

I. INTRODUCTION

A. Purpose

The purpose of the Drainage Sub-element is to provide a guide for management and storage of surface waters created by the runoff generated from rainfall events. The element is intended to protect and enhance the public health, safety and welfare and the quality of the environment within the City of Ocoee as related to stormwater management. In addition, this element will provide a plan and policy direction concerning use of existing drainage criteria for the sixteen (16) drainage sub-basins within the City of Ocoee and provide a basis for future modifications to existing development regulations. See Figure 3 for the limits of drainage basins within the City of Ocoee.

As growth occurs in the City of Ocoee, the need for protection and management of the City's water resources as related to structural improvements will increase. The City's current drainage basins are identified and analyzed. A description of these basins and their significance in the City is presented. Goals, objectives and policies will be provided for water quality protection and flood protection. Identifiable costs of capital improvements for substandard areas have been developed in specific areas. A schedule for future identification and correction is also included.

This Drainage Sub-element was made consistent with the Natural Groundwater Aquifer Recharge Sub-element due to a recent overlap of environmental regulations. Drainage needs to be addressed for flooding and water quality protection as well as regulating stormwater runoff as a potential source for groundwater/aquifer recharge for continued use of the aquifer as a water supply for drinking water.

Over the past 20 years, the City of Ocoee has proposed many maintenance and Capital Improvement projects identified first in their numerous basin studies prepared by Professional Engineering Consultants (PEC), and then later in the Regional Master Stormwater Management Plan, prepared by Camp, Dresser, and McKee (CDM) and dated November 2005. This Regional Master Stormwater Management Plan was funded by all of the municipalities within the Wekiva Study Area, as identified by the Florida Department of Community Affairs and the St. Johns River Water Management District.

It should be noted that the City continues to support the implementation of the projects identified in the basin study report; however, it should be pointed out that many of these projects are very small (i.e. clean sediment from a roadway culvert) or they may identify projects that have since been handled by other methods.

In the last 10 years, the NPDES and the Total Maximum Daily Loads (TMDL) regulations have focused on surface water resource protection and water quality improvement. The City has thereby primarily shifted their focus of stormwater management from a maintenance program that accomplishes flood protection, to a water quality protection/improvement based program. The City now evaluates the implementation of

regional stormwater ponds that can achieve the maximum pollutant removal of nutrients, particularly total phosphorus, to the City's waterbodies.

The City has been actively involved in the Upper Ocklawaha Basin Working Group, hosted by FDEP, which will soon adopt by Secretarial Order the State's first Basin Management Action Plan (BMAP). The goal of the Upper Ocklawaha BMAP is implementation of management strategies and capital projects that will facilitate meeting the adopted TMDLs for the impaired waterbodies in the basin.

The City of Ocoee occupies the southeastern shore of Lake Apopka. Many agencies have been working to improve the water quality in Lake Apopka for the last couple of decades. Dramatic improvements have been seen due to the efforts of the local governments surrounding the lake, the FDEP, the SJRWMD, and the Friends of Lake Apopka. Legislation that was adopted for the Lake Apopka hydrologic basin limits phosphorus discharge from new development and sets the total phosphorus criterion for Lake Apopka to 55 parts per billion (ppb)

B. Environmental Setting

The City of Ocoee is located in the west central portion of Orange County, Florida. Ocoee is a mostly residential community with some agricultural, commercial development, and light industrial areas. The City of Ocoee was platted and named in 1886. It is surrounded by the City of Winter Garden on the west and unincorporated areas of Orange County on the other three sides. The flood plains of Ocoee consist of lowlands adjacent to a number of lakes and three streams. Numerous City streets, State highways and railroads also cross the flood plains.

The topography of Ocoee is relatively flat with some gently rolling hills. Ground elevations in Ocoee range from less than 100 feet to approximately 170 feet mean sea level. The climate of Ocoee is semi-tropical characterized by warm, humid summers and mild, dry winters. Daily maximum temperatures average near 90°F in the summer and minimum temperatures average 50°F in the winter. Temperature extremes of over 100°F are rare. The average annual precipitation in the study area is approximately 48 inches, most of which occurs during the June-October rainy season.

The City of Ocoee adopted subdivision regulations in 1985 that addressed the issues of water quality, water quantity, stormwater conveyance and flood protection. See Figure 3 for a map of the City of Ocoee's flood prone areas.

The majority of the City of Ocoee lies within the middle St. Johns River or the Ocklawaha River Basin located in the St. Johns River Water Management District jurisdictional limits. There is a very small portion of the City that lies within the Shingle Creek basin, which is located in the South Florida Water Management District jurisdictional limits. The Shingle Creek area is located near the intersection of Maguire Road and Parkridge-Gotha Road in the extreme south of the City.

An unnamed stream with drainage improvements flows easterly from the south central portion of the City from the Florida Auto Auction and the West Orange Industrial Park

areas completely across the City into Lake Lotta, which is located in the eastern portion of the City, just north of SR 50; this is known as the Lake Lotta drainage basin.

The other lakes and drainage basins in the City of Ocoee are considered to be landlocked except for Lake Moxie and Peach Lake which have been interconnected and now have a positive outfall system to the "Northwest Ditch", which ultimately flows to Lake Apopka. Landlocked lakes without drainage wells have no outlet and the lake stages will vary directly with rainfall. The northwest portion of the City generally drains toward Lake Apopka through a series of shallow ditches and lowlands, which also connect to the Northwest Ditch.

According to the 1972 publication, "Appraisal of Water Resources in the East Central Florida Region," by William F. Lichter of the United States Geological Survey, the City of Ocoee lies in a portion of Orange County that is considered an effective recharge area. Rainfall in effective recharge areas moves to the closed lakes and ponds within the City where it is temporarily stored before seeping down to the aquifer.

Problems that interfere with the recharge arise when urbanization occurs. Rooftops and paving reduce the infiltration capacity of the surface soils and increase surface runoff to lakes and ponds. Because urbanization tends to speed the movement of water to lakes and ponds, more of the flood plains become inundated than before urbanization. In the past, as flood plains have become inundated during wet periods, there has been great pressure to dig drainage canals or construct drainage wells to remove the excess water off of the land surrounding the lakes.

With enactment of the 1986 St. Johns River Water Management District regulations, stormwater runoff was required to be stored in retention or detention ponds to provide water quality treatment before overflowing to waters of the State, to effectively control flooding of low lying areas around those waters of the State, and to detain the runoff to aid in its infiltration into the ground for effective recharge.

These regulations were to be applied in areas where development was converting undeveloped land into residential, commercial, and industrial developments. While development was creating impervious surfaces that could reduce the effective recharge areas, the regulations were effectively aiding in the ability to offset that loss of recharge by requiring the storing of runoff in dedicated stormwater management facilities to allow for the recharge element to remain.

A few drainage wells have been installed in the City of Ocoee (circa 1960s) that convey the surface water directly to the upper zone of the Florida Aquifer. These drainage wells are located within the Starke Lake, Spring Lake, Lake Johio, and Lakes Lilly and Pearl drainage basins. Although listed as an effective recharge area, some site-specific studies have indicated that much of the recharge occurs through the bottom of major lakes or by drainage wells within the City and not through soil percolation. The recharge rate continues to be affected by debris and/or sediment disposition on the bottom of a few of the lakes, thereby reducing the recharge potential.

Much of the upland area at one time was in citrus production. Site-specific soil studies associated with the development approval process have indicated that, in many areas, impermeable soils within the top ten feet of the surface reduce recharge potential in the upland areas and allow for direction of surface and sub-surface water movement toward the receiving lakes where recharge occurs. Aquifer recharge is an important concern of the City because the aquifer is the City's potable water source, and other utilities in west Orange County.

C. Regulatory Framework

Federal

The 1987 amendments to the Clean Water Act (CWA) required the U.S. Environmental Protection Agency (EPA) to publish regulations to control point and non-point source stormwater discharges under the National Pollutant Discharge Elimination System (NPDES) program. Those regulations were published in late 1990 which require certain dischargers of stormwater to waters of the United States to apply for permits, adhere to the regulations regarding controlling pollutants in discharges, and to eliminate illicit discharges to waters of the United States. The regulations also required the State and EPA to track and monitor sources of stormwater pollution.

The City of Ocoee has been a co-applicant of the EPA mandated Orange County MS4 (Municipal Separate Storm Sewer System) NPDES permit since its inception in 1990. The permit was issued in 1996 and the first five-year permit was renewed by the DEP (Permit No. FLS000011). Ocoee has followed the requirements of regulating pollutant discharges and monitoring the waters of the State within the City limits. The City has filed yearly Annual Reports to EPA, as required, which discuss the past year's compliance issues and establish the next year's programs.

