

CHAPTER SIX
STORMWATER MANAGEMENT

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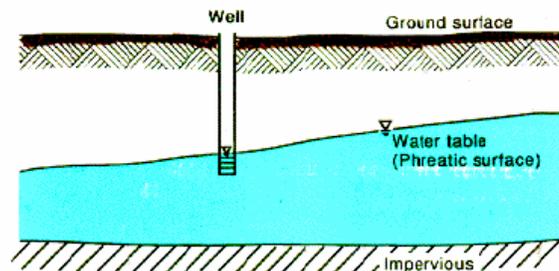
6000. PURPOSE

The purpose of this Chapter is to guide engineers and developers in the design of stormwater management systems in Citrus County. Integrated in this Chapter are methodologies and design procedures, as well as the County's required stormwater management design standards and criteria, into a single-source document. This Chapter is compatible with the requirements of the Drainage Sub-Element of the County's Comprehensive Plan. It represents a coordinated effort to bring water resource managers, developers, and designers current with regulations and criteria applicable to stormwater management design in Citrus County.

This Chapter will be utilized by Citrus County for permitting, study, review, and design. The content of this Chapter shall not be construed as a guarantee against all stormwater damage, but as a means to minimize the extent of apparent stormwater hazards to the public. These are minimum standards only and do not relieve the owner/developer or his engineer of record from their designated responsibility to meet the intent of this Ordinance, and to protect the rights of surrounding property owners and the public interest, in accordance with good engineering practices.

6005. OBJECTIVES

- A. Design criteria presented in this Chapter have been established to enable architects, engineers, planners, and developers to accomplish the following objectives:
1. Protect human life, health, and welfare.
 2. Minimize private and public property damage resulting from erosion, sedimentation, changes in seepage slopes, i.e., phreatic surfaces, and flooding in and adjacent to proposed developments and other proposed stormwater management systems.



3. Provide a technically efficient and cost-effective stormwater management system design.
4. Maintain or enhance the quantity and quality of groundwater supplies.
5. Maintain or enhance the quality of surface waters and receiving water bodies.
6. Provide for the least possible disturbance to community welfare and to the environment during construction.
7. It is also the County's intent for the design criteria specified herein to be compatible with the criteria of other regulatory agencies having jurisdiction within Citrus County.

B. Review of permits

The Technical Services Division reviews stormwater management applications to ensure they meet County criteria related to stormwater management and to ensure other properties are not impacted by flooding as a direct result of development. The types of applications reviewed relate to subdivisions, commercial sites, public infrastructure, residential lot development, and any land alterations. SWFWMD and FDEP regulate wetland protection, allowed impacts on water bodies, and environmental concerns, on the local level, for the County.

C. Overseeing County Flood Damage Control Ordinance

The County requires Flood Insurance Rate Map amendments to be filed by the Engineer of Record as part of the design process when the flood zone designation of portions of the development are proposed to be changed. Sites within the floodplain require an elevation certification by a registered land surveyor.

D. Interagency regulation

Both private and public stormwater management activities may be subject to a variety of regulations and/or permitting requirements in addition to those required by Citrus County. Stormwater management design criteria, which may differ from Citrus County criteria, are specified by various jurisdictional agencies at federal, state, and local levels.

1. The Engineer of Record is responsible for assuring that all appropriate permits or approvals are obtained from all necessary agencies prior to construction on a site.

2. The Engineer of Record may also be required to submit a Notice of Intent (NOI) for stormwater discharges associated with industrial activity and/or construction activity involving one or more acres of land disturbance (refer to 40 CFR 122, 123, and 124 for specific information regarding requirements and exemptions). EPA requirements may include certain stormwater pollution prevention measures, possible monitoring activities, and annual inspections.

6010. WARNING AND DISCLAIMER OF LIABILITY

The degree of protection obtained by use of regulations presented in this Chapter is considered to provide a reasonable level of flood protection and is based on sound and accepted engineering practice. Flooding may occur or flood heights may be increased by man-made or natural causes. This Section does not contain implications or guarantees that areas or properties designed and constructed according to these regulations will be free from flooding or flood damages. This Chapter shall not create liability on the part of Citrus County, or any officer or employee thereof, for any flood damages that result from reliance on this Chapter, or any administrative decision lawfully made there under. The applicant's Engineer of Record remains responsible for any and all adverse impacts that may result from the design.



6020. DEVIATIONS FROM STANDARDS AND ABANDONMENT OF STORMWATER MANAGEMENT FACILITIES

The standards and criteria in this Chapter were developed to protect the lives and property of the citizens of unincorporated Citrus County. Deviations from selected criteria may be approved when specifically referenced, provided adequate justification is formally submitted for such approval, the proposed deviations will not appreciably alter a project's impact on offsite properties, the proposed deviations are not in conflict with other applicable ordinances and/or regulations, and the deviations are formally approved by the County as may be

necessary for a waiver or variance of specific ordinance requirements. The approval of a specific deviation, through an administratively issued waiver, for a specific site does not in any way imply that a subsequent approval will be granted for the same deviation for a different site or for the same deviation for a future phase of the same site.

Stormwater management facilities cannot be abandoned or reduced in capacity, unless a facility is appropriately permitted or formally approved by the County or SWFWMD for such a modification. Proper maintenance (including pertinent activities identified herein) of any and all stormwater management facilities must be continuously provided by the facility owner. The intentional or unintentional occurrence of a reduction in the attenuation capacity, and/or increase in the discharge capacity, and/or reduction in the treatment capacity of a constructed stormwater management facility or system is a violation of this Section.

Any proposal to reduce the attenuation capacity, increase the discharge capacity, or reduce the treatment capacity of an existing stormwater management facility must include replacement of the altered capacity at an alternative location to be formally approved by the County. Any proposed modification to an existing stormwater management facility can improve, but cannot reduce, the net effectiveness and efficiency of the original facility.

6030. PROFESSIONAL STANDARDS OF CONSTRUCTION AND DESIGN

The following documents, manuals, codes, ordinances, etc., shall constitute standards of construction and design for purposes of the Chapter:

FDOT Drainage Manual;

SWFWMD Basis of Review;

Florida Administrative Code 40D-4, 40-D40, 40D-400;

Florida Stormwater Erosion and Sedimentation Control Inspectors Manual; and

Florida Building Codes

FDOT Design Standards and Specifications

Any design standards not referenced in this Code will be determined by the County Engineer.

6040. REVIEW STANDARDS

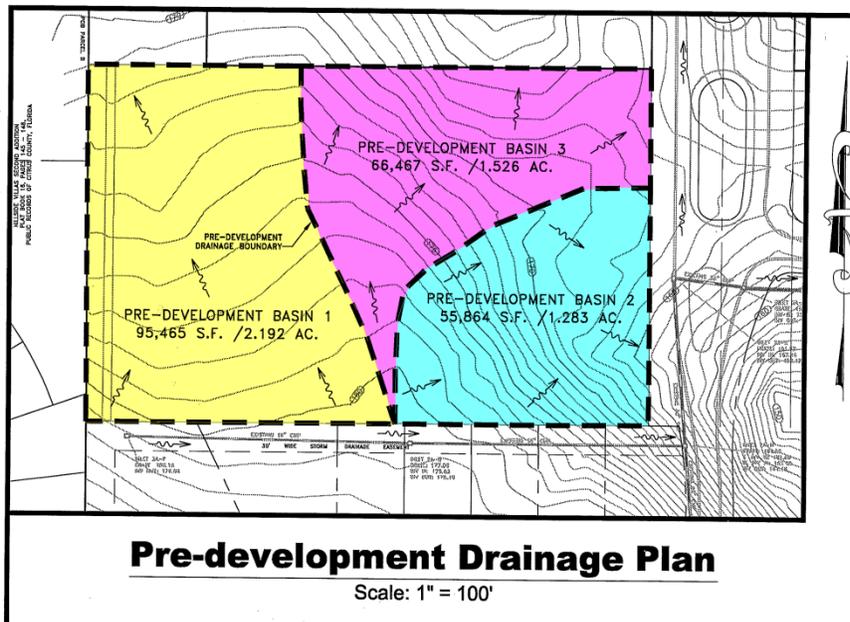
A. The owner/developer shall be required to submit all pertinent information in plan and specification form and environmental data as necessary to

construct appropriate drainage facilities for the project site. Plans and specifications for the design of the drainage facilities shall be signed and sealed by a Professional Engineer licensed by the State of Florida. The plans and specifications shall contain a definition of the scope of all work to be accomplished in the construction of the improvements and shall be submitted to the County for review and approval prior to commencing construction and/or plat approval as applicable. As conditions warrant, additional drainage reviews, plat approval, and approvals by other public agencies may be required.

- B. For projects to be developed in phases, each phase must be associated with a concurrent stormwater management system, which has adequate attenuation, discharge, and treatment capacity. A master plan may be submitted for future phases. Criteria shown in an approved master plan, sets the criteria for the future phases. The design requirements identified below, and the design requirements and criteria found in any other part of this Chapter, are the requirements which must be met to receive approval of a proposed stormwater management system by Citrus County. Other regulatory agencies may have additional permitting requirements.

6050. NEW DEVELOPMENT SITES

All new development shall be designed such that post-development stormwater runoff from the site shall be equal to or less than predevelopment runoff in terms of rate and volume and shall meet applicable state and water management district water quality and quantity standards, and the requirements contained herein.



6060. REDEVELOPMENT SITES

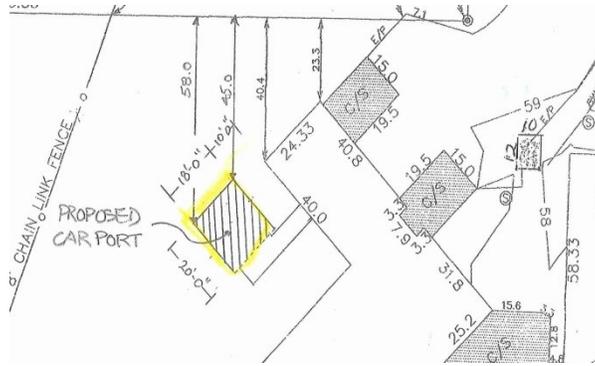
All nonresidential, nonagricultural redevelopment and expansions of existing nonresidential, nonagricultural development shall construct or contribute to a stormwater management system for the entire site which treats stormwater runoff to State and SWFWMD water quality standards and has a runoff rate and volume which is substantially similar to that for predevelopment conditions.

6070. EXEMPT REDEVELOPMENT SITES

Nonresidential redevelopment, or expansion of a site, with a cumulative alteration area of less than or equal to 1,000 square feet, are exempt from review of existing drainage.

6080. DE MINIMIS DRAINAGE

- A. The De Minimis drainage application determines the amount of detention/retention required for sites with a minor amount of new impervious area compared to the pervious area on the site. A Professional Engineer is not required to complete the application. If the De Minimis drainage application cannot be used, the applicant shall provide the required stormwater design and calculations as stated in this chapter.
- B. Requirements to use De Minimis drainage application:
1. Properties cannot contain wetlands, sinkholes, or direct discharge to any Outstanding Florida Water (OFW).
 2. Property cannot be in V Zone, A zone, or Floodways
 3. Meet the pervious/impervious area requirements as listed on the application.
 4. Less than or equal to 500 S.F. of new impervious area. No Stormwater Drainage system requirements or review.
 5. 500 S.F. to 2,000 S.F. of new impervious area. Applicant can use the De Minimis drainage application if the site conditions allow.



6090. EXEMPTIONS

- A. The following development activities are exempt from the requirements of this chapter. Developments exempt under this section shall nevertheless be constructed in such a manner as to prevent flooding from stormwater entering the site from adjacent property including roadways.
 - 1. Fill associated with establishing any residential house pad structure or drainfield shall be limited to an area no greater than that necessary to comply with the Florida Building Codes, approved construction footprint, the Firewise Program footprint, and where there are other site requirements, or any areas related to construction of the Florida On-Site Treatment and Disposal System (O.S.T.D.S.) standards.
 - 2. Any development within a subdivision if each of the following conditions have been met:
 - a. Stormwater management provisions for the subdivision were previously approved and remain valid as part of a final plat or development plan, **AND**
 - b. The development is conducted in accordance with the stormwater management provisions submitted with the final plat or development plan.
 - 3. Bona fide agricultural activity.
 - 4. Maintenance activity that does not change or affect the quality, rate, volume, or location of stormwater flows on the site or of stormwater runoff.
 - 5. Action taken under emergency conditions to prevent imminent harm or danger to persons, or to protect property from imminent fire, violent storms, hurricanes, or other hazards. A report of the emergency action shall be made to the Director of the Department of Public Works as soon as practicable.

6. Decks or walkways, whether elevated or at ground level, that have one-half inch (0.5”) spacing between boards can be considered pervious areas for Engineering Drainage Calculations, with approval of satisfactory soil conditions under the walkway or deck as determined by the County Engineer. Such decks or walkways shall remain uncovered.

6200. INFRASTRUCTURE DESIGN CRITERIA

6205. SCOPE AND PURPOSES

This section is applicable for all new subdivisions, private or public, and any developments that will become property of Citrus County, including but not limited, to planned unit developments.

All proposals for development shall include detailed drainage and detention/retention plans to be submitted for the approval of the County. The drainage plans shall illustrate the means by which compliance with the intent of the stormwater management policies of the County will be achieved.



