

# Article 12 | Infrastructure and Public Improvements

## Sec. 12.1 Improvement Requirements

### 12.1.1 General

#### A. Applicability

The requirements of this Article shall apply to all development required to submit site plans or plats, unless expressly exempted by the language of the sections below.

#### B. Mitigation

The approving authority may require on- and off-site improvements to mitigate the impacts of the proposed development.

#### C. Clearing and Grading

1. All property required to be dedicated, reserved or otherwise set aside and identified on the approved site plan or preliminary plat shall be surveyed, staked, and appropriately marked and protected prior to beginning clearing and grading work.
2. All clearing and grading work shall be in conformance with the approved site plan or preliminary plat.

#### D. Floodplains

Base floodplain elevation data shall be provided for all development proposals that are impacted by a floodplain as required by Sec. 8.4, Floodplain and Flood Damage Protection Standards.

#### E. Compliance

Prior to any land disturbing activity, the applicant shall comply with all Federal, State, and local permitting requirements.

#### F. Utility Lines and Drainage Channels

Such facilities shall be located in groupings and with the least possible disturbance to existing trees to the maximum extent allowed by sound engineering practices, as determined by the Public Works director or designee.

### 12.1.2 Survey Monuments and Markers

Permanent survey monuments and markers shall be installed in accordance with N. C. General Statutes 39-32 and 47-30, as supplemented by City/County and N. C. Department of Transportation requirements.

### 12.1.3 Public Facility Sites

When a proposed site for any public facility, including but not limited to schools, or other public use sites, is shown on an adopted plan, the site shall be reserved and/or dedicated in accordance with Sec. 3.6.7E, Reservation of Public Facility Sites and Lands. Such sites shall receive credit for density purposes of 50% in residential developments.

#### 12.1.4 Required Easements

- A. Storm drainage and utility easements for water, sanitary sewer, electricity, gas and communications improvements shall be provided in the location and to the width as required by the provider.
- B. Easements for other purposes, including but not limited to trails and greenways, scenic views, historic preservation, cemetery access, and unique natural sites, shall be designed for reservation or dedication as appropriate.
- C. All site plans and plats shall exhibit standard easement notes stating the type and purpose of the easement along with a list of prohibited uses/activities within the easement.
- D. Any cross access agreement shall specify maintenance responsibilities and require that access be unrestricted. The agreement and a plat depicting the easement shall be recorded. Copies of the recorded documents and an attorney certification that the requirements of this paragraph have been met shall be provided to the Planning Director or designee.

## Sec. 12.2 Ingress and Egress Requirements

### 12.2.1 Dedicated and Publicly Maintained Streets

Dedicated and publicly maintained streets shall be required for development in all districts except as described in Sec. 12.2.2A, Private Streets or Roads. An unlimited number of building permits may be issued for land parcels adjacent to a public street that is not maintained by either the City or NCDOT. However, no occupancy permits shall be issued unless the street has been accepted for maintenance by the City or NCDOT, as appropriate, or the construction has been certified to be acceptable for maintenance by the City or NCDOT, as appropriate, or a surety instrument has been posted in an amount adequate to complete construction to the satisfaction of the City Public Works Director or NCDOT, or appropriate designees. For streets outside the corporate limits, the applicant shall request NCDOT maintenance as soon as the NCDOT occupancy requirement is met; not more than twice the minimum number of units required for maintenance by NCDOT may be issued Certificates of Occupancy prior to acceptance for maintenance by NCDOT.

### 12.2.2 Other Forms of Access

No building shall be erected or enlarged on a parcel in any district unless such parcel abuts upon or has access to a publicly-accepted and maintained street, except in the following circumstances.

#### A. Private Streets or Roads

Private streets or roads may be permitted in the following circumstances. Such streets shall be designed and constructed according to Public Works Department or NCDOT standards.

##### 1. Residential

- a. For up to six single-family detached or duplex lots. Lots permanently protected as open space, on which no development rights remain, shall not be counted in determining the number of lots on a private street;
- b. For multifamily developments or multifamily areas of development;
- c. If shown on an approved development plan as private streets; or
- d. Within Conservation Subdivisions designed and established pursuant to Sec. 6.2.4, Conservation Subdivision.

##### 2. Nonresidential

For any nonresidential development in a nonresidential district.

#### B. Ingress/Egress Easements Other than Private Streets

Ingress/egress easements not involving construction of a private street shall be permitted in the following circumstances:

##### 1. In the Rural Tier

Easements shall be allowed for the construction of one single-family residence on an existing lot of record as of September 16, 1996. The parcel shall not be further subdivided.

**2. Other than in the Rural Tier**

**a. Ingress/Egress Easements of record**

Lots with ingress/egress easements of record, and developed through use of the easement, as of September 16, 1996 may continue.

**b. Driveways**

A driveway shall be allowed for vehicular access to multiple parcels or lots within a townhouse development or shopping center, even if those parcels or lots may be individually owned. Any such driveway within a townhouse development shall be located entirely in a common area.

**12.2.3 Acceptance by City of Private Streets**

Prior to acceptance by the City, any private street, or any driveway allowed for access within a townhouse development or shopping center under Sec. 12.2.2B.2.b. above, that is not constructed and maintained to City or NCDOT street standards shall be improved to City street standards.

## Sec. 12.3 Streets

### 12.3.1 Street Layout

Within any proposed development, the proposed street layout shall be coordinated with the existing and planned street system of the surrounding area, with respect to location, alignment, and cross-section. Street design shall satisfy the minimum requirements of the City Public Works Director or NCDOT, or applicable designees. The following street standards may be modified or varied by the approving authority in order to accommodate unique conditions.

#### A. Right-of-Way

1. A proposed right-of-way shall be of sufficient width to accommodate the required cross section of the roadway. In no case shall the proposed right-of-way be less than the currently adopted standards unless the approving authority determines that special circumstances exist which make the dedication or reservation of the full right-of-way unnecessary or impractical.
2. Right-of-way shall be dedicated and/or reserved and improvements installed to City or NCDOT standards for each class of street as follows:

##### a. Freeways

The entire right-of-way shall be reserved for future acquisition and improvement by the public.