In addition to the MS4 permit, the City of Ocoee requires all new developments that exceed five (5) acres in construction impacts to prepare and submit a Notice of Intent (NOI) to DEP and EPA, which includes the preparation of a Storm Water Pollution Prevention Plan (SWPPP) to minimize erosion and sedimentation during construction. A Notice of Termination (NOT) will also be required upon completion of construction to transfer NPDES permit coverage to the City's MS4 permit.

National Flood Insurance Program

This program, created by the U.S. Department of Housing and Urban Development, requires designated flood prone communities to undertake sound land use planning to minimize potential flood damage to future development. The City of Ocoee has complied with the National Flood Insurance Program (NFIP) regulations, as administered by the Federal Emergency Management Agency (FEMA), by regulating development within flood prone areas as described in the Flood Insurance Study (FIS) for Orange County, Florida and Incorporated Areas as well as the Flood Insurance Rate Maps (FIRMs) that were published to accompany the FIS, effective December 6, 2000.

State

Since the EPA regulations were enacted in 1990, DEP has adopted those regulations and enhanced them through further State action. There are many rules governing stormwater runoff, protection of waters of the State, and water resource management; some of those Florida Statutes (FS) are Chapter 298 Drainage and Water Control, Chapter 373 Water Resources, and Chapter 376 Pollutant Discharge Prevention and Removal.

The enactment of those statutes have been delineated under Chapter 62-25 Regulation of Stormwater Discharge, Chapter 62-43 Surface Water Improvement and Management Act, and Chapter 62-302 Surface Water Quality Standards of the FAC. The water management districts have assumed much of the permitting, enforcement, and control of these programs that are administered by DEP and EPA.

The City of Ocoee has adopted, in the 1985 Subdivision Ordinance and its amendments, requirements for the provision of retention and treatment of stormwater consistent with Chapter 62-25 of the FAC. Stormwater water quality treatment, as currently required by the DEP, can be accomplished through, but not be limited to: retention, detention and detention with filtration. Retention requires the impoundment of the required volume of runoff within a retention basin.

An overflow system from the retention basin can be provided to allow excess stormwater volume above and beyond that required for the prescribed storm event can be provided as a measure of emergency relief for the system. Implementation of the stormwater rule has been achieved through the State permitting process, and the City of Ocoee fully cooperates with the DEP and SJRWMD on this permitting process. New construction is required to receive the stormwater permits as a part of the approval process; stormwater water quality facilities are required to be constructed prior to completion of improvements creating additional stormwater runoff.

The City of Ocoee lies within the boundaries of the St. Johns River Water Management District (SJRWMD). The SJRWMD has adopted regulations pertaining to water quality treatment similar to those provided in Chapter 62-25 and has also adopted regulations regarding rates of stormwater runoff and quantity of stormwater runoff. Permits are required from the SJRWMD for most activities that would create additional stormwater runoff and provide for concentration of stormwater runoff.

The governing rules of SJRWMD are FAC Chapter 40C-4 Environmental Resource Permits: Surface Water Management Systems, Chapter 40C-40 Environmental Resource Permits: Standard General Environmental Resource Permits; Chapter 40C-41 Environmental Resource Permits: Surface Water Management Basin Criteria; Chapter 40C-42 Environmental Resource Permits: Regulation of Stormwater Management Systems and Chapter 40C-400 Environmental Resource Permits: Noticed General Environmental Resource Permits. The City of Ocoee recognizes the rules of the District and reviews requests for new development in a manner consistent with those rules.

Local

In 1985 the City of Ocoee adopted a subdivision ordinance (Article VIII Stormwater Management), which provides design criteria for the disposition of stormwater runoff. All development within the City of Ocoee is required, at a minimum, to pre-treat the runoff generated from the first inch of rainfall consistent with the regulations of the DEP and the SJRWMD and all development is subject to the treatment of stormwater runoff. Pre-treatment of the volume of runoff is defined as retention, detention with filtration, or wet detention.

Additional volumes generated beyond the first inch of runoff are regulated as to rate of discharge and subject to the availability of the conveyance systems to accept the rate. The regulations also provide criteria for development within areas of the special flood hazard (100-year flood plain). Stormwater management systems within the City of Ocoee are designed to provide for: 1) pollution abatement, 2) recharge where possible, and 3) protection from flooding.

D. Terms and Concepts

A stormwater management practice is one that accounts for the changes in hydrograph shapes or the peak rate of discharge and improves the quality of stormwater being discharged to receiving waters. Best management practices (BMPs) for stormwater are those combinations of management practices, which achieve desired functions at minimum cost. These functions are generally one or more of the following:

- Peak Runoff Rate Reduction
- Runoff Volume Reduction
- Water Quality Enhancement
- Flood Protection

The choice of practices is limited by site-specific location and the regulations discussed earlier in this section. Thus a BMP is one that meets discharge quantity and quality at minimum cost. The quantity and quality requirements have been translated into State, Regional and Local regulations which specify design considerations such as rainfall return period (frequency and duration), rainfall distribution, peak rate factors, runoff quantities and pollutant removals (usually implied through a standard).

Peak flow rate reduction or hydrograph attenuation is commonly required to reduce downstream flooding. The philosophy expressed by hydrograph attenuation is frequently required to match post-development to pre-development conditions. Development is used here to indicate any condition that would result in hydrograph shape changes. Also, changes in the design or operation of transport and storage facilities may cause a change in the hydrograph shape.

The following short descriptions of structural practices are an overview of the stormwater management practices associated with the generation, accumulation and transport of materials within watersheds which are consistent with State, Regional and Local regulations. This is an introduction with the purpose of establishing definitions as

a basic understanding of each stormwater management practices. The practices are primarily a compilation of those used commonly in Central Florida and are deemed permissible by the regulatory agencies.

Structural practices are the primary means to achieve water quality and quantity restrictions. It is frequently necessary to modify the transport or discharge structure to achieve a peak discharge reduction and pollution control. With respect to the terms listed in this section, the following are the structural practices that are currently being followed by the City of Ocoee.

Off-line Retention

This includes a diversion structure that diverts stormwater to a percolation, infiltration or other treatment area. If the runoff volume from the first one-inch of rainfall is diverted for treatment, one can expect to remove about 80% to 90% of the annual mass pollutants discharged from the watershed to the receiving water body. These are usually combinations of hydraulic structures and stormwater management ponds. The soil must have the capacity for infiltration and infiltration is generally about one inch per hour. The location and performance of retention ponds is primarily dictated by the presence of well-drained soils (Hydrologic Soil Group "A").

On-line Retention and Detention with Filtration

These are ponds that are constructed within the path of the stormwater conveyance system. Typically, on-line retention is used interchangeably with detention with filtration. Filtration devices such as underdrains are placed below the control level of the outlet structure to allow for filtration of the stormwater volume from the first half-inch of rainfall or the direct runoff from the first inch of rainfall. Pond depths vary but typically range from four (4) to ten (10) feet in depth. The bottom of dry retention ponds function to evacuate the impounded stormwater runoff into the underlying aquifer.

The common types of stormwater filtration systems within the on-line retention ponds or detention with filtration are side bank and bottom underdrain systems. Stormwater filtration systems usually consist of a perforated pipe encompassed by filter media wrapped by filter fabric material. The filtration system intercepts, collects and conveys stormwater runoff, treating the runoff through the filtration media prior to discharging to downstream systems.

Detention

These are on-line ponds with very relatively short duration (hours to days) holding times. The stored waters are slowly released so that the peak discharge rate is attenuated to equal or below the pre-development peak discharge rate for a specified storm frequency and duration (Mean Annual and 25-year frequency, 24-hour duration storm event for the SJRWMD). Detention ponds in the context of this document pertain to "wet detention" systems. Detention systems function primarily to reduce peak discharge rate; however, the provision of water quality treatment through the settling of suspended solids over a prescribed residence time is just as important an element.

The volume of a "wet" detention pond is composed of two separately designated volumetric elements (i.e., permanent pool and dynamic storage). The permanent pool storage is that volume below an established control water elevation and/or the established seasonal high water elevation. This portion of the pond is used to settle out suspended solids in the water column of the inflow runoff volume. Dynamic storage is that volume provided above the pond control elevation, but below the pond top of bank, and provides the peak runoff rate reduction and water quality treatment.

Grassed Waterways and Swales

This practice involves utilizing grass surfaces to reduce runoff velocities, enhance infiltration of runoff into the soil column and remove runoff contaminants, thus improving runoff water quality and reducing the potential for downstream erosion and sedimentation. Frequently, swale blocks are used to detain the stormwater runoff and promote infiltration into the underlying soil column.

