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Bay Lake Example

By: Mike Hardin, PhD, PE, CFM

BMPTRAINS Model Training Course

5/17/2016

UNIVERSITY OF CENTRAL FLORIDA
STORMWATER MANAGEMENT ACADEMY

Problem Defined

- Water Quality Retrofit
- Located in Orange County
  - Section 9 of Township 22 South, Range 29 East
- Bay Lake impaired for nutrients
- AMEC study completed in 2012 identified outfall from Heatherington Road as a significant source of pollutants
- Outfall receives runoff from 15.6 acres of mixed land use including single family residences, a church, a commercial property and vacant land.

Problem Defined

- The outfall is piped to lake with roadside swales draining to it
- A wet detention pond serves the church and commercial properties also discharges to the swales
- It is desired to reduce pollutant loads from this outfall
- A modular wetland system is proposed for this project
  - Bold & Gold media will be used
  - Vegetation will be used
  - The system will be designed for a 5+ minute residence time

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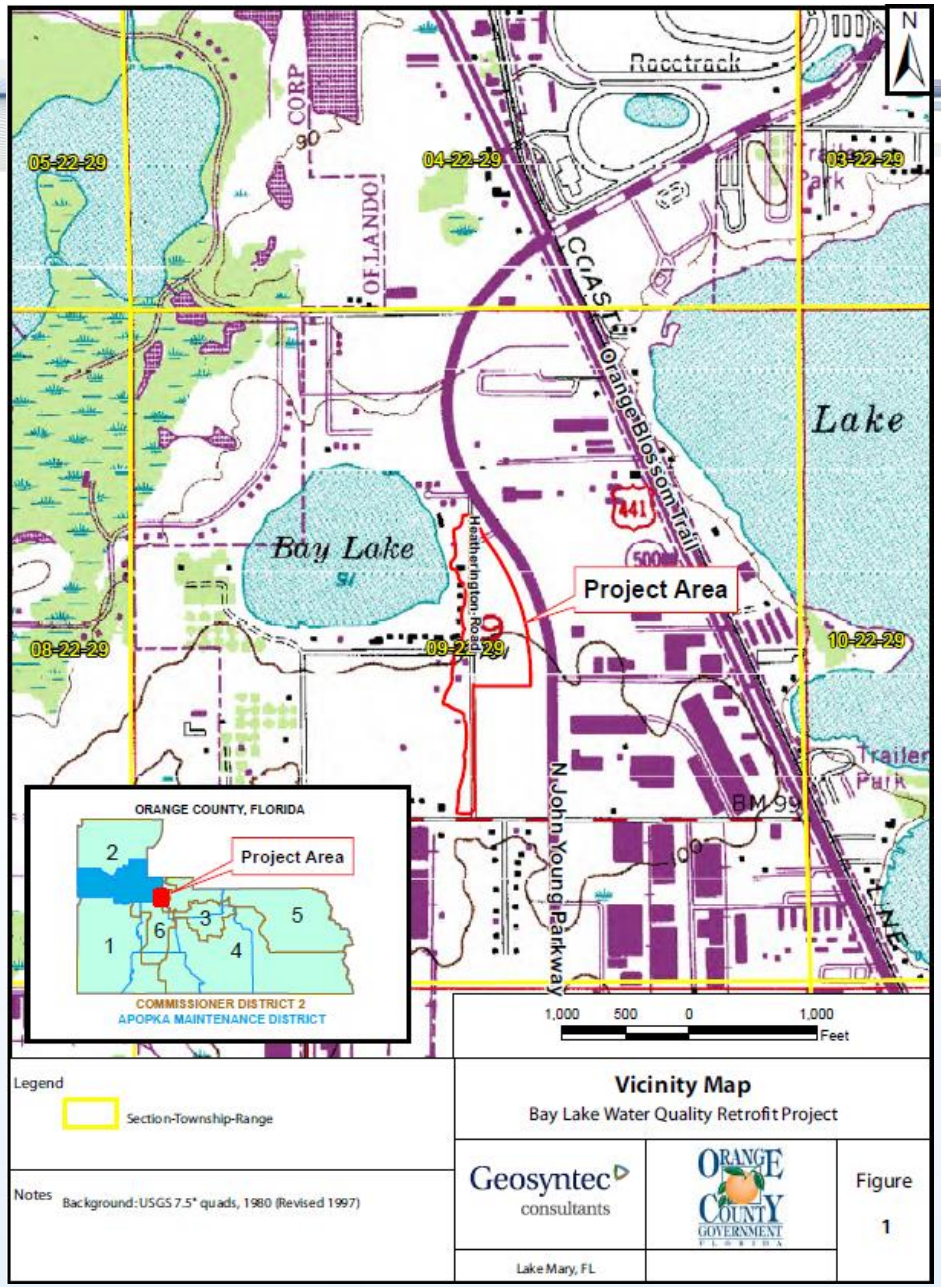
Project Vicinity Map



