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DRAFT TECHNICAL MEMORANDUM

TO: Walton County Board of County Commissioners

FROM: Harvey H. Harper, III, Ph.D., P.E. – President

DATE: November 11, 2015

RE: Sandestin DRI and Driftwood Estates Stormwater Standard

Introduction

Driftwood Estates is part of the Sandestin Development of Regional Impact (DRI) which is located in Walton County, Florida. The Sandestin DRI is a mixed use development that includes approximately 1,960 acres of residential, office, and commercial land use activities which was approved by the Walton County Board of County Commissioners on October 19, 1976. The Sandestin DRI is bisected by U.S. Highway 98, with the majority of the development located north of U.S. Highway 98.

Driftwood Estates is located on the northern tip of the Sandestin DRI, approximately 2.5 miles north of U.S. Highway 98, and is bordered on the west, north, and east by Choctawhatchee Bay. Choctawhatchee Bay is a highly productive estuarine system which is classified in Chapter 62-302.400 of the Florida Administrative Code (FAC) as a Class II surface water suitable for shellfish propagation or harvesting.

An Application for Development Approval (ADA) was submitted to the Florida Department of Community Affairs (DCA) during 1974 to obtain approval for the proposed Sandestin development, including Driftwood Estates. The ADA included detailed descriptions of proposed activities for water supply, sewage disposal, surface drainage (runoff), water quality, natural resources, archeology, traffic, noise pollution, air pollution, and other design elements associated with significant developments. The ADA, including description of proposed activities and preliminary construction drawings, were developed by Baskerville-Donovan Engineers, Inc.

Driftwood Estates was developed in two separate phases. Driftwood Estates Phase I consists of perimeter portions of the overall Driftwood Estates, with lots that generally border Choctawhatchee Bay. These areas were platted during 1979 and are commonly referred as the "exterior" portions of Driftwood Estates. Driftwood Estates Phase II consists of center or "interior" portions of Driftwood Estates and was platted in three separate plats during 2003, 2004, and 2006.

Stormwater Matters in Dispute

Walton County and Greater Driftwood Estates Homeowners Association (Driftwood) have had an ongoing dispute regarding interpretation of the DRI development standards and criteria along with periodic flooding episodes which occur in the exterior portions of Driftwood Estates. During 2008, the parties entered into an agreement which stipulated that matters in dispute would be heard by an impartial Special Magistrate tasked with holding an evidentiary hearing, making findings of fact regarding the relevant issues, and providing recommendations for resolution of the matters in dispute. An evidentiary hearing was held on August 24-25, 2009 with participation from Walton County, Driftwood Estates, and DCA. The stormwater related areas of disagreement addressed by the Special Magistrate involved: (1) whether the Driftwood Estates stormwater system is designed according to standards outlined in the Sandestin DRI, and (2) and measures taken to correct the perceived deficiencies and stop the periodic flooding events.

The Special Magistrate Recommendation from the hearing included the following language regarding the stormwater issues:

> "A review by an independent, qualified, and experienced stormwater engineer of the Driftwood Estates exterior stormwater system and interior stormwater system (jointly referred to as the "Driftwood Stormwater Systems") should be undertaken as soon as reasonably possible to determine or perform the following:
>
> A. The appropriate model to be used in modeling the Driftwood Stormwater Systems.
>
> B. The permitted design of the Driftwood Stormwater Systems and a reasonable review of what has been built to determine any significant changes not consistent with the design.
>
> C. The modeling inputs should assume full build-out and model the exterior stormwater system and the interior stormwater system independently and jointly.
>
> D. Model the Driftwood Stormwater Systems to determine if the 3-day, 24-hour storm DRI level of service pursuant to the Sandestin ADA and the 25-year, 24-hour storm Walton County development code level of service are being met. The independent contractor should assess from the Sandestin ADA and other relevant data whether the 3-day, 24-hour storm level of service is a 'retention' or 'detention' standard or some variation of the two.
>
> E. If the level of service standards are not met, determine what stormwater system options, including wet detention systems similar to other parts of the Sandestin DRI, are possible meet the level of service and their estimated costs.
>
> F. All results are to be reported to Walton County, Driftwood, and DCA."