6210. DEVELOPMENT PERMIT REQUIREMENTS

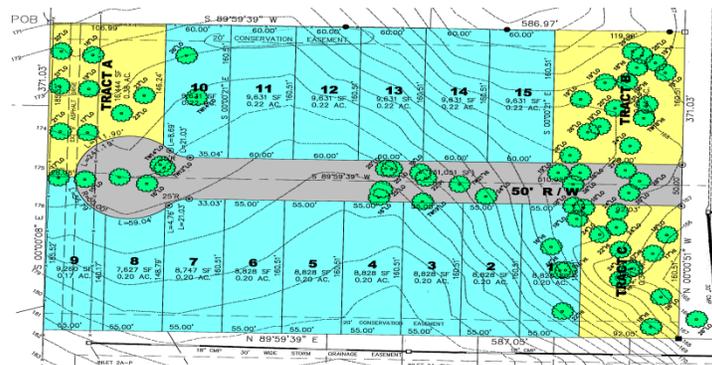
The developer is required to provide sufficient documentation to the County to ensure the standards of this Chapter are being met. Although general data requirements are located in this section, additional or special documentation requirements for projects may be required due to differences in their complexity, potential offsite impacts, and other factors.

A. Master Stormwater Management Plan

1. Content

A Master Stormwater Management Plan of land to be developed shall be submitted for approval prior to the start of site preparation work.

2. The Engineer of Record shall include with the Master Stormwater Plan a Master Stormwater Management Plan Map showing all existing and proposed land features. An appropriate scale shall be used to adequately represent the information on the map. The following information shall be included in Master Stormwater Management Plan:
 - a. Vicinity sketch and legal description.
 - b. Watershed basin and sub-basin boundaries, including all on-site and off-site areas contributing to the site, and the breakdown of the subarea(s) contributing to each inlet in the internal stormwater collection system.
 - c. Recent Topographic or recognized public source such as County or SWFWMD information shown must be obtained by a registered surveyor licensed in Florida. When the public source is used, the most recent adopted version must be used.
 - 1) Light Detection and Ranging (LIDAR) is allowed at the discretion of the County. If the topographic information is obtained by aerial methods, a registered surveyor must verify the accuracy of the data.
 - 2) Contours obtained by aerial means shall not be used for establishing finish grades, calculating cut or fill quantities, or calculating stormwater runoff quantities when there is reasonable doubt as to their accuracy due to dense ground cover or other reasons. Under such conditions, contours obtained from more reliable ground methods shall be used.
 - 3) Existing Topographical Contours of sufficient detail, with the elevations based on NAVD 88, on the property to be developed and extended onto abutting properties a distance not less than one-hundred (100) feet from the property lines, or until a topographic basin divide, or water body is encountered.



- 4) The Surveyor shall give the source of such topographic data and certify its currency. The project benchmark shall be referenced and described on the grading and drainage plans, along with any NGVD/NAVD conversion equations.
- d. Existing and proposed shorelines of lakes and ponds and their depths of water.
- e. Delineation of jurisdictional wetlands as approved by SWFWMD or other government agencies, i.e., U.S. Army Corp of Engineers, FDEP.
- f. Flood zone designation determined from the current Flood Insurance Rate Maps (FIRM). Elevations of the flood zone along with the Flood Hazard boundary shall be delineated on the Master Stormwater Management Plan and on all Grading and Drainage Plans.
- g. The waterways, channels and ditches within the development, and other features that affect present or planned drainage.
- h. Flow lines used to determine the basin and sub-basin times-of-concentration.
- i. Existing stormwater management system features (ditches, ponds, etc.) are to be shown within and downstream of the proposed development. The Engineer of Record shall investigate drainage patterns and stormwater management facilities within at least 1000 feet of the site or basin boundary, or until a topographic basin divide, or water body is encountered. The Engineer of Record shall also demonstrate that the assumed design tailwater conditions are appropriate. This information shall be included in the stormwater management design report.
- j. Notes pertaining to standing water, springs, areas of seepage or seepage slopes and sources of highwater data.
- k. Proposed development layout with vertical controls. Vertical datum shall be NAVD 88, unless otherwise approved by the County Surveyor.
- l. Proposed stormwater management system features including, but not limited to, the locations of inlets, swales, ponds, conveyance systems, easements, etc.
- m. General soil characteristics obtained from the Natural Resources Conservation Service (NRCS) or the Florida Land Use, Cover and Forms Classification System (FLUCCS).



- n. For Master Stormwater Management Plans, drawings shall provide sufficient information and references for use with future phases of the master plan development.
 - o. A master lot grading plan and Individual lot grading plans shall be provided for every lot in accordance with Neighborhood grading plan design procedures contained herein.
3. For projects which are part of a master plan development, related drainage information for both the proposed project and the pre-development stormwater management plan must be provided to demonstrate compliance with this Section. Such information to be provided shall include a drawing of the proposed drainage basins and proposed drainage calculations for design values for C or CN, as well as sufficient information from the master stormwater management plan (excerpts from the approved calculations for post-development C or CN, list of the included drainage basins with approved elevations for the Design High Water (DHW) and freeboard).
 4. Revisions made to a phased project shall require updating of applicable portions of the Master Stormwater Management Plan Map and the Stormwater Management System Design Report before processing/project review of the revised and/or future phases commences or continues, as deemed appropriate by the County. Concurrent submittal of the updated documents with the proposed phase construction plans and other support reports/data is acceptable.
 5. When revisions are not necessary, the previously approved Master Stormwater Management Plan Map shall be utilized for all future phases.
 6. For projects which are part of a master plan development, the EOR shall certify that the drainage has been designed within the previously approved limits, and that existing infrastructure conforms to the previously approved

construction plans. Such certification should be supported by a summary of the related previously approved and proposed stages and rates of discharge for future phases for comparison and shall indicate the datum that all elevations refer to.

B. Stormwater Management System Design Calculations

1. Stormwater design calculations shall be submitted in a report, which may be submitted electronically in PDF or other approved format. The report shall contain all hydrologic and hydraulic calculations and assumptions used to design the proposed development. The hydrologic and hydraulic calculations shall include support information such as: stage-storage data, stage-discharge data (if applicable), inflow hydrographs, outflow hydrographs, etc.
2. The stormwater management system design report shall be signed and sealed by a Professional Engineer registered in the State of Florida.
3. If a separate geotechnical report is provided with the stormwater design calculations, it shall be signed and sealed by the responsible Professional Engineer or Geologist registered in the State of Florida.
4. A build-out groundwater table analysis, utilizing generally accepted methodology, for ponds located above adjacent properties shall be required. This analysis shall demonstrate that design storms up to and including a 100-year storm will not adversely impact down gradient properties. The County may in any case require the build-out groundwater table analysis if there is any doubt regarding the potential to impact off-site properties.

C. Computer Programs

All reports containing computer generated information shall include input and output data. Input data, when computerized flood routing techniques are utilized, shall include, but not be limited to: basin areas, curve numbers, rational coefficients, inflow hydrographs, SCS peak rate factor, SCS Type II Florida Modified distribution data, time of concentration values, rainfall distribution data, stage/storage information, etc. Programs shall be routed in 0.25-hour increments. Any calculation generated by a program not recognized by Citrus County may be checked by accepted programs. The Engineer of Record shall be responsible for clarifying any discrepancies between programs. Input and output data must also be provided when requested by the County.

D. Roadway and Utility Cross Section

All projects shall submit a cross section of the Right-of-Way (ROW), showing the ROW width, pavement width, sidewalk, curb and gutter, swales, above ground utilities, underground utilities, depth of pavement, base, sub-base, and dimensions for horizontal and vertical dimensions of all items.

6220. STORMWATER DRAINAGE SYSTEM DESIGN REQUIREMENTS

- A. All stormwater management systems designs shall adopt Florida Administrative Code 40D-4, 40-D40, 40D-400, and SWFWMD Basis of Review requirements for water quality and water quantity in accordance with the rules and regulations of the SWFWMD, and any other federal/state/local agency having jurisdiction.
- B. FDOT Drainage Manual shall be adopted for conveyance systems.
- C. Citrus County Design rainfall amounts to be used are 100 yr./24-hour storm event = 11.50 inches. 25 year / 24-hour storm event = 8.64 inches.
- D. Impervious areas are land surfaces which do not allow, or minimally allow, the penetration of water. Impervious areas shall include, but are not limited to:
- Buildings
 - Asphalt surfaces
 - Concrete
 - Ponds (at top of bank location)
 - Shell
 - Limerock
 - Pavers, stone, rock, etc.
 - Gravel parking
- E. Low Impact Development (LID) strategies and technologies are encouraged for new and existing development. Site designers are encouraged to use a treatment train approach to reduce, manage, and treat stormwater runoff on the site. Principles that the designer should consider include, but are not limited to:
- Use of existing site assets that provide natural water quality and quantity attenuation and treatment.
 - Minimize generation of stormwater and especially flows from directly connected impervious areas.
 - Distributed retention, detention, treatment, and infiltration of runoff areas and systems.
 - Minimize site disturbances, land clearing, and compaction of soils, through low-impact clearing, grading, and construction practices.

- Use of permeable pavement, geoblock, and other permeable surfaces for driving, and walking areas.

F. Permission from property owner shall be obtained for all properties the proposed drainage system is located on or crosses.

G. The Engineer of Record shall verify that the proposed design is compatible with the completed design of any Citrus County capital improvement projects that may impact the site or that the site may impact. Unless otherwise agreed upon, if design conflicts are encountered, the design constraints imposed by the capital improvement project shall take precedence. The proposed site design must not rely upon the improvements included in any Citrus County capital improvement project unless the County project is to be constructed before or concurrently with the proposed site.

H. Finished Floor Elevation Requirements

Finished floor elevations shall be in conformance with the Florida Building Codes.

I. General Grading and Excavation Requirements

1. General Grading

Sites must be graded such that all stormwater runoff drains in a manner no worse than that which occurred during the predevelopment condition along private property boundaries, with any excess runoff directed to the nearest public right-of-way or drainage facility having capacity, without crossing or causing detrimental impact to adjacent property.

The proposed work must comply with the following requirements:

- a. Side Slope - The maximum side slope for any fill shall be three (3) feet horizontal and one (1) foot vertical.

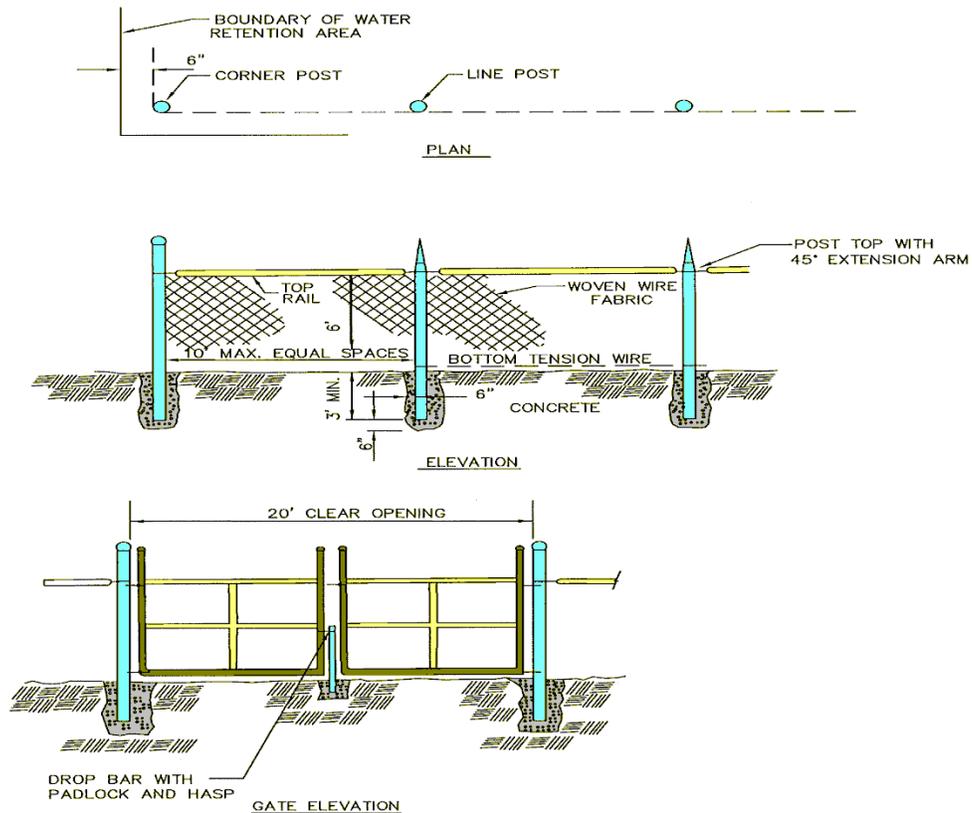


- b. Erosion Control - All sites must have an erosion control plan addressing waterborne erosion, windblown erosion, and sediment deposited by vehicles entering or leaving the site. The erosion control plan may consist of, but is not limited to, either a temporary system installed by the applicant or a twenty (20) foot wide buffer of undisturbed vegetation. In all instances, the plan must remain in effect until the site is permanently vegetated.

2. General Excavation and Pond Requirements

Proposed excavation must comply with the following requirements. Standards for mines and borrow pits are addressed separately within the Code.

- a. Setback - The maintenance berm shall not be considered as a part of the setback. No part of the maintenance berm shall encroach into the setback. The minimum horizontal separation from any sidewalk, normal pedestrian area, slab or grade type patio, vehicle driving or parking area or leisure activity area to the top of bank for any excavation is two (2) feet or current ADA criteria, if greater. The maximum constructed slope within a setback area is one (1) foot vertical to eight (8) feet horizontal.
- b. Side Slope – Side slopes shall not promote erosion, shall be easily maintainable, grassed and shall be appropriate for the soil conditions. The maximum allowable side slope for an excavation without a fence is one (1) foot vertical to four (4) feet horizontal. The maximum allowable side slope for an excavation with a fence is one (1) foot vertical to three (3) feet horizontal.



