ENGINEERING MEMO SUMMARIES

TUSCARAWAS RIVER WATERSHED STUDY

Prepared for:

SUMMIT COUNTY ENGINEER and
SUMMIT COUNTY SURFACE WATER MANAGEMENT DISTRICT

Prepared by:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
TOLEDO, OH

CEC Project 333-528

APRIL 2025

Civil & Environmental Consultants, Inc.

Toledo | One SeaGate, Suite 2050 | Toledo, OH 43604 | p: 419-724-5281 f: 419-724-5286 | www.cecinc.com

TABLE OF CONTENTS

FIGURES

ENGINEERING MEMO SUMMARY BACKGROUND

The following sections include an extracted summary and maps of each of twelve (12) Engineering Memos prepared for the Summit County Engineer and Summit County Surface Water Management District for the Tuscarawas River Watershed Study. These projects were chosen as potential projects to address water quality and water quantity issues across 28.2 miles of stream throughout the Tuscarawas River Watershed in Summit County, Ohio.

TUSCARAWAS RIVER WATERSHED STUDY MAP OF PROJECT LOCATIONS

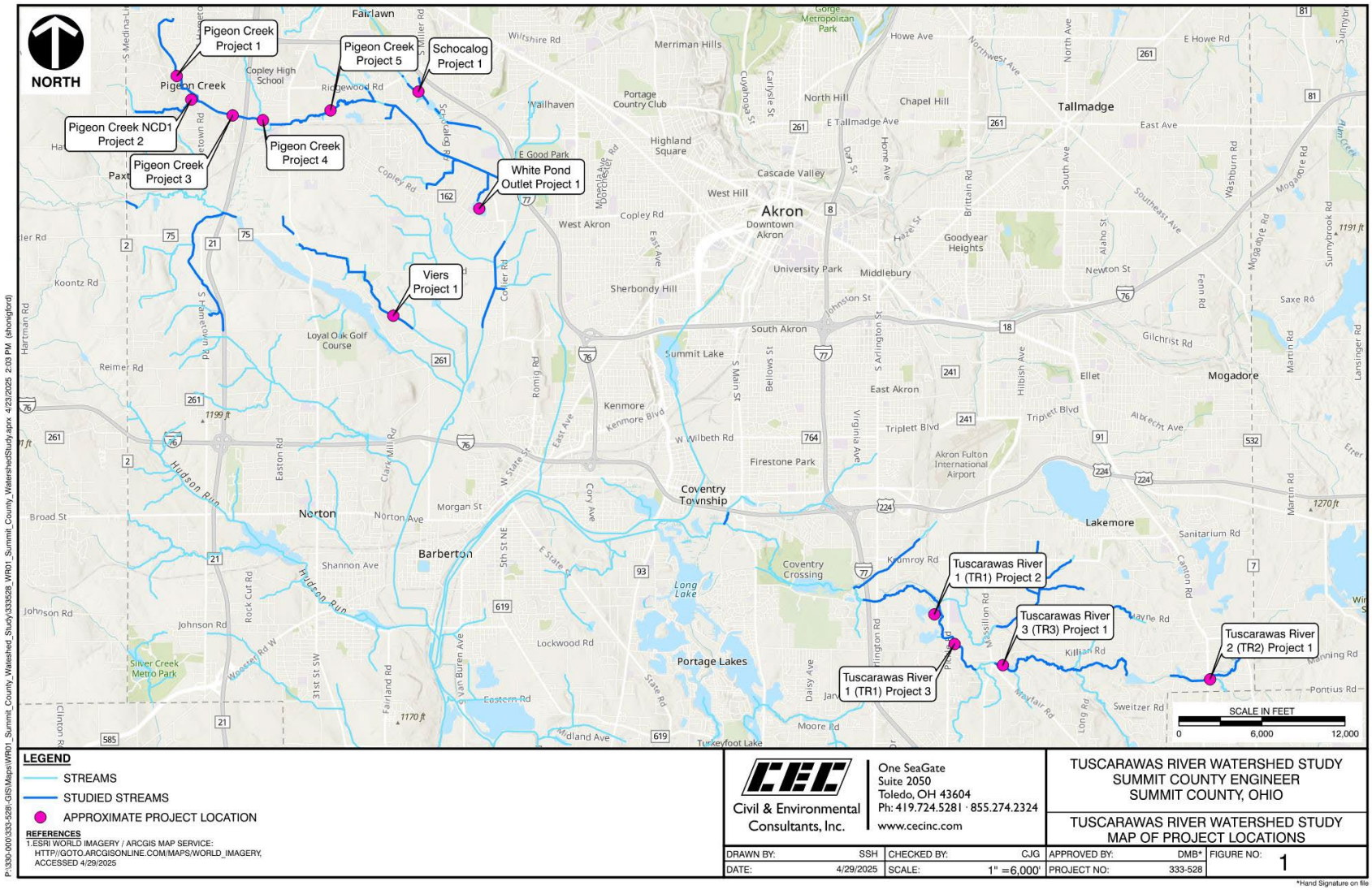

Figure 1. Tuscarawas River Watershed Study Map of Project Locations

ENGINEERING MEMO SUMMARY FOR
PIGEON CREEK PROJECT 1

COPLEY TOWNSHIP, CONESTOGA TRAIL

TUSCARAWAS RIVER WATERSHED STUDY

Prepared for:

SUMMIT COUNTY ENGINEER and
SUMMIT COUNTY SURFACE WATER MANAGEMENT DISTRICT

Prepared by:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
TOLEDO, OH

CEC Project 333-528

APRIL 2025

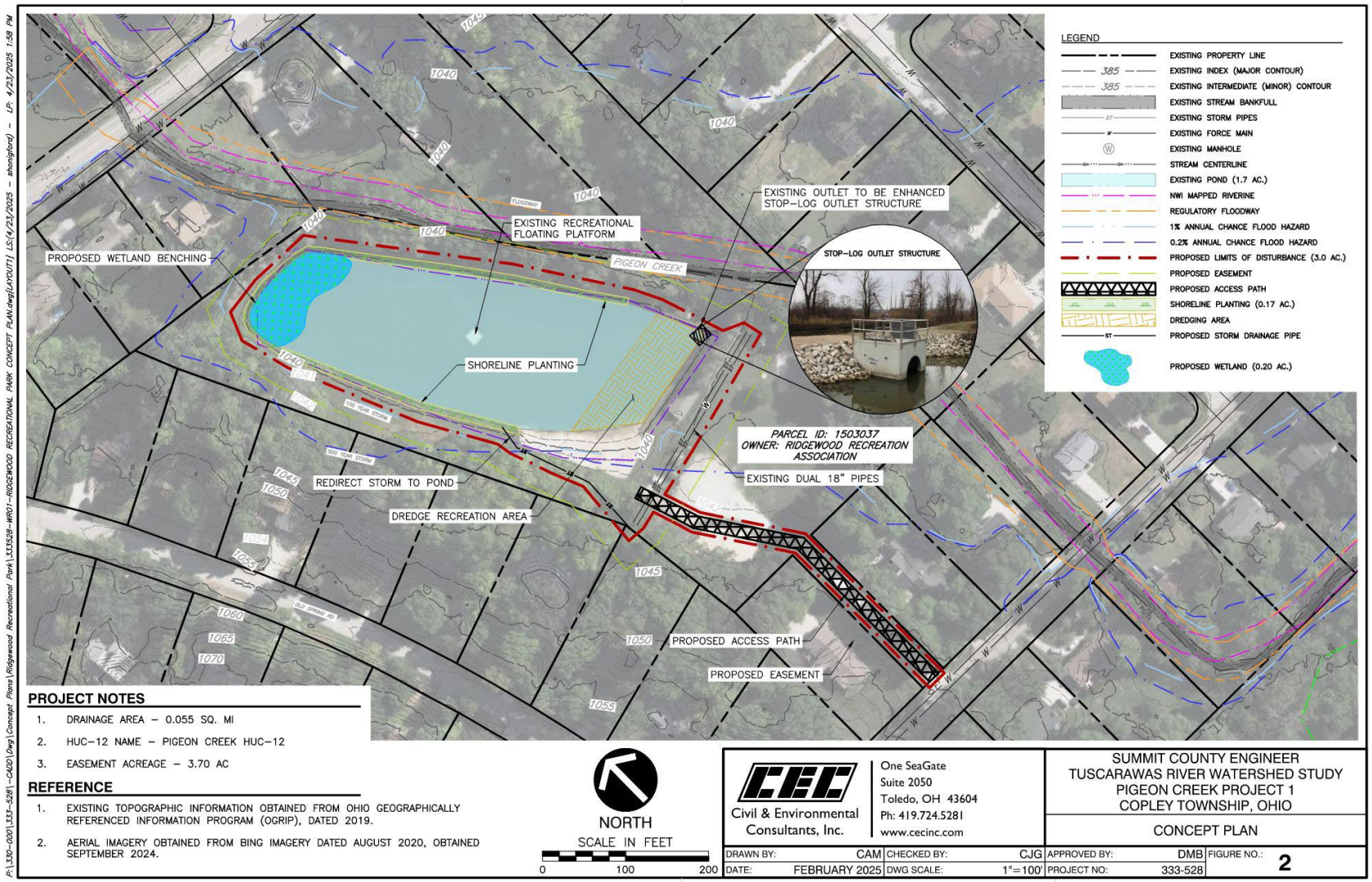

Figure 2. Pigeon Creek Project 1 Concept Plan

SUMMARY NARRATIVE OF PROPOSED PROJECT

The Pigeon Creek Project 1 (Project) includes dredging an estimated 1,055 cubic yards of sediment from the southernmost portion of Bluebird Lake (Lake) to redistribute sediment along the northernmost edge. This redistribution would create an enhanced wetland bench along the northern edge. Approximately 0.30 acres would be planted with native wetland vegetation.

The existing Lake outlet structure would be modified with a stop-log structure that would facilitate additional detention during times of increased seasonal stormwater runoff (fall and spring). One 18-inch pipe from the unnamed tributary would be decommissioned and replaced with an 18-inch pipe that routes directly to the southwestern edge of the Lake, which would reduce stormwater volume runoff and peak flows in Pigeon Creek.