During April 2015, Walton County entered into a contract with Environmental Research & Design, Inc. (ERD) and Harvey H. Harper, III, Ph.D., P.E. (hereafter referred to as "Engineer") to address the stormwater-related recommendations provided by the Special Magistrate. Over the past few months, the Engineer has met with representatives of Driftwood Estates and Walton County and has reviewed numerous documents provided by each party. ERD is currently working on issues related to modeling of the Driftwood Stormwater Systems and interactions between the interior and exterior stormwater systems and results of these modeling efforts will be presented in a subsequent report. This Technical Memorandum specifically addresses the Recommendation from the Special Magistrate related to the level of service for the Driftwood Stormwater System outlined in the DRI and whether the level of service is a "retention" or "detention" standard or some variation of the two.

Description of DRI Stormwater Standard

A narrative description of the proposed stormwater management system for the Sandestin DRI is included in the Sandestin ADA. Section 19b(1)(b) of the ADA states the following:

> "The series of lakes shown in the Master Plan, Section 34i, represents an efficient system of retaining water in a readily useable form. In the natural state, the flatwoods are flooded with each intense summer rain after which the native plants rapidly "pump" much of this water back into the air with accelerated rats of evapotranspiration. Much of the water is normally taken into the soil profile and is retained there and used in the growth of native trees and shrubs. A part of the water is normally taken into the surface sand aquifer where it is stored and is generally available."

This language implies that the stormwater system is designed to mimic the existing site hydrology where runoff is returned to the hydrologic cycle through evapotranspiration, infiltration into the soil profile, and stored in the surface sand aquifer.

Section 19b(2) of the Sandestin ADA provides further information regarding the intent of the stormwater management system as follows:

> "In all cases as in the handling of storm runoff, any liquid discharges, such as treated sewage effluent, will be assimilated into the vegetation, soils, and internal lake system within the Sandestin area. Every precaution is being taken to maintain or improve the good water quality of Choctawhatchee Bay."

The intent of the stormwater management system is further clarified in Section 19b(2)(d) of the Sandestin ADA which provides a description of removal processes associated with the stormwater management system as follows:

> "Normally, all surface runoff will pass through a series of natural filters, such as (1) grassed, landscaped, and native areas near the impervious surfaces, (2) a zone of shoreline plants around the lakes, (3) the lake waters, and (4) finally the salt marshes around the area. In most cases, the runoff water will be recirculated many times via irrigation waters from the lakes and will not reach the public waters of Choctawhatchee Bay. In cases of extremely high rates of rainfall, the runoff waters will still have to pass through the same set of filters which will clean them of sediments and nutrients, but the retention time will be shortened. Such intense rains would follow much of the same route without the Sandestin project and would have approximately the same BOD and even greater sediment loads."

This language describes a lake-based stormwater system which is designed to recirculate and reuse runoff inputs so that discharges from the lakes "will not reach the public waters of Choctawhatchee Bay" and anticipates that runoff will reach the Bay only in "cases of extremely high rates of rainfall".

The specific design standard for portions of the Sandestin DRI north of U.S. Highway 98, including Driftwood Estates, is provided in Appendix 26-1 of the Sandestin ADA which states:

> "The system is to hold stormwater on-site in a series of interconnecting inland lakes (See Plan No. 13). These lakes will be adequate in size to retain onsite runoff from a 3-year design storm of 24-hour duration and not rise more than 2 feet."

It is not known whether the standard was proposed by DCA or provided by the applicant.

