Sec. 6.13.8. Stormwater conveyance criteria.

A. Methodology. ~~Calculations for stormwater~~ Stormwater collection and transmission systems shall be designed using the Rational Method based on ~~FDOT Zone 7 Intensity - Duration Curves~~NOAA Atlas 14 rainfall intensity-duration data. Cross drains shall be designed using the Rational Method or Natural Resources Conservation Service (NRCS) Peak Discharge Method based on NOAA Atlas 14 rainfall intensity-duration data or other available flow data as permitted by the County Engineer or their designee. Ditch and storm drain flow capacity shall be determined from Manning's Formula with coefficients of roughness based on an assumption of conditions of ultimate development.

B. Minimum requirements.

(1) Design storm. Conveyance systems shall be sized to accommodate the following minimum design storm events based on the condition of ultimate development:

(a) Stormwater conveyance pipes, Driveway Culverts, and Open Channels shall be designed to accommodate a 25-year ~~24-hour~~ storm event ~~based on the condition of ultimate development~~.

(b) Cross Drains shall be designed to accommodate a 25-year storm event. The backwater created by the cross drain shall remain below the travel lanes. If located within a FEMA Special Flood Hazard Area, the 100-year storm event shall be analyzed for potential upstream impacts.

(2) Tailwater.

(a) The tailwater elevation utilized shall be based on the tailwater elevation of the receiving water body plus 6 inches at the peak discharge time of the 25-year 24-hour design storm.

(b) Alternatively, the tailwater elevation utilized can be the design high water elevation of the 25-year 24-hour design storm.

(c) Note that future connections must be able to demonstrate that conveyance can be achieved at all connections, future and existing, meeting one of the above criteria.

(3) Lane spread. Lane spread shall be calculated using FDOT criteria considering the 4-inch per hour or 10-year frequency storm as appropriate, to produce the following results:

(a) Subdivision Local and Minor Local Roads. The allowable lane spread shall be no greater than the crown (or high side) of the road. For all divided roadways the allowable lane spread shall be no greater than the inside (or high side) edge of pavement.

(b) Arterial, Collector, and Major Local Roads. The allowable lane spread shall leave 8 feet of the outside travel lane dry in each direction.

(c) Auxiliary or Turn Lanes. The allowable lane spread shall leave half of the lane dry on arterial, collector, and major local roads. On lesser classification roads, the allowable lane spread shall be no greater than the full width of the lane.

(4) Drainage rights-of-way. All retention/detention areas within subdivision developments shall have direct access to a right-of-way. A drainage right-of-way may be necessary to establish this access. A minimum 12-foot wide, stabilized vehicle access at six percent maximum grade shall be provided to allow for ingress and egress of the retention/detention area. Drainage rights-of-way shall be a minimum of ~~30~~ 20 feet in width. As an alternative to right-of-way, access may be provided by an easement of the same width.

(5) Drainage easements. All drainage swales to facilities or underground stormwater conveyance systems shall be within drainage easements, except where rights-of-way or drainage parcels of equivalent width are provided. Required ~~Drainage~~ drainage easement widths shall ~~be a minimum of 20 feet in~~

~~width.~~depend upon the type, size and depth of the proposed conveyance system. The minimum required easement width is 10 feet for swales that collect runoff from multiple non-adjacent parcels and 20 feet for outfalls. Easement widths for underground conveyance systems shall be in accordance with table 6.13-2. Reduced easement widths may be permitted by the County Engineer or their designee.~~-~~ Conveyance system pipes shall be approximately located in the center of the easement unless demonstrated that the pipe backfill zone and associated trench is contained within the easement.

Table 6.13-2 Minimum Easement Width by Pipe Invert Depth

Inner Pipe Diameter (inch)	Minimum Easement Width (feet)			
	Pipe invert depth less than 5'	Pipe invert depth up to 10'	Pipe invert depth up to 15'	Pipe invert depth greater than 15'
Less than 30	10	15	20	25
30-54	-	-	20	25
Greater than 54	-	-	20 + Inner Diameter (I.D.) rounded up to the nearest 5'	25 + I.D. rounded up to the nearest 5'

(6) Floodways. If in a FEMA designated floodway ~~or flood prone area~~, the cross drain shall be sized and certified to accommodate the ~~design intent~~base flood discharge of that basin with no rise in flood height.

(7) Sizes. The following minimum pipe or culvert sizes are required for stormwater conveyance systems unless otherwise approved by the County Engineer or their designee:

(a) Stormwater conveyance pipes shall be a minimum of 15 inches diameter for privately maintained systems and a minimum of 18 inches diameter or for publicly maintained systems.

(b) ~~and cross~~ Cross culverts shall be a minimum of 18 inches diameter or equivalent.

(c) Driveway culverts shall be a minimum of 15 inches diameter or equivalent ~~for residential use and a minimum of 18 inches diameter or equivalent for commercial use~~.

(d) Yard drain pipes shall be a minimum of 8 inches diameter.

(e) Roof drains, prior to connection to the overall stormwater system, and pipe exfiltration or underdrain systems are exempt from minimum diameter requirements.

C. Design considerations.

(1) Culvert flow capacity shall be determined for the conditions of inlet control or outlet control as applicable.

(2) Stormwater collection and transmission systems shall be by inlets, swales, culverts, etc. The use of siphons, pumps, or similar devices is not allowed.

(3) Ditch blocks shall be designed and constructed with hard core centers.

(4) Stormwater flow velocity shall be taken into consideration in the design of all ~~drainage ditches~~conveyance systems. ~~and a~~Appropriate channel and outlet erosion protection shall be provided in accordance with the FDOT Drainage Manual. Physical pipe slopes shall be that which produce a velocity of at least 2.5 feet per second (fps) when flowing full. Where 2.5 fps is not feasible due to flat terrain or site constraints, slopes which produce a velocity below 2.5 fps are allowable with additional consideration for upkeep in the operations and maintenance document and approval by the County Engineer or their designee.

(5) Where any storm pipe terminates at an earthen slope a mitered end section and concrete collar, or approved equal, is required. Concrete mitered end sections are required for culverts, cross drains and side drains when within a County right-of-way with posted speeds of 40 mph or greater.

(Ord. No. 13-20, § 2, 7-11-2013)