Documentation in Support of Category 4e for WBIDs 647C and 647F: Killarney and Kanturk January 29, 2016

Waterbody/Watershed Identification

Organization	City of Tallahassee (COT) – Local Government Agency
Point of Contact	Catherine Bray, Water Quality Planning Chief, Water Resources Engineering, 300 S. Adams St. B-35, Tallahassee, FL. 32301. (850) 891-6853, Catherine.Bray@talgov.com
Project Title	Cooperative Water Quality Enhancement – City of Tallahassee Stormwater Improvements & Killearn Homes Association (KHA) Activities
Waterbody(s)	WBID 647C Killarney/Kinsale and WBID 647F Kanturk
Watershed(s)	Ochlockonee/St. Marks River Watershed/Lake Lafayette Planning Unit (Group 1 Basin)
No. Waterbody / Pollutant Combinations	2013 Cycle 3 Verified List: WBID 647C Lk Killarney –Nutrients (TSI) and Un-ionized Ammonia, WBID 647F Lk Kanturk –Nutrients (TSI)
No. Watersheds Improved	One (1) Apalachee-St. Marks River 03120001

Description of Baseline Conditions

Watershed(s)	Apalachee-St. Marks River 03120001		
Impairments	HUC St. Marks River	WBID **Cycle 3/Group 1** Verified List: WBID 647C Lk Killarney –Nutrients (Trophic State Index (TSI), Un-ionized ammonia WBID 647F Lk Kanturk – Nutrients (TSI).	Impairment Listing Nutrients
Baseline Data	Tables 1a and 1b show the ambient nutrient concentrations (annual geometric mean) for the period of 2007 through September 2014 from IWR Run 49 and supplemental data collected by the City.		
Map	**Attachment 1** Delineates the watershed area and land use that contributes to these waterbodies.		

Table 1a. Period of Record (POR) Lake Killarney/Kinsale Assessment (WBID 647C)

Year	Chl *a* (µg/L)	TN (mg/L)	TP (mg/L)	Alkalinity[1] (mg/L $CaCO_3$)	Color[1] (PCU)
2007	19.9	0.87	0.06		
2008	41.0	0.74	0.03		
2009	33.7	1.30	0.07		
2010	27.7	1.63	0.06	20.6	23.6
2011	14.9	0.41	0.06		
2013	12.7	0.39	0.06		
2014	9.2	0.42	0.04		

[1]Alkalinity and color data were derived from the full period of data (2007 to 2014).

Table 1b. Period of Record (POR) Lake Kanturk Assessment (WBID 647F)

Year	Chl *a* (µg/)	TN (mg/)	TP (mg/)	Alkalinity[1] (mg/L CaCO)	Color[1] (PCU)
2008	74.0	0.90	0.03		
2009	11.9	0.91	0.06		
2010	30.0	1.71	0.06	17.2	28.3
2011[2]	4.2	0.95	0.32		
2013	8.3	0.52	0.04		
2014	8.7	0.46	0.03		

[1]Alkalinity and color data were derived from the full period of data (2007 to 2014).

[2]Year with data but not sufficient data for NNC evaluation.

Evidence of Watershed Approach

Area of Effort

The Kinsale/Killarney and Kanturk WBIDs lie within the Ochlockonee-St. Marks River Basin, a TMDL Group 1 Basin. Kinsale and Killarney are both included as part WBID 647C and Kanturk is WBID 647F. The full pool surface area for each of the three waterbodies is approximately 14 acres, 80 acres, and 77 acres for Kinsale, Killarney and Kanturk respectively. The total watershed comprises approximately 7,000 acres, 43% is within the City limits and 57% consists of the unincorporated area of Leon County. The approximate sub-basin areas for the three waterbodies are shown below.

Lake Kinsale sub-basin area	5.9 square miles
Lake Killarney sub-basin area	1.4 square miles
Lake Kanturk sub-basin area	3.6 square miles
Total contributing area	10.9 square miles

Key Stakeholders Involved and Their Roles

The Killearn Homes Association (KHA) owns, manages and maintains the majority of the Kinsale, Killarney and Kanturk waterbodies. Management and maintenance responsibilities traditionally have been performed by the KHA pursuant to its Declaration of Covenants and Restrictions.

The City of Tallahassee (City) is the responsible entity for the Municipal Separate Storm Sewer System (MS4) – Permit # FLS000034.

Watershed Plan & Other Supporting Documentation

Impaired Waters Listing

The Cycle 3/Group 1 Verified List listed the following impairments for these waterbodies: WBID 647C Lk Killarney – Nutrients (TSI), Un-ionized ammonia WBID 647F Lk Kanturk – Nutrients (TSI).

Statement of Understanding

The system of waterbodies (Kinsale-Killarney-Kanturk) frequently fluctuates from a system in excess of 170 acres to small pools of a few acres. This hydrologic influence impacts both the water quality and biological community of the waterbodies.

Cause of Impairment

Lake Killarney was identified as impaired for Nutrients and Un-ionized Ammonia by FDEP based on water quality data from IWR Database Run 47. The data period used for the assessment was from 1/1/2005 – 6/30/2012. Lake Kanturk was also identified as impaired for Nutrients by FDEP based on data from the same time period. A May 2015 report by ATM concludes that although there are anthropogenic inputs into the system, sediments and soils are not a major source, and the largest sub-basin exhibited background water quality conditions. Based on event mean concentrations and associated contributing areas, the report does not identify a significant source of pollutant loading to the system. The hydrologic influence of the system's cyclical pattern of drying and refilling may continue to impact the water quality and biological community of the waterbodies.