Analysis of DRI Stormwater Standard

At the time of submittal of the Sandestin ADA during 1974 the field of stormwater management was in its infancy. In fact, generally accepted stormwater rules and design criteria did not exist at the time of the Sandestin ADA submittal. The first stormwater rule promulgated by the Florida Department of Environmental Protection (FDEP, referred to at the time as the Department of Pollution Control) was outlined in Chapter 17-4.248 FAC and was an interim rule adopted in October 1979 that applied only to "significant discharges" while the rule-making process was going on for a more permanent rule.

The primary issue of contention regarding the Sandestin DRI stormwater standard is whether the standard reflects a "retention" or "detention" standard. At the time of the Sandestin ADA, the terms "retention" and "detention" were clearly part of stormwater nomenclature, although the first formal regulatory definitions for these terms were not published by FDEP until adoption of the Chapter 17-25 rule in October 1981. This rule defines "retention" as:

> "Retention" or "To Retain" – the prevention of, or to prevent the discharge of, a given volume of stormwater runoff into surface waters of the State by complete on-site storage where the capacity to store the given volume of stormwater is again provided within 72 hours following the storm event. The additional storage volume must be provided by a decrease of stored water caused only by percolation through soil, evaporation, or evapotranspiration.

Chapter 17-25 defines "detention" as:

> "Detention" or "To Detain" – the collection and temporary storage of stormwater in such a manner as to provide for treatment through physical, chemical, or biological processes with subsequent gradual release of the stormwater.

The basic difference between the two treatment techniques is the mode of achieving pollutant load reductions. Retention systems provide pollutant removal by reducing the runoff volume through infiltration into groundwater, use as an irrigation source, or evapotranspiration through plants and the water surface. Detention systems simply detain the water for a period of time, without significant reduction in runoff volume, relying upon physical, chemical, or biological processes to remove pollutants during the period in which the water is detained, typically 72 hours or less.

It is generally undisputed between the parties that the Sandestin ADA uses the word "retention" instead of "detention" in describing the Sandestin Stormwater System. The assertion by Walton County that the words "retention" and "detention" were used interchangeably during the 1970s is correct, and in fact, these terms are still used interchangeably today by some stormwater engineers. However, the intent of the stormwater management system, described by the applicant in the Sandestin ADA, clearly appears to describe a retention rather than detention system. For example, Section 19b(1)(b) of the ADA states that "the series of lakes shown in the Master Plan, Section 34i, represents an efficient system of retaining water in a readily useable form. This section goes on to further describe how the pre-existing flatwoods on the site served to "pump" much of the runoff back into the atmosphere through evapotranspiration and how "water is normally taken into the soil profile and is retained there and used in the growth of native trees and shrubs". This description appears to describe a "retention" rather than a "detention" system.

Section 19b(2)(d) of the Sandestin ADA describes removal processes associated with the stormwater management system as occurring through a series of natural filters such as pervious areas near impervious surfaces, shoreline plants around the lakes, the lakes themselves, and the salt marshes around the area. This section indicates further that "in most cases, the runoff water will be recirculated many times via irrigation waters from the lakes and will not reach the public waters of Choctawhatchee Bay". This language supports a stormwater system where a majority of the runoff is retained on-site and prevented from reaching the waters of Choctawhatchee Bay.

Further evidence of a retention standard is provided by the applicant who uses the word "retention" or "retained" in every description of the stormwater management system as well as in responses to questions from DCA regarding protection of water quality. In fact, the word "detention" does not appear in any references to the stormwater management system for the Sandestin DRI reviewed by the Engineer for this analysis. The word "retention" appears almost exclusively in subsequent submittals for modification of the 1976 DRI development order, as well as in communications between DCA and the applicant. For example, the document titled "Sandestin-1984 Master Plan Update" prepared by the Sandestin Corporation and dated August 1, 1984 continues to refer to the stormwater system as "retention" and proposes an increase in the area of the retention lakes from 187.3 acres to 222.7 acres.

