

CHAPTER 6 STORMWATER MANAGEMENT

6.1 PURPOSE

Protection of water resources is critical to the public health, safety and welfare of Osceola County. All residential, industrial and commercial development shall provide a stormwater management system. All stormwater management schemes shall meet or exceed the applicable water management district's requirements and Osceola County standards.

No site alterations shall adversely affect the existing surface water flow pattern. No site alterations shall cause siltation or pollution of downstream water bodies or reduce the natural retention or filtering capabilities of water bodies.

6.2 WATER QUALITY

The control of pollution, sedimentation and flooding shall be mandatory. All proposed development will be required to provide water quality of the required volume of water, as specified by the applicable water management district's standards and specifications.

6.3 PROTECTION FROM FLOODING

Flood protection will be accomplished by design in accordance with the following:

- A.** Within the South Florida Water Management District (SFWMD), the post-developed peak rate of discharge, permitted from the site, will not exceed the pre-developed peak rate of discharge from the site, during a 10 year-72 hour storm event.
- B.** Within the St. Johns River Water Management District (SJRWMD), the post-developed peak rate of discharge permitted from the site will not exceed the pre-developed peak rate of discharge from the site, during a 25 year-24 hour storm event.
- C.** The finished floor elevations for all proposed commercial, industrial and residential structures shall comply with the Osceola County Flood Damage Prevention Ordinance and/or Osceola County Code, Chapter 11, as amended from time to time. The more stringent criteria shall apply. Public and institutional facilities, including but not limited to schools, police stations, government buildings and hospitals, shall be set at least one foot above the 100 year flood elevation. This is to ensure public accessibility during major storm events.
 - 1.** Within SFWMD jurisdiction, compensating storage for development is to be accomplished between the average wet season water table within the special flood hazard area, and the estimated 100 year base flood elevation.
 - 2.** Within the SJRWMD jurisdiction, compensating storage for development is to be provided within the 10 year flood plain.

6.4 DISPOSITION OF STORMWATER RUNOFF

All development will be required to pre-treat the required volume of runoff, in accordance with the applicable water management district regulations, for pollution abatement purposes. Pre-treatment of this volume of runoff is defined as retention (no surface discharge) or detention with filtration (surface discharge) prior to

release. Additionally, all development will be required to limit the rate of discharge from the developed site to the rate of discharge emanating from the site, prior to development. This is based upon a 10 year - 72 hour frequency storm event within SFWMD and a 25 year - 24 hour storm event within SJRWMD. When pollution abatement volumes and detention volumes (to reduce the peak-rate of discharge) are incorporated in the facility, the volume of water impounded (to reduce peak discharges in excess of the pollution abatement volume) must be evacuated by a positive, non-filtering system.

The post-development runoff from any site shall either sheet flow in a natural way at natural elevations or discharge into a positive and legal outfall. As it pertains to this Chapter, a legal outfall is one which drains to county rights of way or drainage easements, to other government regulatory agencies rights of way or drainage easements, or to a (manmade or natural) drainage system previously approved by the County where no easement exists.

6.5 DEVELOPMENT WITHIN AREAS OF SPECIAL FLOOD HAZARD (100 YEAR FLOOD)

All development within areas of special flood hazard, as delineated on the Official Flood Insurance Rate Maps (FIRM) or areas further expanded by the County Engineer, shall comply with the following requirements:

- A.** Establish elevation of the base flood (100 year flood).
- B.** Minimum finished floor elevations are to be set in accordance with the Osceola County Flood Prevention Ordinance.
- C.** For commercial or industrial construction, flood proofing may be substituted in lieu of elevating the finished floor.
- D.** Provide compensating storage for all flood water displaced by development below the elevation of the base 100 year flood.

Compensating storage is to be provided between the average wet season water table in the special flood hazard area and the estimated 100-year flood elevation. All developments within river rain flood hazard areas shall be designed to maintain the flood carrying capacity of the flood plain, such that the base flood elevations are not increased, either upstream or downstream.

6.6 DESIGN CRITERIA

- A.** The design method used to establish runoff volume and peak-rate of discharge shall be by accepted practices and standard techniques.
- B.** Methods of computing run-off volume and peak rate of discharge.
 - 1.** Basins or Sub-basins 0-10 acres.