FENCE DETAIL

- c. Fencing - All proposed detention and retention areas with side slopes steeper than one (1) foot vertical to four (4) feet horizontal (4:1) shall be fenced. Fencing is also required at the top of retaining walls that are greater than two (2) feet high. The fence shall be approved by the County and be constructed along the outer perimeter and on top of the maintenance berm. Ingress and egress for pond maintenance shall be provided but restricted by lockable gates of adequate size to allow for the easy passage of necessary maintenance equipment.



d. Erosion Control and Stabilization - All sites must have an erosion control plan addressing waterborne erosion, windblown erosion, and sediment deposited by vehicles entering or leaving the site. The plan must remain in effect until the site is permanently grassed.

J. Drainage Patterns Not To Be Changed To The Detriment Of Neighboring Properties

Notwithstanding the issuance of a Development Order by the County the act(s) of stockpiling material, grading, excavating, and other act(s) affecting drainage shall not change the surface drainage patterns to the detriment of neighboring properties or public rights-of-way.

An upstream property owner may not change the point of discharge of surface waters, nor concentrate them in ditches, nor divert in one direction waters which would have escaped in another direction, nor discharge them at a higher velocity, nor add to their pollution and cause a downstream property adverse impact. Likewise, the downstream owner may not obstruct natural flow of surface waters onto his land, either by excluding it or causing backwater on his neighbor.

K. Erosion and Sedimentation Control

Proposed temporary and permanent erosion and sediment control plans shall be submitted with each application for development approval. These plans shall specify in detail the erosion and sedimentation control measures to be used during all phases of clearing, grading, filling, construction and permanent development, and accurately describe their proposed operation. In addition, these plans shall be in accordance with the latest applicable specifications and recommendations as contained in the Florida DEP's (FDEP's) publication, "*Florida Stormwater Erosion and Sedimentation Control Inspectors Manual*", latest edition and the State of Florida Department of Transportation (FDOT Drainage Manual).

No clearing, grading, excavating, filling, or other disturbing of the natural terrain will be permitted until County-approved erosion and sediment control measures have been installed. All erosion and sediment control measures shall be continuously maintained during the construction phase of the development. These erosion and sediment control measures shall apply to all features of the construction site, including street and utility installations as well as to the protection of individual lots.

L. Functional Stormwater System During Construction

During all phases of construction, all stormwater entering, leaving, or flowing through construction sites shall be controlled in a manner consistent with the approved stormwater management plan and shall not adversely affect the drainage of the adjacent properties.

M. Permits For Work In Public Rights-of-Way

Any work within public rights-of-way or easements may require a right-of-way utilization permit. Some examples of improvements that would require a permit are:

1. Connection of a private stormwater system to the County's storm sewer or ditch system both within and without an easement or right-of-way;
2. Changes and/or additions to any County storm sewer system;
3. Changes and/or additions (including regrading) to any County ditch system;
4. Changes and/or additions to any existing County pavement;
5. Any construction, modification, or removal of items that occur within the limits of any County right-of-way or easement.
6. Utility Installation



N. Review of Offsite Improvements Associated With Commercial and Residential Development

Applicable sets of plans should be submitted to the County for approval:

1. Plan and profile of the existing and proposed storm sewers or ditch (including affected drainage structure sizes - such as manholes, inlets, etc.) showing all existing utilities at scale.

2. Erosion Control Plan.
3. Upon completion of work for subdivisions, one printed set, signed and sealed by a Professional Engineer registered in the State of Florida, and one digital (AutoCAD) set of the record drawings, shall be submitted to the County.
4. Upon completion of subdivision work, a digital video of the internal features of the entire storm sewer system shall be provided to the Citrus County Engineering Division.
5. As part of subdivision design or prior to developer maintenance request, a letter from Engineer of Record or a licensed testing service stating Ground Penetrating Radar survey of all streets has been completed and results are provided for the Counties review.

O. Protection of County Stormwater Management Systems

Permanent structures or improvements shall not be constructed such as (but not limited to) sidewalks, driveways, impervious surfaces, patios, decks, air conditioners, structures, utility sheds, poles, signs, fences, sprinkler systems, trees, shrubs, hedges, landscaping plants (other than grass), concrete foundations, pools, walls or buildings may not be constructed in any County drainage easement, except for the landscaping of stormwater detention and retention ponds as required by the Land Development Code as long as landscaping is designed and installed to not impede drainage.

P. Maintenance of Private Drainage Facilities

Any portion of a drainage system, including onsite and offsite facilities located in easements and/or rights-of-way, that is specifically constructed to serve a particular development will be continuously maintained by the owner(s) or an entity identified by the developer such as a homeowner's association. The County reserves the right to act in accordance with Florida law and may be authorized to enter upon such drainage ways to clear or remove the debris or obstructions.



Q. Easement Requirements

Minimum right-of-way and maintenance easements by legal instrument or plat dedication shall be provided if used for all waterways used to convey runoff to a publicly-owned and/or maintained facility. Drainage easements shall be granted to Citrus County for all stormwater management facilities to be maintained by Citrus County. Off-site drainage easements may be required in cases where the performance of minimum maintenance activities associated with roads and stormwater management facilities to be dedicated to Citrus County would not be practical without such easements. Rights-of-way and easements for dedication to the County shall not include areas under the jurisdiction of other agencies.

1. Stormwater Conveyance Systems

- a. Stormwater conveyance systems shall be located in drainage easements or road right-of-ways dedicated to Citrus County if they are to be maintained by Citrus County.
- b. The drainage easement width shall not be less than thirty (30) feet unless otherwise approved by the County.
- c. Residential lot grading and drainage shall be in accordance with the requirements contained herein.

2. Canals and Ditches

The minimum widths of right-of-way and easement shall be as follows:

**TABLE 6-1
MINIMUM WIDTH AND RIGHT OF WAY**

	Top of Bank Width	Maintenance Width	Minimum Control Width
Swales (except in R/W)	--	--	30 feet (DROW/easement)
Pipes & Culverts	--	--	30 feet minimum (DROW/easement, refer to guidelines below)
Detention/Retention	--	15 feet each side	Varies-30 feet plus top of bank width. Connected to right-of-way by 30 foot DROW/easement

3. Detention and Retention Ponds

A minimum access right-of-way or easement of 30 feet wide with a maximum slope of longitude/latitude 10% shall be provided for access to any runoff detention/retention basin from a dedicated road or street. In addition, a continuous 15-foot-wide border with a maximum 2% cross slope, serving as an access maintenance area around the perimeter of the basin shall be included in the basin area.

R. Developments in 100-Year Floodplains

Criteria for Development

1. The criteria for development in 100-year floodplains shall pertain to all such floodplains and not be limited to just those floodplains identified on FIRM maps. Areas which convey or store stormwater may have an associated 100-year floodplain due to stormwater runoff and flows, including those conveyance and storage facilities in storm surge areas. The Engineer of Record shall be responsible for determining the on-site 100-year flood elevations if not defined by a FEMA study. The Engineer-of-Record is required to submit a Letter of Map Amendment or Map Revision to FEMA for any changes in existing FEMA flood zone designations as determined by a detailed study of the area.
2. No development (structures or fill) shall be allowed in the conveyance portion of any 100-year frequency floodplain associated with a freshwater stream, channel, lake or waterway unless provisions are made to compensate for any reduction in conveyance caused by the development or exempted by SWFWMD.
3. No development (structures or fill) shall be allowed in any 100-year frequency non-tidal floodplain and any floodplain associated with riverine flooding in a tidally influenced area unless provisions are made to compensate for the reduction in storage volume due to the proposed development or exempted by SWFWMD.
4. Any compensation storage volumes shall be provided in addition to stormwater detention or retention volumes otherwise required to reduce peak runoff rates from the development. An exception to these criteria may be provided if it is demonstrated by computer modeling that the timing is such that all of the required attenuation and compensation volumes can be provided by the same storage area. If timing is utilized, the computer model must also demonstrate that full recovery of the required attenuation volume can be achieved, by gravity flow, within 72 hours after the storm event.

5. No earthen fill shall be placed within a 100-year floodplain area unless an equal amount of flood storage volume is created by excavation below the 100-year flood elevation and above the controlled seasonal high groundwater table elevations. In those cases where the provided flood storage compensation volume is to be located contiguous with an existing surface water body, the seasonal high surface water elevation, rather than groundwater table, elevation shall be used as the lower limit reference. An exception to these criteria may be provided if it is demonstrated by computer modeling that the timing is such that all of the required attenuation and compensation volumes can be provided by the same storage area. If timing is utilized, the computer model must also demonstrate that full recovery of the required attenuation volume can be achieved, by gravity flow, within 72 hours after the storm event.
6. No encroachment shall be allowed in a regulatory floodway, as designated on the FEMA Floodway Maps, unless approved by FEMA and accepted by Citrus County.
7. If proposing to build any obstructions, not including fill less than 2 feet under a building, in a Velocity or Coastal A Zone, the applicant shall submit an engineering analysis, showing the proposed obstructions will not cause wave deflection, and adverse effects

S. Maintenance for Retention/Detention Ponds in Subdivision Developments

The maintenance of any privately owned stormwater management system included as part of an approved site plan shall be the responsibility of the owner. This includes, but is not limited to, any scarifying or sediment removal in percolation ponds which is necessary to continue the specified infiltration rates and storage volume. Every project must provide a plan which shall include all SWFWMD requirements for maintenance.

T. Vaults

Vaults are not allowed unless written Department of Public Works approval is obtained.

U. Exfiltration Systems Standards

Underground exfiltration systems shall meet SWFWMD requirements.

V. Watershed Determination

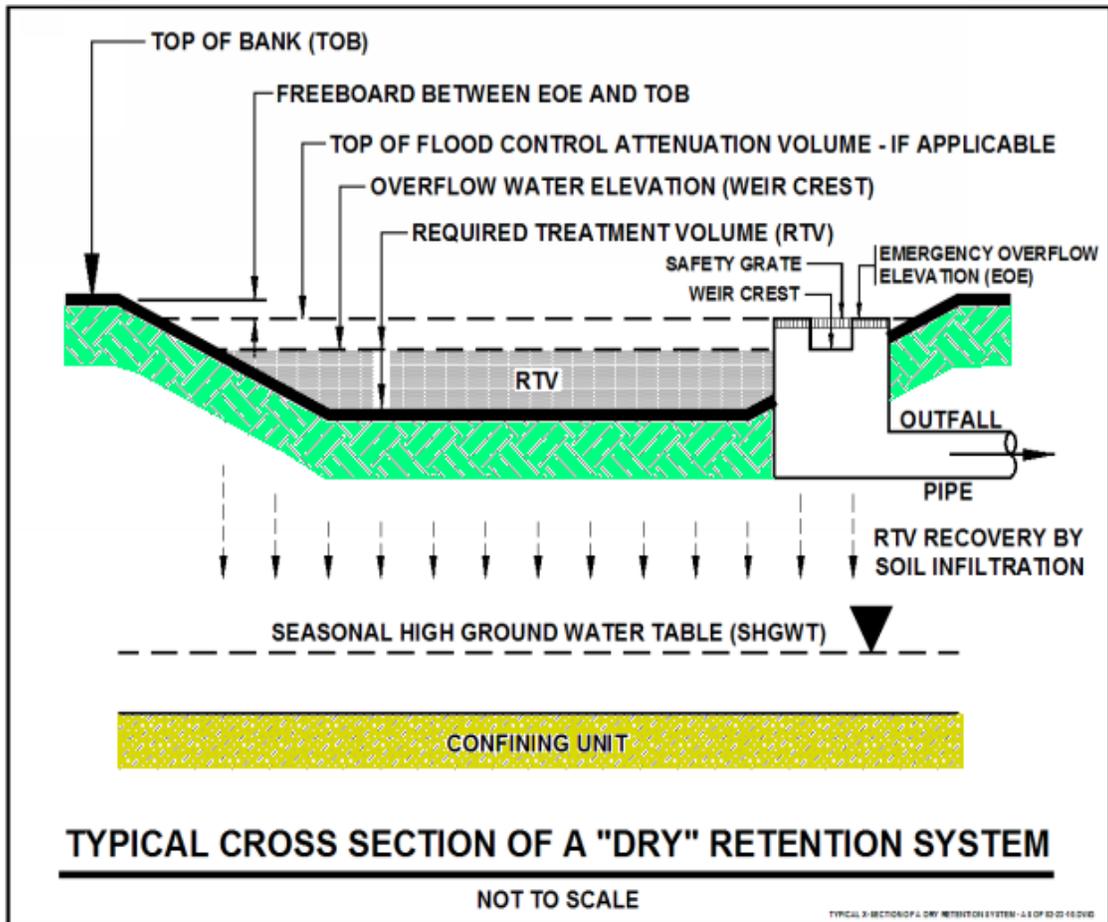
The entire site area, and any and all offsite areas which drain to the project area, shall be included in the design of the stormwater management system for the site.

W. Stormwater Management Facility Design Storm Frequencies

Stormwater management system components shall be designed to accommodate the storm events identified herein.

X. General Design Criteria for Detention/Retention Ponds

1. For the design of detention ponds, the design storm event peak discharge expected for the undeveloped site due to rainfall shall not be exceeded by the peak discharge from the developed site due to a design storm event rainfall.
2. Calculation of the peak discharge from the undeveloped site shall consider the effect of existing storage in attenuating this peak. Pre- and post-development initial elevations for estimating storage shall be the seasonal high water elevation (as determined by geotechnical and biological indicators or other suitable methods), and controlled seasonal high water elevation, respectively.
3. A stormwater routing and mounding analysis is required for the design of all detention ponds. A routing analysis is also required for retention ponds where percolation is considered during the runoff event. Tailwater conditions must be considered in the routing calculations.
4. If the design high water of a pond is proposed to be above the ground surface adjacent to or in the vicinity of the pond area, a geotechnical analysis to certify that there will be no adverse impacts due to potential seepage, or from induced seepage slopes, will be required. If there appears to be seepage, or the analysis is not completed, a clay liner or other methods shall be utilized.