##### b. All Other Public Streets

- (1) New Streets. The right-of-way required to accommodate the proposed development shall be dedicated, with the remainder reserved. The applicant shall be required to install improvements sufficient to service traffic demands of proposed development.
- (2) Existing Streets. The applicant shall dedicate or reserve additional right-of-way and install improvements as required to serve proposed development. Other improvements shall be installed according to the City Public Works Reference Guide for Development or NCDOT standards, as applicable.

#### B. Grades and Curves

Proposed streets shall be designed in accordance with the standards and specifications of the City Public Works Department or NCDOT, as applicable.

#### C. Intersections

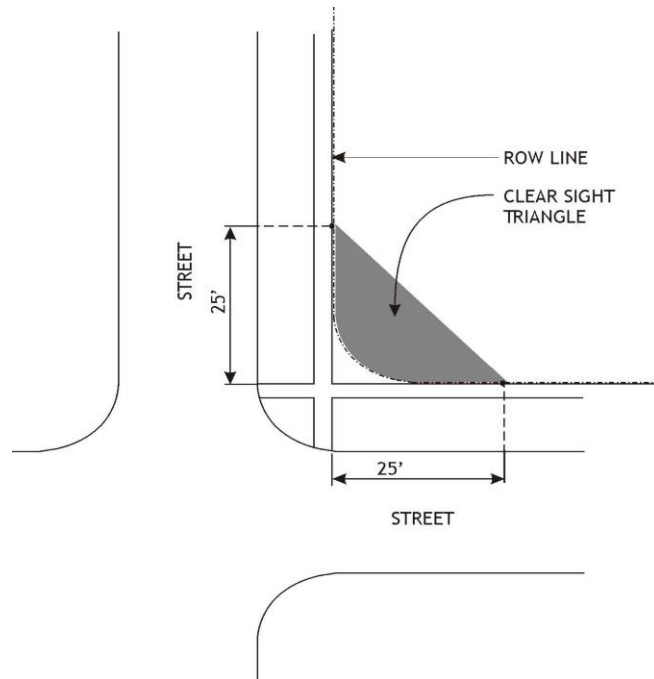
1. Street intersections shall be as nearly at right angles as possible with no intersection angle less than the minimum established by the Public Works Department or NCDOT, as applicable.
2. Offset intersections shall be avoided. Intersections on streets which cannot be aligned shall be separated by a minimum distance determined by the Public Works Department or NCDOT, as applicable, considering possible signalization, necessary storage, and sight distance, as well as other design constraints.
3. Adequate sight distances shall be provided at all intersections between streets and at driveway intersections with streets.

4. Property lines at corners of all intersecting streets shall, as a minimum, be established as the hypotenuse of a triangle with each leg having a length of at least 20 feet or as required by the Public Works Department or NCDOT along both street rights-of-way.

#### D. Sight Triangles

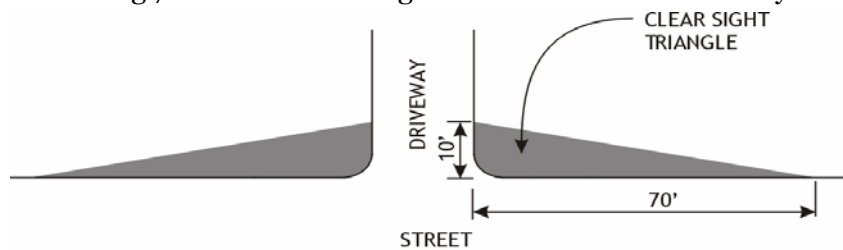
##### 1. Corner Lots

On any corner lot, a sight triangle shall be established. The sight triangle shall be formed by extending lines from the intersections of two streets (measured from the edge of the right-of-way) to points 25 feet from the corner of the rights-of-way of the intersecting streets and then connecting the two points.



##### 2. Driveways

For any driveway, a sight triangle measuring ten feet from the back of curb and extending 70 feet from the edge of each side of the driveway shall be required.



##### 3. Design Standards

Within the sight triangle, no materials which would impede traffic visibility shall be allowed. Structures, fences and plant materials that extend into the sight triangle between two and one half feet and eight feet in height, as measured from the grade of the street or drive, shall not be allowed.

#### 4. Alternative Dimensions

- a. Sight distance triangles along local rights-of-way using geometric standards other than those specified in this Ordinance may be approved if designed and sealed by a registered engineer considering the following:
  - (1) Street width;
  - (2) Posted speed limits;
  - (3) Stopping position;
  - (4) Field obstructions; and
  - (5) Horizontal and vertical curves.
- b. Approval of alternative standards shall be subject to a determination by the Public Works Director or designee that the proposed standards will function as adequately or better than standard Ordinance dimensions.

#### E. Cul-de-sac Streets

Cul-de-sac streets shall not be longer than 800 feet and shall be terminated by a circular right-of-way having a minimum diameter of 92 feet or an approved alternative turnaround as determined by the Public Works Director or NCDOT, or appropriate designees. The length of cul-de-sac streets shall be measured from the centerline of the bulb to the edge of pavement at the nearest intersection.

#### F. Stub Outs

1. Unless exempted below, stub outs shall be required on each side (as defined by each of the cardinal directions) of a development as follows:
  - a. **Rural Tier.** At least one stub out for every 2,800 linear feet on any single side of the proposed development.
  - b. **Suburban Tier.** At least one stub out for every 1,400 linear feet on any single side of the proposed development.
  - c. **Urban Tier.** At least one stub out for every 1,000 linear feet on any single side of a proposed development.
  - d. **Projects terminating at the edge of a Tier.** Stub outs at the standard required for the less intense Tier.
2. Stub outs shall not be required adjacent to existing development that has not made any accommodation for such connections or to adjoining sites that are permanently protected from development through conservation easements or ownership that precludes development. Nor shall stub outs be required if the only point of access would require crossing floodplains, steep slopes, or other similar natural features. Stub outs shall also not be required when the existing street pattern in the area of the proposed development already provides for vehicular connections at intervals no greater than one-half mile apart in the Rural Tier, one-quarter mile apart in the Suburban Tier, or one-fifth mile apart in the Urban Tier.
3. The proposed street layout in new development shall be coordinated with the existing street system with connections made at all stub outs. Where no full connection can be made as a result of the topography of the site being

developed, the developer shall install a cul-de-sac bulb or other turnout facility at the stub out constructed according to the City Public Works Department Reference Guide for Development.