The rational formula may be used to determine peak pre-development discharge by the formula $Q = CIA$, where:

- Q = Peak discharge in cfs
- I = Intensity of rainfall derived from FDOT rainfall charts
- A = Area contributing in acres
- C = Runoff coefficient

The detention storage volume of the pond is required when using the rational formula and be determined by the formula $V=CRA$, where:

V = Volume of pond in acre-feet
 C = Runoff coefficient
 R = 10 year, 72 hour rainfall (9.5") divided by 12 inches per foot
 A = Area contributing in acres

In lieu of the above, runoff hydrographs as specified below and routing calculations may be substituted.

2. Basins or sub-basins 0 to 300 acres. Hydrograph(s) shall be developed by SCS unit-hydrograph method or by one of the Santa Barbara urban hydrograph methods.
3. Basins or sub-basins of over 300 acres. Computer model TR-20, U.S.D.A. Soil Conservation Service and U.S.A. Corps of Engineers HEC I, may be used. Other county approved models may be used.
4. Alternate methods of computation must be approved by the County Engineer.
5. In areas where specific basin plans have been completed, a pro-rata discharge may have been designated. In this case, allowable discharge shall be governed by the specific basin criteria.

C. DESIGN STORM MINIMUM STANDARDS

<u>FACILITY</u>	<u>DESIGN STORM FREQUENCY</u>
BRIDGES	50 year
OUTFALL DITCHES drainage area greater than 1 square mile	25 year
OUTFALL DITCHES drainage area less than 1 square mile	10 year
Cross Drains - arterial roads	50 year
Cross Drains - collector roads	25 year
Cross Drains - local roads	10 year
Sidedrains and roadside swales	10 year
RETENTION/DETENTION BASINS (SFWMD)	10 year - 72 hour
RETENTION/DETENTION BASINS (SJRWMD)	25 year - 24 hour
RETENTION BASINS (no positive outfall)	100 year - 24 hour

The design frequency for major drainage systems may be increased if deemed necessary by the

County Engineer. Adjustments by the County Engineer may be necessary in order to protect upstream or downstream properties, or to comply with other regulations.

Road-side swales may be considered for approval by the County Engineer upon presentation of a geotechnical report by a qualified geotechnical engineer. To be considered, the bottom elevation of the road-side swales must be at an elevation no higher than 1 foot below the bottom of the stabilized subgrade of the affected roads, and no lower than 1 foot above the control elevation of the receiving body. Swale drainage will be permitted only in single family subdivisions with a minimum lot size of at least 1 acre, and right-of-way widths of 60 feet or greater. Additional right-of-way or drainage easements may be required to accommodate swale drainage.

Curb and gutter (urban) drainage will be required for subdivisions with lots one acre or less.

D. STORM DURATION AND RAINFALL INTENSITY

The following guidelines are for use in the design of the stormwater management system. For the rational method, time of concentration (TC) will dictate the rainfall intensity. Rainfall intensities for the rational method are to be obtained from the Florida Department of Transportation rainfall curves from zone 7. TC values are to be obtained from methods used in accordance with the FDOT drainage manual. Alternate methods of computation must be approved by the County Engineer.

A 24 hour rainfall duration is to be used with all calculations establishing a 100 year flood elevation for the Federal Flood Insurance Program.

E. DRAINAGE POND - RETENTION/DETENTION AREA CRITERIA

The detention pond shall be sized to limit the peak rate of discharge from the developed site to that discharge generated prior to development. Supporting calculations shall be submitted and shall contain, as a minimum, run off hydrographs for the pre-developed site and the post-developed site, and a discharge hydrograph after routing through the proposed detention facility. All routing calculations to be submitted must consider the tailwater of the receiving facility. Pond control elevations must be at, or above, the normal wet-season water table elevation.

A pond outlet structure shall be designed to skim floating debris, oil, and grease. The skimming shall be accomplished from an elevation 6" below the control elevation and elevated to an elevation 6" above the design highwater level. The top of the discharge structure shall be placed at least 6" below the top of the berm. Pond outlet structures shall include a bleeder mechanism such as an orifice or V-notch weir, for returning the water level to the control elevation.

In dry ponds, the bleeder invert elevation shall be set 1 foot below the normal pond bottom. Mosquito control ditches or other appropriate features for such purpose, shall be incorporated into the design of dry detention areas. The control structure design and construction shall include a depression and a 4" thick concrete pad extending 2 feet each side of the width of the structure and 4 feet from the face of the structure. The top of the concrete pad shall be below the bleeder invert. The purpose of the pad is to prevent encroachment by vegetative matter and obstruction to the free operation of the skimmer.

