

1 **SECTION 4.8 POST CONSTRUCTION STORMWATER MANAGEMENT STANDARDS**

2 A. Purpose, Goals and Definitions

- 3 1. The purpose of post construction stormwater management standards is to provide  
4 reasonable guidance for the regulation of stormwater runoff to protect local natural  
5 resources from degradation and prevent adverse impacts to adjacent and downstream land,  
6 property, facilities, and infrastructure. These standards regulate discharges from  
7 stormwater and runoff from land development projects and other construction activities to  
8 control and minimize increases in stormwater runoff rates and volumes, soil erosion, stream  
9 channel erosion, and nonpoint source pollution associated with stormwater runoff.
- 10 2. The goal of these standards is to establish minimum stormwater management requirements  
11 and controls to protect and safeguard the general health, safety, and welfare of the public in  
12 the Town of Raymond. This regulation seeks to meet that goal through the following  
13 objectives:
- 14 a. Minimize increases in stormwater runoff from any development to reduce  
15 flooding, siltation and streambank erosion and maintain the integrity of stream  
16 channels.
  - 17 b. Minimize increases in nonpoint source pollution caused by stormwater runoff  
18 from development which would otherwise degrade local water quality.
  - 19 c. Minimize the total volume of surface water runoff which flows from any specific  
20 site during and following development to not exceed the pre-development  
21 hydrologic condition to the maximum extent practicable as allowable by site  
22 conditions.
  - 23 d. Reduce stormwater runoff rates and volumes, soil erosion and nonpoint source  
24 pollution, wherever possible, through stormwater management controls and to  
25 ensure that these management controls are properly maintained and pose no  
26 threat to public safety or cause excessive municipal expenditures.
  - 27 e. Protect the quality of groundwater resources, surface water bodies and wetlands.

28 **B. Minimum Thresholds for Applicability** *(This is the only section in the regulations that changes for*  
29 *SUBDIVISION regulations. Everything else stays the same. All amended language that was worked on*  
30 *in site plan regulations has been carried over.)*

- 31 1. The Post-Construction Stormwater Management Standards apply to subdivisions that result  
32 in creation of a private road or a road intended for adoption as a public road. All stormwater  
33 runoff generated from the proposed private or public roadway(s) and any other stormwater  
34 runoff contributing to the roadway stormwater management system(s) shall be managed  
35 and treated in full compliance with these standards.
- 36 2. For subdivisions comprising lots with frontage on existing private or public roadways,  
37 roadside drainage and any other stormwater runoff from the new lots discharging to the  
38 roadside drainage system must be managed for: stormwater runoff quantity/volume; and  
39 water quality treatment if stormwater is discharged to the municipality's drainage system  
40 subject to the EPA MS4 permit.
- 41 3. The following activities are considered exempt from preparing and submitting a stormwater  
42 management plan:
- 43 a. Agricultural and forestry practices located outside wetlands and surface water  
44 setbacks and/or buffers.

