



Annual Report Form For Individual NPDES Permits For Municipal Separate Storm Sewer Systems (RULE 62-624.600(2), F.A.C.)

- This Annual Report Form must be completed and submitted to the Department to satisfy the annual reporting requirements established in Rule 62-621.600, F.A.C.
- Submit this fully completed and signed form and any REQUIRED attachments by email to the NPDES Stormwater Program Administrator or to the MS4 coordinator (<http://www.dep.state.fl.us/water/stormwater/npdes/contacts.htm>). Files larger than 10MB may be placed on the FTP site at: ftp://ftp.dep.state.fl.us/pub/NPDES_Stormwater/. After uploading files, email the MS4 coordinator or NPDES Program Administrator to notify them the report is ready for downloading; or by mail to the address in the box at right.
- Refer to the Form Instructions for guidance on completing each section.
- **Please print or type information in the appropriate areas below.**

Submit the form and attachments to:
 Florida Department of Environmental
 Protection
 Mail Station 3585
 2600 Blair Stone Road
 Tallahassee, Florida 32399-2400

SECTION I. BACKGROUND INFORMATION

A.	Permittee Name: City of Lake Worth		
B.	Permit Name: Palm Beach County MS4		
C.	Permit Number: FLS000018-004		
D.	Annual Report Year: <input type="checkbox"/> Year 1 <input checked="" type="checkbox"/> Year 2 <input type="checkbox"/> Year 3 <input type="checkbox"/> Year 4 <input type="checkbox"/> Year 5 <input type="checkbox"/> Other, specify Year:		
E.	Reporting Time Period (month/year): October 2017 through September 2018		
F.	Name of the Responsible Authority: Brian Shields		
	Title: Water Utilities Director		
	Mailing Address: 301 College Street		
	City: Lake Worth	Zip Code: 33460	County: Palm Beach
	Telephone Number: (561) 586-1675		Fax Number: (561) 533-7389
	E-mail Address: bshields@lakeworth.org		
G.	Name of the Designated Stormwater Management Program Contact (if different from Section I.F above): Judy Love		
	Title: Water Sewer Storm Field Manager		
	Department: Water Utilities		
	Mailing Address: 301 College Street		
	City: Lake Worth	Zip Code: 33460	County: Palm Beach
	Telephone Number: (561) 586-1719		Fax Number:
	E-mail Address: jlove@lakeworth.org		

SECTION II. MS4 MAJOR OUTFALL INVENTORY (Not Applicable in Year 1)

A.	Number of outfalls ADDED to the outfall inventory in the current reporting year (insert "0" if none): (Does this number include non-major outfalls? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not Applicable)
B.	Number of outfalls REMOVED from the outfall inventory in the current reporting year (insert "0" if none): (Does this number include non-major outfalls? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not Applicable)
C.	Is the change in the total number of outfalls due to lands annexed or vacated? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not Applicable

SECTION III. PART V.B. ASSESSMENT PROGRAM

A.	<p>Provide a brief statement as to the status of water quality monitoring plan implementation. Status may include sampling frequency changes, monitoring location changes, or sampling waiver conditions. <i>DEP Note: If permittee participates in a collaborative monitoring plan, permittee may refer to a joint response as defined by the interlocal agreement.</i></p> <p>Name and date of the approved plan: Current approved plan of the Group Monitoring Plan is September 8, 2016 with Issuance of the Cycle 4 permit. Individual Assessment Plan was submitted on September 8, 2017.</p> <p>Status: The group Monitoring Report is included in the Cycle 4, Joint Annual Report. The Assessment Plan is awaiting approval by FDEP.</p>
B.	<p>Provide a brief discussion of the monitoring and loading results to date which includes a summary of the water quality monitoring data and / or stormwater pollutant loading changes from the reporting year. <i>DEP Note: Results must be specific to the permittee's SWMP.</i></p> <p>Refer to attached City's 2018 Water Quality Report</p>
C.	<p>Attach a monitoring data summary as required by the permit. An analysis of the data discussing changes in water quality and/or stormwater pollutant loading from previous reporting years. <i>DEP Note: Analysis must be specific to the permittee's SWMP.</i></p> <p>See response for Section III.B., above.</p>

SECTION IV. FISCAL ANALYSIS

A.	Total expenditures for the NPDES stormwater management program for the current reporting year: \$1,812,145
B.	Total budget for the NPDES stormwater management program for the subsequent reporting year: \$1,580,658
C.	<p>Did the current reporting year resources decrease from the previous year? Y <input type="checkbox"/> / N X</p> <p>Program is fully funded.</p>

SECTION V. MATERIALS TO BE SUBMITTED WITH THIS ANNUAL REPORT FORM

Only the following materials are to be submitted to the Department along with this fully completed and signed Annual Report Form (check the appropriate box to indicate whether the item is attached or is not applicable):

Attached	N/A	Required Attachments	Permit Citation	Attachment Number/Title
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Any additional information required to be submitted in this current annual reporting year in accordance with Part III.A of your permit that is not otherwise included in Section VII below.	Part III.A	High Risk Facilities and Proactive Inspection Report
<input type="checkbox"/>	<input checked="" type="checkbox"/>	An explanation of why the minimum inspection frequency in Table II.A.1.a. was not met, if applicable.	Part II.A.1	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	A list of the flood control projects that did not include stormwater treatment and an explanation for each of why it did not (if applicable).	Part III.A.4	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	A monitoring data summary as directed in Section III.C above and in accordance with Rule 62-624.600(2)(c), F.A.C.	Part V.B.3	Refer to Joint Report And 2018 Water Quality Report
<input type="checkbox"/>	<input checked="" type="checkbox"/>	YEAR 1 ONLY: An inventory of all known major outfalls and a map depicting the location of the major outfalls (hard copy or CD-ROM) in accordance with Rule 62-624.600(2)(a), F.A.C.	Part III.A.1	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	YEAR 2: A summary review of codes and regulations to reduce the stormwater impact from development.	Part III.A.2	2017-2018 Code and Land Development Regulation Review
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Year 3 ONLY: The estimates of pollutant loadings and event mean concentrations for each major outfall or each major watershed in accordance with Rule 62-624.600(2)(b), F.A.C.	Part V.A	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	YEAR 3: Summary of TMDL Monitoring Results (if applicable).	Part VIII.B.2	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	YEAR 3: Bacteria Pollution Control Plan (if applicable).	Part VIII.B.3	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	YEAR 4: A follow-up report on plan implementation of changes to codes and regulations to reduce the stormwater impact from development.	Part III.A.2	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	YEAR 4: A report on any amendments to the applicable legal authority (if applicable).	Part III.A.7.a	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	YEAR 4: Permit re-application information in accordance with Rule 62-624.420(2), F.A.C. <ul style="list-style-type: none">• The monitoring plan (with revisions, if applicable).• If the total annual pollutant loadings have not decreased over the past two permit cycles, revisions to the SWMP, as appropriate.	Part V.B.3 Part V.A.3	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	YEAR 4: TMDL Supplemental SWMP (if applicable).	Part VIII.B.3	

DO NOT SUBMIT ANY OTHER MATERIALS

(such as records and logs of activities, monitoring raw data, public outreach materials, etc.)

SECTION VI. CERTIFICATION STATEMENT AND SIGNATURE

The Responsible Authority listed in Section I.F above must sign the following certification statement, as per Rule 62-620.305, F.A.C.:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based upon my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name of Responsible Authority (type or print): Brian Shields

Title: Water Utilities Director

Signature:  Date: 2 / 11 / 19

SECTION VII. STORMWATER MANAGEMENT PROGRAM (SWMP) SUMMARY TABLE									
A.	B.					C.	D.	E.	F.
Permit Citation/ SWMP Element	Permit Requirement/Quantifiable SWMP Activity					Number of Activities Performed	Documentation / Record	Entity Performing the Activity	Comments
Part III.A.1	Structural Controls and Stormwater Collection Systems Operation								
	Report the current known inventory.								
	Report the number of inspection and maintenance activities conducted for each applicable type of structure included in Table II.A.1.a, and the percentage of the total inventory of each type of structure inspected and maintained.								
	<i>Note: Delete structures that are not in your MS4's inventory. The permittee may choose its own unit of measurement for each structural control to be consistent with the unit of measurement in the documentation. Unit options include: miles, linear feet, acres, etc.</i>								
	Type of Structure	Number of Structures	Number of Inspections	Percent Inspected	Number of Maintenance Activities	Percent Maintained			
	Dry retention systems	4	12	100 %	12	100%	Storm Water Reports	Storm Water Division	Monthly Street/ Quarterly Maintenance
	Exfiltration trench / French drains (lf)	762 ft.	4	100 %	4	100%	12	100%	
	Grass treatment swales (miles)	.68	12	100 %	12	100%	Monthly Reports/Grounds Division	Grounds Division	
	Wet detention systems	1	12	100 %	4	100%	Stormwater Division Reports	Stormwater Division	Monthly Inspections/ Quarterly Maintenance
	Pollution control boxes	5	12	100 %	12	100%	Control Inspection Log	Stormwater Division	Monthly Inspections/ Quarterly Maintenance
	Major outfalls	46	46	100 %	4	100%	Outfall Inspections Log	Stormwater Division	Inspected Once Annually
	Weirs or other control structures	1	12	100 %	12	100%	Inspector Log	Stormwater Division	Control Structure Operating Properly
	pipes / culverts (miles)	22.1	16 miles	75%	3	75%	Inspection Logs	Stormwater Division	Clean as needed
	Inlets / catch basins / grates	1934	967	50%	500	25%	Inspection Logs	Stormwater	

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	Ditches / conveyance swales (miles)							Division	
		1	12	100 %	12	100%	Inspection Logs	Stormwater Division	Mowed and Cleaned Monthly
	If the minimum inspection frequencies set forth in Table II.A.1.a. were not met, provide as an attachment an explanation of why they were not and a description of the actions that will be taken to ensure that they will be met.	<input type="checkbox"/>							All Met

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Permit Citation/ SWMP Element	Permit Requirement/Quantifiable SWMP Activity	Number of Activities Performed	Documentation / Record	Entity Performing the Activity	Comments
Part III.A.1 Summary	Provide an evaluation of the Stormwater Management Program according to Part VI.B.2 of the permit.				
	Strengths: All stormwater management assets are inventoried in a GIS data base and updated as new information is available. Active storm crew.				
	Limitations: Limited Stormwater staff to annually inspect the entire stormwater collection system				
	SWMP revisions implemented to address limitations: Thoroughly document the past inspections on the collection system to avoid overlap				
Part III.A.2	Areas of New Development and Significant Redevelopment				
	Report the number of significant development projects, including new and redevelopment, reviewed and approved by the permittee for post-development stormwater considerations.				
	Number of significant development projects reviewed	14	Site Plan Review	Public Services and Community Sustainability	
	Number of significant development projects approved	6	Site Plan Review	Public Services and Community Sustainability	
	Provide in the Year 2 Annual Report the summary report of the review activity. Provide in the Year 4 Annual Report the follow-up report on plan implementation.				
	Year 2 ONLY: Attach the summary report of the review activity	<input checked="" type="checkbox"/>	2017-2018 Code and Land Development Review	Mock•Roos	Consultant
	Year 4 ONLY: Attach the follow-up report on plan implementation	<input type="checkbox"/>			
Part III.A.2 Summary	Provide an evaluation of the Stormwater Management Program according to Part VI.B.2 of the permit.				
	Strengths: Stringent site plan review process as well as Lake Worth policy for new development must contain 3-year 1-hour storm event, provide erosion control plans, exfiltration trench. Inspections are performed throughout the projects to ensure that BMP's are adhered to.				
	Limitations: None identified at this time				
	SWMP revisions implemented to address limitations: N/A				
Part III.A.3	Roadways				
	Report on the litter control program, including the frequency of litter collection, an estimate of the total number of road miles cleaned or amount of area covered by the activities, and an estimate of the quantity of litter collected. <i>Note: If the permittee does not contract activities, delete CONTRACTOR activities.</i>				
	PERMITTEE Litter Control: Frequency of litter collection	Daily	Disposal Assessment Form SWA	Grounds Division	Collection of trash daily from roads and parks
	PERMITTEE Litter Control: Estimated amount of area maintained (lf)	63,100	Disposal Assessment Form	Grounds Division	Collection of trash daily

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Permit Citation/ SWMP Element	Permit Requirement/Quantifiable SWMP Activity	Number of Activities Performed	Documentation / Record	Entity Performing the Activity	Comments
	PERMITTEE Litter Control: Estimated amount of litter collected (cy)		SWA		from roads and parks
	CONTRACTOR Litter Control: Frequency of litter collection	83	5 gallon Bucket Log	Grounds Division	Based on collection data
	CONTRACTOR Litter Control: Estimated amount of area maintained (lf)	0			
	CONTRACTOR Litter Control: Estimated amount of litter collected (cy)	0			
	OPTIONAL: If an Adopt-A-Road or similar program is implemented, report the total number of road miles cleaned and an estimate of the quantity of litter collected. If you do not participate in an Adopt-A-Road program, report "0".				
	Trash Pick-up Events: Total miles cleaned	N/A			
	Trash Pick-up Events: Estimated amount of litter collected (cy)	N/A			
	Adopt-A-Road: Total miles cleaned	N/A			
	Adopt-A-Road: Estimated amount of litter collected (cy)	N/A			
	Report on the street sweeping program, including the frequency of the sweeping, total miles swept, an estimate of the quantity of sweepings collected, and the total nitrogen and total phosphorus loadings that were removed by the collection of sweepings. If no street sweeping program is implemented, provide the explanation of why not in column F.				
	Frequency of street sweeping	Daily	NPDES Sweeper Log	Streets div.	Streets are swept 5 days a week
	Total miles swept	3,016	Sweeper Log	Streets Div.	City has 116 miles of roadway swept twice per month
	Estimated quantity of sweeping material collected (cy)	3,596	Sweeper Log	Streets Div.	Sweeper Logs and Tickets
	Total phosphorous loadings removed (pounds)	2,976	FSA Spreadsheet	Mock•Roos	
	Total nitrogen loadings removed (pounds)	4,642	FSA Spreadsheet	Mock•Roos	
	Report the equipment yards and maintenances shops that support road maintenance activities, and the number of inspections conducted for each facility.				
	Name of Facility	Number of Inspections			
	#1: Public Services Department – Fleet Maintenance Garage 1749 3rd Ave. South	12	Municipal Maintenance Yard Inspection Checklist	Stormwater Division	Public Services Garage
#2: Public Services Department – Streets/Stormwater Division Yard 1880 2 nd Ave. North, Lake Worth, FL 33460	12	Inspection Log	Stormwater Division	Facility houses Streets/Storm Water Division Employees Material and	

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					Equipment
Part III.A.3 Summary	Provide an evaluation of the Stormwater Management Program according to Part VI.B.2 of the permit.				
	Strengths: Lake Worth maintains routine street sweeping city wide. Also, the City has various trash receptacles along roads, parks and beach. The Grounds Department systematically removes trash to avoid overflow which reduces pollution found in the system during treatment.				
	Limitations: Weather and littering				
	SWMP revisions implemented to address limitations: Collection of sediment and trash during inclement weather periods.				
Part III.A.4	Flood Control Projects				
	Report the total number of flood control projects that were constructed by the permittee during the reporting period and the number of those projects that did NOT include stormwater treatment. The permittee shall provide a list of the projects where stormwater treatment was not included with an explanation for each of why it was not.				
	Report on any stormwater retrofit planning activities and the associated implementation of retrofitting projects to reduce stormwater pollutant loads from existing drainage systems that do not have treatment BMPs.				
	Flood control projects completed during the reporting period	0	Storm Division Report	Storm Division	
	Flood control projects completed that did <u>not</u> include stormwater treatment				
	Stormwater retrofit projects planned/under construction				
	Stormwater retrofit projects completed				
	If there were projects that did not include stormwater treatment, provide as an attachment a list of the projects and an explanation for each of why it did not.	<input type="checkbox"/>			
Part III.A.4 Summary	Provide an evaluation of the Stormwater Management Program according to Part VI.B.2 of the permit.				
	Strengths: Implementing improvements or identifying areas of improvements based on the City's recent stormwater master plan. Working with other local agencies to improve flood control on municipalities' streets.				
	Limitations:				
	SWMP revisions implemented to address limitations:				

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Permit Citation/ SWMP Element	Permit Requirement/Quantifiable SWMP Activity	Number of Activities Performed	Documentation / Record	Entity Performing the Activity	Comments
Part III.A.5	Municipal Waste Treatment, Storage, and Disposal Facilities Not Covered by an NPDES Stormwater Permit				
	Report the applicable facilities and the number of the inspections conducted for each facility.				
	Name of Facility	Number of Inspections			
	N/A	N/A			
	N/A	N/A			
Part III.A.5 Summary	Provide an evaluation of the Stormwater Management Program according to Part VI.B.2 of the permit.				
	Strengths: N/A				
	Limitations: N/A				
	SWMP revisions implemented to address limitations: N/A				
Part III.A.6	Pesticides, Herbicides, and Fertilizer Application				
	Report the number of permittee personnel applicators and contracted commercial applicators of pesticides and herbicides who are FDACS certified / licensed.				
	Report the number of permittee personnel who have been trained through the Green Industry BMP Program and the number of contracted commercial applicators of fertilizer who are FDACS certified / licensed.				
	PERSONNEL: FDACS public applicators of pesticides/herbicides	2	Employees licenses recorded on file with State of Florida	Grounds Maintenance DIV	Public Services Department
	CONTRACTORS: FDACS commercial applicators of pesticides/ herbicides	1	State License		Contractor for City Owned Golf Course
	PERSONNEL: Green Industry BMP Program training completed	8	Certificate of Training	Grounds Maintenance Division	Public Service
	CONTRACTORS: FDACS certified / licensed applicators of fertilizer	1	Certificate of Training		Golf Course
	Provide a copy of the adopted ordinance with the Year 2 Annual Report. If this provision is not applicable because the permittee is not within the watershed of a nutrient-impaired water body, indicate that in Column F.				
	Year 2 ONLY: Attach copy of adopted Florida-friendly ordinance	<input checked="" type="checkbox"/>			Refer to PBC MS4 Website
	Report on the public education and outreach activities that are performed or sponsored by the permittee within the permittee's jurisdiction to encourage citizens to reduce their use of pesticides, herbicides and fertilizers including the type and number of activities conducted, the type and number of materials distributed, and the number of Web site visits (if applicable).				
	Public Education and Outreach Program	The public outreach and education plan is carried out as a joint effort by the Palm Beach County Co-permittees. Please see the Palm Beach County Joint Annual Report for the public education and outreach information.			

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Part III.A.6 Summary	Provide an evaluation of the Stormwater Management Program according to Part VI.B.2 of the permit.				
	Strengths: Staff and/or Vendors are licensed and certified to execute work in a safe and proper manner. The Lake Worth Fertilizer Friendly Use Regulation (Code of Ordinances, Chapter 12, and Article 8) and the pesticide, herbicide, and fertilizer application log continue to be advantageous in tracking, recording and scheduling. The City customizes work schedules which meet the demand of the seasons.				
	Limitations: Some may not follow the City's Fertilizer Friendly Use Regulation and Maintenance Plan				
	SWMP revisions implemented to address limitations: Periodically check the logs for compliance and proper documentation. Public outreach and education to contractors and lawn service companies.				
Part III.A.7.a	Illicit Discharges and Improper Disposal — Inspections, Ordinances, and Enforcement Measures				
	Report amendments in Year 4.				
	Year 4 ONLY: Attach a report on amendments to applicable legal authority	<input checked="" type="checkbox"/>	Chapter 18	Utilities	Chapter 18 – Utilities Ordinance
Part III.A.7.c	Illicit Discharges and Improper Disposal — Investigation of Suspected Illicit Discharges and/or Improper Disposal				
	Report on the proactive inspection program, including the number of inspections conducted by the permittee, the number of illicit activities found, and the number and type of enforcement actions taken.				
	Proactive inspections for suspected illicit discharges	1,013	Inspection Log	Stormwater Division	Outfall and Catchbasin Inspections
		1	2018 City of Lake Worth High-Risk Facilities and Proactive Inspection Report	Mock•Roos	Drive around within the vicinity of the High Risk Facilities
	Illicit discharges found during a proactive inspection	0	Illicit Discharge Connection Report	Stormwater Division	
		NOV/WL/citation/fines issued for illicit discharges found during proactive inspection	0	Illicit Discharge Form	Stormwater Division
	Report on the reactive investigation program as it relates to responding to reports of suspected illicit discharges, including the number of reports received, the number of investigations conducted, the number of illicit activities found, and the number and type of enforcement actions taken.				
	Reports of suspected illicit discharges received	2	Call Log	Public Service	Reports received and dispatched to Stormwater Division/Code
		Reactive investigations of reports of suspected illicit discharges etc.	2	CIMS Stormwater Program	Public Services/ Utilities Department

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	Illicit discharges etc. found during reactive investigation	0	CIMS Stormwater Program	Stormwater Division	CLW
	NOV/WL/citation/fines issued for illicit discharges etc. found during reactive investigation		Lake Worth Illicit Discharge Form	Stormwater Division	
	Report the type of training activities, and the number of permittee personnel and contractors trained (both in-house and outside training) within the reporting year.				
	Personnel trained	1	Sign-In Sheet	PBC Steering Committee	03/21/18
	Contractors trained	0			
Part III.A.7.d	Illicit Discharges and Improper Disposal — Spill Prevention and Response				
	Report on the spill prevention and response activities, including the number of spills addressed.				
	Hazardous and non-hazardous material spills responded to				
	Report the type of training activities, and the number of permittee personnel and contractors trained (both in-house and outside training) within the reporting year.				
	Personnel trained	5	Certificates: Industrial Pretreatment/Sanitary Sewer Overflow Planning/PBC Fire Rescue	Collections Division/PBC Fire Rescue	5 CITY Employees trained state certification Storm Water Level C
	Contractors trained	0			
Part III.A.7.e	Illicit Discharges and Improper Disposal — Public Reporting				
	Report on the public education and outreach activities that are performed or sponsored by the permittee within the permittee's jurisdiction to encourage the public reporting of suspected illicit discharges and improper disposal of materials, including the type and number of activities conducted, the type and number of materials distributed, and the number of Web site visits (if applicable).				
	Public Education and Outreach Program	The public outreach and education plan is carried out as a joint effort by the Palm Beach County Co-permittees. Please see the Palm Beach County Joint Annual Report for the public education and outreach information.			
Part III.A.7.f	Illicit Discharges and Improper Disposal — Oils, Toxics, and Household Hazardous Waste Control				
	Report on the public education and outreach activities that are performed or sponsored by the permittee within the permittee's jurisdiction to encourage the proper use and disposal of oils, toxics, and household hazardous waste, including the type and number of activities conducted, the type and number of materials distributed, the amount of waste collected / recycled / properly disposed, and the number of Web site visits (if applicable).				
	Public Education and Outreach Program	The public outreach and education plan is carried out as a joint effort by the Palm Beach County Co-permittees. Please see the Palm Beach County Joint Annual Report for the public education and outreach information.			