A wet retention/detention area shall also meet the following criteria:

1. If the retention area has water in it year round, the area shall be either fenced with a six (6) ft. chain fence, or shall have a 4 to 1 slope which extends at least two (2) feet below control elevation. At the end of construction the engineer of record shall certify to the County

Engineer that the slope has met the 4 to 1 requirement. Side slopes of wet ponds are to be sodded from two (2) feet below the control elevation, to five (5) feet beyond the outside toe of berm.

2. Areas used for excavation during the construction of development shall be shown on the construction plans.
3. If the retention pond is being used as an ongoing borrow pit while the subdivision is being developed, this pit shall be fenced or the sides shall be sloped to a minimum of 4 to 1.
4. Retention/detention areas shall be maintained so as to preserve the integrity and intent of the design. Outfall pipes, inlets, grates, weirs, and orifices shall be cleaned and kept free of debris. Dry ponds shall be mowed, with cuttings deposited in an approved landfill. Undesirable material such as trash, and rubbish shall not be placed in any retention/detention area.

F. DESIGN CRITERIA WHERE A POSITIVE OUTFALL IS NOT AVAILABLE

When a positive outfall is not available or discharge into a lake without a positive outfall is proposed, the retention/detention pond design shall detain the 100 year-24 hour storm event. The pond shall be designed to evacuate a daily volume, equivalent to 3/8 inch of runoff from the total project area contributing to the pond.

6.7 LAND DEVELOPMENT

A. NATURAL WATERCOURSE, DRAINAGE WAY OR CHANNEL

Should the proposed development area contain an existing natural watercourse drainage way or channel, such natural watercourse and the vegetation inherent therewith shall be maintained and the proposed development designed so as to preserve same. However, the use of such natural watercourse have been provided to carry stormwater runoff from any development, may be permitted if provision for control of sediment in the excess runoff is made prior to entrance of the use of wetlands.

If necessary, the hydraulic cross-sections of these natural watercourses, drainage ways or channels may be modified to accommodate existing or proposed runoff. An unobstructed maintenance easement may be required on one or both sides of these drainage ways, in accordance with this Chapter.

- B.** No person, firm, corporation, etc., shall fill or grade his or her property so as to adversely affect the natural or designed flow of water onto or from adjacent property.

C. OPEN DRAINAGE WAYS

All man-made stormwater conveyance systems shall be of the shallow, flat, slow-velocity (maximum 2 feet/sec), open-channel type which shall be designed and constructed within a recorded drainage easement. The side slopes of such conveyance systems shall be a maximum of two (2) horizontal to one (1) vertical and they shall be fully sodded up to and including five (5) feet beyond the top of slope. An unobstructed maintenance easement shall be provided on one or both sides of these drainage ways as detailed in this Chapter.

The maintenance easements will be so placed that they will connect to a county maintained road every one thousand (1,000) feet for a ditch or canal, or at least once for a retention/detention area.

1. The minimum requirement for maintenance easements is as follows:

<u>Ditch or Canal Width</u>	<u>Minimum Width Maintenance Easement</u>
Less than 16 feet	20 feet one side
16 feet to 55 feet	20 feet both sides
Over 55 feet	30 feet both sides

2. Areas adjacent to open drainage ways and ponds shall be graded to preclude the entrance of stormwater except at planned locations. The influent locations shall be designed and constructed to prevent erosion and sedimentation. Where retention/detention areas are located on the project periphery, the developer may be required to provide additional landscaping or screening pursuant to other chapters of this ordinances.

3. Maximum Side Slope:

<u>Open Drainage Ways</u>	<u>Maximum Side Slopes</u>
Four (4) feet deep or less	4:1
Over four (4) feet deep	2:1
In Subdivisions where lots are ½ acre or less	3:1

D. PONDS

<u>Pond</u>	<u>Maximum Side Slopes</u>
Dry Ponds	4:1 (Horizontal: Vertical) 2:1 (Commercial Sites)
Wet Ponds	4:1 to 2 feet below control elevation, then 2:1 to pond bottom with 10' wide berm around pond perimeter.
Wet Ponds Fenced	20' wide berm around pond perimeter with side slopes up to 2:1.

