TALLAHASSEE MASTER PLAN – SURFACE WATER (TMaPS): VOLUME 1

EXECUTIVE SUMMARY

CITY OF TALLAHASSEE

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engineers | scientists | innovators

July 2025

TMaPS: VOLUME 1

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Prepared for

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Project Number: FW7714

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The engineering material and data contained within the enclosed report was prepared by Geosyntec Consultants, Inc. for sole use by the City of Tallahassee. This report was prepared under the supervision and direction of the respective undersigned, whose seal as a registered professional engineer is affixed below.

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Tallahassee Master Plan – Surface Water (TMaPS)

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Geosyntec consultants

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ACRONYMS AND ABBREVIATIONS

BMP	best management practices
City	City of Tallahassee
LDC	Land Development Code
MARS	Megginnis Arm Regional Stormwater
MS4	municipal separate storm sewer system
NPDES	National Pollutant Discharge Elimination System
SSAC	Site Specific Alternative Criteria
TAPP	Think About Personal Pollution
TMaPS	Tallahassee Master Plan - Surface Water
TMDL	total maximum daily load
TN	total nitrogen
TP	total phosphorus

1 EXECUTIVE SUMMARY

The Tallahassee Surface Water Master Plan (TMaPS) was developed to help guide the City of Tallahassee (City) as they continue efforts to improve surface water quality. The plan focuses on specific waterbodies that appear in volumes dedicated to the Lake Munson, Lake Jackson, and Lake Lafayette drainage basins. Wakulla Springs and Lake Talquin were included in the plan and appear in a separate volume. Additionally, project and regulatory recommendations are provided in separate volumes. Ultimately, the plan is presented within seven volumes following this Executive Summary.

Volume 2: Background & Approach

An important characteristic of the City is the multitude of waterbodies throughout and around its jurisdiction that play an important role in the community's history and present-day ecology. In recognition of their importance, the community approved a Penny Sales Tax that in part raises funds dedicated to local surface water quality improvement. To most efficiently and effectively mitigate surface water pollution, a comprehensive master plan based on sound data, science, and engineering is essential. To that end, the City contracted with Geosyntec Consultants, Inc. to complete TMaPS, which provides documentation of past efforts, characterization of water quality, recommendations for data collection projects and water quality improvement projects, and recommendations for updates to City regulations that support surface water quality.

Water quality assessments within this plan are for nutrients, namely nitrogen and phosphorus species, and to a lesser extent, bacteria. While many aspects of the plan are focused on stormwater runoff, other sources of surface water pollution are identified, quantified, and discussed where relevant. Where sufficient data existed, total nitrogen (TN) and total phosphorus (TP) loading estimates were developed and used to identify areas within each drainage basin to prioritize potential water quality improvement projects and/or data collection studies. The priority waterbodies identified within each basin were then ranked with respect to existing water quality, biology, and other factors that could negatively impact water quality.

Volume 3: Lake Munson Basin

Seven priority waterbodies were identified within the Lake Munson Basin, including Lake Munson, Munson Slough (below Lake Henrietta), the Bradford Chain of Lakes (Lake Bradford, Lake Hiawatha, Cascade Lake), Silver Lake, and the East Drainage Ditch. The analyses within this basin focused primarily on nutrients but also addressed potential sources of other pollutants, such as bacteria and metals.

Lake Munson is the most downstream waterbody in the basin and discharges over a manmade dam downstream to Ames Sink. For Lake Munson and Munson Slough (below Lake Henrietta), nutrient levels and associated algal growth within the lake have dropped significantly since 2016, with levels in recent years near or below targets. Additionally, flows from Munson Slough to Lake Munson are well below targets for both nitrogen and phosphorus. While the improvements are encouraging, concerns remain around the potential for internal loads from sediments within the lake to impact future water quality conditions.

The East Drainage Ditch, including Silver Lake, drains a highly urbanized watershed and flows into Munson Slough near Lake Henrietta. Silver Lake and the East Drainage Ditch are meeting

nutrient targets, although at times nutrient levels are higher than in other areas within the basin, likely due to stormwater runoff. Based on pollutant loads calculated for the watershed, these areas have the highest nutrient loads per acre in the basin; however, gaps in the available data for this watershed made it difficult to track changes over time.

The Bradford Chain of Lakes (Cascade Lake, Lake Hiawatha, Lake Bradford) are highly colored lakes that receive drainage primarily from the Apalachicola National Forest, with some residential areas along Highway 20. Nutrient and algal levels are low and stable throughout the chain, with all the waterbodies well below targets. Present conditions dictate that efforts within this watershed should focus on maintenance versus restoration. Potential septic impacts to Lake Bradford, due to the high density of systems surrounding the lake, along with verified impairments for lead in Lake Bradford and Cascade Lake, should be addressed through identification of potential sources.