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Part III.A.7.g	Illicit Discharges and Improper Disposal — Limitation of Sanitary Sewer Seepage						
	Report on the type and number of activities undertaken to reduce or eliminate SSOs and inflow/ infiltration, the number of SSOs or inflow / infiltration incidents found and the number resolved, and the name of the owner of the sanitary sewer system within the permittee's jurisdiction. Report only the SSOs and inflow / infiltration incidents into the MS4.						
	Owner of the sanitary sewer system			City of Lake Worth			
	Activity to reduce/eliminate SSOs and I&I: (description)			Inflow Inserts	Work Order	Utilities	
	Activity to reduce/eliminate SSOs and I&I: (description)			Man Hole Rehab	Work Order	Utilities	
	SSO incidents discovered			0			
	SSO incidents resolved			0			
	Inflow / infiltration incidents discovered			0			
Inflow / infiltration incidents resolved			0				
Part III.A.7 Summary	For activities required by Part III.A.7: Provide an evaluation of the Stormwater Management Program according to Part VI.B.2 of the permit.						
	Strengths:						
	Limitations:						
	SWMP Revisions implemented to address limitations:						
Part III.A.8.a	Industrial and High-Risk Runoff — Identification of Priorities and Procedures for Inspections						
	Report on the high-risk facilities inventory, including the type and total number of high risk facilities and the number of facilities newly added each year.						
	Report on the high-risk facilities inspection program, including the number of inspections conducted and the number and type of enforcement actions taken.						
	Type of Facility	Number of Facilities	Number of Inspections	Enforcement Actions			
	Operating municipal landfills	0					
	Hazardous waste treatment, storage, disposal and recovery (HWTSDR) facilities	36	36	0	City of Lake Worth High Risk Facilities and Proactive Inspection Report, August 2018	Mock•Roos	See attached - High Risk Facilities and Proactive Inspection Report
	EPCRA Title III, Section 313 facilities (TRI)	0					
	Facilities determined as high risk by the permittee	0					
Part III.A.8.b	Industrial and High-Risk Runoff — Monitoring for High Risk Industries						
	Report the number of high risk facilities sampled.						

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	High risk facilities sampled	0			
Part III.A.8 Summary	Provide an evaluation of the Stormwater Management Program according to Part VI.B.2 of the permit.				
	Strengths: Documentation and Inspection Protocols				
	Limitations: EPA database needs updating for inactive sites and areas outside permittee's jurisdiction.				
	SWMP revisions implemented to address limitations: Added facilities since 2012, reviewed address locations and applicable categories, cross-referencing with Florida State Division of Corporations, checking active business, status and field verification.				
Part III.A.9.a	Construction Site Runoff — Site Planning and Non-Structural and Structural Best Management Practices				
	Report the number of permittee and private pre-construction site plans reviewed for stormwater, erosion, and sedimentation controls, and the number approved.				
	PERMITTEE SITES: Construction site plans reviewed	12	City Construction Drawings	Public Services/ Utilities Dept.	
	PERMITTEE SITES: Construction site plans approved	12	City Construction Dwgs.	Public Services/ Utilities Dept.	
	PRIVATE SITES: Construction site plans reviewed	5	Permit File/Naviline	Community Sustainability	Site Plan Review
	PRIVATE SITES: Construction site plans approved	5	Permit File/Naviline	See Above	
	Report the number of development permit applicants notified of the ERP and CGP, and the number of applicants who confirmed ERP and CGP coverage.				
	Notified of ERP stormwater permit requirements	0	Permit Files	Public Services/ Water Utility	Document required prior to building permit
	Confirmed ERP coverage	0	ERP Permit	See Above	
	Notified of CGP stormwater permit requirements	0	Permit File	See Above	
	Confirmed CGP coverage	0	Permit File	See Above	
Part III.A.9.b	Construction Site Runoff — Inspection and Enforcement				
	Report on the inspection program for privately-operated and permittee-operated construction sites, including the number of active construction sites during the reporting year, the number of inspections of active construction sites, the percentage of active construction sites inspected, and the number and type of enforcement actions / referrals taken.				
	PERMITTEE SITES: Active construction sites	0	Construction Plans	Public Services/ Water Utilities	
	PERMITTEE SITES: Pre-, During, and Post inspections of active construction sites for E&S and waste control BMPs	0	SWWP Log	Public Services	
	PERMITTEE SITES: Percentage of active construction sites inspected	100%	SWWP Log	Public Services	

SECTION VII. STORMWATER MANAGEMENT PROGRAM (SWMP) SUMMARY TABLE						
A.	B.		C.	D.	E.	F.
Permit Citation/ SWMP Element	Permit Requirement/Quantifiable SWMP Activity		Number of Activities Performed	Documentation / Record	Entity Performing the Activity	Comments
	PRIVATE SITES: Active construction sites		0	Construction Plans	Community Sustainability	
	PRIVATE SITES: Pre-, During, and Post inspections of active construction sites for E&S and waste control BMPs		0	Permit File	Community Sustainability	Site Plan Review
	PRIVATE SITES: Percentage of active construction sites inspected		0	Permit File	Community Sustainability	
	Enforcement Action		0			
Part III.A.9.c	Construction Site Runoff — Site Operator Training					
	Report the type of training activities, the number of inspectors, site plan reviewers and site operators trained (both in-house and outside training).					
		DEP Certification	Annual Training			
	Permittee construction site inspectors	3	1	Sediment & Erosion Control Certification	PBC Steering Committee	Russel, Oudan, Love
	Permittee construction site plan reviewers		1	2018 Sign-In Sheet	PBC Steering Committee	Carlos Enriquez
	Permittee construction site operators			Precon Meeting	Public Services/ Contractors	
Part III.A.9 Summary	Provide an evaluation of the Stormwater Management Program according to Part VI.B.2 of the permit.					
	Strengths: Stringent review processes and regular inspection along with supplementing inspection by Consultants					
	Limitations: Large amount of activity and requires contractors' self-regulation and NPDES Compliance					
	SWMP revisions implemented to address limitations: More stringent emphasis on NPDES regulations and erosion control BMP's					

SECTION VIII. CHANGES TO THE STORMWATER MANAGEMENT PROGRAM (SWMP) ACTIVITIES (Not Applicable in Year 4)		
A.	Permit Citation/ SWMP Element	Proposed Changes to the Stormwater Management Program Activities Established as Specific Requirements Under Part III.A of the Permit (Including the Rationale for the Change) — REQUIRES DEP APPROVAL PRIOR TO CHANGE IF PROPOSING TO REPLACE OR DELETE AN ACTIVITY.
	N/A	
B.	Permit Citation/ SWMP Element	Changes to the Stormwater Management Program Activities NOT Established as Specific Requirements Under Part III.A of the Permit (Including the Rationale for the Change)
	N/A	

SECTION IX. TMDL Status Report

A.	YEAR 1 Provide a table summarizing the status of the TMDL process. Include a list of prioritized TMDLs and their monitoring and implementation schedule; and include the Identification number of the outfall prioritized for TMDL monitoring.								
	WBID Number	Segment/ Waterbody/ Basin	Pollutant of Concern	TMDL DEP / EPA	Percent Reduction (WLA)	Priority Rank	Priority Outfall	Monitoring Summary / BPCP Due Date	Supplemental SWMP Due Date
	N/A			<input type="checkbox"/> / <input type="checkbox"/>		1		(Year 3 AR)	(Year 4 AR; N/A) if BPCP)
				<input type="checkbox"/> / <input type="checkbox"/>					
B.	YEAR 3 and annually thereafter, provide a summary of the estimated load reductions that have occurred for the pollutant(s) of concern being discharged from the MS4 to the TMDL water body during the reporting period and cumulatively since the date the Supplemental SWMP was implemented. Year 3: Submit a Monitoring data summary or BPCP (if applicable). Year 4: Submit a Supplemental SWMP (if applicable).								
	WBID Number	Pollutant of Concern	Monitoring Summary / BPCP Submitted	Supplemental SWMP Submitted	Projected load reductions OR Actual load reductions to date				
	N/A		(Year 3 AR)	(Year 4 AR; N/A if BPCP)					
C.	Provide a brief statement as to the status of TMDL implementation according to Part VIII.B of the permit (e.g. status of monitoring to validate WLA): No discharge to a TMDL WBID at the time of permit issuance.								



City of Lake Worth High Risk Facilities and Proactive Inspection Report

August 2018
Updated January 2019

PA#B8017.00

Prepared By:
MOCK • ROOS
CONSULTING ENGINEERS

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Introduction

Background

The City of Lake Worth contracted with Mock, Roos & Associates, Inc. (Mock•Roos) to provide consulting services with respect to the Municipal Separate Storm Sewer System – National Pollution Discharge Elimination System (MS4-NPDES) Permit compliance. The request for services contained several tasks one of which addresses High Risk Facilities. Mock•Roos developed a methodology for reviewing the High Risk Facilities within the MS4 boundary, coordinated with City staff to add and remove facilities from the previous list, developed an inspection schedule, and visited the sites. This report documents the results of the services provided (Item 5 of Task Order No. 004).

Methodology

Evaluation of Existing High Risk Facilities Inventory

Each permit cycle the City of Lake Worth updates the High Risk Facility inventory in regard to the City MS4. In 2012, information was gathered from a search of EPA databases which included RCRAInfo, TRIS, CERCLIS data sets. The City identified 214 potential facilities under the 2012 High Risk Facility EPA Query. Of the 214 facilities 118 were found to be in areas outside of or not contributing to the City's MS4 and were removed from the list of remaining 96 facilities, some are not considered high risk as they are managed under different regulatory managements programs. 52 facilities such as dry cleaners, gas stations, auto part stores, etc. fall into this category. These facilities were removed from the list, leaving 43 facilities in the City's High Risk Facility Inventory.

To update the list in 2018, information was gathered again from a search of EPA's "Multisystem search" (<https://www3.epa.gov/enviro/>). This information was then reduced to the facilities within the City's MS4 boundary. The data set includes a column "CREATE_DAT" which is "A system-generated value that represents the calendar date and time the corresponding information was first posted to the database." All data posted in 2011 or later were extracted and resulted in 12 additions to the 2012 list. Review of the added facilities noted 3 locations that were Lake Worth Power Generation associated facilities; these were removed (similar to the FPL substations and not high risk per FDEP memorandum). 1 city park, and 3 duplicates within the previous submission were removed and 4 duplicates of facilities from the 2012 list and updated facilities were combined. Cross-referencing the Florida State Division of Corporations, each entry was reviewed for active business status in the Lake Worth MS4 boundary, 8 facilities were found to be either inactive or moving from the area; these were removed from the inventory.

The final 36 High Risk Facility Inventory each requires inspection during permit Cycle Four. A list and maps of these facilities are included in Appendix A - Maps of High Risk Facilities. As expected, the High Risk Facilities are located within the commercial and light industrial areas of the City. Since the intention was to inspect all the High Risk Facilities, it was decided to also conduct proactive inspection for illicit discharges within the vicinity of the High Risk Facilities.

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Site Visit of High Risk Facilities and Illicits

The review of existing and new High Risk Facilities resulted in several maps that may be found in Appendix A. These maps were used to plan the site visits. Sites were grouped in geographic areas and visited in the most efficient path possible. The site visit had several goals:

- To determine if the facility was currently active in the location reported
- Identify if the facility had the potential to discharge to the MS4
- To observe evidence of the facility discharging to the MS4 such as
 - Illicit connection to storm sewer
 - Dumping or spilling to the storm sewer
 - Visual evidence of wash water going to the storm sewer
 - Visual evidence of storage tanks leaking or improperly contained
 - Stockpiles/debris piles uncontained

In addition, while visiting the commercial and industrial areas, a proactive effort was made to look for and document other suspected Illicit Discharges or illegal dumping to the City's MS4.

On July 31, 2018, Alan Wertepny, P.E. and David Cowan, P.E. visited each site and observed conditions from the Right-of-Way. If any of the above conditions were observed, it was photo documented. A summary of observations, in table form, may be found in Appendix B and the photos from the field may be found in Appendix C. The results of the site visits are summarized in the following section of this report.

Results

Site Visit

Based on the observations the day of the site visit the facilities may be grouped into categories:

High Risk Facilities (24) where no indication of illicit activity was observed

• MAP ID1	2 Brothers Mobile Auto Repair LLC	202 South H Street
• MAP ID2	All Import Car Repair	412 South H Street
• MAP ID3	Atlantis Air Conditioning	1130a North G Street
• MAP ID4	Beiter Battery	747 Barnett Drive
• MAP ID5	Caroline Tire Co.	117 S. Dixie Hwy
• MAP ID9	Gas Systems Technology Inc.	1910 7th Ave N
• MAP ID10	Gonz Auto Collision Center Inc.	1401 N Dixie Hwy # B
• MAP ID11	J L G Auto Repair Inc.	1109 7th Ave N
• MAP ID12	Joy Towing Inc.	2628 Park Street
• MAP ID15	Paco's Auto Body Repair	431 S H St
• MAP ID16	Palm Beach Contracting LLC.	1107 Barnett Dr. A
• MAP ID17	Priority Towing	740 Barnett Dr.
• MAP ID18	Regal Paint Center	201 S Dixie Highway
• MAP ID20	Star Pavement Supply	719 Barnett Dr.
• MAP ID21	Steve's Towing	305 S H St
• MAP ID24	Tony's Paint & Body Shop	410 N G St
• MAP ID25	Vinnies Auto Body Shop	1835 7th Ave N
• MAP ID27	Worldwide Transmissions	714 Barnett Drive
• MAP ID29	Lifetime Exteriors, Inc.	102 South F Street
• MAP ID30	South Florida Aluminum	1226 Wingfield St
• MAP ID32	Wayne Akers Ford	2000 10th Ave N
• MAP ID34	Stanley Steamer	3670 23rd Ave S
• MAP ID35	Van Linda Iron Works Inc.	3787 Boutwell Road
• MAP ID36	Control Logistics, Inc.	1213 Pope Lane

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High Risk Facilities (7) that are no longer at the location reported

- | | | |
|------------|---|-----------------------------|
| • MAP ID8 | Midnight Express Towing Inc. | 1108 3rd Ave N |
| • MAP ID13 | Lake Worth Commerce Home Pest Defense | 1100 Barnett Drive Suite 11 |
| • MAP ID14 | National Cremation & Burial Society Garage Yard | 1022 North H Street |
| • MAP ID19 | Sheen Towing | 323 South H Street |
| • MAP ID22 | Sullivan Electric & Pump | 2115 7th Ave N |
| • MAP ID26 | W.E. Brodbeck Roofing Co. | 1807 6th Avenue North |
| • MAP ID33 | Perrigo | 2201 4th Ave N |

Potential illicit discharges into the City's MS4

(First 6 High Risk Facilities and 7th one from proactive inspections)

- | | | |
|-------------|---|-----------------------|
| • MAP ID6 | Construction Hydraulics | 1320 S J Ter. |
| • MAP ID7 | Devland Site Paving and Utilities, Inc. | 1302 Wingfield St |
| • MAP ID23 | Table Enterprise Inc. Warehouse District | 1934 7th Avenue North |
| • MAP ID28 | A-1 Paint | 1018 5th Ave N |
| • MAP ID31 | CEMEX Construction Materials Florida LLC. | 1819 7th Ave N |
| • NO MAP ID | Shaw G Street Properties LLC. | 1110 C N G Street |

Conclusion

The purpose of the project was to update the High Risk Facilities Inventory and conduct site visits of the facilities and adjacent areas. Mock•Roos reviewed the reasonable ascertainable information to update The City of Lake Worth's High Risk Facilities Inventory and visited all the sites. The following recommendations are made:

1. For High Risk Facilities where no indication of illicit activity was observed, no further investigations are needed at this time.
2. The seven (7) High Risk Facilities that are no longer at the location reported should be removed from the inventory leaving 29 facilities.
3. High Risk Facilities where observations indicate the possibility of illicit discharges, require follow-up investigation by the City. It is recommended that City staff meet with the facilities owner/operator to, determine the appropriate action to be taken, such as a warning, or a fine and corrective action plan. The City will also need to conduct follow-up visits to verify that the corrective actions have been taken.

Below is a list of the facilities and potential corrective measures.

MAP ID6 Construction Hydraulics - 1320 S J Terrace (Photo 20 and Photo 21)

- Collect all items that are in the back maintenance yard and store in a location that will prevent exposure to rain and minimize the potential of polluted runoff from leaving the site and entering the stormwater system.

MAP ID7 Devland Site Paving and Utilities, Inc. - 1302 Wingfield Street (Photo 23 - Photo 25)

- Remove and dispose of rubbish and debris piles in yard. Stabilize areas adjacent to street to prevent sediment from washing into the street and catchbasin.

MAP ID23 Table Enterprise Inc. Warehouse District - 1934 7th Avenue North (Photo 10 - Photo 12)

- Develop and implement dust collection and control best management practices that prevent waste products from the fabrication process from leaving the site.

MAP ID28 A-1 Paint - 1018 5th Ave North (Photo 32 - Photo 33)

- Develop a waste container removal schedule that prevents large quantities of waste paint products from being stored outside and uncovered. This will reduce the risk of potential pollutant runoff from entering the stormwater system.

MAP ID31 CEMEX Construction Materials Florida LLC. - 1819 7th Ave North (Photo 13 - Photo 18)

- Develop new best management practices that prevent all cement laden water from leaving site. Develop QA/QC process to prevent water with pH outside the range of 6.5 to 8.5 and water with no greater than 29 NTUs above natural background conditions from leaving the site. An erosion and sediment control plan is needed.

NO MAP ID Shaw G Street Properties LLC. - 1110C North G Street (Photo 35 - Photo 36)

- Determine the nature and source of tainted water, from the discharge pipe flowing to the catch basin. Determine if it is an illicit discharge. Note that if the discharge is from an air conditioning condensation it is allowed.

