

Douglas County Transportation and Land Services

Drainage Report Guidelines

The Drainage Report is to be inclusive, clear, legible and reproducible, with a complete set of drainage computations. The computations are to be presented in a rational format with information included so as to allow a reviewer to be able to reproduce the same results. The computations should provide sufficient information for an unbiased third party to be able to review the report and determine that all applicable standards have been met. All assumptions and computer input and output data, and variables listed in the computer printouts, should be clearly identified. Computer printouts should clearly show which sub-basin(s) they are applicable to and the design storm event identified thereon if multiple-storm events are addressed in the design. Include copies of design charts, nomographs or other design aids used, with the calculations.

All relevant geotechnical information related to the project, and all site specific soil logs and subsurface testing information should be included in the Drainage Report or provided in a separate report prepared and stamped by the geotechnical engineer.

The Drainage Report should also include a basin map. A pre-developed and post-developed basin map should be provided. The following items shall be included on pre-developed and post-developed basin maps:

- Site boundary
- Basin limits, (on-site and off-site) which contribute or receive runoff from the project, field verified by the engineer.
- Drainage sub-basins. All sub-basins should be clearly labeled and correlated with the calculations.
- Topographic contours, extending beyond the project or drainage basin boundaries to the extent necessary to confirm basin limits; in the absence of topographic mapping being available, the Engineer may field verify the basin limits including contributing off-site areas, and should describe how the basin limits were determined.
- Drainage features, natural or man-made, such drainage channels, culverts, closed depressions, manholes, etc.
- Time of concentration routes, clearly labeled and correlated with the calculations.
- Footprint of proposed drainage features, such as ponds, infiltration facilities, pipe routes, ditches, etc.
- Indications of floodplain limits, as defined by FEMA or other studies.
- North arrow and scale bar.
- Wetlands
- Existing easements

The Drainage Report is to identify existing drainage facilities which are clearly inadequate or need repair, such as collapsed culverts or culverts with a substantial amount of debris. The condition and capacity of existing drainage facilities located onsite, which are proposed to be utilized by the development, should be evaluated and discussed in the drainage report.

Calculations for detention and infiltration ponds may include the following: inflow and outflow hydrographs, level-pool routing calculations, a listing of the maximum water surface elevation, pond volume and discharge rating tables (stage/storage & stage/discharge). Hydrograph and level-pool routing calculation sheets clearly marked with the design storm event, applicable sub-basin(s), and pond identification name, which corresponds with the basin map and plans. If infiltration is to be a significant element in the design (sizing) of the on site retention facility, frozen ground conditions must be considered and addressed in the design report.

The drainage submittal shall incorporate all calculations for the determination of the required size of the system. Typical calculations include:

- Hydrology computations
- Culvert and pipe capacities and outlet velocity
- Inlet capacities
- Detention/Retention storage capacities
- Ditch capacities and velocities
- Map with the project plotted thereon

A copy of applicable floodplain maps, or studies within the project area should be included in the Drainage Report.

For additional drainage design guidelines refer to the *Stormwater Management Manual for Eastern Washington* and Ecology's web site at www.ecy.wa.gov/programs/wq/stormwater.

Reports and plans shall be stamped by a professional engineer, licensed in the state of Washington. Incomplete reports may be returned without County review.

Additional requirements are provided in Douglas County Code and Road Standards available on the Douglas County website at www.douglascountywa.net.