MEMORANDUM

JONES EDMUNDS

FROM: Suzanne Kish and Brett Cunningham

DATE: June 8, 2006

TO: John Ryan (Sarasota County), Jeff Herr (PBS&J), Jon Perry (Sarasota County), Veronica Craw (SWFWMD), Jack Merriam (Sarasota County)

XC:

RE: Sarasota County Pollutant Loading Model Development (W552)
Land Use Field Reconnaissance
May 19, 2006

In the current version of the County's pollutant loading model, direct runoff loads are determined based on land use and soils information in the County's GIS database and literature-based event mean concentrations and best management practice removal efficiencies. In an effort to improve the reliability and accuracy of the model in making pollutant load projections, it may be necessary to refine some of the larger land use categories and collect monitoring data to support the differences in the refinements. It is desirable—although not absolutely necessary—for the refinements to be based on other indicators that may be derived from existing GIS data in order to perform the refinement expeditiously. This memorandum provides a summary of the efforts to date make these refinements, including results from a land use field reconnaissance performed on May 19, 2006.

Planning and Data Collection

To aid in planning for the reconnaissance, percentages of the GIS land use data were calculated, with the results shown in Tables 1 and 2. Land use percentages were calculated over the entire County and on just the portions of the County that discharge to the Sarasota County bays since the large portions of open and agricultural land use in the Myakka watershed may skew the percentages. Residential land uses as well as crop and pastureland make up the largest percentages, as shown in Tables 1 and 2. Because of their relatively large percentages and potential for variability within each of the classes, these land uses were identified as having potential need to be further characterized in the GIS database and through sampling. Pine flatwoods is the only other land use with a high enough percentage that may be considered for sampling only but not further refinement in the GIS database.

A 1-day land use field reconnaissance trip was planned to make an initial assessment and to determine if additional reconnaissance would be cost-effective. Land use reconnaissance efforts for the first day were proposed to be focused on the residential and crop and pastureland land uses but were revised to primarily residential land use during the reconnaissance. For the reconnaissance efforts, randomly selected areas throughout the County were proposed to be visited.

On May 19, 2006, Brett Cunningham and Suzanne Kish (Jones Edmunds) visited 18 neighborhoods (and made notes for many others) in the County and noted the following characteristics that could potentially impact pollutant loading:

Density (low, medium, or high)
Presence/absence of curb and gutter
Presence/absence of swales
Presence/absence of ditching
Lot grading (1 low – 5 high)
Lawn health/fertilizer use (1 low – 10 high)
Lot percent grass cover
Lot percent canopy cover
Presence/absence of centralized stormwater treatment

Photographs and miscellaneous notes were also taken in the 18 subdivisions. The information above—coupled with a GIS coverage provided by Sarasota County containing average year of lot development—was used to determine trends in development as related to characteristics affecting water quality.

Results

Although 18 sites were analyzed in detail, general notes were taken for developments throughout the County regarding lawn health and presence or absence of curb and gutter. Figure 1 shows locations of the 18 sites visited where detailed notes and photographs were collected, and Table 3 provides a summary of data.

Results from the reconnaissance are summarized in Table 3. Twelve of the 18 (67 percent) residential areas sampled have curb and gutter. Based on the characteristics of other subdivision noted during the reconnaissance, the percentage on a County-wide basis is likely greater than 67 percent. Eight of the 18 subdivisions had swales in at least portions of the neighborhood, with older developments being more likely to use swales and ditches. Lot grades varied substantially from relatively flat to fairly steep. Likewise, lawn care practices (fertilizing and irrigation—using visual health of the lawn during a drought period as an indicator) varied widely. There was some variation in terms of percent of yard that is grass, but the variation was not great enough to likely have a large impact on loading estimates. Likewise, there was variation in the percentage of tree cover (which has been shown to reduce annual runoff volumes), but the majority tended to be clustered within a fairly small percentage range, as shown in Table 3. Tree canopy appears to usually be greater in older developments, which primarily displayed swales and ditching as stormwater treatment and conveyance.

Although property value has not yet been extracted from the available GIS data for the sampled subdivisions, there was a clear trend between lawn care practices and age/value. Recently developed properties tend towards a high lawn health rating, low lot grading, and presence of curb and gutter leading to centralized treatment. For further validation of this finding, the field reconnaissance data and the generalized field notes were examined in GIS with respect to the

coverage containing development age. Noted developments outside of the 18 listed in Table 3 were attributed within GIS according to age of development and the fields which are expected to affect water quality (density, presence/absence of curb and gutter, lawn health/fertilizer use) were inferred based on the visited sites. This information is also shown in Figure 1 by color-coding the developed parcels.