**G. Alleys**

Alleys may be required along the rear lot line of commercial or industrial property, along the rear lot line of lots fronting on thoroughfares, or where the lots are less than 50 feet wide. Alley widths shall be determined by their proposed use.

**H. Reserve Strips Controlling Access**

The reservation of private property strips of too narrow a depth to permit development as a means of controlling access to public ways shall not be permitted.

**I. Frontage Roads and Access Streets**

Where a development abuts or contains a controlled or limited access street or thoroughfare, whether existing or proposed, an access street or frontage road may be required.

**12.3.2 Street Names**

- A.** A street name shall be established for a public street or a private street. A street name may be established for a driveway allowed for access within a townhouse development under Sec. 12.2.2B.2.b. above, and for a pedestrian mall under Sec. 6.12.3D.3, Pedestrian Malls, unless the approving authority determines that establishing a name would encourage circumvention of development requirements for private streets, sidewalks, street trees, or other items. Any street name established for a driveway in a townhouse development or for a pedestrian mall shall be included on the subdivision plat or site plan, and a subdivision plat revision or site plan amendment shall be required in order to establish a street name for a driveway within an existing townhouse development or an existing pedestrian mall.
- B.** Street names shall not duplicate nor closely approximate existing street names within the City or County. Extensions of existing, named streets shall bear the existing street name. A complete list of previously used names shall be maintained by the Planning Department.

**12.3.3 Street Signs and Markers**

- A.** Standard street name signs shall be installed at one corner of all street intersections, including private streets and named driveways allowed for access within townhouse developments under Sec. 12.2.2B.2.b. above. The size, design, materials, location, fabrication, installation, and maintenance of the signs and poles within the public right-of-way and elsewhere shall be in accordance with City Public Works Department or NCDOT standards, as applicable. The developer or owner of a private street or a common area in which a named driveway is located shall be responsible for permanent maintenance as well as fabrication and installation.
- B.** Signs denoting the beginning and ending of public maintenance shall also be erected and maintained on private streets and may be required on named driveways allowed for access within townhouse developments under Sec. 12.2.2B.2.b. above that intersect with the public right-of-way. All such signs shall conform to the street name sign requirements of paragraph A above.

- C. Signs denoting the right-of-way boundaries of dedicated or reserved, unopened streets shall be erected and maintained according to City or County standards.

#### **12.3.4 Street Lights**

Street lighting, as required for traffic safety and property security, shall be installed in conformance with City Public Works Department or NCDOT policies, as applicable. The design, materials, location, and installation shall conform to all applicable City Public Works Department or NCDOT standards, and applicable public utility standards, including appropriate separation from street trees.

## Sec. 12.4 Pedestrian and Bicycle Mobility

### 12.4.1 General

- A. Sidewalk, walkway, on-road improvements, and trail systems sufficient to serve both existing and projected pedestrian and cyclist needs shall be labeled on all site and subdivision plans. Such systems shall be designed to connect with all elements within the development, adjacent areas, and transit stops and may include sidewalks along public or private streets, wide outside travel lanes, bike lanes on roadways, and walkways and trails in alternative locations as appropriate. Design, location, dimensions, dedications, easements, and reservations shall conform to applicable City and County policies and plans for sidewalks, bicycle routes, and trails.
- B. Walkways and trails shall be designed to maximize the safety of users and the security of adjoining properties with respect to location, visibility, and landscaping.

### 12.4.2 Sidewalk Requirement

Unless the approving authority approves an alternate walkway, a conventional sidewalk shall be provided along streets within the right-of-way as shown in the table below unless the approving authority determines that the cost of providing the required sidewalks is disproportionate to the cost of the proposed development. In such cases a portion of the required sidewalk may be required or the requirement may be waived, at the discretion of the approving authority. Further adjustments to this location, if required, may be allowed by the Public Works Director, or designee during construction.

Street Type	Rural Tier	Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tiers
Freeways	None	None	None	None
Major/Minor Thoroughfare	None	Both Sides	Both Sides	Both Sides
Collectors	None	Both Sides	Both Sides	Both Sides
Nonresidential Street				
At least 2,000 daily trips (post development)	None	One Side	Both Sides	Both Sides
Less than 2,000 daily trips (post development)	None	One Side	One Side	Both Sides
Residential Street	None	One Side	One Side	Both Sides
Cul-de-Sac				
400 or more linear feet	None	One Side	One Side	Both Sides
Less than 400 linear feet	None	None	One Side	Both Sides

### 12.4.3 Alternate Requirement

#### A. Alternate Walkways

1. A pedestrian walkway may be provided outside of the right-of-way when the approving authority determines the walkway will have the same functionality as the conventional sidewalk required in Sec. 12.4.2, Sidewalk Requirement, above.
2. A pedestrian walkway may be provided outside of the right-of-way with a reduced level of functionality when the approving authority determines that the construction of a conventional sidewalk within the right-of-way is impractical due to impending road widening or other physical limitations.

#### B. Alternative Pedestrian Plans

An Alternative Pedestrian Plan may be proposed for projects where the approving authority determines that the Alternative Pedestrian Plan will better accommodate pedestrian traffic on site than the conventional sidewalk required in Sec. 12.4.2, Sidewalk Requirement. The Alternative Pedestrian Plan shall detail proposed locations of sidewalks and other pedestrian ways including dimensions and surfacing. An approved Alternative Pedestrian Plan shall be valid for four years from the date of approval. Reauthorization of an expired Alternative Pedestrian Plan shall be required for any activity necessitating a site plan. Alternative Pedestrian Plans approved prior to the adoption of this provision shall require reauthorization four years from the date of adoption of this provision, or when the site plan is revised, whichever is sooner.

### 12.4.4 Standards for Pedestrian and Bicycle Facilities

- A. Pedestrian and bicycle facilities shall be clearly marked using NCDOT standard markings, or shall be based on the Manual on Uniform Traffic Control Devices.
- B. Adjacent public greenways shall be connected to pedestrian and bicycle facilities on the site.
- C. Pedestrian and bicycle connections shall be made to any existing or proposed off-site Pedestrian and bicycle facilities.

