	105.288	470	49,455	6,182	87.5%	43,273							105.288	49,455	6,182	87.5%	43,273	
ER090	4.046	517	2,090	1,904	8.9%	186							4.046	2,090	1,904	8.9%	186	
ER095	8.325	421	3,503	3,219	8.1%	284							8.325	3,503	3,219	8.1%	284	
ER110	68.139	505	34,436	8,471	75.4%	25,965							68.139	34,436	8,471	75.4%	25,965	
ER120	96.119	234	22,496	7,514	66.6%	14,982							96.12	22,496	7,514	66.6%	14,982	
ER130	59.574	308	18,376	2,811	84.7%	15,564							59.574	18,376	2,811	84.7%	15,564	
Total	1,252.0		330,155	82,649	75.0%	247,506					0		1,252.0	330,155	82,649	75.0%	247,506	

Assumptions
(1) Agricultural lands in the Lower Fox River Mainstream HUC-12 are discharging 540lbs/acre of TSS. Assume a 5% TSS reduction.
(2) Move this End of Year Totals to Beginning of Year Totals for the next calendar year. Delete extra rows at the beginning of each year. These are the rows that summarize multiple actions within a basin.

LOWER FOX RIVER MAINSTREAM - CITY OF DE PERE, WI
Modifications/Upgrades for TSS Reduction
2023 MS4 Annual Report
Last Update -October 30, 2023

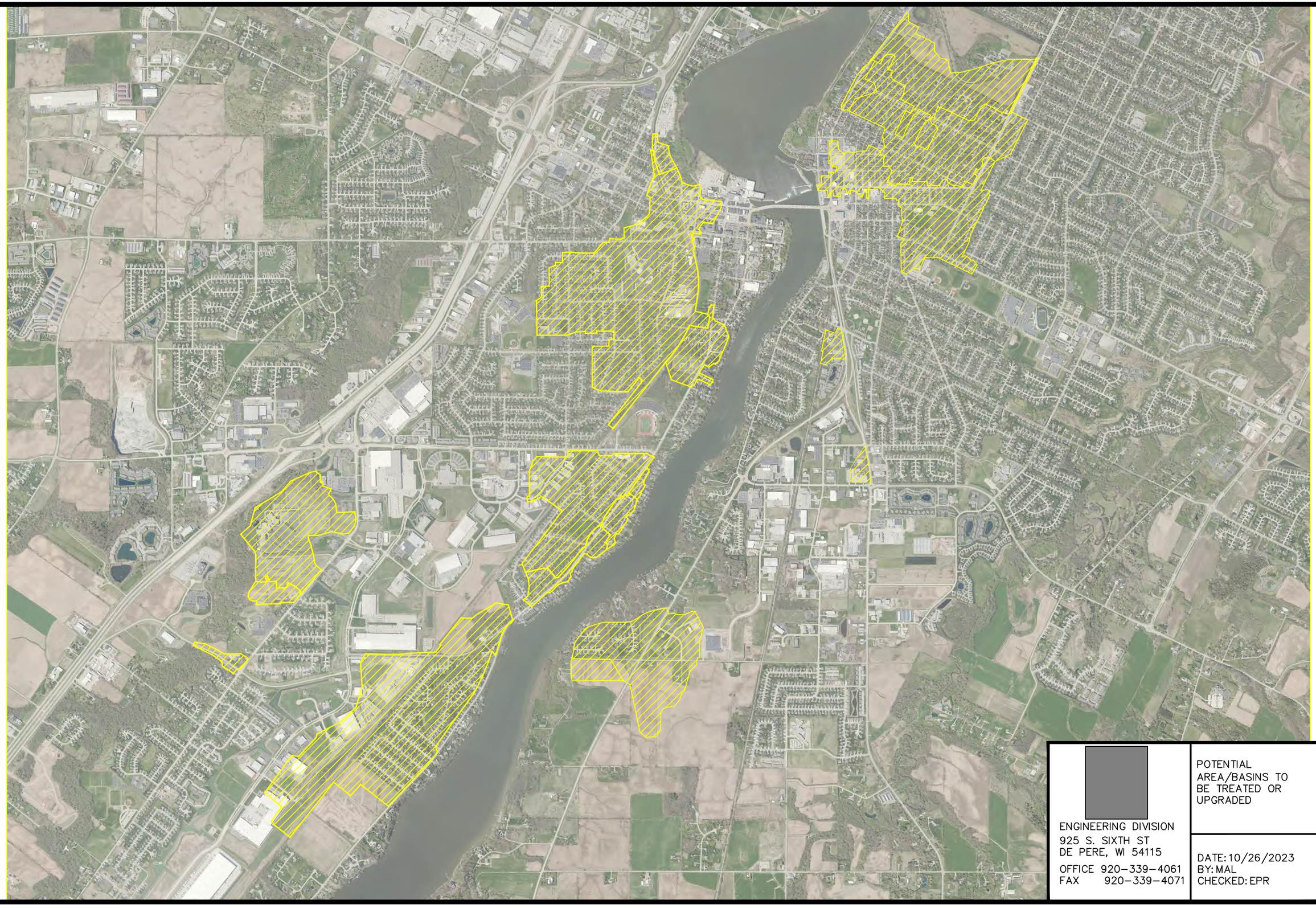
Modifications/Upgrades to Existing Basins

	End of Year Totals 2022						Calender Year 2023 Modifications						End of Year Totals 2023					
Basin	Area (acres)	Total Suspended Solids No Controls (lbs/acre/yr)	Total Suspended Solids No Controls (lbs/yr)	Total Suspended Solids With Controls (lbs/yr)	Percent TSS Reduction	TSS Reduction	Area Modifications (Acres)	Total Suspended Solids No Controls - New Treatment Area (lbs/yr)	Modeled Percent TSS Reduction	Total Suspended Solids Reduction (lbs/year)	Additional Suspended Solids Reduction (lbs/year)	Comment - 2023 Changes	Area (acres)	Total Suspended Solids No Controls (lbs/yr)	Total Suspended Solids With Controls (lbs/yr)	Percent TSS Reduction	TSS Reduction	Comment for Next Year
FE010	64.606	273	17,624	15,491	12.10%	2,133							64.606	17,624	15,491	12.10%	2,133	
FE030	123.12	232	28,563	24,421	14.50%	4,142							123.12	28,563	24,421	14.50%	4,142	
FE050	159.27	214	34,055	27,891	18.10%	6,164							159.27	34,055	27,891	18.10%	6,164	
FE070	40.76	300	12,247	10,006	18.30%	2,241	40.76	12,247	72.21%	8,843	6,602	Pond constructed in 2023	40.76	12,247	3,403	72.21%	8,843	
		300					1.97	591	72.21%	427	427	Area added with pond and storm sewer installation	1.97	591	164	72.21%	427	Add to the overall FE070 for 2024 making the total of 42.73 acres
FE110	139.2	242	33,658	28,037	16.70%	5,621							139.2	33,658	28,037	16.70%	5,621	
FE120	1.82	387	704	580.096	17.60%	124							1.82	704	580.096	17.60%	124	
FE130	36.029	284	10,243	8,481	17.20%	1,762							36.029	10,243	8,481	17.20%	1,762	
FE140	2.789	139	388	347.26	10.50%	41							2.789	388	347.26	10.50%	41	
FE150	127.311	268	34,093	28,808	15.50%	5,284							127.311	34,093	28,808	15.50%	5,284	
FE160	42.629	215	9,165	7,735	15.60%	1,430							42.629	9,165	7,735	15.60%	1,430	
FE170	6.249	166	1,040	877.76	15.60%	162							6.249	1,040	877.76	15.60%	162	
FE190	17.59	835	14,679	12,374	15.70%	2,305							17.59	14,679	12,374	15.70%	2,305	
	51.87	250	12,968	1504	88.40%	11,463							51.87	12,968	1504	88.40%	11,463	
FE210	30.413	195	5,937	4,928	17.00%	1,009							30.413	5,937	4,928	17.00%	1,009	
FE230	13.221	214	2,830	2,355	16.80%	475							13.221	2,830	2,355	16.80%	475	
FE240	56.309	246	13,866	9,706	30.00%	4,160							56.309	13,866	9,706	30.00%	4,160	
FE250	4.965	201	997	816.543	18.10%	180							4.965	997	816.543	18.10%	180	
FE260	104.219	416	43,355	8,671	80.00%	34,684							104.219	43,355	8,671	80.00%	34,684	
FE270	42.165	457	19,269	17,689	8.20%	1,580							42.165	19,269	17,689	8.20%	1,580	
			0	0		0								0	0		0	
FE275	23.216	291	6,761	1,258	81.40%	5,503							23.216	6,761	1,258	81.40%	5,503	
FE280	124.622	257	32,013	19,464	39.20%	12,549							124.62	32,013	19,464	39.20%	12,549	
FE290	40.108	346	13,877	1749	87.40%	12,129							40.11	13,877	1749	87.40%	12,129	
	58.21	540	31,433	3961	87.40%	27,473							58.21	31,433	3961	87.40%	27,473	
FE310			0	0	5.00%	0								0	0	5.00%	0	
FW010	25.055	142	3,567	991.626	72.20%	2,575							25.055	3,567	991.626	72.20%	2,575	
FW015	8.853	182	1,615	1,360	15.80%	255							8.853	1,615	1,360	15.80%	255	
FW020	3.298	201	662	541.516	18.20%	120							3.298	662	541.516	18.20%	120	
FW040	10.493	426	4,468	4,218	5.60%	250							10.493	4,468	4,218	5.60%	250	
FW060	7.785	233	1,812	1,535	15.30%	277							7.785	1,812	1,535	15.30%	277	
FW070	323.861	264	85,651	73,746	13.90%	11,906							323.86	85,651	73,746	13.90%	11,906	
			0	0		0									0		0	
FW090	4.984	401	2,000	1,680	16.00%	320							4.984	2,000	1,680	16.00%	320	
FW100	11.052	376	4,156	3,441	17.20%	715							11.052	4,156	3,441	17.20%	715	
FW110	63.639	264	16,817	14,497	13.80%	2,321							63.64	16,817	14,497	13.80%	2,321	
FW120	13.135	332	4,366	3,890	10.90%	476							13.135	4,366	3,890	10.90%	476	
FW130	4.476	335	1,498	1,336	10.80%	162							4.476	1,498	1,336	10.80%	162	
FW140	3.62	335	1,211	1,080	10.80%	131							3.62	1,211	1,080	10.80%	131	
FW150	2.691	329	886	788.54	11.00%	97							2.691	886	788.54	11.00%	97	
FW155	1.111	201	223	182.637	18.10%	40							1.111	223	182.637	18.10%	40	
FW160	1.022	201	205	167.895	18.10%	37							1.022	205	167.895	18.10%	37	
FW170	5.628	218	1,226	1,008	17.80%	218							5.628	1,226	1,008	17.80%	218	
FW180	38.228	179	6,854	5,826	15.00%	1,028							38.228	6,854	5,826	15.00%	1,028	
FW190	3.672	201	737	603.603	18.10%	133							3.672	737	603.603	18.10%	133	
FW200	509.021	306	155,608	89,941	42.20%	65,666							509.02	155,607	89,941	42.20%	65,666	
FW200	120.77	306	36,956	7,354	80.10%	29,601							120.77	36,956	7,354	80.10%	29,601	
FW210	3.561	201	715	585.585	18.10%	129							3.561	715	585.585	18.10%	129	
FW230	13.484	201	2,708	2,218	18.10%	490							13.484	2,708	2,218	18.10%	490	
FW270	22.826	200	4,565	3,743	18.00%	822							22.826	4,565	3,743	18.00%	822	
FW280	189.281	472	89,344	32,521	63.60%	56,823							189.281	89,344	32,521	63.60%	56,823	
	12.93	201	2,599	2,131	18.00%	468							12.93	2,599	2,131	18.00%	468	
FW290	321.329	312	100,255	38,698	61.40%	61,556							321.329	100,255	38,698	61.40%	61,556	
FW300	7.598	211	1,606	1,327	17.40%	279	(7.598)	-2,279	72.21%	-1,646	-1,925	This area is not being treated in Basin AC100	0	0	0	17.40%	0	This was moved to AC100 in 2022. Delete this in 2024
FW310	59.88	0	0	0	5.00%	0							92.9	0	0	5.00%	0	
			0															
Total	3,103.97		912,076	532,563	41.61%	379,513	35.13				5,104		3,131.37	911,060	524,798	42.40%	386,262	

Assumptions
(1) Agricultural lands in the Lower Fox River Mainstream HUC-12 are discharging 540lbs/acre of TSS. Assume a 5% TSS reduction.
(2) Move this End of Year Totals to Beginning of Year Totals for the next calendar year. Delete extra rows at the beginning of each year. These are the rows that summarize multiple actions within a basin.