Conclusions and Recommendations

Further refinement of the medium density residential land use class should be considered under this project. It represents a large enough percentage that the efforts spent in refinement of its loading may be justifiable. Lawn care practices appear to be the most variable of the characteristics and may therefore represent the highest priority category of refinement. Additionally, it appears that the GIS refinement of lawn care practices may be adequately automated as a function of age and property value. For sampling, it may be most effective to monitor in subdivision that have lawn care practices to the two extremes and then interpolate in between.

The absence of curb-and-gutter, the presence of swales, and other low impact development measures are worthy of inclusion for monitoring and GIS refinement, but they are not anticipated to have as large of an impact due to the relatively low use of these measures. However, having these data will help the load estimates and serve other purposes within the County.

Based on field reconnaissance of agricultural land uses, the temporal variability may be too great to develop meaningful monitoring data under this project.

JONES EDMUNDS

Table 1. Land Use Percentages Within Sarasota County

FLUCCSCODE	Description	Area (acres)	% of Total Area
1100	RESIDENTIAL LOW DENSITY < 2 DWELLING UNITS	21596.84	5.84
1200	RESIDENTIAL MED DENSITY 2->5 DWELLING UNIT	29379.48	7.94
1300	RESIDENTIAL HIGH DENSITY	16385.82	4.43
1400	COMMERCIAL AND SERVICES	6063.35	1.64
1500	INDUSTRIAL	1737.35	0.47
1600	EXTRACTIVE	2894.47	0.78
1700	INSTITUTIONAL	2127.89	0.58
1800	RECREATIONAL	7952.58	2.15
1900	OPEN LAND	25737.54	6.96
2100	CROPLAND AND PASTURELAND	47157.21	12.75
2140	ROW CROPS	2839.38	0.77
2200	TREE CROPS	3749.40	1.01
2300	FEEDING OPERATIONS	13.14	0.00
2400	NURSERIES AND VINEYARDS	345.49	0.09
2500	SPECIALTY FARMS	490.99	0.13
2600	OTHER OPEN LANDS <RURAL>	2643.40	0.71
3100	HERBACEOUS	1152.80	0.31
3200	SHRUB AND BRUSHLAND	39769.49	10.75
3300	MIXED RANGELAND	1679.00	0.45
4100	UPLAND CONIFEROUS FOREST	907.99	0.25
4110	PINE FLATWOODS	51776.97	14.00
4120	LONGLEAF PINE - XERIC OAK	2.79	0.00
4200	UPLAND HARDWOOD FORESTS - PART 1	2308.18	0.62
4340	HARDWOOD CONIFER MIXED	13043.52	3.53
4400	TREE PLANTATIONS	527.17	0.14
5100	STREAMS AND WATERWAYS	1130.98	0.31
5200	LAKES	2836.70	0.77
5300	RESERVOIRS	6014.87	1.63
5400	BAYS AND ESTUARIES	2648.16	0.72
6100	WETLAND HARDWOOD FORESTS	58.73	0.02
6110	BAY SWAMPS	317.08	0.09
6120	MANGROVE SWAMPS	632.66	0.17
6150	STREAM AND LAKE SWAMPS (BOTTOMLAND)	19084.06	5.16
6200	WETLAND CONIFEROUS FORESTS	339.43	0.09
6210	CYPRESS	687.82	0.19

Table 1. Cont'd.

FLUCCSCODE	Description	Area (acres)	% of Total Area
6300	WETLAND FORESTED MIXED	2233.73	0.60
6410	FRESHWATER MARSHES	34745.11	9.39
6420	SALTWATER MARSHES	1005.69	0.27
6430	WET PRAIRIES	6952.91	1.88
6440	EMERGENT AQUATIC VEGETATION	1233.38	0.33
6510	TIDAL FLATS/SUBMERGED SHALLOW PLATFORM	26.25	0.01
6530	INTERMITTENT PONDS	64.82	0.02
7100	BEACHES OTHER THAN SWIMMING BEACHES	91.72	0.02
7400	DISTURBED LAND	388.94	0.11
8100	TRANSPORTATION	4194.40	1.13
8200	COMMUNICATIONS	86.24	0.02
8300	UTILITIES	2882.34	0.78
	Totals	369938.27	100

*This summary is based on all land use covering Sarasota County.

