

Chapter 17. INFRASTRUCTURE IMPROVEMENT REQUIREMENTS

17.1 Purpose and Intent

It is hereby declared to be the policy of the Town that the subdivision and development of land shall be guided and regulated in such a manner as to meet the following requirements for orderly and harmonious growth:

- Land to be subdivided shall be of such character that it can be used safely without danger to health, or peril from fire, flood, erosion, excessive noise, air and/or water pollution, or other menace. Proper provisions shall be made for drainage, water supply, sewerage, and other appropriate utility services.
- The proposed streets shall provide a safe, convenient and functional system for vehicular circulation and shall be properly related to the land use plan of the area. Streets shall be of such width, grade, and location as to accommodate prospective traffic, as determined by existing and probable future land uses. Streets shall be detailed to compliment neighborhoods and commercial centers and shall be pedestrian in scale.
- Buildings, lots, blocks, and streets shall be so arranged as to afford adequate light, view, and air, and to facilitate fire protection.
- Land shall be subdivided and developed with due regard to topography so that the natural beauty of the land and vegetation shall be protected and enhanced.

17.2 Required Improvements for all Development Plans

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| A. Water Supply Distribution System | G. Street Lights |
| B. Sanitary Sewer Collection System | H. Underground Wiring |
| C. Public Streets (Paved) and other Public Rights-of-Way | I. Dedicated Open Space |
| D. Utility Easements | J. Landscaping |
| E. Sidewalks and Greenways | K. Traffic Control Signs & Pavement Markings |
| F. Curb and Gutter | L. Street Signs |

17.3 General Provisions

- A. **Conformity to existing maps or plans:** Conformity to existing maps or plans: The plat of a subdivision shall conform to any adopted plans of the town as appropriate and meet the requirements of the Long-Range Transportation Plan for the Capital Area Metropolitan Planning Organization (CAMPO) as adopted by the CAMPO Transportation Advisory Committee and the North Carolina Department of Transportation, as well as the local arterial, collector and bike route/greenway plans approved by the LURB and adopted by the Town Council. *See Chapter 9 for additional street improvement requirements.*

- B. Continuation of adjoining street system:** The proposed street layout shall be coordinated with the existing street system of the surrounding area. Where possible, proposed streets shall be the extension of existing streets.

Whenever connections to existing or proposed streets on adjoining property are required, the street right-of-way shall be extended and the street developed to the property line of the subdivided property (or to the edge of the remaining undeveloped portion of a single tract) at the point where the connection to the existing or proposed street is expected.

In addition, the Town may require temporary turnarounds to be constructed at the end of such streets pending their extension. The Town may require extension or connection where necessary to permit the convenient movement of traffic between residential neighborhoods or to facilitate access to neighborhoods by emergency service vehicles or for other sufficient reasons

- C. Street Names:** Street names shall be assigned by the developer subject to the approval of the Town of Knightdale and Wake County. Proposed streets which are continuations of existing streets shall be given the same name. In assigning new street names, names shall not duplicate or be phonetically similar to existing street names in Wake County. Upon final plat approval, the Town shall erect street name signs.

- D. Large tracts or parcels:** Where land is subdivided into larger parcels than ordinary building lots, such parcels shall be arranged so as to allow for the opening of future streets and logical further re-subdivision.

- E. Street Classification:** the Town shall make the final determination of the classification of streets in a proposed development. Street Classifications are defined in Section 17.4A.

- F. Payment in Lieu of Median Construction:** As noted in Section 17.4(A), new developments with frontage on an existing publicly maintained street are required to upgrade said frontage to meet the standards of the Chapter. Some streets prescribe a center median for which a development that only embraces one side of an existing publicly maintained street would be responsible for half of said median. Therefore, the Town Council has determined that it is in the best interest of the citizenry for the Town to accept a payment in lieu of median construction when all of the following findings have been made by the Administrator:

- The street classification has been made and involves a street cross-section that includes a median; and
- The full right-of-way dedication will not be obtained through the approval process for the subject development application; and
- The construction of the median is deemed impractical at the time.

The fee shall be equal to half of the present cost estimate for full median construction with said estimate having been found acceptable by the Town Engineer. All fee payments made in lieu of median construction shall be made at the time of Construction Document approval. Failure to submit the required payment along with Construction Document applications will delay approval of such submissions until payment is rendered. All funds received for payment in lieu of median construction shall be used

for public street improvements around the Town as prioritized within the Town’s Capital Improvement Program.

- G. **Private Streets:** Where private streets are allowed, all private streets shall be constructed to the same standards as depicted in Section 17.4.

17.4 General Infrastructure Design Guidelines

A. Street Classification & Design

In an effort to protect this investment, the Town views streets as the most important public space and therefore has developed a set of principles which permit this space to be used by both the automobile, pedestrian and bicyclist. New development with frontages on existing and new publicly maintained streets shall be required to upgrade all their frontages to meet the standards of this Chapter.

Healthy, traditional streets are categorized by the work they perform for the neighborhood. For simplicity, street types can be broken down into three (3) groups:

- **Category One:** providing neighborhood access such as alleys and local streets;
- **Category Two:** roadways providing transitional access to neighborhood streets, i.e., avenues and main streets; and
- **Category Three:** roadways providing regional access, i.e., boulevards and freeways.

