Albemarle County Engineering

Drainage Plan checklist for plan reviewers
Updated 1 Dec 2014

A drainage plan is typically a component of a road plan, site plan, or stormwater management plan. It consists of the channel, ditch, culvert, and storm sewer design drawings, drainage maps, and computations for hydrology and hydraulics.

Reference key:
[Square Brackets] are County Code references, [Curved Brackets] are policy references, and (regular parenthesis) are explanatory. Links to reference documents are provided where possible.

___ A professional seal should be provided for any computation packages where are separate from sealed plans.

Drainage: [18-32.6.2d, 14-305, 311]
___ drainage area maps (This is a basic element, and without this there is no review)
___ drainage computations (usually in the form of tables from the VDOT Drainage Manual App. 9B-1 LD-2014, App.7B-1 LD-268, App., App.8B-1 LD-269, etc. -computations are a basic element, and without them there is no review)
___ all proposed and existing storm sewer must be shown in plan view
___ for residential development, principle access free of flooding during the 25yr storm [14-410]
___ site runoff and entrances do not drain into streets (from VDOT Drainage Manual 9.4.5.2, 9.4.6.2)
___ concentrated runoff (1cfs or greater) does not run across travelways/streets (as above following VDOT design)
___ drainage does not run across, through, or backwater in dumpster areas [18-4.12.19]
___ overland relief is provided for any drainage structure or inlet in case of clogging. The failure of any system will not cause structures, streets or yards to flood. {Policy}
___ direction of flow change (or deflection angle) in each drainage structure is 90 degrees or greater (flow should not have to reverse direction) (from guide of VDOT Drainage Manual 9.4.9.3.2.3)
___ labels on all drainage structures provided (and should match the drainage computations and profiles)
___ provisions and easements for drainage across 3 or more lots. Dense development where fencing, decking, sheds, patios, etc. are expected should provide yard inlets and pipes in easements, rather than ditches {Policy}

Drainage profiles: (applicable to site plans, road and drainage plans) [14-311, 18-32]
drainage profiles for each pipe, structure or channel must contain:
___ existing ground
___ proposed ground
___ any channel linings
___ all utility crossings
___ a VDOT designation (MH-1, DI-3B, etc.) for each structure
___ throat length for each drop inlet
___ grate type for each grate inlet
___ a label on each structure to correspond with the computations
material and strength class or gage of each pipe
manhole access every 300’ for 15”-42” or 800’ for 48” or greater
pipe slopes at 0.5% min. to 16% max. (per VDOT stds for anchors over 16%)
cement inlet shaping (IS-1) specified on any structure with a 4’ or greater drop
safety slabs (SL-1) in any structure taller than 12’.
top or rim elevation for each structure
all invert elevations for each structure (with positive flow drop between inverts).
end sections (ES-1) or endwalls (EW-1) on all pipe outlets. Endwalls for culverts 48” or taller
scour outlet protection at all outlets, corresponding to computations (Green Brook, OP)

**Drainage computations:** (applicable to any plan proposing pipes, channels, etc.)

Pipe computations for all pipes
All proposed systems are designed within open channel flow capacities. (HGL computations are not necessary, and should not be relied upon unless the entire system is to be watertight.)
For systems within drainage easements, all proposed pipes are a minimum 15” in diameter
There are no excessive outlet velocities (> 15fps)

Curb inlet computations for any curb inlets on grade
All spreads are less than 10’
carryover is accounted for
100% capture at entrances so no flow runs out entrances into travel lanes
100% capture, or overland flow of capacity storm, to stormwater management facilities. Typically stormwater management is designed to the 10yr storm, and inlets on grade often cannot capture this. Inlets in sumps should be used.

Curb inlet computations for any curb inlets in sump conditions
All flow depths are below 6” in the capacity table
All spreads are less than 10’
100% capture to stormwater management facilities

Ditch computations for any ditches
ditch linings specified per plans meet velocity requirements
Culvert computations for any culverts
headwaters < 1.5 x culvert height, and 18” below shoulder elevation of streets.

Outlet protection computations for all outlets
dimensions and stone sizes for all outfalls

Proposed pipe and inlet drainage area map
limits of all areas and sub-areas draining to proposed structures, and existing structures or channels which will be impacted
acreage of each drainage area as used in computations
hydrologic coefficient for each drainage area as used in the computations
time of concentration for each drainage area as used in the computations
destination structure labeled for each drainage area (if not obvious)