5. The detained or retained runoff storage volume required for the design storm event is to be stored entirely in the pond. Freeboard containment shall be provided by the pond berms and the banks of any hydraulically connected ditch or swale. This shall also be inclusive of perimeter ditches/swales serving subdivisions. The runoff associated with the 100 year/24-hour event shall be routed through the detention/retention pond to establish the minimum residential floor slab elevation, or the floodproofing elevation (commercial sites only). The routing analysis shall also confirm that the pond is not overtopped for the 100 year/24-hour event.
6. For all sites, the maximum side slope for retention/detention areas shall be no steeper than 4:1; however, steeper slopes may be allowed if the entire area of the pond shall be protected with county approved fence, or equivalent safety feature and be constructed along the outer perimeter and on top of the maintenance berm. Ingress and egress for pond maintenance shall be provided but restricted by lockable gates of adequate size to allow for the easy passage of necessary maintenance equipment.

7. For subdivisions, the minimum freeboard for ponds shall be 6 inches between design high water and top of bank. When the adjacent property slopes upward from the outer edge of the maintenance area, credit will be given for freeboard to the external limit of the maintenance area. The cross slope of the maintenance area shall be no steeper than 2%. The maintenance area shall be at least 15 feet wide. All slopes shall establish a stand of perennial grass within the specified areas, by furnishing and placing sod, and rolling, fertilizing, watering, and maintaining the sodded areas to ensure a healthy stand of grass.
8. Recovery of water quality attenuation for detention/retention ponds is required 72 hours after the end of the storm event.
9. Vertical walled ponds are not permitted in residential subdivisions.
10. The pond maintenance area shall establish a full stand of perennial grass within the specified areas.
11. All slopes for retention and detention ponds shall establish a full stand of perennial grass within the specified areas.
12. Double ring infiltrometer test or approved equal.
13. Certified Soil Borings shall be provided for each DRA/DDA. Soil borings shall be extended to a depth of 10 feet below the bottom of the proposed pond. The boring(s) need to provide a soil profile and determination of the seasonal high water elevation.

The number of borings required for each DRA shall be calculated by the following formula.

$$B = 1 + \sqrt{2A} + \frac{L}{2\pi W}$$

B = Number of borings required (round to nearest whole number)

A = Average area of pond in acres

L = Length of pond, in feet

W = Width of pond, in feet

π = pi(3.14)

14. Seasonal High Groundwater Table (SHGWT) Elevation

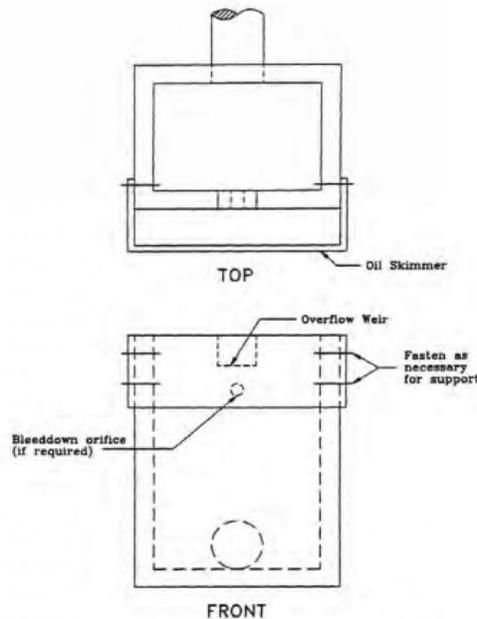
- a. At locations proposed to be utilized as ponds, the seasonal high groundwater table elevation shall be determined using borings or the Soil Survey of Citrus County, Florida and acceptable engineering practices, based upon the Natural Resources Conservation Service

(NRCS) methodologies and be signed and sealed by a qualified engineer. The results shall be included in an original certified subsoil investigation report provided to Citrus County. The following factors should also be considered:

- b. Existing soil conditions (spodic stainlines, where applicable)
 - c. Measured groundwater levels
 - d. Measured water levels surrounding water bodies
 - e. This elevation shall be included in the design plans.
 - f. No storage credit will be given below the controlled seasonal high groundwater table elevation.
15. All supporting information and calculations described above shall be included within the Stormwater Pollution Prevention Plan (SWPPP). Erosion and sedimentation control plans shall be submitted and contain a systematic and comprehensive erosion sedimentation control plan for both the construction phase and the completed project.
16. Proposed temporary and permanent erosion and sediment control plans shall be submitted with each application for development approval. These plans shall specify in detail the erosion and sedimentation control measures to be used during all phases of clearing, grading, filling, construction and permanent development, and accurately describe their proposed operation. In addition, these plans shall be in accordance with the latest applicable specifications and recommendations as contained in the Florida Department of Environmental Protection's (FDEP's) publication, "*The Florida Stormwater Erosion and Sedimentation Control Inspectors Manual*", latest edition.
17. No clearing, grading, excavation, filling, or other disturbing of the natural terrain will be permitted until FDEP-approved erosion and sediment control measures have been installed, except those operations needed to implement these measures. All erosion and sediment control measures shall be continuously maintained during the construction phase of the development.
18. Water Level Control Structures
- a. The outlets of detention ponds shall have water level control structures that enable the ponds to function as indicated in the hydraulic calculations.

- 1) A water level control structure shall not be a pipe riser and shall not be adjustable.
 - 2) Acceptable water level control structures include:
 - a) A modified ditch bottom inlet structure constructed in accordance with the FDOT Roadway and Traffic Design Standards and the FDOT Standard Specifications for Road and Bridge Construction (latest editions).
 - b) Level control weir - sufficient details shall be provided for the County to review the structural/hydraulic design.
- b. All control structures shall be designed to prohibit the entrance of floating debris into the structure. A hydraulic design of the device will be required to ensure that the skimming device will not control pond discharge.
 - c. For wet pond design, the control structure shall have a slot or orifice design for purposes of attenuation.
 - d. Pond control structures are not to be placed within road rights-of-way.
 - e. Detention Pond Outfall Control Design

Direct discharge by means of control structures into storm drains or through culverts will be permitted if the receiving systems have the capacity for such discharges.



Typical Debris Skimmer Detail for Outfall Structure

Y. Natural Depressed Areas

1. Natural depressed areas located entirely within the project boundaries may be used for stormwater management purposes when not adversely affecting off-site water levels.
2. Natural protected areas in a stormwater management are shall be protected by an easement.

Z. Karst Development

Stormwater systems shall be designed to prevent direct discharge of untreated stormwater into the Floridian Aquifer. Information regarding karst sensitive areas is outlined in the Comprehensive Plan. Development in karst sensitive areas must meet the additional design criteria of:

1. A minimum of three feet of unconsolidated soil material between the surface of the limestone bedrock and the complete extent of the bottom and sides of the stormwater basin. Excavation and backfill of unconsolidated soil material shall be conducted, if necessary to meet these criteria. As an alternative, an impermeable, permanent and suitably protective liner (e.g., clay, geotextile membrane, or other proven method) can be used to ensure that stormwater is isolated from communication with ground water (e.g., for wet detention). This provision is presumed to provide reasonable assurance of adequate treatment of stormwater before it enters the Floridan Aquifer System.
2. To reduce the potential for solution pipe sinkhole formation caused by a large hydraulic head, stormwater storage areas and basin depths shall not exceed 10 feet (shallower depths are encouraged) and shall have a horizontal bottom (no deep spots);
3. Fully vegetated basin side slopes and bottom (if not a wet pond) planted with turf grass or other appropriate vegetation suitable for growing in the conditions in which it is planted
4. Pre-treatment of stormwater prior to entering the retention basin should be designed into the system whenever possible. Pre-treatment of stormwater by using sheet flow, swales, inverse-swales, initial treatment ponds, or other measures can remove a large percentage of the pollutants (up to 90%) that are present in stormwater

Development can apply to SWFWMD for a determination if their project is required to use Karst Development Guidelines, even if in the Karst Sensitive Area. If found to not be karst sensitive by SWFWMD, the County will follow SWFWMD ruling on the development.

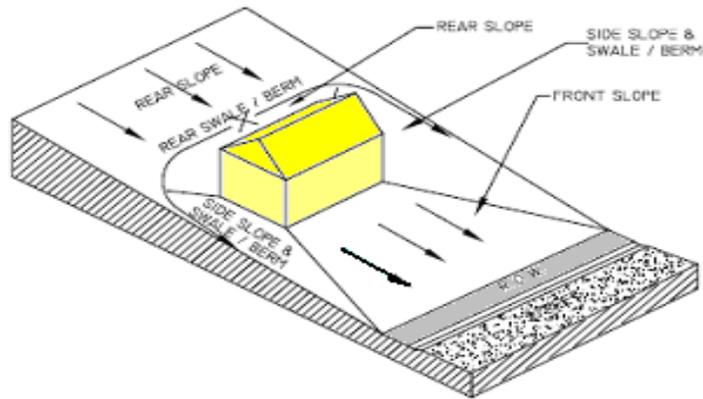
6230. BRIDGE DESIGN

All bridge design shall be in conformance with FDOT Design Specifications. It is recommended that the design of bridge structures be undertaken by engineering staff and/or subconsultants with experience in designing all phases of bridges. Bridges are used when clearance requirements for navigation, hydraulic efficiency, geometrics, constructibility, environmental concerns, costs, or aesthetics preclude the use of multiple culverts. The basic hydraulic design criteria for bridges include the frequency of the design storm event, design high water elevation, allowable backwater, vertical and horizontal clearance, and channel and abutment protection. Any variations in meeting the bridge design criteria specified in this Chapter must have prior approval in writing from the County. FDOT design criteria and procedures (FDOT Drainage Manual) should be followed unless otherwise stated in this Chapter.

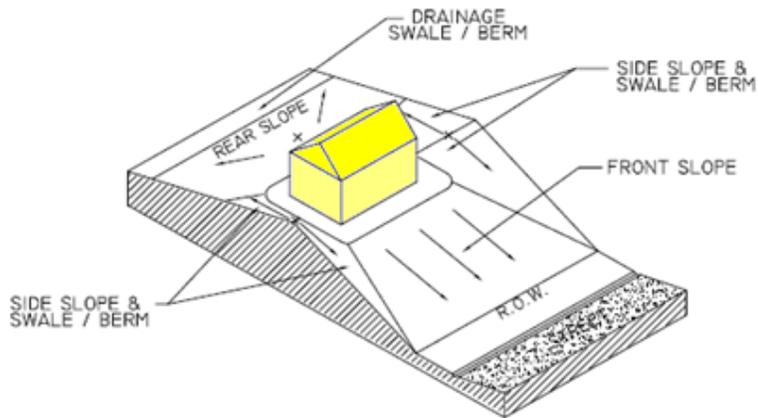
6240. NEIGHBORHOOD GRADING PLAN DESIGN PROCEDURE

A. General Recommendations

1. The design professional, in developing the neighborhood grading and drainage plan, should follow certain basic steps. The objective is to establish the street elevations, finished floor elevations and lot grades in proper relation to each other, and to the existing topography, with the goals of protecting the property from flood stages and flows, while creating an appealing and functional site.
2. The street layout is the first factor which must be considered. If the street layout is still subject to design or adjustment, it should be fitted to the existing topography with proper consideration of seasonal high water table elevations, and the existing directions of stormwater flow.
3. The second factor is to determine the grading for each separate block with reference to Lot Grading Types (A, B or C, or modifications of these types) by establishing an appropriate block cross-section to provide a suitable drainage pattern to the block collection points. Then determine any easements or other provisions needed for adequate block drainage around the selected lot types.

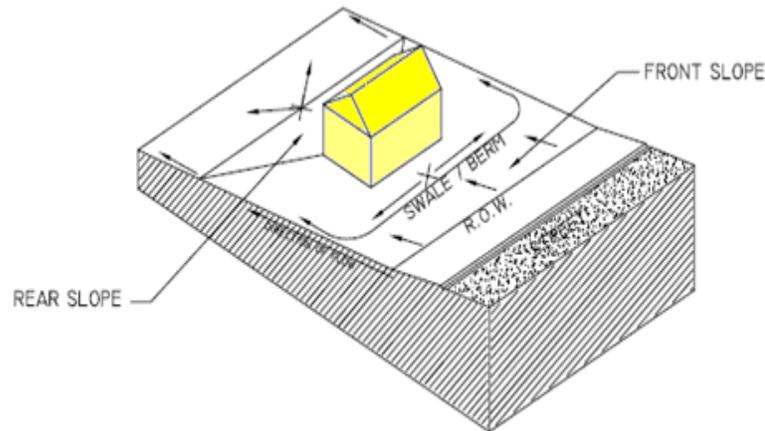


TYPE A LOT GRADING



TYPE B LOT GRADING

4. Determine the general site limitations such as the minimum gradients for grass swales based on the anticipated volume of water to be conveyed.
5. Flood Zone lines and elevations - indicate the-100 year flood elevation and delineate the area of floodplain encroachment and the proposed mitigation area, when applicable.