General illustrations of each street type are shown in Figures 17.1 thru 17.7. For internal streets in MI Districts, please refer also to Section 2.12.B.4. Although the general illustrations have been designed with NCDOT planting guidelines in mind; whenever a street is to be maintained by NCDOT, NCDOT’s *Guidelines for Planting within Highway Right-of-Way* shall supersede the general illustrations provide herein in the case of a conflict between the two sets of guidelines.

Category One – Alleys and Main Streets

Category One connectors, which form the heart of quiet neighborhood streets, function primarily to provide access to neighborhood destinations and make numerous connections within neighborhoods. These connectors – alleys and streets- provide access, utility and walking infrastructure. Traffic speeds of 10-25 mph are appropriate to such functions. Neighborhoods work best with many connections from the edges. Connections to the centers of neighborhoods are appropriate too, but they should not move significant amounts of traffic, nor move that traffic too quickly. People entering neighborhoods should feel rewarded by ease of access to specific locations, but also encouraged to travel by foot or bicycle.

Alleys

Alleys are low speed (10-mph) service easements running behind and sometimes between rows of houses. Alleys provide public service workers easy access to utilities and sanitation, and resident’s easy access to garages, backyards, and accessory units. Alleys also offer second or third approaches for fire response.

Local Streets

Local streets are the most common type of access road in healthy neighborhoods. Streets provide access to single- or multi-family housing and should be low speeds (20-

25 mph). Parking is allowed on both sides of the street. Streets are short, terminating in two to six blocks. They can also encircle a square or other public space. On-street parking should be encouraged. If on-street parking is light or non-existent, or limited to one side, streets fail to properly slow traffic. Landscaping and sidewalks should fill the remainder of the public right-of-way. In some special circumstances, streets may be narrowed (typically 20 feet wide) if parking is allowed on one side only, and the street can operate one-way around parks or nature preserves.

Category Two – Avenues and Main Streets

Category Two roadways connect neighborhoods to commercial centers. Avenues and Main Streets are “transitional” roadways: in addition to providing access, they carry large and more diverse amounts of traffic. Avenues and Main Streets host deliveries and efficient emergency responses. They anchor neighborhood commerce, serve pedestrians and bicyclist, and improve transit operations. Category Two streets must operate at low to moderate speeds, since many people live, work, shop, and play within these street environments. Parking is found on many, but not all avenues and main streets.

Main Streets

Main streets are “transitional” roadways that provide access to neighborhoods, as well as, places for neighborhood commercial and mixed-use buildings. On street parking is very desirable, so a low speed environment is preferred (20-25 mph). Main streets usually do not have medians, but medians with low shrubs are acceptable if they do not detract from terminating vista and attractive storefronts. To help pedestrians across the street and calm traffic, “bulbouts” – wider sidewalks that extend into the roadway – should be provided at intersections and, if blocks are long, at mid-block crossings.

Avenues

Avenues connect neighborhoods to town centers, and as such can extend up to one mile. Two-lane roadways contain sufficient pavement for bicyclists and motorists – with raised medians in the center. Avenues can also operate without a median, although the raised center island is often preferred. On-street parking is available. Triple –canopy landscaping, bike lanes and sidewalks are provided. Avenues are richly landscaped, since they are civic spaces that serve as gateways to the town center. Avenues should have the tallest, most spectacular tree canopies. Since avenues serve as the transition between the town and the neighborhoods, speeds should be kept low, typically 30-35 mph. Avenues may also serve as major transit routes.

Category Three – Boulevards and Freeways

Category Three boulevards and freeways connect town centers to the greater region. On these streets, car traffic, delivery trucks, emergency responders, and transit must operate with high levels of efficiency.