- 45                   b. Resurfacing and routine maintenance of existing roads and parking lots.  
46                   c. Exterior and interior alterations and maintenance to existing buildings and  
47                   structures.
- 48 C. Stormwater Management for New Development
- 49           1. All proposed stormwater management practices and treatment systems shall meet the  
50           following performance standards:
- 51                   a. Stormwater management and erosion and sediment control practices shall be  
52                   located outside any specified buffer zones unless otherwise approved by the  
53                   Planning Board. Alternatives to stream and wetland crossings that eliminate or  
54                   minimize environmental impacts shall be considered whenever possible.
- 55                   b. Low Impact Development (LID) site planning and design strategies are encouraged  
56                   to be used to the maximum extent practicable (MEP) to reduce stormwater runoff  
57                   volumes, protect water quality, and maintain predevelopment site hydrology. LID  
58                   techniques have the goals of protecting water quality, maintaining  
59                   predevelopment site hydrology. LID techniques that preserve existing vegetation,  
60                   reduce the development footprint, minimize, or disconnect impervious area, and  
61                   use enhanced stormwater best management practices (BMP's) (such as rain  
62                   gardens, bio retention systems, tree box filters, and similar stormwater  
63                   management landscaping techniques) shall be incorporated into landscaped  
64                   areas. Capture and reuse of stormwater is strongly encouraged. The applicant  
65                   must document in writing why LID strategies are not appropriate when not used  
66                   to manage stormwater.
- 67                   c. All stormwater treatment areas shall be planted with native plantings appropriate  
68                   for the site conditions: trees, grasses, shrubs and/or other native plants in  
69                   sufficient numbers and density to prevent soil erosion and to achieve the water  
70                   quality treatment requirements of this section.
- 71                   d. All stormwater installations and areas that receive rainfall runoff must be  
72                   designed to drain within a maximum of 72 hours for vector control.
- 73                   e. Salt storage areas shall be fully covered with permanent or semi-permanent  
74                   measures and loading/offloading areas shall be located and designed to not drain  
75                   directly to receiving waters and maintained with good housekeeping measures in  
76                   accordance with NH DES published guidance. Runoff from snow and salt storage  
77                   areas shall enter treatment areas as specified above before being discharged to  
78                   receiving waters or allowed to infiltrate into the groundwater. See NHDES  
79                   published guidance fact sheets on road salt and water quality, and snow disposal  
80                   at <http://des.nh.gov/organization/commissioner/pip/factsheets/wmb/index.htm>
- 81                   f. Surface runoff shall be directed into appropriate stormwater control measures  
82                   designed for treatment and/or filtration to the MEP and/or captured and reused  
83                   onsite.
- 84                   g. All newly generated stormwater from new development shall be treated on the  
85                   development site. Runoff shall not be discharged from the development site to  
86                   municipal drainage systems or privately owned drainage systems (whether  
87                   enclosed or open drainage) or to surface water bodies and wetlands in rates  
88                   greater than discharged under existing conditions (developed condition or

- 89 undeveloped condition). A development plan shall include provisions to retain  
90 natural predevelopment watershed areas on the site by using the natural flow  
91 patterns.
- 92 h. Runoff from impervious surfaces shall be treated to achieve at least 80% removal  
93 of Total Suspended Solids and at least 60% removal of both total nitrogen and  
94 total phosphorus using appropriate treatment measures, as specified in the NH  
95 Stormwater Manual. Volumes 1 and 2, December 2008, as amended (refer to  
96 Volume 2, page 6, Table 2.1 Summary of Design Criteria, Water Quality Volume for  
97 treatment criteria) or other equivalent means. Where practical, the use of natural,  
98 vegetated filtration and/or infiltration practices or subsurface gravel wetlands for  
99 water quality treatment is preferred given its relatively high nitrogen removal  
100 efficiency. All new impervious area draining to surface waters impaired by  
101 nitrogen, phosphorus or nutrients shall be treated with stormwater BMP's  
102 designed to optimize pollutant removal efficiencies based on design standards  
103 and performance data published by the UNH Stormwater Center and/or included  
104 in the latest version of the NH Stormwater Manual. Note: The Anti-Degradation  
105 provisions of the State Water Quality Standards require that runoff from new  
106 development shall not contribute additional pollutant loads to existing water body  
107 impairments.
- 108 i. Measures shall be taken to control the post-development peak rate runoff so that  
109 it does not exceed pre-development runoff. Drainage analyses shall include  
110 calculations comparing pre- and post-development stormwater runoff rates (cubic  
111 feet/second) and volumes (cubic feet) for the 1-inch rainstorm and the 2-year, 10-  
112 year, 25-year, and 50-year 24-hour storm events. Similar measures shall be taken  
113 to control the post-development runoff volume to infiltrate the groundwater  
114 recharge volume GRV according to the following ratios of Hydrologic Soil Group  
115 (HSG) type versus infiltration rate multiplier: HSG-A: 0.4; HSG-B: 0.25; HSG-C: 0.1;  
116 HSG-D: 0.00. For sites where infiltration is limited or not practicable, the applicant  
117 must demonstrate that the project will not create or contribute to water quality  
118 impairment. Infiltration structures shall be in locations with the highest  
119 permeability on the site.
- 120 j. The design of the stormwater drainage systems shall provide for the disposal of  
121 stormwater without flooding or functional impairment to streets, adjacent  
122 properties, downstream properties, soils, or vegetation.
- 123 k. The design of the stormwater management systems shall account for upstream  
124 and upgradient runoff that flows onto, over, or through the site to be developed  
125 or re-developed, and provide for this contribution of runoff.
- 126 l. Whenever practicable, native site vegetation shall be retained, protected, or  
127 supplemented. Any stripping of vegetation shall be done in a manner that  
128 minimizes soil erosion. development impervious surfaces, buildings and  
129 structures; surface water bodies and wetlands; drainage patterns, sub-catchment  
130 and watershed boundaries; building setbacks and buffers, locations of various  
131 hydrologic group soil types, mature vegetation, land topographic contours with  
132 minimum 2-foot intervals and spot grades where necessary for sites that are flat.