### 12.4.5 Dimensions and Locations

#### A. Sidewalks

1. Sidewalks shall be a minimum of five feet in width if sufficient right-of-way is dedicated to ensure that, on roads with curb-and-gutter, a grass strip a minimum of three feet in width lies between the sidewalk and the roadway unless otherwise specified by the Public Works Director, or Designee.
2. Conventional sidewalks shall be constructed of concrete unless an alternate material is approved by the City Public Works Director, or Designee.
3. Along strip-paved roads sidewalks shall be located behind the roadside ditch or guardrail.

#### B. Bicycle Facilities

Either wide outside travel lanes or bicycle lanes, as determined by the City Public Works Director or NCDOT, or appropriate designees, shall be a part of any road

improvement made on roadways which are indicated as bicycle routes on the Durham Trails and Greenways Master Plan, the Metropolitan Planning Organization's Transportation Plan, or other adopted bicycle plan.

**C. Shared Facilities**

Rather than utilize separate pedestrian and bicycle facilities, shared facilities with a 10 foot minimum width may be approved in any area where both sidewalks and bicycle facilities are required, unless separate facilities have been previously developed or approved in the area. Shared facilities of that same width shall be required, however, following the initial installation of shared facilities in the area.

**D. Standards**

Pedestrians and bicycles shall be accommodated as shown in the table below. All street design standards shall be established by the City Public Works Director or NCDOT, or appropriate designees.

Standard	Rural Tier	Suburban Tier	Urban Tier	Compact Neighborhood/Downtown Tiers
<b>PEDESTRIAN FACILITIES</b>				
Public sidewalk, 5 feet minimum, all roadways (see Sec. 12.4.2, Sidewalk Requirement)	No	Yes	Yes	Yes
Pedestrian crossing treatment at intersections (marked crosswalk, bulb-out, hot button etc.)	No	Yes	Yes	Yes
Pedestrian routes in parking areas protected from vehicular traffic	No	Yes	Yes	Yes
<b>BICYCLE FACILITIES</b>				
Bike lanes on all thoroughfares, either 4-foot minimum width striped outside gutter edge or 14-foot outside lanes, determined on a case-by-case basis	Yes	Yes	Yes	Yes

**12.4.6 Payment-In-Lieu (City Only)**

When the approving authority determines that the construction of a required conventional sidewalk or alternate walkway is unfeasible due to special circumstances, including but not limited to: impending road widening, significant street trees, or severe roadside conditions; the approving authority shall require either: (1) a payment-in-lieu of sidewalk construction; (2) construction of sidewalks in the general vicinity of the project site; or (3) a combination of a conventional sidewalk, alternative walkway, or payment-in-lieu.

## Sec. 12.5 Recreation Land

**12.5.1** Provisions for both active and passive recreation areas, including parks, greenways, and trails, consistent with adopted policies, plans, and regulations shall be made for all developments. All such land shall be dedicated or reserved and shall satisfy applicable City or County site suitability standards with regard to location, area, and potential use.

### 12.5.2 Dedication, Impact Fees, and Payment-in-Lieu

#### A. In the Rural Tier

1. The applicant for a residential development shall be responsible for either:
  - a. Dedicating 1,150 square feet of land for recreation purposes (including active and passive recreation areas, including trails) for each proposed dwelling unit; or
  - b. Making payment-in-lieu equivalent to the tax value of 1,150 square feet of comparable property per dwelling unit.
2. The County shall establish recreation service districts, and payments made under this section shall be expended within the respective district from which collected.
3. The approving authority shall determine during the review and approval process as to which of the following shall be required:
  - a. Dedication of land; or
  - b. Payment-in-lieu of dedication.

#### B. Requirements in all Tiers other than the Rural Tier

1. The applicant for a residential development shall be responsible for:
  - a. Paying a recreation impact fee or dedicating 575 square feet of land for parks and active recreation areas for each proposed dwelling unit; and
  - b. Paying a resource based recreation impact fee or dedicating 575 square feet of land for passive recreation areas (including trails) for each proposed dwelling unit. The applicant may make payment-in-lieu equivalent to the tax value of 575 square feet of comparable property per dwelling unit.
2. Where recreation service districts have been established, payments made under this section shall be expended within the respective district from which collected.
3. The approving authority shall determine during the review and approval process as to which of following shall be required:

- a.** Payment of an impact fee;
- b.** Dedication of land; or
- c.** Payment-in-lieu of dedication.

**12.5.3 Reservation**

In addition to the requirements listed above, the approving authority shall decide whether the reservation of land shall be required.

## Sec. 12.6 Railroad Corridors

- 12.6.1** To minimize the loss of existing or former railroad corridors which may have public value as corridors for other forms of transportation, railroad corridors designated for preservation on a plan adopted by a governing body shall be identified on development plans, site plans and subdivision plats.
- 12.6.2** The rail bed and original right-of-way shall be designated for the purpose of dedication or reservation in accordance with requirements for dedication and reservation pursuant to Sec. 12.5, Recreation Land. Dedicated railroad corridors shall reduce the applicant's obligation to dedicate recreation land under Sec. 12.5, Recreation Land, by the amount of the corridor dedicated.
- 12.6.3** No additional at-grade crossings of the corridor by streets or drives shall be allowed, unless documentation shows that extreme hardship would result to the property owner from lack of access, or from design constraints severely limiting the development capability of the property. Documentation shall address the nature and urgency of the hardship. Crossing of the railroad right-of-way shall be permitted for major and minor thoroughfares designated on an adopted thoroughfare plan.

## Sec. 12.7 Water and Sanitary Sewer Systems

### 12.7.1 Water and Sanitary Sewer Systems

#### A. General

Proposed additions to public systems shall be coordinated with the existing systems and shall satisfy the design and construction standards and specifications of the utility providing the services. Where not otherwise prohibited by local ordinance, community systems, or systems designed to serve more than one user independent of public systems, shall satisfy the standards of the applicable agency responsible for approval.

#### B. Public

Installation of improvements which are extensions to existing public systems shall be approved by the public utility providing the services. Sanitary sewer systems may be extended into the Rural Tier in the following instances:

1. Through the issuance of a major special use permit pursuant to Sec. 3.9, Special Use Permit, provided that:
  - a. Pump stations are equipped with battery-backed alarm systems connected to an automatic dialer to a 24-hour maintenance service; and
  - b. Provision is made for connection to a portable generator.
2. To serve an existing use or structure for which a health hazard has been documented by the County health department or the State of North Carolina.