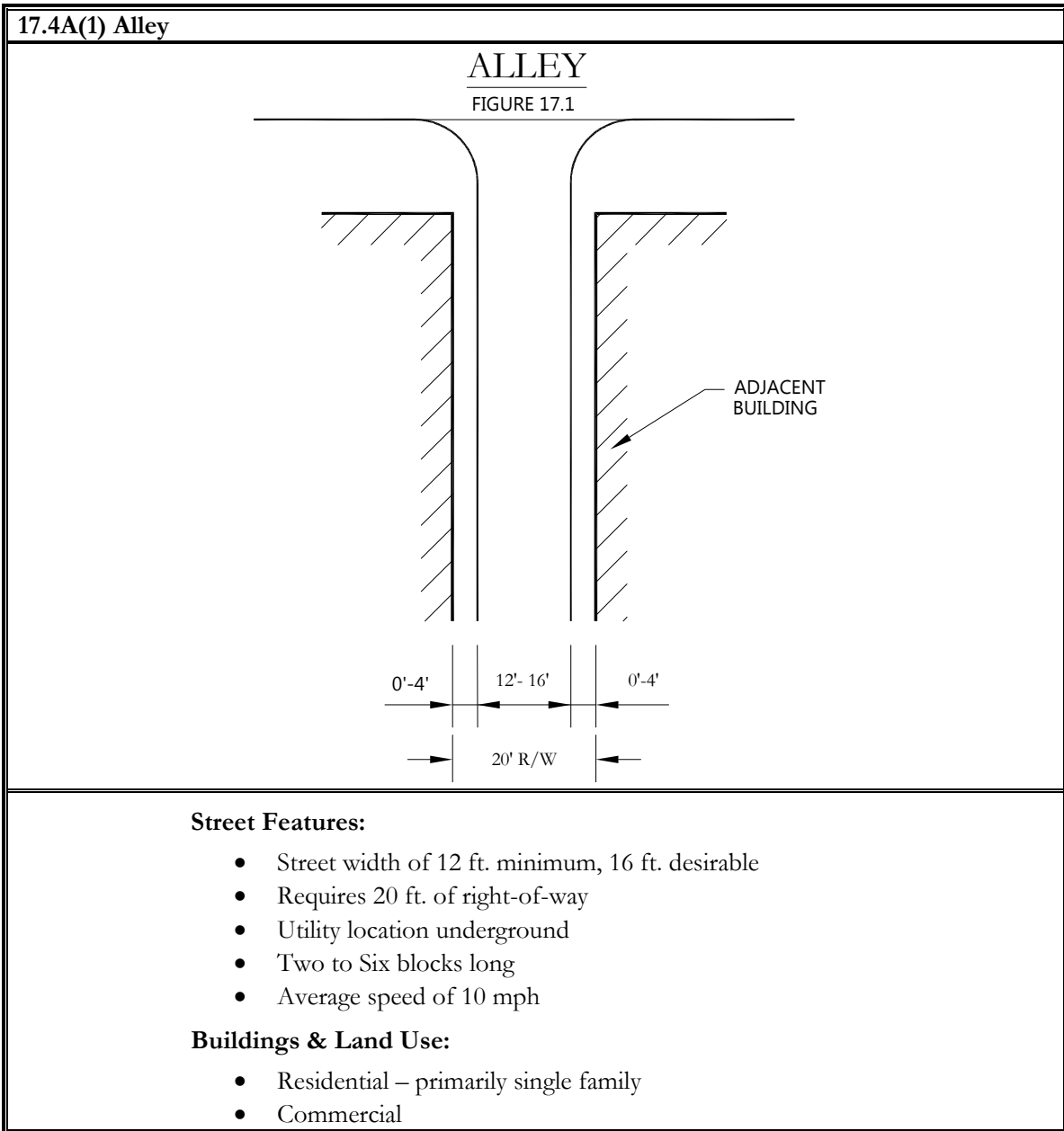
Boulevards

Boulevards also bring people into Town, or they carry traffic through natural areas. They are not designed to accommodate adjoining development. Roadway speeds are usually 45 mph. When boulevards enter the town, they become urban boulevards, and speeds are reduced to 30-35 mph. Bike facilities are found on the edge of boulevards.

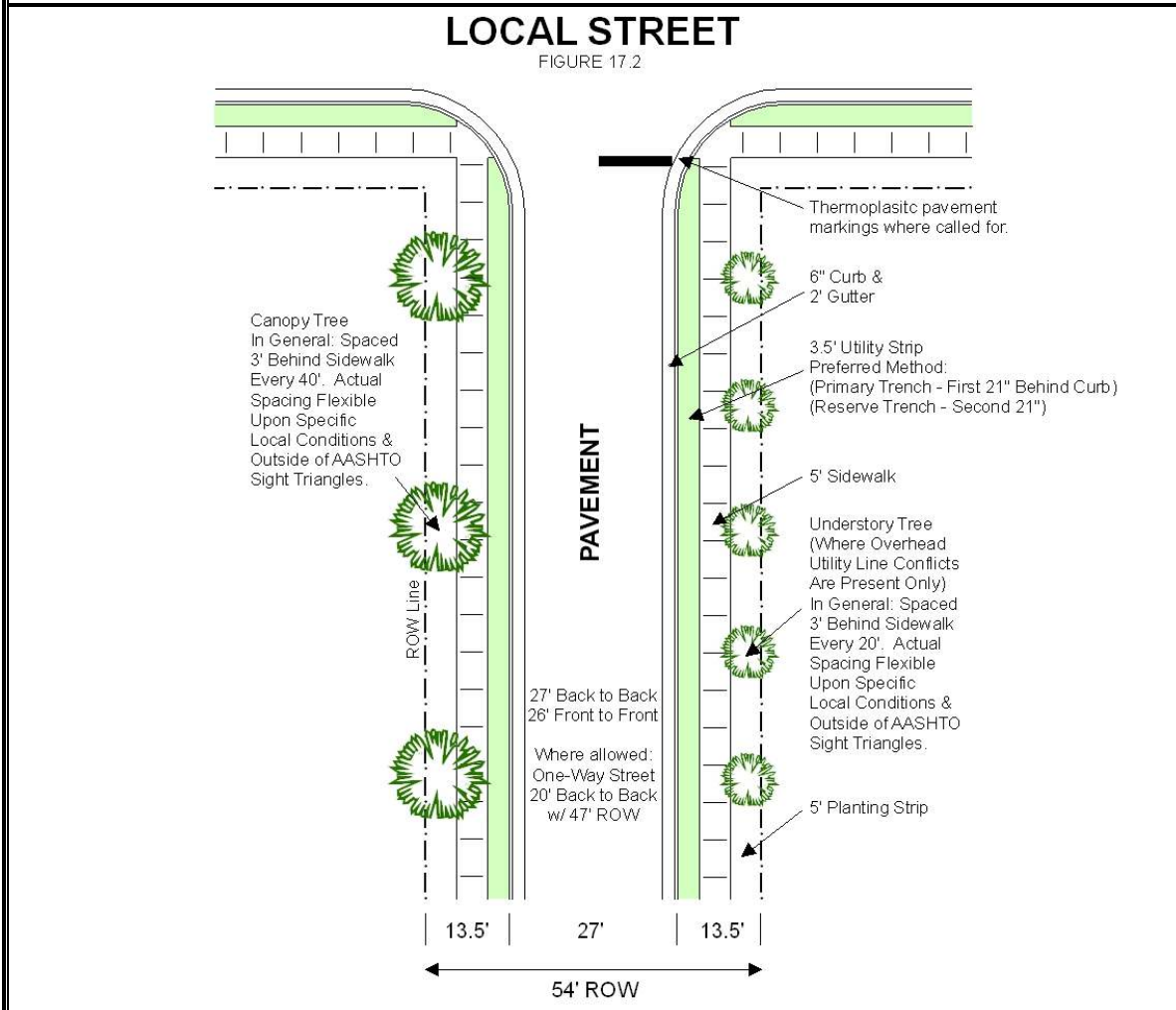
Urban Boulevards can provide multi-lane access to commercial and mixed-use buildings, and they carry regional traffic. For these reasons, speeds on these streets are generally (30-35 mph). In these commercial or mixed-use areas, boulevards have bike lanes, sidewalk, and provide sections of parking to support commerce, parks, schools, and other attractors along their routes.