TYPE C LOT GRADING

6. Identify all EPC delineated wetland boundaries, and all significant habitat areas within the entire site.
7. Indicate all subbasin boundaries and outfall points and include drainage patterns denoted with flow arrows.
8. Provide a complete breakdown of the post-development Runoff Coefficients and/or Curve Numbers (CN), as applicable, and areas for all subcatchments noted within subbasin areas.
9. Provide grading plan details depicting all new elevations and contoured features to provide for flows into proposed stormwater collection system. Plan must distinguish existing and proposed elevations, structures and other drainage features.
10. Provide adequate cross-sections for each proposed block, whenever lot types change. The maximum side slope shall be no steeper than 4:1. Depict typical lot layout with approximate finish floor elevations defined in relation to proposed Block Grading on cross-section.
11. Provide adequate cross-sections of all proposed drainage swales, with the maximum side slope no steeper than 4:1, and minimum depth of six inches (6"). Indicate any modifications which must be completed with lot grading and house construction.
12. Provide yard swales, wherever applicable, between lot grading types A, B & C. Ensure adequate slopes to drain the stormwater runoff flow to roadway catch basins, or other proposed stormwater collection facilities. Include proper drainage easement for these yard swales whenever swales

run for more than a single lot. Yard swales should be dedicated to the Home Owners' Association unless they serve a County right-of way.

B. Additional Grading Plan Recommendations for vacant property

1. Excavation/Fill Requirements.

- a. The maximum side slope for any fill shall be four (4) feet horizontal to one (1) foot vertical. Adequate swales and/or other features must be shown to ensure that adjacent property is not impacted.
- b. The act(s) of stockpiling material, grading, filling, excavating and other acts affecting drainage shall not change the surface or subsurface drainage patterns to the detriment of neighboring properties or public rights-of-way.
- c. Proper erosion protection measures to control water borne and wind-blown erosion, including erosion caused by vehicles entering and leaving the site, shall be provided during all stages of construction.
- d. All disturbed areas will be permanently revegetated with sod, or seed and mulch in accordance with the FDOT Standard Specifications for Road and Bridge Construction (latest edition).

2. Special Conditions

Some project locations may require special requirements. Stormwater detention/retention, special controls and/or administrative procedures may be involved. Special requirements may be required for projects located within areas determined to be flood prone by a history of flooding. These areas include but are not limited to:

Development in Existing Low Lots - Lots that are lower than the street and receive runoff from the road and/or adjacent properties may be subject to special fill/storage requirements.

C. Erosion and Sedimentation Control Plans

The submitted plans shall contain a systematic and comprehensive erosion sedimentation control plan for both the construction phase and the completed project.

6250. ROADWAY (PAVEMENT) DRAINAGE DESIGN

A. Roadway Swales

Roadside swales within street right-of-way shall be designed as follows;

1. Front slopes no steeper than four (4) feet horizontal to one (1) foot vertical. Back slopes no steeper than three (3) feet horizontal to one (1) foot vertical.
2. Maximum roadside swale depths shall not exceed twenty-four (24) inches below the edge of shoulder.
3. Runoff may be accumulated and carried in the swales in the right-of-way, up to, but not above, the point where flooding of the shoulders or roadside property would occur. Water in excess of that quantity shall be diverted from the roadside swales and carried away by storm sewers, ditches or other approved means.
4. Roadside swales shall be sloped to drain dry, be grass seeded and mulched or sodded and comply with minimum and maximum design velocities as follows:

**Table 6-2
Allowable Velocities within Roadside Swales**

Allowable Velocity (fps)	Type of Cover
0 – 2	Grass seed and Mulching
2 – 4	Sodding
4 – 5.5	Lapped sod
5.5<	Ditch Pavement

NOTE: Grass seeding and mulching to meet current FDOT Standard Specifications

B. Sidedrain

Driveways across roadside swales may require the placement of a drainage culvert under the driveway in order not to impede flow in the swale resulting in an increase of backwater onto upstream property. The size of the sidedrain culvert shall be noted on the improvement plans for each buildable lot. Removal or modification of side drains is not allowed without prior County approval by the Department of Public Works.

C. Closed Drainage System

a. Roadway Inlets

1. Roadway inlets in curb and gutter construction shall be designed and constructed to:
 - a. Avoid abrupt changes in hydraulic slope and velocity.
 - b. Limit the quantity of storm sewer water flowing in street to a depth of two (2) inches below the crown of roadway.
 - c. Prevent design flows across street intersections.
 - d. Have formed inverts to one-half the pipe diameter.
 - e. Have pipes cut flush with the inside wall.
 - f. Have no standing water when not functioning.
 - g. Shall be designed and constructed for ease of maintenance.
 - h. No curb inlets shall be placed along curb returns unless approved by the County.
 - i. Grates within traffic areas and clear zones shall meet FDOT standards. Grates in traffic areas shall be traffic rated, chained in accordance with FDOT requirements.

6260. STORMWATER DRAINAGE SYSTEM TECHNICAL REQUIREMENTS

A. Scope

The work covered and described in this chapter includes the furnishing and construction of storm sewers, inlets, manholes, end sections and other drainage structures or drainage construction as shown or indicated on the plans.

B. Size

Minimum pipe size is 15" diameter.

C. Materials

1. Concrete Pipe

Concrete pipe shall be reinforced concrete culvert pipe conforming to ASTM Designation C 76, Table III, except when otherwise indicated. Reinforced concrete horizontal, elliptical pipe shall conform to the requirements of ASTM Designation C 507, Class HE III. Pipe joints shall be rubber gasket joints, and the pipe joint shall be manufactured to meet the requirements of the approved type of gasket to be used. Pipe joints and rubber gasket shall meet the requirements of Sections 941 and 942 of the Standard Specification. Pipe joints for elliptical concrete pipe shall be designated and detailed by the pipe manufacturer and those details shall be approved by the Project Engineer prior to installation.

2. Corrugated Metal Pipe

Corrugated metal pipe and pipe arch shall conform to the requirements of AASHTO Designation M 36, and shall be fully bituminous coated in conformance with the requirements of AASHTO Designation M 190, Type A. Pipe thickness shall meet the requirements of Section 943 of the Standard Specifications.

3. Concrete Structures

Concrete manholes, inlets, connection collars, or other structures shall be constructed in conformity with the plans. Forms shall be designed and constructed so that they may be removed without injury to the concrete and shall be left in place for at least 24 hours after concrete is poured. Concrete shall be thoroughly tamped and shall be cured for at least five (5) days after removal of forms. Honeycombed areas shall be thoroughly cleaned, saturated with water and pointed up with mortar or treated in a manner as directed by the Engineer of Record.

Precast manholes or other structures shall be approved by the Engineer of Record. Castings and frames and greats of all structures where applicable shall be placed to final grade by the use of leveling course of brick and mortar, if necessary, or may be set in mortar only provided the depth of mortar is not more than the depth of a course of brick and mortar.

4. Brick

Bricks used as permitted herein for drainage structures shall be dense, hard burned, shale or clay brick conforming to ASTM Designation C 32, Grade MM or C 62, Grade MW, except that brick absorption shall be

between 5 and 25 grams of water absorbed in one minute by dried brick, set flat face down, in 1/8 inch of water.

5. Cement Mortar

- a. For Sealing Joints shall consist of one part cement and two parts clean sharp sand to which may be added lime in the amount of not over 15 percent of the volume of cement. It shall be mixed dry and then wetted to proper consistency for use. No mortars that have stood for more than one hour shall be used.
- b. For Brick Masonry shall be one part cement and three parts clean sharp sand to which may be added hydrated lime in the amount not to exceed 10 percent of the amount of cement by volume. It shall be mixed dry and then wetted to proper consistency for use. No mortars that have stood for more than one hour shall be used

6. Castings

All castings for manhole frames, covers, steps and other purposes shall conform to the ASTM Designation A 48, Class 30. Casting shall be true to pattern in form and dimensions and free of pouring faults and other defects in positions which would impair their strength or otherwise make them unfit for the service intended. The seating surfaces between frames and covers or grates will be allowed. Lifting or "pick" holes shall be provided, but shall not penetrate the manhole cover. Casting patterns shall conform to those shown or indicated on the plans. The words STORM SEWER shall be cast in all manhole covers. All manhole frames and covers shall be traffic bearing.

6270. SCOUR AND EROSION REQUIREMENTS

- A. Protection against scour and erosion within channels, waterways, swales, ditches, and DRA/DDAs shall be provided by stone, concrete, clean broken concrete, bagged concrete riprap or sod. Concrete shall be used for larger structures additional techniques that may be used are listed below:
 1. Paved swales, ditches, channels, or channel side slopes using concrete or riprap.
 2. Sod cover in swales and ditches.
 3. Wide channels with shallow bottom slopes using check dams.

4. Culverts with a break in grade to hold outlet velocity within the allowable limits. When this method is employed, the position of the hydraulic jump must be determined to ensure uniform flow occurring within the culvert.
- B. The development shall not allow erosion to affect or damage any adjacent areas. The Engineer of Record shall show on the plans the proposed method of erosion control to be used within the development during construction.
 - C. The developer's engineer must design sediment basins, velocity checks, hydroseeding applications, etc., to confine all erosion within the limits of the developed site.
 - D. Design of channels, streams, ditches and any other waterways shall be based on current open channel design procedures using Manning's Formula and/or other methods as accepted by good engineering practices. Design velocities without erosion protection shall not exceed the maximum set for soil types by the FDOT. Design levels shall not exceed top of banks for the required design storm. Runoff and roughness coefficients, safe velocities, nomography, erosion control and practical limitations on use of design formulas shall be based on current practice in the field of hydraulics notwithstanding any requirements of this section.
 - E. Developments that result in removal of soil from the site with the potential of causing an adverse impact to the County roadway network, may be required to obtain a Haul Route permit through the Right-of-way permit process, as determined by staff.



6300. NONRESIDENTIAL DESIGN CRITERIA

6305. SCOPE AND PURPOSES

All proposals for development shall include detailed drainage plans and calculations to be submitted for the review and approval of the County.

6310. DEVELOPMENT PERMIT REQUIREMENTS

For all properties, 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.

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

The County review to ensure no adverse offsite impacts to surrounding properties are created, including degradation of water quality.

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 Citrus County.

A. General Provisions

1. A stormwater management system review will be required for all of the following types of developments:
 - a. Non-residential, meeting requirements of standard general permit for systems, noticed general, or exemption of SWFWMD
 - b. Industrial
 - c. Multifamily as defined in this Code
 - d. Platting, and exceptions to platting, as defined in this Code
2. All stormwater management systems designs shall include water quantity/quality treatment in accordance with the rules and regulations of

the SWFWMD and FDEP, and any other federal/state/local agency having jurisdiction.

3. Provisions shall be included in the site development construction plans to control soil erosion and sedimentation both during and after the construction phase of the development.
4. Low Impact Development (LID) strategies and technologies are encouraged for new and existing development. Site designers are encouraged to use a treatment train approach to reduce, manage, and treat stormwater runoff on the site. Principles that the designer should consider include, but are not limited to:
 - a. Use of existing site assets that provide natural water quality and quantity attenuation and treatment.
 - b. Minimize generation of stormwater and especially flows from directly connected impervious areas.
 - c. Distributed retention, detention, treatment, and infiltration of runoff areas and systems.
 - d. Minimize site disturbances, land clearing, and compaction of soils, through low-impact clearing, grading, and construction practices.
 - e. Use of permeable pavement, geoblock, and other permeable surfaces for driving, and walking areas.
5. Impervious areas are land surfaces which do not allow, or minimally allow, the penetration of water. Impervious areas may include, but are not limited to:
 - Buildings
 - Asphalt surfaces
 - Concrete
 - Ponds (at top of bank location)
 - Shell
 - Limerock

Stone, rock, gravel, geoblock, permeable pavers and any other “permeable surface” can be reviewed for approval* as a partial permeable surface by the Technical Services Division with the following stipulations:

- Signed and sealed construction drawings showing cross section of material and subgrade.
- Post construction Engineer of Record approval of construction.

- Maintenance plan and owner signed certification to maintain the permeable surface.
- Percentage of pervious area will be decided upon review by staff.

*If the proposed project receives an Individual or Standard General ERP (not including Minor System) from SWFWMD or DEP and permeable surface is approved by the reviewing agency we will approve it also.

6. Any property in the Drainage System will require permission from the property owner.
7. Conveyance Systems for parking lots shall be designed with minimum 10yr/24hr storm event unless reasoning for an alternative criteria is provided and is acceptable to the County.
8. Nonresidential development that accesses an unclassified county road shall either upgrade the portion of the roadway to County Roadway standards or provide testing and survey results indication that the roadway meets these requirements.

B. Finished Floor Elevation Requirements

Finished floor elevations shall be at or above the appropriate FEMA 100-year flood elevation. Criteria for the minimum finish floor elevation can be found in the most currently adopted copy of the Florida Building Codes.

C. General Grading and Excavation Requirements

1. General Grading

Sites must be graded such that all stormwater runoff drains in a manner no worse than that which occurred during the predevelopment condition along private property boundaries, with any excess runoff directed to the nearest public right-of-way or drainage facility having capacity, without crossing or causing detrimental impact to adjacent property.

The proposed work must comply with the following requirements:

- a. Side Slope - Unless restrained by an adequate retaining wall terracing or other accepted stabilizing method, the maximum side slope for any fill shall be three (3) feet horizontal and one (1) foot vertical.
- b. Erosion Control - All sites must have an erosion control plan addressing waterborne erosion, windblown erosion, and sediment deposited by vehicles entering or leaving the site. In all instances, the plan must remain in effect until the site is permanently vegetated.

2. General Excavation and Pond Requirements

Proposed excavation must comply with the following requirements. Standards for mines and borrow pits are not addressed in this Section.