Natural Systems

This involves the use of marsh or wetland systems. Wetland systems can be used for stormwater management purposes, provided that the required water quality treatment for the runoff volume to be discharged is complied with. Directing stormwater to the wetland should be regulated such that the system is not adversely affected by the alteration of the normal range of water level fluctuations. However, in many urbanized areas, altered wetlands can be enhanced by directing stormwater into them and restoring the system hydroperiod.

Landlocked Basins

Landlocked basins are those basins within the City of Ocoee that have no surface drainage outlet such as ditches or pipes that discharge to other downstream receiving surface waters. Landlocked basins are of concern in urbanized areas because as the amount of pervious area is covered by asphalt and rooftops, stormwater runoff can be expected to increase and infiltration into the soil column can be expected to decrease. Thus, the potential to alter historical lake levels and duration of flooding increases, therefore, landlocked basins require special attention and need to have specific criteria that are more stringent than the general criteria for non-landlocked or "open" basins.

Design Storm Events

With respect to peak rate reduction, the storm events used in the drainage subsection are the FDOT Zone 7, 10-year frequency storm (duration based upon the time of concentration), the 25-year frequency, 24-hour duration storm event and the 100-year frequency, 24-hour duration storm event. A 10-year frequency storm event produces an intense rainfall within a very short duration (typically less than two hours and can produce up to 7.5 inches per hour for a small drainage basin), the 25-year frequency storm produces approximately 8.6 inches of rainfall within a 24-hour period, and the 100-year frequency storm produces approximately 10.6 inches of rainfall in a 24-hour period.

The 10-year frequency storm is used as the design standard for the construction of drainage and stormwater conveyance systems (i.e. storm sewer systems) to serve localized improvements such as subdivisions, commercial and industrial facilities as well as roadway improvements. The conveyance systems in these facilities must be able to carry the peak runoff rate during a 10-year frequency storm event without exceeding critical elevations (i.e., edge of pavement, etc.) along the system.

The 25-year frequency storm is used as the design criteria for peak runoff rate reduction and the flood protection level of service for new roadway systems. Within the State, Regional and Local regulations, there can be no increase of post-development runoff rate over the pre-development runoff rate for a 25-year frequency, 24-hour duration storm event. In addition, the flood stages for the 25-year frequency, 24-hour duration storm event are not to exceed the lowest elevation along the profile grade line of a roadway.

The 100-year frequency storm event is used to establish the flood protection level of service (LOS) for habitable and/or insurable structures, and for landlocked basins. The City and FEMA require that "lowest floor" elevation of a habitable and/or insurable structure shall be above the base (100-year) flood elevation. The City also requires that all developments in landlocked basins provide retention of the volume produced by a 100-year frequency, 24-hour duration storm event, which is to be recovered within 14-days following the storm event.

The basic factors involved in establishing a successful stormwater management program centers around the following two principles:

1. Establish and apply a uniform design standards and procedures.
2. Ensure adequate operation and maintenance of system components once they are constructed.

The design standard, which is of primary importance, is the design storm event as discussed earlier. The design storm event specifies intensity (rate of rainfall) and duration of the rainfall to be used for the design of stormwater management facilities.

Data on rainfall intensity and duration have been summarized for various regions of the State by the Florida Department of Transportation (FDOT) and by the St. Johns River Water Management District (SJRWMD). Standard procedures for sizing and designing stormwater management facilities are a part of the current City regulations and will be further discussed in this Sub-element. This will ensure that the systems are structurally and functionally compatible. Any BMP system should also allow for routine inspection and maintenance of facilities to ensure proper performance during the facility's life.

II. INVENTORY AND ANALYSIS

A. Natural Drainage Basins

In this section, the drainage basins with the City of Ocoee are presented as shown on the Major Drainage Basin and Aquifer Recharge Areas map (see Figure 3). A description of each drainage sub-basin is provided in Table 6.

The drainage basin studies for the City of Ocoee lakes and other drainage systems has generally been completed, with exception to those basins that are partially within the City of Ocoee, but the lakes are within unincorporated Orange County (i.e., Lake Stanley/Florence, Lake Lilly/Pearl, etc.).

The completed drainage basin studies inventories the drainage and stormwater infrastructure within the basin, identifies problem areas within the basin with respect to level of service, identifies water quality conditions and trends, and summarizes capital improvements recommended to bring the basin in compliance with the City's level of service standards for flood protection, water quality and localized flooding.

B. Flood Plains

The limits of the 100-year flood plains delineated within the City of Ocoee are summarized on the attached flood prone area map. This map is based on the Flood Insurance Rate Maps (FIRM) for the City of Ocoee and Orange County effective December 6, 2000 (Flood Insurance Study – Orange County, Florida and Incorporated Areas, Federal Emergency Management Agency).

Table 6 lists the 100-year flood elevations of drainage sub-basins in the City of Ocoee, as published by Federal Emergency Management Agency.

**Table 6
Drainage Sub-Basin Characteristics**

Drainage Sub-Basin Name	Total Drainage Area (acres)	Land Area (acres)	Lake Area (acres)	100-Year Flood Elevation (feet, NGVD)	Conditions
1. Lake Addah	264	254	10	81.10	Land-locked
2. Lake Meadow	1,132	956	176	85.50	Land-locked
3. Prairie Lake	668	567	101	85.80	Land-locked
4. Northwest Ditch	743	41,726	17	N/A	Lake Apopka
5. Spring Lake	446	411	35	121.10	Land-locked w/ Drainage Well
6. Lake Johio	229	203	26	Unknown	Land-locked w/ Drainage Well
7. Starke Lake	894	661	233	101.00	Land-locked
8. Lake Olympia	444	337	107	101.00	Land-locked
9. Lake Lotta	2,529	2,489	4440	93.40	Lake Rose Land-locked
10. Unnamed No. 1	218	214	4	Unknown	Land-locked
11. Unnamed No. 2	211	205	6	Unknown	Land-locked
12. Lake Blanchard	139	120	19	118.30	Land-locked (Lake Bennet)
13. Lake Lilly	325	277	48	119.40 ³	Land-locked w/ Drainage Well
14. South Maguire	931	931	0	N/A	Land-locked
15. Lake Stanley ¹	390	351	39	86.50 ³	Land-locked w/ Drainage Well
16. Lake Florence ¹	315	275	40	Unknown	Land-locked w/ Drainage Well

Notes: ¹ Limits of drainage basin extend beyond City limits.

² Flood Insurance Study, Orange County, Florida and Incorporated Areas, December 6, 2000.

³ Flood elevation determined by Orange County Engineering.

Source: PEC/Professional Engineering Consultants, Inc.

C. Soil Conditions

Table 9 and Figure 3 identify the types of soils found in the City of Ocoee as provided by the United States Department of Agriculture Soil Conservation Service (SCS) Soil Survey for Orange County, Florida. Also included in this table is the SCS hydrologic soil classifications that are identified by the letters A, B, C, and D. The "A" group soils are those soils characterized as having the highest infiltration rates, having the highest potential for aquifer recharge and have the lowest potential for surface runoff. Conversely, the "D" group soils have the lowest infiltration rates, have the highest

potential for surface runoff and are often accompanied by high groundwater levels, with little or no recharge.

Table 7
Soil Map Units in Orange County, Florida

Map Symbol	Map Unit Name	Hydrologic Group
1	Arents	C
2	Archbold fine sand, 0 to 5 percent slopes	A
3	Basinger fine sand, depressional	D
4	Candler fine sand, 0 to 5 percent slopes	A
5	Candler fine sand, 5 to 12 percent slopes	A
6	Candler-Apopka fine sand, 5 to 12 percent slopes	A
7	Candler Urban land complex, 0 to 5 percent slopes	A
8	Candler Urban land complex, 5 to 12 percent slopes	A
10	Chobee fine sandy loam, frequently flooded	B/D
15	Felda soils, frequently flooded	B/D
20	Immokalee fine sand	B/D
22	Lockloosa fine sand	C
26	Ona fine sand	B/D
27	Ona-Urban land complex	B/D
28	Orlando fine sand, 0 to 5 percent slopes	A
29	Orlando-Urban land complex, 0 to 5 percent slopes	A
33	Pits	--
34	Pomello fine sand, 0 to 5 percent slopes	C
35	Pomello-Urban land complex, 0 to 5 percent slopes	C
37	St. Johns fine sand	B/D
38	St. Lucie fine sand, 0 to 5 percent slopes	A
39	St. Lucie-Urban land complex, 0 to 5 percent slopes	A
40	Samsula muck	B/D
41	Samsula-Hontoon-Basinger association, depressional	B/D
42	Sanibel muck	D
43	Seffner fine sand	C
44	Syrma fine sand	B/D
45	Syrma-Urban land complex	B/D
46	Tavares fine sand, 0 to 5 percent slopes	A
47	Tavares-Millhopper fine sand, 0 to 5 percent slopes	A
48	Tavares-Urban land complex, 0 to 8 percent slopes	A
50	Urban land	--
51	Wabasso fine sand	B/D
52	Wabasso-Urban land complex	B/D
53	Wauberg fine sand	D
54	Zolfo fine sand	C
55	Zolfo-Urban land complex	C

Sources: USDA, SCS, 1989 Edition and City of Ocoee, Basin Studies.