Freeways

Freeways are generally Interstate or US Highway Routes maintained by NCDOT where the main purpose of the roadway is to provide mobility. Access is generally controlled and speeds are high (45-65 mph). Three roadways are classified as Freeways in the town – Interstate 540, US Highway 64/264, and US Highway 64 Business/Knightdale Boulevard.



17.4A(2) Local Street



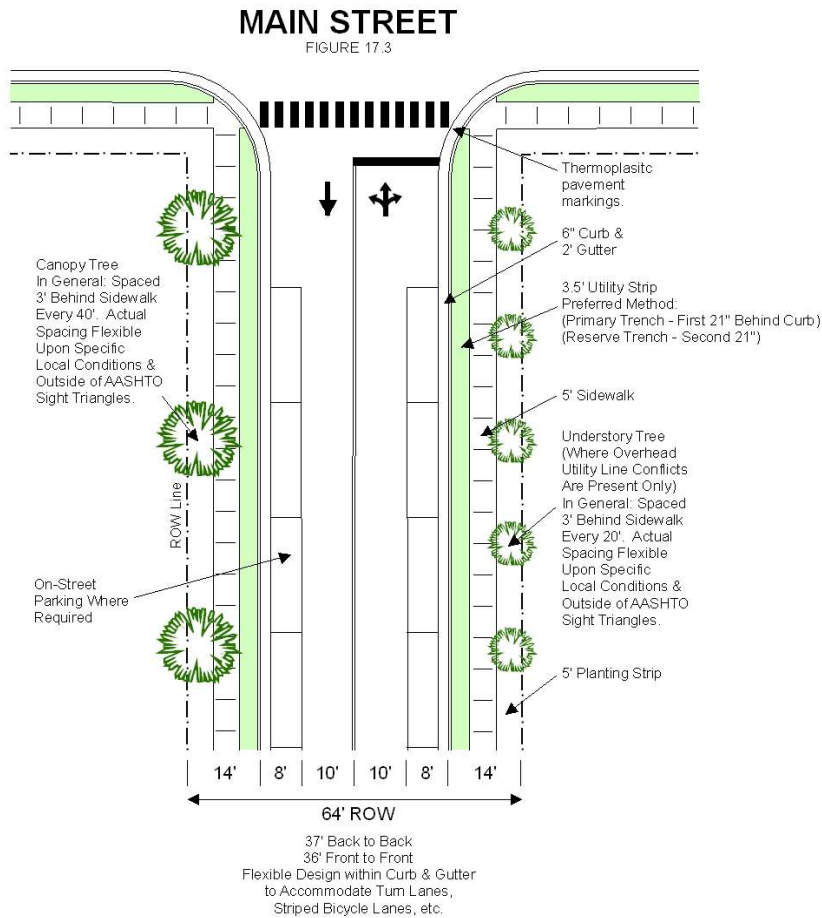
Common Street Features (Section 2.2):

- Curb & gutter
- Informal parking
- Street Tree Planting strips – 5 ft. (see introduction of Section 17.4A for further notes about NCDOT maintained streets)
- Sidewalks – 5 ft. on each side
- Requires 54 ft. of right-of-way – two way
- Requires 47 ft. of right-of-way – one way
- Utility location underground or alley
- Two to Six blocks long
- Average speed 20-25 mph

Buildings & Land Use:

- Residential – many residential types
- Residences brought close to sidewalk
- Consistent building line recommended
- Front porches encouraged

