

DRAINAGE REPORT CHECKLIST

Owner's Name: _____ Engineer's Name: _____
Site Address: _____ Date: _____

The following checklist is not all-inclusive, but is generally representative of the requirements of the Marlborough Site Plan Review and Approval Ordinance (SPR&A) and the Planning Board's Rules and Regulations (S/D R&R). In all cases, you should use the checklist in conjunction with the SPR&A and S/D R&R as appropriate.

All reports shall be bound and include the following information:

Report Cover

- ☐ Project title/development name
- ☐ Site address
- ☐ Site map and parcel
- ☐ Owner's name, address, and telephone number
- ☐ Developer's name, address, fax and telephone number
- ☐ Engineer's and Surveyor's names, address, fax and telephone number
- ☐ Date of report (with latest revision date(s))
- ☐ Engineer's stamp

Pre- and Post-development Plans

- ☐ Pre- and post-development plans on 24"x36" sheets
- ☐ Clearly show all pre and post subcatchment areas
- ☐ Show all ultimate point source discharge locations for each subcatchment area
- ☐ Show all Tc paths with lengths and slopes for each subcatchment area
- ☐ Plans should show enough topographic information outside of the site to show pre and post discharge impacts

Summary

- ☐ Description of project
- ☐ Locus map
- ☐ Soil Conservation Service maps
- ☐ Description of existing conditions/use
- ☐ Description of proposed conditions/use
- ☐ Flow Summary table showing changes in pre and post-development flows for the 2, 10, 25, and 100-year storm events-Post-development flows shall not exceed pre-development flows

Pre-Development Conditions

- ☐ Pre-development drainage conditions (describe in report and coordinate with pre-development plans)
- ☐ Describe all existing subcatchment areas
- ☐ Describe (and label on plan) impervious and pervious areas within each subcatchment
- ☐ Provide CN number calculations
- ☐ Provide Tc calculations
- ☐ Provide flow calculations for the 2, 10, 25, and 100-year storm events
- ☐ Provide hydrographs showing time-stage relationship (peak flow, peak hour)
- ☐ Test Pit Data (locations shall be shown on pre- and post-construction plans)
- ☐ Groundwater elevations
- ☐ Percolation test results (without percolation test results, conservative assumptions will need to be made based on soil type. Assumptions to be verified during construction.)

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Post-Development Conditions

- ☐ Post-development drainage conditions (describe in report and coordinate with post-development plans)
- ☐ Describe all future subcatchment areas
- ☐ Describe (and label on plan) impervious and pervious areas within each subcatchment
- ☐ Provide CN number calculations
- ☐ Provide Tc calculations
- ☐ Provide flow calculations for the 2, 10, 25, and 100-year storm events
- ☐ Provide hydrographs showing time-stage relationship (peak flow, peak hour)

Detention Basins

- ☐ Description of basin (details, method of construction, sizing etc.)
- ☐ Provide flow calculations for the 2, 10, 25, and 100-year storm events-clearly indicate total flow into and out of basin
- ☐ Provide hydrographs showing time-stage relationship inside basin (peak flow, peak elevation, peak hour)
- ☐ Outfall structure detail showing all outfall elevations
- ☐ Recommend outfall structure with a low flow discharge and grated top
- ☐ Provide for 1 foot of freeboard
- ☐ Where necessary basin is to be designed and inspected by a Licensed Professional Geotechnical Engineer and stamped certification of proper design and inspection shall be provided to the City Engineer after installation and prior to as-builts being approved
- ☐ Detention basin sections showing all storm event elevations
- ☐ Emergency overflow spillway made of rip rap
- ☐ Basin inlet and outlet shall have flared end with rip rap apron
- ☐ Basin side slopes no steeper than 3:1
- ☐ Impervious core material keyed into existing subgrade within berm
- ☐ Provide concrete anti-seepage collar in basin berm around discharge pipe
- ☐ 10 foot wide level access around basin to provide for maintenance of the entire basin
- ☐ Enclose basin with gated fence (6' high)
- ☐ Verify groundwater elevations do not impact operation of basin
- ☐ All infiltration areas must be excavated and inspected by Conservation Commission or City Engineer. 24-hr notice for inspection must be provided.
- ☐ Provide calculations for sediment removal showing adequate removal prior to infiltration
- ☐ Provide no fewer than four inspection ports for any underground detention infiltration system
- ☐ Provide access for maintenance of entire system