III. NEEDS ASSESSMENT

Criteria and needs for the sub-basins identified in Table 6 of the City of Ocoee are provided in this section. A large number of the lakes within the City are landlocked. The criteria to be applied to these landlocked sub-basins are as follows.

For landlocked drainage basins within the City of Ocoee, upland retention of the runoff from 100-year frequency, 24-hour duration storm events (10.6 inches of rainfall) will be required. Upland retention shall be required above the normal high water of the receiving water body and the top of the retention basin situated a minimum of one (1) foot above the 100-year elevation in the pond. Retention basins encroaching into the 100-year floodplain will require equal compensation for floodplain storage lost.

For sub-basins within the City, as site specific improvement plans are developed, a geotechnical report must be provided with the development plans that addresses surface water and groundwater issues within these sub-basins. The geotechnical report shall include changes in land use due to future development within the basin that is consistent with the City's growth management plan and the anticipated rezoning that will allow for increased growth impacts within the landlocked basins. The retention of the stormwater runoff volume produced by a 100-year frequency, 24-hour duration storm should allow for evacuation and recovery of the impounded volume of water within 14 days.

The City continues to monitor Lake Johio for lake level and water quality information. This will allow the City to take proactive actions should the lake levels elevate to critical elevations, or to restrict the use of the lake should water quality trends indicate a hazard to the safety and well-being of the general public. The drainage well, which serves as the outfall for the lake, is routinely maintained by the City to insure its functionality. Any permanent modifications to the drainage well will require permitting through the Underground Injection Control (UIC) program administered by the Florida Department of Environmental Protection (DEP).

Within the context of the needs assessment, those lakes that are identified as landlocked and require protection by 100-year flood storage retention upland will adhere to the detailed criteria discussion presented in the previous paragraph. The following is a review of each of the sub-basins in the City of Ocoee.

Lake Addah

Lake Addah is a small landlocked lake within a 264-acre basin. This basin is mostly surrounded by existing and approved development with 100-year retention ponds. Any additional development that is to occur within this basin will have to comply with the City's landlocked basin criteria (retention of the volume produced by a 100-year frequency, 24-hour duration storm event, to be recovered in 14-days).

Lake Meadow

Lake Meadow is sparsely developed at this time and is a 176-acre lake located within a 1,132-acre drainage basin. The City completed the Lake Meadow/Prairie Lake Drainage

Basin Study in October 1998, which identified the basin level of service, basin deficiencies, capital improvement projects, water quality issues and maintenance related issues. Any development that is to occur within this basin will have to comply with the City's landlocked basin criteria (retention of the volume produced by a 100-year frequency, 24-hour duration storm event, to be recovered in 14-days).

Prairie Lake

Prairie Lake is a landlocked lake with substantial lake level fluctuations based on a combination of rainfall patterns and regional hydrologic and hydrogeologic elements surrounding the lake. The City completed the Lake Meadow/Prairie Lake Drainage Basin Study in October 1998, which identified the basin level of service, basin deficiencies, capital improvement projects, water quality issues and maintenance related issues. Any development that is to occur within this basin will have to comply with the City's landlocked basin criteria (retention of the volume produced by a 100-year frequency, 24-hour duration storm event, to be recovered in 14 days).

Northwest Ditch System

The Northwest Ditch system ultimately outfalls into Lake Apopka to the northwest. In 1986 the City of Ocoee installed an 18-inch drainage outfall from the Lake Moxie/Peach Lake drainage system to alleviate flooding conditions within the developed Lake Moxie/Peach Lake basin. The City completed the Northwest Drainage Basin Study in January 1996, which identified the basin level of service, basin deficiencies, and maintenance related issues. The study also identified and prioritized capital improvement projects based on: 1) flood protection, 2) water quality, and 3) localized flooding. Future needs for the Northwest Ditch system will include increasing the roadway culvert capacity at Fuller's Cross Road (within unincorporated Orange County) and drainage improvements within the Pioneer Key I and II mobile home parks.

SJRWMD is currently implementing a Surface Water Improvement and Management (SWIM) program for the Lake Apopka Hydrologic Basin under the Lake Apopka Restoration Act of 1996 to restore the lake to Class III or better water quality standards. As part of this program, SJRWMD is currently evaluating the need to impose additional water quality treatment requirements above that currently in their regulations for all new developments discharging to Lake Apopka. This would include those areas within the Northwest Ditch basin. The proposed stormwater rules will require that the post-development total phosphorous load discharged from the development site will not exceed the pre-development phosphorous load, and that the development site will not discharge water directly or indirectly to Lake Apopka for the 100-year frequency, 24-hour duration storm event.

Spring Lake

Spring Lake has a surface water connection to the aquifer through a single drainage well, but is still considered a landlocked basin. The City completed the Spring Lake/Lake Johio Drainage Basin Study in February 1996, which identifies the current flood protection level of service in Spring Lake, basin deficiencies, water quality issues, and

maintenance related issues. The completed study also outlines a capital improvement program to address those identified basin deficiencies. Any development that is to occur within this basin must comply with the City's landlocked basin criteria (retention of the volume produced by a 100-year frequency, 24-hour duration storm event, to be recovered in 14-days).

Lake Johio

Lake Johio is also a landlocked lake served by a single drainage well. The City has previously completed the Spring Lake/Lake Johio Drainage Basin Study in February 1996, which identifies the current flood protection level of service in Lake Johio, the basin deficiencies, water quality related issues and maintenance related issues. The completed study also outlines a capital improvement program to address those identified basin deficiencies. Any development that is to occur within this basin must comply with the City's landlocked basin criteria (retention of the volume produced by a 100-year frequency, 24-hour duration storm event, to be recovered in 14-days).

Starke Lake

Starke Lake is one of the most urbanized basins within the City of Ocoee. Most of the development within this basin occurred prior to the implementation of stormwater and drainage standards by the City, SJRWMD, and DEP. The lake is served by two drainage wells, which serves as the only outfall source for this lake. Due to the age of the neighborhoods surrounding the lake and past development practices, several areas within the basin experience street flooding during heavy and/or sustained rainfall events. There is minimal dedicated stormwater management retention or detention systems provided within this basin.

The City completed the Starke Lake/Lake Olympia Drainage Basin Study in March 1996, which documents the existing flood protection level of service for the lakes, the basin deficiencies, water quality related issues, maintenance related issues, and outlines a capital improvement program for the basin to meet the City's objectives for stormwater management and water quality treatment. Stormwater management for new development within the basin can be accomplished using conventional Best Management Practices (BMPs) such as dry retention in areas with high recharge capabilities or wet detention for areas with high groundwater conditions. In areas that are already developed but do not meet current stormwater management standards or practices, non-conventional BMPs such as baffle boxes or alum treatment systems may be warranted.

The stormwater conveyance system improvements will be required to reduce flooding of the roads and rights-of-way within existing developments in the basin, particularly those constructed prior to the implementation of drainage and stormwater management standards. The City is currently replacing the drainage wells to maintain adequate flood protection. Any development that is to occur within this basin will have to comply with the City's landlocked basin criteria (retention of the volume produced by a 100-year frequency, 24-hour duration storm event, to be recovered in 14-days).

Lake Olympia

Lake Olympia is a landlocked lake located east of Starke Lake and has a permitted surface water connection to Starke Lake. This surface water connection consists of a single culvert with a manual gate that is owned and operated by the City of Ocoee. The culvert system has a permitted operating schedule as required by the SJRWMD. Most of the development contiguous to Lake Olympia meets current City and State stormwater management standards, although several docks were inundated for an extended period of time during and after Tropical Storm Gordon in November 1994. The lake levels fluctuate in concert with those in Starke Lake as documented in the Starke Lake/Lake Olympia Drainage Basin Study, which was completed in March 1996. Any development that is to occur within this basin will have to comply with the City's landlocked basin criteria (retention of the volume produced by a 100-year frequency, 24-hour duration storm event, to be recovered in 14-days).

Lake Lotta

Lake Lotta is part of the Orange County primary drainage system. The portion of the lake north of SR 50 (West Colonial Drive) is in the City of Ocoee. The portion south of SR 50 is within unincorporated Orange County. The floodplain for Lake Lotta was recently remapped under the Flood Insurance Study for Orange County, Florida and Incorporated Areas, effective December 6, 2000, Federal Emergency Management Agency (FEMA). This involved the establishment of the base (100-year) flood elevation for the lake as well as locations along the Lake Lotta Tributary from SR 50 to Bluford Avenue. FEMA also established a regulatory floodway along this tributary, regulating the extent of development that can occur along the tributary. The establishment of a regulatory floodway along this tributary is an important consideration in that the primary conveyance area of the tributary is reserved to convey the discharge from a 100-year flood event.

