

*Borough of Hillsdale, NJ  
Tuesday, October 27, 2020*

## Chapter 310. Land Use

### Part 5. Subdivision and Site Plan Review

#### Article XXVI. Site Plan Design Standards

##### § 310-107. Stormwater management.

[Amended 4-11-2006 by Ord. No. 06-06]

- A. Definitions. Unless specifically defined below, words or phrases used in this section shall be interpreted so as to give them the meaning they have in common usage and to give this section its most reasonable application. The definitions below are the same as or based on the corresponding definitions in the Stormwater Management Rules at N.J.A.C. 7:8-1.2.

##### **CAFRA CENTERS, CORES OR NODES**

Those areas within boundaries accepted by the New Jersey Department of Environmental Protection (the Department) pursuant to N.J.A.C. 7:8E-5B.

##### **CAFRA PLANNING MAP**

The geographic depiction of the boundaries for Coastal Planning Areas, CAFRA Centers, CAFRA Cores and CAFRA Nodes pursuant to N.J.A.C. 7:7E-5B.3.

##### **COMPACTION**

The increase in soil bulk density.

##### **CORE**

A pedestrian-oriented area of commercial and civic uses serving the surrounding municipality, generally including housing and access to public transportation.

##### **COUNTY REVIEW AGENCY**

An agency designated by the County Board of Chosen Freeholders to review municipal stormwater management plans and implementing ordinance(s). The county review agency may either be:

- (1) A county planning agency; or
- (2) A county water resource association created under N.J.S.A. 58:16A-55.5, if the ordinance or resolution delegates authority to approve, conditionally approve, or disapprove municipal stormwater management plans and implementing ordinances.

##### **DEPARTMENT**

The New Jersey Department of Environmental Protection.

##### **DESIGN ENGINEER**

A person professionally qualified and duly licensed in New Jersey to perform engineering services that may include, but not necessarily be limited to, development of project

requirements, creation and development of project design and preparation of drawings and specifications.

### **DESIGNATED CENTER**

A State Development and Redevelopment Plan Center as designated by the State Planning Commission, such as urban, regional, town, village, or hamlet.

### **DEVELOPMENT**

The division of a parcel of land into two or more parcels, the construction, reconstruction, conversion, structural alteration, relocation or enlargement of any building or structure, any mining excavation or landfill, and any use or change in the use of any building or other structure, or land or extension of use of land, by any person, for which permission is required under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq. In the case of development of agricultural lands, development means: any activity that requires a state permit; any activity reviewed by the County Agricultural Board (CAB) and the State Agricultural Development Committee (SADC), and municipal review of any activity not exempted by the Right to Farm Act, N.J.S.A. 4:1C-1 et seq.

### **DRAINAGE AREA**

A geographic area within which stormwater, sediments or dissolved materials drain to a particular receiving water body or to a particular point along a receiving water body.

### **EMPOWERMENT NEIGHBORHOOD**

A neighborhood designated by the Urban Coordinating Council "in consultation and conjunction with" the New Jersey Redevelopment Authority pursuant to N.J.S.A. 55:19-69.

### **ENVIRONMENTALLY CRITICAL AREAS**

An area or feature which is of significant environmental value, including but not limited to: stream corridors; natural heritage priority sites; habitat of endangered or threatened species; large areas of contiguous open space or upland forest; steep slopes; and wellhead protection and groundwater recharge areas. Habitats of endangered or threatened species are identified using the Department's Landscape Project as approved by the Department's Endangered and Nongame Species Program.

### **EROSION**

The detachment and movement of soil or rock fragments by water, wind, ice or gravity.

### **IMPERVIOUS SURFACE**

A surface that has been covered with a layer of material so that it is highly resistant to infiltration by water. This definition is for the purpose of this stormwater management ordinance only.

### **INFILTRATION**

The process by which water seeps into the soil from precipitation.

### **MAJOR DEVELOPMENT**

Any development that provides for ultimately disturbing one or more acres of land. Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation.

### **MUNICIPALITY**

Any city, borough, town, township, or village.

### **NODE**

An area designated by the State Planning Commission concentrating facilities and activities that are not organized in a compact form.

### **NUTRIENT**

A chemical element or compound, such as nitrogen or phosphorus, which is essential to and promotes the development of organisms.

**PERSON**

Any individual, corporation, company, partnership, firm, association, Borough of Hillsdale, or political subdivision of this state subject to municipal jurisdiction pursuant to the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq.

**POLLUTANT**

Any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, refuse, oil, grease, sewage sludge, munitions, chemical wastes, biological materials, medical wastes, radioactive substance [except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)], thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt, industrial, municipal, agricultural, and construction waste or runoff, or other residue discharged directly or indirectly to the land, groundwaters or surface waters of the state, or to a domestic treatment works. "Pollutant" includes both hazardous and nonhazardous pollutants.

**RECHARGE**

The amount of water from precipitation that infiltrates into the ground and is not evapotranspired.

**SEDIMENT**

Solid material, mineral or organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water or gravity as a product of erosion.

**SITE**

The lot or lots upon which a major development is to occur or has occurred.

**SOIL**

All unconsolidated mineral and organic material of any origin.

**STATE DEVELOPMENT AND REDEVELOPMENT PLAN METROPOLITAN PLANNING AREA (PA1)**

An area delineated on the State Plan Policy Map and adopted by the State Planning Commission that is intended to be the focus for much of the state's future redevelopment and revitalization efforts.

**STATE PLAN POLICY MAP**

The geographic application of the State Development and Redevelopment Plan's goals and statewide policies, and the official map of these goals and policies.