Question 26B of the Sandestin ADA relates to flood protection and impacts on the floodplain resulting from the proposed development. In response to this question, the applicant replied "since Choctawhatchee Bay is a Class II body of water, it is desirable to limit direct discharge of storm waters into its surface waters. In order to obtain this goal, a series of interconnected ponds are proposed which would collect and retain on-site all surface stormwater expected for the overflow of heavy storms which would occur infrequently". This language describes a retention system which would retain stormwater runoff on-site even for infrequent heavy storms. Later in addressing this same issue as part of Question 26C, the applicant further describes the system as "retention ponds" and states that "for design storms of greater intensity than a 3-year storm, six spillways will be constructed that will allow discharge of this excess stormwater from the lake system into Choctawhatchee Bay". This statement clearly anticipates that discharges will only occur from the stormwater system for storm events in excess of a 3-year storm.

In a correspondence dated April 2, 2010, the DCA reiterated the stormwater standard in a letter to the Honorable Scott Brannon, Chair of the Walton County Board of County Commissioners. DCA states in the third paragraph of this letter that "the controlling standard, as documented in the Sandestin application for development approval (ADA) is *retention* of 6.7 inches of rainfall during a 3-year, 24-hour storm event. The ADA also prohibits untreated runoff from reaching any of the public waters surrounding Sandestin, including the Choctawhatchee Bay." Although the words "retention" and "detention" were often used interchangeably in the stormwater community during the 1970s, it is unlikely that experienced professionals from DCA and FDEP assigned to address stormwater issues, designs, and regulatory criteria would consistently interchange these terms. The emphasis placed by DCA in the April 2, 2010 correspondence on retention (printed in italics in the original letter) supports the fact that DCA considers the standard to originally and currently refer to retention of the runoff generated by 6.7 inches of rainfall. This position is reiterated in correspondence from the Department of Economic Opportunity (DEO) on May 30, 2014 to the Honorable William (Bill) Chapman, Chair of the Walton County Board of County Commissioners, by repeating the assertion of DCA that the stormwater system should be designed to retain runoff from a 3-year, 24-hour storm event (6.7 inches) with no discharge into Choctawhatchee Bay.

The transcript from the Special Magistrate Hearing discusses testimony by Walton County that land development regulations require a stormwater Level of Service (LOS) of a 25-year storm, 24-hour duration with a total of 10.2 inches of rainfall in a 24-hour period. The County contends that the 25-year, 24-hour standard is a stricter standard than the 3-year, 24-hour standard for the Sandestin DRI, and maintains that systems designed to meet the County LOS will automatically meet the Sandestin DRI stormwater standard since the 25-year, 24-hour standard is a stricter standard. However, the Sandestin 3-year, 24-hour standard and Walton County 25-year, 24-hour standard refer to different components of a stormwater system that are not comparable. The Sandestin DRI standard of 3-year, 24-hour storm is a *water quality* volume standard similar to the Walton County performance standard for stormwater management systems outlined in Section 5.06.03-Stormwater Management Requirements of the Walton County Land Development Code which requires developments to provide on-site retention for the first inch of rainfall for water quality purposes. In contrast, the 25-year, 24-hour standard is a *flood protection* volume designed to prevent flooding during extreme storm events by providing temporary runoff storage in a pond so that the post-development peak discharge rate (generally referenced in cubic feet per second, cfs) does not exceed the peak runoff discharge under pre-development conditions. Most stormwater systems combine the water quality and flood control elements into a single pond with separate design elements and volumes for the water quality and flood protection elements. Since the 3-year, 24-hour standard addresses water quality and pollutant load reductions, and the 25-year, 24-hour standard addresses flood control, the standards are not comparable.

As a point of clarification, both The Special Magistrate Recommendation and historical documents related to the Driftwood Estates project used the term LOS, at times, when referring to the 3-year, 24-hour Sandestin DRI stormwater standard. However, the LOS term is typically used in the stormwater field in reference to issues related to runoff collection, conveyance, and flooding, not water quality volumes.