Any development that is proposed along this tributary must either construct outside of the regulatory floodway or receive approval from the City and FEMA to alter the mapped floodway limits. Any alteration of the regulatory floodway from development will require a Condition Letter of Map Revision (CLOMR) from FEMA with approval from the City prior to construction and a Letter of Map Revision (LOMR) after construction is completed. This is required by the Federal Government to comply with the National Flood Insurance Program (NFIP) since the City of Ocoee is a participating community in the NFIP.

The City of Ocoee completed the Lake Lotta Drainage Basin Study in December 1998, which documents the existing basin level of service, identifies deficiencies within the basin, identifies water quality and maintenance related issues, and outlines a capital improvement program to implement improvements to meet the City's objectives for the basin. Lake Lotta ultimately discharges to Lake Sherwood, which is within unincorporated Orange County, and is controlled by a single 24-inch drainage well, therefore is considered a landlocked basin. All development within the Lake Lotta basin will be required to meet the City's landlocked basin criteria (retention of volume produced by a 100-year frequency, 24-hour duration storm event). In addition, portions

of the Lake Lotta basin is within what the SJRWMD considers as “high recharge” areas, therefore will also be required to meet the District’s recharge criteria.

Unnamed Lake #1

This lake is likely a remnant sinkhole in a primarily undeveloped area. Any development that is to occur within this basin will have to comply with the City’s landlocked basin criteria (retention of the volume produced by a 100-year frequency, 24-hour duration storm event, to be recovered in 14-days).

Unnamed Lake #2

This lake is likely a remnant sinkhole in a primarily undeveloped area. Any development that is to occur within this basin will have to comply with the City’s landlocked basin criteria (retention of the volume produced by a 100-year frequency, 24-hour duration storm event, to be recovered in 14-days).

Lake Blanchard / Lake Bennet

Lake Blanchard, also known as Lake Bennet, is a landlocked lake that is bisected by SR 50 (West Colonial Drive). At this time there is a minimal amount of development, however, as this sub-basin develops adherence to the City’s landlocked basin criteria (retention of the volume produced by a 100-year frequency, 24-hour duration storm event, to be recovered in 14-days) will be required.

Lake Lilly / Lake Pearl

The Lake Lilly / Lake Pearl basin is bound on the west by Maguire Road, the south by Florida’s Turnpike, the east by Old Winter Garden Road, and the north by SR 50 (West Colonial Drive). An open channel interconnects Lake Lilly and Lake Pearl. The basin is controlled by a single drainage well. Any development that is to occur within this basin will have to comply with the City’s landlocked basin criteria (retention of the volume produced by a 100-year frequency, 24-hour duration storm event, to be recovered in 14-days).

South Maguire Road Area

This is the area extending south from the Florida Turnpike to Roberson Road at the extreme southwest limits of the City of Ocoee. This is a fast developing area, particularly along the Maguire Road corridor. Historically, during major storm events water has ponded within this area with some of the water draining west into Orange County. Current improvements to Maguire Road and the construction of new developments along the corridor that meet current drainage and stormwater management standards have greatly reduced the drainage problems in this basin.

Orange County is also currently studying the Johns Lake Basin, which encompasses this area of the City. This basin discharges to Black Lake and ultimately into Johns Lake. SJRWMD views the Johns Lake Basin as landlocked, therefore, any new development

that is to occur within this basin will have to comply with the City's landlocked basin criteria (retention of the volume produced by a 100-year frequency, 24-hour duration storm event, to be recovered in 14-days).

Lake Stanley

Lake Stanley is a small landlocked lake within unincorporated Orange County. Portions of the City of Ocoee discharge to this lake. Orange County is currently studying Lake Stanley, along with Lake Lucy and Lake Florence. This chain of lakes is currently controlled by drainage wells in Lake Stanley and Lake Florence. Any development that is to occur within this basin will have to comply with the City's landlocked basin criteria (retention of the volume produced by a 100-year frequency, 24-hour duration storm event, to be recovered in 14-days), which is consistent with Orange County's Subdivision Regulations.

IV. ANALYSIS

Rule 9J-5, Florida Administrative Code, sets forth the State of Florida's comprehensive planning requirements. Rule 9J-5.011 requires the development and implementation of levels of service (LOS) for all infrastructures. The derivation of a LOS standard for drainage infrastructure has proven to be the most challenging since stormwater facilities are not based on "capacity per unit of demand" as described in 9J-5. Traditionally, standards for stormwater management facilities have been based on both the frequency of rainfall occurrence or storm event for which protection is provided.

Stormwater planning is the area which local governments have historically done the least comprehensive planning. The City of Ocoee does not have a complete inventory and analysis of primary and secondary drainage facilities as documented in the completed drainage basin studies. Facility capacity, operational responsibilities and facility life have been determined as part of the completion of the inventory and analysis of the primary and secondary basins.

The most prominent deficiency in the City's effort to effectively address stormwater management is the lack of a detailed master drainage plans for each basin. A city-wide master plan for each sub-basin, which details stormwater management information at the basin level, would improve the City's ability to comprehensively plan for system improvements. This master plan shall include a detailed inventory of all drainage facilities, evaluation of facility conditions, assessment of replacement and retrofit costs. In addition, the master plan should compliment the efforts of Orange County and the Water Management District.

The City implemented a Stormwater Utility Program by October 1991 to fund the required basin studies, which have since been completed, as well as maintenance projects and regional stormwater projects. Recently, the stormwater utility fee was increased in order to address increased CIP and maintenance needs. The City's effort to comprehensively address stormwater and drainage related issues have been completed, resulting in approved drainage basin studies that identify existing problems as they pertain to level of service standards, inventory all drainage facilities and recommend

improvements to elevate the basins to the desired level of service. These completed basin studies also assisted the City in the review of development plans within the subject basin to ensure that the design criteria is adhered to and that no adverse drainage impacts result due to the construction of the development. The City implemented a Stormwater Utility Program in 1991 to help fund the required basin studies, which have since been completed.

The goal of this element is to identify the City's existing level of service on a basin-by-basin basis consistent with Orange County and the Water Management District. The City's level of service classification system to evaluate existing development is based on a 100-year frequency, 24-hour duration storm event. The interim level of service for new development (100-year/24-hour) and the level of service for existing facilities could be defined until completion of the drainage basin studies. The City also includes Chapter 62-25 FAC (without exemptions) as performance standards to amplify the LOS standards. The basin studies were completed by 1999 and an analysis of future improvements were adopted as a future update to Ocoee's Comprehensive Plan.

V. CONCLUSIONS

The regulations currently existing and enforced by the City of Ocoee, SJRWMD, and DEP adequately regulate new development in regards to stormwater treatment/water quality. The regulations also allow the City to manage stormwater quantity discharges from new development, in basins having positive outfalls. The current problems arise from two sources, which historically have not been adequately addressed. The first is areas developed prior to stormwater regulations. These areas without water quality controls continue to add pollutants carried by stormwater runoff to the lake systems. The second problem area is that of new development in landlocked basins.

Dealing with those areas, which were previously developed, will require a commitment of both time and money on the part of the governmental bodies affected. Studies should be performed to determine which areas have direct stormwater discharges, the pollutant loading of the discharge, the possible alternatives to reducing the pollutant load, the cost of each alternative, and a recommendation on what alternative should be implemented. These recommendations and associated costs to implement the improvements are documented in the approved drainage basin studies. The City shall also cooperate with other government entities that share interests within drainage basins that cross political boundaries. They may also have to cooperate in providing funding for the implementation of the selected alternative. The City of Ocoee currently has a stormwater utility program that helps to fund the City's stormwater Capital Improvement Program. In addition, the City has routinely applied for funding from the SJRWMD through their Cost-Share program for stormwater projects that qualify.

The areas surrounding the landlocked basins that have not yet been developed can be controlled by strict regulation. Requiring the retention of the volume produced by a 100-year frequency, 24-hour duration storm event (to be recovered in 14-days) will provide an adequate measure of flood protection and is consistent with Orange County standards for landlocked basins. It should be noted that for the past twenty years, this regulation far exceeds the criteria necessary to meet recharge regulations for SJRWMD.

These areas may also require restrictions on land uses, which contribute additional point and non-point flow sources to the basin through such improvements as septic tanks and irrigation. In conclusion, the City shall implement a program of study, regulation, and construction to achieve the goals and objectives outlined in this section.