The additional requirements of Sec. 8.7.2, General Requirements shall apply in watershed protection overlays.

#### C. Community

Community systems designed to serve more than one user independent of public systems, may be approved through the issuance of a Major Special Use Permit pursuant to Sec. 3.9, provided that:

1. The system will serve a development that is approved as a Conservation Subdivision pursuant to Sec. 6.2.4, Conservation Subdivision, or that satisfies the design requirements for such subdivisions;
2. The facilities are licensed or permitted by the State of North Carolina, and the system operator is licensed by the State of North Carolina. The licensed operator shall inspect the plant daily with the exception of weekends and holidays to determine that the plant is operating adequately. All monthly reports that are sent to the State of North Carolina shall be copied to the Durham Environmental Health Director;
3. The facilities shall be non-discharge, meet North Carolina reuse standards, including, but not limited to, separating liquids and solids, and have permanent standby power sufficient to ensure normal operation in the event of a power failure;
4. The developer of the system (if a private system) provides a performance bond equal to at least 50% of the cost of the replacement of the system or \$100,000, whichever is greater, in the event that the operator of the system ceases to provide service or maintenance;

5. The developer (or his/her successor) shall provide and maintain catastrophic property insurance to cover 100% of the replacement cost of the system; and,
6. The approving authority makes a finding that the wastewater system proposed by the developer provides improved treatment over what would be provided through the use of an on-site ground absorption or spray irrigation wastewater treatment system.
7. To assist the approving authority in making this finding, the applicant shall provide the approving authority with certifications from the state regarding the performance of the proposed facility relative to on-site systems. If such certification is not available or cannot be provided in a timely fashion, the applicant shall pay for a third party expert technical review of the proposed system to ensure that it will meet this standard.

#### **12.7.2 On-Site Water Supply and/or Wastewater Disposal**

Soils evaluation by a qualified soil scientist, early in the approval process, is recommended where the use of individual on-site wastewater disposal systems is anticipated.

## Sec. 12.8 Stormwater Management

### 12.8.1 Stormwater Management

- A. Any land-disturbing activity may be required to provide stormwater management facilities or make other improvements to the existing drainage system to address water quantity concerns, water quality concerns, or both if the proposed development will increase potential flood damages to existing properties or significantly increase pollutant levels in downstream receiving waters.
- B. Stormwater management facilities adequate to accommodate a ten-year or greater storm shall be provided that generally follow existing natural drainage systems. Piping and modification of streams and other natural water courses should be minimized and shall be considered on a case-by-case basis to determine if it is necessary and environmentally sound. Such facilities shall be designed, constructed and maintained to minimize flooding, protect downslope properties, preserve water quality, and adequately transport existing and projected stormwater flows.
- C. Development plans, site plans, and preliminary plats shall require a stormwater impact analysis that complies with the requirements of the City Public Works Director or County Engineer, or appropriate designees, and which determines the impact of the increased stormwater runoff on downstream stormwater facilities and properties.
- D. The need for stormwater management facilities to address offsite impacts shall be determined by the City Public Works Director or County Engineer, or their designees, as appropriate.

### 12.8.2 Regulation

- A. **City Stormwater**  
City stormwater facilities shall be regulated pursuant to the applicable City code.
- B. **County Stormwater**  
County stormwater facilities shall be regulated pursuant to the applicable County code.

## Sec. 12.9 Other Utilities

### 12.9.1 Installation

- A. The applicant shall arrange for the coordinated installation of all other proposed utilities, including gas, electricity, and communications improvements, and shall ensure that site plans, preliminary plats, and final plats clearly show all related easements and right-of-way.
- B. Utilities shall be installed underground unless it is not feasible to do so, as determined by the Planning Director, or designee.

## Sec. 12.10 Sedimentation and Erosion Control

### 12.10.1 Purposes

- A. This Section is adopted for the purposes of:
  - 1. Regulating private, non-exempt land-disturbing activity to control accelerated erosion and sedimentation in order to prevent the pollution of water and other damage to lakes, watercourses and other public and private property by sedimentation; and
  - 2. Establishing procedures through which these purposes can be fulfilled.
- B. No person shall undertake any land-disturbing activity without first obtaining a permit from the Sedimentation and Erosion Control Officer or designee as required by this section.

### 12.10.2 Applicability

- A. **Exemptions.** The following activities do not require a permit under this section:
  - 1. Land-disturbing activities for the purpose of fighting fires;
  - 2. Land-disturbing activities for the stockpiling of raw or processed sand, stone or gravel in material processing plants and storage yards, provided that sediment control measures have been utilized to protect against off-site damage;
  - 3. Land-disturbing activities that are less than 12,000 square feet in surface area. In determining the area, lands under one or diverse ownership being developed as a unit will be aggregated. Notwithstanding this provision, an erosion control plan and/or permit may be required by the Sedimentation and Erosion Control Officer or designee when off-site damage is occurring, or if the potential for off-site damage exists. Additionally, this section may apply when the applicant, or a parent, subsidiary, or other affiliate of the applicant has engaged in any activity enumerated in Sec. 3.8.7, Disapproval of Plan;
  - 4. As set forth in NCGS § 113A-52.01, land-disturbing activities undertaken on agricultural land for the production of plants and animals useful to man, including but not limited to:
    - a. Forage and sod crops, grain and feed crops, tobacco, cotton and peanuts;
    - b. Dairy animals and dairy products;
    - c. Poultry and poultry products;
    - d. Livestock, including beef cattle, llamas, sheep, swine, horses, ponies, mules or goats, including the breeding and grazing of any or all such animals;
    - e. Bees and apiary products; and
    - f. Fur animals;
  - 5. Land-disturbing activities undertaken on forest land for the production and harvesting of timber and timber products and which are conducted in accordance with best management practices set out in Forest Practice Guidelines Related to Water Quality, as adopted by the North Carolina

Department of Environment and Natural Resources (DENR.) If land-disturbing activity undertaken on forestland for the production and harvesting of timber and timber products is not conducted in accordance with Forest Practice Guidelines Related to Water Quality, the provisions of this Article shall apply to such activity and any related land-disturbing activity;

6. Land-disturbing activities undertaken by persons as defined in NCGS § 113A-52(8) who are otherwise regulated by the provisions of the Mining Act of 1971, NCGS § 74-46--74-68;
7. Land-disturbing activities over which the state has exclusive regulatory jurisdiction as provided in NCGS § 113A-56(a);
8. Land-disturbing activities undertaken for the duration of an emergency, activities essential to protect human life; and
9. This section shall not require ground cover on cleared land forming the future basin of a planned reservoir.

