DRAINAGE REQUIREMENTS

Scope:

A. All proposals for development shall include a detailed stormwater management plan to be submitted for approval by Hernando County.

Development Permit Requirements.

For all development properties, where the stormwater system is privately maintained, the issuance of an Environmental Resource Permit (ERP) – General, ERP Individual (not including minor stormwater system, noticed general or exemptions), by the SWFWMD and /or DEP, or a FDOT Drainage permit (for the portion of the project included in the FDOT Drainage permit) shall be deemed as confirmation of compliance with County Stormwater Standards. If this condition is met the County's requirement for stormwater has been met and no additional permit or development order is required. The County will review to ensure there is appropriate access and ability to maintain the drainage systems, in case the county assumes maintenance in the future.

Standard general permit for minor systems, noticed general, exemptions, and any permit from SWFWMD, FDOT or DEP that does not receive a technical review by a Professional Engineer will be reviewed by the County for compliance with County stormwater requirements.

The permit and all supporting documentation shall be submitted by the applicant for incorporation into the County permit file and are deemed adopted by reference into the local development permit.

Provide final approved SWFWMD Standard General ERP letter with conditions and final construction drawings approved by SWFWMD if different than submitted to Hernando County

Should the approved SWFWMD construction plan differ significantly from the Hernando County Approved Master Plan the applicant will need to either receive a revised Master Plan or a revised SWFWMD permit.

Should the construction plans submitted to the County differ from the approved SWFWMD plans, the applicant shall be required to obtain a revised SWFWMD permit, or revise the construction plans to conform with the SWFWMD plans.

B. Requirements:

1) Stormwater Runoff Storage/Discharge:

a) The retention/detention of cumulative stormwater runoff in excess of pre-development release rates and pre-development runoff volume shall be provided by sufficient storage capacity constructed on the property to be developed or within off-site drainage areas. Detention/retention storage capacity shall be based on a 25-year/24-hour duration storm event for open basins and 100-year/24-hour for closed basins and the requirements listed below. The 100-year pre/post volumes may be provided by a combination of storage volume and/or percolation as demonstrated by a routing and mounding analysis. Design high water elevations shall be established in consideration of adjacent properties and facilities such that off-site drainage impacts are minimized.

b) Special closed drainage basins, which have undersized receiving Drainage Retention Areas that flood during a 100-year 24-hour storm event, will necessitate proposed development to provide additional on-site storage volume to accommodate the 100-year storm event. These basins are the Forest Oaks, Berkley Manor, Spring Hill Drive Basins, and the Stony Brook Area of Ridge Manor as shown on sheets III-19-22, and any other basin with documented flooding, identified by the County Engineer and approved by the BOCC.

c) The detention/retention facilities designed for the storage of stormwater to control runoff rates and runoff volumes shall:

(1) Be designed in accordance with requirements of Hernando County, Southwest Florida Water Management District, the Florida Department of Transportation, and/or other agencies with jurisdiction.

(2) Be identified as a drainage retention easement on the final plat of a subdivision, or duly recorded as such in other developments. Include an outlet structure in detention/retention facilities sized to release, as a maximum, the pre-development runoff rate and pre-development volume and designed to provide water quality treatment of the runoff from the contributing area, in accordance with applicable standards of the respective agencies (Hernando County, Southwest Florida Water Management District, Department of Environmental Regulation, the Florida Department of Transportation) having jurisdiction.

(3) Constructed with a DRA height to provide a minimum of six (6) inches of freeboard between the design high water elevation and the lowest provided berm elevation surrounding the detention/retention area.

(4) Discharge from overflow structures flow through an abutting drainage easement, minimum twenty (20) feet, or public right-of-way in order to convey stormwater runoff away from the detention area. Drainage easements will be acceptable if the entire conveyance system is built and has capacity to accept increased runoff volumes. Engineering calculations will be required to support the use of drainage easements.

(5) Include special engineering features such as skimmers designed to remove oils and other objectionable materials, in accordance with criteria established by the Southwest Florida Water Management District, and other applicable agencies having jurisdiction.

d) Off-site discharge and volume is limited to amounts, which will not cause adverse off-site impacts.

(1) For a project or portion of a project located within an open drainage basin, the allowable discharge shall not exceed historic discharge and volume (25 year-24 hour storm), which is the peak rate and maximum volume at which runoff leaves a parcel of land under existing site conditions. These criteria shall not apply to projects, which have been discharging stormwater runoff directly to the Gulf of Mexico or a river system.