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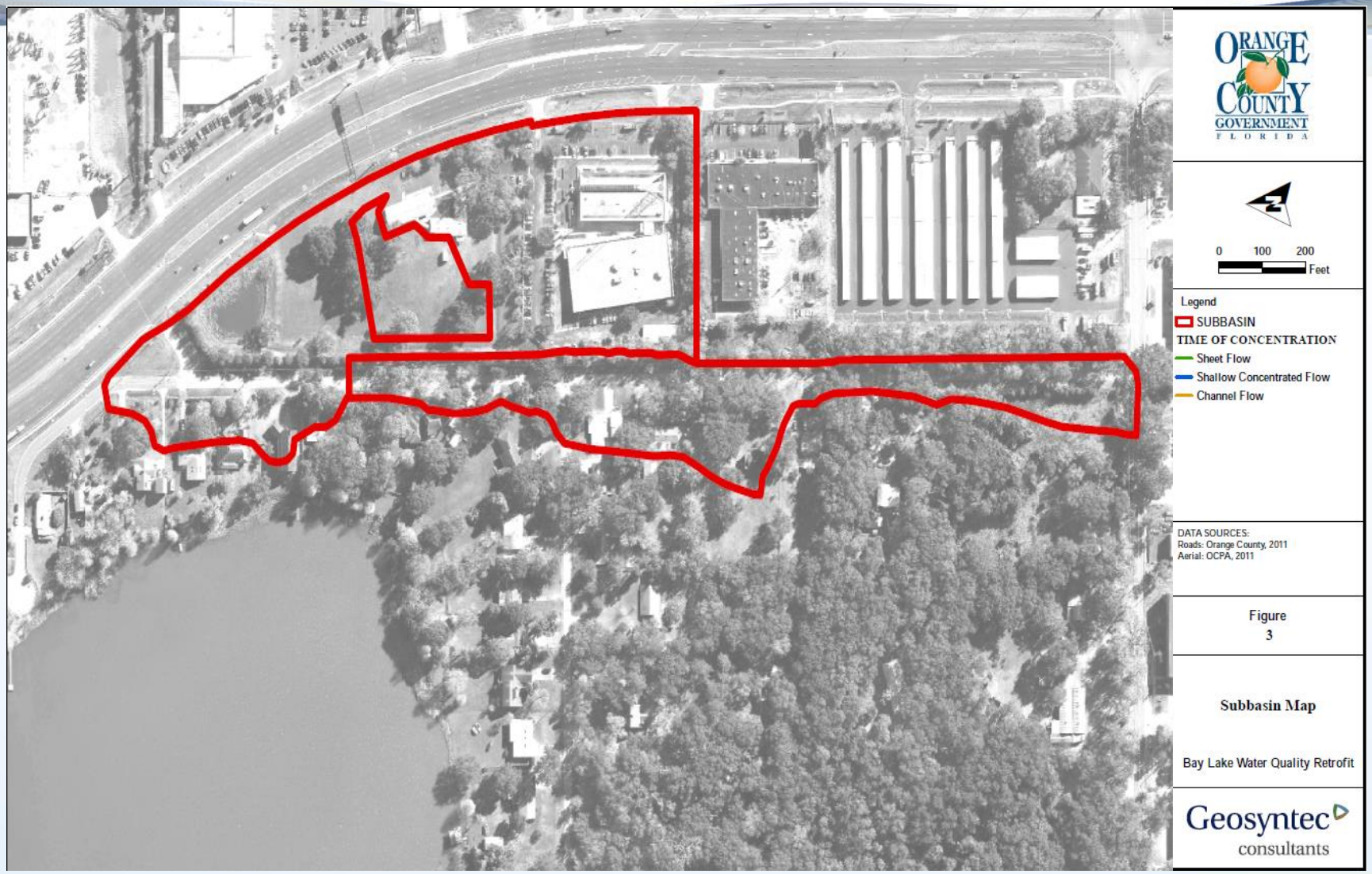
Site Map