**STORMWATER**

Water resulting from precipitation (including rain and snow) that runs off the land's surface, is transmitted to the subsurface, or is captured by separate storm sewers or other sewage or drainage facilities, or conveyed by snow removal equipment.

**STORMWATER MANAGEMENT BASIN**

An excavation or embankment and related areas designed to retain stormwater runoff. A stormwater management basin may either be normally dry (that is, a detention basin or infiltration basin), retain water in a permanent pool (a retention basin), or be planted mainly with wetland vegetation (most constructed stormwater wetlands).

**STORMWATER MANAGEMENT MEASURE**

Any structural or nonstructural strategy, practice, technology, process, program, or other method intended to control or reduce stormwater runoff and associated pollutants, or to induce or control the infiltration or groundwater recharge of stormwater or to eliminate illicit or illegal nonstormwater discharges into stormwater conveyances.

**STORMWATER RUNOFF**

Water flow on the surface of the ground or in storm sewers, resulting from precipitation.

**TIDAL FLOOD HAZARD AREA**

A flood hazard area, which may be influenced by stormwater runoff from inland areas, but which is primarily caused by the Atlantic Ocean.

**URBAN COORDINATING COUNCIL EMPOWERMENT NEIGHBORHOOD**

A neighborhood given priority access to state resources through the New Jersey Redevelopment Authority.

**URBAN ENTERPRISE ZONES**

A zone designated by the New Jersey Enterprise Zone Authority pursuant to the New Jersey Urban Enterprise Zones Act, N.J.S.A. 52:27H-60 et seq.

**URBAN REDEVELOPMENT ARE**

A Previously developed portions of areas:

- (1) Delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1), Designated Centers, Cores or Nodes;
- (2) Designated as CAFRA Centers, Cores or Nodes;
- (3) Designated as Urban Enterprise Zones; and
- (4) Designated as Urban Coordinating Council Empowerment Neighborhoods.

**WATERS OF THE STATE**

The ocean and its estuaries, all springs, streams, wetlands, and bodies of surface or groundwater, whether natural or artificial, within the boundaries of the State of New Jersey or subject to its jurisdiction.

**WETLANDS OR WETLAND**

An area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

**B. Scope and purpose.**

- (1) Policy statement. Flood control, groundwater recharge, and pollutant reduction through nonstructural or low-impact techniques shall be explored before relying on structural best management practices (BMPs). Structural BMPs shall be integrated with nonstructural stormwater management strategies and proper maintenance plans. Nonstructural strategies include both environmentally sensitive site design and source controls that prevent pollutants from being placed on the site or from being exposed to stormwater. Source control plans shall be developed based upon physical site conditions and the origin, nature, and the anticipated quantity or amount of potential pollutants. Multiple stormwater management BMPs may be necessary to achieve the established performance standards for water quality, quantity, and groundwater recharge.
- (2) Purpose. It is the purpose of this section to establish minimum stormwater management requirements and controls for "major development," as defined in Subsection **A**.
- (3) Applicability.
  - (a) This section shall be applicable to all site plans and subdivisions for the following major developments that require preliminary or final site plan or subdivision review:

- [1] Nonresidential major developments; and
  - [2] Aspects of residential major developments that are not preempted by the Residential Site Improvement Standards at N.J.A.C. 5:21.
- (b) This section shall also be applicable to all major developments undertaken by the Borough of Hillsdale.
- (4) Compatibility with other permit and ordinance requirements. Development approvals issued for subdivisions and site plans pursuant to this section are to be considered an integral part of development approvals under the subdivision and site plan review process and do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance. In their interpretation and application, the provisions of this section shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare. This section is not intended to interfere with, abrogate, or annul any other ordinances, rule or regulation, statute, or other provision of law except that, where any provision of this section imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, the more restrictive provisions or higher standards shall control.
- C. General standards. Design and performance standards for stormwater management measures.
- (1) Stormwater management measures for major development shall be developed to meet the erosion control, groundwater recharge, stormwater runoff quantity, and stormwater runoff quality standards in Subsection **D**. To the maximum extent practicable, these standards shall be met by incorporating nonstructural stormwater management strategies into the design. If these strategies alone are not sufficient to meet these standards, structural stormwater management measures necessary to meet these standards shall be incorporated into the design.
  - (2) The standards in this section apply only to new major development and are intended to minimize the impact of stormwater runoff on water quality and water quantity in receiving water bodies and maintain groundwater recharge. The standards do not apply to new major development to the extent that alternative design and performance standards are applicable under a regional stormwater management plan or water quality management plan adopted in accordance with Department rules.
  - (3) Alternative standards shall provide at least as much protection from stormwater-related loss of groundwater recharge, stormwater quantity and water quality impacts of major development projects as would be provided under the standards in N.J.A.C. 7:8-5.
- D. Stormwater management requirements for major development.
- (1) The development shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development in accordance with Subsection **J**.
  - (2) Stormwater management measures shall avoid adverse impacts of concentrated flow on habitat for threatened and endangered species as documented in the Department's Landscape Project or Natural Heritage Database established under N.J.S.A. 13:1B-15.147 through 15.150, particularly *Helonias bullata* (swamp pink) and/or *Clemmys muhlnebergi* (bog turtle).
  - (3) The following linear development projects are exempt from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Subsections **D(6)** and **D(7)**:
    - (a) The construction of an underground utility line, provided that the disturbed areas are revegetated upon completion;