Erosion Protection

Wet Ponds	Side Slopes and Berms are to be sodded from 2 feet below the control elevation up to 5 feet beyond the outside toe of berm.
Dry Ponds	Side slopes and berms are to be sodded. Seed and mulch pond bottom.
Freeboard	All ponds shall have six (6) inches minimum freeboard between design high water level and the minimum berm elevation.

Top of pond slope and/or toe of berm slopes to be five (5) feet minimum from the property line.

6.8 ROADWAY DRAINAGE DESIGN

A. GENERAL

Good pavement drainage design consists of the proper selection of grades, cross slopes, curb types, inlet location, and removal of the storm rainfall from the pavement, in a cost effective way while preserving the safety, traffic capacity and integrity of the highway and street system. Design shall also be conducive to and encourage street landscaping in accord with Chapter 10.

B. MINIMUM GROUNDWATER AND HIGHWATER CLEARANCES

All streets and roadways shall be designed to provide a minimum clearance of one (1) foot between the bottom of the stabilized subgrade and the estimated wet season water table, or the artificial water table induced by an underdrain system.

C. CURBS AND GUTTERS

The width of curb and gutter shall be a minimum of eighteen (18) inches and shall be either Florida State DOT type or Miami curb and gutter, depending upon the flow to be handled. Approved mountable median curb may be used around median dividers on the high side of pavement. All curbs designed to handle water shall incorporate an approved gutter design. There shall be a stabilized subgrade beneath curbs and 6 inches (6") beyond the back of curb.

No water valve boxes, meters, portions or manholes, or other appurtenances of any kind, relating to any underground utilities, shall be located in any portion of a curb-and-gutter section. The minimum allowable flow line grade of curbs and gutters shall be 0.24% unless otherwise approved by the County Engineer.

D. CRITERIA FOR USE OF UNDERDRAINS

The planned use of underdrain systems which control the seasonal highwater table, as required, is allowed with the following requirements and limitations.

1. Underdrains shall be designed and constructed in compliance with the Osceola County Road Construction Specifications.
2. The underdrain trench bottom shall not be placed below the seasonal low water table elevation.
3. The stormwater facilities shall be designed to accommodate the expected flow contributed by the underdrain system.
4. Wherever roadway construction reveals unexpected water bearing strata that would cause deterioration of the pavement, underdrains or other acceptable alternative that will provide necessary measures to maintain the structural integrity of the road will be required, even though not shown on the plans.

E. RUNOFF DETERMINATION

The peak rates of runoff, for which the drainage system must be designed, shall be determined by the rational method or the Santa Barbara urban hydrograph method. The time of concentration, individual drainage areas, percent impervious and rainfall intensity amounts, shall be submitted as part of the drainage calculations and documentation.

A separate rational runoff coefficient © shall be determined for the specific contributing area to each inlet/catch basin within the proposed storm sewer system. A composite C value shall be computed

for each contributing area.

Roadside ditches are not to be normally considered for retention/detention purposes; rather they are to be designed for conveyancing of stormwater runoff only. An area for roadway retention/detention purposes shall be set aside, outside the regular roadway right-of-way limits.

Minimum roadside ditch slope shall be 0.1% unless otherwise approved by the County Engineer in writing .

F. DESIGN STORM FREQUENCY

The design storm frequency to be utilized for the design of pavement drainage shall be as follows:

Arterial Streets	10 year, Hydraulic Gradient Line at or below the gutter line
Collector and Local Streets	10 year, Hydraulic Gradient Line at or below the gutter line

For methods other than the rational method, a 10 year 24 hour hydrograph shall be used.

G. STORMWATER SPREAD INTO TRAVELED LANE

Inlets shall be spaced at all low points, intersection and along continuous grades so as to prevent the spread of water from exceeding tolerable limits. The acceptable tolerable limits for arterial and collector roadways is defined as approximately one half the traveled lane width. Acceptable tolerable limits for interior subdivision roadways, are defined as a maximum of one (1) inch above the crown of the road.

H. INLETS

1. MAXIMUM INLET INTERCEPTION RATES

Types 1 and 3 (single) inlets shall be located such that a maximum of five (5) cubic feet per second (cfs) shall be intercepted during the 10 year frequency storm. Types 2 and 4 (double) inlets: nine (9) cfs maximum. Bypass flow is limited to a maximum of one (1) cfs.