Stormwater Assessment

The Lake Kinsale sub-basin is the largest contributing basin and contains more recent development with higher stormwater treatment standards. This sub-basin shows reduced nutrient concentrations during both ambient and stormwater conditions. Although many of the older developed areas in other sub-watersheds indicate higher nutrient concentrations, they were relatively low when compared to nutrient runoff concentrations from typical residential development. Nonetheless, the older developed areas are where the City continues to implement stormwater capital improvement projects.

Watershed Plan

Projects in this plan will have a dual goal of improving water quality and maintaining water quantity delivered. The City and KHA are committed to the below watershed plan and subsequent restoration work with the understanding that these waterbodies will continue the cyclical pattern of drying and re-flooding, which will continue to impact both the water quality and biological community of the waterbodies.

The City, as a MS4 permittee, will continue to implement pollution prevention measures, treatment or removal techniques, and other appropriate means to control the quality of stormwater discharged from the MS4 to the maximum extent practicable. Additionally, the City will focus on the implementation of structural and non-structural stormwater improvements in the watershed, including flood mitigation, treatment, conveyance improvements, sediment & erosion control, sediment removal, street sweeping and public education. The measurement of effectiveness of these types of BMPs is based on reasonable assumptions, studies and surveys as described below.

- Reductions of sediment and total phosphorus loading will occur for each of the ditch/bank stabilization and flood control projects addressing conveyances that are experiencing extensive sloughing and scour, overland flooding or sediment deposition.

- There are 104 miles of curb and gutter swept within the Killearn watershed. This includes only City and County owned roadways with curb and gutter. This area within the watershed was swept seven times during FY15 for a total of 730 miles of curb and gutter swept. This represents an increase in street sweeping performed by the City over prior efforts. Literature values for Florida indicate the removal of 0.12 lb of TP and 0.18 lb of TN per mile swept.

Additionally, the City will expend significant financial resources by continuing the water quality and stage monitoring, and also enhancing the monitoring efforts by adding a telemetry system to stage gauges already installed. If supplemental augmentation is pursued by the KHA, the telemetry system will serve as a valuable asset to assist in their operational procedures.

At the request of the KHA, the City will review and analyze the possibility of raising the control elevation of Killarney and Kanturk (e.g., construction of a

	weir upstream of Centerville Road) to increase the potential retention volume of the waterbodies; and thereby, help mitigate the hydrologic influence of the system. Implementation of this activity is contingent upon the activity not increasing flood potential of the surrounding properties and the City being donated the necessary drainage easements to grant inundation of the affected properties. KHA, the majority owner of the waterbodies, proposes to enhance the biological community and improve water quality of the waterbodies by focusing on aquatic plant management and implementing a neighborhood targeted public education campaign. To focus on the hydrological issues in the waterbodies KHA will further evaluate potential causes of water loss. Additionally, KHA will continue to review and analyze the possibility of supplemental augmentation and will continue its own in-house water quality monitoring program.
Point Sources	The system is within the jurisdiction of the Municipal Separate Storm Sewer System (MS4) permits FLS000034/City of Tallahassee and FLS000033/Leon County.
Nonpoint Sources	The contributing sub-watersheds to the Killearn system that will be targeted in this project consist of mostly residential land use. The land use comprises 60.8% Residential, 3.5% Commercial, 34.7% Undeveloped/Recreational, and 1% Agricultural. Typical non-point sources for nutrients from this area would include soil erosion, fertilizer, septic systems, pet waste, and wildlife.
Restoration Work	*City of Tallahassee* Specific pollutant load reductions were not calculated for the stormwater capital improvement projects, but the cumulative effect of these projects will reduce nutrient loadings and may improve water quality of the subject waters. Individual project locations, descriptions, cost and completion dates (actual and anticipated) are included within **Attachment 2**. City of Tallahassee CIP Projects – Completed Since 2005 • Twenty-four stormwater capital improvement projects were completed within the Killearn watershed since 2005 totaling $3.69 million dollars. These projects focused on improving the quality of stormwater by reducing overland flooding, stabilizing ditches and removing sediment. City of Tallahassee CIP Projects – Planned • Seventeen additional Stormwater capital improvement projects are planned within the Killearn watershed with an estimated cost of $3.56 million dollars. The projects are set to commence upon approval of the 4e application with an estimated completion date of January 2018. Similar to the completed projects these BMPs will focus on reductions in sediment transport from erosion and overland flooding. With approval of this 4e support document, the City will have either completed or be committed to a potential investment in capital improvement projects totaling in excess of $7.2 million dollars.

Leon County
Leon County Public Works Department has also contributed significant resources toward stormwater improvements within the watershed. Since 2005 Leon County has completed four stormwater projects in the Killearn basin totaling $4.2 million dollars (listed below). Leon County is also in the conceptual/planning phase for an additional project; however, project scope, cost and timing are not yet available.

- Bradfordville Road Culvert Improvements: Upgrade of culverts entering Lake Anna between Widefield Drive and Charles Samuel Drive; cost =$428,400

- Killearn Acres Flood Mitigation: Upgrade of primary conveyance system from Lucky Debonair Trail through Lake Saratoga to Pimlico Drive; cost = $2,657,970

- Bradfordville Pond 6 Rehabilitation: Retrofit of reuse irrigation system; pond west of Velda Dairy Road, south of Target store; cost = $317,120

- Bradfordville Pond 4 Outfall Stabilization: Reconstruction of pond outfall, installation of groundwater cutoff wall; pond west of Thomasville Road and south of Bannerman Road; cost = $773,260

Killearn Homes Association
KHA projects and efforts will focus on enhancing the biological community and water quality through aquatic plant management activities (approx. $20,000/annually) and public education (approx. $45,000). Further study and investigation of water losses through a geotechnical evaluation (approx. $30,000) and the continued analysis of potential supplemental augmentation may address the hydrological issues surrounding these waterbodies. Supplemental augmentation will be considered. Details of the KHA activities are provided within **Attachment 3**.