- 133 2. Submission Requirements for Stormwater Management Report and Plans  
134 a. The SMP shall include a narrative description and a Proposed Conditions Site Plan  
135 showing all post-development proposed impervious surfaces, buildings and  
136 structures; temporary and permanent stormwater management elements and  
137 BMP, including BMP GIS coordinates and GIS files; important hydrologic features  
138 created or preserved the site; drainage patterns, sub-catchment and watershed  
139 boundaries; building setbacks and buffers; proposed tree clearing and topographic  
140 contours with minimum 2-foot intervals. The plans shall provide calculations and  
141 identification of the total area of disturbance proposed on the site (and off site if  
142 applicable) and total area of new impervious surface created. A summary of the  
143 drainage analysis showing a comparison of the estimated peak flow and volumes  
144 for various design storms (see Table 1. Stormwater Infrastructure Design Criteria)  
145 at each of the outlet locations shall be included.  
146 b. The SMP shall describe the general approach and strategies implemented, and the  
147 facts relied upon, to meet the goals of Section 1.15-3. A and C.: The SMP shall  
148 include design plans and/or graphical sketch(es) of all proposed above ground LID  
149 practices.  
150 c. The SMP shall include calculations of the change in impervious area, pollution  
151 loading and removal volumes for each best management practice, and GIS files  
152 containing the coordinates of all stormwater infrastructure elements (e.g. catch  
153 basins, swales, detention/bioretenion areas, piping).  
154 d. The SMP shall include a description and a proposed Site Plan showing proposed  
155 erosion and sediment control measures, limits of disturbance, temporary and  
156 permanent soil stabilization measures in accordance with the NHDES Stormwater  
157 Manual Volume 3 (most recent version) as well as a construction site inspection  
158 plan including phased installation of best management practices and final  
159 inspection upon completion of construction.  
160 e. The SMP shall include a long-term stormwater management BMP inspection and  
161 maintenance plan (see Section 1.15-2.E) that describes the responsible parties and  
162 contact information for the qualified individuals who will perform future BMP  
163 inspections. The inspection frequency, maintenance and reporting protocols shall  
164 be included.  
165 f. The SMP shall describe and identify locations of any proposed deicing chemical  
166 and/or snow storage areas. SMP will describe how deicing chemical use will be  
167 minimized or used most efficiently.  
168 g. In urbanized areas that are subject to the EPA MS4 Stormwater Permit and will  
169 drain to chloride-impaired waters, any new developments and redevelopment  
170 projects shall submit a description of measures that will be used to minimize salt  
171 usage, and track and report amounts applied using the UNH Technology Transfer  
172 Center online tool (<http://www.roadsalt.unh.edu/Salt/>) in accordance with  
173 Appendix H of the NH MS4 Permit.  
174 3. General Performance Criteria for Stormwater Management Plans  
175 a. All applications shall apply site design practices to reduce the generation of  
176 stormwater in the post-developed condition, reduce overall impervious surface