Subbasin Map



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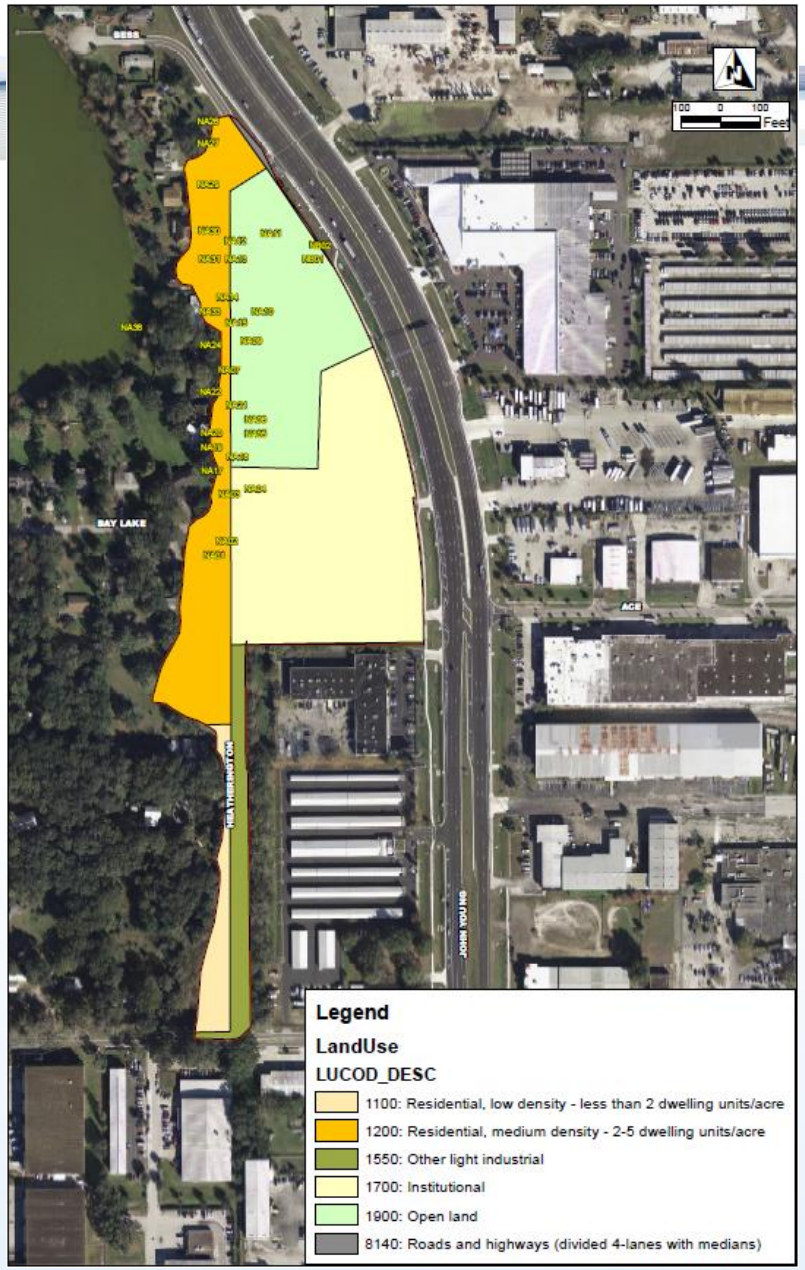
Land Use Map



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Soils Map

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Impervious Area Map

Geoprocessing

- Clip soils and land use layers to project limits
- Use the intersection geoprocessing tool and perform an intersection with the clipped soils and landuse layers
- Perform another intersection with the new soils and land use intersection layer and the basins layer
- Finally, use the union geoprocessing tool and perform a union with the new soils, land use, and basins layer and the impervious area layer
- Export the attribute table from this new layer to Excel
- Determine CN value for each unique polygon