The priority waterbody rankings identified Lake Munson/Munson Slough and Silver Lake/East Drainage, respectively, as the most appropriate targets for restoration efforts and further study. Specific recommendations included studies to eliminate data gaps and better inform future activities, such as measuring nutrient recycling in Lake Munson, expanding water quality monitoring in the East Drainage Ditch, optimizing stormwater treatment effectiveness at Lake Henrietta, assessing potential septic impacts in Lake Bradford, and assessing the source of lead contamination in the Bradford Chain of Lakes.

Volume 4: Lake Jackson Basin

Nine priority waterbodies were identified within the Lake Jackson Basin, including Lake Jackson, Carr Lake, the Summerbrook Chain of Lakes (Lake Alyssa, Somerset Lake, Shelly Pond), Lake Overstreet, Lake Hall, and Lexington Creek. The analyses within this basin focused on nutrients and bacteria.

Lake Jackson is the most downstream waterbody in the basin, with the only outfall through sinkholes in the lake bottom. The lake is not impaired but recently has exhibited nutrient and algal levels near or above target levels. The highest nutrient concentrations are found on the southeast end of the lake, which receives inflows from two urbanized tributaries, Megginnis Arm and Fords Arm. The watersheds that drain to these two tributaries have numerous stormwater treatment facilities, with a large regional facility at the downstream end. High bacteria levels were also identified within tributaries draining primarily residential neighborhoods on the southwestern side of the lake.

Lexington Creek is a highly urbanized tributary that drains into Fords Arm. While not impaired for nutrients, recent data show higher phosphorus levels, with some years above stream targets. The creek is presently verified impaired for bacteria.

Carr Lake drains into the northern end of Lake Jackson and is a shallow waterbody with similar hydrology to Lake Jackson. The lake was designated as an Aquatic Preserve in 1973. Water quality in the lake is very good, with nutrient and algal levels below targets.

The Summerbrook Chain of Lakes (Lake Alyssa, Somerset Lake, Shelly Pond) is managed by the Summerbrooke Property Owners Association, Inc., as a community amenity, and no data were available in the lakes for analyses.

Lake Hall and Lake Overstreet are natural, deeper waterbodies within the basin. While Lake Overstreet flows out through the Overstreet drain into Lake Jackson, Lake Hall is an isolated waterbody with no direct outflow. Both waterbodies have excellent water quality.

The priority waterbodies rankings identified Lexington Creek, Lake Jackson, and the Summerbrook Chain of Lakes as the most appropriate for restoration efforts and further study. Specific recommendations included studies to eliminate data gaps and better inform future activities, such as evaluating the efficacy and potential improvements to the Megginnis Arm Regional Stormwater (MARS) treatment facility, flow and water quality monitoring at key inflow locations to Lake Jackson, a bacteria source assessment for the basin, and evaluation of the overall hydrologic budget for Lake Jackson.

Volume 5: Lake Lafayette Basin

Eleven priority waterbodies were identified within the Lake Lafayette Basin, including the Lafayette Chain of Lakes (Upper Lake Lafayette, Piney Z Lake, Lower Lake Lafayette, Alford Arm), the Killearn Chain of Lakes (Lake Kinsale, Lake Killarney, Lake Kanturk), Lake Tom John, Shakey Pond, Lafayette Creek, and Lake Leon. The analyses within this basin focused on nutrients and bacteria.

The Lake Lafayette Chain of Lakes was once a contiguous meandering wetland prairie system that drained into a sinkhole (Lafayette Sink). Construction of the CSX railroad and berms along the east and west sides of Lake Piney Z created the four distinct waterbodies apparent today. Each waterbody has distinct characteristics and hydrology, and hydrologic exchange between the waterbodies is limited. In short, Upper Lake Lafayette frequently fills and drains through Lafayette Sink, creating extended dry periods followed by periods of inundation. Lake Piney Z is impounded, does not go dry, and allows only limited inflow and outflow. Lower Lake Lafayette and Alford Arm, while classified as lakes, function more as wetland prairie systems with pockets of open water.

Water quality within the Lafayette Chain of Lakes also varies. Upper Lake Lafayette frequently exceeds nutrient and algal targets; however, the causes are mostly related to the unique hydrologic conditions and frequent wet/dry pattern. Lake Piney Z also frequently exceeds nutrient and algal targets, but the cause appears to be a combination of the hydrologic isolation and management of the waterbody, or potentially inappropriate target levels. Lower Lake Lafayette exhibits good water quality, although with limited monitoring, while Alford Arm has very limited data to assess water quality conditions.

The Killearn Chain of Lakes and Lake Tom John (which drains to the Killearn Chain) were historically a wetland prairie system, where agricultural activities circa the 1950s, along with development circa the 1970s, created the lakes as they are today. The Killearn Chain of Lakes experiences extensive dry periods followed by periods of inundation, whereas Lake Tom John generally retains its volume. All four lakes are impaired due to nutrients and algal levels above targets. However, based on their history and hydrology, the present target levels may be inappropriate.