Table 2. Land Use Percentages Within Watersheds Draining to Sarasota Bays

FLUCCSCODE	Description	Area (acres)	% of Total Area
1100	RESIDENTIAL LOW DENSITY < 2 DWELLING UNITS	16883.69	7.26
1200	RESIDENTIAL MED DENSITY 2->5 DWELLING UNIT	30911.38	13.28
1300	RESIDENTIAL HIGH DENSITY	15103.52	6.49
1400	COMMERCIAL AND SERVICES	5958.10	2.56
1500	INDUSTRIAL	2002.19	0.86
1600	EXTRACTIVE	1770.27	0.76
1700	INSTITUTIONAL	2003.58	0.86
1800	RECREATIONAL	7530.38	3.24
1900	OPEN LAND	8386.68	3.60
2100	CROPLAND AND PASTURELAND	40497.59	17.40
2140	ROW CROPS	1686.32	0.72
2200	TREE CROPS	2734.74	1.18
2300	FEEDING OPERATIONS	2.58	0.00
2400	NURSERIES AND VINEYARDS	222.18	0.10
2500	SPECIALTY FARMS	359.64	0.15
2600	OTHER OPEN LANDS <RURAL>	1999.30	0.86
3100	HERBACEOUS	100.66	0.04
3200	SHRUB AND BRUSHLAND	13108.19	5.63
3300	MIXED RANGELAND	360.25	0.15
4100	UPLAND CONIFEROUS FOREST	499.13	0.21
4110	PINE FLATWOODS	18712.67	8.04
4120	LONGLEAF PINE - XERIC OAK	3.12	0.00
4200	UPLAND HARDWOOD FORESTS - PART 1	218.43	0.09
4340	HARDWOOD CONIFER MIXED	6015.09	2.59
4400	TREE PLANTATIONS	409.65	0.18
5100	STREAMS AND WATERWAYS	544.81	0.23
5200	LAKES	974.14	0.42
5300	RESERVOIRS	5084.93	2.19
5400	BAYS AND ESTUARIES	21333.91	9.17
6100	WETLAND HARDWOOD FORESTS	13.14	0.01
6110	BAY SWAMPS	4.30	0.00
6120	MANGROVE SWAMPS	1172.96	0.50
6150	STREAM AND LAKE SWAMPS (BOTTOMLAND)	5221.32	2.24
6200	WETLAND CONIFEROUS FORESTS	120.54	0.05
6210	CYPRESS	105.28	0.05

Table 2. Cont'd.