A final argument proposed by Walton County is that the use of wet ponds as part of the stormwater system assumes a method of "detention" instead of "retention". This statement is generally true when describing current stormwater methods. However, during the 1970s, wet retention systems, which provide for retention of runoff inside a wet pond rather than a dry pond, were popular within Florida. In wet retention systems, water volume is evacuated by exfiltration of the water into the adjacent shallow groundwater table or to deeper aquifers. The concept of wet detention lakes, as we know it today, did not become popular until the 1980s.

Perhaps a confusing aspect of the Sandestin DRI stormwater standard is that the retention depth is based upon a 3-year storm of 24-hour duration, with a total of 6.7 inches of rainfall. Current stormwater water quality design criteria are generally based upon a certain number of inches of rainfall or runoff over the contributing project area for estimation of water quality treatment volumes, while the reference to a return period and duration for a storm event (i.e., 3-year storm of 24-hour duration) is generally used to evaluate storms with respect to flooding potential. However, at the time of development for the Sandestin DRI, stormwater language related to water quality control was much less defined than under current conditions, and the language used to define the Sandestin DRI stormwater quality design standard is stated would probably not be used today.

Calculation of DRI Standard

The Sandestin DRI stormwater standard is based on retaining the runoff generated from a 3-year storm of 24-hour duration, with a total of 6.7 inches of rainfall. The amount of runoff generated from a given storm event is a function of the hydrologic characteristics of the project site and the rainfall depth. To provide more specificity regarding the Sandestin stormwater standard, an analysis was conducted by the Engineer to quantify the runoff treatment depth required by the standard. Due to the different hydrologic characteristics of the Interior and Exterior portions of Driftwood Estates, the runoff treatment depths will be different for the two areas.

Estimates of typical hydrologic characteristics for developed areas within Interior and Exterior portions of Driftwood Estates were developed by the Engineer based upon a review of aerial photography of existing development within the two areas, as well as extensive professional experience in evaluating hydrologic characteristics for a variety of land use types within the State of Florida. A summary of assumed hydrologic characteristics of Interior portions of Driftwood Estates is given in Table 1. Based upon review of aerial photography for existing development in Interior portions of the Driftwood Estates site, it appears that approximately 50% of the developed residential areas are covered by impervious surfaces such as houses, roadways, and sidewalks. This analysis further assumes that approximately 50% of the impervious area is considered to be directly connected impervious areas (DCIA), which refers to impervious areas directly connected into the stormwater drainage system, resulting in an estimated DCIA percentage of 25% of the project area (50% impervious x 50% DCIA = 25% of site).

Land cover in developed portions of the Interior site is assumed to grass in good condition. The hydrologic soil group (HSG) for the Interior site is assumed to be Group D under pre-development conditions, due to the high water table conditions prior to development. However, as a result of the general lowering of the water table under post-development conditions and import of significant amounts of fill, the HSG under post-development conditions is assumed to be Group C. The curve number (CN) value associated with the pervious areas, which is a measure of the runoff potential for the existing land cover and soil group, is assumed to be 74 which was obtained from the NRCS Technical Release 55 (TR-55) dated June 1995. Additional information regarding hydrologic characteristics can be obtained from the TR-55 publication or from the Harper and Baker (2007) report titled “Evaluation of Current Stormwater Design Criteria within the State of Florida” which was prepared for FDEP as part of the Statewide Stormwater Rule process.

TABLE 1

HYDROLOGIC CHARACTERISTICS OF INTERIOR PORTIONS OF DRIFTWOOD ESTATES

PARAMETER	UNITS	VALUE
Impervious Area[1]	% of Total Area	50
Directly Connected Impervious Area (DCIA)[2]	% of Impervious Area % of Total Area	50 25
Pervious Areas	Land Cover HSG[3] CN Value[4]	Grass, good conditions C 74

1. Percentage of total area covered by impervious surfaces
2. Percentage of total area covered by impervious surfaces which are directly connected to the drainage system
3. HSG = Hydrologic Soil Group
4. CN = SCS Curve Number obtained from NRCS Technical Release 55 (TR-55) (June 1995)