17.4A(3) Main Street



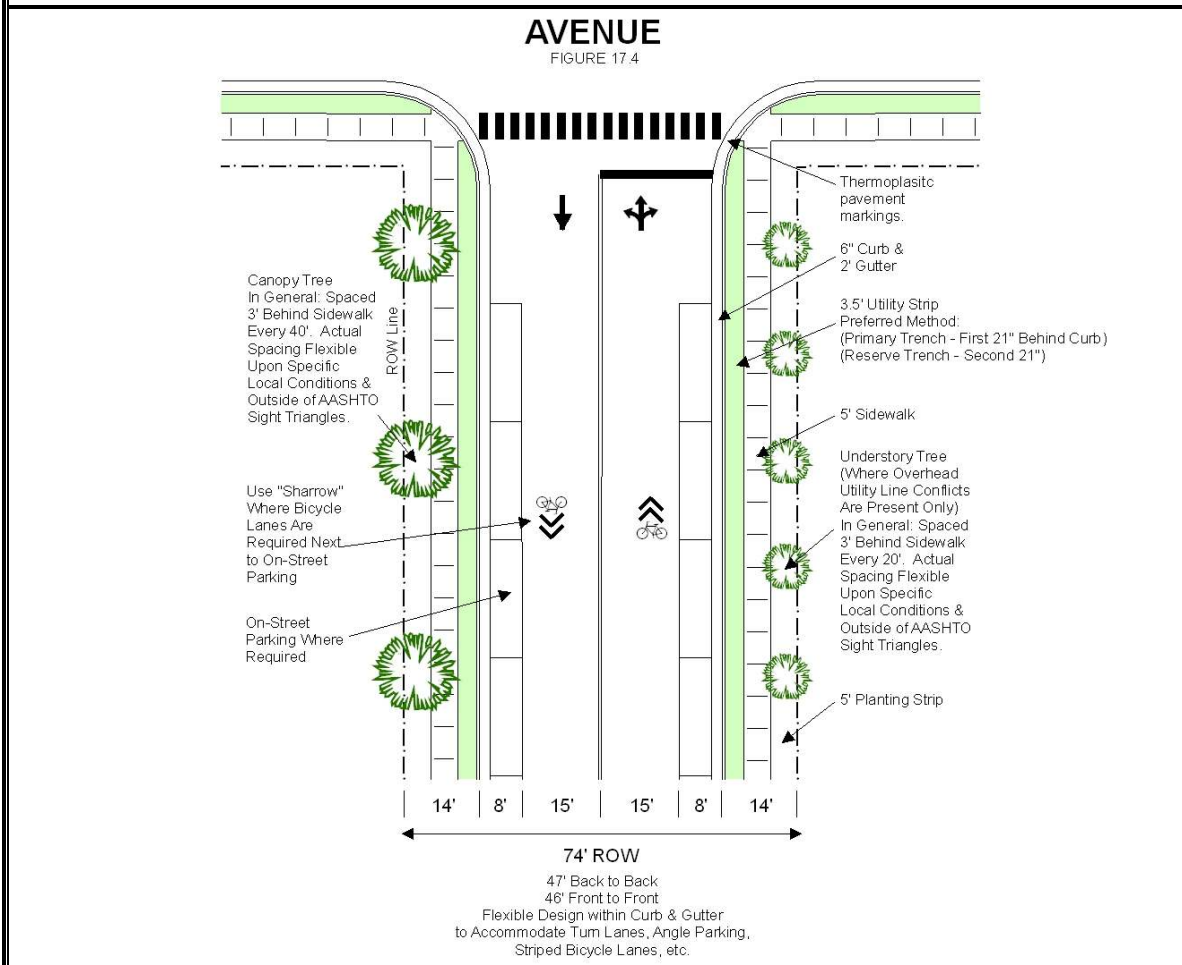
Common Street Features (Section 2.2):

- Travel lanes of 10 ft. minimum
- Curb & gutter
- Striped parking in mixed use and commercial areas
- Street Tree Planting strips – 5 ft. minimum on each side (see introduction of Section 17.4A for further notes about NCDOT maintained streets)
- Sidewalks – 5 to 13.5 ft. on each side (Where sidewalk, utility and planting strips combined in commercial use areas, approved tree grates must be used and trees planted according to standard specification location.)
- If no on-street parking is required and this section is identified for use with a designated bikeway, a minimum 4 foot striped outside bicycle lane excluding gutter shall be provided – see Appendix 3
- Requires 64 ft. of right-of-way
- Utility location underground or alley
- Average speed 20-25 mph
- Includes bulbouts at intersections and midblock crossings

Buildings & Land Use:

- Commercial and mixed use
- Major roadway in neighborhoods
- Consistent building line recommended
- Buildings next to sidewalk
- Pedestrian awnings and arcades recommended except in MI District

17.4A(4) Avenue



Common Street Features (Section 2.2):

- Travel lanes of 15 ft. to accommodate bicyclists (Sharrow pavement markings to be included on designated bikeways where on-street parking is provided – see Appendix 3; otherwise if on-street parking is not required, a minimum 4 foot striped outside bike lane on designated bikeways excluding gutter shall be provided)
- Curb & gutter
- Striped parking in commercial and mixed use areas
- Street Tree Planting strips – 5 ft. minimum on each side (see introduction of Section 17.4A for further notes about NCDOT maintained streets)
- Sidewalks – 5 to 13.5 ft. on each side (Where sidewalk, utility and planting strips combined in commercial use areas, approved tree grates must be used and trees planted according to standard specification location.)
- Requires 74 ft. of right-of-way
- Utility location underground or alley
- Average speed 30-35 mph