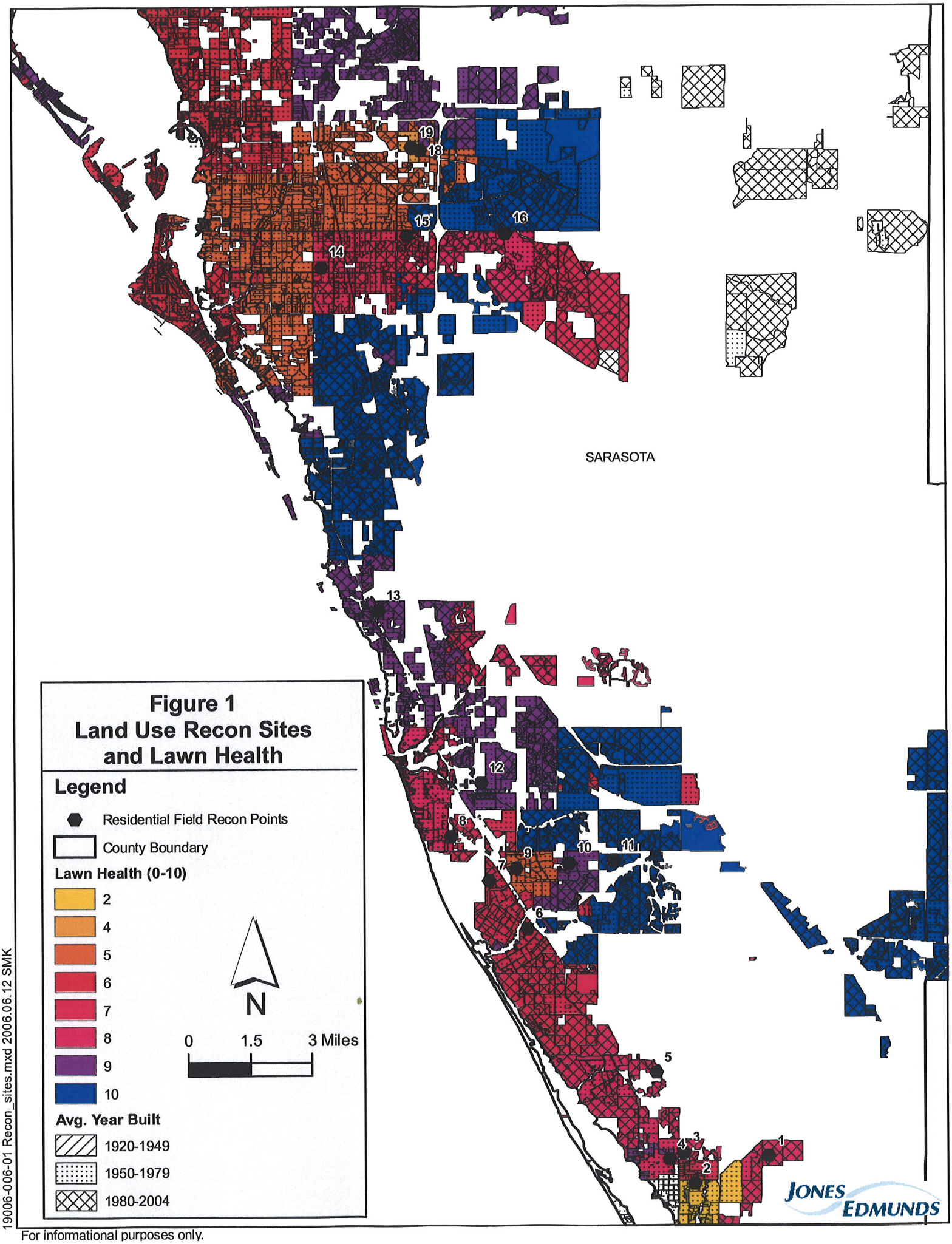
FLUCCSCODE	Description	Area (acres)	% of Total Area
6300	WETLAND FORESTED MIXED	1915.18	0.82
6410	FRESHWATER MARSHES	8763.99	3.77
6420	SALTWATER MARSHES	146.74	0.06
6430	WET PRAIRIES	2980.82	1.28
6440	EMERGENT AQUATIC VEGETATION	447.05	0.19
6510	TIDAL FLATS/SUBMERGED SHALLOW PLATFORM	441.52	0.19
6530	INTERMITTENT PONDS	25.08	0.01
7100	BEACHES OTHER THAN SWIMMING BEACHES	176.42	0.08
7400	DISTURBED LAND	189.42	0.08
8100	TRANSPORTATION	3337.26	1.43
8200	COMMUNICATIONS	84.39	0.04
8300	UTILITIES	2125.46	0.91
	Totals	232688.03	100.00

*This summary is based on watersheds draining to Sarasota, Little Sarasota, Lemon, Dona and Roberts Bays.

Table 3. Summary of Visited Sites

SITE	Avg. Yr Built	TYPE	C&G	SWALES	DITCHES	LOT GRADE	LAWN HEALTH (FERTILIZER)	PERCENT GRASS	PERCENT CANOPY	CENTRALIZED TREATMENT	COMMENTS
1	1985	LDR	No	Yes	No		8	85		No	Very Low DCIA
2	1972	MDR	No	Yes	No		2	95		No	Limited DCIA
3	1987	MDR	Yes	No	No	4	7	85		No	Mix of yard care; small lots
4	1965	MDR	Yes	No	No	4	9	95	10	Yes	
5	1995	MDR	Yes	No	No	3	7	85		Yes	Newer
6	1980	MDR	No	Yes	Yes	4	7	90	60	No	Half ditch, half swale; septic
7	1980	MDR	Yes	Yes	No	3	7	70	70	No	DCIA front 25% of houses; fill
8	1963	MDR	Yes	Yes	No	3	5	70	35	No	
9	1966	MDR	No	Yes	No	3	5	95	15	No	Driveway DCIA
10	1980	MDR	Yes	No	No	2	9	85	20	No	Golf course community
11	1990	MDR	Yes	No	No	3	10	90	10	Yes	Universal driveway DCIA
12	1968	MDR	No	No	No	2	6	90	5	No	Trailer park; inverted crown street; downspouts disconnected
13	1980	MDR	Yes	No	No	3	9	85	15	Yes	Roof-driveway downspouts to grass
14	1970	MDR	Yes	No	No	3	7	90	25	No	
15	1979	MDR	Yes	No	No	2	7	90	20	No	Driveway connected
16	1980	MDR	Yes	No	No	2	8	85	15	No	Inverted crown
17		AG									No tillage
18	1976	MDR	No	Yes	Yes	1	5	80	40	No	Some ditching, some swales
19	1973	MDR	Yes	Yes	Yes	1	4	70	50	No	More ditches than swales

*Ditches are distinguished from swales by being deeper, narrower, and with steeper side slopes.