- 177 coverage, seek opportunities to capture and reuse and minimize and discharge of  
178 stormwater to the municipal stormwater management system.
- 179 b. Water quality protection.
- 180 i. All stormwater runoff generated from new development or redevelopment  
181 shall not be discharged directly into a jurisdictional wetland or surface water  
182 body without adequate treatment.
- 183 ii. All developments shall provide adequate management of stormwater runoff  
184 and prevent discharge of stormwater runoff from creating or contributing to  
185 water quality impairment.
- 186 c. Onsite groundwater recharge rates shall be maintained by promoting infiltration  
187 through use of structural and non-structural methods. The annual recharge from  
188 the post development site shall maintain or exceed the annual recharge from pre-  
189 development site conditions. Capture and reuse of stormwater runoff is  
190 encouraged in instances where groundwater recharge is limited by site conditions  
191 All stormwater management practices shall be designed to convey stormwater to  
192 allow for maximum groundwater recharge. This shall include, but not be limited  
193 to:
- 194 i. Maximizing flow paths from collection points to outflow points.  
195 ii. Use of multiple BMPs.  
196 iii. Retention of and discharge to fully vegetated areas.  
197 iv. Maximizing use of infiltration practices.  
198 v. Stormwater System Design Performance Standards.
- 199 d. Stormwater system design, performance standards and protection criteria shall be  
200 provided as prescribed in Table 1 below. Calculations shall include sizing of all  
201 structures and best management practices, including sizing of emergency  
202 overflow structures based on assessment of the 100-year 24-hour frequency  
203 storm discharge rate.
- 204 e. The sizing and design of stormwater management practices shall utilize new  
205 precipitation data from the Northeast Region Climate Center (NRCC) or the most  
206 recent precipitation atlas published by the National Oceanic and Atmospheric  
207 Administration (NOAA) for the sizing and design of all stormwater management  
208 practices. See the NRCC website at <http://precip.eas.cornell.edu/>.
- 209 f. All stormwater management practices involving bioretention and vegetative cover  
210 as a key functional component must have a landscaping plan detailing both the  
211 type and quantities of plants and vegetation to be in used in the practice and how  
212 and who will manage and maintain this vegetation. The use of native plantings  
213 appropriate for site conditions is strongly encouraged for these types of  
214 stormwater treatment areas. The landscaping plan must be prepared by a  
215 registered landscape architect, soil conservation district office, or another  
216 qualified professional.
- 217 4. Spill Prevention, Control and Countermeasure (SPCC) Plan. Any existing or otherwise  
218 permitted use or activity having regulated substances in amounts greater than five gallons,  
219 shall submit to the local official such as Fire Chief or Emergency Response Official a SPCC  
220 plan for review and approval. The Plan will include the following elements:

- 221 a. Disclosure statements describing the types, quantities, and storage locations of all
- 222 regulated substances that will be part of the proposed use or activity.
- 223 b. Owner and spill response manager’s contact information.
- 224 c. Location of all surface waters and drainage patterns.
- 225 d. A narrative describing the spill prevention practices to be employed when
- 226 normally using regulated substances.
- 227 e. Containment controls, both structural and non-structural.
- 228 f. Spill reporting procedures, including a list of municipal personnel or agencies that
- 229 will be contacted to assist in containing the spill, and the amount of a spill
- 230 requiring outside assistance and response.
- 231 g. Name of a contractor available to assist in spill response, contaminant, and
- 232 cleanup.
- 233 h. The list of available clean-up equipment with instructions available for use on-site
- 234 and the names of employees with adequate training to implement containment
- 235 and clean up response.
- 236 D. Stormwater Management for Redevelopment
- 237 1. Redevelopment (as applicable to this stormwater regulation) means:
- 238 a. Any construction, alteration, or improvement that disturbs existing impervious
- 239 area (including demolition and removal of road/parking lot materials down to the
- 240 erodible subbase) or expands existing impervious cover by any amount, where the
- 241 existing land use is commercial, industrial, institutional, governmental,
- 242 recreational, or multifamily residential.
- 243 b. Any redevelopment activity that results in improvements with no increase in
- 244 impervious area shall be considered redevelopment activity under this regulation
- 245 if capital cost of improvements is greater than 30% of the assessed property
- 246 value.
- 247 c. Any new impervious area over portions of a site that are currently pervious.
- 248 2. The following activities are not considered redevelopment unless they meet the above
- 249 criteria in section D.1.b.:
- 250 a. Interior and exterior building renovation.
- 251 b. Resurfacing of an existing paved surface (e.g. parking lot, walkway or roadway).
- 252 c. Pavement excavation and patching that is incidental to the primary project
- 253 purpose, such as replacement of a collapsed storm drain.
- 254 d. Landscaping installation and maintenance.
- 255 3. Redevelopment applications shall comply with the requirements of Sections C.2 Submission
- 256 Requirements for Stormwater Management Report and Plans, C.3 General Performance
- 257 Criteria for Stormwater Management Plans, and C.4 Spill Prevention, Control and
- 258 Countermeasure (SPCC) Plan.
- 259 4. For sites meeting the definition of a redevelopment project and having less than 60%
- 260 existing impervious surface coverage, the stormwater management requirements will be
- 261 the same as other new development projects. The applicant must satisfactorily demonstrate
- 262 that impervious area is minimized, and LID practices have been implemented on-site to the
- 263 MEP.