(2) For a project or portion of a project located within a closed drainage basin, the required retention volume shall be the post-development runoff volume, less the pre-development runoff volume, computed using Southwest Florida Water Management District's 24-hour/100-year rainfall map, and the Soil Conservation Services, Type II, Florida Modified 24-hour rainfall distribution with an antecedent moisture Condition II. The total post-development stormwater runoff volume leaving the site shall be no more than the total pre-

development stormwater runoff volume leaving the site for the design 100-year storm, unless otherwise approved by the County Engineer.

e) Maintenance of pre-development off-site low flow may be required in hydrologically sensitive areas.

f) In Closed Basins, no net encroachment into the flood plain, up to that encompassed by the 100-year event, which will adversely affect conveyance, storage, water quality, or adjacent lands will be allowed. A detailed flood study performed by a registered engineer will be required by Hernando County, which indicates no adverse impact is caused. Any required compensating storage shall be equivalently provided between the seasonal high water level and the 100-year flood level to allow storage function during all lesser flood events.

g) Off-site Lands, adequate provisions shall be made to allow drainage from off-site upstream areas to downstream areas without adversely affecting the upstream or downstream areas.

h) Exfiltration Systems Designed in conjunction with Detention/Retention Systems.

i) Double ring infiltrometer tests shall be performed at each detention/retention facility, unless otherwise approved in advance by the County Engineer. Said test shall be performed at the approximate elevation of infiltration, (i.e. within two feet of DRA bottom elevation). If the test is greater than two feet above the bottom of the DRA, an additional .25 safety factor per foot above the initial two-foot allowance shall be added to the base 2.0-safety factor.

(1) A safety factor of 2.0 or more shall be applied in the exfiltration design to allow for geological uncertainties by dividing the exfiltration rate by the safety factor.

(2) All development plans shall include a drainage chart, which includes both post-developed and pre-developed discharge rates and volumes; results of Double Ring Infiltration test and the elevation that the test was conducted at; and the Seasonal High Groundwater Elevation.

j) Development of multi-family tri-plex and quad-plex projects require Drainage Retention Areas on-site, sized to store ½" of runoff from the contributing runoff sub-basin area for treatment purposes in systems that utilize dry retention methodology. Wet detention areas require 1" of runoff as above. General: All new developments shall be required to provide a detention/retention system in order to detain/retain-increased runoff caused by the development. Where public or private lakes, ponds, borrow pits, or similar type water detention/retention areas are incorporated in a comprehensive drainage plan, drainage calculations shall demonstrate that the facilities have sufficient capacity for the design storm.

2) Hydraulics of curb and gutter construction:

3) The minimum grade for curb and gutter road construction shall be 0.4 percent.

a) Length of curb run from any high point to a drainage inlet shall not allow stormwater to flood the roadway more than four (4) feet from back of curb. Spread calculations per FDOT Drainage Manual, Chapter 3 are required and shall be submitted for review.

b) Hydraulics of underground drainage: Underground drainage through storm sewers, where employed, shall conform to good accepted engineering practice. Coefficients of friction suitable for the type of pipe or structure shall be applied. Minimum pipe diameters shall be fifteen (15) inches for side drains and eighteen (18) inches for cross drains for swale drainage. Eighteen (18) inch minimum pipe diameter for closed hydraulic design. Inverted siphons shall not be accepted.

4) Hydraulics of drainage structure: Drainage structures such as bridges, box culverts, headwalls, dams, weirs, bulkheads and other structures shall be designed hydraulically and structurally in accordance with good engineering practice. The effects on adjacent channels and structures shall be considered. Energy dissipaters or other means of reducing flow velocity shall minimize erosion.

5) Drainage Outfalls:

a) Positive and adequate outfalls are required for all proposed and/or existing drainage systems. Engineering calculations are required to demonstrate the entire route of the receiving drainage outflow system has capacity to accept the additional stormwater discharge for the project. Energy dissipaters shall be installed at all drainage outfalls with exit velocities greater than 3 fps, for a minimum 10-year 24-hour storm event, or unusual site conditions. Label all velocities on plans. The Developer shall provide the "As-Built" location, elevation, and description of each outfall.

b) Drainage wells and seepage basins are not acceptable as positive outfalls. Percolation is the only outfall method, for dry retention pond systems. Drainage Detention ponds shall include water quality recovery systems in accordance with SWFWMD rules. In some cases of severe hardship, the County Engineer may approve an alternative device with special site-specific restrictions and requirements.