Critical Milestones/Monitoring

Anticipated Critical Milestone(s):

Additional information is contained within **Attachments 2 & 3**.

CIP Projects – Completed

- Twenty-eight (City & Leon County) stormwater capital improvement projects have been completed since 2005 in the Killearn watershed.

CIP Projects – Planned

- Seventeen stormwater capital improvement projects are planned within the watershed. These projects are set to commence upon approval of this 4e application with an estimated completion date of January 2018.

	KHA - Planned • Aquatic Plant Management – In Progress & Continued Through 4e Evaluation Cycle • Water Quality Monitoring – In progress and will continue through the 4e evaluation cycle. • Public Education Campaign – Commence 90 Days Following FDEP 4e Approval & Continued Through 4e Evaluation Cycle • Geotechnical Evaluation – Commence 90 Days Following FDEP 4e Approval • Supplemental Augmentation – Pending Further Feasibility Study & Board Approval (augmentation would begin when water levels stabilize)
Monitoring Component	The City will continue quarterly monitoring of WBIDs 647C and 647F and bi-monthly monitoring of downstream waters. The City will continue its contract with the Northwest Florida Water Management District (NWFWMD) for data collection at nearby rain gauges. • Stage S618 (Lake Kanturk Outfall @Centerville Rd), • Stage S785 (Lake Killarney @ McLaughlin Dr), • Stage S784 (Lake Kinsale Outfall @ Shannon Lakes Dr). • Rain/ Flow 618/31 (Centerville Rd. @ Kanturk Discharge) The City is also moving forward with the NWFWMD to install and maintain a telemetry system at the Killearn stage gauges that will be accessible via a website link for the stakeholders and DEP. For the monitoring station map see **Attachment 4**.

Key Dates

Critical Milestone Dates	*City of Tallahassee (and Leon County)* Twenty-eight of the forty-five projects submitted in this 4e application have been completed. *Killearn Homes Association* All projects will commence in early 2016. If the board approves supplemental augmentation commencement would be dependent on lake levels.
Estimated Completion Date for the Restoration Activities	All projects in this submittal are expected to be ongoing or completed by January 2018.
Estimated Delisting Date	The WBID is in the state's Group 1 Basin. The Group 1 Basin is currently in assessment Cycle 3 (2012) and is expected that Cycle 4 will be in 2018. The planned projects and time for the waterbodies to stabilize and/or respond to

improvements from within the watershed as well as from supplemental augmentation will not be sufficient time to fully assess the WBIDs by 2018. It is anticipated that Cycle 5 in 2022/2023 would be next appropriate assessment cycle, and at that time, if not impaired, the WBIDs are expected to be delisted by DEP. It should be recognized that without supplemental hydraulic augmentation these waterbodies will continue the cyclical pattern of drying and re-flooding thus preventing the establishment of a healthy, well-balanced community of flora and fauna during typical climatic conditions and full attainment of the current lentic lake criteria is unlikely.

Financial Commitments

Estimated Implementation Cost

Total Financial Commitment of Completed Projects -			**$7,865,172**
City Capital Improvement Projects			
1. Completed Projects		$3,688,422	
Leon County Improvement Projects			
2. Completed Projects		$4,176,750	
Total Anticipated Financial Commitment for Future Projects (Capital Improvement, Monitoring Installation, Studies & Augmentation):			**$3,696,875**
Total Anticipated Ongoing /Annual Financial Commitments (Non-Structural Projects & Monitoring):			**$105,511**
	Cost - Annual	Cost - Installation	
City Capital Improvement Projects			
1. Planned Projects		$3,555,800	
City Non-Structural Projects (Annual)			
2. Street Sweeping (Est. $60/mi)	$43,795		
City Monitoring (Costs Initial or Annual)			
3. Annual Lake Monitoring	$6,153		
4. Stage Installation			$6,075
5. Stage Monitoring/Telemetry (O&M)	$5,730		
6. Rainfall/Flow Monitoring (O&M)	$1,683		
7. NPDES Monitoring (Downstream Location)	$4,150		
Killearn			
8. Aquatic Plant Management	$20,000		
9. Public Education Campaign			$45,000
10. Supplemental Augmentation	$24,000		$60,000
11. Water loss Evaluation			$30,000
TOTAL COST (COMPLETED & PLANNED)			**$11,562,047**

	ANNUAL ONGOING COSTS	**$105,511**
Funding Sources	The City is committed to funding the stormwater capital improvement projects, street sweeping, and monitoring components at 100%. If grant funds are received the funding level will decrease by the amount of the executed grant contract. KHA is committed to funding projects as identified in **Attachment 3**.	