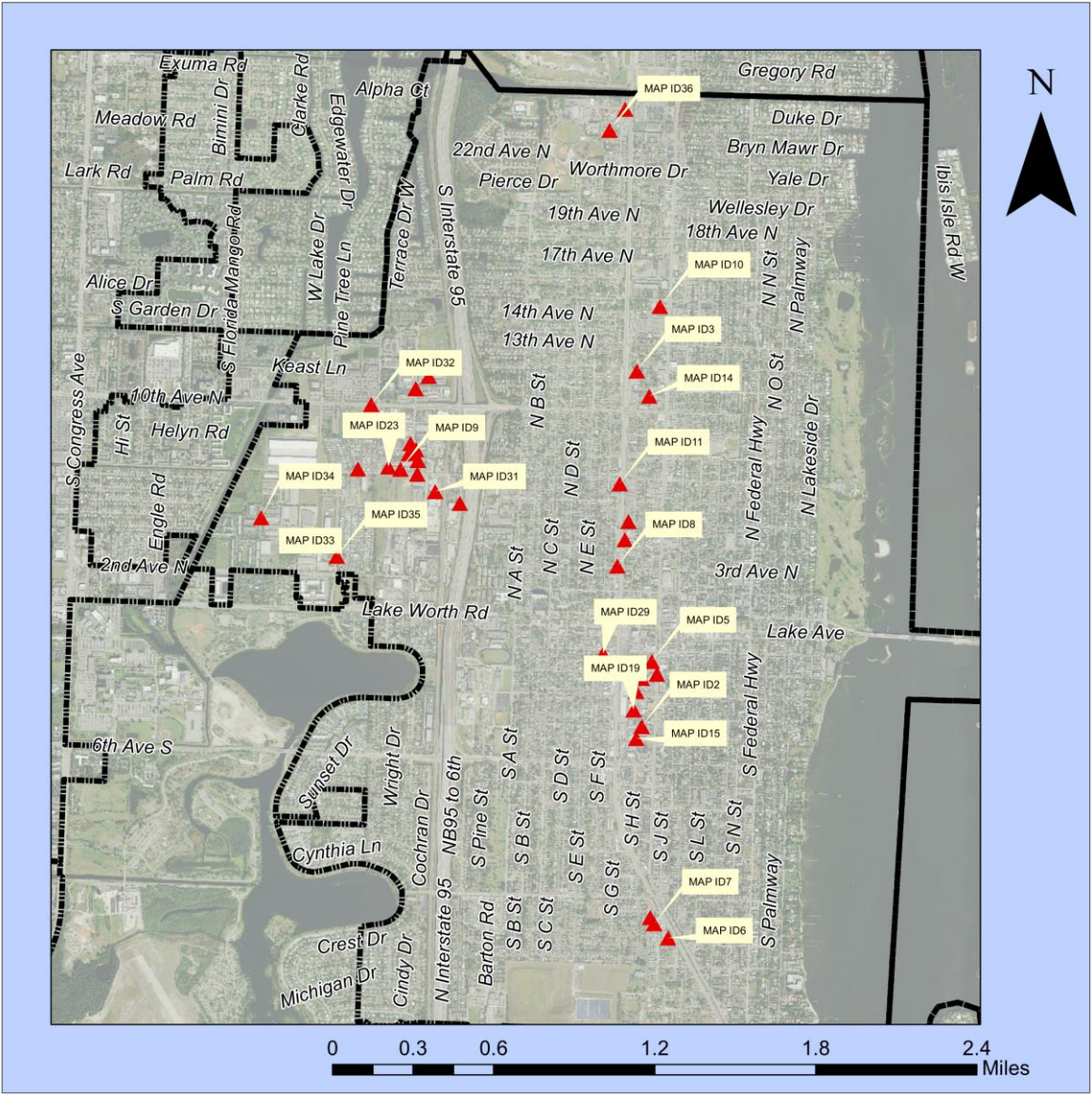
Schedule City crews for cleaning of catch basins and stormwater pipe system to remove trash, debris and sediments at the previous mentioned three sites. (Table Enterprise Inc., CEMEX Construction Materials Florida LLC., Devland Site Paving and Utilities, Inc.)

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Appendix A – Maps of High Risk Facilities

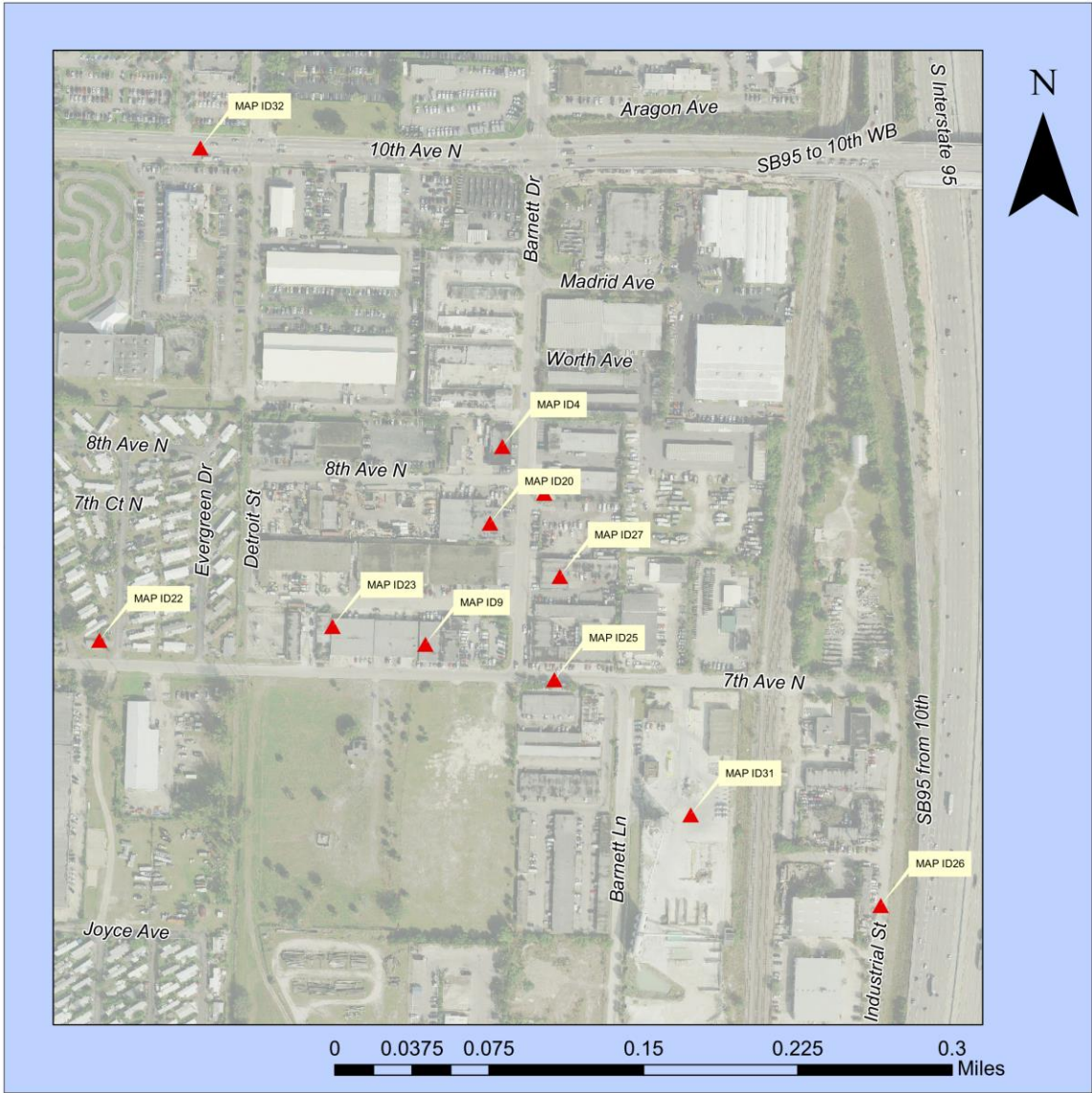
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MAP ID2	ALL IMPORT CAR REPAIR	412 SOUTH H STREET
MAP ID3	ATLANTIS AIR CONDITIONING	1130A NORTH G STREET
MAP ID4	BETTER BATTERY	747 BARNETT DRIVE
MAP ID5	CAROLINE TIRE CO.	117 S. DIXIE HWY
MAP ID6	CONSTRUCTION HYDRAULICS	1320 S J TER
MAP ID7	DEVLAND SITE PAVING AND UTILITIES, INC	1302 WINGFIELD ST
MAP ID8	MIDNIGHT EXPRESS TOWING INC	1108 3RD AVEN
MAP ID9	GAS SYSTEMS TECHNOLOGY INC	1910 7TH AVEN
MAP ID10	GONZ AUTO COLLISION CENTER INC	1401 N DIXIE HWY # B
MAP ID11	J L G AUTO REPAIR INC	1109 7TH AVEN
MAP ID12	JOY TOWING INC	2628 PARK STREET
MAP ID13	LAKE WORTH COMMERCE HOME PEST DEFENSE	1100 BARNETT DRIVE SUITE 11
MAP ID14	NATIONAL CREMATION & BURIAL SOCIETY GARAGE YARD	1022 NORTH H STREET
MAP ID15	PACOS AUTO BODY REPAIR	431 S H ST
MAP ID16	PALM BEACH CONTRACTING LLC	1107 BARNETT DR # A
MAP ID17	PRIORITY TOWING	740 BARNETT DR
MAP ID18	REGAL PAINT CENTER	201 S DIXIE HIGHWAY
MAP ID19	SHEEN TOWING	323 SOUTH H STREET
MAP ID20	STAR PAVEMENT SUPPLY	719 BARNETT DR
MAP ID21	STEVES TOWING	305 S H ST
MAP ID22	SULLIVAN ELECTRIC & PUMP	2115 7TH AVEN
MAP ID23	TABLE ENTERPRISE INC. WAREHOUSE DISTRICT	1934 7TH AVENUE NORTH
MAP ID24	TONY'S PAINT & BODY SHOP	410 N G ST
MAP ID25	VINNES AUTO BODY SHOP	1835 7TH AVEN
MAP ID26	W.E. BRODBECK ROOFING CO.	1807 6TH AVENUE NORTH
MAP ID27	WORLDWIDE TRANSMISSIONS	714 BARNETT DRIVE
MAP ID28	A 1 PAINT	1018 5TH AVEN
MAP ID29	LIFETIME EXTERIORS, INC.	102 SOUTH F STREET
MAP ID30	SOUTH FLORIDA ALUMINUM	1226 WINGFIELD ST
MAP ID31	CEMEX CONSTRUCTION MATERIALS FLORIDA LLC	1819 7TH AVEN
MAP ID32	WAYNE AKERS FORD	2000 10TH AVEN
MAP ID33	PERRIGO	2201 4TH AVEN
MAP ID34	STANLEY STEEMER	3670 23RD AVE S
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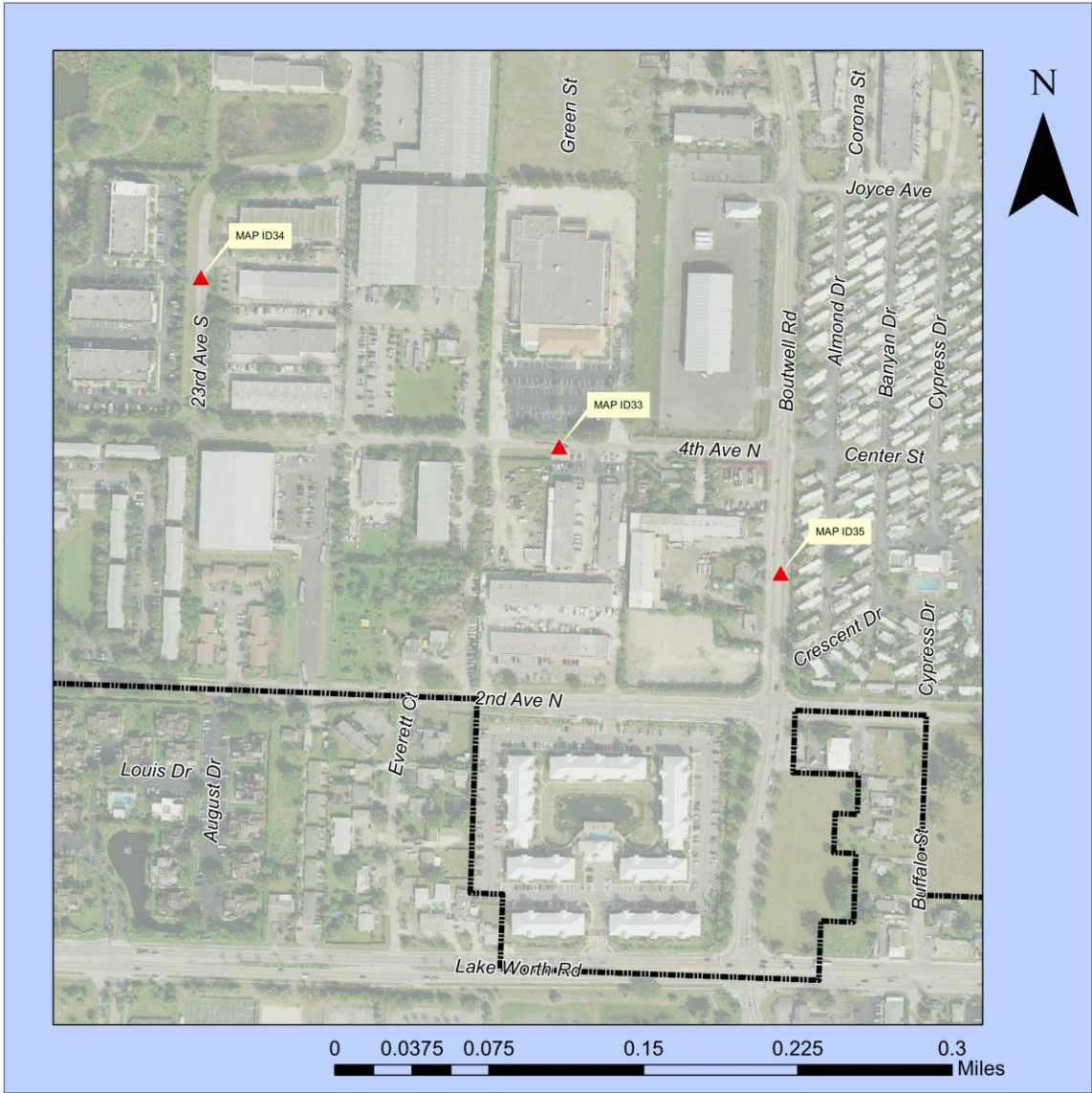
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MAP ID10	GONZ AUTO COLLISION CENTER INC	1401 N DIXIE HWY # B
MAP ID11	J L G AUTO REPAIR INC	1109 7TH AVEN
MAP ID12	JOY TOWING INC	2628 PARK STREET
MAP ID13	LAKE WORTH COMMERCE HOME PEST DEFENSE	1100 BARNETT DRIVE SUITE 11
MAP ID14	NATIONAL CREMATION & BURIAL SOCIETY GARAGE YARD	1022 NORTH H STREET
MAP ID15	PACOS AUTO BODY REPAIR	431 S H ST
MAP ID16	PALM BEACH CONTRACTING LLC	1107 BARNETT DR # A
MAP ID17	PRIORITY TOWING	740 BARNETT DR
MAP ID18	REGAL PAINT CENTER	201 S DIXIE HIGHWAY
MAP ID19	SHEEN TOWING	323 SOUTH H STREET
MAP ID20	STAR PAVEMENT SUPPLY	719 BARNETT DR
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MAP ID22	SULLIVAN ELECTRIC & PUMP	2115 7TH AVEN
MAP ID23	TABLE ENTERPRISE INC. WAREHOUSE DISTRICT	1934 7TH AVENUE NORTH
MAP ID24	TONY'S PAINT & BODY SHOP	410 N G ST
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MAP ID26	W.E. BRODBECK ROOFING CO.	1807 6TH AVENUE NORTH
MAP ID27	WORLDWIDE TRANSMISSIONS	714 BARNETT DRIVE
MAP ID28	A 1 PAINT	1018 5TH AVEN
MAP ID29	LIFETIME EXTERIORS, INC.	102 SOUTH F STREET
MAP ID30	SOUTH FLORIDA ALUMINUM	1226 WINGFIELD ST
MAP ID31	CEMEX CONSTRUCTION MATERIALS FLORIDA LLC	1819 7TH AVEN
MAP ID32	WAYNE AKERS FORD	2000 10TH AVEN
MAP ID33	PERRIGO	2201 4TH AVEN
MAP ID34	STANLEY STEEMER	3670 23RD AVE S
MAP ID35	VAN LINDA IRON WORKS INC	3787 BOUTWELL ROAD
MAP ID36	CONTROL LOGISTICS, INC.	1213 POPE LANE



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MAP_ID	Facility Name	Address
MAP ID1	2 BROTHERS MOBILE AUTO REPAIR LLC	202 SOUTH H STREET
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MAP ID3	ATLANTIS AIR CONDITIONING	1130A NORTH G STREET
MAP ID4	BETTER BATTERY	747 BARNETT DRIVE
MAP ID5	CAROLINE TIRE CO.	117 S. DIXIE HWY
MAP ID6	CONSTRUCTION HYDRAULICS	1320 S J TER
MAP ID7	DEVLAND SITE PAVING AND UTILITIES, INC	1302 WINGFIELD ST
MAP ID8	MIDNIGHT EXPXRESS TOWING INC	1108 3RD AVEN
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Appendix B – Table of Field Observations

Summary Table of High Rick Facility

Identifying Values of High Risk Facilities					Observation Requiring Additional Follow-up			
Map ID No.	Primary Name	Street Location	LATITUDE83	LONGITUDE83	Facility is at Location	Discharge to MS4	Wash Water to MS4	Debris Piles
MAP ID1	2 BROTHERS MOBILE AUTO REPAIR LLC	202 SOUTH H STREET	26.61323	-80.05827				
MAP ID2	ALL IMPORT CAR REPAIR	412 SOUTH H STREET	26.61064	-80.05826				
MAP ID3	ATLANTIS AIR CONDITIONING	1130A NORTH G STREET	26.62980	-80.05854				
MAP ID4	BEITER BATTERY	747 BARNETT DRIVE	26.62589	-80.07074				
MAP ID5	CAROLINE TIRE CO.	117 S. DIXIE HWY	26.61413	-80.05773				
MAP ID6	CONSTRUCTION HYDRAULICS	1320 S J TER	26.59923	-80.05684				X
MAP ID7	DEVLAND SITE PAVING AND UTILITIES, INC	1302 WINGFIELD ST	26.60001	-80.05761		X	X	X
MAP ID8	MIDNIGHT EXPXPRESS TOWING INC	1108 3RD AVE N	26.61929	-80.05958	No		X	X
MAP ID9	GAS SYSTEMS TECHNOLOGY INC	1910 7TH AVE N	26.62450	-80.07128				
MAP ID10	GONZ AUTO COLLISION CENTER INC	1401 N DIXIE HWY # B	26.63328	-80.05728				
MAP ID11	J L G AUTO REPAIR INC	1109 7TH AVE N	26.62372	-80.05945				
MAP ID12	JOY TOWING INC	2628 PARK STREET	26.64391	-80.05916				
MAP ID13	LAKE WORTH COMMERCE HOME PEST DEFENSE	1100 BARNETT DRIVE SUITE 11	26.62952	-80.06976	No			
MAP ID14	NATIONAL CREMATION & BURIAL SOCIETY GARAGE YARD	1022 NORTH H STREET	26.62844	-80.05786	No			
MAP ID15	PACOS AUTO BODY REPAIR	431 S H ST	26.60998	-80.05856				
MAP ID16	PALM BEACH CONTRACTING LLC	1107 BARNETT DR # A	26.62885	-80.07045				
MAP ID17	PRIORITY TOWING	740 BARNETT DR	26.62556	-80.07044				
MAP ID18	REGAL PAINT CENTER	201 S DIXIE HIGHWAY	26.61345	-80.05745				
MAP ID19	SHEEN TOWING	323 SOUTH H STREET	26.61153	-80.05870	No			
MAP ID20	STAR PAVEMENT SUPPLY	719 BARNETT DR	26.62535	-80.07082				
MAP ID21	STEVES TOWING	305 S H ST	26.61253	-80.05857				
MAP ID22	SULLIVAN ELECTRIC & PUMP	2115 7TH AVE N	26.62453	-80.07357	No			
MAP ID23	TABLE ENTERPRISE INC. WAREHOUSE DISTRICT	1934 7TH AVENUE NORTH	26.62462	-80.07193		X	X	
MAP ID24	TONYS PAINT & BODY SHOP	410 N G ST	26.62070	-80.05918				
MAP ID25	VINNIES AUTO BODY SHOP	1835 7TH AVE N	26.62425	-80.07037				
MAP ID26	W.E. BRODBECK ROOFING CO.	1807 6TH AVENUE NORTH	26.62266	-80.06807	No			
MAP ID27	WORLDWIDE TRANSMISSIONS	714 BARNETT DRIVE	26.62498	-80.07033				
MAP ID28	A 1 PAINT	1018 5TH AVE N	26.62168	-80.05899				
MAP ID29	LIFETIME EXTERIORS, INC.	102 SOUTH F STREET	26.61456	-80.06035				
MAP ID30	SOUTH FLORIDA ALUMINUM	1226 WINGFIELD ST	26.60033	-80.05782				
MAP ID31	CEMEX CONSTRUCTION MATERIALS FLORIDA LLC	1819 7TH AVE N	26.62330	-80.06941		X	X	
MAP ID32	WAYNE AKERS FORD	2000 10TH AVE N	26.62799	-80.07286				
MAP ID33	PERRIGO	2201 4TH AVE N	26.62070	-80.07628	No			
MAP ID34	STANLEY STEEMER	3670 23RD AVE S	26.62189	-80.07880				
MAP ID35	VAN LINDA IRON WORKS INC	3787 BOUTWELL ROAD	26.61981	-80.07472				
MAP ID36	CONTROL LOGISTICS, INC.	1213 POPE LANE	26.64278	-80.06000				

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Photo 1 Beiter Battery, no illicit observed



Photo 2 Priority Towing, no illicit observed



Photo 3 Priority Towing's impound yard



Photo 4 Star Pavement Supply, no illicit observed



Photo 5 Sullivan Electric & Pump, Inc., new location



Photo 6 Sullivan Electric & Pump, Inc., new location

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Photo 7 Sullivan Electric & Pump, Inc., no illicit observed



Photo 8 Carolina Tires, no illicit observed



Photo 9 Vinnies Autobody Shop, no illicit observed



Photo 10 Table Enterprise Inc., debris washed to MS4



Photo 11 Table Enterprise Inc., debris washed to MS4



Photo 12 Table Enterprise Inc., debris washed to MS4

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Photo 13 CEMEX Construction Materials, Process Yard



Photo 14 Cement waste water in road side ditch



Photo 15 Cement waste water in road side ditch



Photo 16 Illicit connection, no treatment prior to ditch



Photo 17 Illicit connection running directly form process



Photo 18 Illicit connection flowing to catch basin



Photo 19 Van Linda Iron Works, no illicit observed



Photo 20 Front view of Construction Hydraulics



Photo 21 Construction Hydraulics, stockpiles observed



Photo 22 Former Perrigo location, for lease



Photo 23 Devland Site Paving and Utilities, stockpiles



Photo 24 Devland Site Paving and Utilities, stockpiles



Photo 25 Devland Site Paving and Utilities, debris to MS4



Photo 26 Impacted catch basin on Wingfield Street



Photo 27 Impacted catch basin on Wingfield Street



Photo 28 Regal Paint Center, no illicit observed



Photo 29 Regal Paint Center, no illicit observed



Photo 30 Former Midnight Express Towing, Now Gardens

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Photo 31 Tony's Paint & Body, no illicit observed



Photo 32 A1 Paint, no illicit observed



Photo 33 A1 Paint, staging of spent paint buckets



Photo 34 Condensate flowing to MS4, concrete eroded



Photo 35 Unit 1110C N G Street, not on list



Photo 36 Control Logistics, no illicit observed

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Appendix D – Report Updates

Updates to Report Following Draft Submission

The purpose of the project was to update the High Risk Facilities Inventory the report was drafted and submitted for comments. During the elapsed time between the draft report and finalization the City of Lake Worth took some initiative to follow up on some of the reported items. The following updates are included in this report.