2. INLET TYPES

The curb inlet types to be used shall be the latest version of the Florida Department of Transportation inlet types as detailed in the DOT roadway and traffic design standards.

3. LOW POINT INLETS

All inlets at low points (sumps) shall be designed to intercept 100 percent of the design flow, without exceeding the allowable spread of water onto the traveled lanes, as defined above. On arterial roadways, in order to prevent siltation and to provide for a safety factor against clogging of single inlet in a sump location, it is required to construct multiple inlets at all sump locations.

I. STORM SEWER AND CULVERT DESIGN

1. DESIGN DISCHARGES

Storm sewer system design is to be based upon a 10 year frequency event. The system shall be designed to handle the flows from the contributory area within the proposed development. Then, the system shall be analyzed a second time to ensure that any off-site flows can also be accommodated. This second analysis shall consider the relative timing of the on-site and off-site flows in determining the adequacy of the designed system.

2. MINIMUM PIPE SIZE

The minimum size of pipe to be used in storm sewer systems is 15 inches. Design shall be based upon six (6) inch increments in sizes above 18 inches.

Pipes to be used for driveway crossings or outfall pipes within county right-of-way shall be a minimum 15 inches with mitered ends.

3. DESIGN TAILWATER

All culvert installations shall be designed taking into consideration the tailwater of the receiving facility. A design tailwater estimate can be obtained by averaging the 10 year 72-hour design high water elevation for the pond and the pond bottom elevation for “dry bottom” ponds or the controlled water elevation for “wet bottom” ponds.

4. ALLOWABLE HEADWATER

The allowable headwater of a culvert installation should be set by the designer for an economical installation. When end walls are used, the headwater should not exceed the top of the end wall at the entrance. If the top of the end wall is inundated, special protection of the roadway embankment and/or ditch slope may be necessary for erosion protection.

5. PIPE GRADE

All storm sewers shall be designed and constructed to produce a minimum velocity of 2.5 fps when flowing full. When outlet velocities for the design storm discharges exceed six feet per second, the need for special channel lining or energy dissipation is required.

6. MAXIMUM LENGTHS OF PIPE

The following maximum runs of pipe shall be used when spacing access structures of any type:

Pipe Size	Maximum
15 to 18 inches	200 feet
24 to 36 inches	400 feet
42 inches and larger	500 feet

7. MAINTENANCE EASEMENT

An unobstructed Maintenance easement shall be provided for all underground stormwater systems. The required size of the easement shall be based upon the following formula: width of easement = 2 [depth of pipe (in feet) x 2] + diameter of pipe (in feet) + 2 feet. The minimum width of maintenance easements for storm sewer pipes located outside the public

right-of-way is 20 feet.

J. HYDRAULIC GRADIENT LINE COMPUTATIONS

The hydraulic gradient line for the storm sewer system shall be computed taking into consideration the design tailwater on the system and the energy losses associated with entrance into and exit from the system, friction through the system, and turbulence in the individual manholes/catch basins/junctions within the system.

The energy losses associated with the turbulence in the individual manholes are minor for an open channel or gravity storm sewer system and can typically be overcome by adjusting (increasing) the upstream pipe invert elevations in a manhole by a small amount. However, the energy losses associated with the turbulence in the individual manholes may be significant for a pressure or surcharged storm sewer system and must be accounted for in establishing a reasonable hydraulic gradient line.

K. ALLOWABLE MATERIALS

Allowable materials for storm sewers shall be in accordance with the Osceola County Road Construction Specifications.

L. DESIGN PROCEDURE

The determination of the required size of a culvert installation can be accomplished by exact mathematical analysis or by the use of design nomographs. The mathematical solution will give precise results, but is time consuming and somewhat nonproductive when considering the inaccuracies of estimating design flows and flood water elevations. Copies of criteria and standards for culvert nomographs and culvert size selection procedures are available in the S.F.W.M.D.'s permit information manual, Volume IV or FDOT's drainage manual.

6.9 DRAINAGE PLAN REQUIREMENTS

A. DRAINAGE MAP

The project engineer shall include in the construction plans a master drainage map showing all existing and proposed features. The map is to be prepared on a 24 inch by 36 inch sheet on a scale not to exceed 1"=200'. Listed below are the features that are to be included on the drainage map.