Attachments - Supporting Documentation

1. Killearn Land Use Map
2. City of Tallahassee Completed & Planned Capital Improvement Projects
3. KHA Projects
4. Monitoring Stations

References

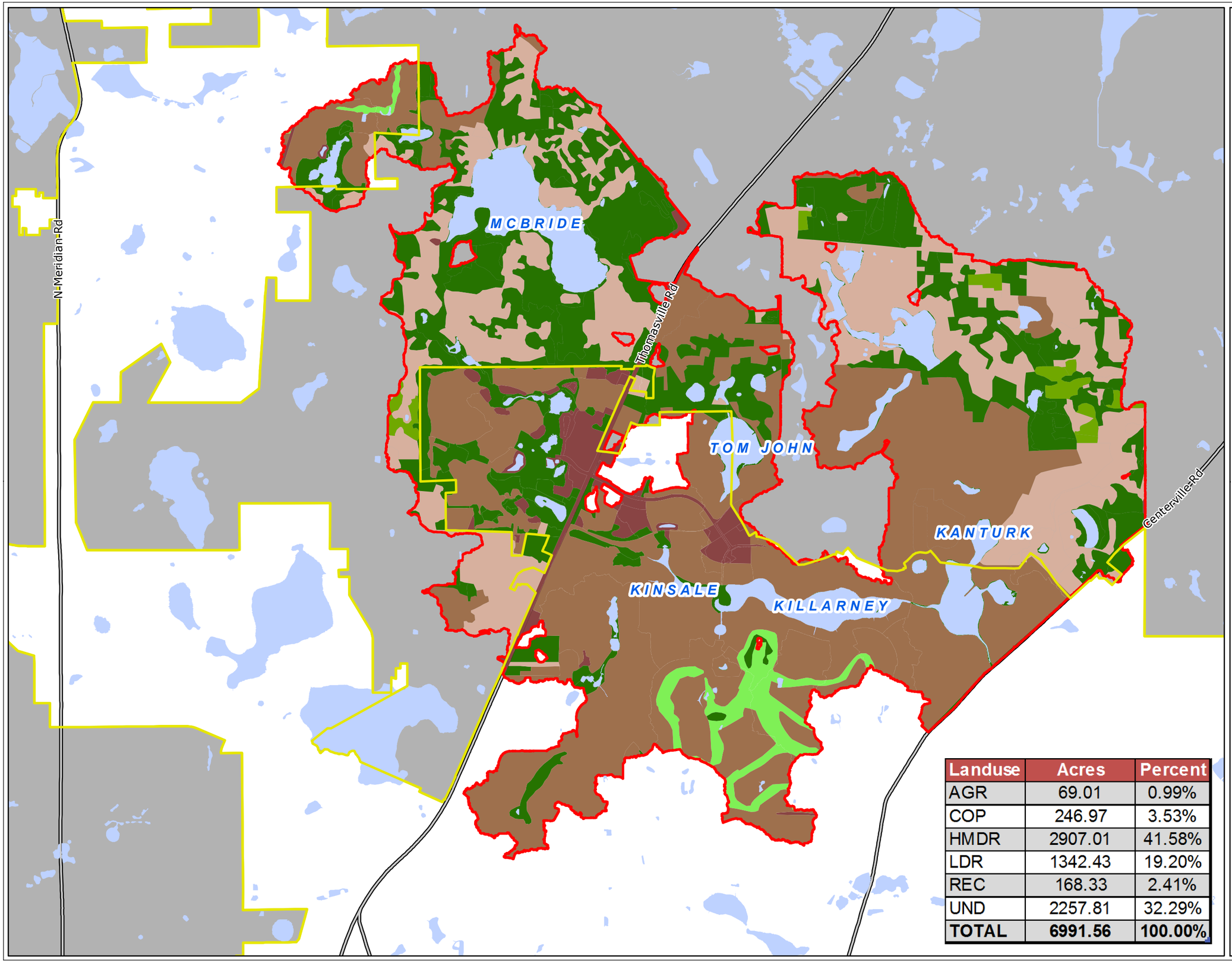
1. Applied Technology and Management, *Monitoring Plan Review and Data Analysis Relative to Listing Assessment: Final Report, Lake Kinsale, Lake Killarney, and Lake Kanturk.* 2015.

Attachment 1

Killearn Landuse

City of Tallahassee

Landuse
- Agriculture
- Commercial & Government
- Low Density Residential
- Medium & High Density Residential
- Recreational-Parks-Open Space
- Undeveloped
- Killearn Drainage Basin
- Major Roads
- Waterbody - Undeveloped
- City Limits
- County



Landuse	Acres	Percent
AGR	69.01	0.99%
COP	246.97	3.53%
HMDR	2907.01	41.58%
LDR	1342.43	19.20%
REC	168.33	2.41%
UND	2257.81	32.29%
TOTAL	**6991.56**	**100.00%**

NORTH

City of Tallahassee
Your Own Utilities℠

City of Tallahassee
Stormwater Management
300 S. Adams St. (B-35)
Tallahassee, FL 32301
Tel No: (850) 891-6860
Fax No: (850) 891-6880

Underground Utilities Department
Water Resources Engineering Division
Stormwater Management