Unit 1110C N G Street - Shaw G Street Properties LLC. (NO MAP ID)

A plumbing inspector Larry Wagner visits the site around the date of October 29th, and did not observe any violations during his inspection. He stated it was normal condensation.

1320 S J Terrace - Construction Hydraulics (MAP ID6)

The City discussed the observations with the responsible parties on the property. They have cleaned the area and City of Lake Worth staff have inspected site. Site is noted as being in well field and county inspects facility. They are compliant.

1817 7th Ave N - CEMEX Construction Materials Florida LLC. (MAP ID31)

Bobby Hicks, Community Code Officer did an onsite inspection of the above address on 10/26/2018. The property line per property appraiser goes all the way across the street on the west side. The drainage ditch is located on the owner's property and has a concrete bottom and sides. The water that runs off from the plant comes down to the ditch, from there it spills into a metal grate and pipe that's underground that flows into their retention pond. If this retention pond overflows there is another grate where the water flows into that goes under the road to another retention pond. Cemex has taken all necessary action to unclog their drains so the water will flow easier.

1934 7th Ave N - Table Enterprise Inc. Warehouse District (MAP ID23)

Bobby Hicks, Community Code Officer made several site inspections. The water that is sitting in the parking lot is there all the time due to rain and the granite business. There is no grate where the water can run into the City drain system. He also walked the parking lot and found this is the only area where the water stands.

1302 Wingfield Street - Devland Site Paving and Utilities, Inc. (MAP ID7)

City staff made a site inspection and the site was found to be compliant at the time of the inspection.

1018 5th Ave North - A-1 Paint (MAP ID28)

City staff made a site inspection and the site was found to be compliant at the time of the inspection.

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Code and Land Development Regulation Review

NPDES Permit Year 2

2017 – 2018



Prepared By:

MOCK • ROOS

CONSULTING ENGINEERS

Introduction

The City of Lake Worth's current Code of Ordinances and Comprehensive Plans were reviewed. The goal of the review was to identify both Code items that encouraged development utilizing low impact design, implement green infrastructure and promote sustainability with respect to water quality and quantity management. These goals satisfy the requirements of the MS4 Permitting Manual in the section on Stormwater Management Program No. 2-Areas of New Development and Significant Redevelopment. This program emphasizes four items: 1) A reduction in impervious area, 2) Reductions in flow and volume of stormwater discharge, 3) Increased natural hydrology, and 4) Adoption of the Florida Yards and Neighborhoods Program in Landscaping. This report lists the current techniques aimed at reducing the stormwater impacts, recommends techniques or language for possible future incorporation into the regulations, and outlines a plan for implementation. Throughout this report, recommendations are presented in **bold text**. Some information was copied from the applicable document to demonstrate how the stormwater quality and quantity management objective listed above are being met.

List of regulations reviewed

- City of Lake Worth's Planning and Zoning web page
- Land Use Maps, Zoning Maps
- City of Lake Worth's Comprehensive Plan
- City of Lake Worth's Land Development Regulations
- City of Lake Worth's Standard Forms and Standard Specification Sheets on their website

Comprehensive Plan

The City of Lake Worth adopted updates to its Comprehensive Plan in June of 2018. The Comprehensive Plan is a policy document that lays out a vision for Lake Worth and includes goals, objectives, and policies to continue to improve the City's quality of life. High level goals of the plan include Sustainability, Climate Adaptation and Resiliency. Within the City of Lake Worth, the Department for Community Sustainability coordinates the comprehensive review and approval process of its buildings, codes, planning, zoning, economic development and historic preservation divisions. It is responsible for the implementation, administration and interpretation of the Land Development Regulations (LDRs).

Below is a list of the all the Comprehensive Plan's Elements:

- | | |
|---|----------------------------------|
| • Introduction, Plan Administration, Definitions and Acronyms | • Conservation |
| • Future Land Use | • Recreation & Open Space |
| • Transportation | • Intergovernmental Coordination |
| • Housing & Neighborhoods | • Capital Improvement |
| • Infrastructure | • Education |
| • Coastal Management | • Economic Development |

The City's Comprehensive Plan can be found as the following link (<https://www.lakeworth.org/business/planning-zoning/>)

The comprehensive Plan, in conjunction with the Land Development Regulations, guides future growth and investment within the City in a coordinated and efficient manner. Within the Future Land Use (FLU) Element, the City outlines several goals, objectives and policies that identify areas of the City that will be the focus of redevelopment. The general goal in these redevelopment areas is to encourage high density and more sustainable redevelopment, to promote policies within the areas by reviewing the LDRs and design standards to eliminate or reduce inconsistencies with that goal. Additionally, Objective 1.2.3 of the FLU introduced the City of Lake Worth Sustainable Bonus Incentive Program with items such as maximum Floor Area Ratios (FAR), densities and building heights. The City of Lake Worth Sustainable Bonus Incentive Program offers the opportunity for increased height, as provided in the comprehensive plan future land use element, or an option for increased intensity FAR, or both, within certain zoning districts in exchange for the incorporation of sustainable design features, community based improvements and overall design excellence as part of a development proposal. Amenities may include, but are not limited to additional open space, park space, or landscaping above the minimum required by code; Leadership in Energy and Environmental Design (LEED) and/or Florida Green Building Coalition (FGBC); or LEED 2009 Neighborhood Development Guidelines.

The Transportation Element revisits these goals with policies such as Policy 2.6.22, where The City shall consider working with the County to explore modifications that promote urban infill, community redevelopment, 24-hour livable cities and deterring urban sprawl.

Again, in the Housing & Neighborhoods Section the comprehensive plan revisits urban sprawl with Policy 3.2.4.1: The City shall continue to implement the provisions in FLUE Objective 1.2.3, the Sustainable Bonus Incentive Program for energy conservation, "green city" concepts and encourage new or existing developments to acquire LEED and/or FGBC certifications, and other accredited national or international green program standards, such as Green Globes, Living Building Challenge, or similar "green" design guidelines that may be developed in the future.

Through the Infrastructure Element of the comprehensive plan the City outlines an intent to collaborate with other municipalities and entities such as South Florida Water Management District (SFWMD), Florida Department of Transportation (FDOT), and Environmental Resource Management (ERM) to manage and conserve water quality and quantity. Two examples are Objective 4.1.3: To provide effective stormwater management through the expansion, maintenance and improvement (where needed) of the existing drainage system., and Objective 4.1.9: To conserve potable water. **The city may consider adding an objective to this element to promote more green infrastructure using a program such as ENVISION as developed by American Society of Civil Engineers (ASCE) or other Sustainable Infrastructure rating system.**

The Coastal Management Section of the Comprehensive Plan starts with the statement “The City will comply with permitting and enforcement powers of the U.S. Army Corps of Engineers, SFWMD, Palm Beach County and other appropriate agencies to protect the remaining marine, estuarine and riverine wetlands of the coastal area from dredge and fill activities associated with development through standards that meet or exceed existing federal, state and county regulation of these activities.” Subsequently, this element provides 14-pages of objectives and policies that address all aspects of stormwater management and protection of surface water and drinking water supply.

The City recognizes the value of open space on reducing runoff in the Recreational and Open Space Element of the Comprehensive Plan. This element lays out policies such as “identify properties available for acquisition and/or vacant or underutilized properties, and consider acquiring these properties in order to expand its inventory of usable recreation and open space... and preserving open space lands for purposes of recreation, habitat protection and enhancement.” This will aid in maintaining land for infiltration, reducing runoff and pollutant loading. In addition, “The City adopts a LOS standard of 0.5 acres of neighborhood parks and 2.0 acres of community parks for every 1,000 persons to be developed in conjunction with all residential development.” Maintaining again opportunity for infiltration.

Within the Intergovernmental Coordination Element, there is discussion about coordination with the County and SFWMD with respect to water supply management and sea-level rise.

The City may consider including a policy to addressing water quality, such as, what is done to maintain water supplies in a sustainable manner as Policy 8.1.4.6. “Maintain the inter-local agreement associated with the Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) permit with Northern Palm Beach County Improvement District (NPBCID) as the lead permittee. A cooperative approach to permit compliance, and jointly conducting permit activities and collectively developing tools used to carry out the permit programs, to protect the City’s water quality in a sustainable manner.” It is noteworthy that this topic was covered in some part in Infrastructure Element by Policy 4.1.3.5: The City shall protect and enhance surface water quality through the full implementation of programs and activities included in the National Pollutant Discharge Elimination System (NPDES) permit and as set forth in SFWMD rules governing the issuance of Environmental Resource Permits.

Budgeting for stormwater improvements is included within the Capital Improvement Element Level of Service standards are defined as “Design storm frequency for a 5-year, 24-hour storm duration, as recorded in the SFWMD ERP Handbook, current edition and fully contained onsite for developments. The level of service standard for stormwater quality shall be as specified in Chapter 17–25 for water quality.” No language within this section discourages stormwater protection or low-impact design.

The reference in the Comprehensive Plan to the Land Development Code for water quality Chapter 17 -25 is not the correct section; it should reference Chapter 18 -103 On-site drainage. As part of the Economic Development Element the City commits to supporting renewable energy as an economic development engine. The City shall adopt and maintain Land Development Regulations that provide incentives for the development of innovative sustainable initiatives, such as, but not limited to, the Sustainable Incentive Bonus Program.

The City may consider including Green Infrastructure as a policy 11.1.8.4, adding “The City shall continue to provide support for sustainable natural environments that enhance the quality of life in the City and protect the functions of important regional environmental resources. On infrastructure projects throughout the City, green certification should be considered, such as Envision by the ASCE or other Sustainable Infrastructure rating system.”

Land Development Regulations:

Information from the Land Development Regulation (LDR) section can be found at the links below. The City’s regulations are documented LDRs within its municipal code. All sections are listed below with notation and discussion within relevant sections.

<https://www.lakeworth.org/business/planning-zoning/>

<https://www.lakeworth.org/files/files/business%20tab/Sustainable%20Bonus%20Incentive%20Program.pdf>

Chapter 1 - GENERAL PROVISIONS

Chapter 2 – ADMINISTRATION

Article VII ABATEMENT OF NUISANCES, Sec. 2-75.6.2. - General requirements.

(b)

Exterior property areas.

(2)

Grading and drainage. All premises shall be graded and maintained to prevent the erosion of soil and to prevent the accumulation of stagnant water thereon, except in approved retention areas and reservoirs, or within any structure located thereon.

This reference to stormwater management and erosion prevention is built upon in much more detail in Chapter 18 Article VII – Stormwater Utility.

ARTICLE IX. - CITY TREE BOARD, Sec. 2-82. - Creation; advisory function.

There is hereby created and established an official city tree board to serve in a planning and advisory capacity to the city commission. The purpose of the board is to establish policy and provide standards within the city landscape ordinance for tree preservation and protection, both public and private. This policy will include, but not be limited to: providing educational materials on proper planting, pruning techniques, insect and disease control; planting of native species; inventorying of existing trees; developing permit guidelines including rules for tree removal; providing opportunities for citizen involvement; and encouraging city tree sales. The board will also recommend the planting of trees which will provide a continuing shade canopy into the future.

Chapter 6 - ANIMALS AND FOWL

Sec. 6-5. - Allowable pets: The animals or fowls permitted as pets to be kept in the City of Lake Worth are exclusively limited to dogs, cats, birds, rabbits, hamsters, snakes, gerbils and fish. All others are expressly prohibited including, but not limited to, chickens, ducks, sheep, goats, cows and horses.

Sec. 6-6. - Raising or boarding of animals or fowl: The raising or boarding of animals or fowl is prohibited except where boarding is incidental to the operation of veterinarian's offices.

Sec. 6-7. - Running at large prohibited: At large shall mean off the premises of the owner and not under the direct control of any person by leash, cord, chain, or other physical constraint. Owner shall mean any person having or exercising any rights of property in a dog, including the right of possession as a keeper or custodian without pay. It shall be unlawful for any person while walking a dog, or who permits a dog to run at large, to allow the dog to defecate upon private property not owned by the owner of the dog or upon any public property, including but not limited to streets, sidewalks, swales, and public parks, without removing the defecation.

All of the ordinances within this chapter indirectly address stormwater quality and quantity and adhere to the goals of the NPDES MS4 permit. The pet waste ordinance has been found to be particularly effective in minimizing potential nutrient loading and bacteria levels in stormwater.

Chapter 12 - HEALTH AND SANITATION

Secs. 12-1—12-10. - Reserved.

Editor's note— Ord. No. 2015-03, § 4, adopted February 17, 2015, repealed Art. I, which pertained to use of stormwater system and derived from Ord. No. 93-5, § 1, adopted March 3, 1993.

This editor's note creates some confusion during the review process. The City may want to consider adding a link to the Ord. No. 2015-03§ 4. Previously submitted legal authority refers to Chapter 12 for Stormwater management not Chapter 18 Article VII – Stormwater Utility. The editor's note does not indicate to the reader to proceed to Chapter 18.

In addition, the City's legal authority to control the discharge of pollutants into the City's stormsewer system should be provided to the Florida Department of Environmental Protection MS4 Coordinator. Attach the Cycle 4 Year 2 Lake Worth Annual Report, to Chapter 18 when forwarding it to FDEP.

Sec. 12-11.1. - Collection of construction and demolition debris and use of roll off containers. Regulates the use and placement and maintenance of the construction and demolition (C&D) debris containers and require the use of a container for construction and demolition (C&D) debris, protecting the migration of debris into the MS4. Section 12-12 continued this requirement for during construction and provided guidance for non-compliance.

Sec. 12-26. - Preparation of yard and garden wastes and white goods. Address how yard waste should be placed out for collection.

The City may consider adding within this section language requiring yard waste to be placed in such a way to minimize potential nutrient loading to the MS4.

ARTICLE VIII. - FERTILIZER FRIENDLY USE REGULATIONS

This article shall be known as the Fertilizer Friendly Use Regulations Ordinance.

Sec. 12-102. - Findings.

As a result of the Florida Department of Environmental Protection's determination that certain water bodies within Palm Beach County are impaired for excessive nutrient levels, the City finds that the best management practices contained in the most recent edition of the "Florida-Friendly Best Management Practices for Protection of Water Resources by the Green Industries", are required in this article.

This Section firmly reinforces and encourages actives described in the "Florida-Friendly Best Management Practices for Protection of Water Resources" by the Green Industries reducing the amount of fertilizer

Chapter 18 – UTILITIES

ARTICLE III. - EMERGENCY WATER USE: Sec. 18-22. - Intent and purpose. It is the intent and purpose of this article to protect the city's water resources from the harmful effects of overutilization during periods of water shortage and allocate available water supplies by assisting the South Florida Water Management District in the implementation of its water shortage plan. The District's water shortage plan, as set forth in Chapter 40E-21, Florida Administrative Code, as same may be amended from time to time, is incorporated herein by reference as a part of this article.

ARTICLE VII. - STORMWATER UTILITY: Sec. 18-70. - Authority. The City is authorized by the Florida Constitution and the provisions of F.S. Ch. 166 § 403.0893, Florida Statutes, to construct, reconstruct, improve, and extend the

stormwater utility system and to issue revenue bonds and other debts if needed to finance in whole or part the cost of such system and to establish just and equitable rates, fees, and charges for the services and facilities provided by the system.

Maintenance of the stormwater utility/management system includes but is not limited to inlets, conduits, manholes, channels, ditches, drainage easements, retention and detention basins, infiltration facilities, swales, and other components as well as natural waterways. All elements of these storm and surface water management systems, which provide for the collection, storage, treatment, and conveyance of stormwater, are of benefit and provide services to all property within the city.

Section 18-70 through 18-84 provides in-depth definitions and procedures for the creation and management of Stormwater Management System and the funding mechanisms for the system. DIVISION 2. - PROHIBITED DISCHARGE STANDARDS. Sec. 18-84. - Discharge prohibited to stormwater system, outlines in detail what is not allowed to be released into the stormwater system. Sections 18-86 to 18-101 goes into more detail about specific topics such as the NPDES program, Discharges, Control and Reporting of flows from commercial, industrial, or construction activities to the stormwater system or regulated waters, Interagency agreement, on-site drainage and runoff, hazardous material storage, and etc.

In addition, Section 18-102 adopts the FAC “Surface Water Quality Standards” while Section 18-103 On-site Drainage required drainage plans to be approved prior to land development. The plan must indicate through calculations, proposed facilities which will totally contain on-site a three-year one-hour storm event and such facilities must be constructed prior to final inspection by the City.

To encourage sustainable and low-impact design the City may consider allowing some portion of this on-site retention requirement be met by using green technologies or low-impact design. Such as rain catchment and reuse, bio-swales/rain gardens, pervious pavers, or other attenuation and treatment processes.

Chapter 23 - LAND DEVELOPMENT REGULATIONS

ARTICLE 2. - ADMINISTRATION

DIVISION 3. – PERMITS

Within this section of the LDRs provisions are made for sustainable and low-impact design. Reference is made to the LEED Rating System, as well as the Florida Green Building Coalition. Within these reference guides recommendations are made to reduce water use by the building and site, as well as runoff from the site. Recommendation to reduce water demand include low flow fixtures, water reuse and adaptive landscapes. Suggested methods for reducing run-off to more closely mimic historical hydrologic processes (low-impact design) include rain catchment and reuse, bio-swales/rain gardens, filter strips, pervious pavement, and the like. Typically, the goal of these systems is to provide a level of service that exceeds the requirements of the regulation. This

being said, care should be taken to provide credits for going beyond what is determined as the minimum level of service, and not requiring unnecessarily high levels.

ARTICLE 4. - DEVELOPMENT STANDARDS

Sec. 23.4-7. - Maintenance of parking lots.

The City may consider adding to Item No. 2. keeping drainage systems operational and free from debris; and do not allow unpermitted discharge to the MS4.

Sec. 23.4-10. - Off-street parking.

The City may consider adding the following bold text to Item No. 3. Parking prohibited. Parking is prohibited on lawns or landscaping areas in all zoning districts, **except where parking has been designed by a licensed professional as vegetative parking.** Parking shall be confined to designated marked parking spaces in all districts except SF-7 and SF TF-14 districts. In SF-7 and SF TF-14 districts, parking is limited to driveways, carports, garages or marked parking spaces. No vehicle in excess of three-quarter ton shall be parked in any residential district except when used for temporary construction or service purposes.

This edit may be sufficiently addressed by the material section of the sub-part D.

ARTICLE 6. - ENVIRONMENTAL REGULATIONS

This article addresses topics such as Landscape, Impervious Area, and Habitat Retention and Restoration. All of which directly address stormwater quality and quantity. No additional language is recommended at is time.

Sec. 23.6-1. c) Site design requirements.