**B. Plan Required**

Subject to the exemptions listed in subsection 12.10.2, a sedimentation and erosion control plan shall be required for any land-disturbing activity within the County, including the City, if more than 20,000 aggregate square feet will be disturbed, or if 12,000 or more aggregate square feet will be disturbed in a M/LR-A, M/LR-B, F/J-A, or E-A watershed protection overlay district. The Sedimentation and Erosion Control Officer or designee may also require a plan for any land-disturbing activity if it determines that off-site damage is occurring or the potential for off-site damage exists. A plan may also be required when the applicant, or a parent, subsidiary, or other affiliate of the applicant, has engaged in any activity listed in Sec. 3.8.7, Disapproval of Plan.

	Less than 12,000 s.f.	12,000 s.f. to 20,000 s.f.	More than 20,000 s.f.
Plan	MR	MR(*R)	R
Permit	MR	R	R
Plan to District			R

**MR** - May be required when off-site damage is occurring, the potential for off-site damage exists, or if the applicant or a parent, subsidiary, or other affiliate of the applicant has engaged in any activity enumerated in Sec. 3.8.7, Disapproval of Plan.

**R** - Required.

**\*R** - Required in a Lake Michie/Little River Critical Area (M/LR-A), Lake Michie/Little River Protected Area (M/LR-B), Falls/Jordan Critical Area (F/J-A) and Eno River Critical Area (E-A).

**C. Protection of Property**

Persons conducting land-disturbing activity shall take all reasonable measures to protect all public and private property from damage caused by such activity.

**D. More Restrictive Rules Shall Apply**

Whenever conflicts exist between federal, State or local laws, ordinances or rules, the more restrictive provision shall apply.

### 12.10.3 Basic Control Objectives

In order for a sedimentation and erosion control plan to be approved, the following control objectives shall be met:

**A. Identify Critical Areas**

On-site areas which are subject to severe erosion, and off-site areas which are especially vulnerable to damage from erosion and/or sedimentation, are to be identified and receive special attention;

**B. Limit Time of Exposure**

All land-disturbing activity is to be planned and conducted to limit exposure to the shortest feasible time;

**C. Limit Exposed Areas**

All land-disturbing activity is to be planned and conducted to minimize the size of the area to be exposed at any one time;

**D. Control Surface Water**

Surface water runoff originating upgrade of exposed areas shall be controlled to reduce erosion and sediment loss during the period of exposure;

**E. Control Sedimentation**

All land-disturbing activity is to be planned and conducted so as to restrain off-site sedimentation damage; and

**F. Manage Stormwater Runoff**

When the increase in the velocity of stormwater runoff resulting from a land-disturbing activity is sufficient to cause accelerated erosion of the receiving watercourse, plans are to include measures to control the velocity at the point of discharge so as to minimize accelerated erosion of the site and increased sedimentation of the stream.

### 12.10.4 Mandatory Standards for Land-Disturbing Activity

No land-disturbing activity shall occur except in accordance with the mandatory standards listed below. Except where more stringent standards are specified in this Ordinance, the technical standards and specifications contained in the North Carolina Erosion and Sediment Control Planning and Design Manual shall also apply.

**A. Buffer Zones**

Except where more stringent buffer requirements are specified in Article 8, Environmental Protection, and/or Article 9, Landscaping and Buffering, the following requirements shall apply;

- 1.** No land-disturbing activity during periods of construction or improvement to land shall be permitted in proximity to a lake or natural watercourse unless a buffer zone is provided along the margin of the watercourse of sufficient width to confine visible siltation within the 25% of the buffer zone nearest the land-disturbing activity. This subsection shall not apply to a land-disturbing activity in connection with the construction of facilities to be located on, over or under a lake or natural watercourse; and

2. Unless otherwise provided, the width of a buffer zone is measured from the top of the bank nearest edge of the disturbed area, with the 25% of the strip nearer the land-disturbing activity containing natural or artificial means of confining visible siltation.

**B. Stabilization of Disturbed Land**

The angle for disturbed land shall be no greater than the angle which can be retained by vegetative cover or other adequate erosion control devices or structures.

1. **Ongoing Activity.** Land left exposed shall be planted or otherwise provided with temporary ground cover, devices, or structures sufficient to restrain erosion within the applicable time period after completion of any phase of grading or period of inactivity as follows: seven days for a steep slope; ten days for a moderate slope; 14 days for land with no slope or inclination. For purposes of this section, a moderate slope means an inclined area, the inclination of which is less than or equal to three units of horizontal distance to one unit of vertical distance; and a steep slope means an inclined area, the inclination of which is greater than three units of horizontal distance to one unit of vertical distance. No other criteria apply.

*Commentary: The moderate and steep slope definitions in this section are mandated by state law (S.L. 2009-486) for sedimentation and erosion control purposes. This steep slope definition differs from the steep slope definition under UDO Sec. 8.8, Steep Slope Protection Standards, which is otherwise applicable throughout the UDO.*

2. **Completed Activity.** For any area of land-disturbing activity where grading activities have been completed, temporary or permanent ground cover sufficient to restrain erosion shall be provided as soon as practicable, but in no case later than seven days after completion of grading.

**C. Stabilization of Sedimentation and Erosion Control Devices**

Whenever land-disturbing activity exceeds 12,000 square feet, the person conducting the land-disturbing activity shall install such sedimentation and erosion control devices and practices as are sufficient to retain the sediment generated by the land-disturbing activity within the boundaries of the tract during construction upon and development of such tract, and shall plant or otherwise provide a temporary ground cover sufficient to restrain erosion generated by such devices and practices within seven days.