- (b) The construction of an aboveground utility line, provided that the existing conditions are maintained to the maximum extent practicable; and
  - (c) The construction of a public pedestrian access, such as a sidewalk or trail with a maximum width of 14 feet, provided that the access is made of permeable material.
- (4) A waiver from strict compliance from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Subsections **D(6)** and **D(7)** may be obtained for the enlargement of an existing public roadway or railroad or the construction or enlargement of a public pedestrian access, provided that the following conditions are met:
- (a) The applicant demonstrates that there is a public need for the project that cannot be accomplished by any other means;
  - (b) The applicant demonstrates through an alternatives analysis that through the use of nonstructural and structural stormwater management strategies and measures, the option selected complies with the requirements of Subsections **D(6)** and **D(7)** to the maximum extent practicable;
  - (c) The applicant demonstrates that, in order to meet the requirements of Subsections **D(6)** and **D(7)**, existing structures currently in use, such as homes and buildings, would need to be condemned; and
  - (d) The applicant demonstrates that it does not own or have other rights to areas, including the potential to obtain through condemnation lands not falling under Subsection **D(4)(c)** above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate the requirements of Subsections **D(6)** and **D(7)** that were not achievable on site.
- (5) Nonstructural stormwater management strategies.
- (a) To the maximum extent practicable, the standards in Subsections **D(6)** and **D(7)** shall be met by incorporating nonstructural stormwater management strategies set forth at Subsection **D(5)** into the design. The applicant shall identify the nonstructural measures incorporated into the design of the project. If the applicant contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management measures identified in Subsection **D(5)(b)** below into the design of a particular project, the applicant shall identify the strategy considered and provide a basis for the contention.
  - (b) Nonstructural stormwater management strategies incorporated into site design shall:
    - [1] Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;
    - [2] Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;
    - [3] Maximize the protection of natural drainage features and vegetation;
    - [4] Minimize the decrease in the time of concentration from preconstruction to postconstruction. "Time of concentration" is defined as the time it takes for runoff to travel from the hydraulically most distant point of the watershed to the point of interest within a watershed;
    - [5] Minimize land disturbance including clearing and grading;
    - [6] Minimize soil compaction;

- [7] Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;
- [8] Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas;
- [9] Provide other source controls to prevent or minimize the use or exposure of pollutants at the site, in order to prevent or minimize the release of those pollutants into stormwater runoff. Such source controls include, but are not limited to:
  - [a] Site design features that help to prevent accumulation of trash and debris in drainage systems, including features that satisfy Subsection **D(5)(c)** below;
  - [b] Site design features that help to prevent discharge of trash and debris from drainage systems;
  - [c] Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and
  - [d] When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act, N.J.S.A 4:24-39 et seq., and implementing rules.
- (c) Site design features identified under Subsection D(5)(b)[1][b] above shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this paragraph, "solid and floatable materials" means sediment, debris, trash, and other floating, suspended, or settleable solids. For exemptions to this standard see Subsection **D(5)(c)[3]** below.
  - [1] Design engineers shall use either of the following grates whenever they use a grate in pavement or another ground surface to collect stormwater from that surface into a storm drain or surface water body under that grate:
    - [a] The New Jersey Department of Transportation (NJDOT) bicycle safe grate, which is described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines (April 1996); or
    - [b] A different grate, if each individual clear space in that grate has an area of no more than seven square inches, or is no greater than 0.5 inches across the smallest dimension.
 

Examples of grates subject to this standard include grates in grate inlets, the grate portion (non-curb-opening portion) of combination inlets, grates on storm sewer manholes, ditch grates, trench grates, and grates of spacer bars in slotted drains. Examples of ground surfaces include surfaces of roads (including bridges), driveways, parking areas, bikeways, plazas, sidewalks, lawns, fields, open channels, and stormwater basin floors.
  - [2] Whenever design engineers use a curb-opening inlet, the clear space in that curb opening (or each individual clear space, if the curb opening has two or more clear spaces) shall have an area of no more than seven square inches, or be no greater than two inches across the smallest dimension.
  - [3] This standard does not apply:
    - [a] Where the review agency determines that this standard would cause inadequate hydraulic performance that could not practicably be overcome by using additional or larger storm drain inlets that meet these standards;

- [b] Where flows from the water quality design storm as specified in Subsection **D(7)(a)** are conveyed through any device (e.g., end-of-pipe netting facility, manufactured treatment device, or a catch basin hood) that is designed, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:
    - [i] A rectangular space 4 5/8 inches long and 1 1/2 inches wide (this option does not apply for outfall netting facilities); or
    - [ii] A bar screen having a bar spacing of 0.5 inches.
  - [c] Where flows are conveyed through a trash rack that has parallel bars with one-inch spacing between the bars, to the elevation of the water quality design storm as specified in Subsection **D(7)(a)**; or
  - [d] Where the New Jersey Department of Environmental Protection determines, pursuant to the New Jersey Register of Historic Places Rules at N.J.A.C. 7:4-7.2(c), that action to meet this standard is an undertaking that constitutes an encroachment or will damage or destroy the New Jersey Register-listed historic property.
- (d) Any land area used as a nonstructural stormwater management measure to meet the performance standards in Subsections **D(6)** and **D(7)** shall be dedicated to a government agency, subjected to a conservation restriction filed with the appropriate county clerk's office, or subject to an approved equivalent restriction that ensures that measure or an equivalent stormwater management measure approved by the reviewing agency is maintained in perpetuity.
- (e) Guidance for nonstructural stormwater management strategies is available in the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the Department.
- (6) Erosion control, groundwater recharge and runoff quantity standards.
- (a) This subsection contains minimum design and performance standards to control erosion, encourage and control infiltration and groundwater recharge, and control stormwater runoff quantity impacts of major development.
    - [1] The minimum design and performance standards for erosion control are those established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and implementing rules.
    - [2] The minimum design and performance standards for groundwater recharge are as follows:
      - [a] The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at Subsection **E**, either:
        - [i] Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100% of the average annual preconstruction groundwater recharge volume for the site; or
        - [ii] Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from preconstruction to postconstruction for the two-year storm is infiltrated.
      - [b] This groundwater recharge requirement does not apply to projects within the urban redevelopment area, or to projects subject to Subsection **D(6)(a)[3]** below.