A tabular summary of assumed hydrologic characteristics for Exterior portions of Driftwood Estates is given in Table 2. Exterior portions are characterized by a lower impervious percentage, which is assumed to be approximately 30% of the total area. Impervious areas connected directly to the stormsewer system are assumed to be 25% of the total impervious area in Exterior portions, resulting in a DCIA percentage of 7.5% of the total area (30% impervious x 25% DCIA = 7.5% of site). Land cover for developed areas in Exterior portions of Driftwood Estates is assumed to be grass in good condition. The HSG for developed areas in Exterior portions of Driftwood Estates is assumed to be Group D due to a lower degree of fill and a lower degree of drawdown of the pre-development water table. The CN value associated with the assumed land cover and HSG is 80 which was obtained from TR-55.

TABLE 2

HYDROLOGIC CHARACTERISTICS OF EXTERIOR PORTIONS OF DRIFTWOOD ESTATES

PARAMETER	UNITS	VALUE
Impervious Area[1]	% of Total Area	30
Directly Connected Impervious Area (DCIA)[2]	% of Impervious Area % of Total Area	25 7.5
Pervious Areas	Land Cover HSG[3] CN Value[4]	Grass, good conditions D 80

1. Percentage of total area covered by impervious surfaces
2. Percentage of total area covered by impervious surfaces which are directly connected to the drainage system
3. HSG = Hydrologic Soil Group
4. CN = SCS Curve Number obtained from NRCS Technical Release 55 (TR-55) (June 1995)

Estimates of the runoff volume generated by the 6.7-inch rainfall event were calculated for Interior and Exterior portions of Driftwood Estates using a modification of the SCS curve number methodology. The modified SCS method used by ERD calculates the runoff volume for a given rainfall event by adding the rainfall excess (runoff) from the non-DCIA portion to the rainfall excess created from the DCIA portion of the land use. Rainfall excess from the non-DCIA areas is calculated using the following set of equations:

$$nDCIA\ CN = \frac{CN * (100 - Imp) + 98\ (Imp - DCIA)}{(100 - DCIA)}$$

$$Soil\ Storage\ (S) = \frac{1000}{nDCIA\ CN} - 10$$

$$Q_{nDCIAi} = \frac{(P_i - 0.2S)^2}{(P_i + 0.8S)} \quad x\ (\%\ nDCIA\ of\ total\ area)$$

where:

CN	=	curve number for pervious area
Imp	=	percent impervious area
DCIA	=	percent directly connected impervious area
nDCIA CN	=	curve number for non-DCIA area
P_i	=	event rainfall
Q_{nDCIAi}	=	rainfall excess for non-DCIA for rainfall event

For the DCIA portion, rainfall excess is calculated using the following equation:

$$Q_{DCIAi} = (P_i - 0.1)\ x\ (\%\ DCIA\ of\ total\ area)$$

When P_i is less than 0.1, Q_{DCIAi} is equal to zero. This factor reflects the initial abstraction for the impervious areas which assumes that the first 0.1 inch of rainfall is stored within the irregularities in the impervious surfaces and does not become stormwater runoff. After these surfaces become filled with the initial 0.1 inch of rainfall, additional rainfall begins to generate runoff on these surfaces.

A summary of calculated runoff depth for a 6.7-inch rain event in Interior portions of Driftwood Estates is given on Table 3. The values listed in Table 3 are calculated using the previous formulas. The total runoff generated by a 6.7-inch rain event in Interior portions of Driftwood Estates is 5.1 inches, corresponding to an event C value of 0.75, indicating that approximately 75% of the rainfall generated by the 6.7-inch rain event became runoff. This value is substantially higher than annual average C values associated with residential developments which are typically in the range of 0.25-0.4. However, during extreme rainfall events, such as a 6.7-inch storm, the available soil storage is rapidly filled, and significant runoff begins to be generated by both pervious and impervious surfaces. Based upon this analysis, the retention standard for Interior portions of Driftwood Estates is approximately 5.1 inches of runoff over the developed area.