Hydraulic Calculations

- ☐ Hydraulic calculations shall be based on the 25-year storm event
- ☐ Provide a hydraulic summary table

Stormwater Management

- ☐ Completed Stormwater Management Form from the latest edition of the Massachusetts Department of Environmental Protection Stormwater Management Policy
- ☐ Summary of pre and post-development flows
- ☐ Infiltration flows from recharge structures can not be subtracted from post-development flow calculations
- ☐ Provide water quality volume calculations (supported by SCS soil data)
- ☐ Describe Best Management Practice method proposed to improve water quality
- ☐ Provide TSS removal calculations (required and provided)
- ☐ Provide oil separation
- ☐ Provide recharge to groundwater volume calculations (required and provided)
- ☐ Recharge roof drains and provide calculations
- ☐ All subsurface structures shall be accessible for maintenance

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- ☐ All recharge rates shall be supported by actual percolation test results

Operation and maintenance section

- ☐ All drainage structures shall be inspected after every major storm including rainfall in excess of 2" or precipitation with high winds
- ☐ Remove debris from drainage structures and property that could inhibit proper function
- ☐ Inspection reports shall be filed for each inspection and recorded in log
- ☐ Inspection reports shall be filed with the Conservation Commission and City Engineer yearly for compliance
- ☐ All drainage structures shall be cleaned as required to remove debris and sediment
- ☐ Parking lots shall be swept as required to remove debris and sediment
- ☐ Detention/infiltration structures which fail to drain in 72 hours need to be assessed by a professional engineer for cause of problem and to propose corrective action. Corrective action must be implemented as soon as practicable
- ☐ Any hydrocarbons observed in drainage structures will be removed and disposed of in accordance with local, state, and federal laws
- ☐ During fall & spring remove accumulated leaves from catch basin and other drainage system elements
- ☐ Inspect all drainage system elements a minimum of twice a year
- ☐ Remove all accumulated sediment in catch basins, detention basins, vegetated swales, flared ends, and other areas as necessary and not less than annually
- ☐ When excessive sediment is encountered in catch basin sumps, drain pipe must also be inspected and cleaned as necessary
- ☐ Mow grass slopes and detention basins and remove cuttings at least twice a year

General Drainage Requirements

- ☐ Catch basins shall have 4 foot deep sumps
- ☐ All discharges to the City system in excess of the pre development rate (for all discharges unless can prove that cannot infiltrate on site as determined by the City engineer) at that location will require complete review of system from that point to outfall and mitigation of any and all capacity or structural issues within the City system.
- ☐ Drainage pipes shall be RCP (unless otherwise approved by the City Engineer) dual wall HDPE may be used with cover between 3' & 9'
- ☐ All drainage pipes shall be 12 inches in diameter (minimum)
- ☐ Minimum cover over pipe shall be 3.0 feet (2.0 feet absolute minimum if approved by City Engineer for valid reasons and accompanied by codes)
- ☐ Minimum slope of drainage pipe is 1.0% (0.5% absolute minimum if approved by City Engineer for valid reasons)
- ☐ Maximum slope of drainage pipe is 9%
- ☐ Velocity of flow within the pipe not be less than 2 ft/s (cleaning) or greater than 14 ft/s (scour)

Details

- ☐ Detention basin and underground detention/infiltration section showing bottom elevation, invert elevations, 100-year storm event elevation, 1' freeboard, top of basin elevation, outlet structure elevations, etc...
- ☐ Outlet structure detail
- ☐ Catch basin detail
- ☐ Trench detail