ESTIMATED POLLUTANT LOAD REDUCTION

A Pollutant Load Estimation Tool (PLET) model was developed for the Pigeon Creek HUC-12 (05040001 01 02). Land use acreages were calculated using the National Land Cover Database (2021). Nitrogen and phosphorus loading estimates were calibrated using loading data for the Muskingum River watershed, supplied by the Ohio Environmental Protection Agency (EPA) - Division of Surface Water. All other inputs were held at the default settings.

The best management practice (BMP) modeled for the Project included the Urban (Single Family) BMP for Extended Wet Detention receiving 35 acres of drainage. The proposed Project is estimated to provide the following annual load reductions:

Total nitrogen: 94.5 pounds per year
Total phosphorus: 8.3 pounds per year
Total sediment: 2.2 tons per year

ESTIMATED INCREASE IN STORMWATER CAPACITY

Stormwater capacity calculations were performed with the US Army Corps of Engineers (USACE) HEC-HMS software and the SCS Curve Number Method. Curve numbers were calculated using the US Geological Survey (USGS) National Land Cover Database and the United States Department of Agriculture (USDA)-Natural Resources Conservation Service (NRCS) Web Soil Survey data. The proposed enhancement activities will provide an increased stormwater detention capacity of 1.9 ac-ft.

ENGINEERING MEMO SUMMARY FOR
PIGEON CREEK NCD1 PROJECT 2

COPLEY TOWNSHIP, SPRUCE RUN ROAD

TUSCARAWAS RIVER WATERSHED STUDY

Prepared for:

SUMMIT COUNTY ENGINEER and
SUMMIT COUNTY SURFACE WATER MANAGEMENT DISTRICT

Prepared by:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
TOLEDO, OH

CEC Project 333-528

APRIL 2025

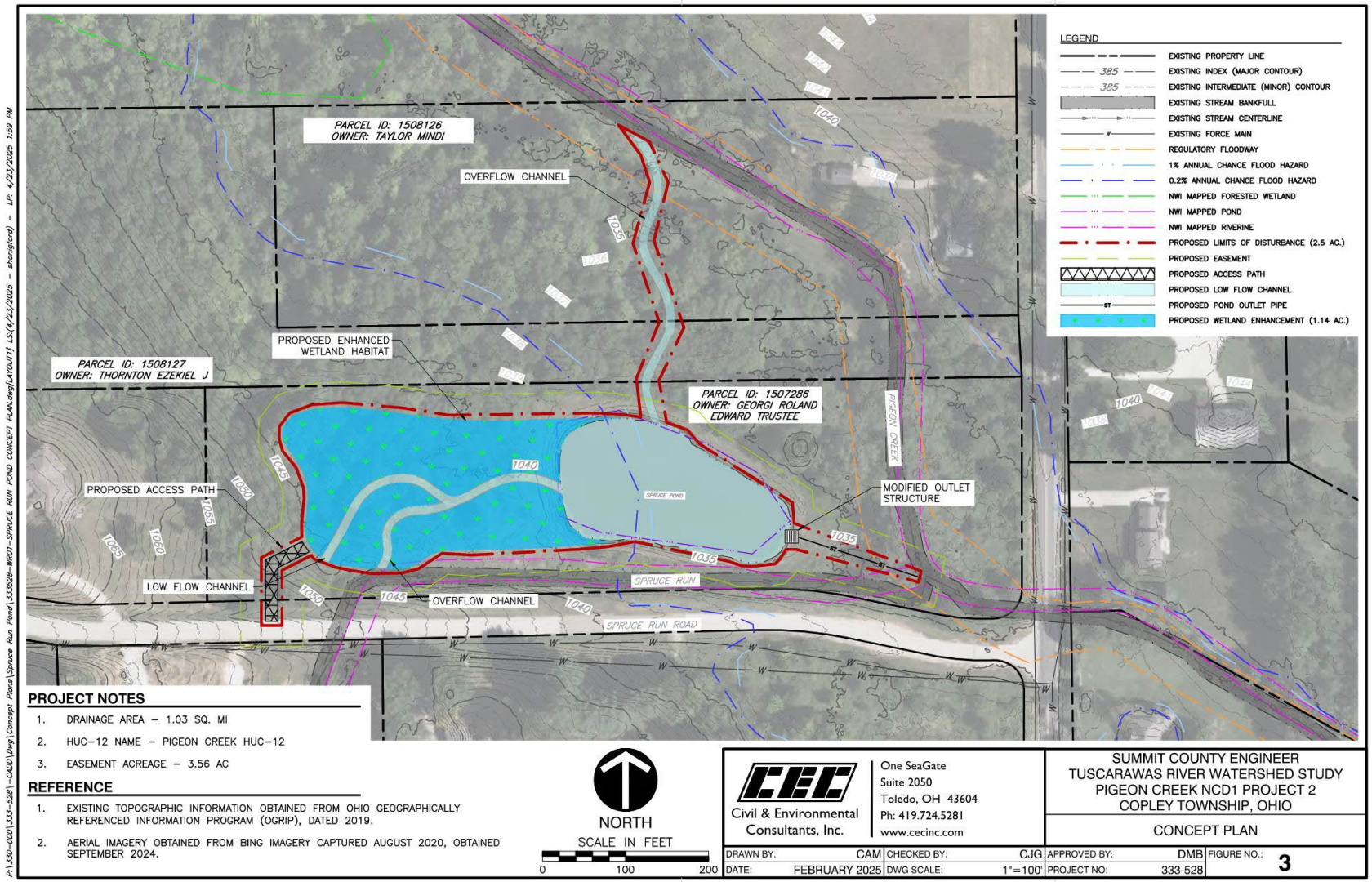

Figure 3. Pigeon Creek NCD1 Project 2 Concept Plan

SUMMARY NARRATIVE OF PROPOSED PROJECT

The Pigeon Creek NCD1 Project 2 (Project) will enhance/restore approximately 1.14 acres of wetlands through depressional grading to create additional stormwater detention to the west of the pond. Stormwater from NCD1 (Spruce Run) will be diverted north to this wetland via a low flow channel. An approximate 360-linear foot overflow channel will divert flows from Pigeon Creek southward to the pond, while an approximate 150-linear foot overflow channel from NCD1 will flow easterly to the pond. The existing outlet structure in the pond will be modified to detain more stormwater during low flow events and up to the 1% Annual Chance Exceedance event.

ESTIMATED POLLUTANT LOAD REDUCTION

A Pollutant Load Estimation Tool (PLET) model was developed for the Pigeon Creek HUC-12 (05040001 01 02). Land use acreages were calculated using the National Land Cover Database (2021). Nitrogen and phosphorus loading estimates were calibrated using loading data for the Muskingum River watershed, supplied by the Ohio Environmental Protection Agency (EPA) - Division of Surface Water. All other inputs were held at the default settings.

The best management practice (BMP) modeled for the Project included the Urban (Single Family) BMP for Wetland Detention receiving 435 acres of drainage from NCD1 consistently from the low flow channel and Extended Wet Detention for 1,043 acres from overflow from Pigeon Creek and NCD1, adjusted for non-continuous engagement. The proposed Project is estimated to provide the following annual load reductions:

Total nitrogen: 455.6 pounds per year
Total phosphorus: 68.2 pounds per year
Total sediment: 24.9 tons per year

ESTIMATED INCREASE IN STORMWATER CAPACITY

Stormwater capacity calculations were performed with the US Army Corps of Engineers (USACE) HEC-HMS software and the SCS Curve Number Method. Curve numbers were calculated using the United States Geological Survey (USGS) National Land Cover Database and the United States Department of Agriculture (USDA)-Natural Resources Conservation Service (NRCS) Web Soil Survey data. The proposed enhancement activities will provide an increased stormwater detention capacity of 5.7 ac-ft.

ENGINEERING MEMO SUMMARY FOR
PIGEON CREEK PROJECT 3

COPLEY TOWNSHIP, ENCELL DRIVE

TUSCARAWAS RIVER WATERSHED STUDY

Prepared for:

SUMMIT COUNTY ENGINEER and
SUMMIT COUNTY SURFACE WATER MANAGEMENT DISTRICT

Prepared by:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
TOLEDO, OH

CEC Project 333-528

APRIL 2025

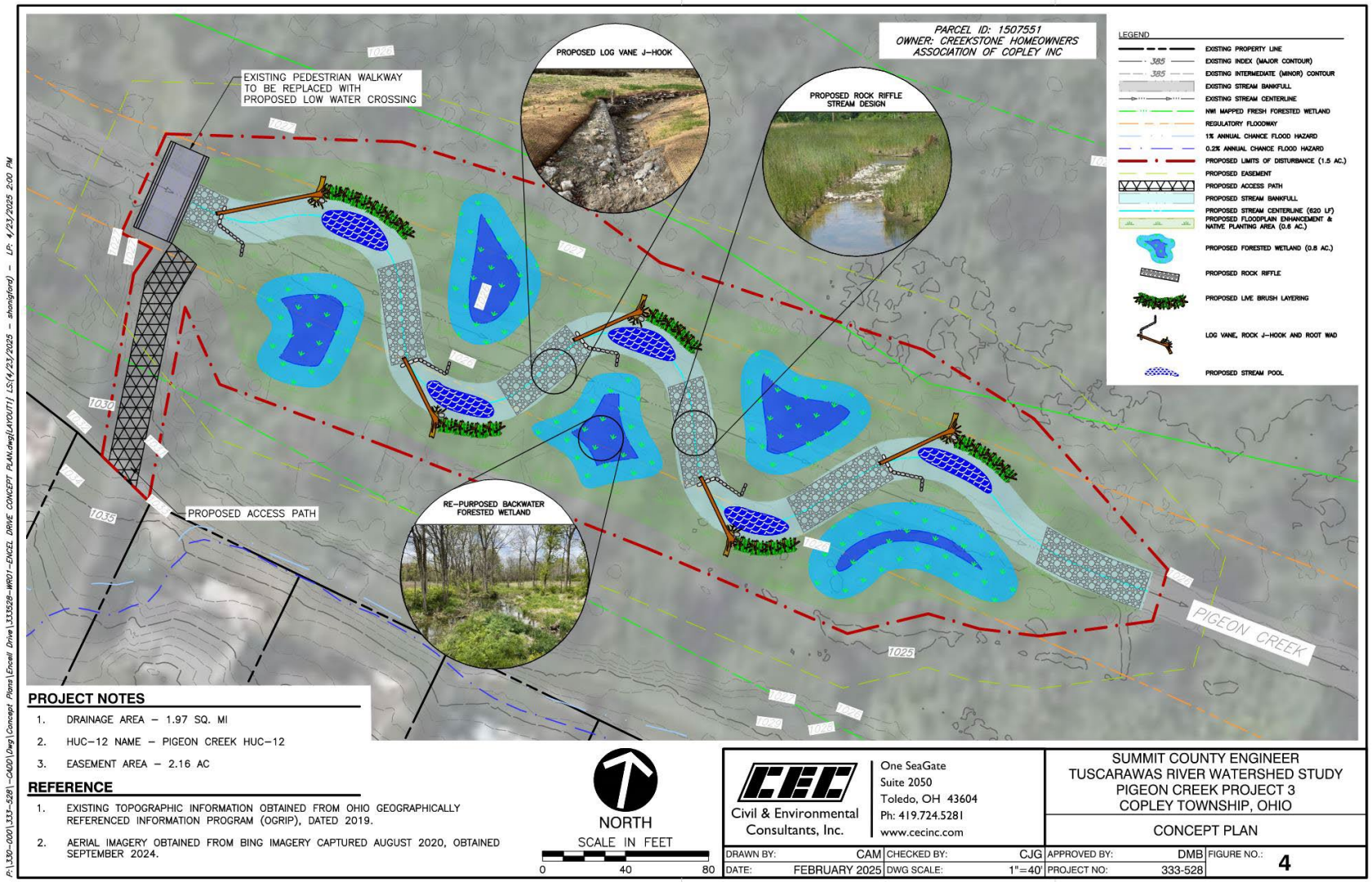

Figure 4. Pigeon Creek Project 3 Concept Plan

SUMMARY NARRATIVE OF PROPOSED PROJECT

The Pigeon Creek Project 3 (Project) aims to improve channelization of Pigeon Creek and restore natural conditions of the stream. Activities include restoring 620 linear feet of Pigeon Creek to improve meander pattern and pool/riffle sequencing and contouring floodplain benching with wetland restoration (0.8 acres) to provide additional floodplain storage. Additionally, the existing pedestrian crossing and failing corrugated metal pipe (CMP) culvert would be removed and replaced with a low flow crossing. Log-vane structures in Pigeon Creek would be installed to improve the stability of the restored channel and redirect shear stress off the banks of this section.

ESTIMATED POLLUTANT LOAD REDUCTION

A Pollutant Load Estimation Tool (PLET) model was developed for the Pigeon Creek HUC-12 (05040001 01 02). Land use acreages were calculated using the National Land Cover Database (2021). Nitrogen and phosphorus loading estimates were calibrated using loading data for the Muskingum River watershed, supplied by the Ohio Environmental Protection Agency (EPA) - Division of Surface Water. All other inputs were held at the default settings.

The best management practice (BMP) modeled for the Project included Streambank Restoration/Stabilization for 1,240 linear feet, accounting for both banks, with Wetland Detention, adjusted for pulsed engagement with the floodplain. The proposed Project is estimated to provide the following annual load reductions:

Total nitrogen: 204.6 pounds per year
Total phosphorus: 30.4 pounds per year
Total sediment: 67.7 tons per year

ESTIMATED INCREASE IN STORMWATER CAPACITY

Stormwater capacity calculations were performed with the US Army Corps of Engineers (USACE) HEC-HMS software and the SCS Curve Number Method. Curve numbers were calculated using the United States Geological Survey (USGS) National Land Cover Database and the United States Department of Agriculture (USDA)-Natural Resources Conservation Service (NRCS) Web Soil Survey data. The proposed enhancement activities will provide an increased stormwater detention capacity of 2.1 ac-ft.

ENGINEERING MEMO SUMMARY FOR
PIGEON CREEK PROJECT 4

COPLEY TOWNSHIP, COPLEY ROAD/STATE ROUTE 21

TUSCARAWAS RIVER WATERSHED STUDY

Prepared for:

SUMMIT COUNTY ENGINEER and
SUMMIT COUNTY SURFACE WATER MANAGEMENT DISTRICT

Prepared by:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
TOLEDO, OH

CEC Project 333-528

APRIL 2025

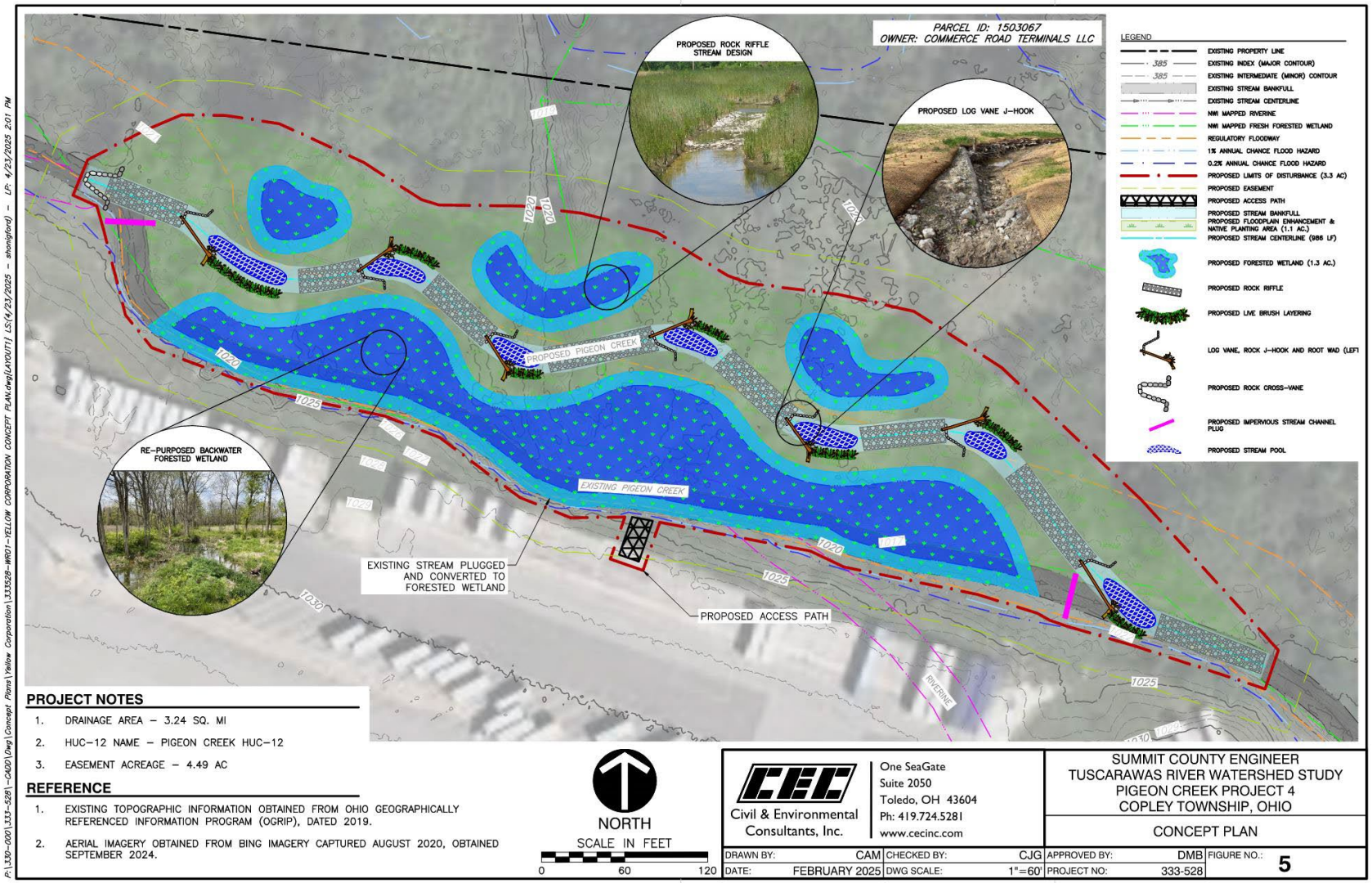

Figure 5. Pigeon Creek Project 4 Concept Plan

SUMMARY NARRATIVE OF PROPOSED PROJECT

The Pigeon Creek Project 4 (Project) aims to improve habitat conditions and restore natural channel form and functionality in a highly channelized segment of Pigeon Creek. Activities include relocating 990 linear feet of Pigeon Creek toward the north and away from the embankment which abuts the distribution facility to the south. The relocation will allow channel realignment and improve meander pattern and pool/riffle sequencing. Floodplain contouring and microdepressional grading will restore approximately 1.3 acres of the floodplain. The installation of boulder vane and log-vane structures will redirect flow toward the centerline of the stream and live brush layering will be used to not only improve stability of the restored channel, but also improve habitat.

ESTIMATED POLLUTANT LOAD REDUCTION

A Pollutant Load Estimation Tool (PLET) model was developed for the Pigeon Creek HUC-12 (05040001 01 02). Land use acreages were calculated using the National Land Cover Database (2021). Nitrogen and phosphorus loading estimates were calibrated using loading data for the Muskingum River watershed, supplied by the Ohio Environmental Protection Agency (EPA) - Division of Surface Water. All other inputs were held at the default settings.