- D. Erosion and sedimentation control measures, structures and devices shall be so planned, designed and constructed as to provide protection from the calculated maximum peak of runoff from the 25-year storm. Runoff rates shall be calculated using the procedures in the USDA, Soil Conservation Service's "National Engineering Field Manual for Conservation Practices," or other calculation procedures acceptable to the Sedimentation and Erosion Control Officer or designee.
- E. Each sediment basin or trap in the Suburban or Rural Tier shall have a minimum volume of 3,600 cubic feet per acre of disturbed area and a minimum surface area of 435 square feet per cfs of  $Q_{25}$  (25-year storm) peak inflow. Each sediment basin or trap in the Downtown, Compact Neighborhood, or Urban Tier shall have a minimum

volume of 1,800 cubic feet per acre of disturbed area and a minimum surface area of 325 square feet per cfs of  $Q_{25}$  peak inflow. A skimmer shall be used in each sediment basin or trap.

- F. Sediment basins and traps shall be designed and constructed such that the basin will have a settling efficiency of at least 70% for the 40-micron (0.04mm) size soil particle transported into the basin by the runoff of that two-year storm that produces the maximum peak rate of runoff as calculated according to procedures in the United States Department of Agriculture Soil Conservation Service's "National Engineering Field Manual for Conservation Practices" or according to procedures adopted by any other agency of the State or the United States or any generally recognized organization or association.
- G. Sediment basins and traps shall not be installed in perennial or intermittent streams.
- H. Existing ponds and lakes shall not be used as sediment basins or traps.
- I. One party shall retain operational control of any basin or trap. Sold outparcels shall be permitted separately.
- J. Newly constructed open channels shall be designed and constructed with side slopes no steeper than two horizontal to one vertical if a vegetative cover is used for stabilization, unless soil conditions permit steeper slopes or where the slopes are stabilized by using mechanical devices, structural devices or other acceptable ditch liners. In any event, the angle for side slopes shall be sufficient to restrain accelerated erosion.
- K. Additional areas may be added per the criteria enumerated in this section only if the basin or trap is properly installed and maintained.
- L. In high quality water (HQW) zones, uncovered areas shall be limited at any time to a maximum total area of 20 acres. Only the portion of the land-disturbing activity within a HQW zone shall be governed by this section. Larger areas may be uncovered with the written approval of the Director of DENR.

#### **12.10.5 Permanent Downstream Protection of Stream Banks, Channels and Slopes**

##### **A. Intent**

Stream banks and channels downstream from any land-disturbing activity shall be protected from increased degradation by accelerated erosion caused by increased velocity of runoff from the land-disturbing activity.

##### **B. Performance Standard**

The land-disturbing activity shall be planned and conducted such that the velocity of stormwater runoff in the receiving watercourse at the point of discharge resulting from a 25-year storm after development shall not exceed the greater of:

- 1. The velocity specified according to the soil type in the following table, for a point of discharge into a receiving watercourse with bare soil or rock banks or bed;

Materials		Maximum Permissible Velocities	
Name	Description	FPS <sup>1</sup>	MPS <sup>2</sup>
Fine Sand (noncolloidal)	Cecil fine sandy loam, Pinkston fine sandy loam	2.5	0.8
Sand Loam (noncolloidal)	Appling sandy loam, Creedmoor sandy loam, Helena sandy loam, Mayodan sandy loam, Wedowee sandy loam, Wilkes sandy loam, White shore sandy loam	2.5	0.8
Silt Loam (noncolloidal)	Georgeville silt loam, Herndon silt loam, Lignum silt loam, Roanoke silt loam	3.0	0.9
Ordinary Firm Loam	Iredell loam, Mecklenburg loam, Wahee loam, Davidson clay loam, White Store clay loam-eroded	3.5	1.1
Fine Gravel		5.0	1.5
Stiff Clay (very colloidal)	Iredell-Urban land complex, White Store-Urban land complex, Mayodan-Urban land complex	5.0	1.5
Graded, Loam to Cobbles (noncolloidal)	Tatum gravelly silt loam, Nason stony silt loam, Goldston slaty (channery) silt loam	5.0	1.5
Graded, Silt to Cobbles (colloidal)		5.5	1.7
Alluvial Silts (noncolloidal)	Wehadkee silt loam, Congaree silt loam, Chewacla silt loam, Cartecay silt loam	3.5	1.1
Alluvial Silts (colloidal)		5.0	1.5
Coarse Gravel (noncolloidal)		6.0	1.8
Cobbles and shingles		5.5	1.7
Shales and Hard Pans		6.0	1.8

<sup>1</sup> FPS: Feet per second

<sup>2</sup> MPS: Meters per second

- The velocity specified according to the type of vegetation and depth of flow in the following table, for a point of discharge into a vegetated receiving watercourse; or

Vegetatively Protected Watercourses and Point of Stormwater Discharge			
Group No.	Vegetation	Depth of Flow (feet)	Maximum Permissible Velocity
1	Bermudagrass	up to1 greater than 1	4 6
2	Reed canarygrass; Kentucky bluegrass	up to1 greater than 1	3 6
3	Grass and legumes, mixed; Weeping lovegrass	up to1 greater than 1	3 4
4	Annuals: Annual lespedeza (KOBE); Sudangrass Small grain: (Rye, Oats, barley); Ryegrass	up to1 greater than 1	2.5 2.5

**Notes:** Do not use vegetative protection on longitudinal parallel to flow slopes steeper than 10% except for side slopes. Annuals: use only as temporary protection until permanent cover is established.

- The velocity in the receiving watercourse determined for the ten-year storm prior to development.

- C. If the conditions enumerated in paragraph B, Performance Standard, of this subsection cannot be met, the channel below the discharge point shall be designed and constructed to withstand the expected velocity.

**D. Slope Protection**

When soils with slopes as indicated in the following table, occur between a point of stormwater discharge and the next confluence of concentrated stormwater runoff, such areas, on- or off-site, shall be protected from accelerated erosion by diverting the stormwater discharge from those soil surfaces. Diversion may include the provision of piped, paved or armored storm drainage facilities.