- [c] The following types of stormwater shall not be recharged:
- [i] Stormwater from areas of high pollutant loading. High pollutant loading areas are areas in industrial and commercial developments where solvents and/or petroleum products are loaded/unloaded, stored or applied; areas where pesticides are loaded/unloaded or stored; areas where hazardous materials are expected to be present in greater than "reportable quantities" as defined by the United States Environmental Protection Agency (EPA) at 40 CFR 302.4; areas where recharge would be inconsistent with Department-approved remedial action work plan or landfill closure plan and areas with high risks for spills of toxic materials, such as gas stations and vehicle maintenance facilities; and
  - [ii] Industrial stormwater exposed to source material. "Source material" means any material(s) or machinery, located at an industrial facility that is directly or indirectly related to process, manufacturing or other industrial activities, which could be a source of pollutants in any industrial stormwater discharge to groundwater. Source materials include, but are not limited to, raw materials; intermediate products; final products; waste materials; by-products; industrial machinery and fuels, and lubricants, solvents, and detergents that are related to process, manufacturing, or other industrial activities that are exposed to stormwater.
- [d] The design engineer shall assess the hydraulic impact on the groundwater table and design the site so as to avoid adverse hydraulic impacts. Potential adverse hydraulic impacts include, but are not limited to, exacerbating a naturally or seasonally high water table so as to cause surficial ponding, flooding of basements, or interference with the proper operation of subsurface sewage disposal systems and other subsurface structures in the vicinity or downgradient of the groundwater recharge area.
- [3] In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at Subsection **E**, complete one of the following:
- [a] Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, postconstruction runoff hydrographs for the two-, ten- and one-hundred-year storm events do not exceed, at any point in time, the preconstruction runoff hydrographs for the same storm events;
  - [b] Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the preconstruction condition, in the peak runoff rates of stormwater leaving the site for the two-, ten- and one-hundred-year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. This analysis shall include the analysis of impacts of existing land uses and projected land uses assuming full development under existing zoning and land use ordinances in the drainage area;
  - [c] Design stormwater management measures so that the postconstruction peak runoff rates for the two-, ten- and one-hundred-year storm events are 50%, 75% and 80%, respectively, of the preconstruction peak runoff rates. The percentages apply only to the postconstruction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed. The percentages shall not be applied to postconstruction stormwater runoff into tidal flood hazard areas if the increased volume of stormwater runoff will not increase flood damages below the point of discharge; or

- [d] In tidal flood hazard areas, stormwater runoff quantity analysis in accordance with Subsection D(6)(a)[3][a], [b] and [c] above shall only be applied if the increased volume of stormwater runoff could increase flood damages below the point of discharge.
- (b) Any application for a new agricultural development that meets the definition of major development at Subsection A shall be submitted to the appropriate soil conservation district for review and approval in accordance with the requirements of this section and any applicable soil conservation district guidelines for stormwater runoff quantity and erosion control. For the purposes of this section, "agricultural development" means land uses normally associated with the production of food, fiber and livestock for sale. Such uses do not include the development of land for the processing or sale of food and the manufacturing of agriculturally related products.
- (7) Stormwater runoff quality standards.
- (a) Stormwater management measures shall be designed to reduce the postconstruction load of total suspended solids (TSS) in stormwater runoff by 80% of the anticipated load from the developed site, expressed as an annual average. Stormwater management measures shall only be required for water quality control if an additional 1/4 acre of impervious surface is being proposed on a development site. The requirement to reduce TSS does not apply to any stormwater runoff in a discharge regulated under a numeric effluent limitation for TSS imposed under the New Jersey Pollution Discharge Elimination System (NJPDES) rules, N.J.A.C. 7:14A, or in a discharge specifically exempt under a NJPDES permit from this requirement. The water quality design storm is 1.25 inches of rainfall in two hours. Water quality calculations shall take into account the distribution of rain from the water quality design storm, as reflected in Table 1. The calculation of the volume of runoff may take into account the implementation of nonstructural and structural stormwater management measures.

<b>Water Quality Design Storm Distribution</b>	
<b>Time (minutes)</b>	<b>Cumulative Rainfall (inches)</b>
0	0.0000
5	0.0083
10	0.0166
15	0.0250
20	0.0500
25	0.0750
30	0.1000
35	0.1330
40	0.1660
45	0.2000
50	0.2583
55	0.3583
60	0.6250
65	0.8917
70	0.9917
75	1.0500
80	1.0840

<b>Water Quality Design Storm Distribution</b>	
<b>Time (minutes)</b>	<b>Cumulative Rainfall (inches)</b>
85	1.1170
90	1.1500
95	1.1750
100	1.2000
105	1.2250
110	1.2334
115	1.2417
120	1.2500