- a. Side Slope – Side slopes shall not promote erosion, shall be easily maintainable, grassed and shall be appropriate for the soil conditions. The maximum allowable side slope for a drainage retention/detention area without a fence is one (1) foot vertical to four (4) feet horizontal.
- b. Fencing - The fence shall be a County approved and be constructed along the outer perimeter and on top of the maintenance berm.

D. Development Within Floodprone and Restricted Areas

1. Equivalent Storage within Flood Prone Areas

The storage capacity of the floodplain must be preserved. In order to ensure that any proposed development will not decrease the FEMA designated floodplain storage capacity of stormwater conveyance systems, all development will be evaluated for compliance with the following:

No earth fill or structure may be placed within a FEMA-designated flood plain area unless an equal amount of flood storage volume is created by excavation below the base flood elevation and above the seasonal high groundwater table elevation. In those cases where the provided flood storage compensation volume is to be located contiguous with an existing surface water body, the seasonal high surface water elevation, rather than groundwater table, elevation shall be used as the lower limit reference. An exception to these criteria may be provided for large sites (greater than 10 acres) if it is demonstrated by computer modeling that the timing is such that all of the required attenuation and compensation volumes can be provided by the same storage area. If timing is utilized, the computer model must also demonstrate that full recovery of the required attenuation volume can be achieved, by gravity flow, within 72 hours after the storm event.

E. Drainage Patterns

Notwithstanding the issuance of a Development Order by the County the act(s) of stockpiling material, grading, excavating, and other act(s) impacting drainage shall not change the historic surface drainage patterns of rights-of-way.

F. Functional Stormwater System

During all phases of construction, all stormwater entering, leaving, or flowing through construction sites shall be controlled in a manner consistent with the approved stormwater management plan and shall not adversely impact the drainage of the adjacent properties.

G. Permits for Work in Public Rights-of-Way

Any work within public rights-of-way or easements shall require a right-of-way utilization permit.

H. Protection of County Stormwater Management Systems

Permanent structures or improvements such as, but not limited to, sidewalks, driveways, impervious surfaces, patios, decks, air conditioners, structures, utility sheds, poles, signs (per LDC regulations), fences, sprinkler systems, trees, shrubs, hedges, landscaping plants (other than grass), concrete foundations, pools, walls or buildings may not be constructed in any County drainage easements, except for the landscaping of stormwater detention and retention ponds as required by the Land Development Code. If in the process of retrofitting, replacing and/or otherwise maintaining a stormwater management facility within drainage easements, an illegally constructed permanent structure(s) or improvement(s) is encountered, the cost of removal and replacement (elsewhere) of the structure or improvement shall be borne by the developer or affected property owner.

I. Discharge to Sinkholes

Citrus County shall protect the surface water quality of springs, spring runs, and sink holes open to the aquifer. (Refer to the Surface Water Protection of Springs, Spring Runs and Open Sinkholes standards of the Citrus County Comprehensive Plan for details)

J. Maintenance of Private Drainage Facilities

Any portion of a drainage system, including onsite and offsite facilities located in easements and/or rights-of-way, that is specifically constructed to serve a

particular development will be continuously maintained by the owner(s) or an entity identified by the developer such as a homeowner's association.

K. Developments in 100-year Floodplains

1. Criteria for Development

- a. The criteria for development in 100-year floodplains shall pertain to all such floodplains and not be limited to just those floodplains identified on FIRM maps. Areas which convey or store stormwater may have an associated 100-year floodplain due to stormwater runoff and flows, including those conveyance and storage facilities in storm surge areas. The Engineer-of-Record shall be responsible for determining the on-site 100-year flood elevations if not defined by a FEMA study. The Engineer of Record is required to submit a Letter of Map Amendment or Map Revision to FEMA for any changes in flood zone designations as determined by a detailed study of the area.
- b. No development (structures or fill) shall be allowed in the conveyance portion of any 100-year frequency floodplain associated with a freshwater stream, channel, lake or waterway (Floodways) unless provisions are made to compensate for any reduction in conveyance caused by the development, or a certification of no-rise certificate is submitted and approved by the County and FEMA if necessary.

No development (structures or fill) shall be allowed in any 100-year frequency non-tidal floodplain and any floodplain associated with riverine flooding in a tidally influenced area unless provisions are made to compensate for the reduction in storage volume due to the proposed development.

- c. Any compensation storage volumes shall be provided in addition to stormwater detention or retention volumes otherwise required to reduce peak runoff rates from the development. An exception to this criteria may be provided for large sites (greater than 10 acres) if it is demonstrated by computer modeling that the timing is such that all of the required attenuation and compensation volumes can be provided by the same storage area. If timing is utilized, the computer model must also demonstrate that full recovery of the required attenuation volume can be achieved, by gravity flow, within 72 hours after the storm event.
 - 1) No fill shall be placed within a 100-year floodplain area unless an equal amount of flood storage volume is created by excavation below the 100-year flood elevation and above the controlled seasonal high groundwater table elevations. In those cases where

the provided flood storage compensation volume is to be located contiguous with an existing surface water body, the seasonal high surface water elevation, rather than groundwater table, elevation shall be used as the lower limit reference. An exception to this criteria may be provided for large sites (greater than 10 acres) if it is demonstrated by computer modeling that the timing is such that all of the required attenuation and compensation volumes can be provided by the same storage area. If timing is utilized, the computer model must also demonstrate that full recovery of the required attenuation volume can be achieved, by gravity flow, within 72 hours after the storm event.

2) Exceptions shall be allowed if the floodplain is associated with a landlocked waterbody and is under one ownership.

d. No encroachment shall be allowed in a regulatory floodway, as designated on the FEMA Floodway Maps, unless approved by FEMA and accepted by Citrus County.

e. If proposing to build any obstructions, not including fill less than 2 feet under a building, in a Velocity or Coastal A Zone, the applicant shall submit an engineering analysis, showing the proposed obstructions will not cause wave deflection, and adverse effects

2. Interagency Jurisdiction

All improvements shall be in conformance with FEMA requirements, unless a more restrictive requirement applies.

6320. STORMWATER DRAINAGE SYSTEM DESIGN REQUIREMENTS

A. General

The system shall be designed for water quality, and quantity resulting from storm events of the following frequencies or runoff volumes.

B. Water Quality

1. Stormwater runoff shall be treated in accordance with all applicable guidelines as established in the Florida Statutes, Florida Administrative Code, Citrus County Comprehensive Plan, and the Basis of Review of the Environmental Resource Permit and this document.

2. At a minimum, Water Quality for three-quarters (3/4") (additional 50 percent) inch of runoff from the developed areas that discharge into Outstanding Florida Waterbodies and one-half (1/2) inch of runoff from the developed area of all other basins shall be required for all systems.

3. If offsite runoff is not prevented from combining with onsite runoff prior to treatment, then treatment shall be provided for the entire combined offsite and project runoff. However, if offsite runoff has been prevented from combining with onsite runoff, then the drainage from the offsite up gradient areas shall not be adversely altered, i.e.: time of travel, volume, rate, point or manner of discharge and water quality.

C. Water Quantity

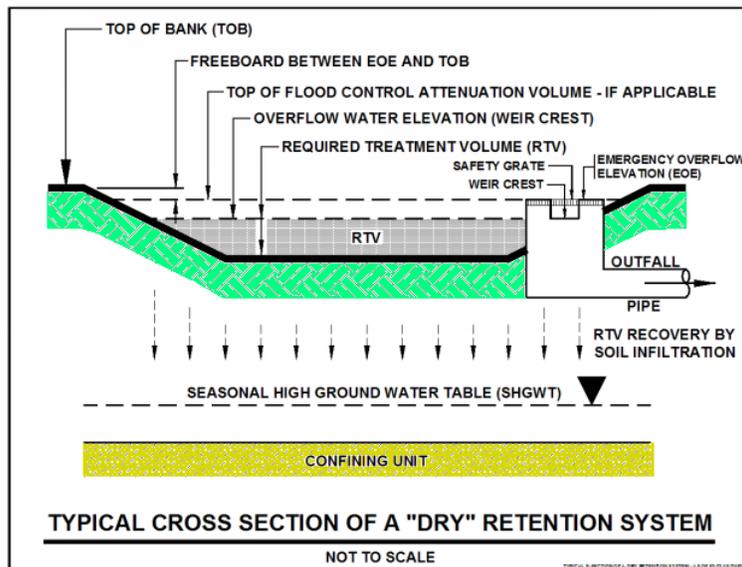
SWFWMD Water Quantity criteria from the Basis of Review of the Environmental Resource Permit shall be adhered to.

D. Design Storm Events

Citrus County Design rainfall amounts to be used are 100 yr./24-hour storm event = 11.50 inches. 25 year / 24-hour storm event = 8.64 inches.

General Design Criteria for Detention/ Retention Ponds

1. For the design of detention ponds, the design storm event peak discharge expected for the undeveloped site due to rainfall shall not be exceeded by the peak discharge from the developed site due to a design storm event rainfall.



2. Calculation of the peak discharge from the undeveloped site shall consider the effect of existing storage in attenuating this peak. Pre- and post-development initial elevations for estimating storage shall be the seasonal high water elevation (as determined by geotechnical and biological

indicators or other suitable methods), and controlled seasonal high water elevation, respectively.

3. A stormwater routing and mounding analysis is required for the design of all detention ponds. A routing analysis is also required for retention ponds where percolation is considered during the runoff event. Tailwater conditions must be considered in the routing calculations.
4. If the design high water of a pond is proposed to be above the ground surface adjacent to or in the vicinity of the pond area, a geotechnical analysis to certify that there will be no adverse impacts due to potential seepage, or from induced seepage slopes, will be required. If there appears to be seepage, or the analysis is not completed, a clay liner or other methods shall be utilized.
5. The detained or retained runoff storage volume required for the design storm event is to be stored entirely in the pond. Freeboard containment shall be provided by the pond berms and the banks of any hydraulically connected ditch or swale. This shall also be inclusive of perimeter ditches/swales serving subdivisions. The runoff associated with the 100 year/24-hour event shall be routed through the detention/retention pond to establish the floodproofing elevation (commercial sites only). The routing analysis shall also confirm that the pond is not overtopped for the 100 year/24-hour event.
6. For all sites, the maximum side slope for retention/detention areas shall be no steeper than 4:1; however, steeper slopes may be allowed if the entire area of the pond shall be protected with county approved fence, or equivalent safety feature and be constructed along the outer perimeter and on top of the maintenance berm. Ingress and egress for pond maintenance shall be provided, but restricted by lockable gates of adequate size to allow for the easy passage of necessary maintenance equipment.
7. Recovery of water quality attenuation for detention/retention ponds is required 72 hours after the end of the storm event.
8. The pond maintenance area shall establish a full stand of perennial grass within the specified areas.
9. All slopes for retention and detention ponds shall establish a full stand of perennial grass within the specified areas.
10. Double ring infiltrometer test or approved equal.

11. Certified Soil Borings shall be provided for each DRA/DDA. Soil borings shall be extended to a depth of 10 feet below the bottom of the proposed pond. The boring(s) need to provide a soil profile and determination of the seasonal high water elevation.

The number of borings required for each DRA shall be calculated by the following formula.

$$B = 1 + \sqrt{2A} + \frac{L}{2\pi W}$$

B = Number of borings required (round to nearest whole number)

A = Average area of pond in acres

L = Length of pond, in feet

W = width of pond, in feet

π = pi(3.14)

12. Seasonal High Groundwater Table (SHGWT) Elevation

- f. At locations proposed to be utilized as ponds, the seasonal high groundwater table elevation shall be determined using borings or the Soil Survey of Citrus County, Florida and acceptable engineering practices, based upon the Natural Resources Conservation Service (NRCS) methodologies and be signed and sealed by a qualified engineer. The results shall be included in an original certified subsoil investigation report provided to Citrus County. The following factors should also be considered:
 - g. Existing soil conditions (spodic stainlines, where applicable)
 - h. Measured groundwater levels
 - i. Measured water levels surrounding water bodies
 - j. This elevation shall be included in the design plans.
 - k. No storage credit will be given below the controlled seasonal high groundwater table elevation.

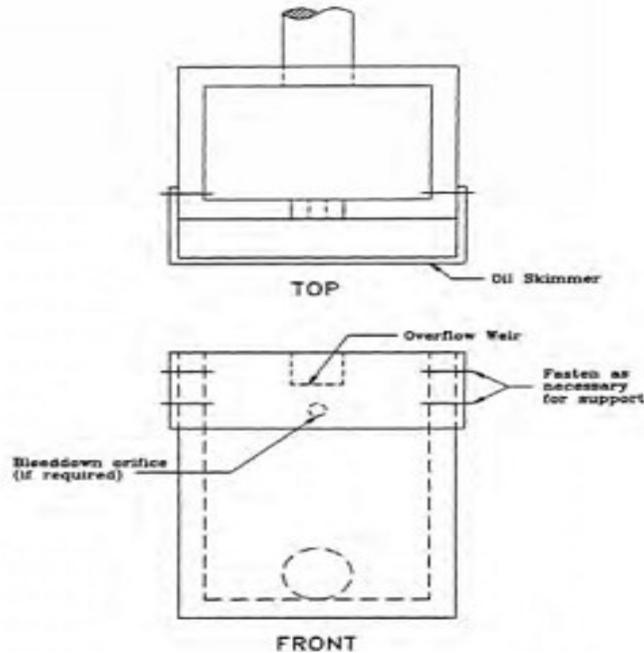
13. All supporting information and calculations described above shall be included within the Stormwater Pollution Prevention Plan (SWPPP). Erosion and sedimentation control plans shall be submitted and contain a systematic and comprehensive erosion sedimentation control plan for both the construction phase and the completed project.