Shakey Pond was originally a marsh-stream system but transformed into a shallow pond to accommodate adjacent residential development. Water quality data indicates that the pond exceeds phosphorus and algal targets regularly, and recent failure of the control structure serving

as the pond's outfall has reduced water levels in the pond and exacerbated poor water quality conditions.

Lake Leon is a small, impounded waterbody located within Tom Brown Park and drains to Lafayette Creek. Lafayette Creek is an ephemeral urban stream that flows from its headwaters in commercial areas around the intersection of Capital Circle and Apalachee Parkway and drains across the CSX railroad into Upper Lake Lafayette. Presently, both Lafayette Creek and Lake Leon are below their targets for nutrients and algal growth.

The priority waterbody ranking identified Shakey Pond, Upper Lake Lafayette, the Killearn Chain of Lakes, and Lake Tom John, respectively, for restoration efforts and/or additional study. Specific study recommendations to eliminate data gaps and better inform future activities, include assessments of restoration alternatives including wetland systems, hydrologic evaluations, bacteria loading or source studies, and evaluations of site specific alternative criteria (SSAC), i.e., identification of more appropriate target nutrient levels.

Volume 6: Wakulla Springs and Lake Talquin

The plan's objective for Wakulla Springs and Lake Talquin was to document current conditions and pollution sources (related to the City), describe the City's efforts to protect water quality to date, and determine the need for additional actions moving forward.

For Wakulla Springs, nitrates are the primary source of pollutant loading, leading to excessive growth and productivity. The City's primary contribution to nitrogen loading is the sprayfields associated with the Thomas P. Smith Water Reclamation Facility. Over the years, the City has made significant improvements to the facility including upgrading to advanced wastewater treatment and eliminating biosolids applications, which have reduced the City's contributing nitrogen load more than 75 percent, exceeding the target load reduction of 56.2 percent established in the total maximum daily load (TMDL). It follows that the reductions seen in nitrate concentrations over the years at the spring are due largely to the City's actions and, accordingly, the City has met its obligations for restoration of Wakulla Springs. No further actions are recommended.

The City lies entirely outside of the Lake Talquin watershed; however, the City-operated Arvah B. Hopkins Power Generating Station straddles the eastern boundary of the Lake Talquin watershed and discharges to Beaver Creek and, ultimately, into the Ochlockonee River upstream of Lake Talquin. Since the Hopkins facility operates under National Pollutant Discharge Elimination System (NPDES) permit FL0025518, that includes effluent load limits for TN and TP in accordance with the TMDL allocations. The City is compliant with its NPDES permit, and no additional activities are planned beyond the routine operation. No further actions are recommended.

Volume 7: Non-Structural and Structural Project Development

Non-structural practices considered for implementation included code modifications, optimizing the City's Street Sweeping Program and municipal separate storm sewer system (MS4), enhancing the City's Think About Personal Pollution (TAPP) campaign, and additions/revisions to the prioritization of septic-to-sewer conversion areas from a water quality perspective. Most notably, more than 25 potential septic-to-sewer project areas were reviewed, and 10 were

identified as priority areas; however, it must be noted that these areas are primarily outside the City limits and within unincorporated Leon County.

Potential stormwater best management practices (BMPs) projects were identified based on the priority waterbody rankings in each basin. More than 25 projects were identified, representing several different types of structural BMPs, including: enhancement of existing stormwater ponds, stormwater pond dredging, wetland reversion, ditch armoring, nutrient separating baffle boxes, and baseflow treatment. From these, the top 10 project concepts were evaluated further. Four of these are currently underway, while other potential BMPs in the top 10 include: (1) passive baseflow treatment at Wahnish Way and South Adams Street; (2) passive baseflow treatment near Mabry Street; (3) pond enhancement at Lake Elberta; (4) pond enhancement at the wet detention pond located between Mayhew Street, Eppes Drive, and Pepper Drive; (5) active baseflow treatment near Jake Gaither Municipal Golf Course; and (6) pond enhancement at a dry detention pond located north of Daniels Street and west of James Street. Other project concepts that ranked highly included additional pond enhancements, dredging, and ditch armoring.

Volume 8: Regulatory Review

Regulatory mechanisms reviewed included the City's Comprehensive Plan, Code of Ordinances, the Land Development Code (LDC), Resiliency Plan, Strategic Plan, and Fertilizer Ordinance. The recommendations aimed to strengthen the regulatory framework, promote sustainable development practices, and enhance water quality of surface waterbodies. However, the recommendations were developed prior to the state's adoption of new statewide stormwater rules and, consequently, some recommendations are superseded by the new rules and/or no longer required.