- (b) For purposes of TSS reduction calculations, Table 2 below presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in Subsection **G**, or found on the Department's Web site at [www.njstormwater.org](http://www.njstormwater.org). The BMP Manual and other sources of technical guidance are listed in Subsection **G**. TSS reduction shall be calculated based on the removal rates for the BMPs in Table 2 below. Alternative removal rates and methods of calculating removal rates may be used if the design engineer provides documentation demonstrating the capability of these alternative rates and methods to the review agency. A copy of any approved alternative rate or method of calculating the removal rate shall be provided to the Department at the following address: Division of Watershed Management, New Jersey Department of Environmental Protection, P.O. Box 418, Trenton, New Jersey, 08625-0418.
- (c) If more than one BMP in series is necessary to achieve the required 80% TSS reduction for a site, the applicant shall utilize the following formula to calculate TSS reduction:

$$R = A+B-(AXB)/100$$

Where

R = total TSS percent load removal from application of both BMPs

A = the TSS percent removal rate applicable to the first BMP

B = the TSS percent removal rate applicable to the second BMP

<b>TSS Removal Rates for BMPs</b>	
<b>Best Management Practice</b>	<b>TSS Percent Removal Rate</b>
Bioretention systems	90
Constructed stormwater wetland	90
Extended detention basin	40-60
Infiltration structure	80
Manufactured treatment device	See Subsection <b>F(3)</b>
Sand filter	80
Vegetative filter strip	60-80
Wet pond	50-90

- (d) If there is more than one on site drainage area, the eighty-percent TSS removal rate shall apply to each drainage area, unless the runoff from the subareas converge on site, in which case the removal rate can be demonstrated through a calculation using a weighted average.
- (e) Stormwater management measures shall also be designed to reduce, to the maximum extent feasible, the postconstruction nutrient load of the anticipated load from the developed site in stormwater runoff generated from the water quality design storm. In achieving reduction of nutrients to the maximum extent feasible, the design of the site shall include nonstructural strategies and structural measures that optimize nutrient removal while still achieving the performance standards in Subsections **D(6)** and **D(7)**.
- (f) Additional information and examples are contained in the New Jersey Stormwater Best Management Practices Manual, which may be obtained from the address identified in Subsection **G**.
- (g) In accordance with the definition of FW1 at N.J.A.C. 7:9B-1.4, stormwater management measures shall be designed to prevent any increase in stormwater runoff to waters classified as FW1.
- (h) Special water resource protection areas shall be established along all waters designated Category One at N.J.A.C. 7:9B, and perennial or intermittent streams that drain into or upstream of the Category One waters as shown on the USGS Quadrangle Maps or in the county soil surveys, within the associated HUC14 drainage area. These areas shall be established for the protection of water quality, aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, and exceptional fisheries significance of those established Category One waters. These areas shall be designated and protected as follows:
  - [1] The applicant shall preserve and maintain a special water resource protection area in accordance with one of the following:
    - [a] A three-hundred-foot special water resource protection area shall be provided on each side of the waterway, measured perpendicular to the waterway from the top of the bank outwards or from the center line of the waterway where the bank is not defined, consisting of existing vegetation or vegetation allowed to follow natural succession.
    - [b] Encroachment within the designated special water resource protection area under Subsection D(7)(h)[1][a] above shall only be allowed where previous development or disturbance has occurred (for example, active agricultural use, parking area or maintained lawn area). The encroachment shall only be allowed where applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable. In no case shall the remaining special water resource protection area be reduced to less than 150 feet as measured perpendicular to the top-of-bank of the waterway or center line of the waterway where the bank is undefined. All encroachments proposed under this subparagraph shall be subject to review and approval by the Department
  - [2] All stormwater shall be discharged outside of and flow through the special water resource protection area and shall comply with the standard for off-site stability in the Standards for Soil Erosion and Sediment Control in New Jersey, established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq.
  - [3] If stormwater discharged outside of and flowing through the special water resource protection area cannot comply with the standard for off-site stability in the Standards for Soil Erosion and Sediment Control in New Jersey, established under the Soil

Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., then the stabilization measures in accordance with the requirements of the above standards may be placed within the special water resource protection area, provided that:

- [a] Stabilization measures shall not be placed within 150 feet of the Category One waterway;
  - [b] Stormwater associated with discharges allowed by this section shall achieve a ninety-five-percent TSS postconstruction removal rate;
  - [c] Temperature shall be addressed to ensure no impact on the receiving waterway;
  - [d] The encroachment shall only be allowed where the applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable;
  - [e] A conceptual project design meeting shall be held with the appropriate Department staff and soil conservation district staff to identify necessary stabilization measures; and
  - [f] All encroachments proposed under this section shall be subject to review and approval by the Department.
- [4] A stream corridor protection plan may be developed by a regional stormwater management planning committee as an element of a regional stormwater management plan, or by a municipality through an adopted municipal stormwater management plan. If a stream corridor protection plan for a waterway subject to Subsection **D(7)(h)** has been approved by the Department of Environmental Protection, then the provisions of the plan shall be the applicable special water resource protection area requirements for that waterway. A stream corridor protection plan for a waterway subject to Subsection **D(7)(h)** shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined in Subsection D(7)(h)[1][a] above. In no case shall a stream corridor protection plan allow the reduction of the special water resource protection area to less than 150 feet as measured perpendicular to the waterway subject to this subsection.
- [5] Subsection G(8) does not apply to the construction of one individual single-family dwelling that is not part of a larger development on a lot receiving preliminary or final subdivision approval on or before February 2, 2004, provided that the construction begins on or before February 2, 2009.

E. Calculation of stormwater runoff and groundwater recharge.

- (1) Stormwater runoff shall be calculated in accordance with the following.
  - (a) The design engineer shall calculate runoff using one of the following methods:
    - [1] The USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Dimensionless Unit Hydrograph, as described in the NRCS National Engineering Handbook Section 4 — Hydrology and Technical Release 55 — Urban Hydrology for Small Watersheds; or
    - [2] The Rational Method for peak flow and the Modified Rational Method for hydrograph computations.
  - (b) For the purpose of calculating runoff coefficients and groundwater recharge, there is a presumption that the preconstruction condition of a site or portion thereof is a wooded land use with good hydrologic condition. The term "runoff coefficient" applies to both the

NRCS methodology at Subsection **E(1)(a)[1]** and the Rational and Modified Rational Methods at Subsection **E(1)(a)[2]**. A runoff coefficient or a groundwater recharge land cover for an existing condition may be used on all or a portion of the site if the design engineer verifies that the hydrologic condition has existed on the site or portion of the site for at least five years without interruption prior to the time of application. If more than one land cover have existed on the site during the five years immediately prior to the time of application, the land cover with the lowest runoff potential shall be used for the computations. In addition, there is the presumption that the site is in good hydrologic condition (if the land use type is pasture, lawn, or park), with good cover (if the land use type is woods), or with good hydrologic condition and conservation treatment (if the land use type is cultivation).