<b>Critical Soils of Durham County</b>		
ApC	Appling sandy loam	6-10% slopes
CfC	Cecil fine sandy loam	6-10% slopes
CrC	Creedmoor sandy loam	6-10% slopes
DaD	Davidson clay loam	6-10% slopes
GeC	Georgeville silt loam	6-10% slopes
GeD	Georgeville silt loam	10-15% slopes
GIE	Goldston slaty silt loam	10-25% slopes
GIF	Goldston slaty silt loam	25-45% slopes
GrC	Granville sandy loam	6-10% slopes
Gu	Gullied land	Clayey materials
HeC	Helena sandy loam	6-10% slopes
HrC	Herndon silt loam	6-10% slopes
HsC	Herndon stony silt loam	2-10% slopes
IrC	Iredell loam	6-10% slopes
IyC	Iredell-Urban land complex	6-10% slopes
MfC	Mayodan sandy loam	6-10% slopes
MfD	Mayodan sandy loam	10-15% slopes
MfE	Mayodan sandy loam	15-25% slopes
MrC	Mayodan-Urban land complex	0-10% slopes
MrD	Mayodan-Urban land complex	10-15% slopes
MuC	Mecklenburg loam	6-10% slopes
NaD	Nason silt loam	10-15% slopes
NaE	Nason silt loam	15-25% slopes
NoD	Nason stony silt loam	10-15% slopes
PfC	Pinkston fine sandy loam	2-10% slopes
PfE	Pinkston fine sandy loam	10-25% slopes
TaE	Tatum gravelly silt loam	15-25% slopes
Ur	Urban land	
WmD	Wedowee sandy loam	10-25% slopes
WmE	Wedowee sandy loam	15-25% slopes
WsC	White Store sandy loam	6-10% slopes
WsE	White Store sandy loam	10-25% slopes
WvC2	White Store clay loam	2-10 % slopes, eroded
WvE2	White Store clay loam	10-25% slopes, eroded
WwC	White Store-Urban land complex	0-10% slopes
WwE	White Store-Urban land complex	10-25% slopes
WxE	Wilkes sandy loam	10-25% slopes

**E. Acceptable Management Measures**

Measures applied alone or in combination to satisfy the intent of this section are acceptable if there are no objectionable secondary consequences. The State Sedimentation Control Commission recognizes that the management of stormwater runoff to minimize or control downstream channel and bank erosion is a developing technology. Innovative techniques and ideas will be considered and may be used when shown to have the potential to produce successful results. Some alternatives are to:

1. Avoid increases in surface runoff volume and velocity by including measures to promote infiltration to compensate for increased runoff from areas rendered impervious;
2. Avoid increases in stormwater discharge velocities by using vegetated or roughened swales and waterways in lieu of closed drains and high velocity paved sections;
3. Provide energy dissipaters at outlets of storm drainage facilities to reduce flow velocities at the point of discharge. These may range from simple rip-rapped sections to complex structures; and
4. Protect watercourses subject to accelerated erosion by improving cross sections and/or providing erosion-resistant lining.

**F. Exceptions**

This section shall not apply where it can be demonstrated, to the satisfaction of the Sedimentation and Erosion Control Officer or designee that stormwater discharge velocities will not create an erosion problem in the receiving watercourses.

**12.10.6 Borrow and Waste Areas**

When the person conducting the land-disturbing activity is also the person conducting the borrow or waste disposal activity, areas from which borrow is obtained and which are not regulated by the provisions of the Mining Act of 1971, and waste areas for surplus materials other than landfills regulated by the State Department of Environmental and Natural Resources Division of Solid Waste Management, shall be considered as part of the land-disturbing activity where the borrow material is being used or from which the waste material originated. When the person conducting the land-disturbing activity is not the person obtaining the borrow and/or disposing of the waste, these areas shall be considered a separate land-disturbing activity.

**12.10.7 Access and Haul Roads**

Temporary access and haul roads, other than public roads, constructed or used in connection with any land-disturbing activity shall be considered a part of such activity.

**12.10.8 Operations in Lakes or Natural Watercourses**

Land-disturbing activity in connection with construction in, on, over, or under a lake or natural watercourse shall be planned and conducted in such a manner as to minimize the extent and duration of disturbance of the stream channel. The relocation of a stream, where relocation is an essential part of the proposed activity, shall be planned and executed so as to minimize changes in the stream flow

characteristics, except when justification for significant alteration to flow characteristic is provided.

### **12.10.9 Responsibility for Maintenance**

During the development of a site, the person conducting the land-disturbing activity shall install and maintain all temporary and permanent erosion and sedimentation control measures as required by the North Carolina Sedimentation Pollution Control Act of 1973, as amended, and all rules and orders adopted pursuant to it (the Act), this section, rules or orders adopted or issued pursuant to this section or the Act, or an approved sedimentation and erosion control plan. After site development, the land owner or person in possession or control of the land shall install and/or maintain all necessary permanent erosion and sediment control measures, except those measures installed within a road or street right-of-way or easement accepted for maintenance by a governmental agency.

### **12.10.10 Additional Measures**

Whenever the Sedimentation and Erosion Control Officer, or designee, determines that significant sedimentation is occurring as a result of land-disturbing activity, despite application and maintenance of protective practices, the person conducting the land-disturbing activity will be required to and shall take the additional protective action directed.

## Sec. 12.11 Performance Guarantees

### 12.11.1 Filing of Performance Guarantees

Performance guarantees, as described below, in an amount determined at the reasonable discretion of the director or designee of the City or County department(s) responsible for supervision and/or acceptance of the constructed infrastructure, shall be required for delays in completion of necessary infrastructure improvements, landscaping, and committed elements as elsewhere provided in this ordinance. Where the improvements have not been completed before final plat approval or issuance of a certificate of compliance for a building within the approved project, the responsible director(s) or designee(s) shall specify the time period within which such improvements must be completed.

### 12.11.2 Form and Conditions of Performance Guarantee

Such guarantee may be in the form of a surety bond, letter-of-credit, or some other surety instrument acceptable to the City or County. Such guarantee shall be conditioned upon the performance of all work necessary to complete the specified improvements and the delivery of all necessary encroachment agreements, with said performance and delivery to be done within a stipulated time period. The required amount of the guarantee shall be as determined by the City or County and shall allow for administrative costs, inflation, and other contingencies.

#### A. Release of Guarantee

All improvements shall be completed according to the City, County, or NCDOT standards and specifications, as applicable, and shall be acceptable for City or State maintenance. No guarantee shall be released until all of the appropriate agencies certify that all of the necessary improvements have been completed as required.

#### B. Completion

Once the conditions of the guarantee have been completed to the satisfaction of the City or County, the guarantee shall be released.

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