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For informational purposes only.

PHOTOS

Low Density Residential

Photo 1. Site 1 - Englewood Farms Acres

Photo 2. Site 1 – Englewood Farms Acres

Medium Density Residential

Sites with Curb and Gutter, High Level of Lawn Care Practice

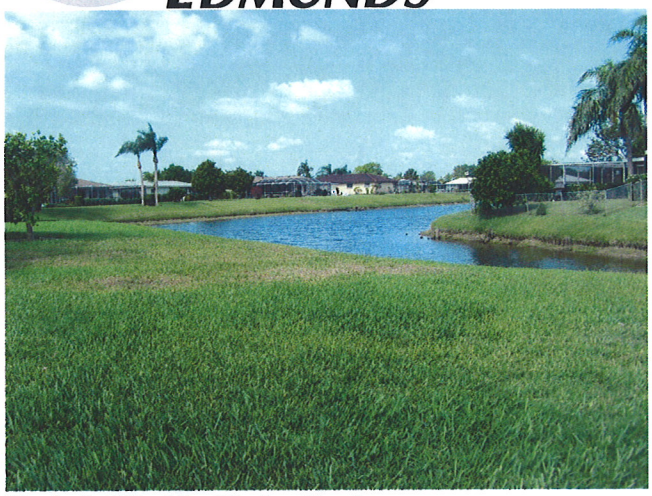

Photo 3. Site 10 – Venice Gardens

Photo 4. Site 11 – Willow Springs

Photo 5. Site 13- Sorrento East

Photo 6. Site 8 – South Venezia Park

Photo 7. Site 14 – South Gate Ridge

Photo 8. Site 15 - Southridge

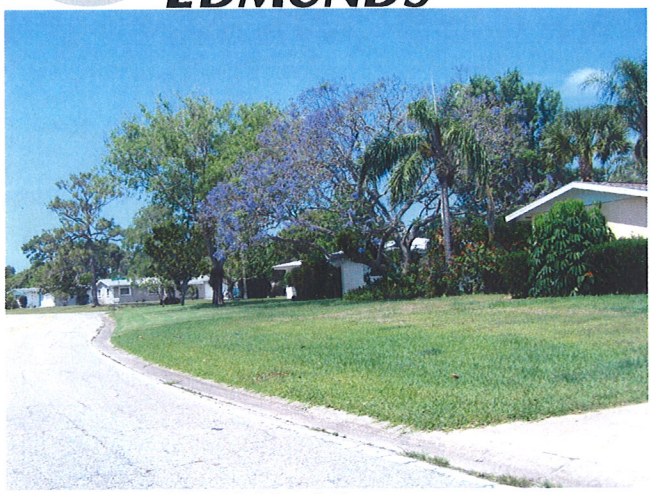

Photo 9. Site 18 – Highland Crest

Sites with no Curb and Gutter

Photo 10. Site 2 – Prospect Park

Photo 11. Site 2 – Prospect Park

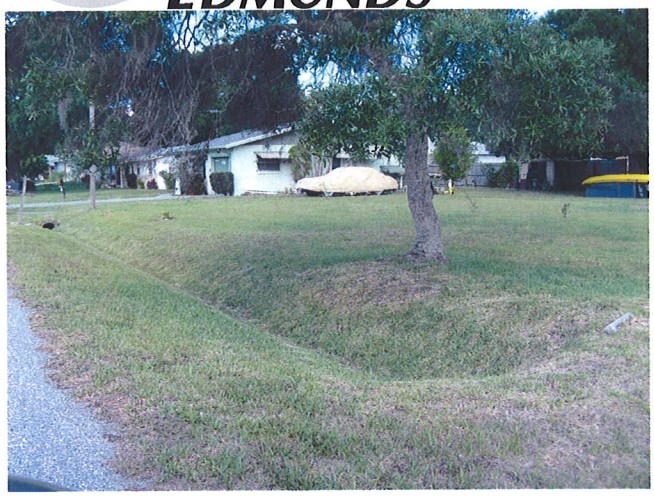

Photo 12. Site 6 – South Venice

Photo 13. Site 9 – Venice Gardens