1. Drainage bounds, including all off-site areas draining to the proposed subdivision or project.
2. Sufficient topographical information with elevations to verify the location of all ridges, streams, etc. (one foot contour intervals).
3. Highwater data on existing structures upstream and downstream for the subdivision or project.
4. Notes indicating sources of highwater data.
5. Notes pertaining to existing standing water, area of heavy seepage, or springs.
6. Existing off site and on site drainage features (ditches, roadways, ponds, etc.) shall be shown as needed. The County Engineer can request this information be extended up to 1000' downstream of the proposed development.

7. Subdivision layout with horizontal and vertical controls.
8. Drainage features, including but not limited to location of inlets, swales and ponding areas.
9. Delineation and areas of drainage sub-basins.
10. Show retention/detention areas and ingress/egress areas for retention/detention facilities.
11. General type of soils (obtain from soil survey of Osceola County).
12. Flood hazard classification.
13. Description of current ground cover and/or land use.

B. SUBSOIL INVESTIGATION

A subsoil report prepared by a geotechnical engineer experienced in the preparation of this type of report will be required. The contents of the subsoil report will be in accordance with this Ordinance. A minimum of one (1) boring will be taken per retention/detention area.

C. STORMWATER CALCULATIONS

Stormwater calculations for retention/detention areas, including design high water elevations for the 10 year storm events shall include the following.

1. Storm sewer tabulations including, but not limited to, the following:
 - a. Locations and types of structures.
 - b. Sizes, types and lengths of lines.
 - c. Drainage sub-basin tributary to each structure.
 - d. Runoff coefficient per sub-basin.
 - e. Time of concentration to structure.
 - f. Hydraulic gradient for the 10 year frequency storm event.
 - g. Estimated receiving water (tailwater) elevation with sources of information, if available.
 - h. Diameters of pipe.
 - i. Outlet and other pipe velocities.
2. Drainage plans including, but not limited to, the following:
 - a. Cross-section of retention/detention facilities.
 - b. Typical swale, ditch or canal sections.
 - c. Drainage rights-of-way.

- d. Typical fencing detail.
- e. Erosion control plan.

6.10 CONSTRUCTION EROSION CONTROL

An erosion control plan and a detailed description of the measures to be undertaken during construction to control erosion within the limits of the project, and to prevent the deposition of sediments in off-site systems or receiving water bodies, shall be submitted with the final engineering plans of the development. Included with this submittal shall be calculations supporting the effectiveness of the proposed plans.

A. EROSION CONTROL PLAN

The erosion control plan and details and calculations shall document the measures necessary to limit the transport of sediments outside the limits of the projects, to the volume and amount of that existing prior to the commencement of construction. This pre-construction condition shall be satisfied for the total anticipated construction period. Provision must be made to preserve the integrity and capacity of check weirs, sediment basins, slope drains and grading patterns, required to meet this provision throughout the project construction life.

B. STOCKPILING MATERIAL

No excavated material shall be stockpiled in such a manner as to direct runoff directly off the project site or into any adjacent water body or stormwater collection facility.

C. EXPOSED AREA LIMITATION

The surface area of open, raw, erodible soil, exposed by clearing and grubbing operations or excavation and filling operations, shall not exceed ten acres. This requirement may be waived, for large projects with a dust control plan, which demonstrate that opening of additional areas will not significantly affect off-site deposit of sediments. This waiver will be by written authorization from the County Engineer.

D. INLET PROTECTION

Inlets and catch basins shall be protected from sediment-laden storm runoff until the completion of all construction operations that may contribute to the inlet.

E. TEMPORARY SEEDING AND MULCHING

Areas opened by construction operations, that are not anticipated to be dressed and receive final grassing treatment within thirty days, shall be seeded with a quick growing grass species which will provide an early cover during the season in which it is planted, and will not later compete with permanent grassing. The rate of seeding shall be 30 pounds per acre. Slopes steeper than 4:1 shall receive mulching of approximately 2 inches loose measure of mulch material, cut into the soil of the seeded area to a depth of four inches.

F. TEMPORARY GRASSING

As required by Osceola County, the seed or seeded and mulched area shall be rolled and watered to assure optimum growing conditions, for the establishment of a good grass cover.

G. TEMPORARY REGRASSING

If, after fourteen days, the temporary grassed areas have not attained a minimum of 75% good grass cover, the area will be reworked and additional seed applied sufficient to establish the desired vegetative cover.