14. Proposed temporary and permanent erosion and sediment control plans shall be submitted with each application for development approval. These plans shall specify in detail the erosion and sedimentation control measures to be used during all phases of clearing, grading, filling, construction and permanent development, and accurately describe their proposed operation. In addition, these plans shall be in accordance with the latest applicable specifications and recommendations as contained in the Florida Department of Environmental Protection's (FDEP's) publication, "*The Florida Stormwater Erosion and Sedimentation Control Inspectors Manual*", latest edition.

15. No clearing, grading, excavation, filling, or other disturbing of the natural terrain will be permitted until FDEP-approved erosion and sediment control measures have been installed, except those operations needed to implement these measures. All erosion and sediment control measures shall be continuously maintained during the construction phase of the development.

16. Water Level Control Structures

- a. The outlets of detention ponds shall have water level control structures that enable the ponds to function as indicated in the hydraulic calculations.
 - 1) A water level control structure shall not be a pipe riser and shall not be adjustable.
 - 2) Acceptable water level control structures include:
 - a) A modified ditch bottom inlet structure constructed in accordance with the Florida DOT Roadway and Traffic Design Standards and the FDOT Standard Specifications for Road and Bridge Construction (latest editions).
 - b) Level control weir - sufficient details shall be provided for the County to review the structural/hydraulic design.
- b. All control structures shall be designed to prohibit the entrance of floating debris into the structure. A hydraulic design of the device will be required to ensure that the skimming device will not control pond discharge.



Typical Debris Skimmer Detail for Outfall Structure

- c. For wet pond design, the control structure shall have a slot or orifice design for purposes of attenuation.
- d. Pond control structures are not to be placed within road rights-of-way.
- e. Detention Pond Outfall Control Design

Direct discharge by means of control structures into storm drains or through culverts will be permitted if the receiving systems have the capacity for such discharges.

E. Natural Depressed Areas

1. Natural depressed areas located entirely within the project boundaries may be used for stormwater management purposes when not adversely affecting off-site water levels.
2. Natural protected areas in a stormwater management are shall be protected by an easement.

F. Retention Ponds - Design Criteria for Retention Ponds

SWFWMD criteria shall be followed for retention pond design.

G. Karst Development

Stormwater systems shall be designed to prevent direct discharge of untreated stormwater into the Floridian Aquifer. The County has adopted a Karst Sensitive Area Map in the Comprehensive Plan, and contained herein.

Development in karst sensitive areas must meet the additional design criteria of:

1. A minimum of three feet of unconsolidated soil material between the surface of the limestone bedrock and the complete extent of the bottom and sides of the stormwater basin. Excavation and backfill of unconsolidated soil material shall be conducted, if necessary to meet these criteria. As an alternative, an impermeable, permanent and suitably protective liner (e.g., clay, geotextile membrane, or other proven method) can be used to ensure that stormwater is isolated from communication with ground water (e.g., for wet detention). This provision is presumed to provide reasonable assurance of adequate treatment of stormwater before it enters the Floridan Aquifer System.
2. To reduce the potential for solution pipe sinkhole formation caused by a large hydraulic head, stormwater storage areas and basin depths shall not exceed 10 feet (shallower depths are encouraged) and shall have a horizontal bottom (no deep spots);
3. Fully vegetated basin side slopes and bottom (if not a wet pond) planted with turf grass or other appropriate vegetation suitable for growing in the conditions in which it is planted
4. Pre-treatment of stormwater prior to entering the retention basin should be designed into the system whenever possible. Pre-treatment of stormwater by using sheet flow, swales, inverse-swales, initial treatment ponds, or other measures can remove a large percentage of the pollutants (up to 90%) that are present in stormwater.

Development can apply to SWFWMD for a determination if their project is required to use Karst Development Guidelines, even if in the Karst Sensitive Area. If found to not be karst sensitive by SWFWMD, the County will follow SWFWMD ruling on the development.

6330. STORM DRAINAGE SYSTEM TECHNICAL REQUIREMENTS

A. Scope

The work covered and described in this chapter includes the furnishing and construction of storm sewers, inlets, manholes, end sections and other drainage structures or drainage construction as shown or indicated on the plans.

B. Materials

1. Concrete Pipe

Concrete pipe shall be reinforced concrete culvert pipe conforming to ASTM Designation C 76, Table III, except when otherwise indicated. Reinforced concrete horizontal, elliptical pipe shall conform to the requirements of ASTM Designation C 507, Class HE III. Pipe joints shall be rubber gasket joints, and the pipe joint shall be manufactured to meet the requirements of the approved type of gasket to be used. Pipe joints and rubber gasket shall meet the requirements of Sections 941 and 942 of the Standard Specification. Pipe joints for elliptical concrete pipe shall be designated and detailed by the pipe manufacturer and those details shall be approved by the Project Engineer prior to installation.

2. Corrugated Metal Pipe

Corrugated metal pipe and pipe arch shall conform to the requirements of AASHTO Designation M 36, and shall be fully bituminous coated in conformance with the requirements of AASHTO Designation M 190, Type A. Pipe thickness shall meet the requirements of Section 943 of the Standard Specifications.

3. Concrete Structures

Concrete manholes, inlets, connection collars, or other structures shall be constructed in conformity with the plans. Forms shall be designed and constructed so that they may be removed without injury to the concrete and shall be left in place for at least 24 hours after concrete is poured. Concrete shall be thoroughly tamped and shall be cured for at least five (5) days after removal of forms. Honeycombed areas shall be thoroughly cleaned, saturated with water and pointed up with mortar or treated in a manner as directed by the Engineer of Record.

Precast manholes or other structures shall be approved by the Engineer of Record. Castings and frames and greats of all structures where applicable shall be placed to final grade by the use of leveling course of

brick and mortar, if necessary, or may be set in mortar only provided the depth of mortar is not more than the depth of a course of brick and mortar.

4. Brick

Bricks used as permitted herein for drainage structures shall be dense, hard burned, shale or clay brick conforming to ASTM Designation C 32, Grade MM or C 62, Grade MW, except that brick absorption shall be between 5 and 25 grams of water absorbed in one minute by dried brick, set flat face down, in 1/8 inch of water.

5. Cement Mortar

- a. for Sealing Joints shall consist of one part cement and two parts clean sharp sand to which may be added lime in the amount of not over 15 percent of the volume of cement. It shall be mixed dry and then wetted to proper consistency for use. No mortars that have stood for more than one hour shall be used.
- b. for Brick Masonry shall be one part cement and three parts clean sharp sand to which may be added hydrated lime in the amount not to exceed 10 percent of the amount of cement by volume. It shall be mixed dry and then wetted to proper consistency for use. No mortars that have stood for more than one hour shall be used

6. Castings

All castings for manhole frames, covers, steps and other purposes shall conform to the ASTM Designation A 48, Class 30. Casting shall be true to pattern in form and dimensions and free of pouring faults and other defects in positions which would impair their strength or otherwise make them unfit for the service intended. The seating surfaces between frames and covers or grates will be allowed. Lifting or "pick" holes shall be provided, but shall not penetrate the manhole cover. Casting patterns shall conform to those shown or indicated on the plans. The words STORM SEWER shall be cast in all manhole covers. All manhole frames and covers shall be traffic bearing.

6340. SCOUR AND EROSION REQUIREMENTS

A. General

1. Protection against scour and erosion within channels, waterways, swales, ditches, and DRA/DDAs shall be provided by stone, concrete, clean broken concrete, bagged concrete riprap or sod. Concrete shall be used

for larger structures. Additional techniques that may be used are listed below:

- a. Paved swales, ditches, channels, or channel side slopes using concrete or riprap.
 - b. Sod cover in swales and ditches.
 - c. Wide channels with shallow bottom slopes using check dams.
 - d. Culverts with a break in grade to hold outlet velocity within the allowable limits. When this method is employed, the position of the hydraulic jump must be determined to ensure uniform flow occurring within the culvert.
2. The development shall not allow erosion to affect or damage any adjacent areas. The Engineer of Record shall show on the plans the proposed method of erosion control to be used within the development during construction.
 3. The developer's engineer must design sediment basins, velocity checks, hydroseeding applications, etc., to confine all erosion within the limits of the developed site.
 4. Design of channels, streams, ditches and any other waterways shall be based on current open channel design procedures using Manning's Formula and/or other methods as accepted by good engineering practices. Design velocities without erosion protection shall not exceed the maximum set for soil types by the FDOT. Design levels shall not exceed top of banks for the required design storm. Runoff and roughness coefficients, safe velocities, nomography, erosion control and practical limitations on use of design formulas shall be based on current practice in the field of hydraulics notwithstanding any requirements of this section.
 5. Developments that result in removal of soil from the site with the potential of causing an adverse impact to the County roadway network, may be required to obtain a Haul Route permit through the Right-of-way permit process, as determined by staff



6400. RESIDENTIAL PERMITTING

6405. SCOPE AND PURPOSES

The purpose for review is to:

- A. Safeguard against adverse consequences of uncontrolled or misdirected surface water drainage, degradation of wetlands and transition areas, the altering of the historical drainage pattern of land, pollution of water bodies and negative impact by development on public lands, and State and County rights of-way;
- B. Ensure compliance with regulations concerning disturbance of sloped areas, swales, berms and/or other storm water conveyances, flood hazard areas, protection of trees, the integrity of easements, conservation areas and storm water detention/retention facilities;
- C. Provide for safe and suitable location of driveways, proper geometry, alignment and entrance features for driveways, efficient and safe accessibility by emergency vehicles, proper installation of utilities and utility connections, methods for suitable collection, storage and disposal of trash and debris, and advancement of the intent and purposes of land use planning; and
- D. Promote and protect the health, safety, and welfare of the citizens of Citrus County by guiding the conduct of new construction in such a manner as to direct attendant storm water drainage into public or private facilities, or detained on-site rather than onto the land of adjoining property.

6410. LOT DEVELOPMENT REVIEW

Prior to the issuance of a residential construction permit (building permit) by the Building Division, a review of the stormwater management system for the entire development site will be conducted for any of the following:

- A. A new primary structure on a parcel of land less than 10,000 sq. ft. in an existing subdivision, which does not have an existing master plan of development or site development plan on file with the County,
- B. Any new structure on a waterfront lot.

Placing fill on either of the above lot types without a building permit also requires a Lot Development Review.

The review will be conducted concurrent with the issuance of the Building Permit.

For the purpose of this Chapter, “developed lot” and “undeveloped lot” shall be defined as follows:

DEVELOPED LOT - Any lot upon which a principal structure is located.

UNDEVELOPED LOT - Any lot upon which no principal structure is presently located.

Whenever preliminary subdivision approval or site development plan has been granted, each lot shown upon the subdivision plat which does not have a principal structure located thereon shall be deemed a separate undeveloped lot.

6420. GENERAL REQUIREMENTS

A. Review Procedure

A site drainage plan shall be submitted with the building permit application online. If the submittal is not an online permit, submit three (3) paper copies.

Upon a determination of compliance, the County Technical Services Division, or its successor, will notify the Building Division. If disapproved, the applicant shall be notified with a written statement for the reasons of disapproval.

B. Plan Details

1. For lots meeting the requirements of 6410.a (10,000 sq.ft. or less lot size) the grading and drainage plan does not have to be done by a licensed professional engineer and shall provide all items on list below.
 - a. Lots shall be designed and constructed with adequate drainage, such that no adverse impacts to adjacent properties are demonstrated.
 - b. The location of all existing and proposed structures, including, but not limited to, buildings, swimming pools, decks, patios, walkways, walls, fences and other impervious areas.
 - c. The location, and dimensions for any existing or proposed driveway aprons, driveways, parking and onsite turnaround areas.
 - d. Finished floor elevations for all proposed structures that contain living area. The finished first floor elevation shall be one (1) of the following, whichever is higher:
 - 1) The finished first floor elevation shall be at a minimum of twelve (12) inches above the highest point of the adjacent roadway, or as approved by a finish floor elevation waiver.
 - 2) FEMA 100 year flood. The finished floor elevation shall meet or exceed the most recent edition of the Florida Building Code.

NOTE: There may be additional standards as outlined in Chapter 18 of the Citrus County Code or Ordinances and/or the Florida Building Codes.

- e. All intended lot grading, cutting and/or filling shall be represented by sufficient information to depict the proposed conditions, such as spot elevations, or contour lines at a corresponding one foot intervals. Assumed elevations cannot be used. Include changes in drainage patterns, drainage swales, structures, piping, or retaining structures. The proposed drainage flow shall be illustrated by use of directional arrows.
- f. A typical swale and/ or berm cross-section shall be provided, if used in the design of the drainage system.
- g. Rainwater from roof valleys, downspouts, scuppers, or other rainwater collection devices shall not directly impact adjacent parcels of land.
- h. All soil erosion and sediment control methods shall be implemented.