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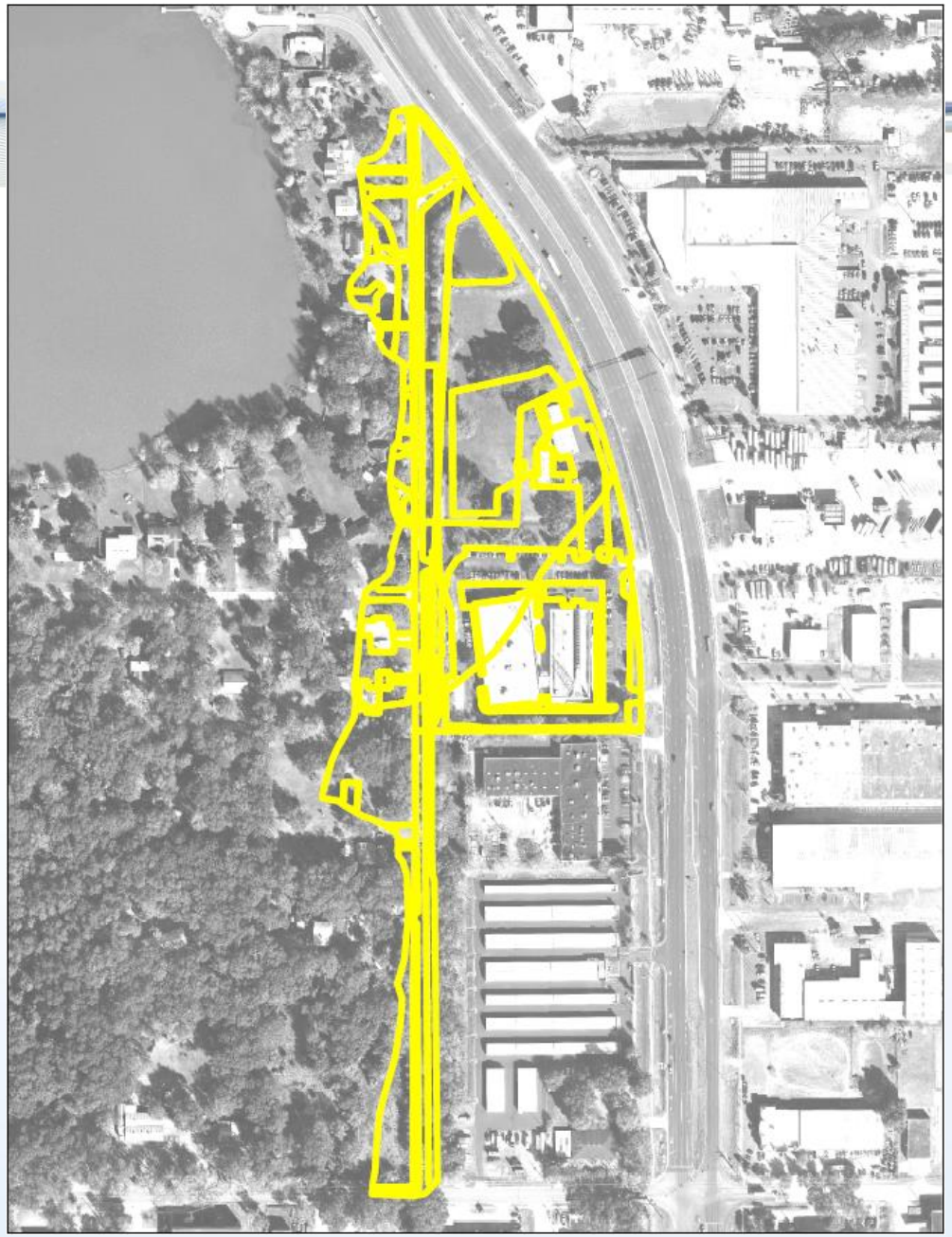
Soils, Land use, basins, and impervious area



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Exported Attribute Table/ CN Lookup