Appendix B: Modifications and Proposed Storm Water Facilities

1) Overall Basin Additional Treatment Map
2) Basin FE010 Pond and Drainage Area Updates
3) Basin FE030 & FE050 Wet Pond and Potential Wet Pond Expansion
4) Basin FE050 Storm Reroute to New Pond
5) Basin FE030 & FE050 Revised Drainage Area
6) Basin FE110 to FE070 Drainage Area
7) Basin FE110 Wet Pond
8) Basin FE110 Revised Drainage Area
9) Basin FE190 Wet Pond and Drainage Area
10) Basin FE280A Wet Pond
11) Basin FE280A Revised Drainage Area
12) Basin FE310 Basin Drainage Area
13) Basin FW060 Wet Pond
14) Basin FW060 Revised Drainage Area
15) Basin FW070 & FW060 Wet Pond
16) Basin FW070 & FW060 Revised Drainage Area
17) Basin FW200D&E Outfall Reroute
18) Basin FW200E&F Revised Drainage Area
19) Basin FW280 Remodel and FW280C New Sub-basin Area
20) Basin FW290C New Sub-basin Area
21) Basin AC105 Wet Pond
22) Basin AC220 and 230 – Pond and New Basins



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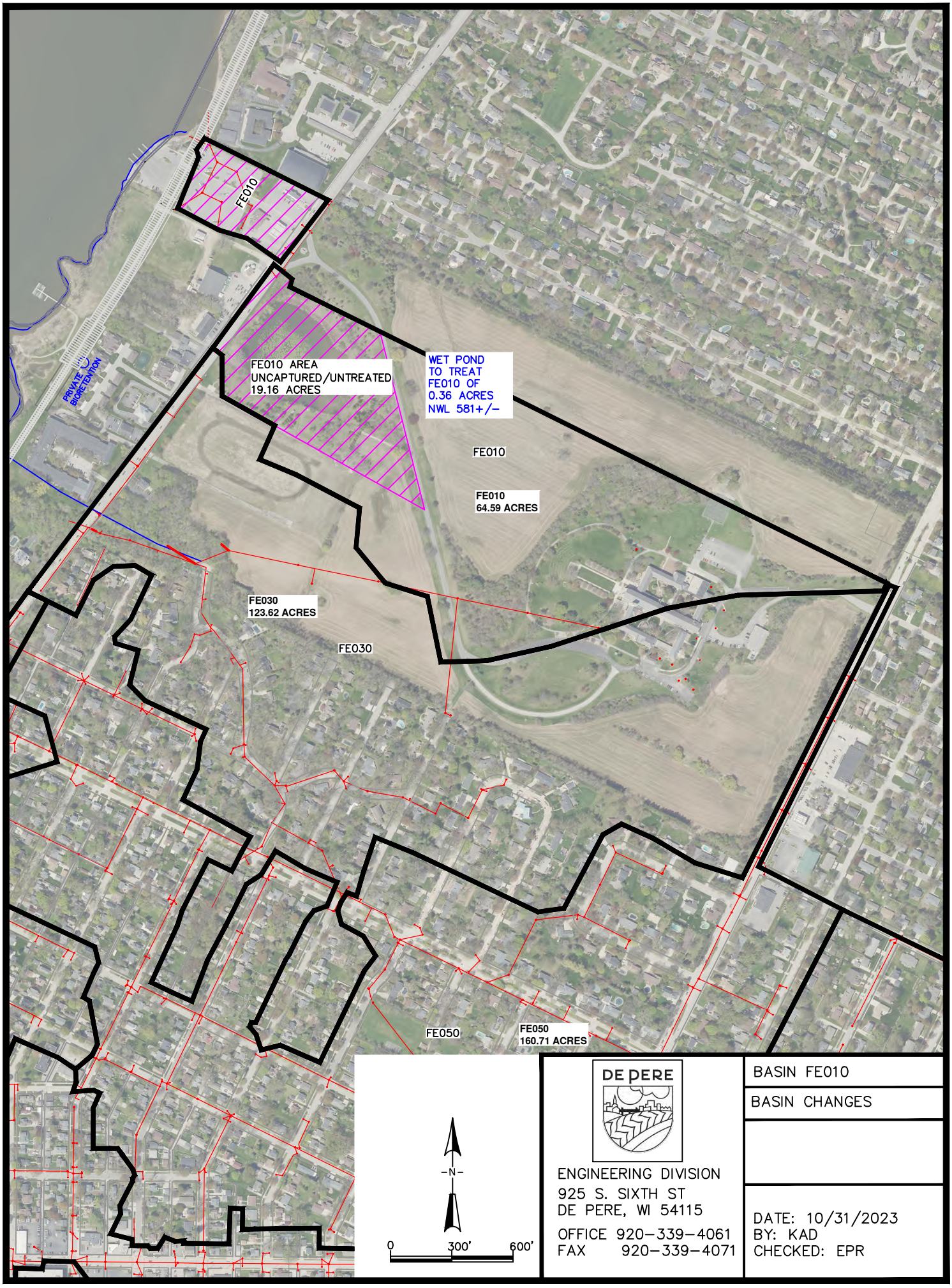
POTENTIAL AREA/BASINS TO BE TREATED OR UPGRADED

DATE: 10/26/2023
BY: MAL
CHECKED: EPR

X:\ENG\Storm\System Map\2023_5YR_MAPS_POTENTIAL AREA.dwg



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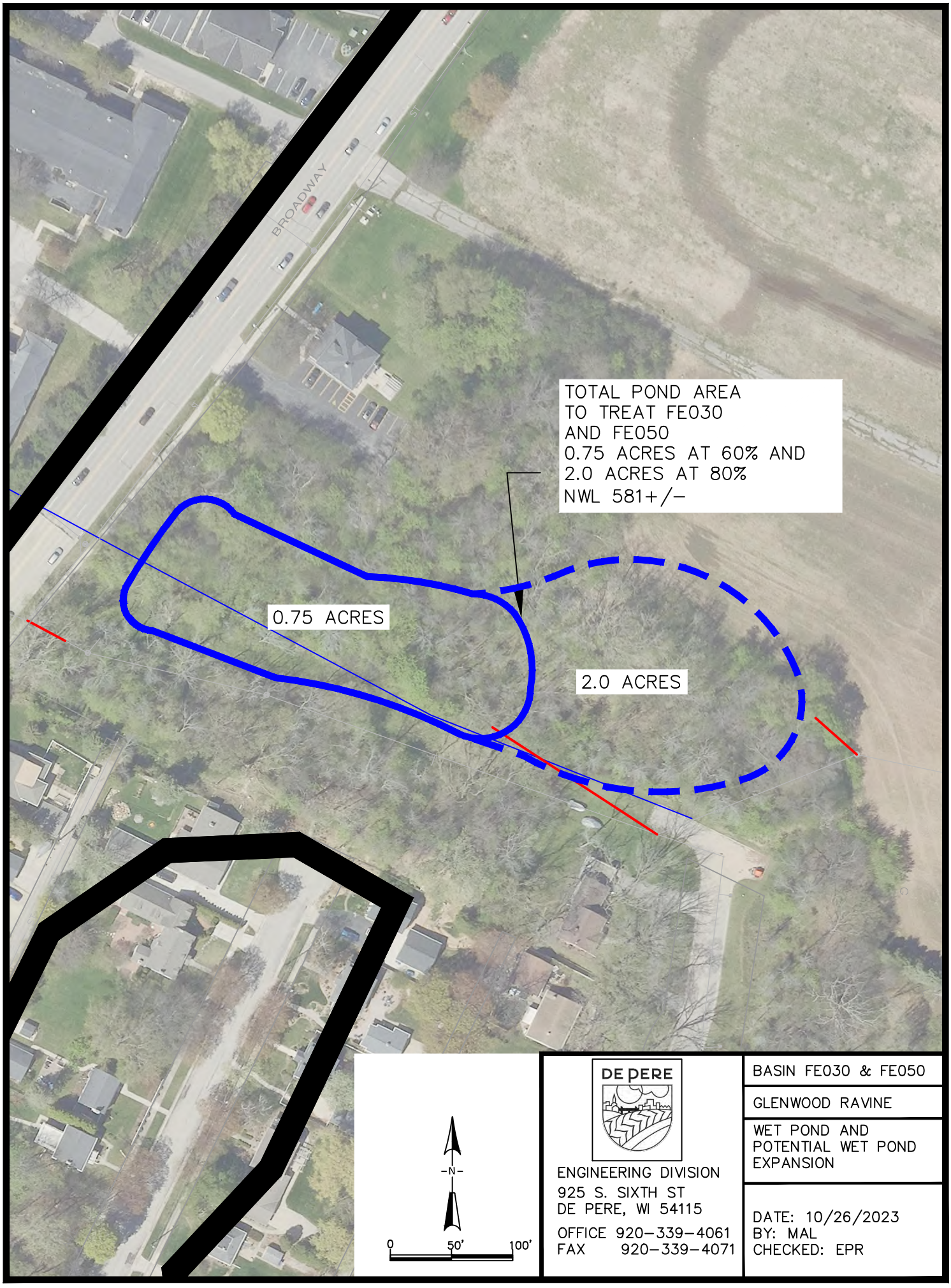
BASIN FE010

BASIN CHANGES

DATE: 10/31/2023
BY: KAD
CHECKED: EPR



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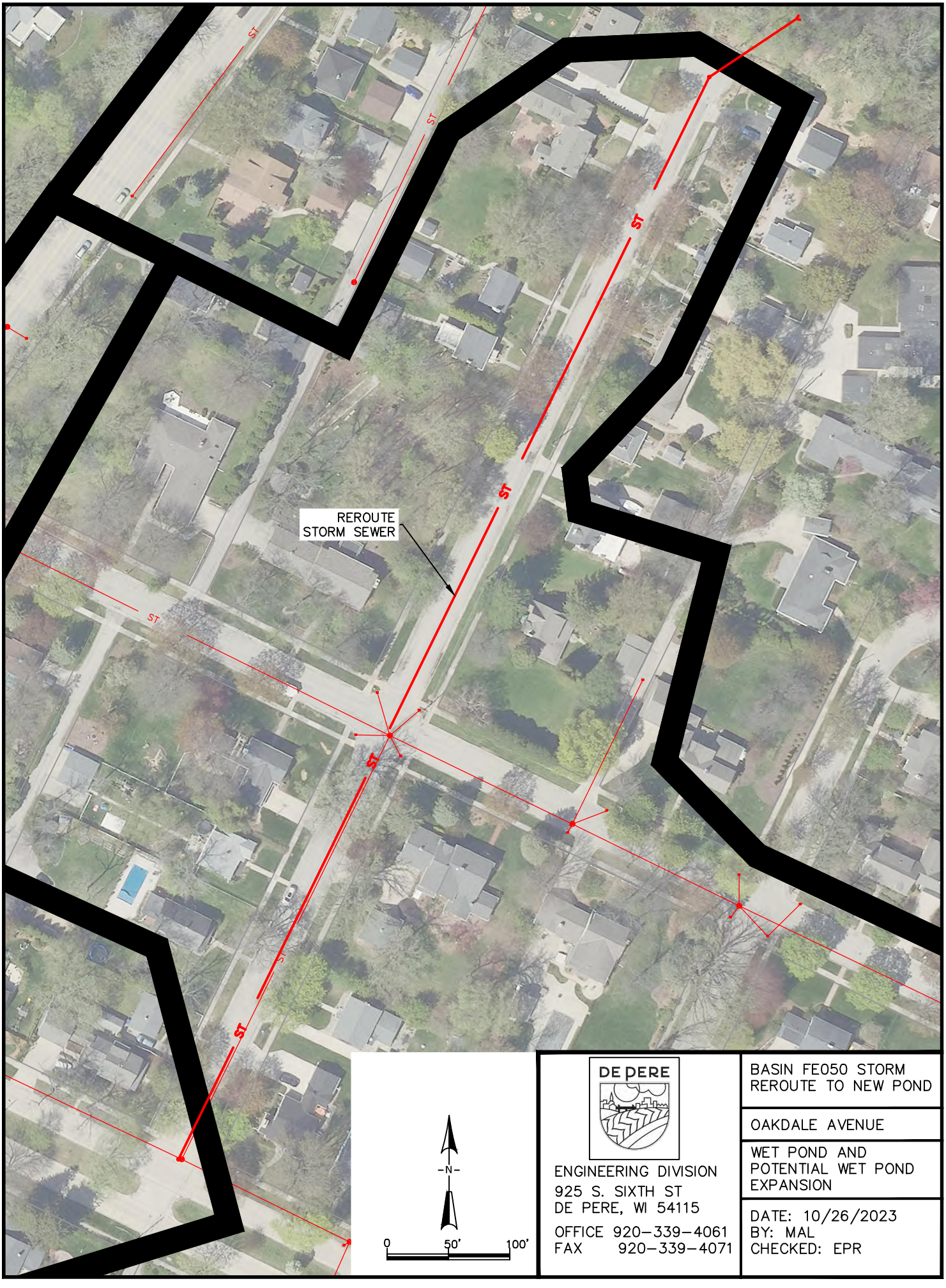
BASIN FE030 & FE050

GLENWOOD RAVINE

WET POND AND
POTENTIAL WET POND
EXPANSION

DATE: 10/26/2023
BY: MAL
CHECKED: EPR



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BASIN FE050 STORM REROUTE TO NEW POND

OAKDALE AVENUE

WET POND AND POTENTIAL WET POND EXPANSION

DATE: 10/26/2023
BY: MAL
CHECKED: EPR

AC020

AC010

FE010

WET POND
TO TREAT
FE010 OF
0.36 ACRES
NWL 581+/-

FE010

FE010
64.59 ACRES

TOTAL POND AREA
TO TREAT FE030 AND FE050
0.75 ACRES TO TREAT 60%
2.00 ACRES TO TREAT TO 80%

WET POND
EXPANSION TO
TREAT FE050
OF 0.48
ACRES NWL
581 +/-

FE030
123.62 ACRES

FE030

FE050
10.20 ACRES NOT TREATED

FE070

FE050

FE050
160.71 ACRES

FE050
150.51 ACRES TO BE TREATED

FE110

FE120

W090

N

0 300' 600'