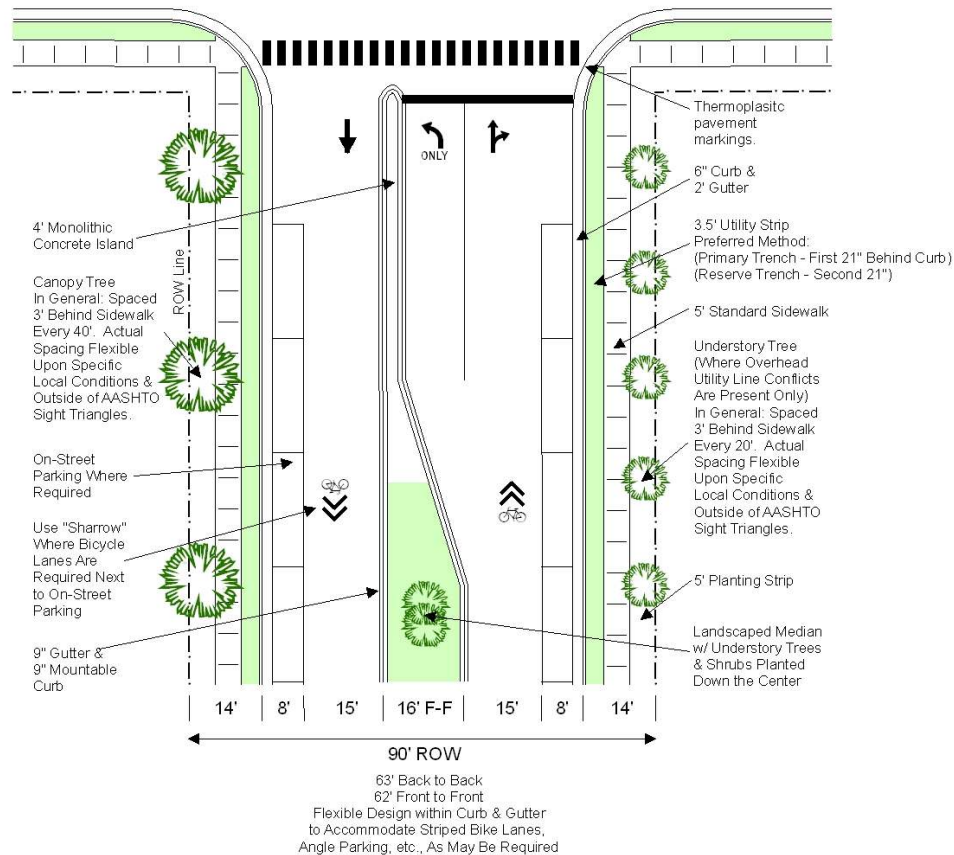
Buildings & Land Use:

- Residential, Industrial, and Commercial areas
- Consistent building line recommended
- Buildings next to sidewalk
- Place prominent public buildings and plazas at end of vista

17.4A(5) Urban Avenue

URBAN AVENUE

FIGURE 17.5



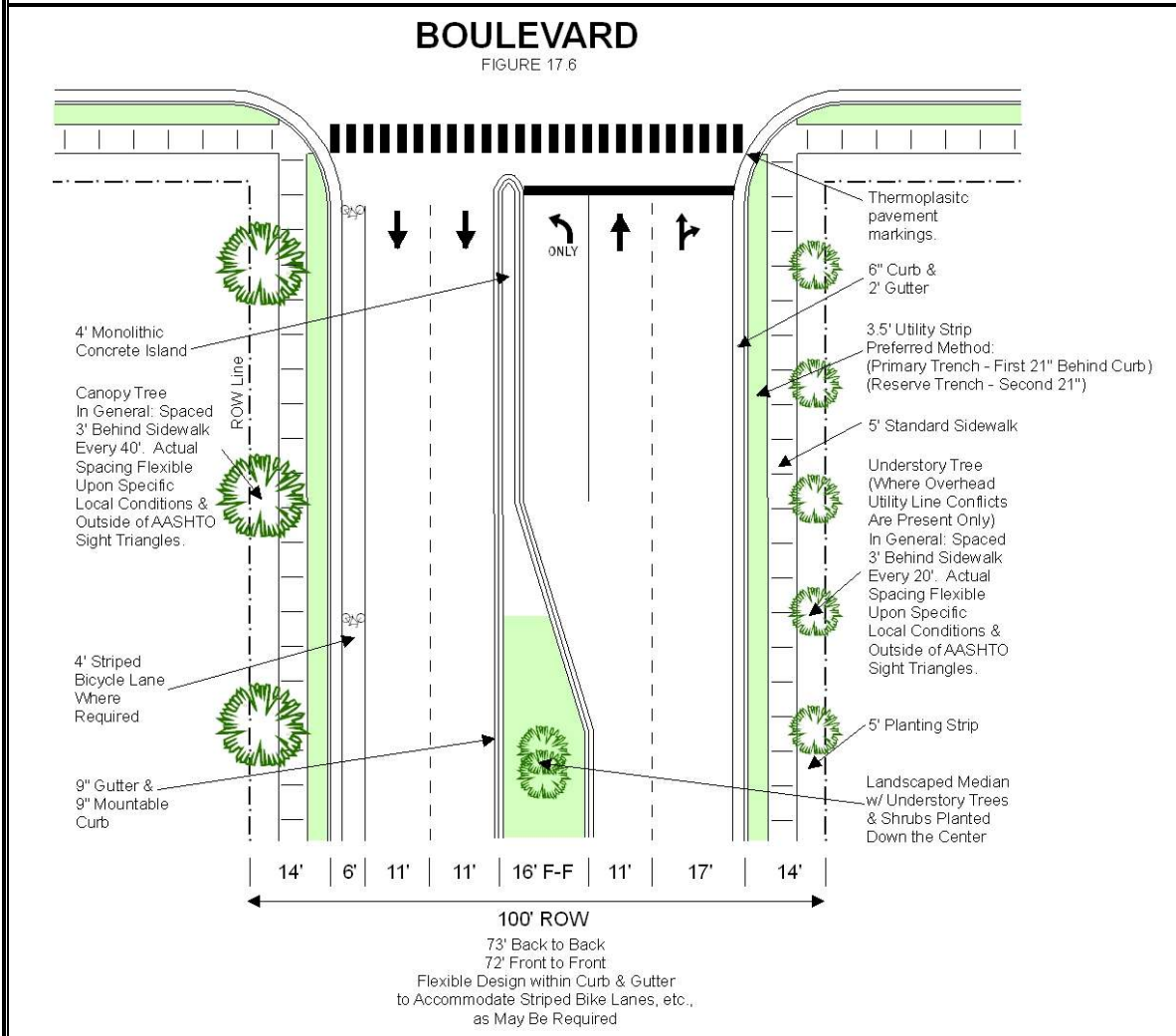
Common Street Features (Section 2.2):