TABLE 3

CALCULATED RUNOFF DEPTH FOR A 6.7-INCH RAIN EVENT FOR INTERIOR PORTIONS OF DRIFTWOOD ESTATES

PARAMETER	SYMBOL	UNITS	VALUE
Event Rainfall	P_i	inches	6.7
Non-DCIA CN Value[1]	nDCIA CN	--	82.0
Soil Storage	S	inches	2.20
Non-DCIA Runoff	Q_{nDCIA}	inches	3.48
DCIA Runoff	Q_{DCIA}	inches	1.58
Total Runoff[2]	Q_{TOTAL}	inches	5.1
Event C Value[3]	C	--	0.75

1. Weighted curve number of pervious areas and non-DCIA impervious areas
2. Sum of non-DCIA and DCIA runoff
3. Proportion of annual rainfall which becomes runoff

A summary of calculated runoff depth for a 6.7-inch rain event in Exterior portions of Driftwood Estates is given on Table 4. This analysis is conducted using the same methodology used for the Interior portion analysis. The total runoff generated by a 6.7-inch rain event in Exterior portions of Driftwood Estates is approximately 4.8 inches, equivalent to an event C value of 0.72, indicating that approximately 72% of the event rainfall became runoff. Therefore, the retention standard for Exterior portions of Driftwood Estates is approximately 4.8 inches over the contributing watershed area.

TABLE 4

CALCULATED RUNOFF DEPTH FOR A 6.7-INCH RAIN EVENT FOR EXTERIOR PORTIONS OF DRIFTWOOD ESTATES

PARAMETER	SYMBOL	UNITS	VALUE
Event Rainfall	P_i	inches	6.7
Non-DCIA CN Value[1]	nDCIA CN	--	83.4
Soil Storage	S	inches	1.99
Non-DCIA Runoff	Q_{nDCIA}	inches	4.43
DCIA Runoff	Q_{DCIA}	inches	0.40
Total Runoff[2]	Q_{TOTAL}	inches	4.8
Event C Value[3]	C	--	0.72

1. Weighted curve number of pervious areas and non-DCIA impervious areas
2. Sum of non-DCIA and DCIA runoff
3. Proportion of annual rainfall which becomes runoff

The calculated retention standards of 5.1 inches for Interior portions of Driftwood Estates and 4.8 inches for Exterior portions of Driftwood Estates are exceedingly high standards which far exceed any existing water quality treatment volume standards within the State of Florida. It is not known if the originator of the stormwater standard intended to provide this level of protection for off-site discharges into Choctawhatchee Bay. However, regardless of the original intention, the retention depths of 5.1 inches for Interior portions and 4.8 inches for Exterior portions reflect the numerical interpretation of the adopted Sandestin DRI stormwater standard.

Conclusions

Based upon the review of available documentation, there appears to be overwhelming evidence that the stormwater standard for the Sandestin DRI is intended to be a “retention” standard. This conclusion is supported by documentation provided by the applicant as well as DCA which has reaffirmed their position on the issue on multiple occasions. In contrast, other than the interchangeability of the words “retention” and “detention” during the 1970s, and allegations by the County that a pond designed with a wet permanent pool volume must be detention by definition, there is little evidence to support a detention rather than retention interpretation of the standard. The Engineer agrees that the 3-year, 24-hour retention standard is an extraordinarily high standard, particularly for the period in time, but the 3-year, 24-hour retention standard is consistent with the stated objectives by the applicant of maintaining water quality within Choctawhatchee Bay. Therefore, the Engineer concludes that the Sandestin DRI stormwater standard is a retention standard which is equivalent to approximately 5.1 inches over the contributing drainage basin area for Interior portions of Driftwood Estates and 4.8 inches over the contributing drainage basin area for Exterior areas.