0.5 0.25 0 0.5 Miles

1 inch = 0.5 miles

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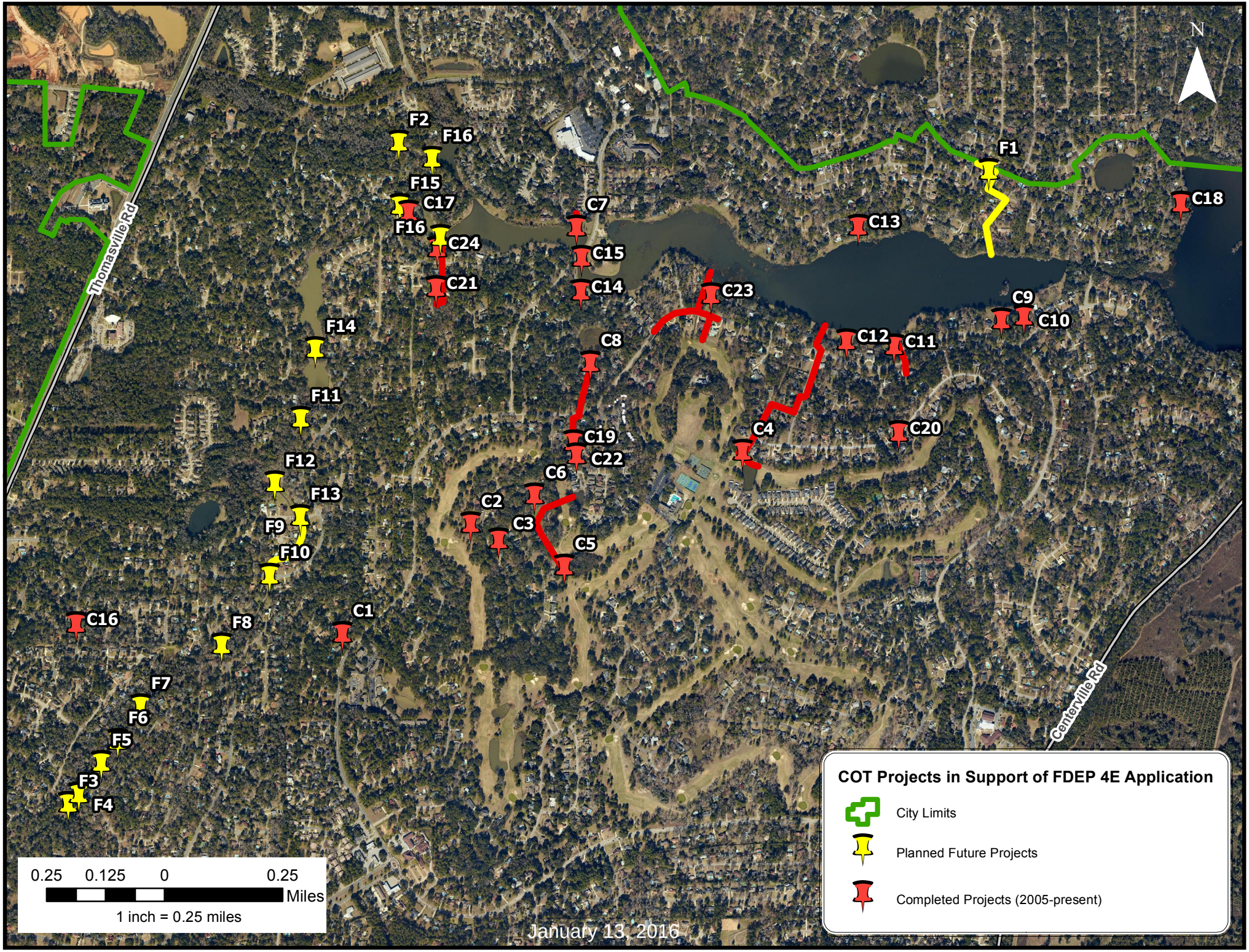
Attachment 2



City of Tallahassee Stormwater Projects in Killearn Chain of Lakes Watershed

Category 4e Support Document - January 29, 2016

Completed Projects (2005-present)

Map ID	Project Name	Description	Cost	Completion Date
C1	3742 Shamrock and 3745 Lifford Circle	Flood & sediment transport reduction.	$50,000	April 2006
C2	4036 Brandon Hill	Flood & sediment transport reduction.	$40,000	September 2006
C3	4029 and 4033 Brandon Hill	Flood & sediment transport reduction.	$50,000	September 2006
C4	Killearn Golf and Country Club Pond Retaining Wall	Erosion control, flood & sediment transport reduction.	$290,000	June 2008
C5	2925 Edenderry Drive	Erosion control & sediment transport reduction.	$166,000	February 2009
C6	2495 Edenderry Drive	Flood & sediment transport reduction.	$30,000	March 2011
C7	Villages of Killearn/Kinsale Drive Outfall Improvements	Ditch stabilization, lake sediment removal & transport reduction.	$85,000	May 2009
C8	Bay Shore Drive Stormwater Outfall Improvement (Phase II)	Ditch stabilization, flood & sediment transport reduction.	$850,000	September 2011
C9	3110 Shamrock North - Public Works Operations	Lake outfall rehab. Headwall construction, slope stabilization & sediment removal.	$11,000	June 2012
C10	4004 McLaughlin - Public Works Operations	Lake outfall rehab. Headwall construction, slope stabilization & sediment removal.	$7,500	June 2012
C11	3074 Shamrock North - Public Works Operations	Lake outfall rehab. Headwall construction, slope stabilization & sediment removal.	$2,000	July 2012
C12	3058 Shamrock North - Public Works Operations	Lake outfall rehab. Headwall construction, slope stabilization & sediment removal.	$2,000	July 2012
C13	3187 Ferns Glen - Public Works Operations	Lake outfall rehab. Headwall construction, slope stabilization & sediment removal.	$2,000	September 2012
C14	2911 Bay Shore - Public Works Operations	Flood & sediment transport reduction.	$2,000	October 2012
C15	Shannon Lakes West Cross Drain (Lk. Kinsale to Lk. Killarney) - Public Works Operations	Remove sediment from Lake Killarney at culvert outfall.	$12,000	October 2012
C16	Runnymede Road Drainage Improvements	Flood & sediment transport reduction.	$260,000	December 2012
C17	2612 Bantry Bay - Public Works Operations	Lake outfall rehab. Slope stabilization & sediment removal.	$40,000	March 2013
C18	5052 Tallow Point - Public Works Operations	Lake outfall rehab. Slope stabilization & sediment removal.	$2,000	March 2013
C19	Shamrock North at Edenderry Drive (Bay Shore Drive Stormwater Outfall Phase I)	Ditch stabilization, flood & sediment transport reduction.	$415,000	February 2011
C20	3065/3068 Obrien Drive	Flood & sediment transport reduction.	$60,421	January 2013
C21	4052 Roscrea	Flood & sediment transport reduction.	$320,000	June 2014
C22	Pebble Creek Drainage Improvements (River Chase and Ironwood)	Flood & sediment transport reduction.	$10,451	June 2013
C23	3015/3016 Shamrock North (sag east of Edenderry)	Lake outfall rehab. Headwall construction, slope stabilization, flood & sediment transport reduction, lake sediment removal at pipe outfall.	$980,000	December 2014
C24	2632 Bantry Bay - Public Works Operations	Lake outfall rehab. Slope stabilization & sediment removal.	$1,050	July 2015
Sub-Total:			**$3,688,422**	

