

- 505.06 Jointing-Rubber Gasket: The use of rubber gaskets when joining pipes will be permitted provided that installation is in strict accordance with manufacturer's specifications and the recommended lubricant is used. The type of rubber gasket, lubricant, and pipe therefor will be subject to approval by the Director or his designated agent.
- 505.07 Jointing-Corrugated Metal Pipe Culvert: When corrugated metal pipe culvert is used, jointing shall be in strict accordance with the pipe manufacturer's specifications.
- 505.08 Jointing Specifications: All jointing must comply with the current criteria, standards, and specifications of the VDOT if roads and streets are to be taken into the State Highway System.
- 505.09 Ditch Construction: Ditches shall be constructed true to the approved cross-section and shall be constructed on a uniform grade and straight line with the longitudinal axis of the drain pipe unless otherwise approved by the Director. The sideslopes shall be free from rocks and stumps and wild vegetation. After dressing the slopes to proper cross-section, they shall be seeded with a grass type seed or sodded to prevent erosion in accordance with the Virginia Erosion and Sediment Control Handbook, latest edition.
- 505.10 Curb and Gutter Construction: Curb and gutter construction shall be in sections of uniform length, approximately ten (10) feet, and no section shall be less than six (6) feet in length.
- 505.11 Expansion Joints: Expansion joints shall be placed in header curb, combination curb and gutter, and sidewalk every forty (40) feet. Where stationary structures such as drop inlets, manholes, etc. are within the limits of the curb and gutter, and sidewalk, an expansion joint shall be placed between the structure and the curb and gutter and sidewalk.

506.00 STORMWATER MANAGEMENT

- 506.01 General Requirements: The general goal of the City of Manassas Park's policy on stormwater run-off control is, "the amount (rate) of run-off will not exceed that which exists before development occurs." The location, area, and a general description of the storm water management plan must be submitted at the time of preliminary plan submission.

At the time of final plan submission, a final storm water management plan must be included. Design and calculations signed and sealed by a duly registered professional engineer, or a land surveyor (3-B) licensed to practice in the Commonwealth of Virginia, must be submitted.

The Director reserves the right to disapprove certain types of stormwater management systems for certain types of development. (i.e. the exclusive use of stormwater retention trenches in a large lot subdivision). Systems designed in VDOT right-of-way will only be approved if there is a well defined method of maintenance approved by VDOT.

- 506.02 Runoff Coefficients, Rainfall Intensities: Run-off coefficients and rainfall intensities shall be in accordance with this section. Coefficients of run-off shall reflect current zoning and/or planned use whichever is greater. On sites larger than 10 acres, the methodologies outlined in the Virginia Erosion and Sediment Control Handbook may be used in developing run-off volume and peak discharge.
- 506.03 Off-Site Drainage: Off-site topography clearly defining all contributing drainage areas must be submitted as part of the calculations.
- 506.04 Design Criteria: The basic criteria used in designing a facility are as follows:
- A. The 10 year frequency - 2 hour duration storm will be used in determining undeveloped flow.
  - B. A 10 year frequency, 2 hour duration storm will be used in determining the developed run-off. Increments of this storm (5 or 10 minutes) are computed and compared to the undeveloped storm to determine the amount of storage required.
  - C. Emergency spillways and ponds will be designed to pass the 100 year, two hour storm assuming that the principal spillway is inoperative. The effect of the 100 year two hour storm must be considered in the design of all stormwater management facilities. The weir formula ( $Q=CLH^{3/2}$ ) shall be used in the design of the emergency spillway.

- D. The calculations submitted will have to include but not be limited to the following:
1. Hydrograph showing the 10 year and 100 year inflow and discharge.
  2. Depth versus volume of storage curve.
  3. Emergency spillway design calculations.
  4. Embankment design calculations.
  5. Percolation test and calculations for gravel trenches or pits proposed. The City Engineer reserves the right to require any additional calculations or information which may be necessary to evaluate the design of the facility.

506.05 Stormwater Management Easements: Due to the fact that all stormwater management plans are designed to be permanent systems, the City will require an easement around the system and an access easement to it. Access to the stormwater management facility shall not exceed a grade of 10%. Although the system is in an easement, the City will require the following note:

The owner of any property on which there is located an easement for stormwater drainage or control shall be responsible for the following items of maintenance, where applicable: Grass mowing with reasonable frequency, and the removal of debris and other matter to the best of the owner's ability where such debris or matter has impeded, or threatens to impede, the free flow of storm water through any drainage structure.

506.06 Fencing Requirements: The Director shall require temporary fencing around any silt pond. The Director may require permanent fencing, 6' in height around a stormwater management facility if the facility is over 2 feet deep, takes over two hours to drain, and the slope to the facility is in excess of 3:1; or, is in a congested area. If the facility is required to be fenced according to the above criteria, fencing may be waived if all homeowners within 500 feet of the facility sign a petition requesting the fence not to be erected.

506.07 Stormwater Runoff Quality Control: Preventing or reducing the amount of water pollution generated by non-point sources to a level compatible with water quality goals as set by the Federal Pollution

Control Act is a goal of primary importance to the City of Manassas Park.

The State Water Control Board has developed manuals for Best Management Practices which set forth an economically feasible program to control non-point source pollution in state waters. Developers and engineers are encouraged to refer to these Manuals or to seek other better methods to achieve the same goal.

Structural measures that store stormwater and rely upon solid settling processes to remove pollutants should be implemented, since minor modifications could practically convert a stormwater detention facility to a multipurpose facility satisfying both water quality and quantity needs.

Volume control best management practices like porous pavement, modular pavement and infiltration pits or trenches (when the soil permeability allows it) are also encouraged to be used.

#### 507.00 FLOOD PLAIN REQUIREMENTS

It is recognized that whenever the balance established by nature between a watershed and its naturally stabilized drainageways is disturbed that some corrective measures must be taken to restore the balance and to avoid downstream flooding and damage.

Therefore, it is recognized that some improvements must be made within flood plains, streams and/or drainageways in such manner that the increased run-off from changes or improvements within the watershed may be accommodated without unacceptably elevating flood plain or stream levels particularly within improved or developed areas. This may take the form of stream bed clearing, removal of obstructions, reduction of constrictions, stabilization of stream bottom and/or banks or areas to eliminate or reduce erosion, widening, deepening or realigning of streams to provide the necessary hydraulic characteristics to accommodate the anticipated stormwater flow without damaging adjacent properties. These improvements should include the removal of silt and debris which may clog or damage downstream drainage structures or property, the filling of drainage ponding areas and stagnant pools which are potential vermin shelters and mosquito breeding areas. Recognizing the right of a land owner to the full lawful use of his land and the City's responsibility for the protection of the health, safety and welfare of all of its citizens, backwater areas may be filled when they are not required as safety valves or temporary retention reservoirs to control downstream run-off intensity