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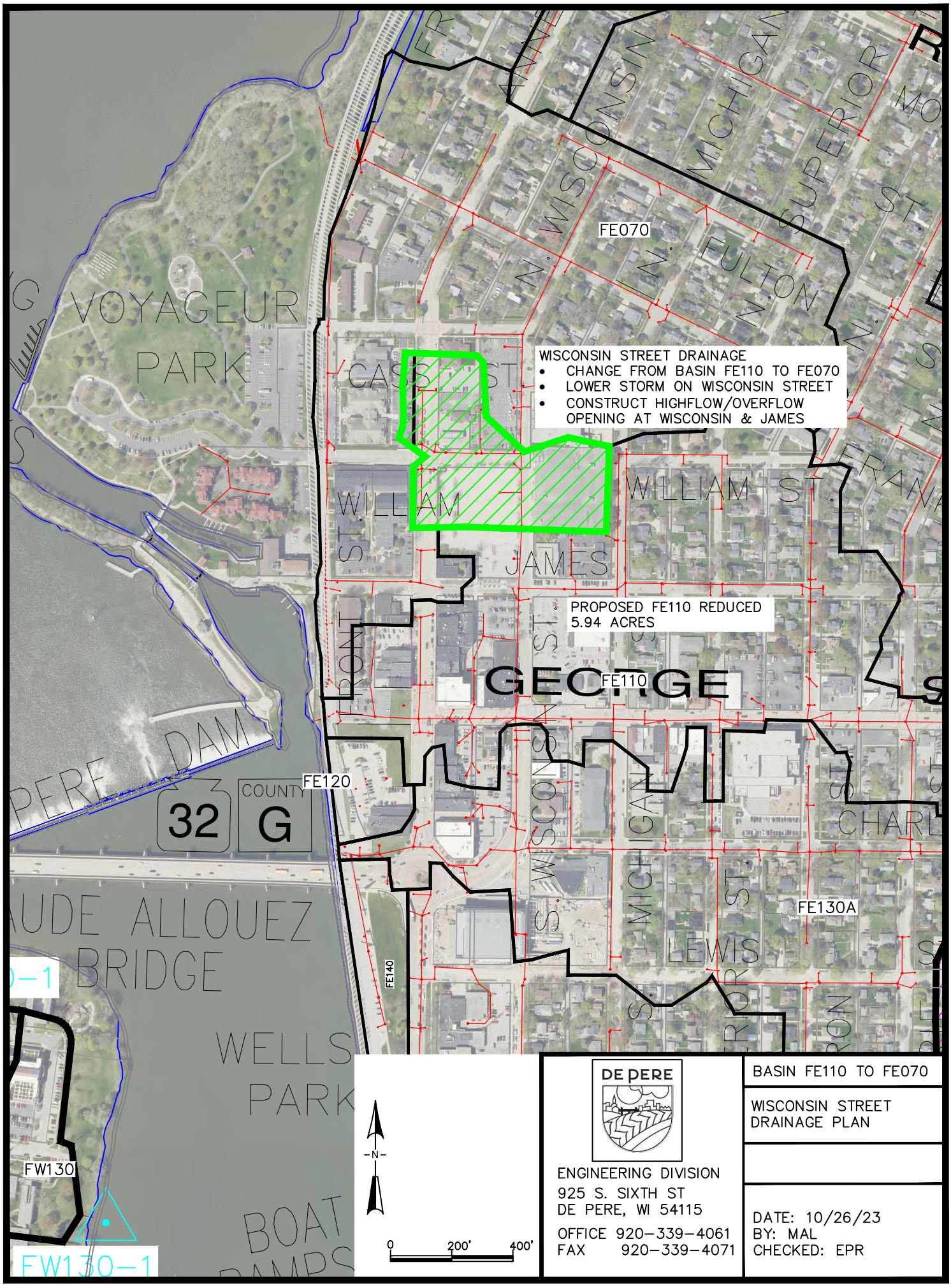
BASIN FE010, FE030
& FE 050

PROPOSED STORM
WATER POND

DATE: 10/30/2023
BY: KAD
CHECKED: EPR


WISCONSIN STREET DRAINAGE
• CHANGE FROM BASIN FE110 TO FE070
• LOWER STORM ON WISCONSIN STREET
• CONSTRUCT HIGHFLOW/OVERFLOW OPENING AT WISCONSIN & JAMES
PROPOSED FE110 REDUCED 5.94 ACRES
FE070
FE110
FE120
FE130A
FE140
FW130
FW130-1
VOYAGEUR PARK
WILLIAM ST.
JAMES
GEORGE
CHARL
LEWIS
WELLS PARK
BOAT
DAM
COUNTY
32
G
N
0
200'
400'
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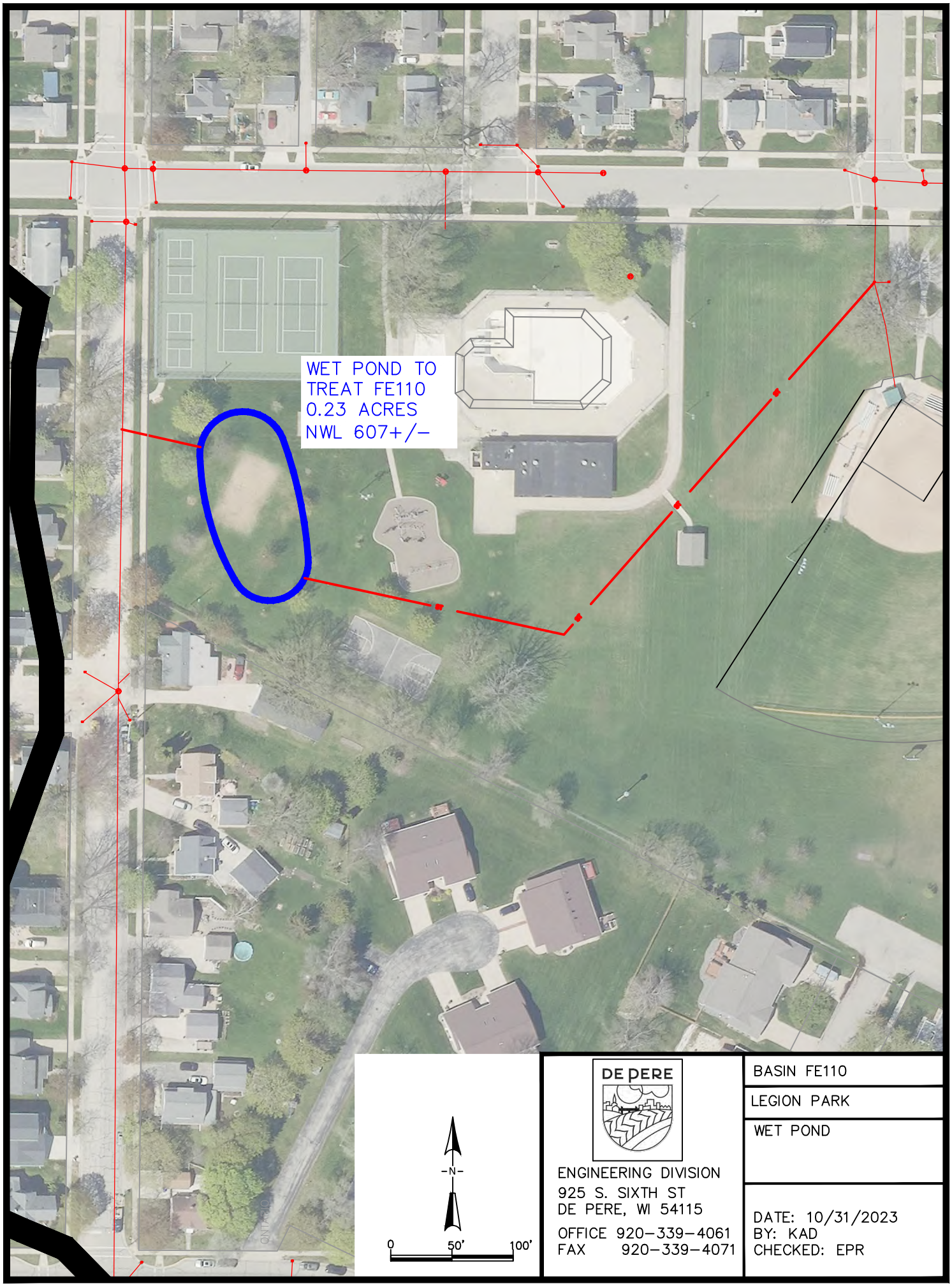
FAX 920-339-4071
BASIN FE110 TO FE070
WISCONSIN STREET DRAINAGE PLAN
DATE: 10/26/23
BY: MAL
CHECKED: EPR



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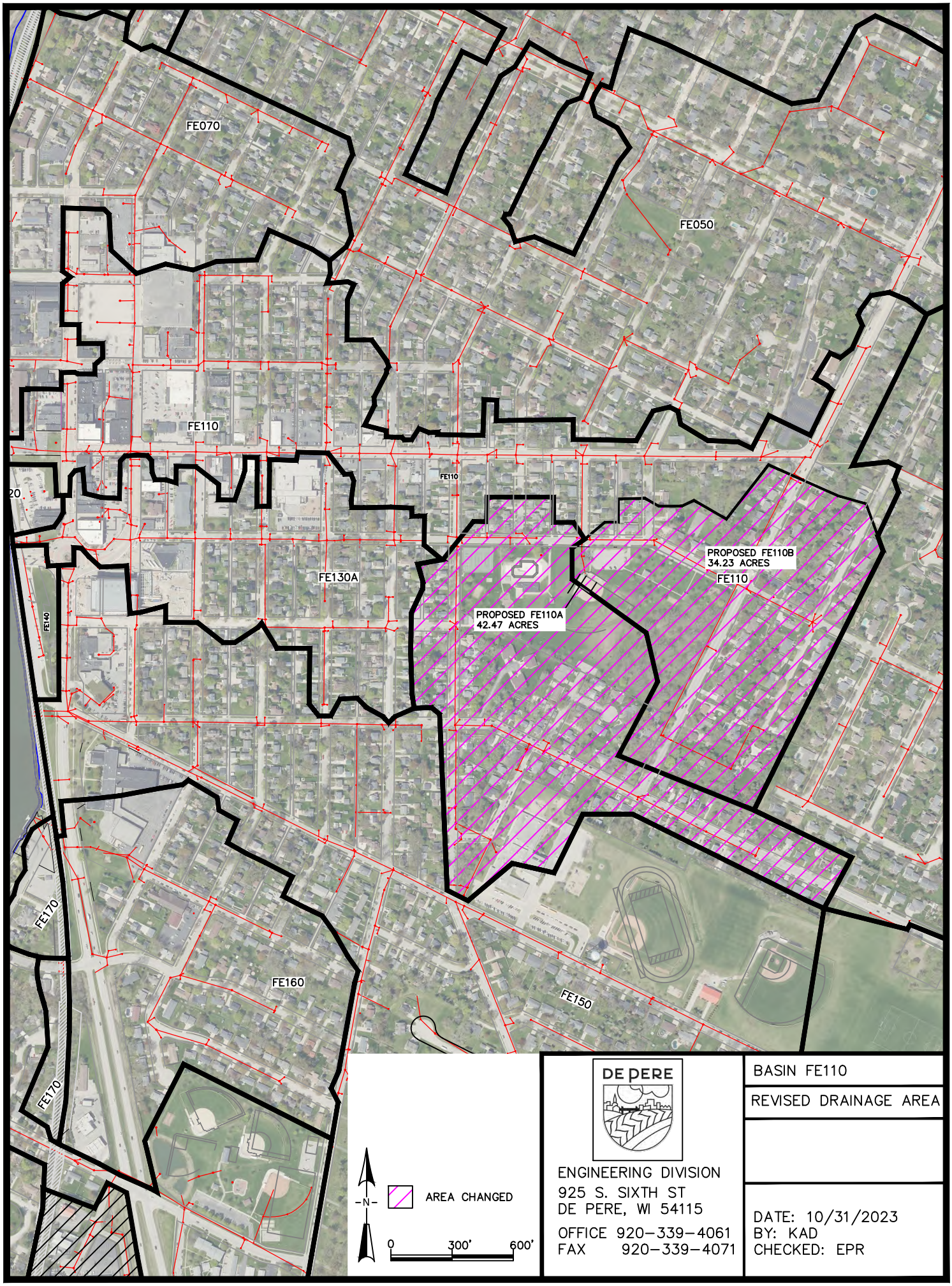
BASIN FE110

LEGION PARK

WET POND

DATE: 10/31/2023
BY: KAD
CHECKED: EPR



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BASIN FE110

REVISED DRAINAGE AREA

DATE: 10/31/2023
BY: KAD
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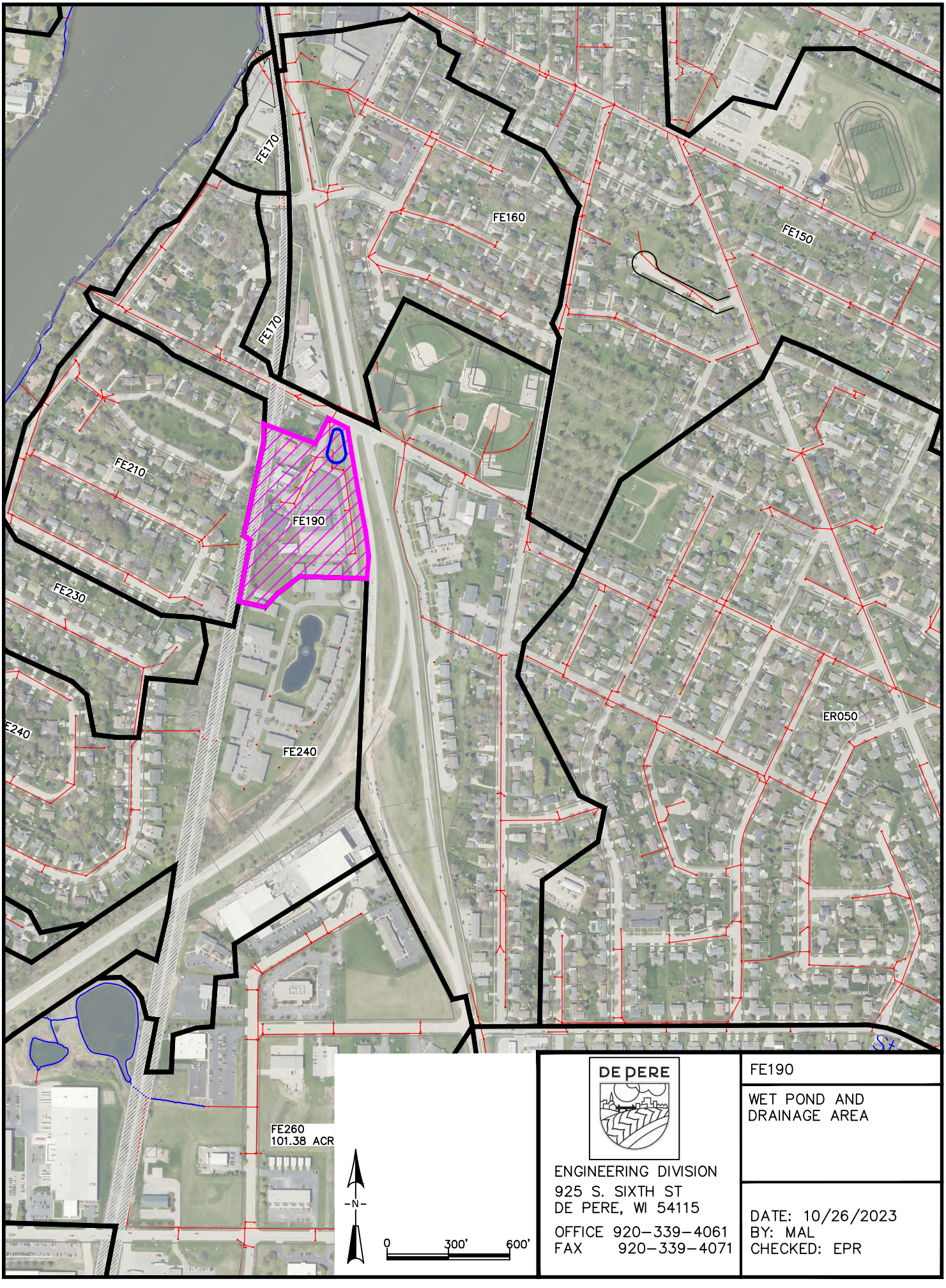