- Left turn lanes of 11 ft. which includes a 9" gutter where median present
- On-Street parking in commercial use areas
- Travel lanes of 15 ft. to accommodate bicyclists (Sharrow pavement markings to be included on designated bikeways where on-street parking is provided – see Appendix 3; otherwise if on-street parking is not required, a minimum 4 foot striped outside bike lane on designated bikeways excluding gutter shall be provided)
- Curb & gutter
- Landscaped Medians– 16 ft. minimum in width
- Street Tree Planting strips – 5 ft. minimum on each side (see introduction of Section 17.4A for further notes about NCDOT maintained streets)
- Sidewalks – 5 to 13.5 ft. on each side (Where sidewalk, utility and planting strips combined in commercial use areas, approved tree grates must be used and trees planted according to standard specification location.)
- Requires 90 ft. of right-of-way
- Utility location underground or alley
- Average speed 35-45 mph

Buildings & Land Use:

- Residential and commercial use areas
- Consistent building line recommended
- Commercial buildings should be close to the sidewalk
- Place prominent public buildings and plazas at the end of vistas

17.4A(6) Boulevard



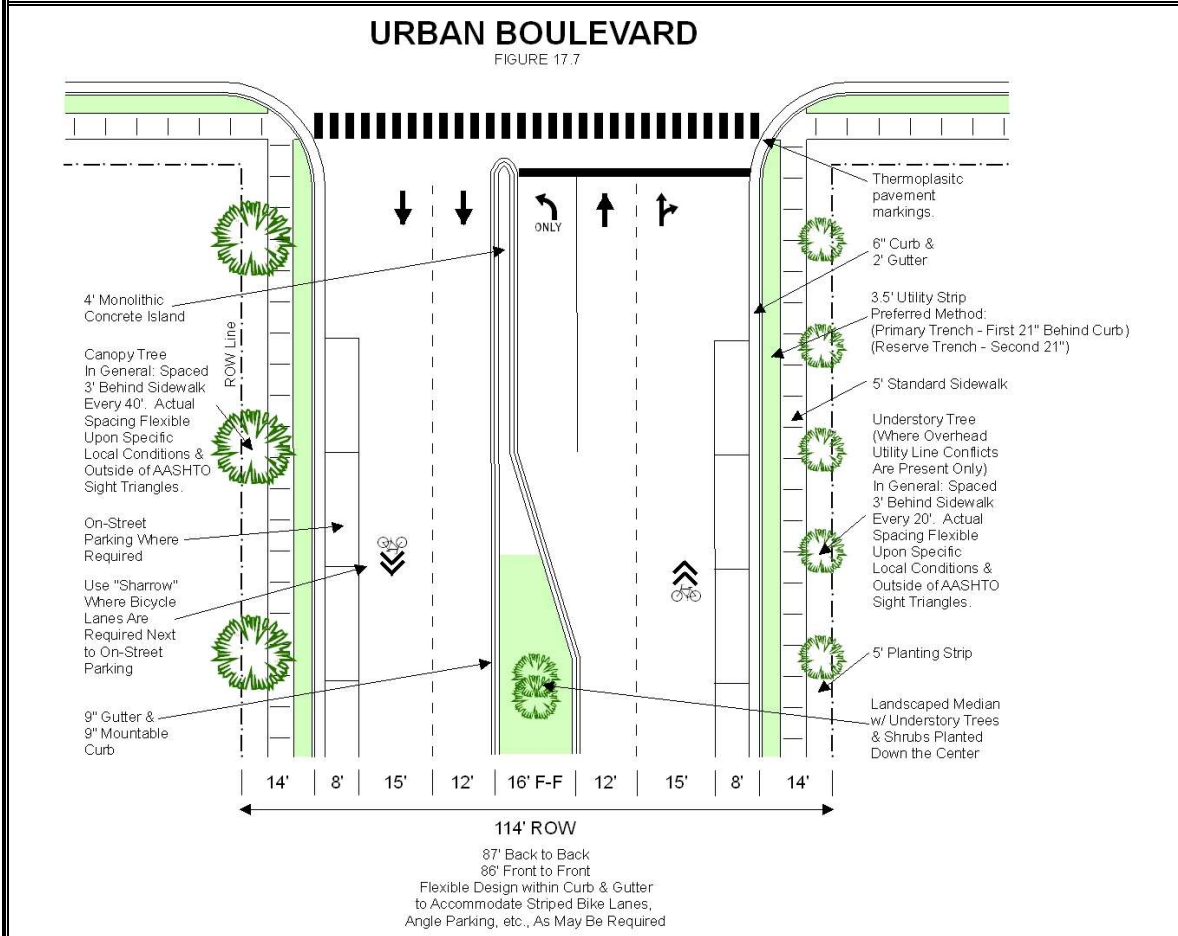
Common Street Features (Section 2.2):