City of Tallahassee Stormwater Projects in Killearn Chain of Lakes Watershed

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Planned Future Projects

Map ID	Project Name	Description	Cost (estimate)	Completion Date (estimate)
F1	3244 Shannon Lakes	Flood, erosion & sediment transport reduction project. Project includes storm drain and headwall construction, lake shoreline stabilization, and sediment removal at pipe outfall. Project also replaces an open ditch with eroded side banks with an underground piping system with a grassed swale on top. Project reduces flooding, yard erosion and the transport of sediments and nutrients due to overland flow by capturing, collecting and conveying excessive stormwater runoff underground to Lake Killarney.	$625,000	June 2016
F2	Tory Sound Lane Drainage Improvements	The drainage improvements includes modifications to roadside inlets and piping systems along Tory Sound Lane. Project reduces flooding of residential properties with resultant reductions in the transport of sediment into Lake Kinsale due to overland flows. Ditch stabilization at upstream end of cross drain is included in the culvert inlet improvements.	$225,000	August 2016
F3	Wallwood Heights Outfall Rehabilitation	Improve an existing flume, which conveys runoff from the upstream residential subdivision. Construct new inlet structure at the reconstructed flume outfall and stabilize the ditch side slope. The project will reduce the quantity of sediment being displaced from the side bank of the Royal Oaks Creek. Capture of excessive runoff in a new storm drain drop structure will dissipate energy prior to discharge into an altered watercourse thereby reducing the transport of sediment into Lake Kinsale.	$145,000	October 2016

City of Tallahassee Stormwater Projects in Killearn Chain of Lakes Watershed

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F4	Shannon Forest Outfall #1	Stabilization and improvement of eroded outfalls will reduce the amount of sediments currently being transported downstream into Lake Kinsale. Filling voids in existing side bank stabilization around several existing outfall structures within Royal Oaks Creek, coupled with construction of flumes to convey flows from the outlets down to the invert of Royal Oaks Creek will reduce erosion and improve water quality by reducing erosion and the transport of nutrients downstream.	$25,000	October 2016
F5	Shannon Forest Outfall #2	Stabilization of eroded outfall structures will reduce the amount of sediments currently being transported downstream into Lake Kinsale. Filling voids in existing side bank stabilization around several existing outfall structures within Royal Oaks Creek, coupled with construction of flumes to convey flows from the outlets down to the invert of Royal Oaks Creek will reduce erosion and improve water quality by minimizing the transport of sediments downstream.	$25,000	October 2016
F6	Shannon Forest Outfall #3	Stabilization of eroded outfall structures will reduce the amount of sediments currently being transported downstream into Lake Kinsale. Filling voids in existing side bank stabilization around several existing outfall structures within Royal Oaks Creek, coupled with construction of flumes to convey flows from the outlets down to the invert of Royal Oaks Creek will reduce erosion and improve water quality by minimizing the transport of sediments downstream.	$32,000	October 2016

City of Tallahassee Stormwater Projects in Killearn Chain of Lakes Watershed

Category 4e Support Document - January 29, 2016

F7	Shannon Forest Outfall #4	Stabilization of eroded outfall structures will reduce the amount of sediments currently being transported downstream into Lake Kinsale. Filling voids in existing side bank stabilization around several existing outfall structures within Royal Oaks Creek, coupled with construction of flumes to convey flows from the outlets down to the invert of Royal Oaks Creek will reduce erosion and improve water quality by minimizing the transport of sediments downstream.	$25,000	October 2016
F8	Royal Oaks Creek Sediment Sump #1	The project involves the construction of an sediment sump at a strategic location along the Royal Oaks Creek. Capture of sediment within this sump will reduce the amount of sediment and nutrients transported downstream into Lake Kinsale.	$75,000	July 2017
F9	Royal Oaks Creek Channel Lining	Construction of channel lining consisting of a combination of gabion baskets and reinforced ditch paving will alleviate the side bank erosion of a section of Royal Oaks Creek. This segment of the creek is currently eroding at a rapid rate, and repeated attempts to perform spot stabilization are short lived. By stabilizing the ditch with permanent revetment, reductions in erosion and associated sediment transport will be minimized.	$1,500,000	December 2017
F10	Royal Oaks Creek Sediment Sump #2	The project involves the construction of an sediment sump at a strategic location along the Royal Oaks Creek. Capture of sediment within this sump will reduce the amount of sediment and nutrients transported downstream into Lake Kinsale.	$145,000	December 2017
F11	Forsythe Way Cross Drain Rehabilitation	Significant erosion at the outlet of this multiple pipe crossing is undermining the roadway, and eroding the side banks of Royal Oaks Creek. Construction of culvert extensions combined with stabilization and energy dissipation at the culvert outlets will stem the erosion and subsequently reduce the amount of nutrient laden sediments conveyed downstream.	$65,000	July 2017