- (c) In computing preconstruction stormwater runoff, the design engineer shall account for all significant land features and structures, such as ponds, wetlands, depressions, hedgerows, or culverts that may reduce preconstruction stormwater runoff rates and volumes.
- (d) In computing stormwater runoff from all design storms, the design engineer shall consider the relative stormwater runoff rates and/or volumes of pervious and impervious surfaces separately to accurately compute the rates and volume of stormwater runoff from the site. To calculate runoff from unconnected impervious cover, urban impervious area modifications as described in the NRCS Technical Release 55 — Urban Hydrology for Small Watersheds and other methods may be employed.
- (e) If the invert of the outlet structure of a stormwater management measure is below the flood hazard design flood elevation as defined at N.J.A.C. 7:13, the design engineer shall take into account the effects of tailwater in the design of structural stormwater management measures.

(2) Groundwater recharge may be calculated in accordance with the following:

- (a) The New Jersey Geological Survey Report GSR-32, A Method for Evaluating Groundwater Recharge Areas in New Jersey, incorporated herein by reference, as amended and supplemented. Information regarding the methodology is available from the New Jersey Stormwater Best Management Practices Manual; at <http://www.state.nj.us/dep/njgs/>; or at New Jersey Geological Survey, 29 Arctic Parkway, P.O. Box 427, Trenton, New Jersey 08625-0427; (609) 984-6587.

F. Standards for structural stormwater management measures.

(1) Standards for structural stormwater management measures are as follows:

- (a) Structural stormwater management measures shall be designed to take into account the existing site conditions, including, for example, environmentally critical areas, wetlands; flood-prone areas; slopes; depth to seasonal high water table; soil type, permeability and texture; drainage area and drainage patterns; and the presence of solution-prone carbonate rocks (limestone).
- (b) Structural stormwater management measures shall be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning. Trash racks shall be installed at the intake to the outlet structure, as appropriate, and shall have parallel bars with one-inch spacing between the bars to the elevation of the water quality design storm. For elevations higher than the water quality design storm, the parallel bars at the outlet structure shall be spaced no greater than 1/3 the width of the diameter of the orifice or 1/3 the width of the weir, with a minimum spacing between bars of one inch and a maximum spacing between bars of six inches. In addition, the design of trash racks must comply with the requirements of Subsection **H(4)**.

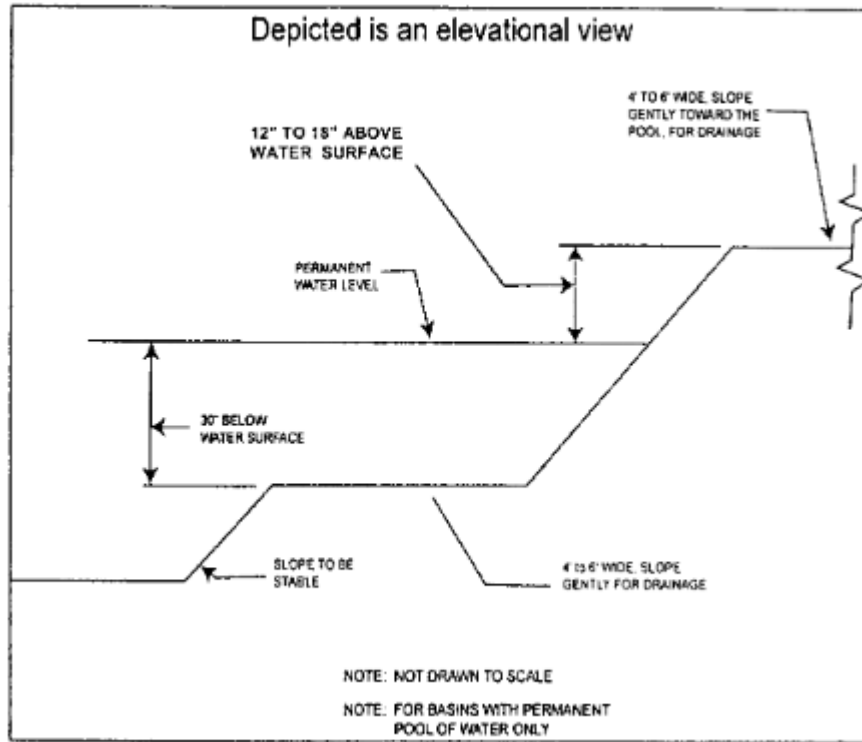
- (c) Structural stormwater management measures shall be designed, constructed, and installed to be strong, durable, and corrosion-resistant. Measures that are consistent with the relevant portions of the Residential Site Improvement Standards at N.J.A.C. 5:21-7.3, 7.4, and 7.5 shall be deemed to meet this requirement.
  - (d) At the intake to the outlet from the stormwater management basin, the orifice size shall be a minimum of 2 1/2 inches in diameter.
  - (e) Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins at Subsection **H**.
- (2) Stormwater management measure guidelines are available in the New Jersey Stormwater Best Management Practices Manual. Other stormwater management measures may be utilized, provided the design engineer demonstrates that the proposed measure and its design will accomplish the required water quantity, groundwater recharge and water quality design and performance standards established by Subsection **D** of this section.
  - (3) Manufactured treatment devices may be used to meet the requirements of Subsection **D** of this section, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department.
- G. Sources for technical guidance.
- (1) Technical guidance for stormwater management measures can be found in the documents listed at Subsections **G(1)(a)** and **G(1)(b)** below, which are available from Maps and Publications, New Jersey Department of Environmental Protection, 428 East State Street, P.O. Box 420, Trenton, New Jersey, 08625; telephone (609) 777-1038.
    - (a) Guidelines for stormwater management measures are contained in the New Jersey Stormwater Best Management Practices Manual, as amended. Information is provided on stormwater management measures such as: bioretention systems, constructed stormwater wetlands, dry wells, extended detention basins, infiltration structures, manufactured treatment devices, pervious paving, sand filters, vegetative filter strips, and wet ponds.
    - (b) The New Jersey Department of Environmental Protection Stormwater Management Facilities Maintenance Manual, as amended.
  - (2) Additional technical guidance for stormwater management measures can be obtained from the following:
    - (a) The Standards for Soil Erosion and Sediment Control in New Jersey promulgated by the State Soil Conservation Committee and incorporated into N.J.A.C. 2:90. Copies of these standards may be obtained by contacting the State Soil Conservation Committee or any of the soil conservation districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each soil conservation district may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey 08625; (609) 292-5540;
    - (b) The Rutgers Cooperative Extension Service, (732) 932-9306; and
    - (c) The Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each soil conservation district may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey, 08625; (609) 292-5540.
- H. Safety standards for stormwater management basins.
- (1) This section sets forth requirements to protect public safety through the proper design and operation of stormwater management basins. This section applies to any new stormwater