H. MAINTENANCE

All features of the project designed and constructed to prevent erosion and sediment, shall be maintained during the project construction life, so as to function as they were originally designed and constructed.

6.11 PERMANENT EROSION CONTROL

The erosion control facilities of the project shall be designed to minimize the impact on off-site facilities. All stormwater discharge from the project limits shall be routed through detention basins to trap suspended sediments and discharge facilities from these basins, shall be provided with a skimming device to trap floatable debris.

A. PERMANENT SEEDING

All areas which have been disturbed by construction shall, as a minimum, be fertilized and seeded in accordance with the Osceola County Road Construction Specifications.

B. PERMANENT SEEDING AND MULCHING

In addition to the minimum requirements above, slopes of from 6:1 to 3:1, inclusive, will be mulched with a uniform thickness of approximately two inches, loose measure, of mulch material incorporated into the soil by mixing to a depth of four inches.

C. PERMANENT SODDING

All retention/detention basins shall be solid sodded as described in this Chapter. All exposed areas including public rights-of-way with slopes steeper than 4:1 will be solid sodded.

D. STRIP SODDING

Strip sod, 1 foot wide or greater, shall be placed adjacent to all curbs, walks and pavement. In areas with a sidewalk, the entire area between the sidewalk and the back of curb and/or edge of pavement shall be sodded.

E. REGRASSING

All grassed areas will be maintained to assure a good stand and sufficient ground cover to minimize erosion. If, after 60 days an adequate ground cover has not been established, the area will be regrassed.

F. ADDITIONAL FERTILIZER

Grassed areas, not accepted within 90 days of their completion, shall be refertilized at an application rate of 250 lb. per acre.

6.12 LOT GRADING

A. GENERAL

All lots must be graded to prevent entrapment of storm-water on the lot or adjoining properties. Post-construction runoff shall drain into existing county drainage systems or to natural waterways. When such a system is not available, the post-construction runoff must match the pre-construction runoff patterns.

B. NEW SUBDIVISIONS

The project engineer shall include in the construction plans a master lot grading plan showing all existing and proposed features. The map is to be prepared on a 24 inch by 36 inch sheet with a scale not to exceed 1"=200'. Listed below are the features that are to be included on the lot grading map.

1. Proposed finished floor elevations along with a note stating all finished floor elevations are to be a minimum of 24" (or 18" for areas outside the urban area) above the adjacent road crown.
2. Elevations of all lot corners.
3. The Federal Housing Administration lot grading type A, B, or C and their detail.
4. The elevation of all drainage structures and the centerline grade of proposed streets.
5. Maximum slope of fill material is 3 feet horizontal to 1 foot vertical for slopes 6 feet in length or less. Maximum slope for slopes over 6 feet in length is 4 feet horizontal to 1 foot vertical.
6. Rear lot swales should be avoided when possible. When the circumstances dictate the need for rear lot swales, ditch bottom inlets will be added to minimize the drainage basins utilizing these swales.

C. COMMERCIAL SITES

The project engineer shall include in the construction plans a master lot grading plan which complies with South Florida Water Management District rules and regulations of the latest addition.

D. LOTS OR PARCELS WITH NO PRIOR APPROVED GRADING PLAN

The County Engineer may require an approved drainage survey and/or a certified engineered grading plan for any building permit which is in an area without an overall approved lot grading plan. Listed below are the features that are to be included in this lot grading plan. Prior to issuance of a certificate of occupancy the County Engineer shall ascertain that the lot grading plan has been complied with.

1. Site plan showing the proposed buildings(s) within the lot with all applicable dimensions.
2. Proposed finished floor elevation in relation to the centerline of the roadway.
3. Proposed and existing ground elevations at the lot corners and midway along each property line in relation to the centerline of the roadway.
4. Arrows showing the direction storm-water runoff.

5. Fill material may extend to within 18 inches of side and rear lot lines unless an overall plan is presented for adjoining lots.
6. Maximum slope of fill material is 3 feet horizontal to 1 foot vertical for slopes 6 feet in length or less. Maximum slope for slopes over 6 feet in length is 4 feet horizontal to 1 foot vertical.

6.13 VARIANCE

The Planning Commissioner may grant a variance from the terms of these regulations in accordance with the terms and conditions as set forth in Chapter 2 of this code.