City of Tallahassee Stormwater Projects in Killearn Chain of Lakes Watershed

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F12	Royal Oaks Pond Sediment Removal	Removal of sediment accumulation at the outfall of Royal Oaks Pond will improve water quality by minimizing the potential for sediments and nutrients being re-suspended in the water column during significant storm events. Removal of this sediment will reduce the potential for re-suspension and transport downstream during significant storm events.	$85,000	May 2018
F13	Royal Oaks Creek Sediment Sump #3	The project involves the construction of an sediment sump at a strategic location along the Royal Oaks Creek. Capture of sediment within this sump will reduce the amount of sediment and nutrients transported downstream into Lake Kinsale.	$175,000	December 2017
F14	Small Pond Outfall Rehabilitation	An improved pond outfall spillway will minimize the transport of sediments by eliminating the erosion of the pond bank around the spillway, and by controlling the elevation in the pond at the desired level.	$75,000	May 2018
F15	Bantry Bay Drive Cross Drain Culvert Replacement	Several residential properties upstream of Bantry Bay Drive experience yard flooding which in turn creates yard erosion that transports sediment and nutrients downstream to Lake Kinsale. The overland flooding, yard erosion and sediment and nutrient transport can be reduced by improving the capacity of the Bantry Bay cross drain. No increase in runoff volume will occur as a result of the improvements.	$325,000	July 2017
F16	4720 Tory Sound and 2632 Bantry Bay	Sediment has accumulated at the Tory Sound Lane and Bantry Bay Drive outfalls into Lake Kinsale. Removal of these sediments will prevent their resuspension within Lake Kinsale during significant storm events. In addition, the sediment accumulation may prevent the unobstructed flow of runoff into the lake.	$8,800	November 2015

City of Tallahassee Stormwater Projects in Killearn Chain of Lakes Watershed

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F17	Centerville Weir	Weir upstream of Centerville Road to increase the potential retention volume, may require KHA to acquire and donate necessary property rights to the City.	TBD	2017

Sub-Total:	**$3,555,800**

Killearn Homes Association, INC.

2705 KILLARNEY WAY. TALLAHASSEE, FLORIDA 32309
TELEPHONE 850.893.3468 FACSIMILE 850.668.0530

October 21, 2015

Jodie Cahoon, P.E.
Manager, Stormwater Management
Underground Utilities – Stormwater
City of Tallahassee
300 S. Adams Street, B-35
Tallahassee, FL 32301

Dear Mr. Cahoon,

In the spirit of ongoing efforts to resolve the impaired status of the Killearn Chain of Lakes (KCOL), the Killearn Homes Association (KHA), on behalf of the residents of Killearn Estates, is providing this list of restoration projects that would be undertaken by the KHA in a joint Category 4e restoration agreement with the City of Tallahassee, to be approved by the Florida Department of Environmental Protection (FDEP). These activities will enhance projects already completed, as well as those scheduled to be completed, by the City throughout the 5-year category review cycle.

The KHA's focus is to ensure that all projects agreed to by the stakeholders actually serve the end goal – reducing stormwater pollution and maintaining good water quality flowing into the KCOL. Towards its part in reaching that goal, the KHA offers to perform the following:

1. ***Invasive Exotic Plant Removal***
The KCOL provides habitat for many ecologically friendly plants and animals. However, some non-native species have also found a home in these waterbodies. The KHA has already begun treatment measures, specifically in Lake Kanturk, to control harmful aquatic plants that are not assistive in the water quality of the KCOL.

Cost: Approximately $20,000 annually
(already in progress and will be ongoing throughout the 4e evaluation cycle)

2. ***Education Campaign***
Effective control of water pollution not only includes physical infrastructure such as dams, flow control structures, sediment sumps, and drains, but also educational outreach projects aimed at increasing responsibility and changing behavior patterns of individual community residents. The KHA will implement several projects including integration of best practices into our web site and monthly newsletter, installation of information kiosks at lake parks, learning seminars, a variety of "nature friendly" contests, and programs to provide recognition to individuals, commercial properties, community groups, and sub-associations. We will also develop strategies to monitor the effectiveness of these efforts.

Cost: Approximately $45,000 total
(will commence 90 days after FDEP's approval of the Category 4e and will remain ongoing throughout the 4e evaluation cycle)

Additionally, the KHA offers to continue researching the following:

3. ***Augmentation by Pumping***
The KHA believes that while an increase in the amount of water in the lakes can assist in improving water quality to a certain extent, it is not a substitute for correcting the source of impairment. Furthermore, we do not believe that pumping water into the KCOL for the purpose of filling the lakes is prudent and will therefore not do it, choosing instead to allow the lakes to refill naturally. We are, however, willing to continue reviewing this as a potential restoration option pending our full and complete analysis.

Cost: Approximately $60,000 upfront then $22,000-$26,000 annually thereafter.
(will commence when lake levels are stabilized and only if approved by the board pending further feasibility studies)

4. ***Geotechnical Evaluation***
It is recognized that the KCOL looses water at an alarming rate, more than what can be accounted for by normal percolation. So much so that the KHA will research possible reasons for such advanced levels of loss, including identification and evaluation of old wells and sewer pipes.