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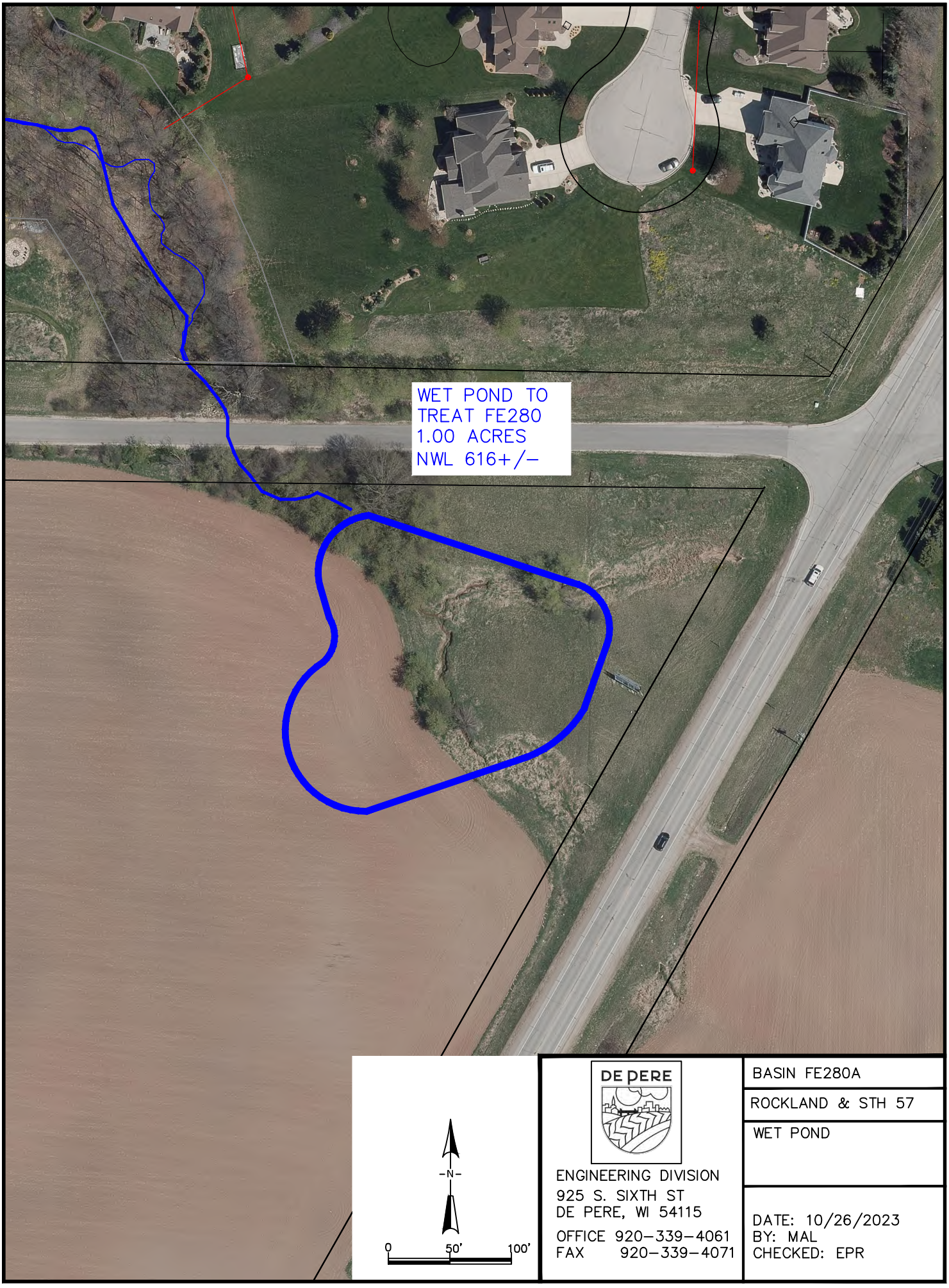
FE190

WET POND AND
DRAINAGE AREA

DATE: 10/26/2023
BY: MAL
CHECKED: EPR



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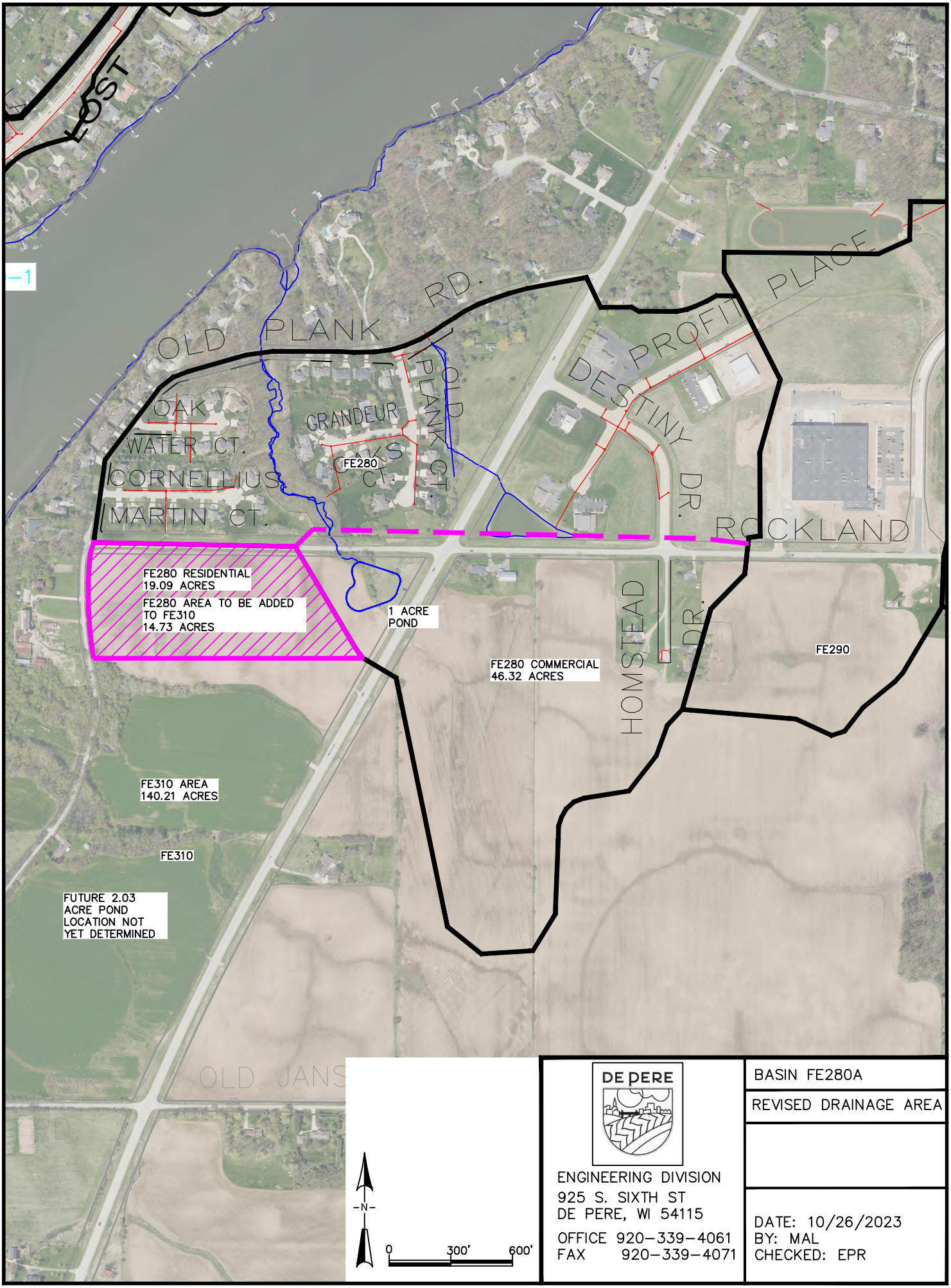
BASIN FE280A

ROCKLAND & STH 57

WET POND

DATE: 10/26/2023
BY: MAL
CHECKED: EPR



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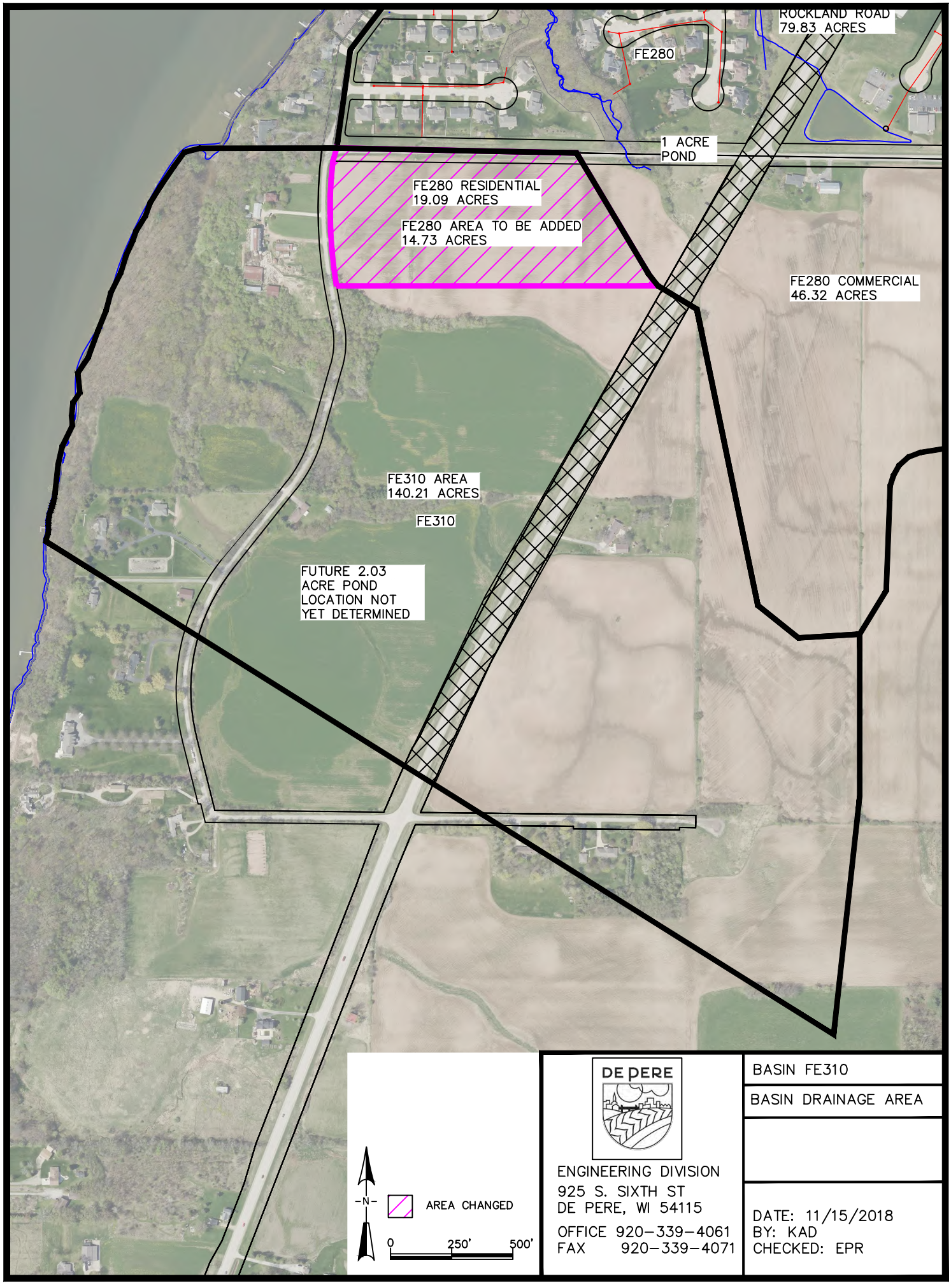
BASIN FE280A

REVISED DRAINAGE AREA

DATE: 10/26/2023
BY: MAL
CHECKED: EPR



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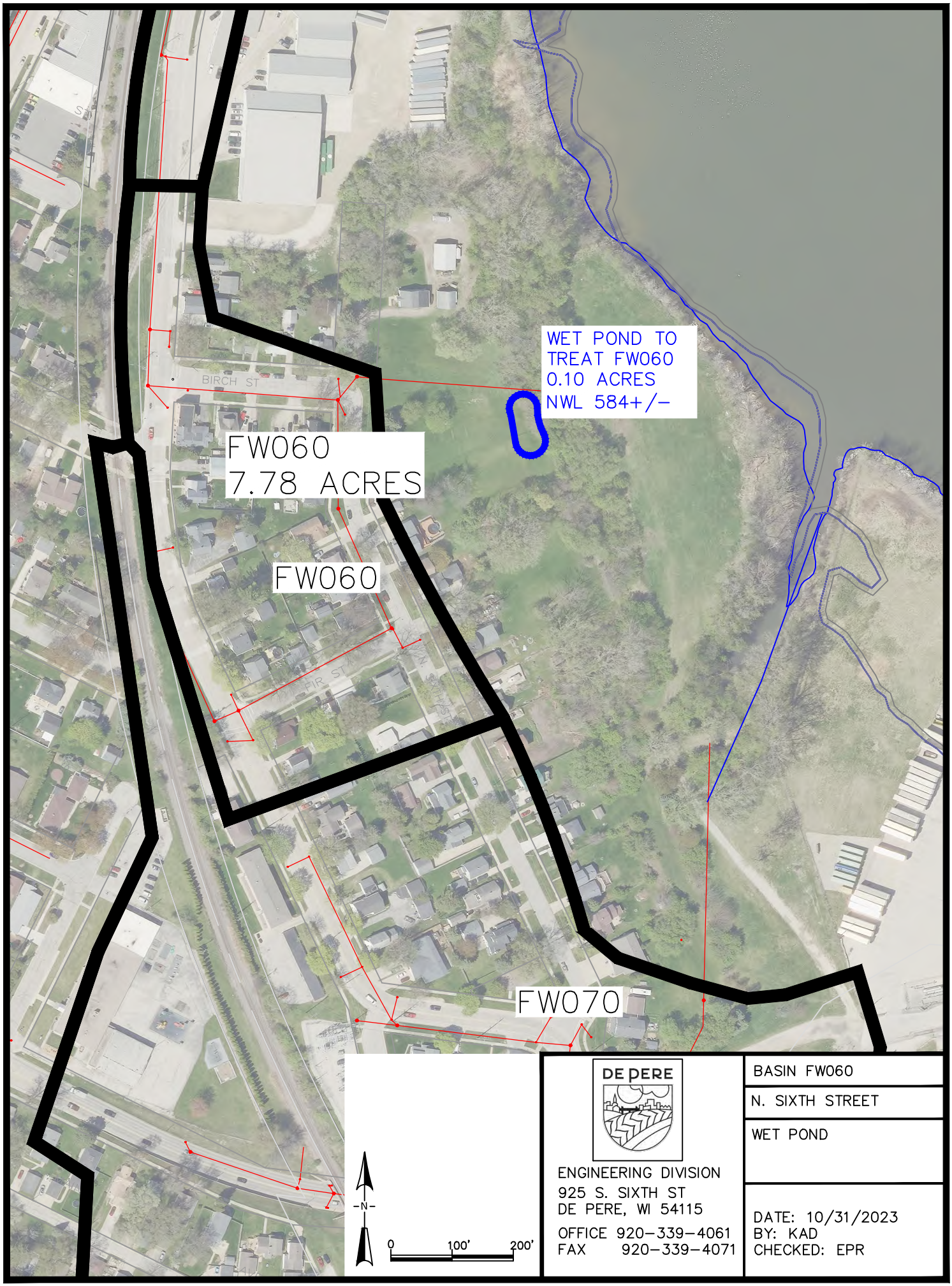
BASIN FE310