1. Water conservation. All landscape plans must be created to implement water conservation by providing for:

- Preservation of existing native plants;
- Re-establishment of native plants;
- Use of plant materials adapted to the existing or modified site conditions;
- Use of shade trees to promote water conservation;
- Limit amounts of lawn grass areas to outdoor gathering or recreational areas only; and
- Retention of storm runoff on site.

All of these items represent requirements that improve water quality management.

Conclusion

The City of Lake Worth's current Code of Ordinances contains its Land Development Regulations and Comprehensive Plan which were updated after the Cycle 4 report and now exceed the goals of the permit by encouraging development utilizing low impact design, implementing green infrastructure and promoting sustainability with respect to water quality. Recommendations within this report only further exceed the goals. The items to be discussed internally by City staff include:

- Infrastructure Section: One item that could be added to this section that would bring it in alignment with other sections is adding Comprehensive Plan is an objective to promote more green infrastructure using a program such as ENVISION as developed by ASCE or other Sustainable Infrastructure rating system.
- Intergovernmental Coordination Section: consider including a policy to address water quality such as, what is done to maintain water supplies in a sustainable manner as Policy 8.1.4.6. "Maintain the inter-local agreement, Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) permit with Northern Palm Beach County Improvement District (NPBCID) as the lead permittee. A cooperative approach to permit compliance, and jointly conducting permit activities and collectively developing tools used to carry out the permit programs, to protect the City's water quality in a sustainable manner."
- Capital Improvement Section. Consider fixing the reference in the Comprehensive Plan to the Land Development Code for water quality for Chapter 17 -25, it should reference Chapter 18 -103 on-site drainage.
- Economic Development Section: Consider including Green Infrastructure as a policy 11.1.8.4, adding "The City shall continue to provide support for sustainable natural environments that enhance the quality of life in the City and protect the functions of important regional environmental resources. On infrastructure projects throughout the City, green certification should be considered such as Envision by the ASCE or other Sustainable Infrastructure rating system."
- Chapter 12 - HEALTH AND SANITATION Secs. 12-1—12-10: This editor's note creates some confusion during the review process. The City may want to consider adding a link to the Ord. No. 2015-03§ 4. Previously submitted legal authority refers to Chapter 12 for Stormwater management not Chapter 18 Article VII – Stormwater Utility. The editor's note does not indicate to the reader to proceed to Chapter 18.

In addition, the City's legal authority to control the discharge of pollutants into the City's stormsewer system should be provided to the Florida Department of Environmental Protection MS4 Coordinator. Attach the Cycle 4 Year 2 Lake Worth Annual Report to Chapter 18 when forwarding to FDEP.

- Chapter 12 - HEALTH AND SANITATION Sec. 12-26: **Additional information could be added here about requiring yard waste to being placed in such a way to minimize potential nutrient loading to the MS4.**
- Chapter 18 – UTILITIES - Section 18-102: **To encourage sustainable and low-impact design the City may consider allowing some portion of this on-site retention requirement be met by using green technologies or low-impact design, such as rain catchment and reuse, bio-swales/rain gardens, pervious pavers, or other attenuation and treatment processes.** One potential allowable percentage could be 30 percent of the calculated on-site retention to be met by the alternative technology.
- Chapter 23 – LAND DEVELOPMENT REGULATIONS - Sec. 23.4-7. - Maintenance of parking lots.
Consider adding to Item No. 2. keeping drainage systems operational and free from debris; and do not allow unpermitted discharge to the MS4.
- Chapter 23 – LAND DEVELOPMENT REGULATIONS - Sec. 23.4-10. - Off-street parking.
Consider adding to Item No. 3. Parking prohibited. Parking is prohibited on lawns or landscaping areas in all zoning districts, except where parking has been designed by a licensed professional as vegetative parking.

While reviewing the regulation it was discovered that the current legal authorization has not been submitted to the State. It is recommended that the City submit the current version of Chapter 18- Utilities, Article VII – Stormwater Utility to the Department of Environmental Protection and post a copy to the Palm Beach County MS4 Permittees Website. No other actions are recommended at this time.



City of Lake Worth

MS4 SWMP ASSESSMENT PROGRAM ANNUAL RESULTS REPORT CYCLE 4, YEAR 2

Abstract

This report is to document the results of the SWMP Assessment Program, by the City of Lake Worth under the MS4 NPDES Permit No. 000018

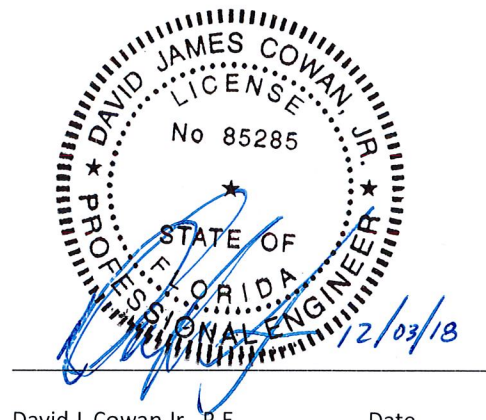
MOCK • ROOS
CONSULTING ENGINEERS

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Engineer's Signature Page

I hereby state, as a Professional Engineer in the State of Florida, that this report titled MS4 SWMP Assessment Program Annual Results Report Cycle 4, Year 2, dated December 2018, for the City of Lake Worth, was prepared and assembled under my direct responsible charge.



David J. Cowan Jr., P.E.

Date

P.E. No. 85285

Project Engineer

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CONSULTING ENGINEERS

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West Palm Beach, FL 33407

Florida C.A. No. 48

(Reproductions are not valid unless signed, dated
and embossed with Professional's Seal)

Limitations:

This document was prepared solely for the City of Lake Worth in accordance with professional standards at the time the services were performed and in accordance with the contract between the City of Lake Worth and Mock•Roos. This document is governed by the specific scope of work authorized by the City of Lake Worth; it is not intended to be relied upon by any other party. We have relied on information or instructions provided by City of Lake Worth and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

1. City of Lake Worth MS4 Assessment Program

1.1. Introduction

The Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) permit is part of a federal program designed to reduce stormwater pollutant discharges to receiving waters of the United States. In 1987, the United States Environmental Protection Agency (EPA) was required under Section 402 (p) of the Clean Water Act to develop the NPDES. In 1997, the first 5-year permit (No. FLS000018) was issued by EPA to Palm Beach County's permittees, Lake Worth is one of the joint permittee of this permit under an Interlocal Agreements with Northern Palm Beach County Improvement District. In 2001, the Florida Department of Environmental Protection (Department) received delegation from EPA for the MS4 Programs. In November 2002, the Cycle 2 MS4 Permit was issued by the Department. The Cycle 3 permit was issued on March 2, 2011 and the Cycle 4 Permit was issued on September 8, 2016. This report is to document the assessment results under this permit.

1.2. Goals

The fundamental goal of the City with respect the NPDES MS4 permit is to reduce the nutrient loadings to the receiving water bodies to the maximum extent reasonable possible. To this end this report discusses the water quality monitoring program and trends of the ambient water quality that the City's MS4 discharges to, so the overall effectiveness of their Stormwater Management Program can be evaluated. Also discussed is the pollutant loading model, used to estimate loads that may flow to these waters, and reduction programs used to mitigate the impacts of development and urbanization. Discussion of current data available, trends observed and conclusions that can be drawing from this data are summarized at the end of this report.

2. Florida Department of Environmental Protection's Impaired Waters

2.1. Water Quality Monitoring

Florida Department of Environmental Protection (FDEP) conducts a state wide water quality monitoring programs. The data used for this monitoring includes both theirs and others. The primary purpose of this programs is to assess Florida's rivers, lakes, springs and estuaries to determine whether they meet publicly adopted water quality standards. Because of limited resources, the state has been divided into areas "Basins Groups". A basin group is assessed once every five years, The City of Lake Worth is in Group 3 and its last assessment was concluded in 2016.

The goal of FDEP's assessment is to update the comprehensive listing system, within each Basin Group and Water Boundary Identifications (WBIDs). By reviewing the water quality data for a WBID in comparison to the chapters 62-302, 62-303, 62-303.720, and 62-303.390 of the F.A.C, impaired WBIDs are added to or removed from lists. Five outcomes can result typically from the cycle review. A WBID stays in its current status listed or unlisted, it can be added to or delisted from the Comprehensive Study List, or added to or delisted from Impaired Waters. WBIDs can be delisted if a previously identified impairment cannot be verified or a Total Maximum Daily Load (TMDL) has been adopted. A TMDL represents the maximum

amount of pollutant loading that can be discharged to a water body and have its designated uses still be met. Once a TMDL is development, watershed stakeholders and FDEP staff develop a Basin Management Action Plan (BMAP). The BMAP specifies the activities, schedule, and funding sources that will be undertake to restore the water body.

2.2. Lake Worth Lagoons Cycle 3 Verified List of Impairments

Currently the City has no WBIDs on the study list and there are 3 WBIDs on the impaired waters list. The listed WBIDs include impairments for: Copper, Chlorophyll-a, Total Phosphorus and Bio-assessments and are shown in Table 1. Within Table 1 it can be seen that Lake Worth Lagoon was listed for copper in both the central and south sections. All marina estuaries along the Palm Beach County coast line are listed as impaired for copper, yet there are no identified copper impairments for any of the inflows from the fresh water tributaries. The copper impairments do not appear to be related to stormwater runoff, however it may be related to the marina boating actives in the water body. The next step in the FDEP process is to rank the impairment for adopting a TMDL for the WBID. Based on the listed Stormwater impairments the primary pollutant of concern is phosphorous.

2.3. Total Maximum Daily Loads Program

Currently the City of Lake Worth does not have any waters with TMDLs that it discharges to or within its boundary. FDEP has a listing for site-specific TMDL priorities through 2022 and has no sites listed with in the City.

TABLE 1 : LISTING OF IMPAIRED WATERS WITHIN CITY'S MS4 FROM 2016 CYCLE 3

Cycle	Group	Group Name	Planning Unit	County (-ies)	WBID	Water Segment Name	Parameters Assessed Using the Impaired Waters Rule (IWR)	Concentration of Criterion or Threshold Not Met	Priority for TMDL Development3	Projected Year For TMDL Development3	Verified Period Assessment Data8	Comments7,8
3	3	Lake Worth Lagoon - Palm Beach Coast	Intracoastal	Palm Beach	3226F1	Lake Worth Lagoon (Central Segment)	Copper	≤ 3.7 µg/L	Medium		6/22	This waterbody is impaired for this parameter based on the number of exceedances for the sample size. This parameter is being added to the 303(d) List.
3	3	Lake Worth Lagoon - Palm Beach Coast	Intracoastal	Palm Beach	3226F1	Lake Worth Lagoon (Central Segment)	Nutrients (Chlorophyll-a)	ENRR2: PCT ≤ 10.2 µg/L	Medium		ENRR2 (PCT) 68/412	This waterbody is impaired for this parameter based on the number of exceedances for the sample size. This parameter is being added to the 303(d) List.
3	3	Lake Worth Lagoon - Palm Beach Coast	Intracoastal	Palm Beach	3226F1	Lake Worth Lagoon (Central Segment)	Nutrients (Total Phosphorus)	ENRR2: AGM ≤ 0.049 mg/L	Medium		ENRR2: AGM 2008 (0.023 mg/L) 2009 (0.035 mg/L) 2010 (0.033 mg/L) 2011 (0.026 mg/L) 2012 (0.028 mg/L) 2013 (0.032 mg/L) 2014 (0.056 mg/L) 2015 (0.052 mg/L)	This waterbody is impaired for this parameter because the annual geometric means exceeded the criterion more than once in a three year period. This parameter is being added to the 303(d) List.
1	3	Lake Worth Lagoon - Palm Beach Coast	Intracoastal Waterway	Palm Beach	3226F2	Lake Worth Lagoon (South Segment)	Copper	> 3.7 mg/L	Medium	2010		PP = 1 / 6 Insufficient data; VP = 9/ 48 Impaired. VP data have been updated using IWR Run 20.0.
3	3	Lake Worth Lagoon - Palm Beach Coast	C-16	Palm Beach	3256A	Lake Osborne	Biology	Average score of at least two temporally independent Lake Vegetation Index (LVI) scores ≥ 43.	Medium		LVI 21FLGW 37860 (04JUN2009: 33) 21FLGW 40243 (23AUG2011: 40) 21FLWPB 28010470 (02DEC2013: 43) 21FLWPB 28010737 (07AUG2008: 45) 21FLWPB 41842 (14NOV2012: 37)	This waterbody is impaired for this parameter based on failing bioassessments and nutrients have been determined to be the causative pollutant. This parameter is being added to the 303(d) List.
3	3	Lake Worth Lagoon - Palm Beach Coast	C-16	Palm Beach	3256A	Lake Osborne	Nutrients (Chlorophyll-a)	≤ 20 µg/L	Medium		AGM 2008 (25 µg/L) 2009 (16 µg/L) 2010 (16 µg/L) 2011 (17 µg/L) 2012 (26 µg/L) 2013 (29 µg/L) 2014 (17 µg/L)	This waterbody is impaired for this parameter. The annual geometric means exceeded the nutrient criteria more than once in a three year period. This parameter is being added to the 303(d) List.
3	3	Lake Worth Lagoon - Palm Beach Coast	C-16	Palm Beach	3256A	Lake Osborne	Nutrients (Total Phosphorus)	Chl-a AGM ≤ 20 µg/L; TP AGM ≤ 0.16 mg/L; If Chl-a has Insufficient or No Data to calculate AGM or if Chl-a AGM > 20 µg/L, TP AGM ≤ 0.05 mg/L	Medium		AGM 2008 (0.03 mg/L) 2009 (0.10 mg/L) 2010 (0.06 mg/L) 2011 (0.05 mg/L) 2012 (0.06 mg/L) 2013 (0.07 mg/L) 2014 (0.07 mg/L)	This waterbody is impaired for this parameter. This parameter was assessed against the minimum nutrient criterion because corrected chlorophyll-a annual geometric means exceeded the applicable chlorophyll-a threshold. The annual geometric means exceeded the nutrient threshold more than once in a three year period. This parameter will be added to the 303(d) list.

3. Water Quality Monitoring Program

3.1. Description

The Palm Beach County NPDES MS4 includes the following components:

- ambient water quality sampling
- water quality data analyses
- trend analyses
- annual pollutant loading estimations in Year 3
- program modifications as needed

The Palm Beach County wide monitoring program includes 40 ambient water quality monitoring sites which were selected after coordination among the South Florida Water Management District (SFWMD), Palm Beach County Environmental Resource Management (ERM), the Loxahatchee River District (LRD), Broward County (BC), and the Palm Beach County permittees.

The sites monitored are sampled and initially analyzed in-situ by staff using a multiparameter water quality monitoring instrument. Water samples are collected, preserved and stored in accordance with Standard Operating Procedures. Final analysis of samples is conducted in laboratory settings under the direction of the entities listed above.

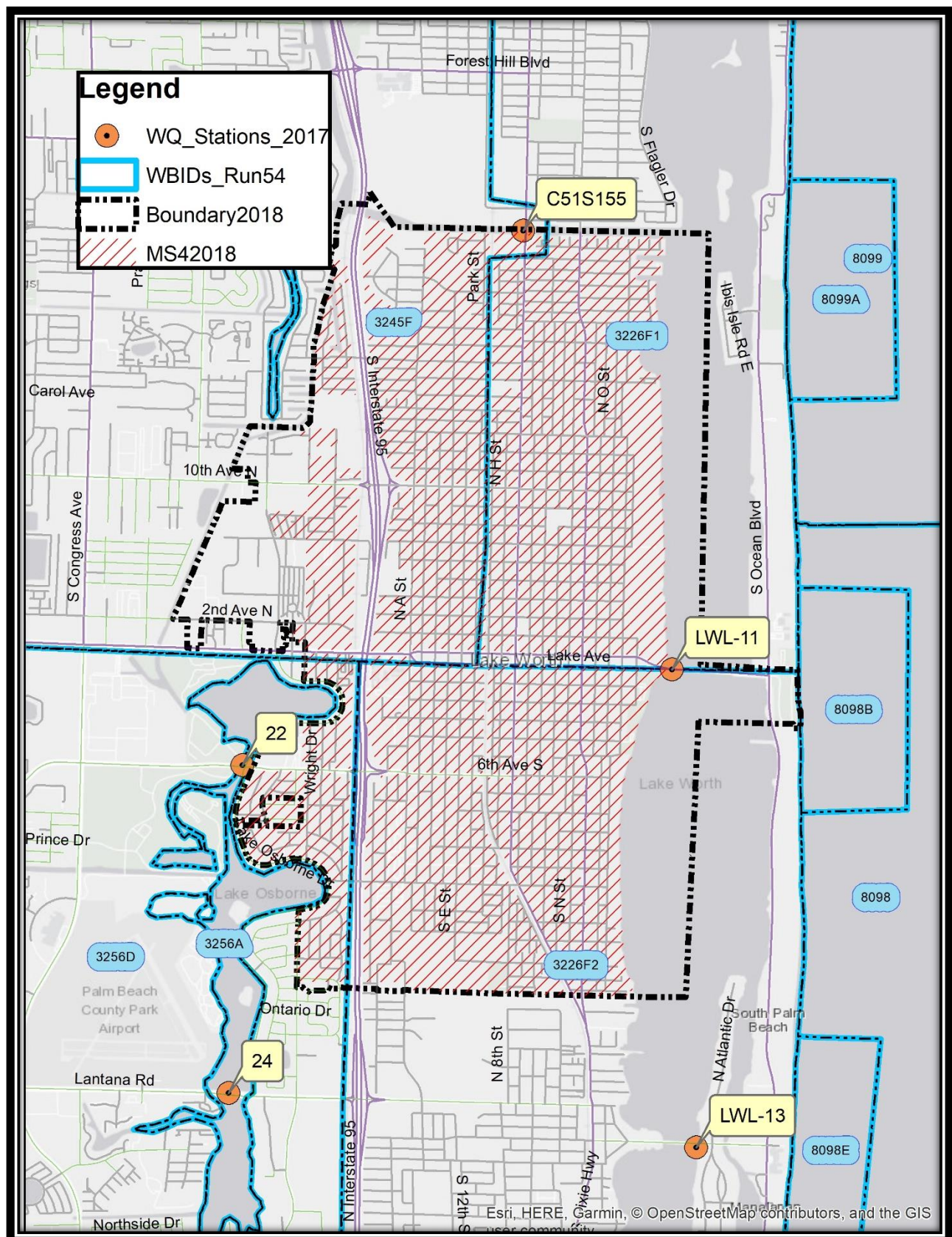
3.2. Monitoring Sites

City of Lake Worth reviewed the available data from the groups water quality monitoring program. Table 2 provide information on the selected sites for the City assessment program.

TABLE 2 : AMBIENT WATER QUALITY MONITORING STATIONS TABLE

Monitoring Station Number	Location Description	Northing/ Easting	Type	Watershed WBID
C51S155 (SFWMD)	S-155 Discharge Structure in the C-51 Canal	N841132.85 E964349.43	Freshwater	C-51: 3245F
LWL-11 (ERM)	Lake Avenue Bridge LWLC	N830580.53 E967926.64	Marine	LWLC: 3226F1
LWL-13 (ERM)	Ocean Avenue Bridge in LWLS	N819086.28 E968516.09	Marine	LWLS: 3226F2
22 (ERM)	6 th Avenue South Bridge in Lake Osborne (C-16)	N828280.34 E957602.68	Freshwater	Lake Osborne: 3256A
24 (ERM)	Lantana Road Bridge in Lake Osborne	N820399.97 E957270.70	Freshwater	Lake Osborne: 3256A

FIGURE 1 : MONITORING LOCATIONS WITH WBIDs



3.3. Water Quality Monitoring Results

The City of Lake Worth does not have its own monitoring program and relies on the group's monitoring program for data. The historical data on the selected five stations are provided to the group via the group's website and can be found at:

http://www.pbco-npdes.org/WaterQualityMonitoring/WaterQualityData_PeriodOfRecord.zip

Parameters are monitored typically month for marine environments or bi-monthly for freshwater. Parameters of primary interest to FDEP and the City are phosphorus, and nitrogen. Chlorophyll A can be an indicator of nutrient enrichment and was also included. Table 3 below helps provide a summary of the limits. To aid in the review of the data and trends the criteria has been placed on the graph with a red line and labeled. Where needed additional commentary with regards to the criteria has been provided on the graphs as well.