In November 2005, the Wekiva Parkway and Protection Act Regional Master Stormwater Management Plan was completed by Camp Dresser & McKee (CDM). This report compiled the existing conditions, regulations, and proposed projects from the basin studies for the 14 communities located in this protection zone. The City of Ocoee basin study projects were identified in this report and the Florida Department of Community Affairs has asked that projects be adopted by reference in the Comprehensive Plan as the final step of compliance with the Wekiva Protection Act. The City plans to adopt these identified maintenance projects; however, as previously noted, the City's focus has shifted in recent years to prioritize regional stormwater projects first. The maintenance related projects as identified in the previous basin studies may already be addressed by completed or future regional stormwater projects. The reason for the primary shift in focus for the City's stormwater program is based on the need to implement water quality improvement projects as part of the NPDES permitting and the FDEP TMDL Program. The City is committed to continue to fund the pertinent stormwater maintenance projects for improved stormwater level of service for the citizens.

VI. GOALS, OBJECTIVES, POLICIES

GOAL: PRESERVE THE WATER QUALITY OF THE LAKES IN THE CITY OF OCOEE, PROTECT THE PUBLIC FROM ADVERSE FLOODING EFFECTS DUE TO STORMWATER RUNOFF AND MANAGE THE SURFACE WATER COLLECTION, CONVEYANCE AND STORAGE SYSTEMS, AND ENCOURAGE RECHARGE AREA PROTECTION TO ENSURE PUBLIC HEALTH, SAFETY AND WELFARE.

Objective 1: The City shall protect the water quality of surface waters, groundwater recharge areas, springs, and springsheds through the implementation of the following policies. Performance standards described in Chapter 62-25 FAC, Chapter 62-302 FAC, Chapter 40C-42, FAC, and design standards for the 100-year frequency, 24-hour duration storm event in landlocked basins and other SJRWMD regulations, the Lake Apopka Basin Rule, where applicable, and the Wekiva Parkway and Protection Act (WPPA): Ch. 369.321(3), F.S.

Policy 1.1: The City shall cooperate with the Florida Department of Environmental Protection (DEP), St. John's River Water Management District (SJRWMD), and Orange County in updating the 1985 Subdivision Ordinance to maintain concurrence with these agencies.

Policy 1.2: The City shall review commercial site plan and subdivision regulations on an annual basis to insure that regulations are adequate to protect surface water quality.

Policy 1.3: Require new development to comply with Best Management Practices and the drainage criteria set forth in the 1985 Subdivision Regulations. Practices include requirements of Chapter 62-25 FAC (without exemptions), Chapter 40C-42, FAC (without exemptions), and City of Ocoee design standards for a 100-year frequency, 24-hour duration storm event in landlocked basins.

Policy 1.4: The City of Ocoee will maintain a level of service standard for water quality based upon the following minimum design standards: Chapter 62-25 FAC, Chapter 62-302, FAC and Chapter 40C-42, FAC.

Policy 1.5: The City of Ocoee shall require all new development or redevelopment to comply with the NPDES Program in accordance with the permit requirements for the NOTICE OF INTENT TO USE GENERIC PERMIT FOR STORMWATER DISCHARGE FROM LARGE AND SMALL CONSTRUCTION ACTIVITIES (Rule 62-621.300(4), F.A.C.), regulated by the U.S. Environmental Protection Agency (USEPA) and administered by the Florida Department of Environmental Protection through Section 403.0885, FS, effective October 2000. A Notice of Intent (NOI) application is required to be executed and submitted at least two (2) days prior to beginning construction. In addition, a Storm Water Pollution Prevention Plan (SWPPP) will be required as part of the NPDES permit coverage for construction activities. Upon completion of construction, a Notice of Termination (NOT) shall be submitted to transfer NPDES permit coverage to the City's MS4 permit.

Policy 1.6 New development will, at a minimum, maintain surface and groundwater flow rates and volumes at pre-development levels, or enhance recharge so that the natural function of groundwater recharge areas is maintained, or improved. New development projects or expansion of existing development within the Wekiva Study Area shall be required to follow best management practices for stormwater design and treatment as described in "Protecting Florida Springs Manual – Land Use Planning Strategies and Best Management Practices" (FDCA and FDEP, November 2002). The City's Land Development Regulations shall be revised to implement these best management practices.

Policy 1.7 Redevelopment projects that result in an increase in impervious surface area shall be considered substantial and comply with all stormwater requirements for new development.

Policy 1.8 All new development, except non-substantial redevelopment projects, shall utilize best management practices in combination as part of a BMP treatment train to protect water quality and minimize flooding. BMPs shall be used in the design of stormwater management facilities and systems. The following stormwater BMPs shall be instituted to reduce nitrate loading within the Wekiva Springs Overlay Protection District:

- a. All rural residential development shall use swales with swale blocks or raised driveway culverts, whenever possible, except when soil, topography, or seasonal high water conditions are inappropriate for infiltration as determined by a professional engineer licensed in the State of Florida.
- b. Vegetated infiltration areas shall be used to provide stormwater treatment and management on all non-urban sites (i.e. parks, churches) except when soil, topography, or seasonal high water conditions are inappropriate for infiltration as determined by a professional engineer licensed in the State of Florida. Design of the stormwater systems for non-urban uses shall use bioretention areas (below grade vegetated areas) to increase stormwater treatment and reduce stormwater volume. Downspouts for non-urban development shall be directed from the roof to vegetated swales, where possible, or directed to the stormwater management system for treatment.
- c. Wet detention systems shall be used for stormwater treatment and management only if dry infiltration systems are not feasible.
- d. Sensitive karst features, including sinkholes with a direct connection to the aquifer and stream-to-sink features, shall not be utilized as stormwater management facilities. Prior to subdivision approval, all depressions will be investigated by a licensed professional geologist using

a professionally acceptable methodology for suitability of water retention are a using generally accepted geo-technical practices with an emphasis on identification of potential connections to the aquifer. If connections are determined to exist, the depression shall not be used for stormwater retention and the area draining to this feature under pre-development conditions shall be preserved through a conservation easement.

e. All development approval by the City of Ocoee shall require the applicant to submit to the City of Ocoee a copy of the SJRWMD or DEP stormwater permit and the NPDES notice of intent to be covered by the construction generic permit prior to any land clearing.

f. Karst features with a direct connection to the aquifer will be identified and placed in a conservation easement so that they will be thereafter used solely for passive recreation subject to permitted activities in subparagraph (d) herein.

g. All components of the stormwater treatment and management system shall be owned and maintained by the responsible legal entity identified in the SJRWMD or DEP stormwater permit, typically a homeowner or property owners association.

Objective 2: The City shall provide for the elimination of flooding effects resulting from the concentration of stormwater runoff and flooding due to rising water in new and existing development through the adoption of the following policies and the Levels of Service Standards for drainage facilities.

Policy 2.1: Cooperate with the SJRWMD on their rules and regulations with respect to peak discharge rates reduction and/or control of runoff volumes.

Policy 2.2: Limit post-development runoff rates of runoff to that of pre-development in open basins and the retention of the volume generated by the 100-year frequency, 24-hour duration storm event in landlocked basins.

Policy 2.3: Limit development within floodplains and flood hazard areas. Consistent with Policy 4.3 of the Future Land Use Element, Land Development Regulations shall ensure flood elevations are not adversely impacted and water quality of the water body shall not be degraded.

Policy 2.4: Require compensating flood storage where proposed development will impact existing floodplains.

Policy 2.5: Review/update commercial site plan and subdivision regulations.

Policy 2.6: The City will continuously plan for and only approve development plans that are consistent with natural drainage and water storage patterns, as defined by the various drainage basin studies.

Policy 2.7: In new developments a retention or detention system shall be provided which is capable of providing sufficient storage to limit peak discharge rate of the post-development site to the peak discharge of the pre-development site consistent with the regulations of the SJRWMD. For those new developments in landlocked basins, retention of the volume produced by the 100-year frequency, 24-hour duration storm event (with recovery within 14-days) shall be adhered to.

Policy 2.8: All stormwater management systems within a subdivision shall be designed and constructed in order to provide adequate flood protection for all structures and to protect the structural integrity of all roadways.

Policy 2.9: All stormwater management systems shall provide for the safe handling of all stormwater runoff that flows into, across, and is discharged from a development without creating any additional flooding to adjacent property owners.

Policy 2.10: The City shall not accept for dedication any road, street, or facility constructed within a designated flood hazard area, unless mitigating measures as identified in the Subdivision Regulations have been installed by the developer to overcome any identified flood hazard. All measures installed by the developer must be certified acceptable by the City prior to project completion.

Policy 2.11: Natural terrain or landscape barriers to flooding shall be preserved during the land development process.