6) Discharge Structures: Discharge structures designed to discharge shall be located to outflow into County right-of-ways. A Drainage Right-of-Way (DROW) of twenty (20) feet minimum shall be provided for access to any stormwater detention/retention facility from a dedicated road or street to the discharge structure. The Developer shall provide the "As-Built" location, elevation, and

description of each outfall. Stormwater Runoff: Runoff and routing analysis shall be based on current hydrological design procedures. Computations shall include a tabulation of both pre-developed and post-developed inflow, discharge, storage capacity, minimum and maximum water elevations, and retention/detention time to peak. Post-developed discharge rate and volume shall not exceed pre-developed discharge rate and volume for 25-year/24 hour storm event. Alternative drainage designs are allowable if approved by SWFWMD and then upon written approval by the County Engineer.

7) Conveyance Facilities:

a) General stormwater conveyance facilities include swales, ditches, channels, culverts, storm sewers, inlets, and weirs. The collection of stormwater runoff should be by positive gravity means without the use of siphons, pumps, or similar devices, unless specific approval is obtained from the County Engineer. The Engineer of Record shall design all underground piping.

8) NPDES Requirements:

a) Prior to the commencement of construction the Developer/Owner shall obtain the necessary permit, from State of Florida Department of Environmental Protection (FDEP), required to comply with the National Pollutant Discharge Elimination System (NPDES) stormwater regulatory program and Hernando County's NPDES Ordnance.

(1) Large Construction Activity is defined in 40 CFR Part 122.26(b)(14)(x)

(2) Small Construction Activity is defined in 40 CFR Part 122.26(b)(15)

b) Hernando County requires that all construction activity include the implementation of stormwater control "Best Management Practices" (BMPs) meaning those schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of surface waters. BMPs also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. Reference is made to Section 104, Florida Department of Transportation Standard Specifications for Road and Bridge Construction (Latest Edition) and F.D.E.P. NDPES Stormwater program, and Guidance for Stormwater Pollution Prevention. The applicable measures shall be implemented to minimize the transportation of silts and sediments off site and to eliminate, to the greatest extent possible, the contamination of surface waters flowing off-site or recharging on-site.

c) Stabilize all disturbed soils within seven days of no construction, project completion, or final inspection, whichever occurs first.

d) Contractors shall clean up all fugitive soils at a minimum weekly or more often as needed.

e) For those sites requiring a FDEP Permit, as described above, a copy of the Stormwater Pollution Prevention Plan shall be provided to the Hernando County Engineering Office, 1525 East Jefferson Street, Brooksville, Florida 34601, prior to commencing construction.

f) Provide a copy of the Notice of Termination to the County Engineers office when construction is complete, as above.

DRAINAGE DESIGN

Drainage Standards:

A. Valley curb shall be twenty four (24) inches wide with a minimum thickness of six (6) inches at the center, with a three (3) inch rise to the back of the curb and a one (1) inch rise to the pavement edge, 3,000 p.s.i. concrete used throughout.

B. Vertical Curb and Gutter shall conform to FDOT Index 300 Type F.

C. Vertical curbs without gutters shall be constructed using 3,000 p.s.i. concrete and be per FDOT Index 300 Type D, used on high side of road only.

D. Curb end transitions to meet FDOT Index No. 300.

E. Culvert Pipe:

1) Culvert pipe under roadways shall be steel reinforced concrete pipe, eighteen (18) inch minimum; driveway pipes may be steel reinforced concrete, corrugated metal, or HDPE. However, for side drain materials other than steel reinforced concrete a minimum of one (1') spacing is required between the non-reinforced concrete pipe material and edge of pavement and or curb. Pipe easements shall be fifteen (15) feet minimum to permit access, maintenance, and protection. Pipes with over 4 feet of cover shall be steel reinforced concrete pipe.

2) Maximum length of culvert pipe between structures shall not exceed four hundred (400) feet.

3) All pipe joints shall be wrapped with approved filter fabric per FDOT Specifications, Section 280.

4) Pipes shall be sized to accommodate a minimum 10-year 24-hour storm event.