management basin. The provisions of this section are not intended to preempt more stringent municipal or county safety requirements for new or existing stormwater management basins. Municipal and county stormwater management plans and ordinances may, pursuant to their authority, require existing stormwater management basins to be retrofitted to meet one or more of the safety standards in Subsections **H(2)(a)**, **H(2)(b)** and **H(2)(c)** for trash racks, overflow grates, and escape provisions at outlet structures.

- (2) Requirements for trash racks, overflow grates and escape provisions.
- (a) A trash rack is a device designed to catch trash and debris and prevent the clogging of outlet structures. Trash racks shall be installed at the intake to the outlet from the stormwater management basin to ensure proper functioning of the basin outlets in accordance with the following:
- [1] The trash rack shall have parallel bars, with no greater than six-inch spacing between the bars.
  - [2] The trash rack shall be designed so as not to adversely affect the hydraulic performance of the outlet pipe or structure.
  - [3] The average velocity of flow through a clean trash rack is not to exceed 2.5 feet per second under the full range of stage and discharge. Velocity is to be computed on the basis of the net area of opening through the rack.
  - [4] The trash rack shall be constructed and installed to be rigid, durable, and corrosion-resistant, and shall be designed to withstand a perpendicular live loading of 300 pounds per square foot.
- (b) An overflow grate is designed to prevent obstruction of the overflow structure. If an outlet structure has an overflow grate, such grate shall meet the following requirements:
- [1] The overflow grate shall be secured to the outlet structure but removable for emergencies and maintenance.
  - [2] The overflow grate spacing shall be no less than two inches across the smallest dimension.
  - [3] The overflow grate shall be constructed and installed to be rigid, durable, and corrosion-resistant, and shall be designed to withstand a perpendicular live loading of 300 pounds per square foot.
- (c) For purposes of this paragraph, escape provisions means the permanent installation of ladders, steps, rungs, or other features that provide easily accessible means of egress from stormwater management basins. Stormwater management basins shall include escape provisions as follows:
- [1] If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. With the prior approval of the reviewing agency identified in Subsection **H(3)**, a freestanding outlet structure may be exempted from this requirement.
  - [2] Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than 2 1/2 feet. Such safety ledges shall be comprised of two steps. Each step shall be four to six feet in width. One step shall be located approximately 2 1/2 feet below the permanent water surface, and the second step shall be located 1 1/2 feet above the permanent water surface. See Subsection **H(4)** for an illustration of safety ledges in a stormwater management basin.



- [3] In new stormwater management basins, the maximum interior slope for an earthen dam, embankment or berm shall not be steeper than three horizontal to one vertical.
- (3) Variance or exemption from safety standards. A variance or exemption from the safety standards for stormwater management basins may be granted only upon a written finding by the appropriate reviewing agency (municipality, county or Department) that the variance or exemption will not constitute a threat to public safety.
- (4) Illustration of safety ledges in a new stormwater management basin.



I. Requirements for a site development stormwater plan.

- (1) Submission of site development stormwater plan.
- (a) Whenever an applicant seeks municipal approval of a development subject to this section, the applicant shall submit all of the required components of the checklist for the site development stormwater plan at Subsection **I(3)** below as part of the submission of the applicant's application for subdivision or site plan approval.
- (b) The applicant shall demonstrate that the project meets the standards set forth in this section.
- (c) The applicant shall submit 12 copies of the materials listed in the checklist for site development stormwater plans in accordance with Subsection **I(3)** of this section.
- (2) Site development stormwater plan approval. The applicant's site development project shall be reviewed as a part of the subdivision or site plan review process by the municipal board or official from which municipal approval is sought. That municipal board or official shall consult the engineer retained by the Planning and/or Zoning Board (as appropriate) to determine if all of the checklist requirements have been satisfied and to determine if the project meets the standards set forth in this section.
- (3) Checklist requirements. The following information shall be required:

- (a) Topographic base map. The reviewing engineer shall require upstream tributary drainage system information as necessary. A topographic base map of the site shall be submitted which extends a minimum of 200 feet beyond the limits of the proposed development, at a scale of one inch equals 200 feet or greater, showing two-foot contour intervals. The map shall indicate the following where appropriate: existing surface water drainage, shorelines, steep slopes, soils, erodible soils, perennial or intermittent streams that drain into or upstream of the Category One waters, wetlands and floodplains along with their appropriate buffer strips, marshlands and other wetlands, pervious or vegetative surfaces, existing man-made structures, roads, bearing and distances of property lines, and significant natural and man-made features not otherwise shown.
- (b) Environmental site analysis. A written and graphic description of the natural and man-made features of the site and its environs. This description shall include a discussion of soil conditions, slopes, wetlands, waterways and vegetation on the site. Particular attention shall be given to unique, unusual, or environmentally sensitive features and to those that provide particular opportunities or constraints for development.
- (c) Project description and site plan(s). A map (or maps) at the scale of the topographical base map indicating the location of existing and proposed buildings, roads, parking areas, utilities, structural facilities for stormwater management and sediment control, and other permanent structures. The map(s) shall also clearly show areas where alterations occur in the natural terrain and cover, including lawns and other landscaping, and seasonal high ground water elevations. A written description of the site plan and justification of proposed changes in natural conditions may also be provided.
- (d) Land use planning and source control plan. This plan shall provide a demonstration of how the goals and standards of Subsections **C** through **F** are being met. The focus of this plan shall be to describe how the site is being developed to meet the objective of controlling groundwater recharge, stormwater quality and stormwater quantity problems at the source by land management and source controls whenever possible.
- (e) Stormwater management facilities map. The following information, illustrated on a map of the same scale as the topographic base map, shall be included:
  - [1] Total area to be paved or built upon, proposed surface contours, land area to be occupied by the stormwater management facilities and the type of vegetation thereon, and details of the proposed plan to control and dispose of stormwater.
  - [2] Details of all stormwater management facility designs, during and after construction, including discharge provisions, discharge capacity for each outlet at different levels of detention and emergency spillway provisions with maximum discharge capacity of each spillway.
- (f) Calculations.
  - [1] Comprehensive hydrologic and hydraulic design calculations for the predevelopment and postdevelopment conditions for the design storms specified in Subsection **D** of this section.
  - [2] When the proposed stormwater management control measures (e.g., infiltration basins) depend on the hydrologic properties of soils, then a soils report shall be submitted. The soils report shall be based on site boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and distribution of soils present at the location of the control measure.
- (g) Maintenance and repair plan. The design and planning of the stormwater management facility shall meet the maintenance requirements of Subsection **J**.

- (h) Waiver from submission requirements. The municipal official or board reviewing an application under this section may, in consultation with the Municipal Engineer, waive submission of any of the requirements in Subsections **I(3)(a)** through **I(3)(f)** of this section when it can be demonstrated that the information requested is impossible to obtain or it would create a hardship on the applicant to obtain and its absence will not materially affect the review process.

J. Maintenance and repair.

- (1) Applicability. Projects subject to review as in Subsection **B(3)** of this section shall comply with the requirements of Subsections **J(2)** and **J(3)** of this section.
- (2) General maintenance.
  - (a) The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of a major development.
  - (b) The maintenance plan shall contain specific preventative maintenance tasks and schedules; cost estimates, including estimated cost of sediment, debris or trash removal; and the name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement). Maintenance guidelines for stormwater management measures are available in the New Jersey Stormwater Best Management Practices Manual. If the maintenance plan identifies a person other than the developer (for example, a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of such person's agreement to assume this responsibility or of the developer's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.
  - (c) Responsibility for maintenance shall not be assigned or transferred to the owner or tenant of an individual property in a residential development or project, unless such owner or tenant owns or leases the entire residential development or project.
  - (d) If the person responsible for maintenance identified under Subsection **J(2)(b)** above is not a public agency, the maintenance plan and any future revisions based on Subsection **J(2)(g)** below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.
  - (e) Preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, including repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of nonvegetated linings.
  - (f) The person responsible for maintenance identified under Subsection **J(2)(b)** above shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders.
  - (g) The person responsible for maintenance identified under Subsection **J(2)(b)** above shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.
  - (h) The person responsible for maintenance identified under Subsection **J(2)(b)** above shall retain and make available, upon request by any public entity with administrative, health, environmental, or safety authority over the site, the maintenance plan and the documentation required by Subsections **J(2)(f)** and **J(2)(g)** above.

- (i) The requirements of Subsections **J(2)(c)** and **J(2)(d)** do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency.
  - (j) In the event that the stormwater management facility becomes a danger to public safety or public health, or if it is in need of maintenance or repair, the municipality shall so notify the responsible person in writing. Upon receipt of that notice, the responsible person shall have 14 days to effect maintenance and repair of the facility in a manner that is approved by the Municipal Engineer or his designee. The municipality, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails or refuses to perform such maintenance and repair, the municipality or county may immediately proceed to do so and shall bill the cost thereof to the responsible person.
- (3) Nothing in this section shall preclude the municipality in which the major development is located from requiring the posting of a performance or maintenance guarantee in accordance with N.J. S.A. 40:55D-53.
- K. Violations and penalties. Any person who erects, constructs, alters, repairs, converts, maintains, or uses any building, structure or land in violation of this section shall be subject to the following penalties: \$1,000 per incidence of violation.
  - L. Effective date. This section shall take effect immediately upon the approval by the county review agency, or 60 days from the receipt of the ordinance by the county review agency if the county review agency shall fail to act.