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	LUCODE	ACRES	LUCOD_DESC	HYDRGRP	HYDRGRP	NAME	DCIA	Imperviou	Imperviou	CN				DCIA %
2	1100	0.737464855	1100: Residential, low density - less than 2 dwelling units/acre	C	C	A08	0		0	79.0				
3	1200	0.783424792	1200: Residential, medium density - 2-5 dwelling units/acre	B/D	C	A08	0		0	81.0				
4	1200	0.891499447	1200: Residential, medium density - 2-5 dwelling units/acre	C	C	A08	0		0	81.0				
5	1200	0.009599753	1200: Residential, medium density - 2-5 dwelling units/acre	B/D	C	A08	0		0	81.0				
6	1700	0.094126368	1700: Institutional	B/D	C	A08	0		0	91.0				
7	1700	0.038216402	1700: Institutional	C	C	A08	0		0	91.0				
8	1700	0.328999321	1700: Institutional	B/D	C	A08	0		0	91.0				
9	1550	0.545029965	1550: Other light industrial	C	C	A08	0		0	91.0				
10	1900	0.254820258	1900: Open land	B/D	C	A08	0		0	77.0				
11	1900	0.974574101	1900: Open land	B/D	C	A08	0		0	77.0				
12	1100	0.016733702	1100: Residential, low density - less than 2 dwelling units/acre	C	C	A08	94.4	dcia	94.4	98.0		0.016734		
13	1200	0.179282059	1200: Residential, medium density - 2-5 dwelling units/acre	B/D	C	A08	94.4	dcia	94.4	98.0		0.179282		
14	1200	0.046379791	1200: Residential, medium density - 2-5 dwelling units/acre	B/D	C	A08	8.8	ia	11.6	98.0				
15	1200	0.092906452	1200: Residential, medium density - 2-5 dwelling units/acre	B/D	C	A08	8.8	ia	11.6	98.0				
16	1200	0.007391298	1200: Residential, medium density - 2-5 dwelling units/acre	B/D	C	A08	8.8	dcia	11.6	98.0		0.007391		
17	1200	0.022970002	1200: Residential, medium density - 2-5 dwelling units/acre	B/D	C	A08	8.8	dcia	11.6	98.0		0.02297		
18	1200	0.017915227	1200: Residential, medium density - 2-5 dwelling units/acre	B/D	C	A08	0	ia	0	81.0				
19	1200	0.038957965	1200: Residential, medium density - 2-5 dwelling units/acre	C	C	A08	8.8	ia	11.6	98.0				
20	1200	0.006914412	1200: Residential, medium density - 2-5 dwelling units/acre	C	C	A08	8.8	ia	11.6	98.0				
21	1200	0.000589686	1200: Residential, medium density - 2-5 dwelling units/acre	B/D	C	A08	94.4	dcia	94.4	98.0		0.00059		
22	1700	0.14830567	1700: Institutional	B/D	C	A08	94.4	dcia	94.4	98.0		0.148306		
23	1700	0.044609831	1700: Institutional	C	C	A08	94.4	dcia	94.4	98.0		0.04461		
24	1700	0.004384206	1700: Institutional	B/D	C	A08	60.4	ia	60.5	98.0				
25	1700	0.063523599	1700: Institutional	B/D	C	A08	94.4	dcia	94.4	98.0		0.063524		
26	1700	0.000139841	1700: Institutional	B/D	C	A08	60.4	ia	60.5	98.0				
27	1550	0.49701278	1550: Other light industrial	C	C	A08	94.4	dcia	94.4	98.0		0.497013		
28	1900	0.12470879	1900: Open land	B/D	C	A08	94.4	dcia	94.4	98.0		0.124709		
29	1900	0.00118922	1900: Open land	B/D	C	A08	60.4	ia	60.5	98.0	5.97167		1.105127	19%
30	1200	0.749277426	1200: Residential, medium density - 2-5 dwelling units/acre	B/D	C	A15	0		0	81.0				
31	1200	0.320829424	1200: Residential, medium density - 2-5 dwelling units/acre	A	A	A15	0		0	57.0				
32	1700	0.701164616	1700: Institutional	C	C	A15	0		0	91.0				
33	1700	1.158892681	1700: Institutional	B/D	C	A15	0		0	91.0				
34	1550	0.036929688	1550: Other light industrial	C	C	A15	0		0	91.0				
35	1900	0.546130311	1900: Open land	B/D	C	A15	0		0	77.0				
36	1900	1.67052841	1900: Open land	B/D	C	A15	0		0	77.0				
37	8140	0.050639617	8140: Roads and highways (divided 4-lanes with medians)	B/D	C	A15	0		0	92.0				
38	8140	0.02414863	8140: Roads and highways (divided 4-lanes with medians)	B/D	C	A15	0		0	92.0				
39	1200	0.096522448	1200: Residential, medium density - 2-5 dwelling units/acre	B/D	C	A15	94.4	dcia	94.4	98.0		0.096522		

EMC Determination

- The new EMC should be determined using a flow weighted average
  - Can use CN and A

$$EMC_{Comp} = \frac{\sum EMC * CN * A}{\sum CN * A}$$

  - This gives a better representation of the true EMC that a BMP will receive
    - Runoff generation differences
      - Imperviousness
      - Area
  - Version 8.0 of the BMPTRAINS Model does this automatically now!