The best management practice (BMP) modeled for the Project included Streambank Restoration/Stabilization for 1,970 linear feet, accounting for both banks, with Wetland Detention, adjusted for pulsed engagement with the floodplain. The proposed Project is estimated to provide the following annual load reductions:

Total nitrogen: 502.3 pounds per year
Total phosphorus: 73.8 pounds per year
Total sediment: 162.4 tons per year

ESTIMATED INCREASE IN STORMWATER CAPACITY

Stormwater capacity calculations were performed with the US Army Corps of Engineers (USACE) HEC-HMS software and the SCS Curve Number Method. Curve numbers were calculated using the United States Geological Survey (USGS) National Land Cover Database and the United States Department of Agriculture (USDA)-Natural Resources Conservation Service (NRCS) Web Soil Survey data. The proposed enhancement activities will provide an increased stormwater detention capacity of 7.2 ac-ft.

ENGINEERING MEMO SUMMARY FOR
PIGEON CREEK PROJECT 5

COPLEY TOWNSHIP, SAWMILL ROAD

TUSCARAWAS RIVER WATERSHED STUDY

Prepared for:

SUMMIT COUNTY ENGINEER and
SUMMIT COUNTY SURFACE WATER MANAGEMENT DISTRICT

Prepared by:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
TOLEDO, OH

CEC Project 333-528

APRIL 2025

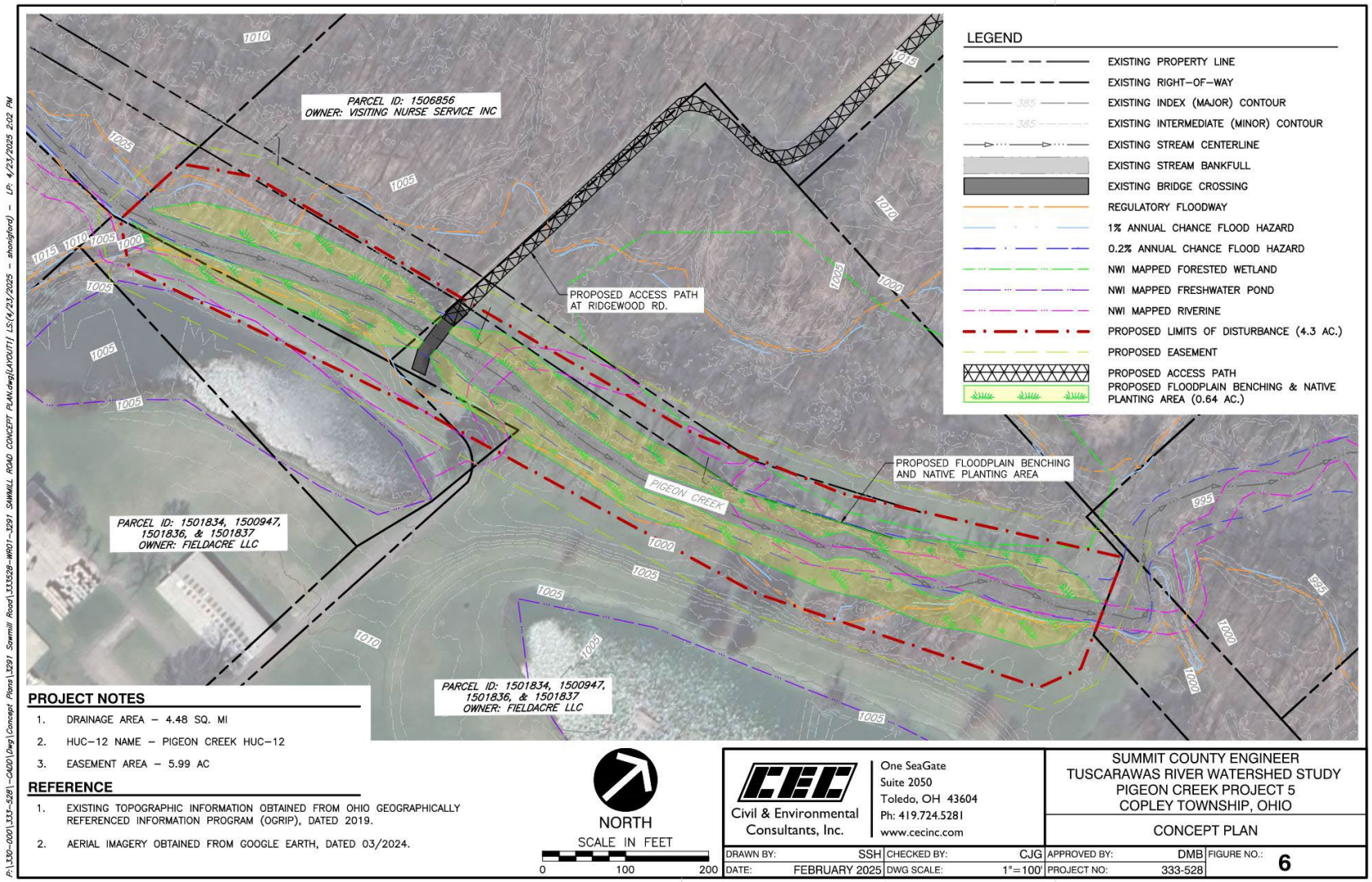

Figure 6. Pigeon Creek Project 5 Concept Plan

SUMMARY NARRATIVE OF PROPOSED PROJECT

The Pigeon Creek Project 5 (Project) activities will include the grading of floodplain benching along the left and right descending banks for 515 linear feet of Pigeon Creek. The floodplain benching will create additional floodplain engagement and capacity during low flow events. Approximately 0.64 acres of native vegetation will be planted at the bankfull depth to improve bank stability and provide in-stream habitat.

ESTIMATED POLLUTANT LOAD REDUCTION

A Pollutant Load Estimation Tool (PLET) model was developed for the Pigeon Creek HUC-12 (05040001 01 02). Land use acreages were calculated using the National Land Cover Database (2021). Nitrogen and phosphorus loading estimates were calibrated using loading data for the Muskingum River watershed, supplied by the Ohio Environmental Protection Agency (EPA) - Division of Surface Water. All other inputs were held at the default settings.

The best management practice (BMP) modeled for the Project included Streambank Restoration/Stabilization for 1,030 linear feet, accounting for both banks, with Wetland Detention/Floodplain Benching, adjusted for pulsed engagement with the floodplain. The proposed Project is estimated to provide the following annual load reductions:

Total nitrogen: 91.0 pounds per year
Total phosphorus: 8.3 pounds per year
Total sediment: 3.5 tons per year

ESTIMATED INCREASE IN STORMWATER CAPACITY

Stormwater capacity calculations were performed with the US Army Corps of Engineers (USACE) HEC-HMS software and the SCS Curve Number Method. Curve numbers were calculated using the United States Geological Survey (USGS) National Land Cover Database and the United States Department of Agriculture (USDA)-Natural Resources Conservation Service (NRCS) Web Soil Survey data. The proposed enhancement activities will provide an increased stormwater detention capacity of 4.9 ac-ft.

ENGINEERING MEMO SUMMARY FOR SCHOCALOG PROJECT 1

COPLEY TOWNSHIP, RIDGEWOOD ROAD

TUSCARAWAS RIVER WATERSHED STUDY

Prepared for:

SUMMIT COUNTY ENGINEER and
SUMMIT COUNTY SURFACE WATER MANAGEMENT DISTRICT

Prepared by:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
TOLEDO, OH

CEC Project 333-528

APRIL 2025

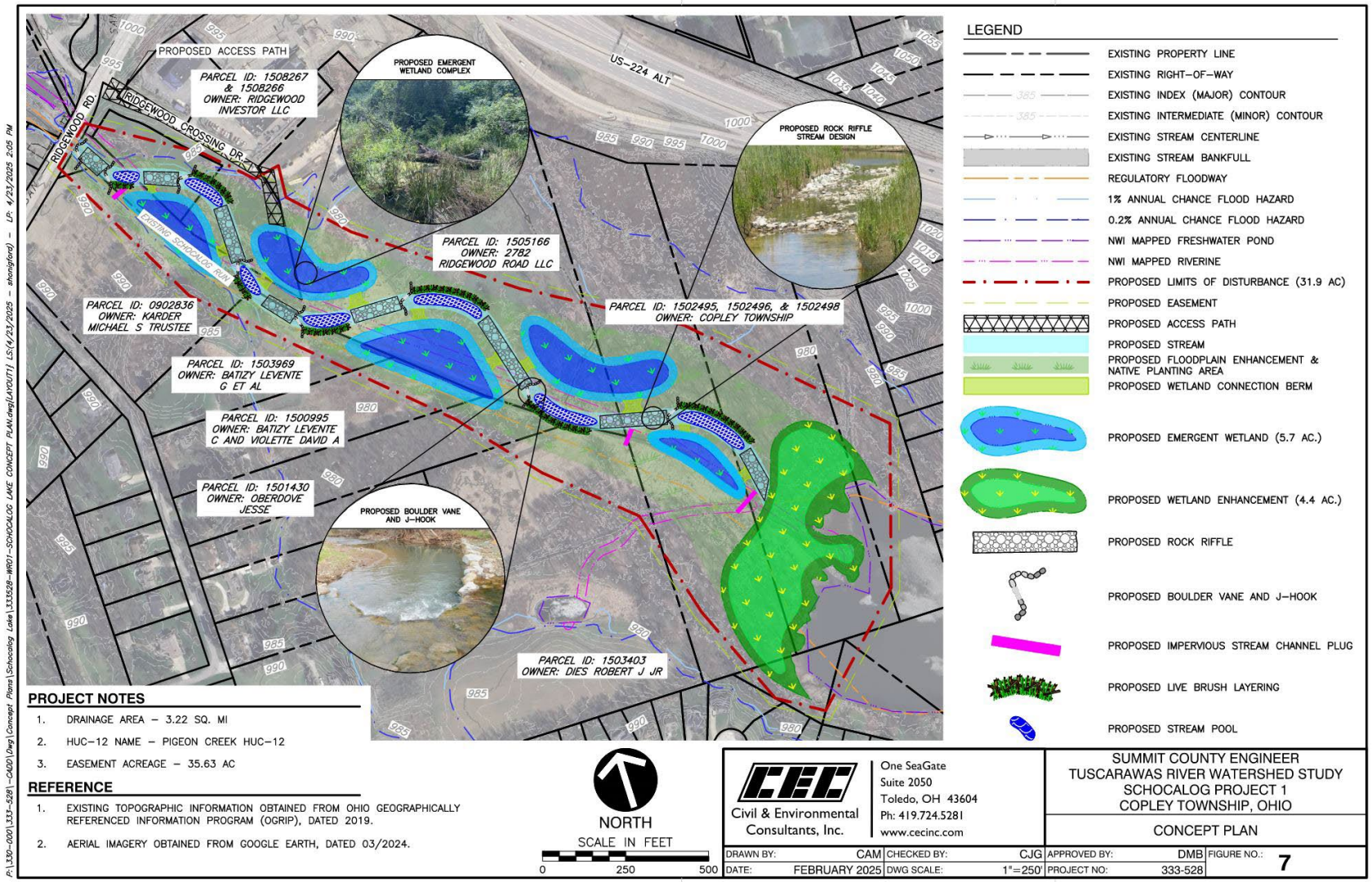

Figure 7. Schocalog Project 1 Concept Plan

SUMMARY NARRATIVE OF PROPOSED PROJECT

The Schocalog Project 1 (Project) will implement restoration on the stretch of Schocalog Run between Ridgewood Road to Schocalog Lake. The Project includes realignment of 2,650 linear feet of Schocalog Run to improve meander pattern and pool/riffle sequencing with natural channel design techniques. Boulder vane structures, boulder J-hooks, constructed rock riffles, toewood and live brush layering are proposed for channel form, bank stabilization and in-stream habitat. Approximately 5.7 acres of floodplain wetlands along Schocalog Run will be enhanced to provide floodplain storage, as well as 4.4 acres of existing wetlands at the inlet of Schocalog Run as it flows into Schocalog Lake.

ESTIMATED POLLUTANT LOAD REDUCTION

A Pollutant Load Estimation Tool (PLET) model was developed for the Pigeon Creek HUC-12 (05040001 01 02). Land use acreages were calculated using the National Land Cover Database (2021). Nitrogen and phosphorus loading estimates were calibrated using loading data for the Muskingum River watershed, supplied by the Ohio EPA - Division of Surface Water. All other inputs were held at the default settings.

The best management practice (BMP) modeled for the Project included Streambank Restoration/Stabilization for 5,300 linear feet, accounting for both banks, with Wetland Detention, adjusted for pulsed engagement with the floodplain. The proposed Project is estimated to provide the following annual load reductions:

Total nitrogen: 866.5 pounds per year
Total phosphorus: 125.5 pounds per year
Total sediment: 288.3 tons per year

ESTIMATED INCREASE IN STORMWATER CAPACITY

Stormwater capacity calculations were performed with the US Army Corps of Engineers (USACE) HEC-HMS software and the SCS Curve Number Method. Curve numbers were calculated using the United States Geological Survey (USGS) National Land Cover Database and the United States Department of Agriculture (USDA)-Natural Resources Conservation Service (NRCS) Web Soil Survey data. The proposed enhancement activities will provide an increased stormwater detention capacity of 58.9 ac-ft.

ENGINEERING MEMO SUMMARY FOR TUSCARAWAS RIVER 1 (TR1) PROJECT 2

SPRINGFIELD TOWNSHIP, PICKLE ROAD

TUSCARAWAS RIVER WATERSHED STUDY

Prepared for:

SUMMIT COUNTY ENGINEER and
SUMMIT COUNTY SURFACE WATER MANAGEMENT DISTRICT

Prepared by:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
TOLEDO, OH

CEC Project 333-528

APRIL 2025

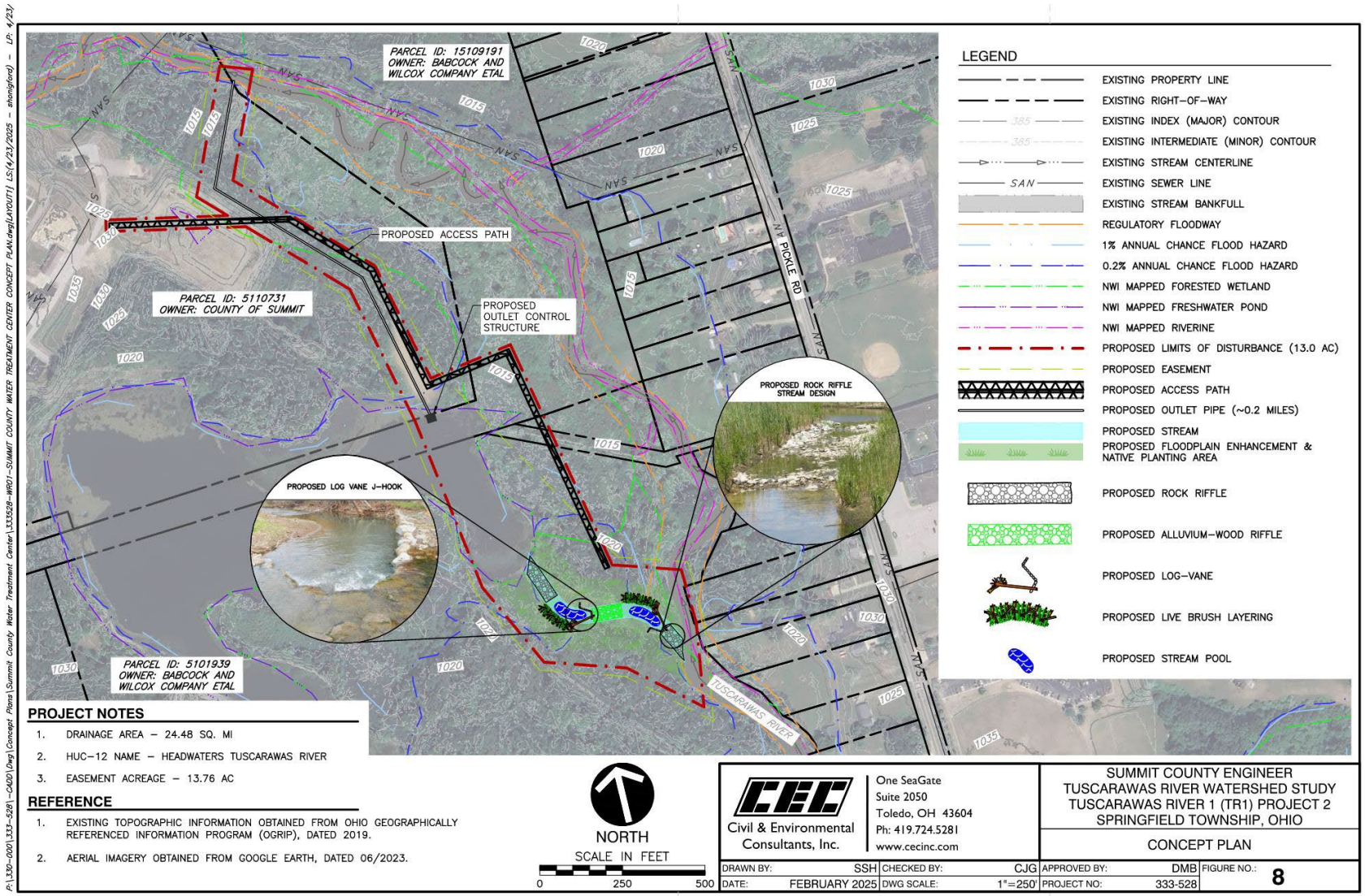

Figure 8. Tuscarawas River 1 (TR1) Project 2 Concept Plan

SUMMARY NARRATIVE OF PROPOSED PROJECT

The proposed Tuscarawas River 1 Project 2 (Project) includes the creation of a 590-linear foot overflow channel that diverts flow from the Tuscarawas River to the St. Lake Shore 2 (Lake). An outlet control structure will be installed along the northern perimeter of the Lake and connected to a storm sewer pipe to discharge water back into the Tuscarawas River at a reduced flow rate. This reduces the amount of peak flow throughout the Tuscarawas channel, reducing the "flashiness" of the stream and erosive shear stress caused by larger flow events. The storm sewer pipe is proposed to be installed along existing pathways to minimize tree cutting. No earthwork modifications to the Lake are proposed as there is approximately two feet of freeboard from the normal pool of the Lake to the top of its banks.

ESTIMATED POLLUTANT LOAD REDUCTION

A Pollutant Load Estimation Tool (PLET) model was developed for the Headwaters Tuscarawas River HUC-12 (05040001 01 01). Land use acreages were calculated using the National Land Cover Database (2021). Nitrogen and phosphorus loading estimates were calibrated using loading data for the Muskingum River watershed, supplied by the Ohio EPA - Division of Surface Water. All other inputs were held at the default settings.

The best management practice (BMP) modeled for the Project included Wet Pond Detention, adjusted for pulsed engagement with the floodplain. The proposed Project is estimated to provide the following annual load reductions:

Total nitrogen: 819.6 pounds per year
Total phosphorus: 38.5 pounds per year
Total sediment: 12.7 tons per year

ESTIMATED INCREASE IN STORMWATER CAPACITY

Stormwater capacity calculations were performed with the US Army Corps of Engineers (USACE) HEC-HMS software and the SCS Curve Number Method. Curve numbers were calculated using the United States Geological Survey (USGS) National Land Cover Database and the United States Department of Agriculture (USDA)-Natural Resources Conservation Service (NRCS) Web Soil Survey data. The proposed enhancement activities will provide an increased stormwater detention capacity of 11.3 ac-ft.