BASIN DRAINAGE AREA

DATE: 11/15/2018
BY: KAD
CHECKED: EPR



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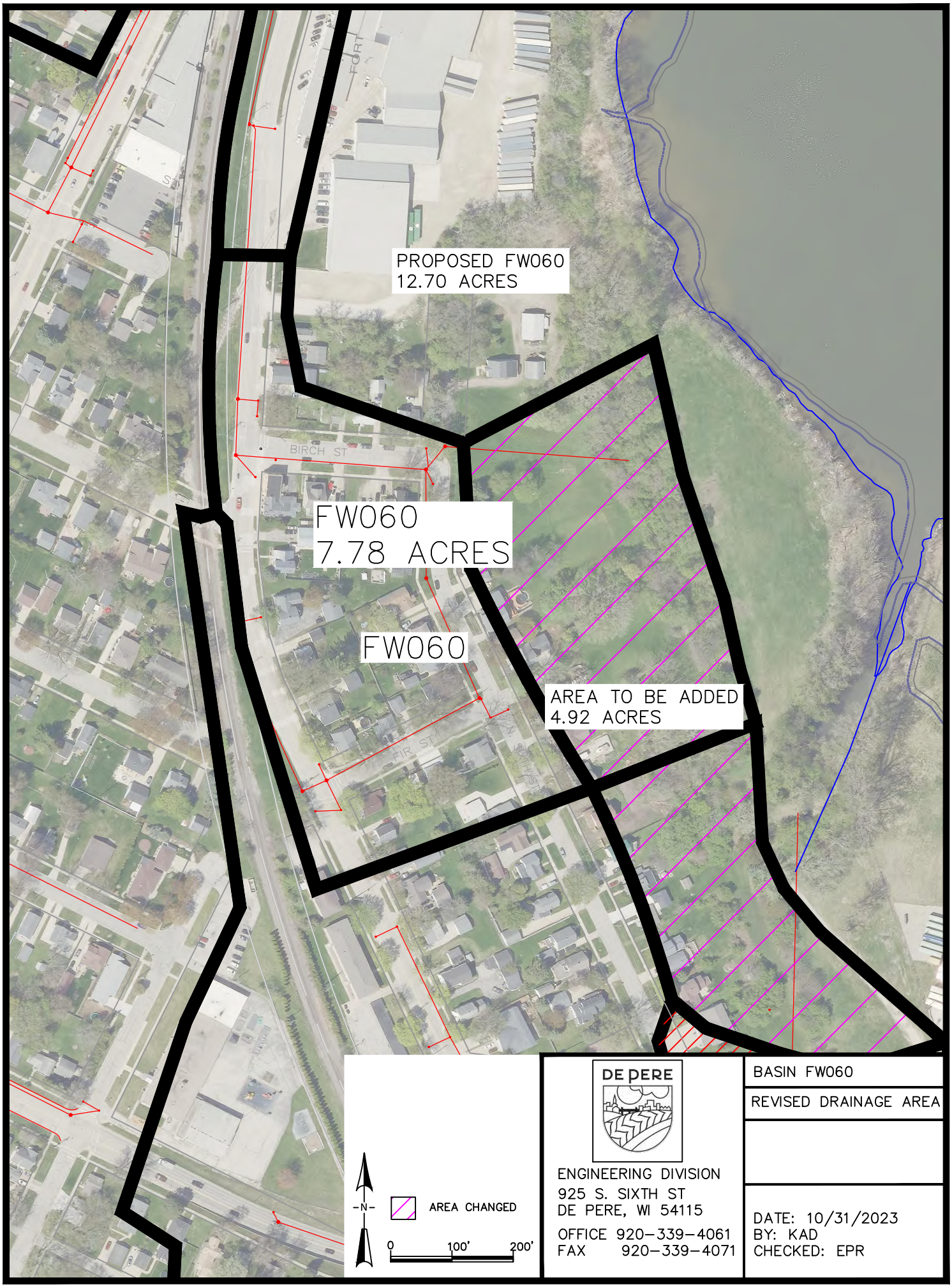
BASIN FW060
N. SIXTH STREET
WET POND

DATE: 10/31/2023
BY: KAD
CHECKED: EPR



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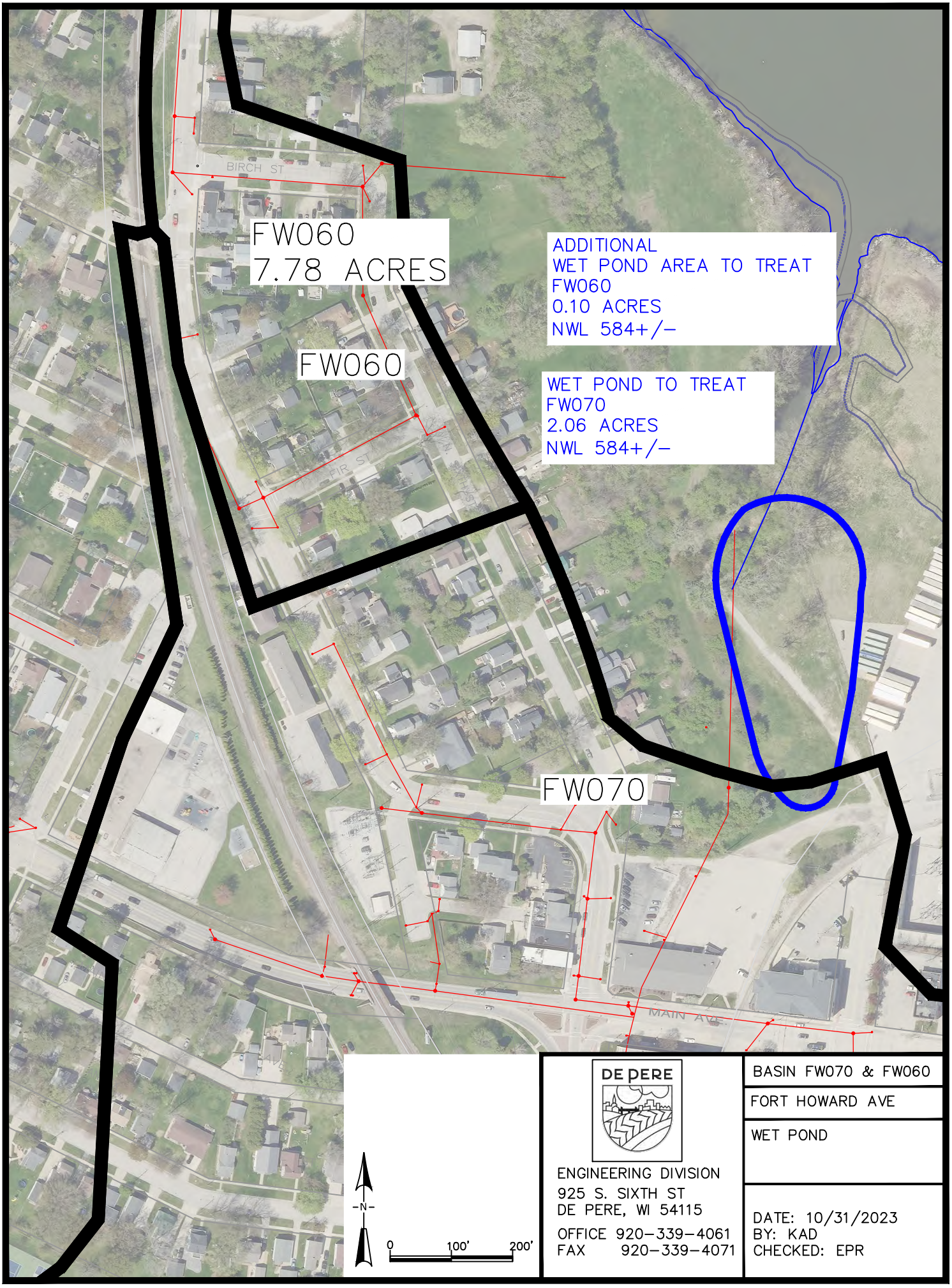
BASIN FW060

REVISED DRAINAGE AREA

DATE: 10/31/2023
BY: KAD
CHECKED: EPR



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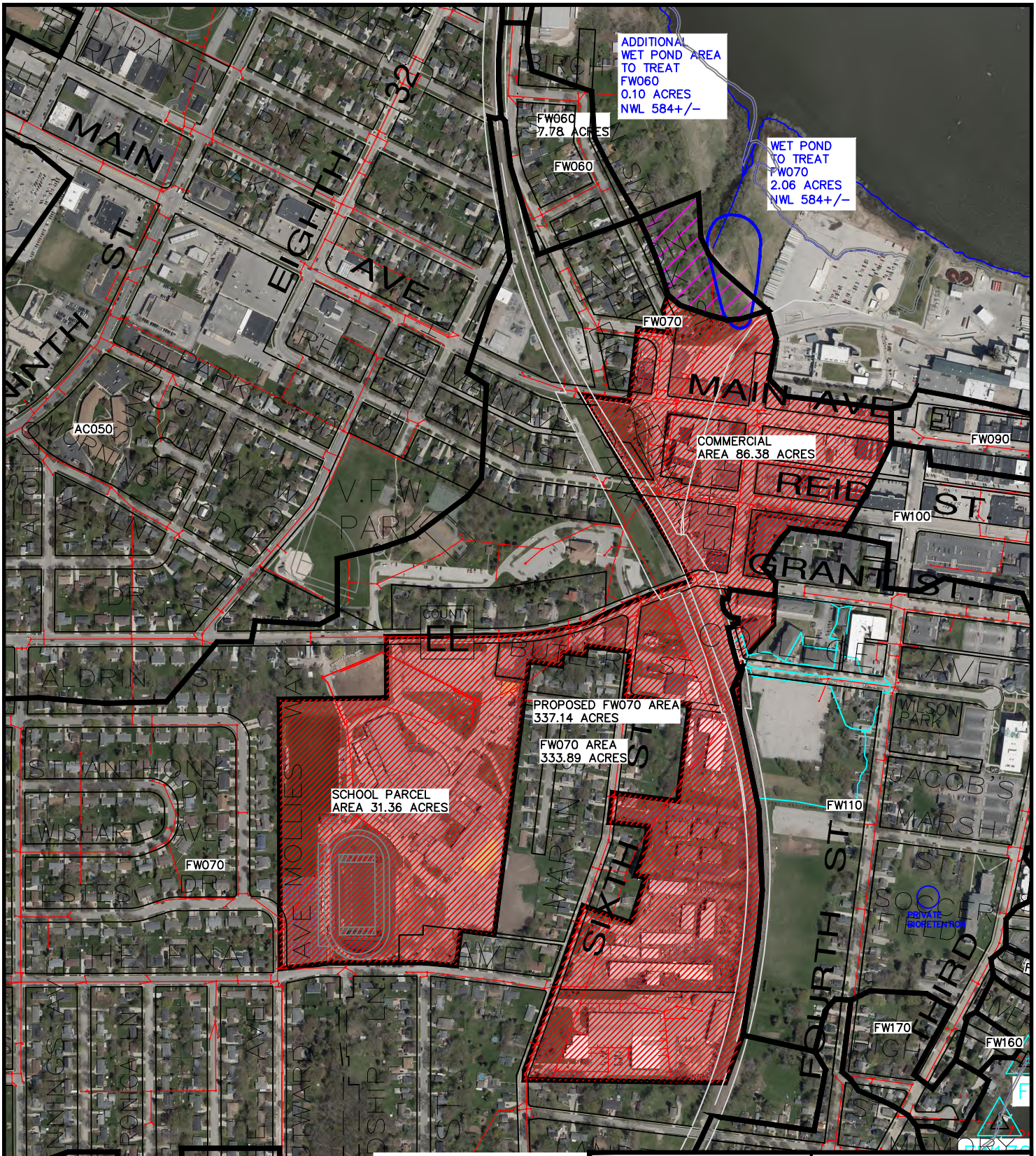
BASIN FW070 & FW060
FORT HOWARD AVE
WET POND