TABLE 3 SOUTH FLORIDA REGION WATER QUALITY CRITERIA

Applicable Class III - Freshwater Lakes Water Quality Criteria C-16 (22 and 24)		
PARAMETER	UNITS	CRITERIA
Chlorophyll-a (corrected)	ug/L	≤ 20 AGM
Nitrogen, Total	mg/L	1.27 to 2.23 AGM
Phosphorus, Total	mg/L	0.05 to 0.16 AGM
Applicable Class III - Freshwater Canal South Florida Region Water Quality Criteria C-51 (38B, 37B, C51S155)		
PARAMETER	UNITS	CRITERIA
Chlorophyll-a (corrected)	ug/L	≤ 20 AGM
Nitrogen, Total	mg/L	Narrative
Phosphorus, Total	mg/L	Narrative
Applicable Class III - Marine Water Quality Criteria Lake Worth Lagoon Central (LWL-11)		
PARAMETER	UNITS	CRITERIA
Chlorophyll-a (corrected)	ug/L	≤ 10.2 TPTV
Nitrogen, Total	mg/L	≤ 0.66 AGM
Phosphorus, Total	mg/L	≤ 0.049 AGM
Applicable Class III - Marine Water Quality Criteria Lake Worth Lagoon South (LWL-13)		
PARAMETER	UNITS	CRITERIA
Chlorophyll-a (corrected)	ug/L	≤ 5.7 AGM
Nitrogen, Total	mg/L	≤ 0.50 AGM
Phosphorus, Total	mg/L	≤ 0.059 AGM
Notes:		
(1) For Freshwater Lakes the Total Nitrogen and Total Phosphorus Minimum Value applies if Chlorophyll-a is > 20 ug/l, Maximum also applies if Chlorophyll-a is ≤ 20 ug/l.		
(2) AMG - Annual Geometric Mean		

3.4. Trend Analysis

Figures 1-1 through 5-3 located in Appendix A provide trend lines and summarizes the annual geometric mean(AGM) values at each of the monitoring stations for the last ten-year period of record for TN, TP, and Chl-a. A trend line provides an indication if the TP, TN, and Chl-a are increasing (upward), decreasing (downward), or at a steady-state (near flat). The appropriate water quality standards are depicted on the trend graphs to allow for a comparison of both trend and relationship to the standard. A general summary of the trend and exceedances can be seen in Table 4 below.

TABLE 4 : SUMMARY OF TRENDS

Monitoring Station	AMG Phosphorus		AMG Nitrogen		AMG Chlorophyll-A	
	Trend	Number of Exceedances	Trend	Number of Exceedances	Trend	Number of Exceedances
C51S155 (SFWMD)	Steady-state	NA	Downward	NA	Downward	Zero
LWL-11 (ERM)	Steady-state	Zero	Steady-state	One	Upward	Zero
LWL-13 (ERM)	Downward	Zero	Downward	Zero	Steady-state	One
22 (ERM)	Downward	One	Downward	One	Upward	Five
24 (ERM)	Downward	Zero	Downward	Two	Steady-state	One

Review of the trend graphs indicates the following:

Total Phosphorus Trends indicate a general improvement (decrease or steady-state) in values within the watersheds, with the except of two watersheds, LWL-11 and Station 22. This trend is steady-state with a significant amount of scatter above and below the AGM line. The general form of the data indicates that the levels are steady-state with variability restrained between 0.02 to 0.04 mg/L and below the required criteria for LWL-11. The one exceedance at Station 22 occurs in 2015 and has trended downward in recent data. Based on the states criteria (two exceedances within any 3-years period) one exceedance would not be considered a violation of the water quality standards.

Total Nitrogen trend graphs indicate the concentrations are improving (downward) in the watersheds throughout. Stations LWL-11 and LWL-13 has had one exceedances in the past ten years as such these exceedances would not be considered a violation of the water quality standards. Station 24 has had two exceedances but not in a three-year period, thus is not in a violation of state standards.

Chlorophyll-a trend graphs indicate that the C-51 and Station 24 are showing improvement while LWL-13 data indicates that the levels are steady-state with variability restrained between 5.8 to 3.2 ug/L with the AGM below the required criteria. Station 22 was the only location had more than two exceedances in a three-year period. The trend for this station is for the past ten years is steady-state. It is notable that in February 2015, The City of Lake Worth adopted extensive revision to the land development code aimed at managing urbanization and stormwater management and impacts. A notable drop in the Chl-a AGM was seen in 2016 and the beginning of 2017 data. It is recommended that this station be monitored over time to determine the effects on the trend of the new regulations.

4. Pollutant Loading Estimates

4.1. Description

In order to estimate the potential pollutant loadings to each WBID, the City has utilized pollutant loading modeling. In 2012, a stormwater master planning study completed by CDM Smith included a pollution loading. Watershed Management Model (WMM) was used by CDM Smith to estimate pollutant loading. WMM is a public domain model used by the Florida Department of Environmental protection (FDEP). It provides high level planning simulations of pollutant loadings on both a seasonal and annual time step. The loadings are non-point source or area weighted based on parameters such as land use, impervious area ratio, water budgets, and event mean concentrations (EMC). Best Management Practices (BMPs) can be included to provide a reduction in pollutant loading based on accepted values of removal efficiency. There have not been any major changes land use from 2012 to present. Referring to the 2012 pollution is appropriate for this assessment. In year three annual report and updated loading data will be available through the group effort

4.2. Pollutant Loading Results

Results of the modeling efforts found that the highest pollutant loads, both total and area weighted, were generated in the Lake Worth Lagoon Central, followed by Lake Worth Lagoon South and Lake Osborne. A summary of the results can be found in Table 5.

TABLE 5 : STATIONS RESULTS FROM LOADING ANALYSIS

Monitoring Station Number	General Location	Tributary Area (acres)	DCIA %	TN (lb/yr)	TP (lb/yr)	NP UAL (lb/ac/yr)	TP UAL (lb/ac/yr)
C51S155 (SFWMD)	C-51 Canal	435.7	48.7	5,403	819	12	1.8
LWL-11 (ERM)	Lake Worth Lagoon Central	1202.8	50.2	16,573	2,592	14	2.2
LWL-13 (ERM)	Lake Worth Lagoon South	851.1	56.2	11,564	1,810	14	2.1
22 (ERM)	Lake Osborne	286.0	61.7	3,933	579	14	2.0
24 (ERM)	Lake Osborne	652.4	60.1	6,917	1,102	11	1.7
Totals		3,428		44,390	6,902		

It can be seen that even though the contribution of TN by of the watershed associated with the LWL-11 and LWL-13 relatively large compared to the other stations, but the UAL is not disproportionately large. These values above account for structural and non-structural BMPs used throughout the City, a discussion of the reduction used is in the following section.

4.3. Reductions Based on Stormwater Management Programs

The premise of the MS4 permit program is that the SWMP will reduce pollution loadings. BMP's reduce the amount of pollutant loading to a system by reducing the volume of discharge or the pollutant being carried by the discharge. BMPs can be very sophisticated or simple such as innovative cyclonic separator devices or grassed swales. The City of Lake Worth uses both structural and non-structural best management practices. For the pollutant load estimations completed in 2012, the BMPs and removal efficiencies that were selected are provided in Table 6.

TABLE 6 : BMPs AND PERCENT REMOVAL EFFICIENCIES

Parameter	Wet Detention	Grassed Swales	Dry Retention	Baffle Boxes	Wet Detention &	Exfiltration Trenches
Total Phosphorous	52	30	90	25	93	55
Total Nitrogen	30	20	90	15	92	50

Some non-structural BMPs, such as the adoption of New Land Development Codes, Florida Friendly Landscape/Fertilizer Ordinances, Street Sweeping, and Public Outreach, are not accounted for even though they may have significant impacts. Other efforts have been undertaken to quantify the effects of these practices and have been reported in previous reports. For example, in the Cycle 4: 2017 -2018 (Year 2) annual report the amount of TN and TP, removed from 116 miles of roads by street sweeping and litter control in the City was estimates by volume to be 3,045 lbs of Nitrogen and 4,749 lbs of Phosphorous. This represents a 7% and 69% reduction in TN and TP, respectively

5. Conclusions

Generally, the water quality monitoring results are encouraging. Nutrient trends are downward or stabilized. Based on these facts the City should continue to monitor the ambient water quality for changes in trends, but no current recommended changes are needed. Only one monitoring station LWL-11 had upward trends in all criteria, but it was noted that all of the AGM were below the states criteria for impairment. Station 22 of the Bridge at 6th Avenue in Lake Osborne was the only station found to have had more than two exceedances in a three-year period, but still meeting the state criteria. It is notable that in February 2015, The City of Lake Worth adopted extensive revision to the land development code aimed at managing urbanization and stormwater management and impacts. A notable drop in the Chl-a AGM was seen in 2016 and the beginning of 2017 data. The SWMP programs (street sweeping and litter collection) has reduced the 2012 nutrient loadings of TN and TP by 7% and 69%, respectively, as a result, the City SWMP are effective in reducing the loads. Based on studies, and impaired water assessments, a future TMDL for the Lake Worth Lagoon would be for phosphorous. Continuation of or expansion of the City's street sweeping program will assist in meeting any future planned TMDL.

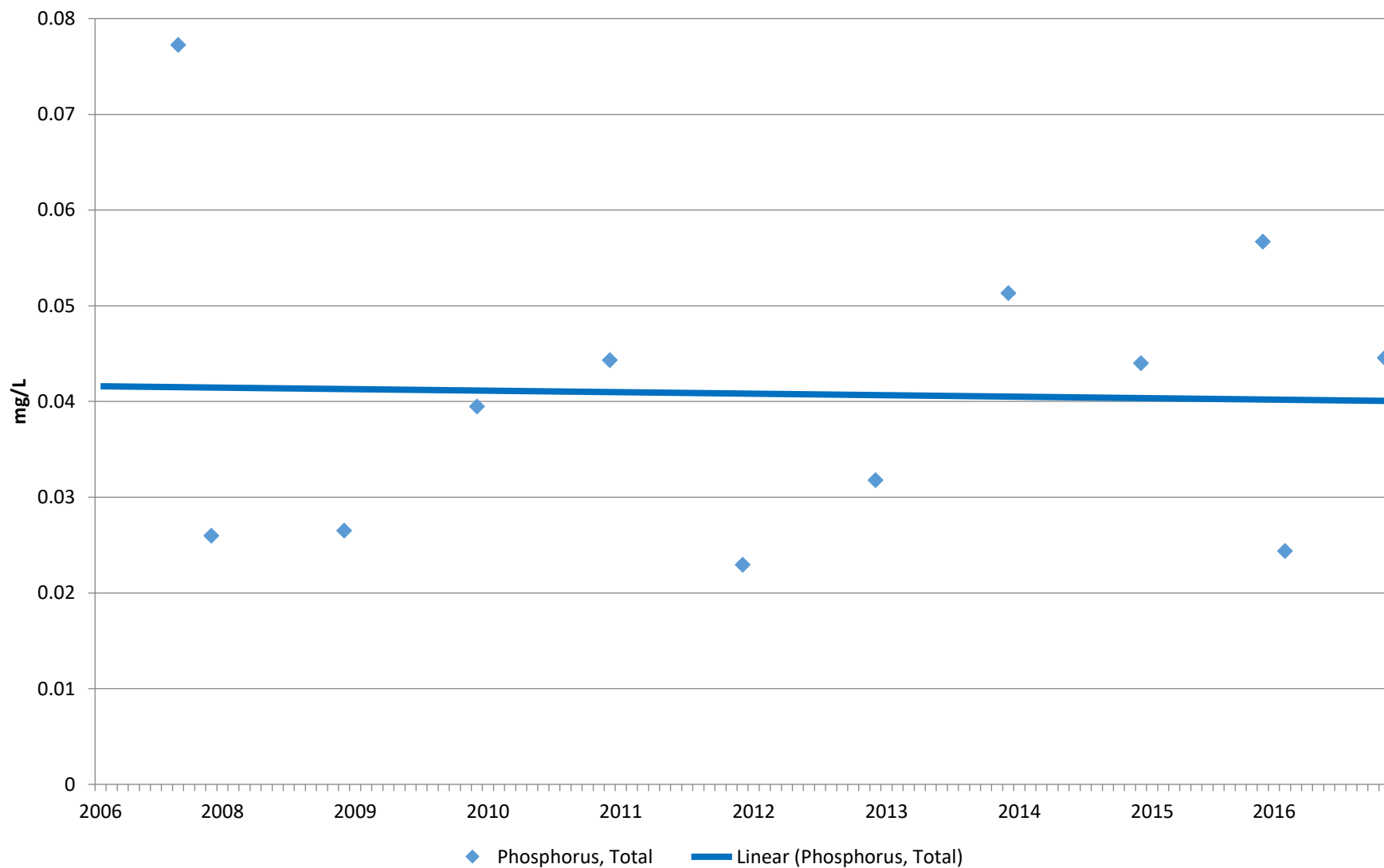
Appendix A – Water Quality Data and Trends Figures 1-1 through 5-3