- 264 5. For sites meeting the definition of a redevelopment project and having more than 60%  
265 existing impervious surface area, stormwater shall be managed for water quality in  
266 accordance with one or more of the following techniques, listed in order of preference:  
267 a. Implement measures onsite that result in disconnection or treatment of 100% of  
268 the additional proposed impervious surface area and at least 30% of the existing  
269 impervious area and pavement areas, preferably using filtration and/or infiltration  
270 practices.  
271 b. If resulting in greater overall water quality improvement on the site, implement  
272 LID practices to the MEP to provide treatment of runoff generated from at least  
273 60% of the entire developed site area.
- 274 6. Runoff from impervious surfaces shall be treated to achieve at least 80% removal of Total  
275 Suspended Solids and at least 60% removal of both total nitrogen and total phosphorus  
276 using appropriate treatment measures, as specified in the NH Stormwater Manual. Volumes  
277 1 and 2, December 2008, as amended (refer to Volume 2, page 6, Table 2.1 Summary of  
278 Design Criteria, Water Quality Volume for treatment criteria) or other equivalent means.  
279 Where practical, the use of natural, vegetated filtration and/or infiltration practices or  
280 subsurface gravel wetlands for water quality treatment is preferred given its relatively high  
281 nitrogen removal efficiency. All new impervious area draining to surface waters impaired by  
282 nitrogen, phosphorus or nutrients shall be treated with stormwater BMP's designed to  
283 optimize pollutant removal efficiencies based on design standards and performance data  
284 published by the UNH Stormwater Center and/or included in the latest version of the NH  
285 Stormwater Manual. Note: The Anti-Degradation provisions of the State Water Quality  
286 Standards require that runoff from development shall not contribute additional pollutant  
287 loads to existing water body impairments.
- 288 7. All newly generated stormwater from redevelopment shall be treated on the development  
289 site. Runoff shall not be discharged from a redevelopment site to municipal drainage  
290 systems or privately owned drainage systems (whether enclosed or open drainage) or to  
291 surface water bodies and wetlands in rates greater than discharged under existing  
292 conditions (developed condition or undeveloped condition).
- 293 8. Off – site mitigation allowance: In cases where the applicant demonstrates, to the  
294 satisfaction of the Planning Board, that on-site treatment has been implemented to the MEP  
295 or is not feasible, off-site mitigation will be an acceptable alternative if implemented within  
296 the same subwatershed, within the project's drainage area or within the drainage area of  
297 the receiving water body. To comply with local watershed objectives the mitigation site  
298 would be preferably situated in the same subwatershed as the development and  
299 impact/benefit the same receiving water. Off-site mitigation shall only be approved by the  
300 Planning Board with the following conditions:  
301 a. The Conservation Commission has been given the opportunity to advise the  
302 Planning Board regarding the proposed off-site mitigation.  
303 b. The off-site mitigation shall be equivalent to no less than the total area of  
304 impervious cover NOT treated on-site. Treatment of the impervious area shall  
305 comply with all standards of this regulation.  
306 c. An approved off-site location must be identified, the specific management  
307 measures identified, and if not owned by the applicant, with a written agreement

308 with the property owner(s) and an implementation schedule developed in  
309 accordance with planning board review. The applicant must also demonstrate that  
310 there is no downstream drainage or flooding impacts that would result from not  
311 providing on-site management for large storm events.