ENGINEERING MEMO SUMMARY FOR TUSCARAWAS RIVER 1 (TR1) PROJECT 3

SPRINGFIELD TOWNSHIP, PICKLE ROAD

TUSCARAWAS RIVER WATERSHED STUDY

Prepared for:

SUMMIT COUNTY ENGINEER and
SUMMIT COUNTY SURFACE WATER MANAGEMENT DISTRICT

Prepared by:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
TOLEDO, OH

CEC Project 333-528

APRIL 2025

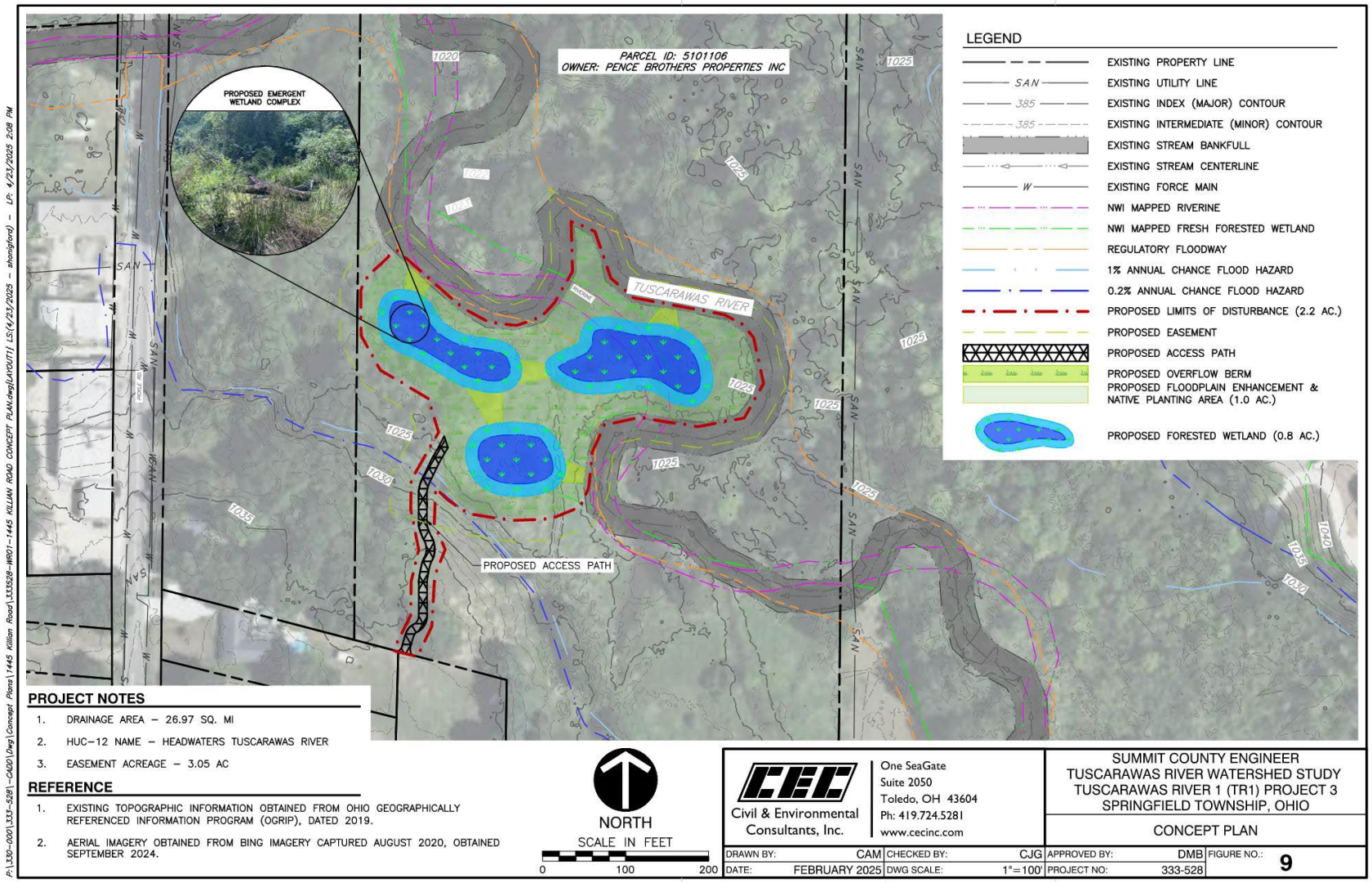

Figure 9. Tuscarawas River 1 (TR1) Project 3 Concept Plan

SUMMARY NARRATIVE OF PROPOSED PROJECT

The Tuscarawas River 1 (TR1) Project 3 (Project) activities include the restoration of approximately 0.8 acres of an emergent wetland complex along the left descending bank of the Tuscarawas River. Several overflow banks will be constructed at the bankfull depth elevation to facilitate floodplain storage in an area that is currently inaccessible.

ESTIMATED POLLUTANT LOAD REDUCTION

A Pollutant Load Estimation Tool (PLET) model was developed for the Headwaters Tuscarawas River HUC-12 (05040001 01 01). Land use acreages were calculated using the National Land Cover Database (2021). Nitrogen and phosphorus loading estimates were calibrated using loading data for the Muskingum River watershed, supplied by the Ohio Environmental Protection Agency (EPA) - Division of Surface Water. All other inputs were held at the default settings.

The best management practice (BMP) modeled for the Project included Wetland Detention, adjusted for pulsed engagement with the floodplain. The proposed Project is estimated to provide the following annual load reductions:

Total nitrogen: 234.7 pounds per year
Total phosphorus: 34.3 pounds per year
Total sediment: 10.0 tons per year

ESTIMATED INCREASE IN STORMWATER CAPACITY

Stormwater capacity calculations were performed with the US Army Corps of Engineers (USACE) HEC-HMS software and the SCS Curve Number Method. Curve numbers were calculated using the United States Geological Survey (USGS) National Land Cover Database and the United States Department of Agriculture (USDA)-Natural Resources Conservation Service (NRCS) Web Soil Survey data. The proposed enhancement activities will provide an increased stormwater detention capacity of 5.5 ac-ft.

ENGINEERING MEMO SUMMARY FOR TUSCARAWAS RIVER 2 (TR2) PROJECT 1

SPRINGFIELD TOWNSHIP, S. CANTON ROAD

TUSCARAWAS RIVER WATERSHED STUDY

Prepared for:

SUMMIT COUNTY ENGINEER and
SUMMIT COUNTY SURFACE WATER MANAGEMENT DISTRICT

Prepared by:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
TOLEDO, OH

CEC Project 333-528

APRIL 2025

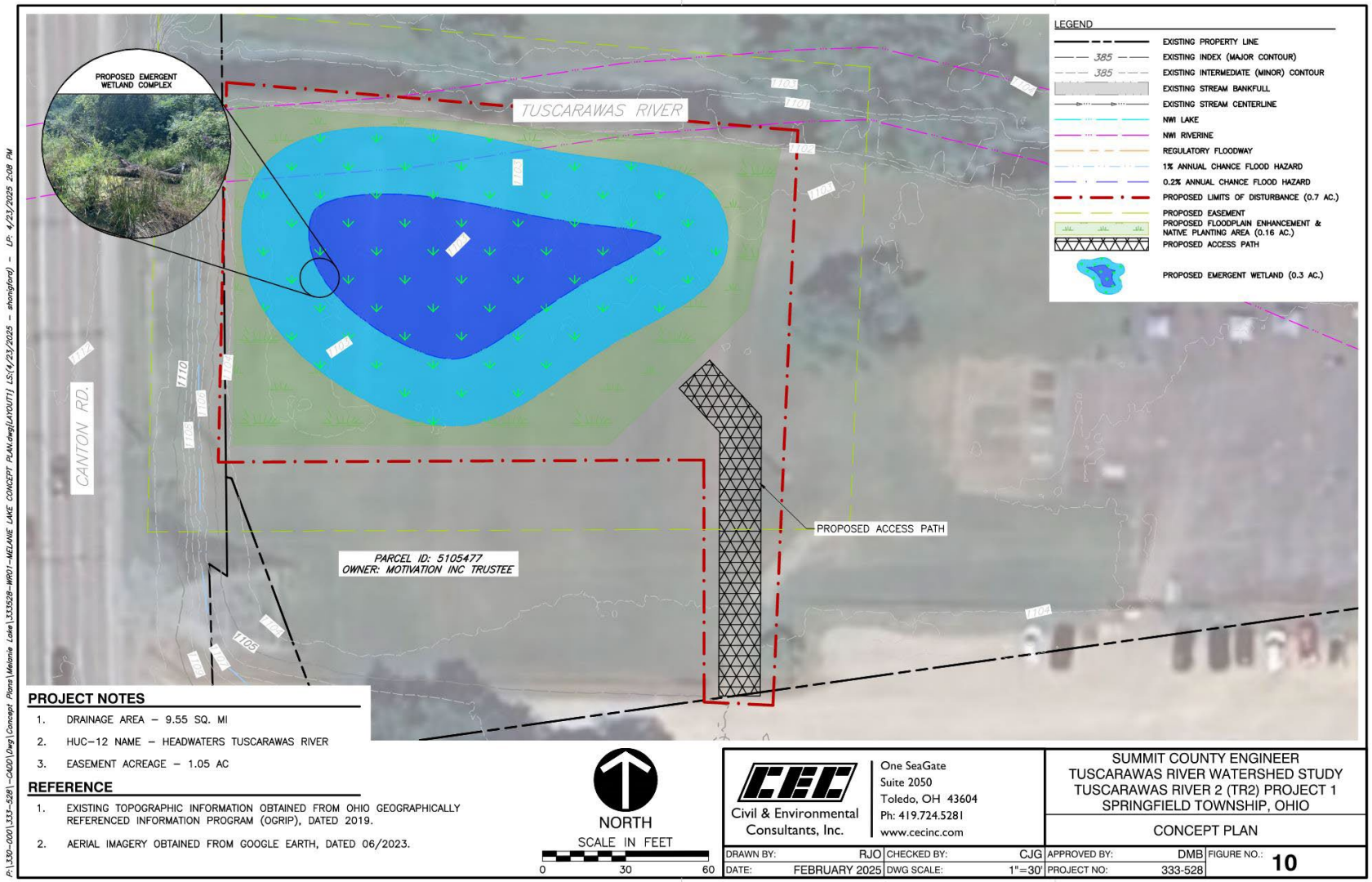

Figure 10. Tuscarawas River 2 (TR2) Project 1 Concept Plan

SUMMARY NARRATIVE OF PROPOSED PROJECT

The proposed Tuscarawas River 2 (TR2) Project 1 (Project) includes conversion of 0.3 acres of mowed lawn to emergent wetland. Recontouring along the floodplain will promote re-engagement of the Tuscarawas River with the floodplain and facilitate capture of floodwaters in the wetland. Microdepressional areas within the wetland will provide additional storage capacity and create diversity in habitat across the wetland footprint.