Policy 2.12: The City shall monitor and update the existing land development regulations to continue to meet the following criteria:

- A. Where economically feasible and physically possible, a non-structural approach shall be utilized to meet the City's surface water quantity and quality needs.
- B. No greater quantity of runoff will be allowed off-site than occurs under natural conditions.
- C. Stormwater collected in any development must be disposed of in a manner that will not cause personal or property damage to upstream and/or downstream property owners.
- D. Each phase of any development in question shall exist as an independent unit capable of having its surface water management needs met by the drainage system design.

Policy 2.13: The City shall enforce the published 100-year flood elevations for lakes within Ocoee pursuant to the Flood Insurance Study (FIS) for Orange County, Florida and Incorporated Areas (effective December 6, 2000) and the accompanying Flood Insurance Rate Maps (FIRMS) published with the study.

Policy 2.14: The City shall enforce the surface water management criteria for swales, open channels and culvert pursuant to Chapter 40C-42, FAC, and the City's design standards.

Policy 2.15: Retention/detention areas shall be designed and located so as to not adversely reduce the existing flood storage of the flood plain.

Policy 2.16: The stormwater drainage regulations contained in the City land development code shall provide for protection of natural drainage features and ensure that future development utilizes stormwater management systems compatible with the completed and future Master Drainage Plan.

Policy 2.17: The City of Ocoee shall participate in the inter-agency Drainage Well Task Force. The Task Force shall inventory drainage wells, identify surrounding land uses, identify potential adverse impacts, prepare a priority of mitigation actions.

Objective 3: Existing facility deficiencies will be identified and corrected on a priority basis. The public health shall be the foremost priority.

Policy 3.1: The City has completed nine (9) of the sixteen (16) drainage basins within the City limits. The remaining seven (7) lie outside of the City limits, but accept stormwater from areas within the City. Of the remaining seven (7), one has been completed by Orange County (Basin 11 - Lake Good Homes/Rose Hill) and the other six (6) are currently under study by the County. The deficiencies identified in the completed drainage basin studies have been summarized and recommendations for improvements identified and prioritized. These recommendations for improvements have been placed with the City's Capital Improvement Project.

Policy 3.2: The City Engineer shall maintain a listing of residential subdivisions in the City which routinely experience flood problems.

Policy 3.3: The City has completed drainage basin studies that identify deficiencies and prioritize recommended improvements to correct those deficiencies, which are included in the City's Capital Improvement Program. The City's Capital Improvement Program shall be revised annually to update any changes to the program and to report any changes as part of the NPDES Annual Report.

Policy 3.4: The City adopted a Stormwater Utility Program in 1991 to assist in the funding of the implementation of drainage and stormwater related improvements recommended within the Capital Improvement Program. The City's Stormwater Utility Program shall continue to assist in the funding of these capital projects identified in the Wekiva Parkway and Protection Act Master Stormwater Management Plan Support, dated November 2005, by dedicating a

specific dollar amount each year for the next twenty (20) years, beginning in 2010.

Policy 3.5: All capital improvements recommended from the completed drainage basin studies have been included and prioritized within the City's Capital Improvement Program and in the Wekiva Parkway and Protection Act Master Stormwater Management Plan Support, dated November 2005. The priorities are based on: 1) Flood Protection; 2) Water Quality; 3) Localized Flooding; and 4) Aquifer Recharge and Protection. The City shall continue to define drainage and stormwater capital projects based on this prioritization hierarchy, as well as evaluating regional stormwater projects to benefit the water quality of Lake Apopka and other impaired waterbodies.

Policy 3.6 The City of Ocoee shall support the recommendations of the Wekiva Parkway and Protection Act Regional Master Stormwater Management Plan

Policy 3.7 The maintenance and flooding projects identified in the Wekiva Parkway and Protection Act Regional Master Stormwater Management Plan from the City's basin studies shall serve as the basis of construction for an annual budgetary allocation as a regular component of the City's stormwater management system and Capital Improvements Program.

Policy 3.8 The City of Ocoee shall incorporate a master project list from the Wekiva Parkway and Protection Act Regional Master Stormwater Management Plan into the Inventory and Analysis section of the Drainage Element that serves as a master project list from which the annual Wekiva Parkway and Protection Act Regional Master Stormwater Management Plan-related capital improvements projects shall be selected, known as Table 7a: Wekiva Parkway and Protection Act Regional Master Stormwater Management Plan Master Projects List--Ocoee.

Policy 3.9 A. The City shall create and annually update as part of its Capital Improvements Element, a five year schedule of projects that will identify the dedicated funding sources and those projects listed on Table 7a: Wekiva Parkway and Protection Act 4.3-25 INFRASTRUCTURE ELEMENT/DRAINAGE SUB-ELEMENT CPA-2002-1-1 Regional Master Stormwater Management Plan Master Projects List—Ocoee, that are selected for the five year schedule.

B. The City shall base funding of any project, program, or activity from the Wekiva Parkway and Protection Act Regional Master Stormwater Management Plan on the following Criteria:

1. Financial Feasibility
2. Flood severity
3. Recharge potential
4. Ease of maintenance
5. Public benefit
6. Permittability
7. Construction cost
8. Water quality retrofit need

9. Potential pollutant load reduction

C. The City has enacted a Stormwater Utility Fee pursuant to the provisions of Chapter 150 of the Code of Ordinances of the City and Section 403.089(3), Florida Statutes. The City shall use the Stormwater Utility Fee as the primary funding source for the continued implementation of those projects identified in the Wekiva Parkway and Protection Act Regional Master Stormwater Management Plan that are specific to the City of Ocoee and included in the City's Capital Improvements Element. The City shall also continue to focus on the water quality projects identified in the Plan within its efforts to comply with the regulations of the NPDES, the Lake Apopka Basin Rule, and the TMDL program, as well as the Wekiva Parkway and Protection Act.

Objective 4: The City will design a stormwater management program sufficient to accommodate projected demand through the year 2030, through the following policies.

Policy 4.1: The City shall establish a program for the acquisition of drainage rights-of-way as recommended by the completed drainage basin studies. The City shall pursue this to comply with the mandates of legal access to drainage and stormwater management facilities by the City's maintenance staff. This is an important consideration, since the level of service protection is directly attributed to the performance and functionality of the City's drainage and stormwater management system. The execution and schedule of some of the maintenance projects identified in the Regional Master Stormwater Management Plan and the Capital Improvement Plan Element may be dependent on the acquisition of certain drainage easements and rights-of-way.

Policy 4.2: All stormwater management devices constructed and dedicated to the City shall be designed so that they can be maintained at a minimal cost to the taxpayer, as determined by the City.

Policy 4.3: The City shall provide adequate drainage services to maintain the adopted level of service standards on the following priority basis:

- A. The protection and maintenance of the lives and safety of City citizens.
- B. The protection and maintenance of the property within the City.
- C. The protection of existing public investment.
- D. The protection and due consideration of water quality.
- E. The reduction of operating and maintenance costs.
- F. The achievement and satisfaction of Regional, State and Federal regulations.

Policy 4.4: The City of Ocoee shall maintain a level of service standard based on performance standards as defined in 44 CFR, Parts 59-78 - National Flood Insurance Program; Chapter 17 62-25, FAC; Chapter 62-302 FAC; Chapter 40C-42, FAC; and the City's published design standards. The performance standards for water quality shall be in accordance with Class III recreational waters, as specified in Surface Water Quality Standards Chapter 62-302, FAC. Secondary drainage collection and conveyance systems shall adhere to the 10-year frequency storm event, as specified by the City Codes. Open basins and roadway culvert crossings shall provide flood protection for a 25-year frequency, 24-hour duration storm event without overtopping of stormwater management ponds and/or roadways. Landlocked basins will be required to retain the volume generated by a 100-year frequency, 24-hour duration storm event, with the retained volume recovered within a 14-day period following a storm event. The lowest floor elevation for a habitable and/or insurable structure shall be established a minimum of one (1) foot above the base (100-year) flood elevation, as required under 44 CFR National Flood Insurance Program; and as established in the Flood Insurance Study for Orange County, Florida and Incorporated Areas (effective December 6, 2000).

Policy 4.5: The City shall utilize all available funding mechanisms for the construction of capital improvements to the Stormwater Management System, especially the City's Stormwater Utility Fund.

Policy 4.6: Additional funding for City-wide surface water management programs shall be sought from Federal and State sources, new revenue sources will be considered, such as FDEP TMDL Non-Point Source Reduction Grants and SJRWMD Cost-Share Grants and any other sources of funding that may be applicable.

Policy 4.7: All stormwater retention/detention systems shall be designed in such a manner as to prevent the degradation of all surface water bodies to the fullest extent possible.

Policy 4.8: The LOS standard for existing drainage facilities shall be those shown in Figure 3.

Objective 5: The City shall properly manage systems to ensure that they are correctly designed, constructed and maintained.