312 E. Stormwater Management Plan and Site Inspections

- 313 1. The applicant shall provide that all stormwater management and treatment practices have  
314 an enforceable operations and maintenance plan and agreement to ensure the system  
315 functions as designed. This agreement will include all maintenance easements required to  
316 access and inspect the stormwater treatment practices, and to perform routine  
317 maintenance as necessary to ensure proper functioning of the stormwater system. The  
318 operations and maintenance plan shall specify the parties responsible for the proper  
319 maintenance of all stormwater treatment practices. The operations and maintenance shall  
320 be provided to the Planning Board as part of the application prior to issuance of any local  
321 permits for land disturbance and construction activities.
- 322 2. The applicant shall provide legally binding documents for filing with the Registry of Deeds  
323 which demonstrate that the obligation for maintenance of stormwater best management  
324 practices and infrastructure runs with the land and that the Town has legal access to inspect  
325 the property to ensure their proper function or maintain onsite stormwater infrastructure  
326 when necessary to address emergency situations or conditions.
- 327 3. The property owner shall bear responsibility for the installation, construction, inspection,  
328 and maintenance of all stormwater management and erosion control measures required by  
329 the provisions of these regulations and as approved by the Planning Board, including  
330 emergency repairs completed by the Town.

331 F. Stormwater Management Plan Recordation

- 332 1. Stormwater management and sediment and erosion control plans shall be incorporated as  
333 part of any approved site plan. A Notice of Decision acknowledging the Planning Board  
334 approval of these plans shall be recorded at the Registry of Deeds. The Notice of Decision  
335 shall be referenced to the property deed (title/book/page number) and apply to all persons  
336 that may acquire any property subject to the approved stormwater management and  
337 sediment control plans. The Notice of Decision shall reference the requirements for  
338 maintenance pursuant to the stormwater management and erosion and sediment control  
339 plans as approved by the Planning Board.
- 340 2. The applicant shall submit as-built drawings of the constructed stormwater management  
341 system following construction.

342 G. Inspection and Maintenance Responsibility

- 343 1. Select Board or their designated agent shall have site access to complete inspections to  
344 ensure compliance with the approved stormwater management and sediment and erosion  
345 control plans. Such inspections shall be performed at a time agreed upon with the  
346 landowner.
- 347 a. If permission to inspect is denied by the landowner, municipal staff or their  
348 designated agent shall secure an administrative inspection warrant from the  
349 district or superior court under RSA 595-B Administrative Inspection Warrants.  
350 Expenses associated with inspections shall be the responsibility of the  
351 applicant/property owner.



- 352                    b. If violations or non-compliance with a condition(s) of approval are found on the  
 353 site during routine inspections, the inspector shall provide a report to the Planning  
 354 Board documenting these violations or non-compliance including recommend  
 355 corrective actions. The Planning Board shall notify the property owner in writing  
 356 of these violations or non-compliance and corrective actions necessary to bring  
 357 the property into full compliance. The Planning Board, at their discretion, may  
 358 recommend to the Select Board to issue a stop work order if corrective actions are  
 359 not completed within 10 days.
- 360                    c. If corrective actions are not completed within a period of 30 days from the  
 361 Planning Board or Board notification, the Planning Board may exercise their  
 362 jurisdiction under RSA 676:4-a Revocation of Recorded Approval.
- 363                    2. The applicant shall bear final responsibility for the installation, construction, inspection, and  
 364 disposition of all stormwater management and erosion control measures required by the  
 365 Planning Board. Site development shall not begin before the Stormwater Management Plan  
 366 receives written approval by the Planning Board.
- 367                    3. In the event a property owner refuses to repair infrastructure that is damaged or is not  
 368 functioning properly, the Town retains the right but not the obligation and accepts no  
 369 responsibility, to repair or maintain stormwater infrastructure if a property is abandoned or  
 370 becomes vacant.
- 371                    4. Landowners shall be responsible for submitting a report to the Planning Department or  
 372 designated agent by September 1 every two years, with the first report due within two years  
 373 of the receipt of an Occupancy Permit. The report shall be signed and stamped by a qualified  
 374 professional engineer of the landowner’s choice that all stormwater management and  
 375 erosion control measures are functioning per the approved stormwater management plan.  
 376 The report shall note if any stormwater infrastructure has needed any repairs other than  
 377 routine maintenance and the results of those repairs. If the stormwater infrastructure is not  
 378 functioning per the approved stormwater management plan the landowner shall report on  
 379 the malfunction in their report and include detail regarding when the infrastructure shall be  
 380 repaired and functioning as approved.
- 381                    5. If no report is filed by September 1 in the year the report is due, the Select Board or their  
 382 designated agent shall have site access to complete routine inspections to ensure  
 383 compliance with the approved stormwater management and sediment and erosion control  
 384 plans. Such inspections shall be performed at a time agreed upon with the landowner.