DATE: 10/31/2023
BY: KAD
CHECKED: EPR



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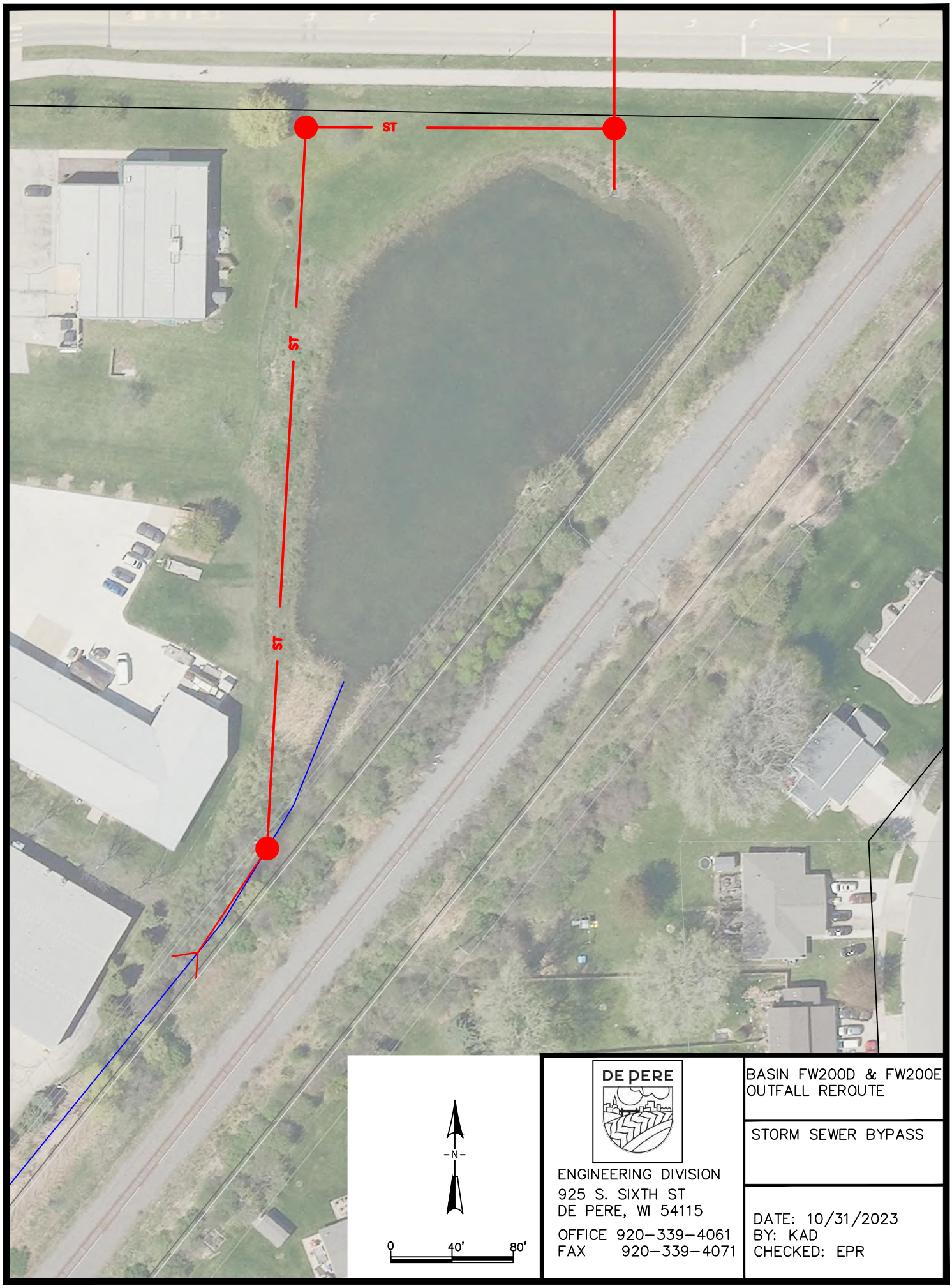
BASIN FW070 & FW060

REVISED DRAINAGE AREA

DATE: 10/26/2023
BY: MAL
CHECKED: EPR



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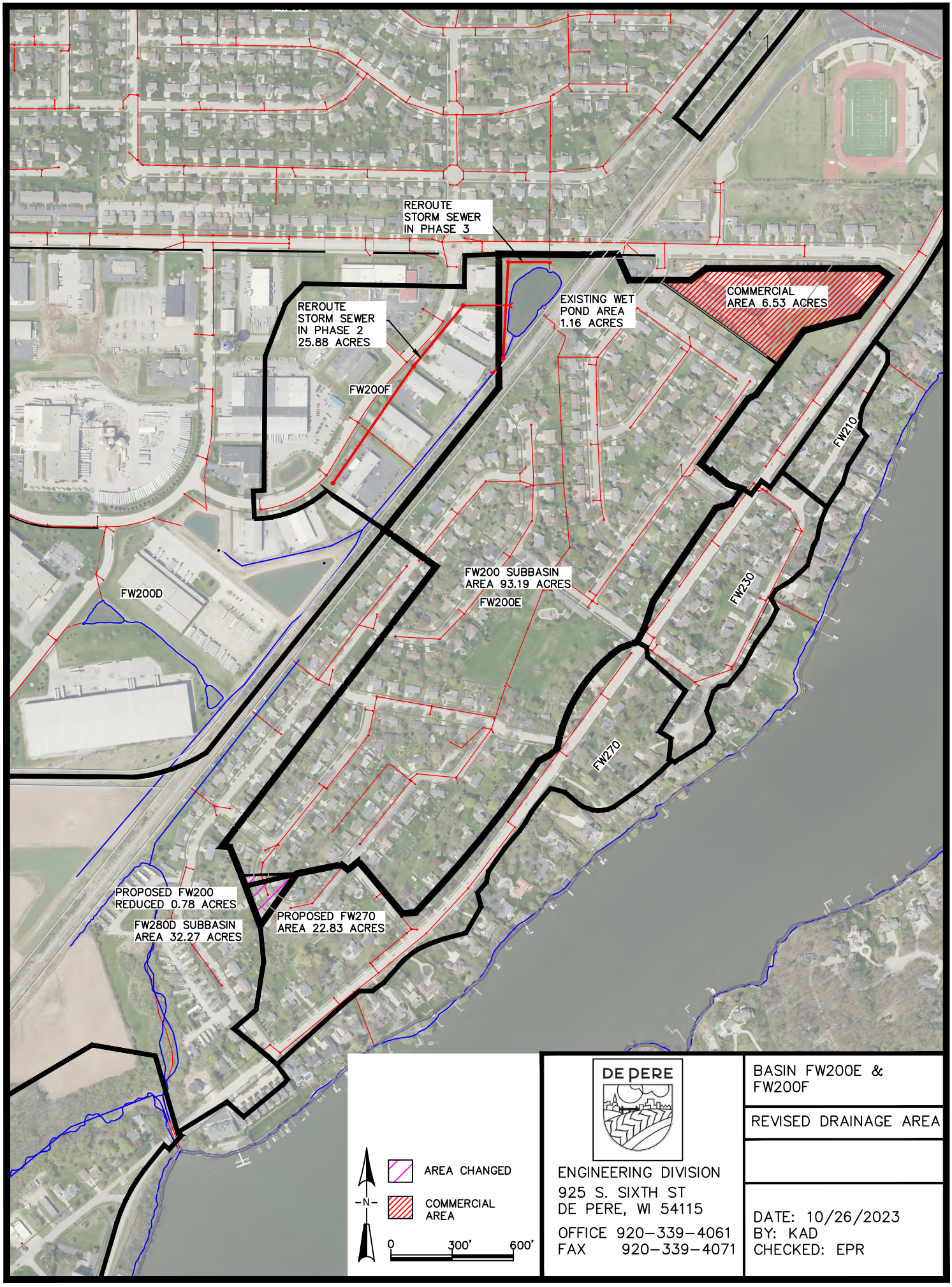
BASIN FW200D & FW200E
OUTFALL REROUTE

STORM SEWER BYPASS

DATE: 10/31/2023
BY: KAD
CHECKED: EPR



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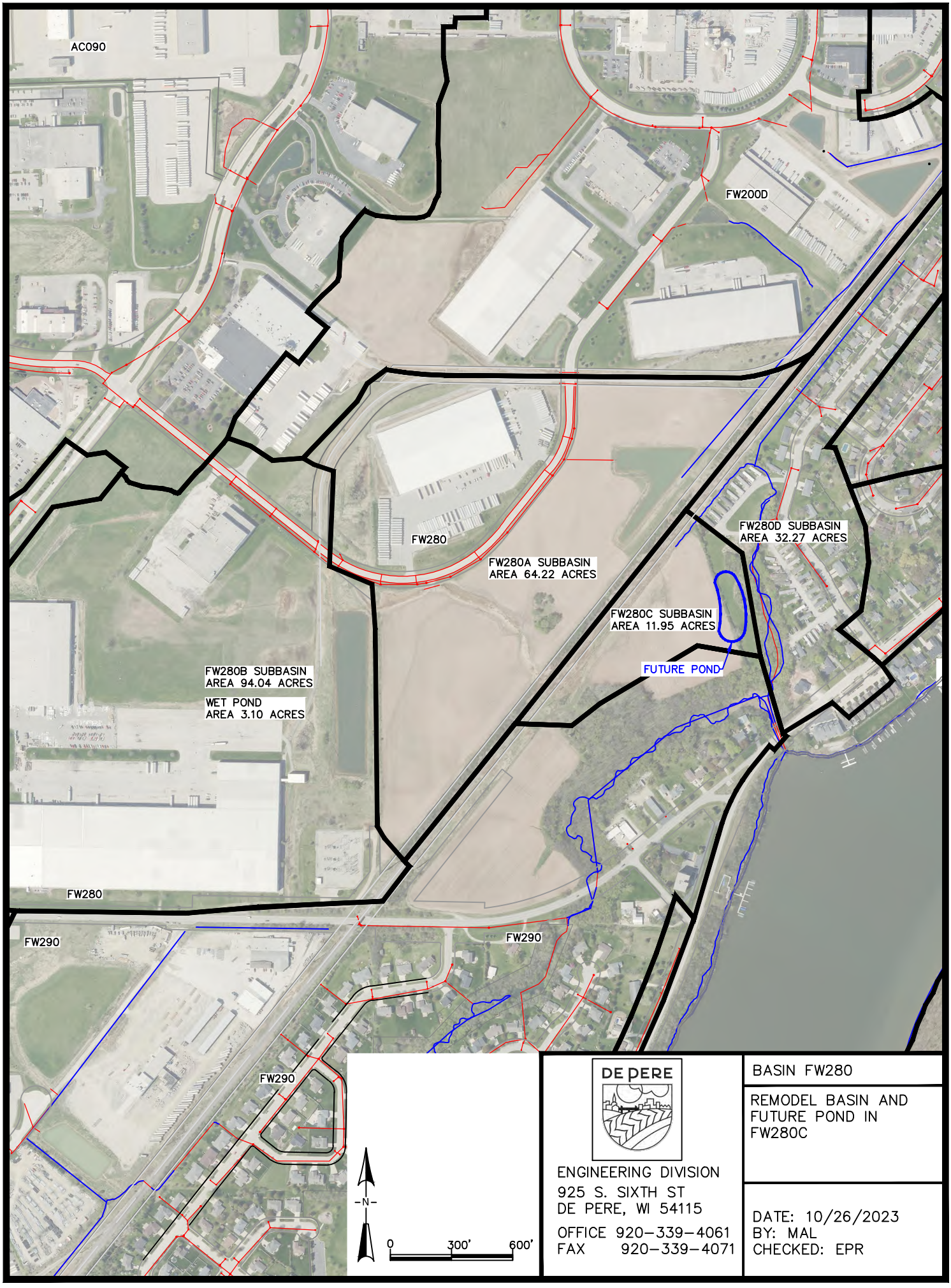
BASIN FW200E & FW200F

REVISED DRAINAGE AREA

DATE: 10/26/2023
BY: KAD
CHECKED: EPR



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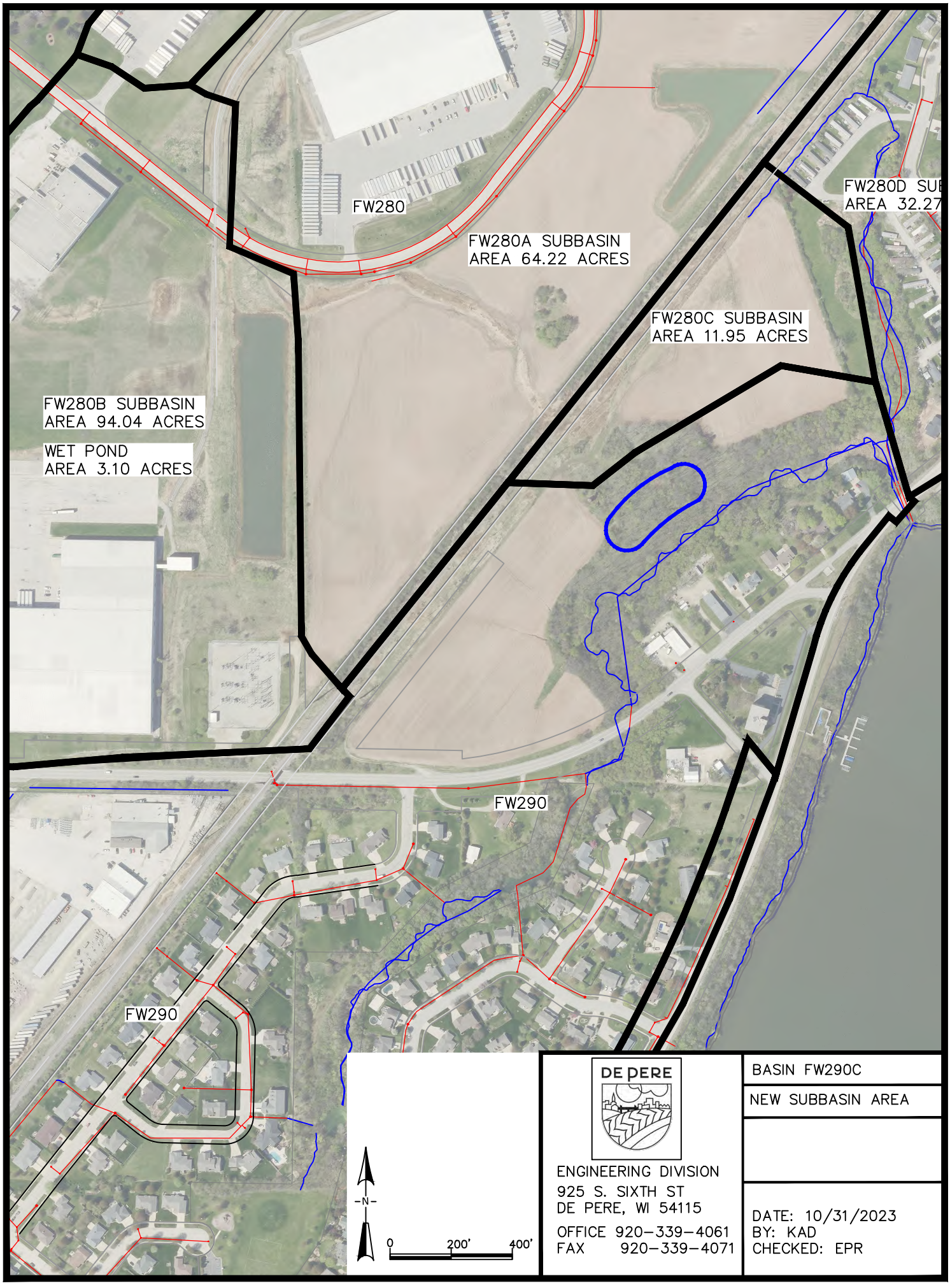
BASIN FW280