F. Mitered End Section, all culverts under roadways or driveways shall have mitered end sections made of reinforced concrete, Plastic Flared End Sections are not allowed. Where shallow swales intersect deeper drainage ditches or DRA's, erosion control shall be provided by use of culvert pipes, concrete swales, mitered end section with spillways, or other suitable means. Cover material over culverts in swales shall be stabilized, compacted, and sodded to prevent erosion. The proposed design of reinforced concrete mitered end sections must meet current FDOT Standards.

G. Splash Pads/Rip Rap: shall be provided on all MES that have velocities of greater than 4 ft/sec for a minimum 10-year 24-hour storm event. Velocities for all pipes shall be provided and ranges shall be within prudent hydraulic engineering design standards.

H. Endwalls shall be made of 3,000 p.s.i. concrete per FDOT Index No. 250 and shall be used only outside the roadway clear recovery area.

I. Manholes or junction boxes shall be constructed of reinforced concrete. They shall be a minimum of four (4) feet inside diameter at the base with straight walls or corbelled a maximum of four (4) inches in one (1) foot, with a manhole rim cast in place for access. Inverts are to be formed to a minimum of ½ the pipe diameter. FDOT Index No. 200 and 201 shall be used with a maximum corbel height of four (4) feet and a vertical chimney height of no more than eighteen (18) inches including ring and cover. Manholes or junction boxes shall not have metal steps.

J. Inlets:

1) Curb Type: See FDOT Roadway and Traffic Design Standards Index No. 200 and 201 (Latest Edition). Bottomless inlets shall not be allowed. Curb inlets shall not be placed within curb return radii.

2) Ditch Bottom Type: Shall be constructed per (a) above with the exception that FDOT Index No. 232 Type C or greater shall be used. A FDOT Index Type F "Modified" may be used and details obtained from Hernando County Engineering Department.

K. Valley Crossing in Local Streets:

1) The design of Valley Crossings in streets will only be allowed on closed drainage system, curb, and gutter, unless otherwise approved by the County Engineer. In no case shall concrete valley gutters be less than thirty six (36) inches wide.

2) Valley Crossing shall be limited to streets that have a stop condition at intersection.

L. Swale Drainage:

1) Roadside Swale Geometry: Shall be per current FDOT Greenbook Standards.

2) Swale Erosion Protection: Swales shall be provided with permanent erosion protection. Such protection may be turf, using an approved type grass, or approved type of erosion fabric may be utilized. When turf protection is used, the swales shall be sodded a lateral distance extending from within one (1) foot of the road pavement to the top of the swale backslope.

3) Driveway Across Swales: Driveways across swales shall have an invert, or drainage pipes of adequate size place beneath them conforming to the proper flow lines for positive drainage. The culvert pipes shall have a minimum fifteen (15) inches in diameter, long enough to provide a six (6) foot wide shoulder on each side of the driveway pavement. The ends of the pipe shall be finished with mitered end sections.

M. Canals, Drainage Retention/Detention Areas, Major Waterways.

1) One twenty (20) foot DROW is required for each retention/detention area not abutting county ROW.

2) The following DRA's shall undergo geotechnical subsurface testing (at a minimum with Ground Penetrating Radar (GPR), Electrical Resistivity Imaging (ERI); Multi-Electrode Electrical Resistivity (MER), or equivalent as accepted by the County Engineer) to determine the presence of karst features or voids:

a) All planned Class A residential subdivision DRA's

b) All DRA's dedicated to the County

c) DRA's serving apartment complexes with one-half (1/2) acre or more of pond bottom and a total design depth of six (6) feet or greater

d) Any non-residential DRA's within fifty (50) feet of a residential area (measured from top of bank) with one-half (1/2) acre or more of pond bottom and a design depth of six (6) feet or greater

A report shall be delivered to the County Engineering & Planning Departments, which details the methods, mapping, results, and conclusions of the subsurface testing signed and sealed by a professional engineer or geologist. The project engineer shall sign and seal a letter to the County Engineering Department acknowledging review of the subsurface testing report; acceptance of its findings; conclusions as to the site suitability for stormwater retention; and detailing any recommendations or remediation of any karst features or voids present.

N. Design factors for known karst features within proposed platted lots.

1) Geotechnical analysis of the feature(s) shall be conducted and recommendations for remedial action provided to the Engineering and Planning Departments.

O. Flood Plains: where lands are or have been subject to periodic flooding, the County and/or FEMA have not established minimum building elevations, the Developer shall establish 100-year, and 25-year flood elevations at design flood conditions in accordance with SWFWMD and County standards.