385 Table 1. Stormwater Infrastructure Design Criteria

Design Criteria	Description
<b>Water Quality Volume (WQV)</b>	$WQV = (P)(Rv)(A)$ P = 1 inch of rainfall Rv = unitless runoff coefficient, $Rv = 0.05 + 0.9(I)$ I = percent impervious cover draining to the structure converted to decimal form A = total site area draining to the structure

<p><b>Water Quality Flow (WQF)</b></p>	<p>WQF = (q<sub>u</sub>)(WQV)                      WQV = water quality volume calculated as noted above                      q<sub>u</sub> = unit peak discharge from TR-55 exhibits 4-II and 4-III</p> <p>Variables needed for exhibits 4-II and 4-III:                      I<sub>a</sub> = the initial abstraction = 0.2S                      S = potential maximum retention in inches = (1000/CN) - 10                      CN = water quality depth curve number                      = 1000/(10+5P+10Q-10[Q<sup>2</sup>+1.25(Q)(P)]<sup>0.5</sup>)                      P = 1 inch of rainfall                      Q = the water quality depth in inches = WQV/A                      A = total area draining to the design structure</p>										
<p><b>Groundwater Recharge Volume (GRV)</b></p>	<p>GRV = (A<sub>i</sub>)(R<sub>d</sub>)                      A<sub>i</sub> = the total area of effective impervious surfaces that will exist on the site after development                      R<sub>d</sub> = the groundwater recharge depth based on the USDA/NRCS hydrologic soil group, as follows:</p> <table border="0" data-bbox="581 814 987 982"> <thead> <tr> <th>Hydrologic Group</th> <th>R<sub>d</sub> (inches)</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>0.40</td> </tr> <tr> <td>B</td> <td>0.25</td> </tr> <tr> <td>C</td> <td>0.10</td> </tr> <tr> <td>D</td> <td>0.00</td> </tr> </tbody> </table>	Hydrologic Group	R <sub>d</sub> (inches)	A	0.40	B	0.25	C	0.10	D	0.00
Hydrologic Group	R <sub>d</sub> (inches)										
A	0.40										
B	0.25										
C	0.10										
D	0.00										
<p><b>Channel Protection Volume (CPV)</b></p>	<p>If the 2-year, 24-hour post-development storm volume <u>does not increase</u> due to development then: control the 2-year, 24-hour post-development peak flow rate to the 2-year, 24-hour predevelopment level.                      If the 2-year, 24-hour post-development storm volume <u>does increase</u> due to development then: control the 2-year, 24-hour post-development peak flow rate to ½ of the 2-year, 24-hour pre-development level or to the 1-year, 24-hour pre-development level.</p>										
<p><b>Peak Control</b></p>	<p>Post-development peak discharge rates shall not exceed pre-development peak discharge rates for the 10-year and 50-year, 24-hour storms</p>										
<p><b>EIC and UDC</b></p>	<p>%EIC = area of effective impervious cover/total drainage areas within a project area x 100                      %UDC = area of undisturbed cover/total drainage area within a project area x 100</p>										

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