REMODEL BASIN AND FUTURE POND IN FW280C

DATE: 10/26/2023
BY: MAL
CHECKED: EPR



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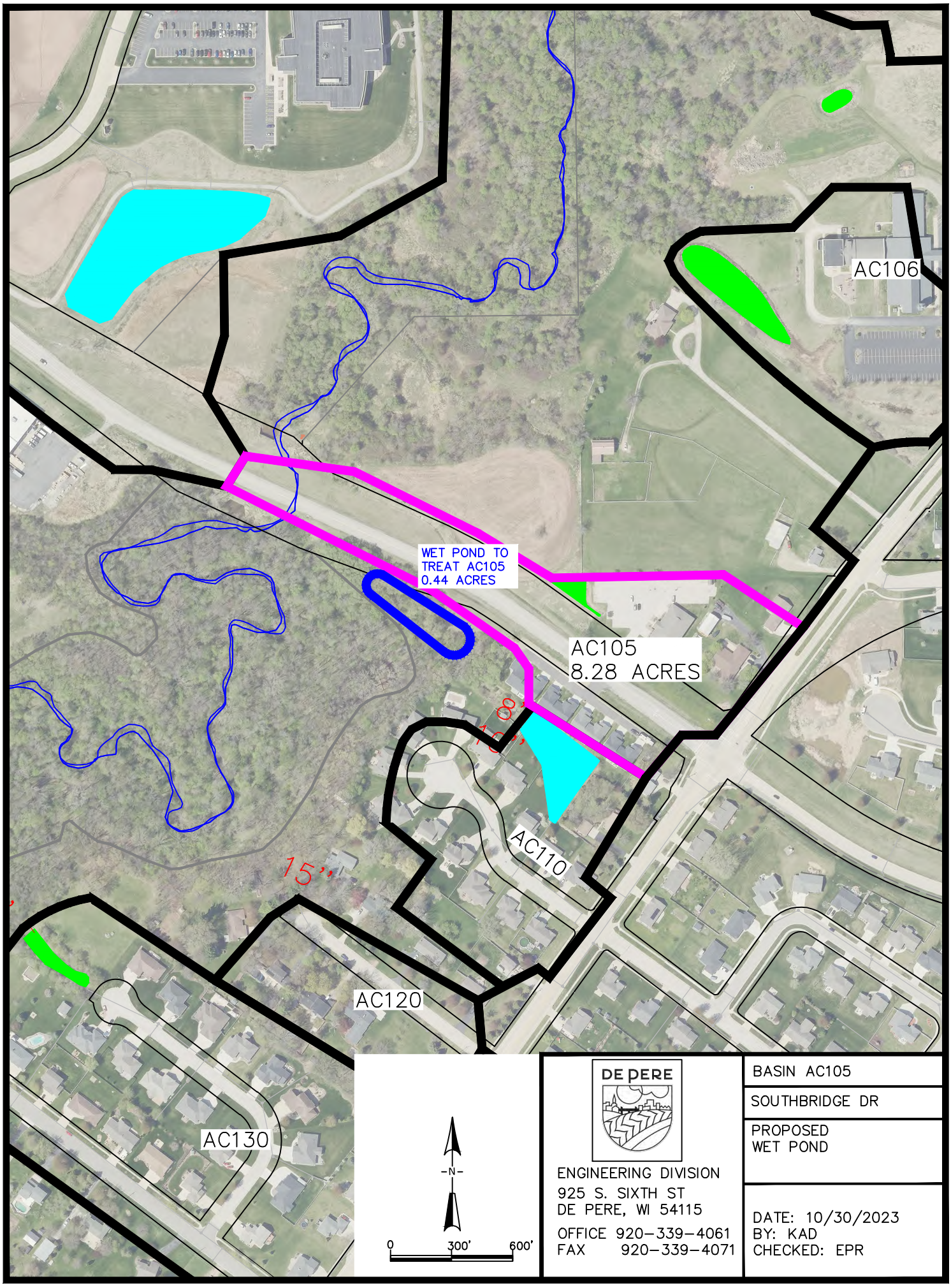
BASIN FW290C

NEW SUBBASIN AREA

DATE: 10/31/2023
BY: KAD
CHECKED: EPR



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BASIN AC105

SOUTHBRIDGE DR

PROPOSED
WET POND

DATE: 10/30/2023
BY: KAD
CHECKED: EPR

I-41

SCHEURING RD
CTH "F"

LAWRENCE DR

AC090
(227.10 ACRES EXISTING)

AC 230
AREA 83.68 ACRES

AREA REMOVED FROM AC090
49.50 ACRES

EMPLOYERS BLVD

FORTUNE AV

AREA REMOVED FROM AC100
7.98 ACRES

AC 220
AREA 23.69 ACRES

AREA REMOVED FROM AC100
9.76 ACRES

LAWRENCE DR

AMERICAN BLVD

AC100
(626.23 ACRES EXISTING)

AC 210
AREA 13.75 ACRES

ROW

PL

N

0 20' 40'

ENGINEERING DIVISION 925 S. SIXTH ST DE PERE, WI 54115 OFFICE 920-339-4061 FAX 920-339-4071	BASIN AC220 & AC230 POND AND NEW BASINS DATE: 10/31/2023 BY: KAD CHECKED: EPR

X:\ENG\Projects\City Projects\2023\Project 23-04 Kingston Preserve Utility and Street Construction\1200- CAD\Pond_Concept.dwg

Appendix C: Non-Feasible Regional Treatment Facilities

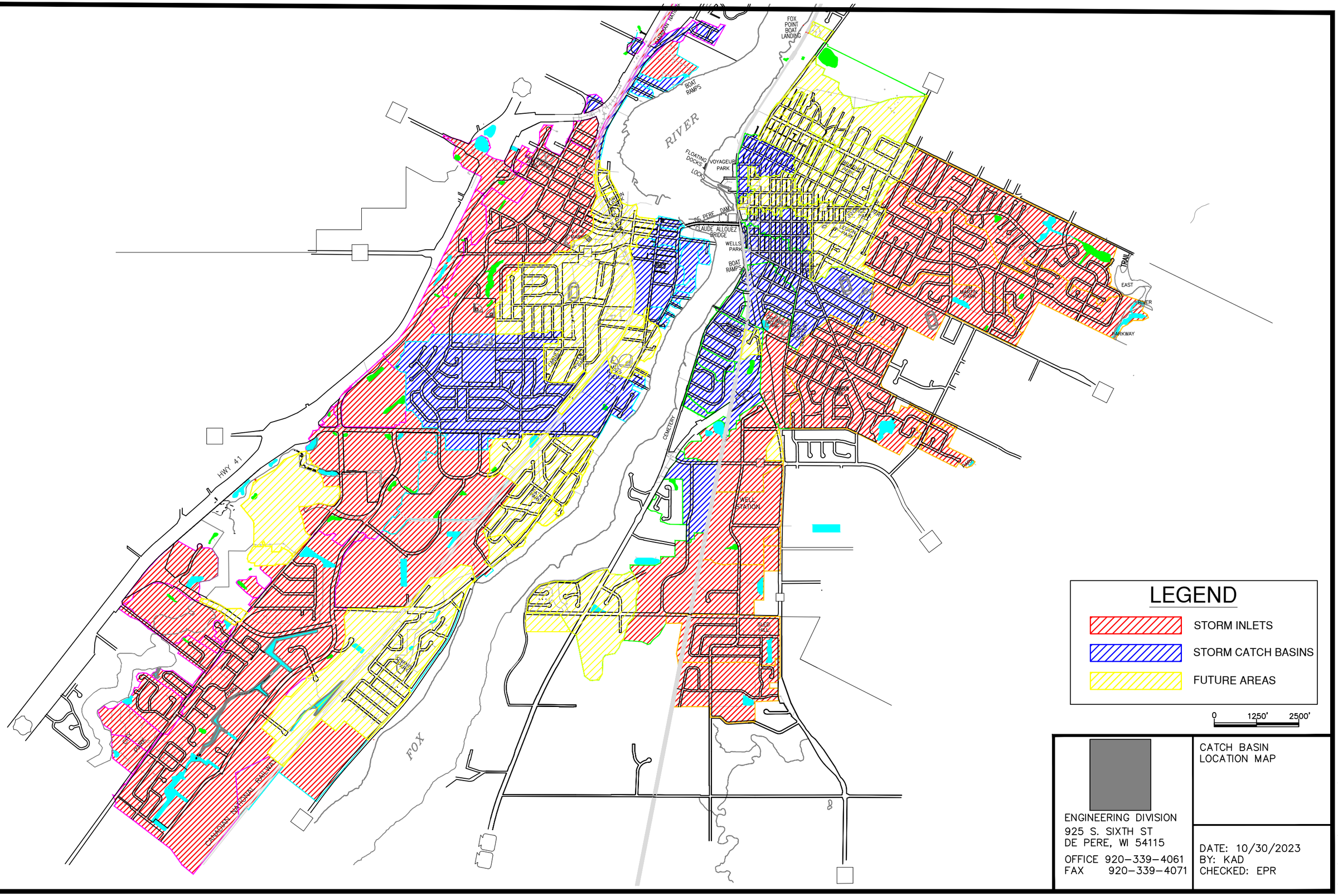
Non-Feasible Potential Facilities Summary

- Fox River East Basin (FE)
    - FE030A/FE050A – Underground Storage in Ridgeway Boulevard – Although there is space to build an underground treatment facility in this location it is not feasible because it would not be treating enough area to be cost effective. Additionally, there are many other utilities located in the right of way.
    - FE110 – Underground Facility at Bridge Approach – The storm sewer at this location is 10 to 12 feet deep and directly adjacent to the Fox River. The construction of an underground facility is cost prohibitive. Additionally, this site will likely be used for a more intensive park/public space gathering site.
    - FE130A/FE150A – Pond across from East Side Fire Station on Lewis St – This site is not feasible for a storm water facility due to other plans for the development of downtown De Pere.
    - FE160A – Pond at Foxview School (Off of Broadway) – There are several issues with this site including the proximity to the school, sewer depth and associated surface impact, and fill at the site.
    - FE160A/170A – Underground Facility at Bomier Boat Launch – The cost of constructing this facility is too high based on a cost analysis of the materials and work required to complete the project.
    - FE210A – Pond at Wilcox Ct – Storm water is unable to be routed to this location for treatment.
    - FE240C/260B – Pond at 1201 Enterprise – Storm water in this area is already treated downstream by ponds between Greenleaf Road and the Fox River Trail.
    - FE280A – Pond off of Old Plank Road – This is a wooded conservancy area with mature oak trees. The City will not be able to obtain the property for pond construction.
    - XF270A/FE280B – Commerce Empty Lot Pond – This is a development site for the City. When the site develops it will have to meet 80% treatment.

- Fox River West Basin (FW)
    - FW010A – Underground Storage at Brown County Fairgrounds – There is already a pond on this site that treats storm water. The redundancy would not gain the City any additional treatment for the storm water entering the Fox River than is already being obtained through the existing facility.
    - FW110A – Pond on Parcel WD-905 (St. Nobert at Bridge) – The potential available area to build a pond is not large enough to provide adequate treatment to outweigh its construction and maintenance costs.
    - FW200A – St. Norbert Pond between Schneider Stadium and Mel Nicks Field – The existing storm sewer is 15’ to 23’ deep upstream of the pond location which is too deep to construct a pond. Additionally, several sub-basins are being treated upstream which would create some redundancy in treating water.

- FW200B – Construct a new pond north of Meadowview Lane. This pond is very deep due to the existing storm sewer depth which significantly increases the cost. The pond is also proposed on West De Pere School property. The excavation depth is 17 feet just to get to the pond surface. This will create safety concerns for the school as well as impacting a large portion of their green space. Finally, the storm sewer to and from the pond would be placed between existing houses in two fifteen foot wide easements which will be challenging due to the storm sewer depth.
- FW200E – Patriot Park Pond – There is an area where a pond could be constructed in Patriot Park which would serve a small portion of FW200E. This same area flows to another pond just south of Scheuring Road resulting in the same water being treated twice.
- FW290A – Red Maple to Lost Dauphin Pond – There is a pond at the Dog Park and at Richco Court upstream that already treat the storm water that this pond would service. The redundancy would not gain the City any additional treatment for the storm water entering the Fox River than is already being obtained by the existing facilities.
- FW290C – Kiwanis Park Pond – The existing storm sewer that would connect to the pond outlet is 8 to 14 feet deep. This is too deep to cost effectively connect the pond into our storm sewer system. In addition to the existing storm sewer being too deep, the storm water that would be treated by this pond is already treated further downstream. The redundancy would not gain the City any additional treatment for the storm water entering the Fox River than is already being obtained by the existing facilities.