- i. The ground immediately adjacent to all foundations shall be sloped away from the structure in compliance with the Florida Building Codes.
 - j. Slopes:
 - 1) Graded slopes, within areas utilized for drainage, shall be stable and shall have a maximum ratio of three (3) to one; however, a slope of four (4) to one is preferable where conditions permit in order to achieve a slope with better aesthetic and maintenance characteristics.
 - 2) The top of a cut or the bottom of a fill shall not adversely affect adjacent properties.
 - 3) Slopes permitted by the for septic system installations are allowed. Citrus County Environmental Health Department.
2. For lots meeting the requirements of 6410.b, the grading and drainage plan shall be prepared by a professional engineer or architect licensed in the State of Florida and shall provide all items on list below.
- a. The grading and drainage plan shall be drawn to a scale of not less than one inch equals 30 feet and prepared in sufficient detail to show the design.
 - b. Lots shall be designed and constructed with adequate drainage, such that no adverse impacts to adjacent properties are demonstrated.
 - c. Map showing all areas within 100 feet of the lot which is the subject of the intended improvement. A recent aerial is sufficient.
 - d. A topographic map of the subject property, including lands twenty (20) feet beyond the boundary of subject lot, and adjoining public and/or private streets, showing one foot contour intervals. This information is available on the Citrus County Board of County Commissioners Website. When deemed necessary by the County, the map shall contain additional topographic information including data and contours relative to adjacent lands 100 feet beyond subject property.
 - e. The location of any waterbodies, storm sewers, wetlands, floodplain, FEMA flood elevation, storm drainage detention and retention structure or areas, easements or drainage facilities which relate to drainage of storm waters emanating from or affecting the subject property.
 - f. The location and details of any proposed storm sewers, ditches, swales, dry wells, detention and retention facilities or other drainage facilities which are designed to dispose of storm waters from the subject property.

- g. The individual lot drainage scheme shall be designed to minimize adverse impacts to adjacent properties.
- h. Store onsite the first one-half (0.5) inch of rainfall from the developed area, or if discharging to an Outstanding Florida Water, the first three-quarters (0.75) inches of rainfall from the developed area, or an equivalent Best Management Practice (BMP).
 - 1) Recordable Affidavit – An affidavit documenting the construction of BMP must be recorded with the Clerk of Courts of Citrus County.
 - 2) Inspection – An inspection of the BMP must be certified by a professional engineer or architect and submitted to the County Stormwater Section every five (5) years to ensure the system is operating as designed.
- i. The location of all existing and proposed structures, including, but not limited to, buildings, swimming pools, decks, patios, walkways, walls, fences and other impervious areas. In addition, the plan shall show all required building setback lines.
- j. The location, and dimensions for any existing or proposed driveway aprons, driveways, parking and onsite turnaround areas.
- k. Finished floor elevations for proposed structures that contain living area. The finished first floor elevation shall be one (1) of the following, whichever is higher:
 - 1) The finished first floor elevation shall be at a minimum of twelve (12) inches above the highest point of the adjacent roadway, or as approved by a finish floor elevation waiver.
 - 2) FEMA 100 year flood. The finished floor elevation shall meet or exceed the most recent edition of the Florida Building Code.

NOTE: There may be additional standards as outlined in Chapter 18 of the Citrus County Code or Ordinances and/or the Florida Building Codes.

- l. Water supply wells, overhead and underground utility lines, and subsurface sewage disposal systems.
- m. All intended lot grading, cutting and/or filling shall be represented by sufficient information to depict the proposed conditions, such as spot elevations, or contour lines at a corresponding one foot intervals. Include changes in drainage patterns, drainage swales, structures, piping, or retaining structures. The proposed drainage flow shall be illustrated by use of directional arrows.

- n. A typical swale and/or berm cross-section shall be provided, if used in the design of the drainage system.
 - o. Rainwater from roof valleys, downspouts, scuppers, or other rainwater collection devices shall not directly impact adjacent parcels of land.
 - p. All soil erosion and sediment control methods shall be implemented.
 - q. The ground immediately adjacent to all foundations shall be sloped away from the structure in compliance with the Florida Building Codes.
 - r. Slopes:
 - 1) Graded slopes, within areas utilized for drainage, shall be stable and shall have a maximum ratio of three (3) to one; however, a slope of four (4) to one is preferable where conditions permit in order to achieve a slope with better aesthetic and maintenance characteristics.
 - 2) The top of a cut or the bottom of a fill shall not adversely affect adjacent properties.
 - 3) Slopes permitted by the Citrus County Environmental Health Department for septic system installations are allowed.
 - s. If proposing to place fill in a 100 year flood plain, applicant shall submit the flood plain compensation plan and calculations.
 - t. If proposing to build any obstructions, not including fill less than 2 feet under a building, in a Velocity or Coastal A zone, the applicant shall submit an engineering analysis, showing the proposed obstructions will not cause wave deflection, and adverse effects.
3. In addition, the grading and drainage plan shall specify and contain any improvements required under the terms and conditions of prior subdivision or site plan approval, which have not been installed at the time the application for a Development Order is made.
 4. All required swales and other conveyance systems must be in place during construction and maintained during the course of construction until final inspections have been made and construction approved.
 5. Drainage improvements cannot directly impact wetlands.

C. Inspection

1. A final lot grading inspection will be required.

2. Additional inspections during construction may be necessary if site conditions require, ensuring no adverse effects occur to surrounding properties or right of ways.

D. Certificate of Compliance

A Certificate of Compliance shall be granted once the property has passed an inspection by County personnel.

In the event that the County determines the conditions do not permit the completion of the required work to effectuate full compliance with the plan and there exists no danger to the health, safety and welfare of the public, the County may issue a temporary Certificate of Compliance.

E. Finish Floor Elevation Waiver

1. Residential houses where the finished first floor elevation of the structure is less than twelve (12) inches above the highest point of the adjacent roadway are required to obtain a Finish Floor Elevation (FFE) Waiver.
The finished floor shall be at a minimum no lower than the FEMA 100-year flood elevation. (Refer to Chapter 18, Citrus County Code, for more information about FEMA/flood plain requirements).
2. FFE Waiver lots shall be graded to prevent redirecting stormwater onto adjacent properties or onto the residential structure itself. Stormwater shall be directed to natural drainage areas, county right of way, drainage retention areas, or existing stormwater infrastructure.
3. The Waiver application shall consist of
 - a. The acceptable justification why the required elevation above the highest point of the adjacent road cannot be obtained. If stating a financial justification, the cost of using fill has to be demonstrated to be excessively disproportionate to the cost of the development.
 - b. Elevation of the highest point of the adjacent road. Assumed elevations are not acceptable.
 - c. Proposed Finish Floor Elevation. Assumed elevations are not acceptable.
 - d. Existing elevations on the site. Assumed elevations are not acceptable.
 - e. Existing stormwater flow path or topographic contours
 - f. Proposed site design, including but not limited to
 - g. Location of slab
 - h. flow arrows showing proposed direction of stormwater flow

- i. Berm or swale locations (if applicable)
- j. Raingutter downspout locations
- k. Driveway and sidewalk locations
- l. Applicable Fee
- m. Statement that Owner and Contractor recognize that this waiver releases Citrus County from any liability or responsibility for flooding which may occur on this property.
- n. Signature of Owner and Contractor
- o. Application shall be notarized.

6500. CONSTRUCTION

A. Pipe Trenches

1. Pipe trenches shall be of necessary widths for the proper laying of the pipe and the walls and faces of excavations shall be guarded from slides or cave-ins by shoring, sloping or other equivalent means. Rules and regulations of the Occupational Safety and Health Administration (OSHA) Part 1926, Subpart P, sets forth minimum standards to be used in this regard. In paved areas the trench shall be vertical and sheeted if required; the clearance between the pipe and trench wall or back of sheeting shall not exceed 18 inches. The bottom of the trenches shall be over-excavated to a depth below the outside bottom of the pipe barrel, as required by the County's Minimum Construction Standards for Utilities. Any over excavation shall be replaced with suitable compacted material.
2. Excavation for inlets and other appurtenances shall be sufficient to provide a clearance between their outer vertical surfaces and the face of the excavation or sheeting, if used, of not less than 12 inches.

B. Removal of Unstable Material

1. Removal of Unstable Material: Soft, spongy, or otherwise unstable material classified as A-2-6, A-2-7, A-4, A-5, A-6 and A-7, in accordance with AASHTO Designation M 145 encountered below the established grade of the excavation which will not provide a firm foundation for subsequent work, shall be removed and replaced as directed.
2. Unless otherwise directed, all such unstable materials shall be removed for the full width of the excavation and replaced with approved fill material.

C. Pumping, Sheeting, and Bracing

1. Where sheeting and bracing are necessary to prevent caving of the trench sidewalls or sidewalls of excavation for other structures, and to safeguard the workmen, the trench or excavation for other structures shall be dug to such width that the proper allowance is made for the space occupied by the sheeting and bracing to provide clearance as specified above. All pipes shall be carefully laid true to line and grade shown on the Plans. Any deviation from true alignment of grade, shall be the lesser of the pipe manufactures allowable deviation or a deviation which would result in a displacement from the normal position of the gasket of as much as 1/4 inch, or which would produce a gap exceeding 1/2 inch between sections of pipe for more than 1/3 of the circumference of the inside of the pipe, will not be acceptable, and where such occurs, the pipe shall be re-laid without additional compensation. No mortar, joint compound, or other filler which would tend to restrict the flexibility of the gasket joint shall be applied to the gap. Pipes having defects that have not caused their rejection are to be so laid that these defects will be in the upper half of the sewer.
2. Before installation of the pipe gasket, the gasket and the surface of the pipe joint, including the gasket recess, shall be clean and free from grit, dirt, or other foreign matter at the time the joints are made. In order to facilitate closure of the joint, application of an approved vegetable soap lubricant immediately prior to closing of the joint will be permitted.
3. All pipes shall be laid with bells or grooves uphill. As the pipes are laid throughout the work, they must be thoroughly cleaned and protected from dirt and water. No length of pipe shall be laid until the two preceding lengths have been thoroughly embedded in place so as to prevent any movement or disturbance of the finished joint. No walking on or working over the pipes after they are laid, except as may be necessary in tamping earth and refilling, will be permitted until they are covered to a depth of one (1) foot. Fill placed around the pipe shall be deposited on both sides simultaneously to approximately the same elevation and uniformly compacted. Whenever the pipe laying is discontinued, as at night, the unfinished end is to be securely protected from displacement due to caving of the banks or from other injury and a suitable stopper is to be inserted therein.

D. Laying Corrugated Pipe

1. All corrugated pipe shall be carefully laid, true to line and grade shown on the plans. The pipe gasket and coupling band installed over wrapping

shall be centered over the joint with the coupling and bolts securely tightened without cutting the gasket.

2. Fill placed around the pipe shall be deposited on both sides simultaneously to approximately the same elevation and uniformly compacted. Whenever the pipe laying is discontinued, the unfinished end is to be securely protected from displacement due to caving of the banks or from other injury and a suitable stopper is to be inserted therein.

E. Drainage Structures

1. Drainage structures shall be built at points shown on the plans or as designated by the Engineer of Record.
2. Excavation for drainage structures shall be sufficient to provide a clearance between their surfaces and the face of the excavation or sheeting, if used, of not less than 12 inches. Backfill shall be placed as specified hereinbefore. Unsuitable material uncovered at the footing elevation shall be excavated to suitable material and the excavation backfilled with pipe bedding material to the required elevation.
3. Brick masonry is not permitted for manholes, inlets or other drainage structures except for adjusting rings or as directed. Quality of bricks and mortar shall be as specified herein. Every fifth course of brick shall be laid as stretchers, the remainder being laid as headers. Every brick shall have full mortar joints. On the bottom and sides which shall have been formed in one operation by placing sufficient mortar on the head and forcing the brick into it. Horizontal joints shall not exceed 1/4 of an inch. All brick shall be thoroughly drenched with water immediately before being laid.
4. Manholes shall, in all cases, be fully and completely built and fitted with their frames and covers as the work progresses.
5. Concrete manholes, inlets, connection collars, or other structures shall be constructed in conformity with the plans. Forms shall be designed and constructed so that they may be removed without injury to the concrete and shall be left in place for at least 24 hours after concrete is poured. Concrete shall be thoroughly tamped and shall be cured for at least five (5) days after removal of forms. Honeycombed areas shall be thoroughly cleaned, saturated with water and pointed up with mortar or treated in a manner as directed by the Engineer of Record.
6. Precast manholes or other structures shall be approved by the Engineer of Record. Castings and frames and grates of all structures where applicable shall be placed to final grade by the use of leveling course of

brick and mortar, if necessary, or may be set in mortar only provided the depth of mortar is not more than the depth of a course of brick and mortar.

F. Backfilling for Pipe Culverts, Storm Sewers, and Drainage Structures

After the backfill has been placed to a level 12 inches over the pipe, the remainder of the backfill shall be placed in lifts, thickness to depend upon material, equipment and compaction methods used, but in no case shall exceed 24 inches. Backfill shall be compacted to a density as shown on the plans.

G. Backfilling in Wet Trenches

After the installation of the pipe, backfill material shall be carefully, uniformly and simultaneously placed on both sides of the pipe by carefully lowering the material into the trenches down to the water surface and then releasing it to settle through the water. Under no circumstances shall backfill material be dumped, pushed, or shoved into the wet trench. Backfill Material shall be carefully and uniformly rammed around both sides of the pipe to properly bed and support the pipe. No specified density requirements shall apply to backfill carefully placed in wet trenches until the fill has reached a level six inches above the water table at which elevation and above, the backfill densities specified elsewhere herein shall be attained.

H. Additional Work

1. Additional items of construction necessary for the complete installation of the system shall conform to specific details on the plans and shall be constructed of first-class materials conforming to the applicable portions of these specifications. All ends of sewer lines that are pending future connection shall be temporarily plugged and their end location marked properly with location markers.
2. Connections to existing structures shall be made without permanent damage to the existing work. Pipe openings cut into existing structure walls shall be made water-tight with an approved grout and mortar.

(Ordinance No. 2013-A08, Section 6090, adopted April 23, 2013)

(Ordinance No. 2016-A07, Section 6420, adopted April 12, 2016)

(Ordinance No. 2022-A29, Sections 6410 and 6420, adopted May 24, 2022)

(Ordinance No. 2023-A34, Section 6420, adopted November 28, 2023)

(Ordinance No. 2025-A04, Section 6005, 6420, adopted March 11, 2025)