CRITERIA IS NARRATIVE IN THIS
WATER BODY FOR PHOSPHORUS
SEE REPORT FOR DETAILS

Figure 1-1

AGM Phosphorus Trends

10-Year at Station C51S155



CRITERIA IS NARRATIVE IN THIS
WATER BODY FOR PHOSPHORUS
SEE REPORT FOR DETAILS

Figure 1-2 AGM Nitrogen Trends 10-Year at Station C51S155

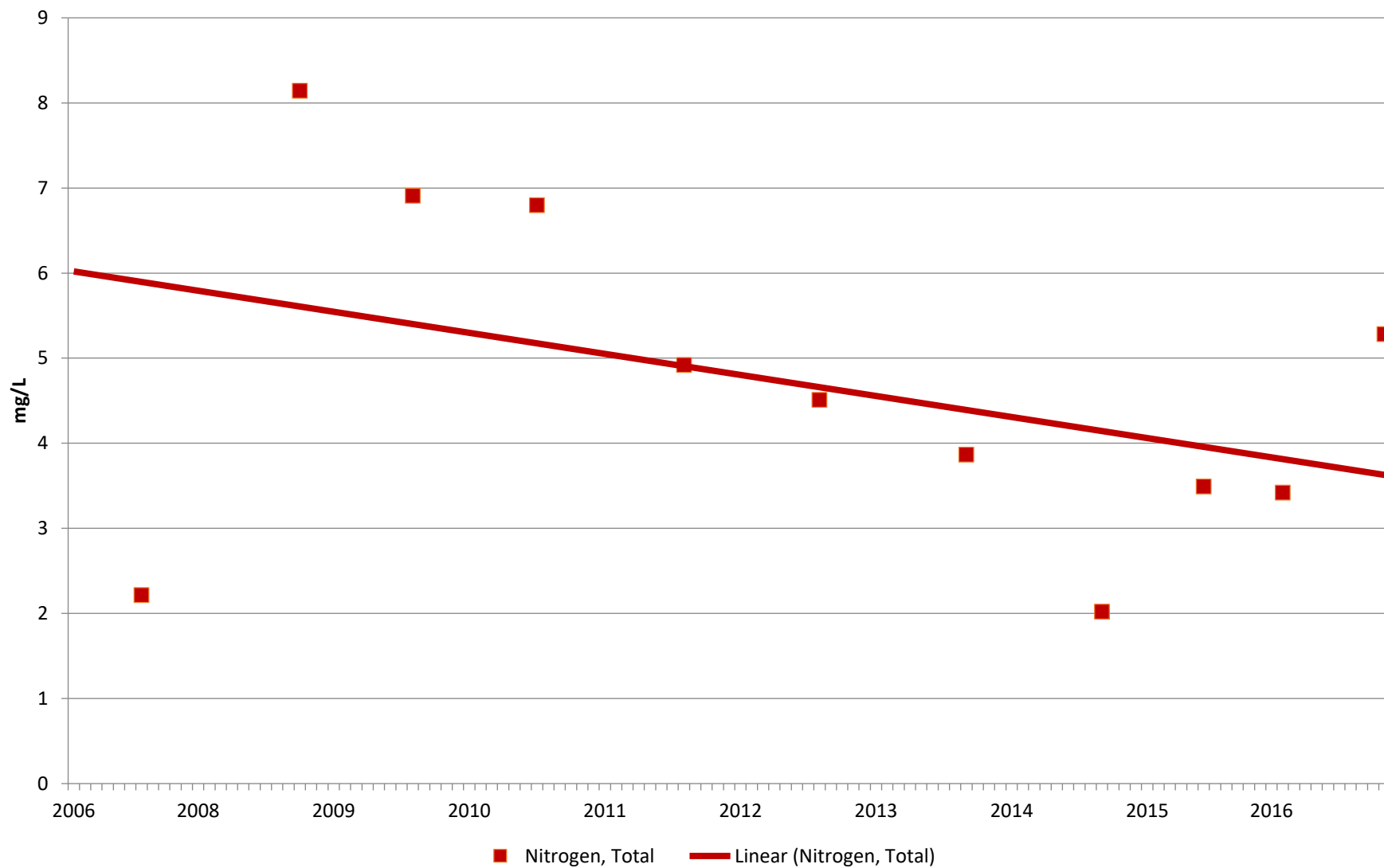


Figure 1-3
AGM Chlorophyll-A
Trends
10-Year at Station C51S155

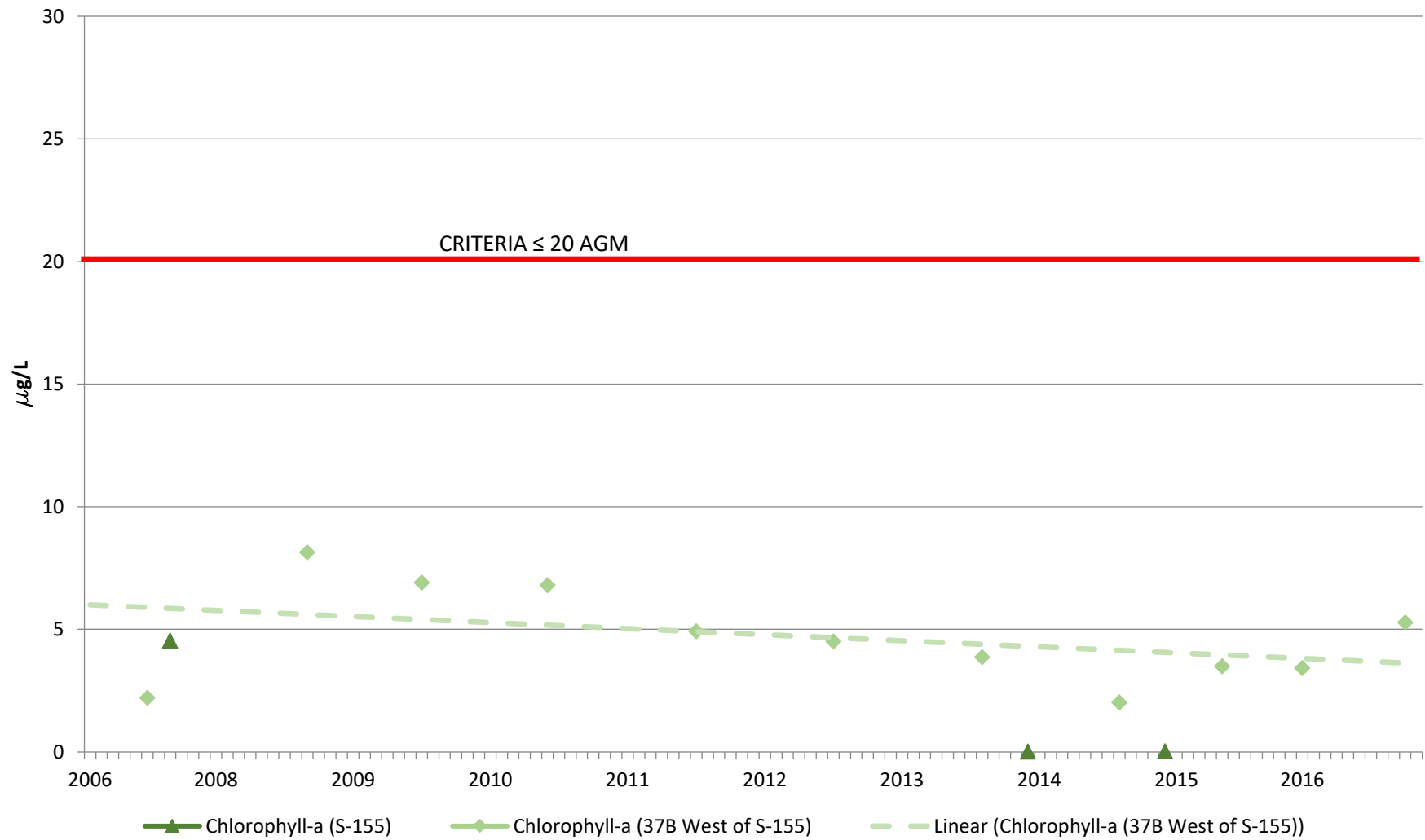


Figure 2-1
AGM Phosphorus Trends
10-Year at Station LWL-11

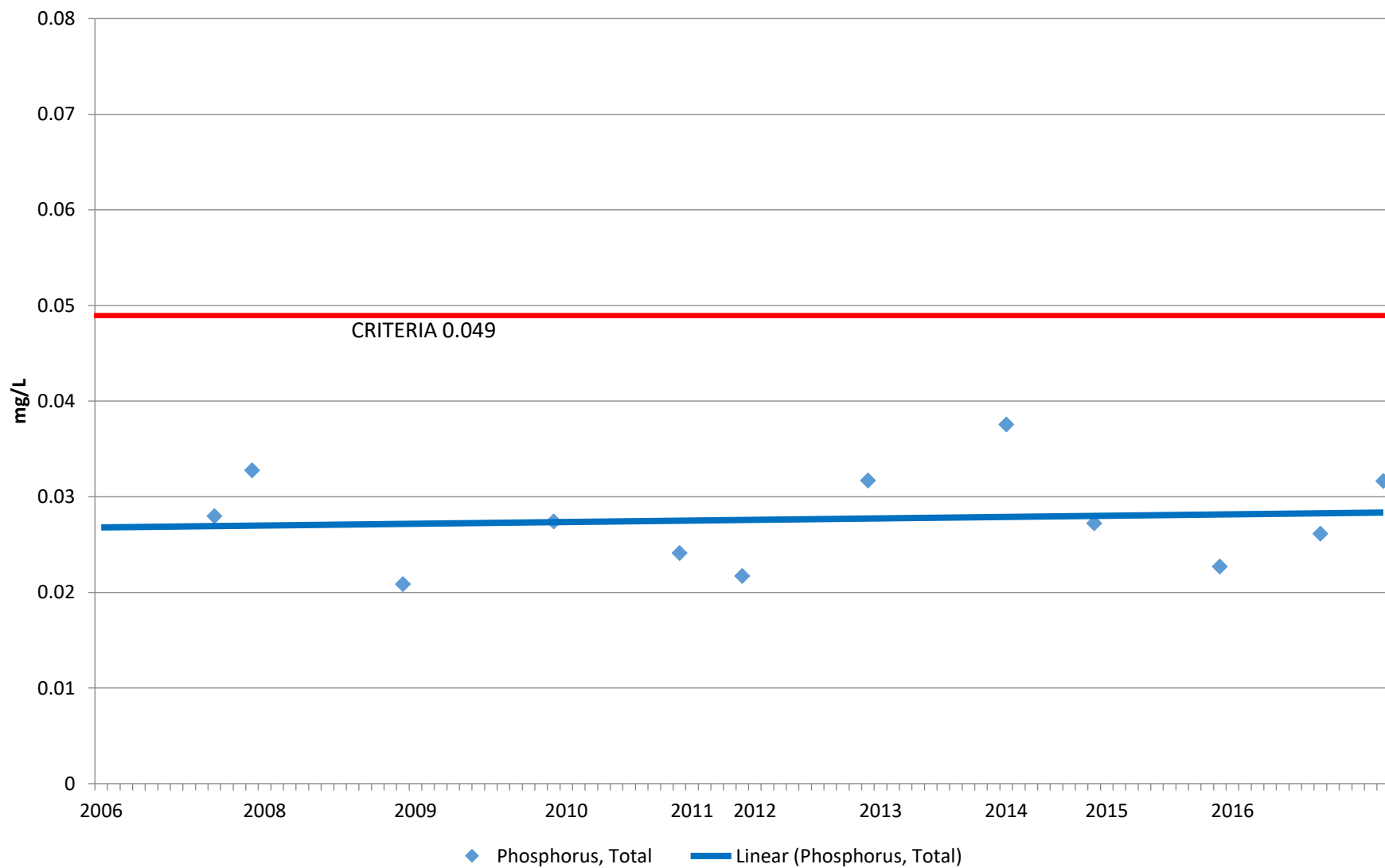


Figure 2-2
AGM Nitrogen Trends
10-Year at Station LWL-11

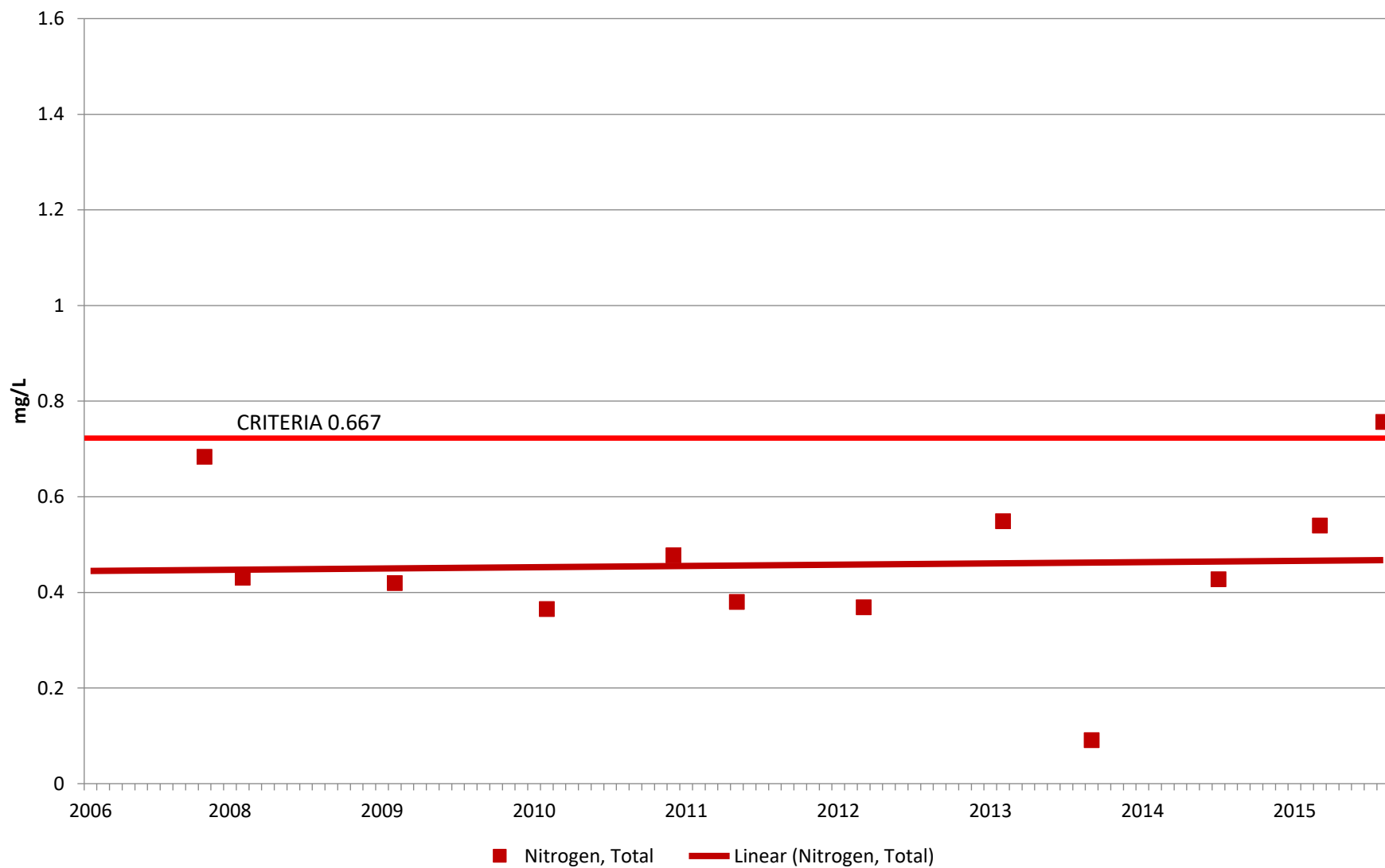


Figure 2-3
AGM Chlorophyll-A
Trends
10-Year at Station LWL-11

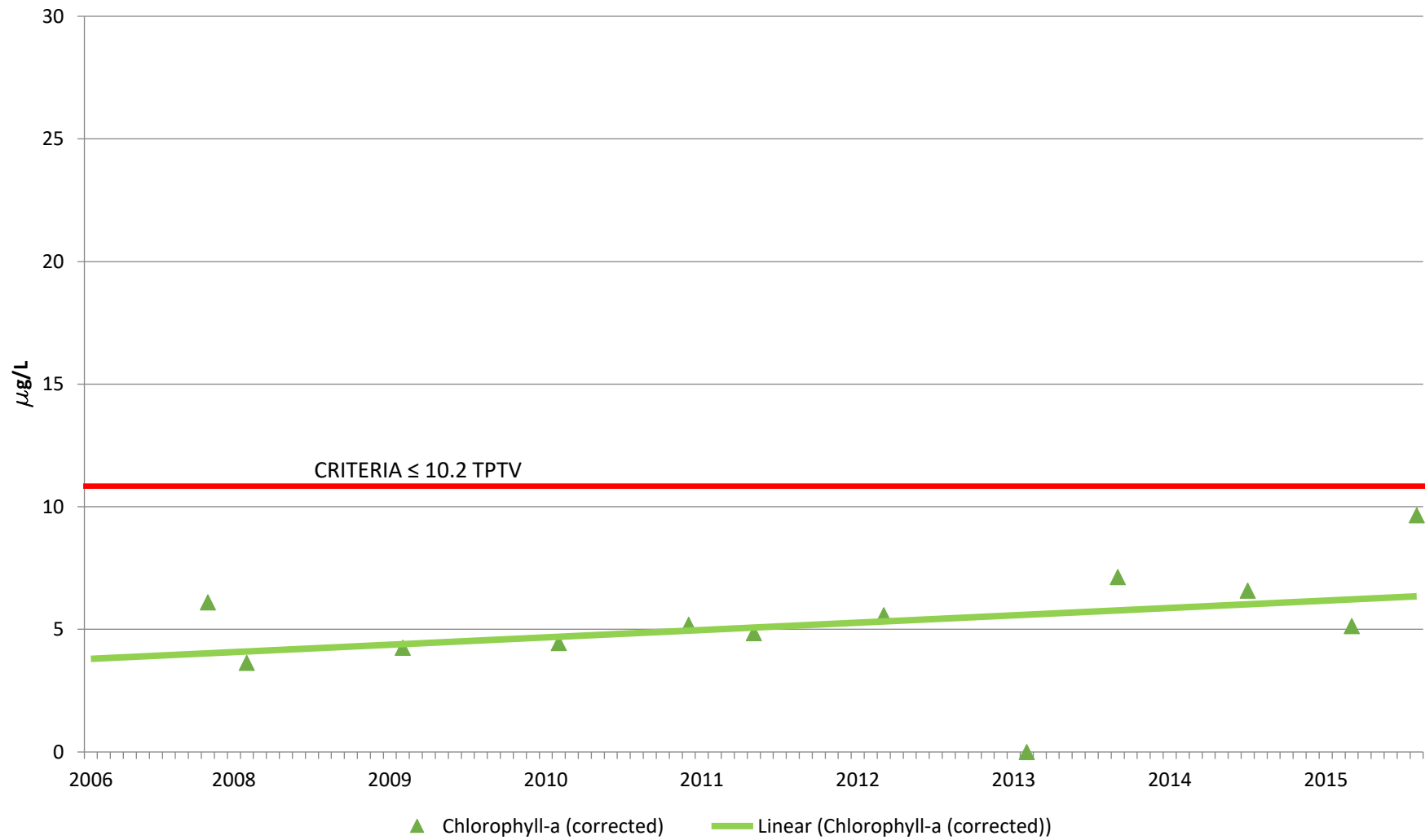


Figure 3-1
AGM Phosphorus Trends
10-Year at Station LWL-13