Appendix D: Map for Catch Basin Installation



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CATCH BASIN
LOCATION MAP

DATE: 10/30/2023
BY: KAD
CHECKED: EPR

X:\ENG\Storm\System Map\Inlet_vs_Catch_Basin_Map.dwg

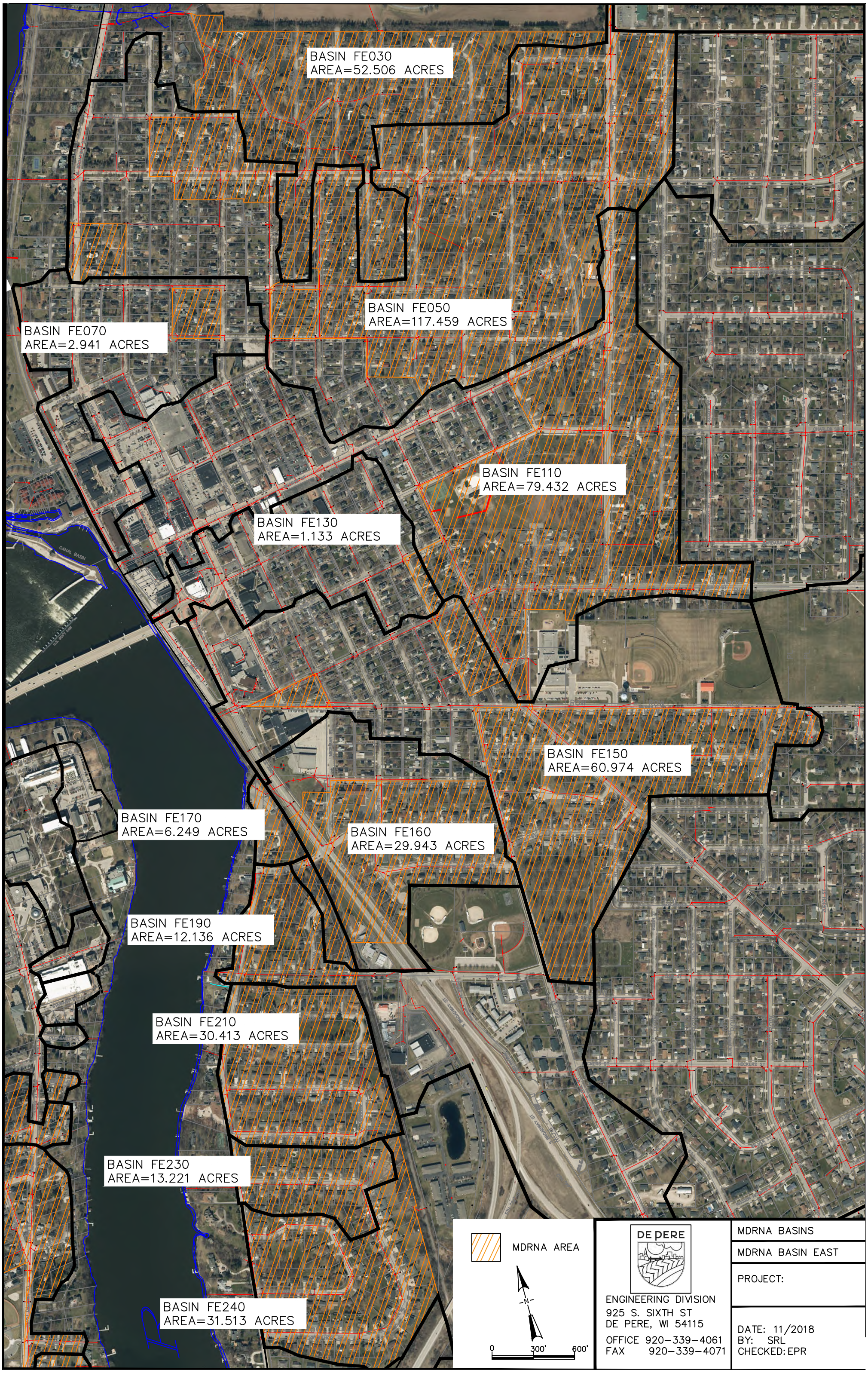
Appendix E: Leaf Collection Credit Map and Calculations

1) Modifications/Upgrades for Phosphorous from Sweeping
2) Modify Leaf Collection Basins Map

Original Study					2018 Revisions						
Basin	Basin Area (Acres)	Total Phosphorus No Controls (LB/Year)	Total Phosphorus With Controls (LB/Year)	Total Phosphorus Reduction (%)	Current Modeled Phosphorus Reduction (LB/Year)	MDRNA[1] Area (Acres)	Total Phosphorus in MDRNA Area (LB/Year)	Ratio of MDRNA Area in Basin	Phosphorus Reduction Whole Basin (%)	Total Phosphorus Reduction (LB/Year)	Additional Total Phosphorus Reduction (LB/Year)
FE010	64.606	38.7	35.3	8.9%	3.44	-	-	-	8.9%	3.44	0.00
FE030	123.561	70.1	61.8	11.8%	8.27	52.506	8.9	0.42	14.0%	9.82	1.55
FE050	160.776	91.1	77.0	15.5%	14.12	117.459	20.0	0.73	16.6%	15.12	1.00
FE070	39.886	26.2	22.1	15.6%	4.09	2.941	0.5	0.07	15.7%	4.11	0.03
FE110	137.342	84.4	73.0	13.5%	11.39	79.432	13.5	0.58	15.5%	13.10	1.71
FE120	1.820	1.5	1.3	12.9%	0.19	-	-	-	12.9%	0.19	0.00
FE130	32.459	22.3	19.1	14.5%	3.23	1.133	0.2	0.03	14.6%	3.25	0.02
FE140	2.789	1.2	1.1	7.5%	0.09	-	-	-	7.5%	0.09	0.00
FE150	127.611	85.3	74.6	12.6%	10.75	60.974	10.4	0.48	14.7%	12.54	1.79
FE160	53.059	29.2	25.4	13.0%	3.80	29.943	5.1	0.56	15.3%	4.46	0.66
FE170	6.249	2.9	2.5	12.9%	0.37	6.249	1.1	1.00	17.0%	0.49	0.12
FE190	58.700	35.7	30.7	13.9%	4.96	12.136	2.1	0.21	14.5%	5.19	0.23
FE210	30.413	16.1	13.8	14.4%	2.32	30.413	5.2	1.00	17.0%	2.74	0.42
FE230	13.221	7.8	6.7	14.0%	1.09	13.221	2.2	1.00	17.0%	1.33	0.23
FE240	56.309	32.7	23.0	29.6%	9.68	31.513			29.6%	9.68	0.00
FE250	4.965	2.7	2.3	15.5%	0.42	-	-	-	15.5%	0.42	0.00
FE260	101.379	62.7	13.2	79.0%	49.53	-	-	-	79.0%	49.53	0.00
FE270	57.935	34.8	32.1	7.8%	2.71	-	-	-	7.8%	2.71	0.00
FE275	23.216	13.6	2.6	80.9%	11.00	-	-	-	80.9%	11.00	0.00
FE280	127.272	65.1	46.2	29.1%	18.94	-	-	-	29.1%	18.94	0.00
FE290	20.768	13.6	0.6	95.6%	13.00	-	-	-	95.6%	13.00	0.00
FW010	25.055	9.4	2.8	70.2%	6.60	-	-	-	70.2%	6.60	0.00
FW015	8.853	4.3	3.7	13.2%	0.57	8.853	1.5	1.00	17.0%	0.73	0.16
FW020	3.298	1.8	1.5	15.5%	0.28	3.298	0.6	1.00	17.0%	0.31	0.03
FW040	10.493	12.8	12.3	3.6%	0.46	-	-	-	3.6%	0.46	0.00
FW060	7.785	4.6	4.0	13.2%	0.61	7.785	1.3	1.00	17.0%	0.78	0.17
FW070	333.921	217.6	193.0	11.3%	24.59	216.146	36.7	0.65	15.0%	32.62	8.03
FW090	4.984	4.0	3.5	12.4%	0.50	-	-	-	12.4%	0.50	0.00
FW100	11.052	8.9	7.8	12.6%	1.12	-	-	-	12.6%	1.12	0.00
FW110	62.419	41.0	36.4	11.1%	4.55	-	-	-	11.1%	4.55	0.00
FW120	13.135	9.8	9.1	7.6%	0.74	-	-	-	7.6%	0.74	0.00
FW130	4.476	3.4	3.1	7.5%	0.26	-	-	-	7.5%	0.26	0.00
FW140	3.620	2.7	2.5	7.5%	0.20	-	-	-	7.5%	0.20	0.00
FW150	2.691	2.0	1.8	7.8%	0.16	-	-	-	7.8%	0.16	0.00
FW155	1.111	0.6	0.5	15.5%	0.09	-	-	-	15.5%	0.09	0.00
FW160	1.022	0.6	0.5	15.5%	0.09	1.022	0.2	1.00	17.0%	0.10	0.01
FW170	5.628	3.2	2.7	15.3%	0.49	5.628	1.0	1.00	17.0%	0.54	0.05
FW180	38.228	19.1	16.8	12.2%	2.33	24.668	4.2	0.65	15.3%	2.92	0.59
FW190	3.672	2.0	1.7	15.5%	0.31	3.672	0.6	1.00	17.0%	0.34	0.03
FW200	641.931	403.2	258.9	35.8%	144.35	-	-	-	35.8%	144.35	0.00
FW210	3.561	1.9	1.6	15.5%	0.29	3.561	0.6	1.00	17.0%	0.32	0.03
FW230	13.484	7.3	6.2	15.5%	1.13	13.484	2.3	1.00	17.0%	1.24	0.11
FW270	23.616	12.8	10.8	15.3%	1.96	23.616	4.0	1.00	17.0%	2.18	0.22
FW280	189.282	130.9	54.5	58.4%	76.45	-	-	-	58.4%	76.45	0.00
FW290	342.139	212.6	97.8	54.0%	114.80	-	-	-	54.0%	114.80	0.00
FW300	7.598	4.2	3.6	15.2%	0.64	-	-	-	15.2%	0.64	0.00
Total	**3007.4**	**1858.2**	**1301.1**	**30.0%**	**557.1**	**749.7**			**30.9%**		**17.2**

Notes:

1. MDRNA - Medium Density Residential No Alleys land use meeting guidelines set forth in WisDNR Bureau of Watershed Management Program Guidance on Interim Municipal Phosphorus Reduction Credit for Leaf Management Programs.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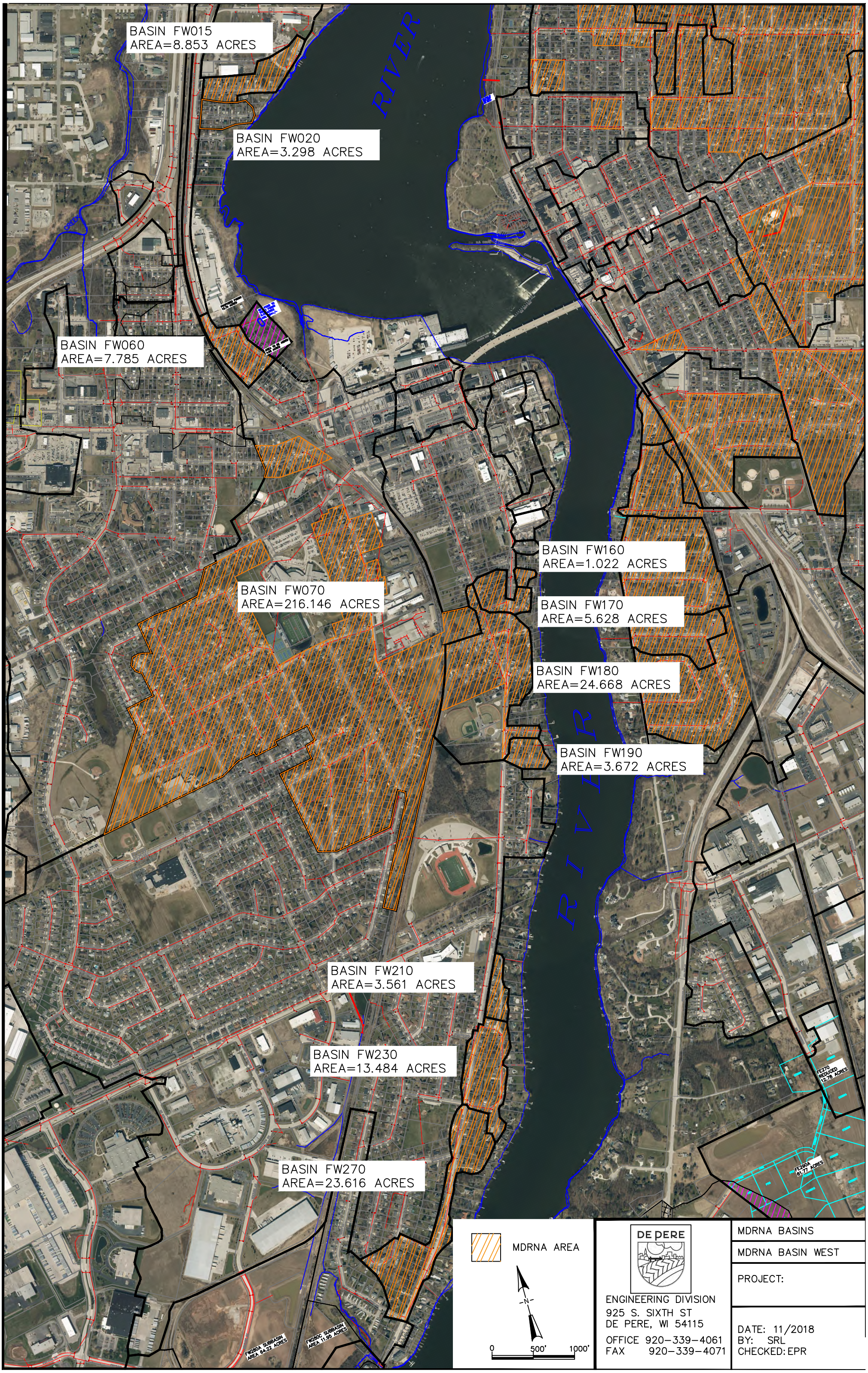
AREA=13.221 ACRES
BASIN FE240
AREA=31.513 ACRES
MDRNA AREA
0
300'
600'
DE PERE
ENGINEERING DIVISION
925 S. SIXTH ST
DE PERE, WI 54115
OFFICE 920-339-4061
FAX 920-339-4071
MDRNA BASINS
MDRNA BASIN EAST
PROJECT:
DATE: 11/2018
BY: SRL
CHECKED: EPR



DE PERE

ENGINEERING DIVISION
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OFFICE 920-339-4061
FAX 920-339-4071

MDRNA BASINS

MDRNA BASIN WEST

PROJECT:

DATE: 11/2018
BY: SRL
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