ESTIMATED POLLUTANT LOAD REDUCTION

A Pollutant Load Estimation Tool (PLET) model was developed for the Headwaters Tuscarawas River HUC-12 (05040001 01 01). Land use acreages were calculated using the National Land Cover Database (2021). Nitrogen and phosphorus loading estimates were calibrated using loading data for the Muskingum River watershed, supplied by the Ohio Environmental Protection Agency (EPA) - Division of Surface Water. All other inputs were held at the default settings.

The best management practice (BMP) modeled for the Project included Wetland Detention, adjusted for pulsed engagement with the floodplain. The proposed Project is estimated to provide the following annual load reductions:

Total nitrogen: 407.0 pounds per year
Total phosphorus: 47.4 pounds per year
Total sediment: 16.0 tons per year

ESTIMATED INCREASE IN STORMWATER CAPACITY

Stormwater capacity calculations were performed with the US Army Corps of Engineers (USACE) HEC-HMS software and the SCS Curve Number Method. Curve numbers were calculated using the United States Geological Survey (USGS) National Land Cover Database and the United States Department of Agriculture (USDA)-Natural Resources Conservation Service (NRCS) Web Soil Survey data. The proposed enhancement activities will provide an increased stormwater detention capacity of 1.9 ac-ft.

ENGINEERING MEMO SUMMARY FOR TUSCARAWAS RIVER 3 (TR3) PROJECT 1

SPRINGFIELD TOWNSHIP, MAYFAIR ROAD

TUSCARAWAS RIVER WATERSHED STUDY

Prepared for:

SUMMIT COUNTY ENGINEER and
SUMMIT COUNTY SURFACE WATER MANAGEMENT DISTRICT

Prepared by:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
TOLEDO, OH

CEC Project 333-528

APRIL 2025

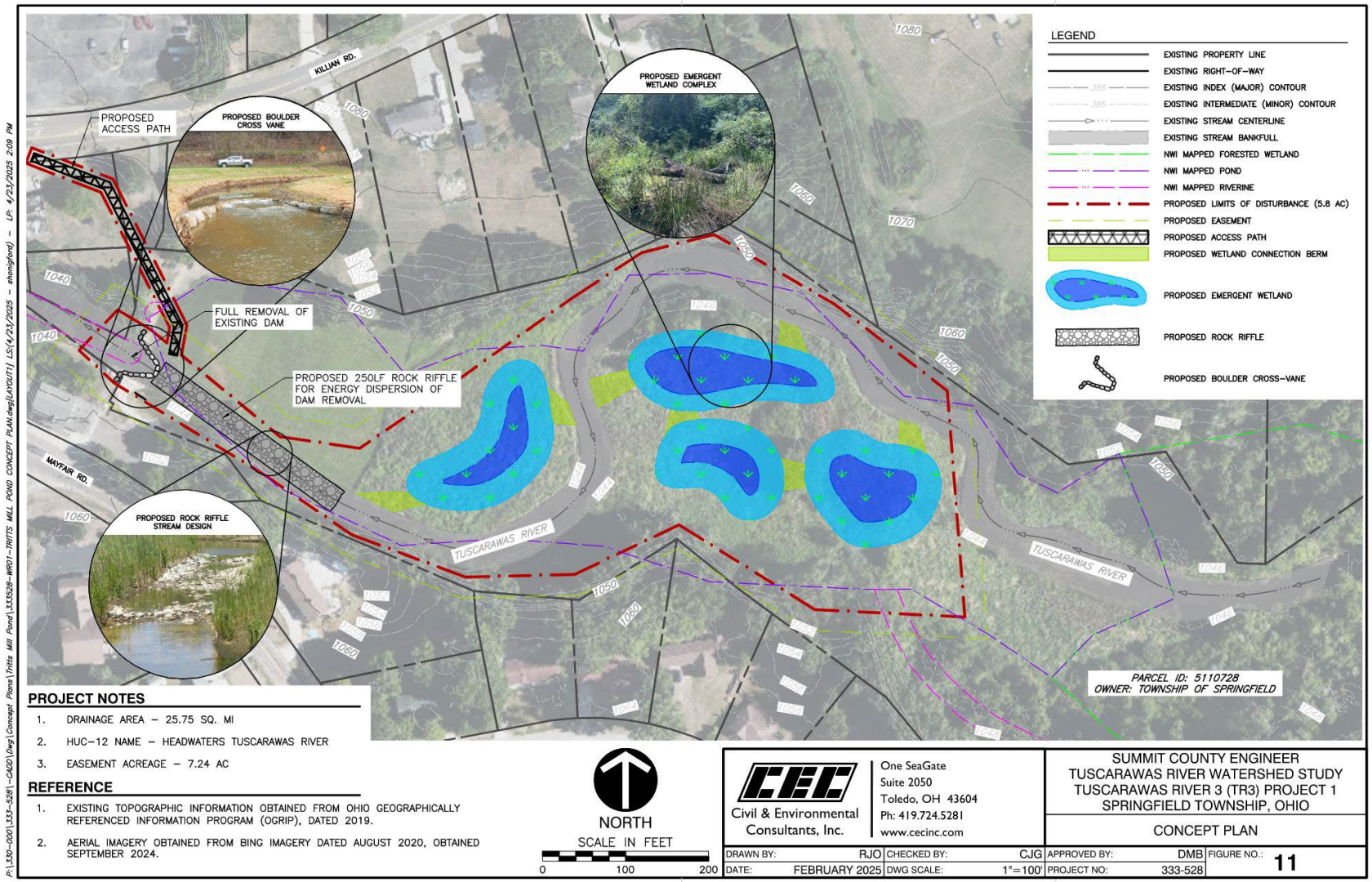

Figure 11. Tuscarawas River 3 (TR3) Project 1 Concept Plan

SUMMARY NARRATIVE OF PROPOSED PROJECT

The proposed Tuscarawas River 3 (TR3) Project 1 (Project) includes the removal of the remaining remnants of the dam at Tritts Mill Pond that was partially removed in 2010. A rock riffle will be installed to reconnect habitat upstream and downstream of the dam. A 2.3-acre emergent wetland complex will be created through the installation of several overflow berms set at bankfull, which would provide additional stormwater detention during high precipitation and flow events.

ESTIMATED POLLUTANT LOAD REDUCTION

A Pollutant Load Estimation Tool (PLET) model was developed for the Headwaters Tuscarawas River HUC-12 (05040001 01 01). Land use acreages were calculated using the National Land Cover Database (2021). Nitrogen and phosphorus loading estimates were calibrated using loading data for the Muskingum River watershed, supplied by the Ohio EPA - Division of Surface Water. All other inputs were held at the default settings.

The best management practice (BMP) modeled for the Project included Wetland Detention, adjusted for pulsed engagement with the floodplain. The proposed Project is estimated to provide the following annual load reductions:

Total nitrogen: 223.9 pounds per year
Total phosphorus: 32.7 pounds per year
Total sediment: 9.5 tons per year

ESTIMATED INCREASE IN STORMWATER CAPACITY

Stormwater capacity calculations were performed with the US Army Corps of Engineers (USACE) HEC-HMS software and the SCS Curve Number Method. Curve numbers were calculated using the United States Geological Survey (USGS) National Land Cover Database and the United States Department of Agriculture (USDA)-Natural Resources Conservation Service (NRCS) Web Soil Survey data. The proposed enhancement activities will provide an increased stormwater detention capacity of 3.4 ac-ft.

ENGINEERING MEMO SUMMARY FOR
VIERS PROJECT 1

COPLEY TOWNSHIP, SUMMIT ROAD

TUSCARAWAS RIVER WATERSHED STUDY

Prepared for:

SUMMIT COUNTY ENGINEER and
SUMMIT COUNTY SURFACE WATER MANAGEMENT DISTRICT

Prepared by:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
TOLEDO, OH

CEC Project 333-528

APRIL 2025

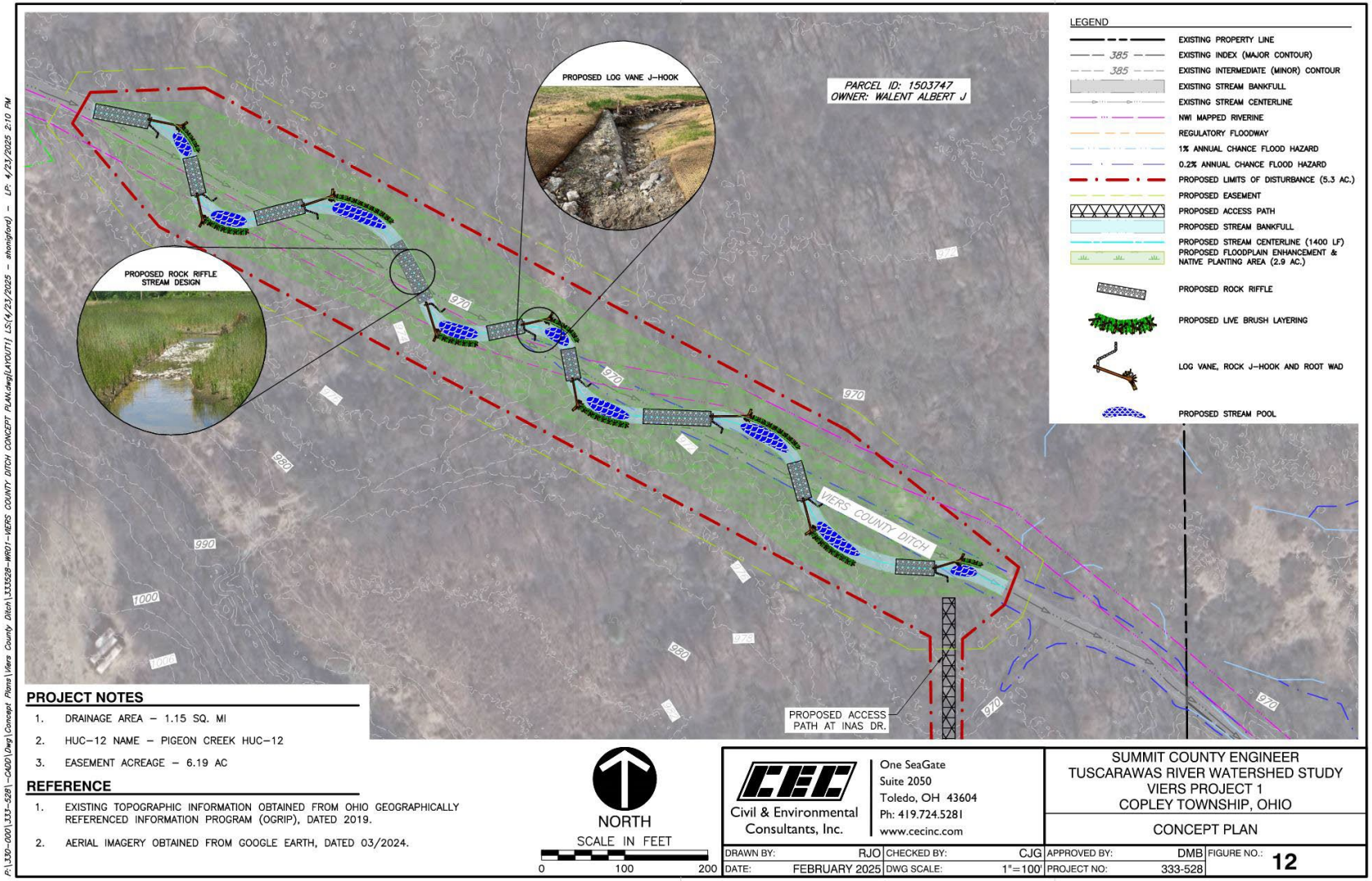

Figure 12. Viers Project 1 Concept Plan

SUMMARY NARRATIVE OF PROPOSED PROJECT

The proposed Viers Project 1 (Project) includes restoration of 1,400 linear feet of Viers Ditch. Restoration activities would include contouring 2.9 acres of a floodplain bench that is set at the bankfull elevation to provide access to additional floodplain storage volume during low flow storm events. Log vane structures and rock riffles would provide grade control and habitat heterogeneity in-stream, while live brush layering and native vegetation along the banks would provide channel and bank stability.

ESTIMATED POLLUTANT LOAD REDUCTION

A Pollutant Load Estimation Tool (PLET) model was developed for the Pigeon Creek HUC-12 (05040001 01 02). Land use acreages were calculated using the National Land Cover Database (2021). Nitrogen and phosphorus loading estimates were calibrated using loading data for the Muskingum River watershed, supplied by the Ohio Environmental Protection Agency (EPA) - Division of Surface Water. All other inputs were held at the default settings.

The best management practice (BMP) modeled for the Project included Streambank Restoration/Stabilization for 2,800 linear feet, accounting for both banks, with Wetland Detention, adjusted for pulsed engagement with the floodplain. The proposed Project is estimated to provide the following annual load reductions:

Total nitrogen: 113.0 pounds per year
Total phosphorus: 16.8 pounds per year
Total sediment: 37.3 tons per year

ESTIMATED INCREASE IN STORMWATER CAPACITY

Stormwater capacity calculations were performed with the US Army Corps of Engineers (USACE) HEC-HMS software and the SCS Curve Number Method. Curve numbers were calculated using the United States Geological Survey (USGS) National Land Cover Database and the United States Department of Agriculture (USDA)-Natural Resources Conservation Service (NRCS) Web Soil Survey data. The proposed enhancement activities will provide an increased stormwater detention capacity of 3.3 ac-ft.

ENGINEERING MEMO SUMMARY FOR WHITE POND OUTLET PROJECT 1

COPLEY TOWNSHIP, COPLEY ROAD

TUSCARAWAS RIVER WATERSHED STUDY

Prepared for:

SUMMIT COUNTY ENGINEER and
SUMMIT COUNTY SURFACE WATER MANAGEMENT DISTRICT

Prepared by:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
TOLEDO, OH

CEC Project 333-528

APRIL 2025

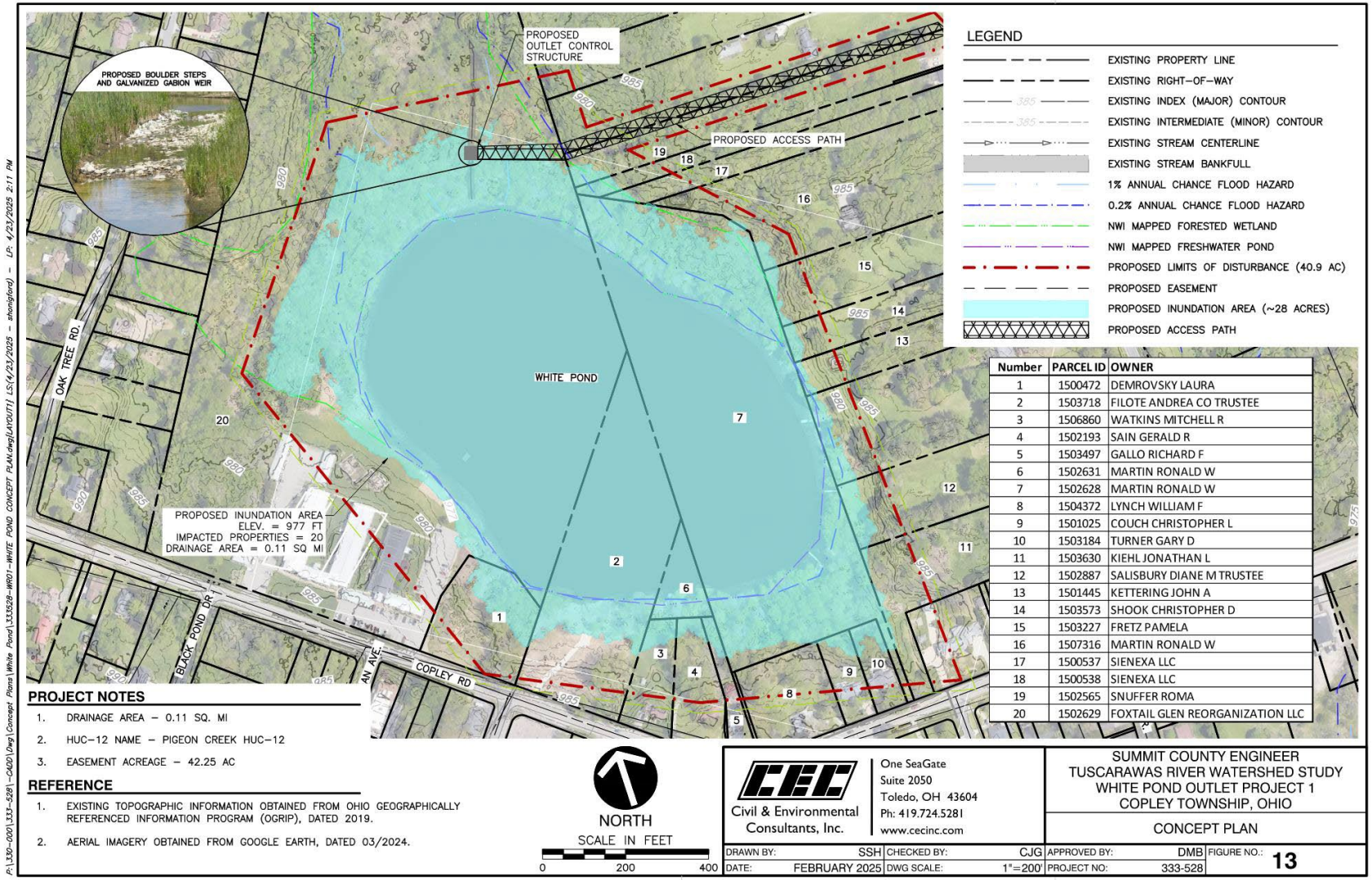

Figure 13. White Pond Outlet Project 1 Concept Plan

SUMMARY NARRATIVE OF PROPOSED PROJECT

The White Pond Outlet Project 1 (Project) encompasses White Pond (Pond) and approximately 300 feet of its drainage outlet to the north. The proposed Project includes the installation of an outlet control weir to increase the stormwater storage capacity of the Pond for smaller storm events. The proposed inundation area would be approximately 28 acres.

ESTIMATED POLLUTANT LOAD REDUCTION

A Pollutant Load Estimation Tool (PLET) model was developed for the Pigeon Creek HUC-12 (05040001 01 02). Land use acreages were calculated using the National Land Cover Database (2021). Nitrogen and phosphorus loading estimates were calibrated using loading data for the Muskingum River watershed, supplied by the Ohio Environmental Protection Agency (EPA) - Division of Surface Water. All other inputs were held at the default settings.

The best management practice (BMP) modeled for the project included the urban BMP for Wet Pond with a drainage area of 70.4 acres. The proposed project is estimated to provide the following annual load reductions:

Total nitrogen: 269.3 pounds per year
Total phosphorus: 13.3 pounds per year
Total sediment: 5.6 tons per year

ESTIMATED INCREASE IN STORMWATER CAPACITY

Stormwater capacity calculations were performed with the US Army Corps of Engineers (USACE) HEC-HMS software and the SCS Curve Number Method. Curve numbers were calculated using the United States Geological Survey (USGS) National Land Cover Database and the United States Department of Agriculture (USDA)-Natural Resources Conservation Service (NRCS) Web Soil Survey data. The proposed enhancement activities will provide an increased stormwater detention capacity of 14 ac-ft.