Cost: Approximately $30,000
(will commence upon 90 days of approval of the Category 4e by FDEP)

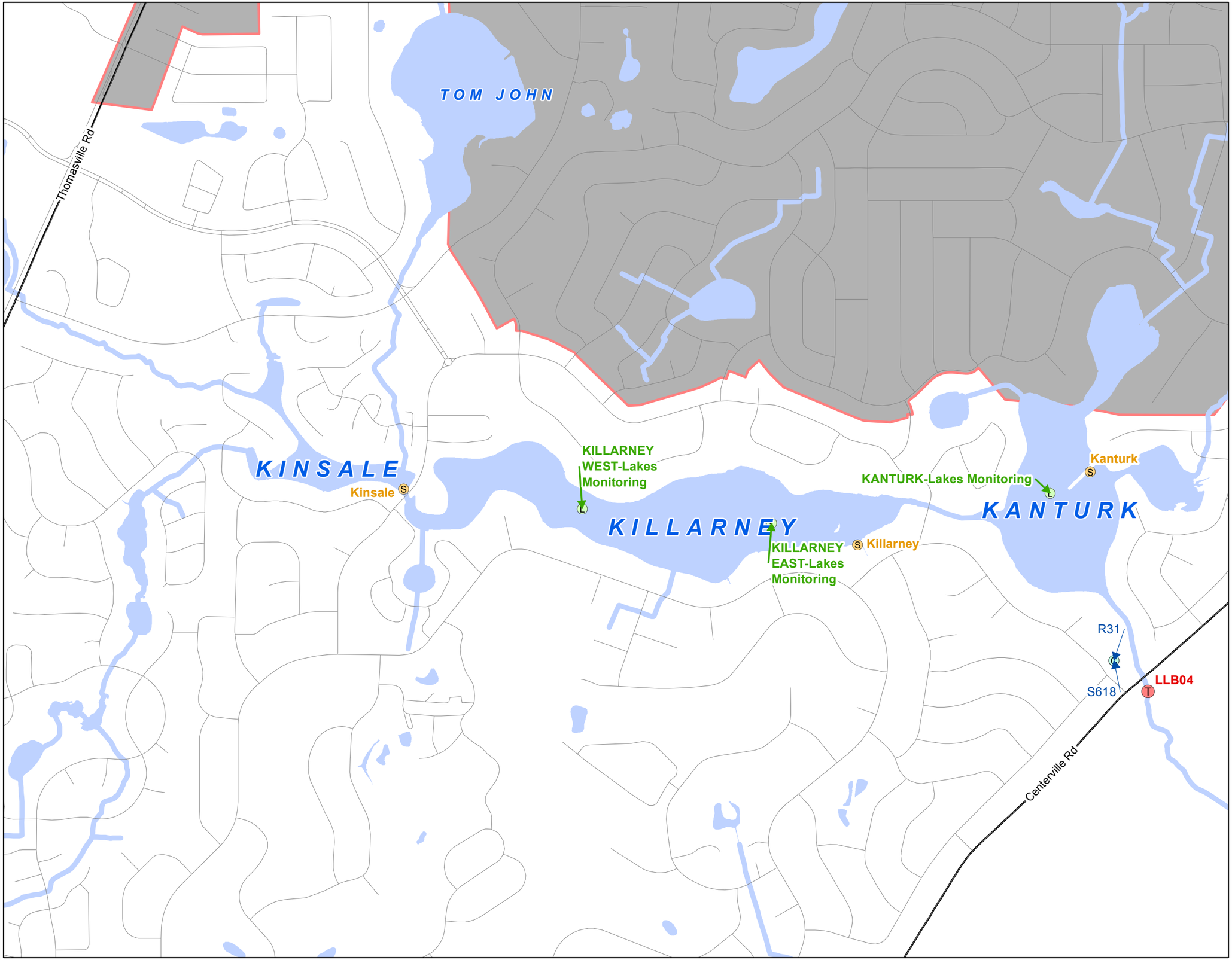
The KHA supports these projects, but participation in this joint Category 4e application is contingent upon KHA's approval of the City's proposed projects and the City's agreement that KHA will be included in technical reviews prior to commencement of projects within the scope of the 4e proposal. This will ensure that *all* projects in the final submission to FDEP will address improvement of water quality in the KCOL. Furthermore, it's anticipated that both stakeholders will work collaboratively on funding sources when prudent and necessary.

We are very appreciative of the projects, both completed and planned, that the City has undertaken on behalf of the KCOL and we look forward to a positive collaboration that as stakeholders, we can be proud of.

On Behalf of the KHA Board of Directors,

LeAnn Sbordone

LeAnn Sbordone, CAM
Executive Director
Killearn Homes Association



Killearn Monitoring Stations

Killearn Waterbodies

Legend

Monitoring Stations

- (T) NPDES Monitoring Stations
- (L) COT Lakes Monitoring
- (S) Stage Gauges
- (C) CAFWIN_Stations

Landbase

- Major Roads
- Stream Channels
- Waterbody
- City Limits
- County

CITY OF TALLAHASSEE

Underground Utilities Department
Water Resources Engineering Division
City of Tallahassee, Stormwater Management
300 S. Adams St. (B-35), Tallahassee, FL 32301
Tel No: (850) 891-6860, Fax No: (850) 891-6880

TALLAHASSEE-LEON COUNTY GIS FLORIDA

NORTH

1,000 500 0 1,000 Feet

1 inch = 1,000 feet

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