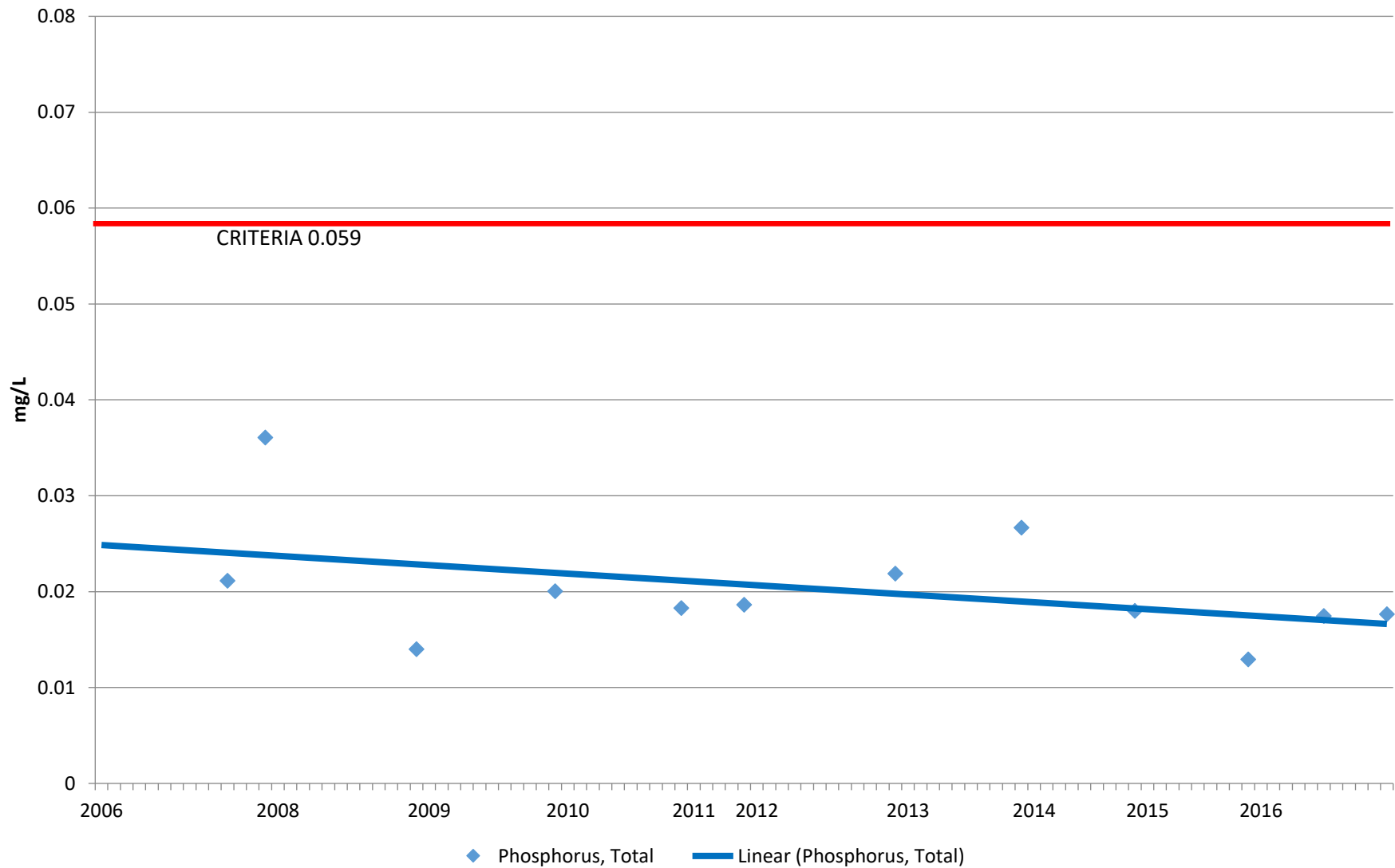


Figure 3-2
AGM Nitrogen Trends
10-Year at Station LWL-13

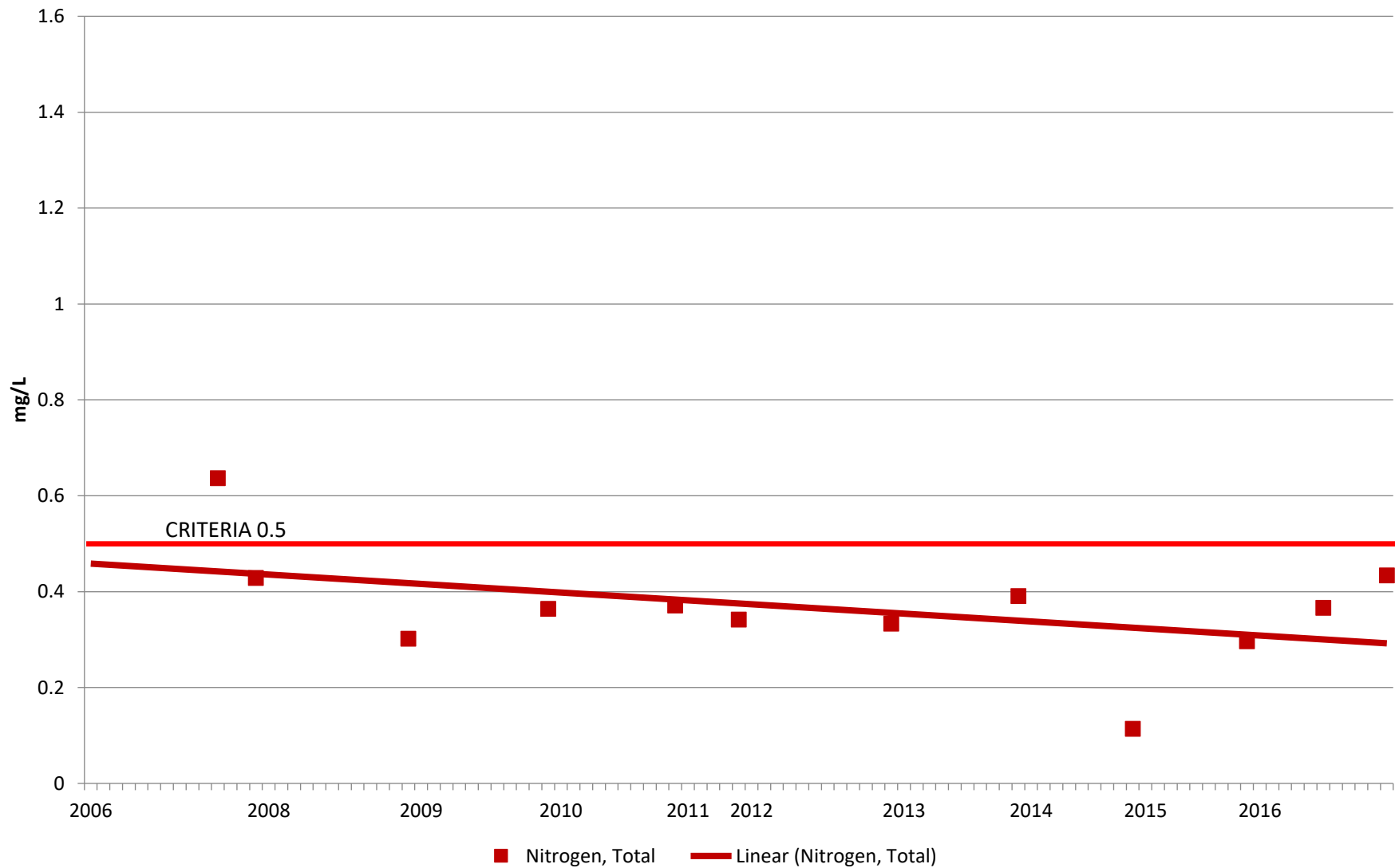


Figure 3-3
AGM Chlorophyll-A
Trends
10-Year at Station LWL-13

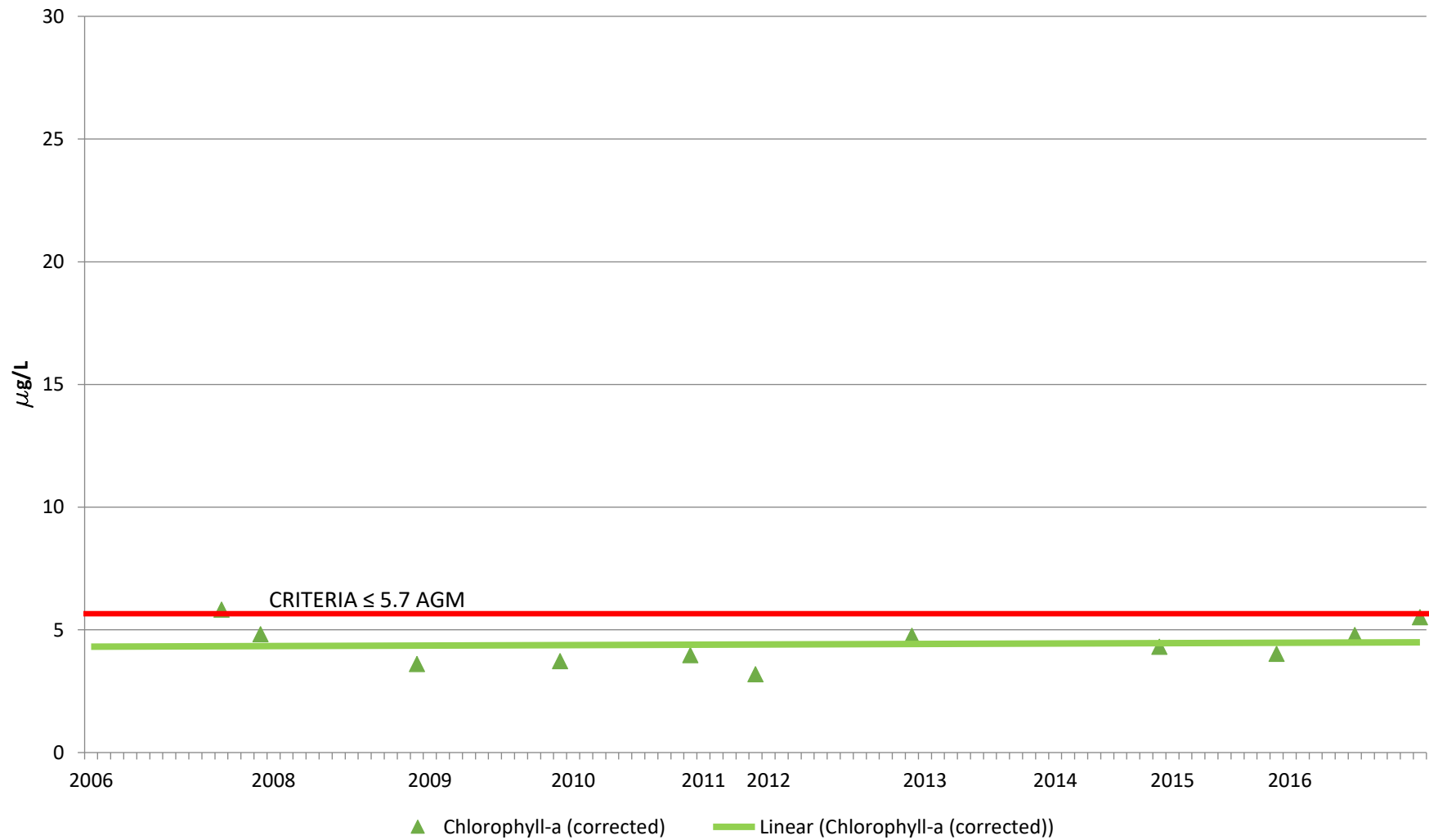


Figure 4-1
AGM Phosphorus Trends
10-Year at Station 22 : C-16

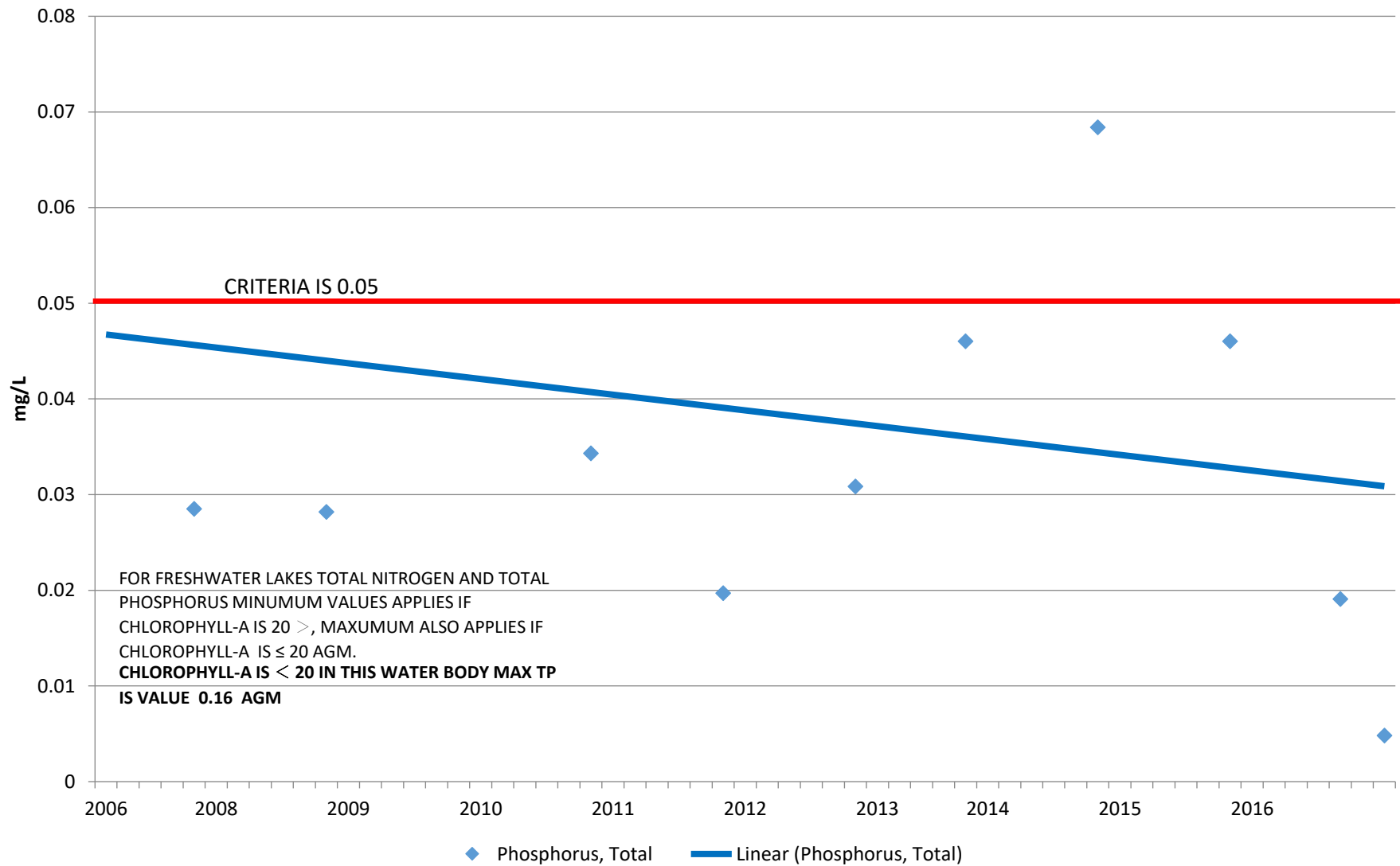


Figure 4-2
AGM Nitrogen Trends
10-Year at Station 22 : C-16

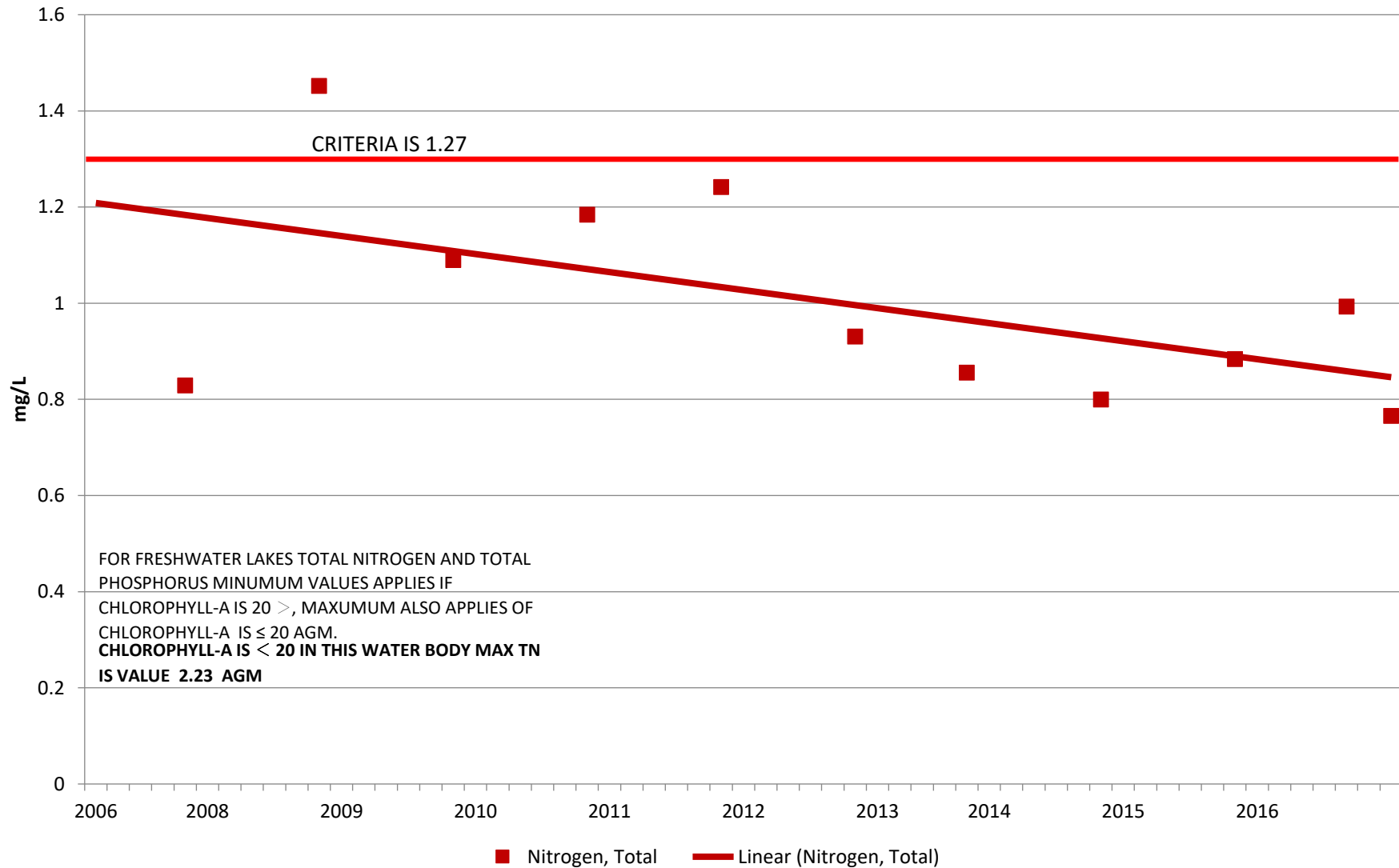


Figure 4-3
AGM Chlorophyll-A
Trends
10-Year at Station 22 : C-16

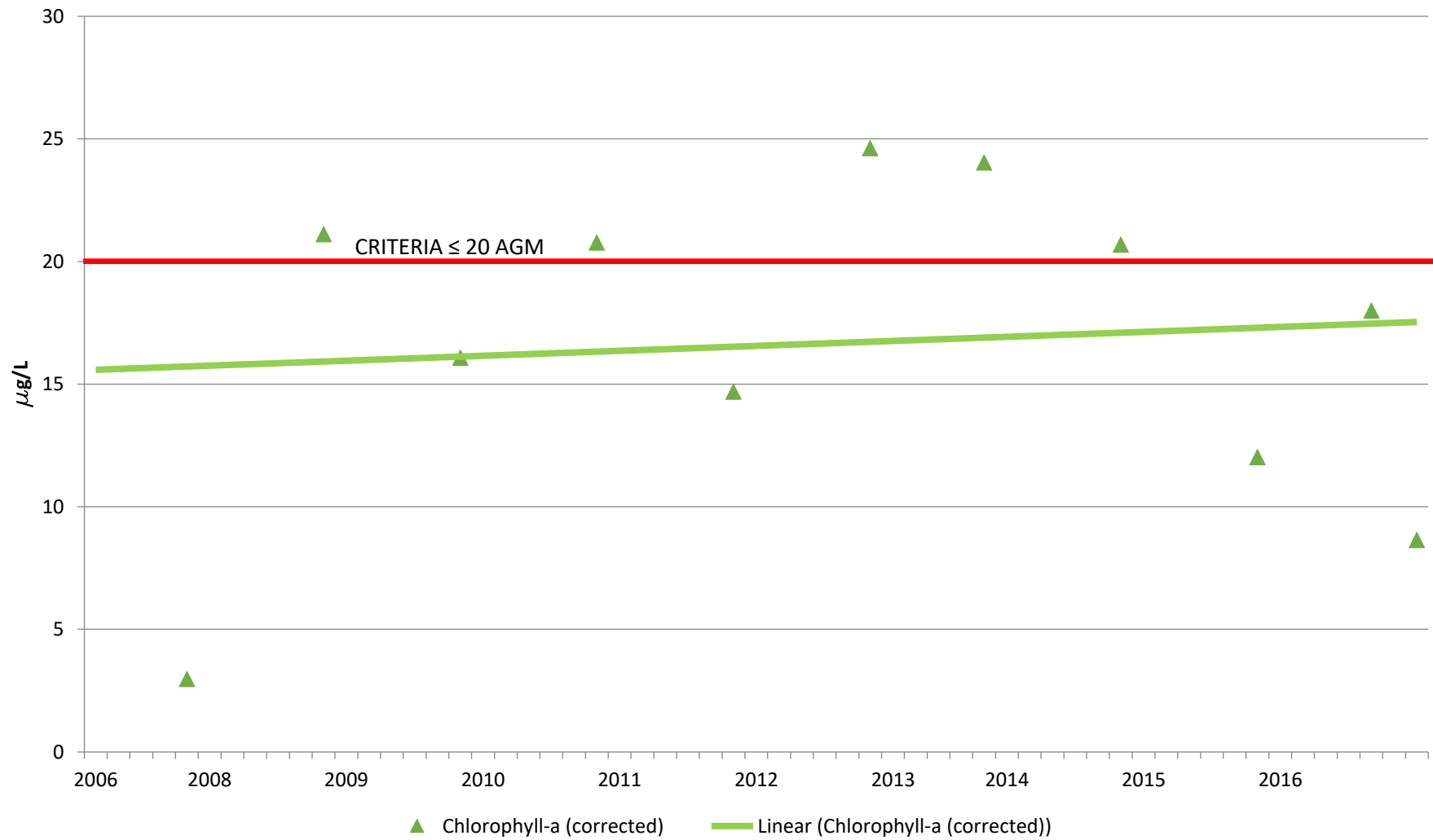


Figure 5-1
AGM Phosphorus Trends
10-Year at Station 24 : C-16

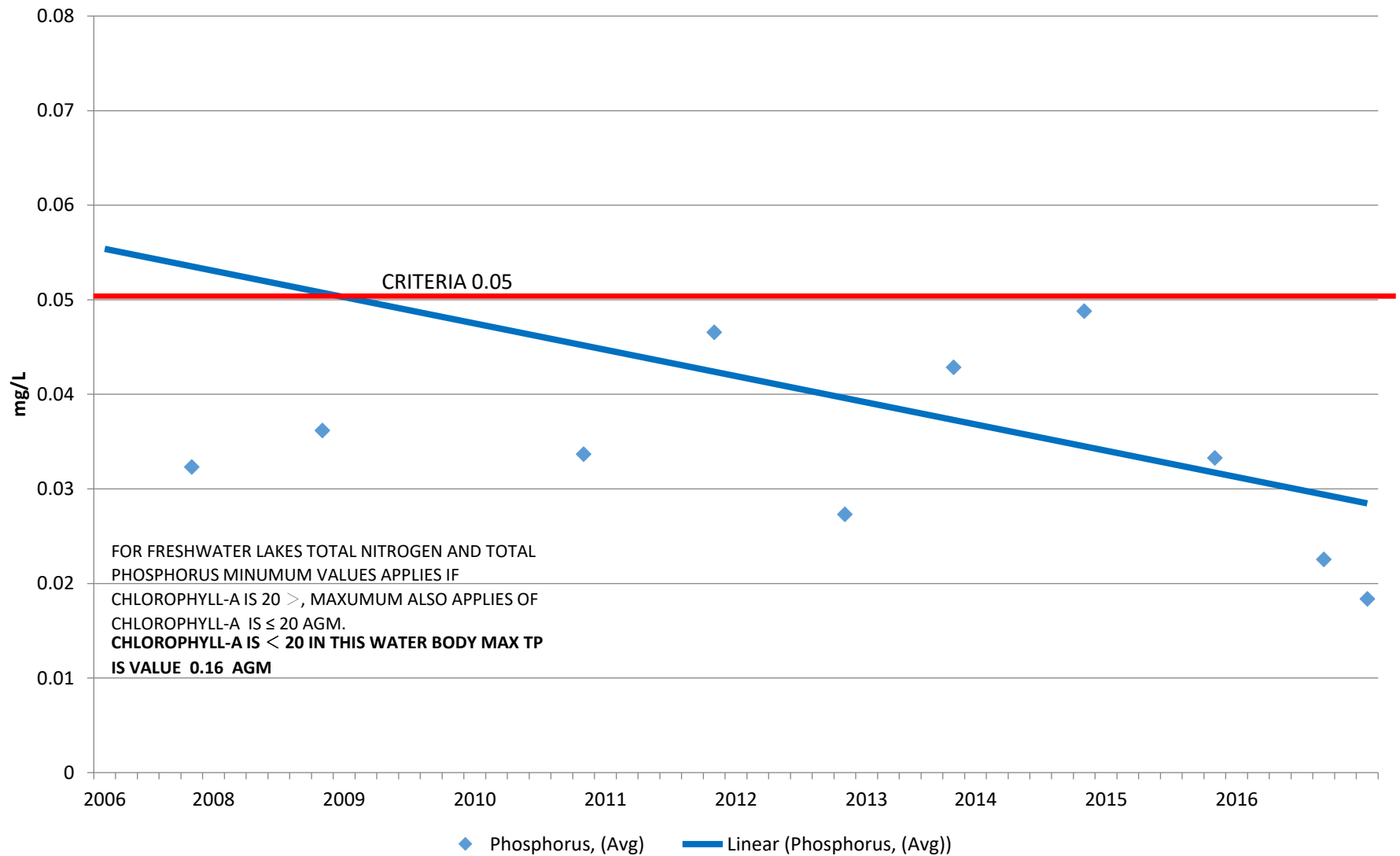


Figure 5-2
AGM Nitrogen Trends
10-Year at Station 24 : C-16

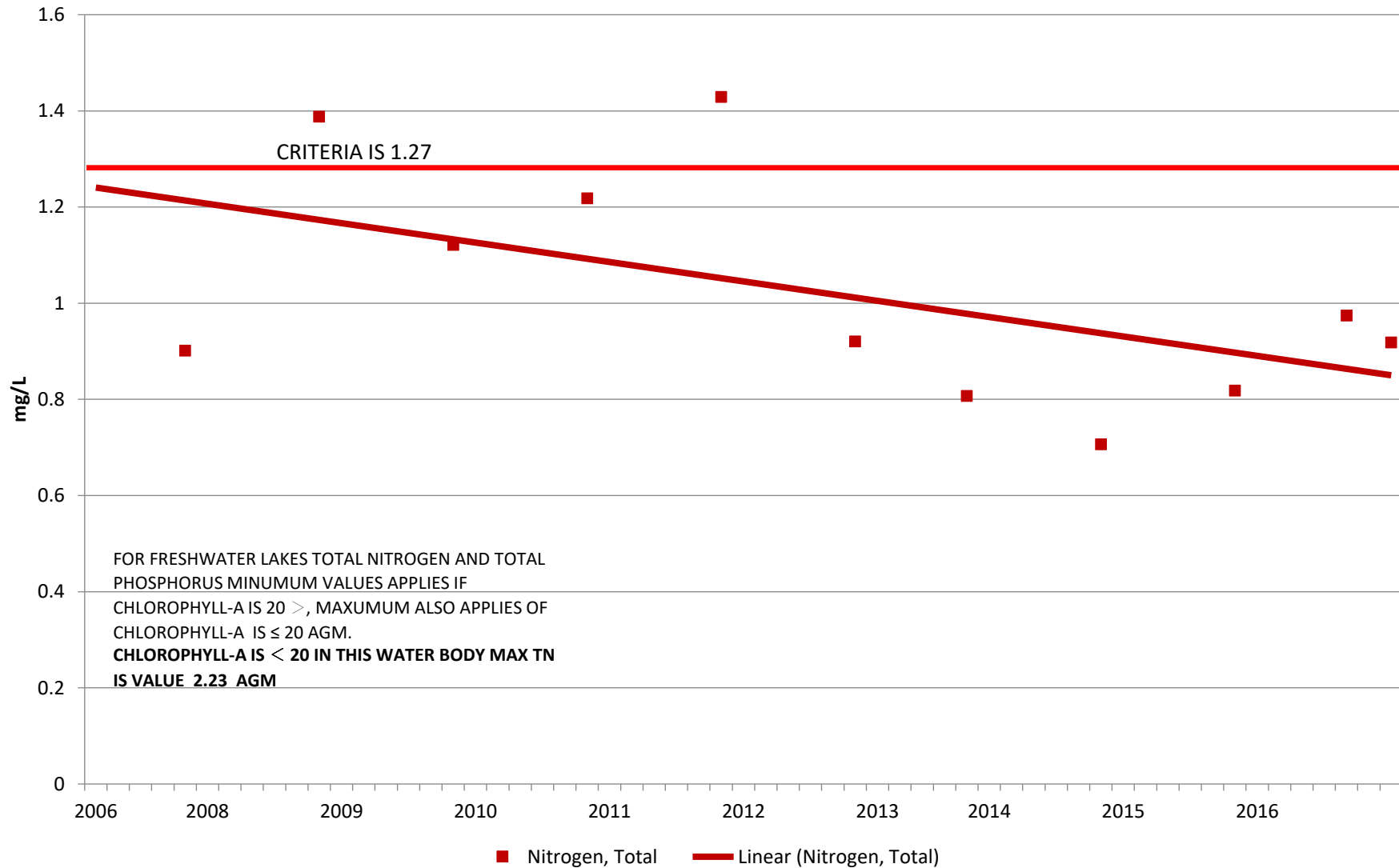


Figure 5-3
AGM Chlorophyll-A
Trends
10-Year at Station 24 : C-16