Policy 5.1: Review site plans and sub-division plans, with plans to be prepared by a registered professional engineer in the State of Florida, and review to be completed by a registered professional engineer in the State of Florida.

Policy 5.2: Review the City's regulations with respect to annual maintenance requirements, maintenance bonds, etc.

Policy 5.3: Provide annual inspections of installed stormwater systems.

Policy 5.4: Provide inspection and evaluation of new stormwater systems.

Policy 5.6: Provide pro-active illicit discharge inspections of the City's storm sewer system.

Objective 6: The City shall implement the following twelve (12) listed policies identified by the Regional Master Stormwater Management Plan (CDM, November 2005) that support and promote the intentions of the Wekiva Parkway and Protection Act (WPPA): Ch. 369.321(3)(a), F.S:

Policy 6.1 For sub-basins in the Wekiva Study Area identified with predicted percent increases in pollutant loads between existing and future conditions, the City of Ocoee shall evaluate the use of controls in addition to what is already required for stormwater treatment by City regulations and permitting agencies, where most beneficial and where feasible, by May 2010. The types of controls to be evaluated will utilize the Best Management Practices (BMPs), to include the following, at a minimum:

- Stormwater Reuse (for regional sized projects)
- Reservoirs/Ponds • No Net Floodplain Loss
- Stormwater Infiltration Basins (SIBs)
- Buffers
- Recharge Rule
- Retention
- Detention
- End-of-Pipe Treatments
- Drainage Well/Recharge Well and Treatment System
- Agricultural Non-point Source Pollution Management
- Waterwise Landscaping and Reduced Turf Area
- Public Outreach / Education for Proper Management and Use of Fertilizers

Policy 6.2: By May 2012, the City of Ocoee shall re-evaluate the recommendations indicated in the Regional Master Stormwater Management Plan Support, dated November 2005, for the prioritized deficiencies that have not already been planned for implementation or addressed by capital projects.

Policy 6.3: The City of Ocoee shall continue to monitor its master stormwater management plan to at a minimum address the requirements of the Wekiva Parkway and Protection Act and include the following components: data collection, identification of problem areas, hydraulic/hydrologic analysis of the primary stormwater management system, water quality, recommendations and estimated costs for capital improvements.

Policy 6.4: The City of Ocoee shall evaluate and identify Surface Water Conservation, Groundwater Protection, and Reuse Management Strategies capital improvement programs identified in the Wekiva Parkway and Protection Act Master Stormwater Management Plan Support, dated November 2005, for sub-basins receiving a rank of "1" and "2" by 2010, and implement financially feasible

projects by 2012; evaluate and identify CIPs for sub-basins receiving a rank of "3" and "4" (or higher) by 2012, and implement financially feasible projects by 2017.

Policy 6.5: The City of Ocoee shall evaluate and identify Surface Water Treatment and Flood Control Management Strategies capital improvement programs identified in the Wekiva Parkway and Protection Act Master Stormwater Management Plan Support, dated November 2005, for sub-basins receiving a rank of "1" and "2" by 2010, and implement financially feasible projects by 2012; evaluate and identify CIPs for sub-basins receiving a rank of "3" and "4" (or higher) by 2012, and implement financially feasible projects by 2017.

Policy 6.6: Within areas not already served by reclaimed water, the City of Ocoee shall identify large potential users such as parks and recreation areas. The City shall implement stormwater reuse and irrigation practices where practicable and financially feasible by 2010. Potential sites shall be evaluated independently on a case-by-case basis based on actual conditions.

Policy 6.7: The City's land development regulations shall provide that no subdivision shall be platted nor shall construction commence for any multifamily, commercial, industrial or institutional project until the drainage design for such project has been approved by the city engineering division. For new development and re-development projects, the design shall meet or exceed design standards and the policies and procedures established by the City of Ocoee, SJRWMD, and the Department of Environmental Protection, the Florida Department of Transportation and the design criteria contained therein, and shall provide for retention and/or detention of stormwater runoff.

Policy 6.8: The City of Ocoee shall continue to implement stormwater maintenance and inspection activities, as defined by the National Pollutant Discharge Elimination System (NPDES) MS4 permit and by established programs such as, street sweeping, inspections and maintenance of outfalls, maintenance of catch basins and grates, and maintenance of other roadside drainage structures.

Policy 6.9: The City of Ocoee shall continue to implement pro-active stormwater maintenance and inspection activities, as defined by the National Pollution Discharge Elimination System (NPDES) MS4 permit or by established programs, such as illicit discharge screening for non-stormwater discharges of commercial, industrial, and City maintenance yards.

Policy 6.10: As part of the periodic updates to the various drainage basin studies, the City shall evaluate improvements to its maintenance programs based on the information presented in the Wekiva Parkway and Protection Act Master Stormwater Management Plan Support, dated November 2005, and based on the needs of the City once new stormwater capital projects are constructed.

Policy 6.11: The City of Ocoee shall continue a dedicated funding source, such as the stormwater utility fee, that can be used for planning, implementation and operations and maintenance of regional projects within the Wekiva Study Area. The City shall continue to fund regional stormwater projects for the benefit to Lake Apopka, and then fund the stormwater maintenance projects, as identified in the Wekiva Parkway and Protection Act Master Stormwater Management Plan Support, dated November 2005, over a twenty-year period, beginning in 2010.

Policy 6.12: The City of Ocoee shall continue to coordinate with Orange County and/or other local governments in the Wekiva Study Area, the planning and implementation of regional (stormwater) projects for the Wekiva Study Area.

Objective 7: (NOTE: 7.1 through 7.6 is included in the submittal to DCA in the Natural Aquifer Recharge Element Update) The City shall implement, in order to minimize the contribution of nitrates to groundwater and to foster long-term stewardship of the springs, special design and best management practices (BMPs) shall be instituted for all development within the Wekiva Study Area [Wekiva Parkway and Protection Act (WPPA): Ch. 369.321(3), F.S.].

Policy 7.1: Development shall use joint or shared access to the maximum extent feasible in order to minimize impervious surfaces. [Wekiva Parkway and Protection Act (WPPA): Ch. 369.321(3), F.S.]

Policy 7.2: Non-residential development shall use shared parking to the maximum extent possible in order to minimize impervious surfaces. All parking lots with 100 or more spaces shall evaluate utilizing up to twenty (20) percent of the parking spaces in pervious areas. [Wekiva Parkway and Protection Act (WPPA): Ch. 369.321(3), F.S.]

Policy 7.3: Design of parking lots, sidewalks, buildings and other impervious surfaces shall minimize connections between impervious surfaces through techniques shown on a site plan such as [Wekiva Parkway and Protection Act (WPPA): Ch. 369.321(3), F.S.]:

- a. Directing flows from roof drains to vegetated areas or to rain barrels or cisterns for reuse of water;
- b. Directing flows from paved areas to vegetated areas;
- c. Locating impervious surfaces so that they drain to vegetated buffers or natural areas; and,
- d. Breaking up flow directions from large paved surfaces.

Policy 7.4: Porous pavement materials, pervious concrete and pervious asphalt should be used to minimize the amount of impervious surface within new development and redevelopment. [Wekiva Parkway and Protection Act (WPPA): Ch. 369.321(3), F.S.]

Policy 7.5: Drainage for streets and roads shall be through roadside swales and berms where rural patterns of development are utilized. [Wekiva Parkway and Protection Act (WPPA): Ch. 269.321(3), F.S.]

Policy 7.6: Commercial and industrial development shall be designed to minimize site disturbance by limiting clearing to the minimum area necessary to accomplish development [Wekiva Parkway and Protection Act (WPPA): Ch. 369.321(3), F.S.]:

- a. Avoid or minimize the removal of existing trees and vegetation;
- b. Minimize soil compaction by delineating the smallest disturbance areas feasible;

Maximize disconnection of impervious surfaces to reduce water runoff flows and increase opportunities for infiltration.

Policy 7.7: In addition to requiring minimum level of service standards established by the Comprehensive Plan Drainage Sub-element, the City shall ensure that post-development recharge volume conditions approximate pre-development recharge volume conditions within the Wekiva Study Area protection zone, as indicated on the Future Land Use Maps. This shall be accomplished in the Land Development Regulations by requiring that the first three inches of stormwater be retained on site within Type A soil areas in the Wekiva Protection Zone for basins that have a positive outfall. For land-locked basins, retention for the 100-year 24-hour storm will be required for the entire site. As an alternative for positive outfall basins, an applicant may conduct a hydrological survey and site analysis to demonstrate that post-development recharge is equal to or greater than pre-development recharge.

Policy 7.8: By January 2010, develop an educational program, incentive program, and appropriate regulations to protect groundwater supply and enhance the functions of water recharge areas in the City of Ocoee Wekiva Study Area.

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