- Inside travel lanes of 11 ft.
- Outside travel lanes of 15 ft. to accommodate bicyclists; otherwise, on designated bikeways, a minimum 4 foot striped outside bicycle lane excluding gutter shall be provided – see Appendix 3
- Curb & gutter
- Landscaped Medians– 16 ft. minimum in width
- Street Tree Planting strips – 5 ft. minimum on each side (see introduction of Section 17.4A for further notes about NCDOT maintained streets)
- Sidewalks – 5 to 8 ft. on each side
- Requires 100 ft. of right-of-way
- Utility location underground or alley
- Average speed 35-45 mph

Buildings and Land Use:

- Mixed residential and commercial use areas

17.4A(7) Urban Boulevard



Common Street Features (Section 2.2):

- Inside travel lanes of 11.5 ft.
- Outside travel lanes of 15 ft. to accommodate bicyclists (Sharrow pavement markings to be included on designated bikeways where on-street parking is provided – see Appendix 3; otherwise, a minimum 4 foot striped outside bike lane on designated bikeways excluding gutter shall be provided)
- Curb & gutter
- Striped parking in mixed use and commercial areas
- Landscaped Medians– 16 ft. minimum in width
- Street Tree Planting strips – 5 ft. minimum on each side (see introduction of Section 17.4A for further notes about NCDOT maintained streets)
- Sidewalks – 5 to 8 13.5 ft. on each side (Where sidewalk, utility and planting strips combined in commercial use areas, approved tree grates must be used and trees planted according to standard specification location.)
- Requires 114 ft. of right-of-way
- Utility location underground or alley
- Average speed 35 mph

Buildings & Land Use:

- Mixed residential and commercial uses
- Consistent building line recommended
- Buildings next to sidewalk
- Place prominent public buildings and plazas at end of vista

B. Horizontal Curve Street Design Criteria

Design Criteria for design speed centerline radius, reverse curve tangent distance and maximum rate of superelevation rates for streets are summarized in Table 16.1. Superelevation rates, minimum runoff lengths and methods of distribution should be in accordance with AASHTO guidelines.

The minimum tangent length approach an intersection should be at least fifty (50) feet for alleys and streets. All other streets shall have a tangent section no less than one hundred (100) feet approaching an intersection.

Table 17.1

Street Type	Design Speed (mph)	Minimum Centerline Radius (feet)	Maximum Rate of Superelevation for Minimum Centerline Radius (foot per foot)	Minimum Tangent Distance Between Reverse Curves (feet)
Alley	10	50	N/A	0
Street	25	150	N/A	0
Main Street	30	300	N/A	0
Avenue	40	533	0.04	250
Boulevard	50	833	0.06	350
Freeway	Shall Meet NCDOT Roadway Standards & Specifications			

C. Vertical Curve Street Design Criteria

Whenever practical, streets should follow the existing contours of a site so as to avoid excessive grading and removal of vegetation. Street grades shall not be less than three-quarters of one percent (0.75%). Standards for vertical street design are listed in Table 16.2.

At signalized intersections, the maximum grade approaching the intersection should not exceed two percent (2%) and extend a minimum distance of hundred (100) feet in each direction. For intersections not controlled by a traffic signal, the maximum grade approaching the intersection should not exceed (5) percent and extend a minimum distance of 50 feet in each direction.

Table 17.2

Street Type	Design Speed (mph)	Maximum Gradient (%)	Minimum Vertical Curve Length, L	
			Crest (feet)	Sag (feet)
Alley	10	12	25	10
Street	25	12	50	26
Main Street	30	9	50	37
Avenue	40	8	125	64
Boulevard	50	7	150	96
Freeway	Shall Meet NCDOT Roadway Standards & Specifications			

Note: The rate of vertical curvature, K, is the length of curve (feet) per percent algebraic difference in intersecting grades (A). $K = L/A$

D. Corner Radii

Curb radii shall be designed to reduce pedestrian crossing times along all streets requiring sidewalks. In general, curb radii should be approximately 20 feet except along NCDOT-maintained roads, where larger radii may be required. In all cases, curb radii shall be sufficiently large to accommodate large commercial or fire trucks.

E. Intersections

- All streets shall intersect at right angles as nearly as possible and no street shall intersect at less than 75 degrees.
- Offset intersections for Alleys and Streets should be at least 125 feet apart measured from centerline to centerline. A larger spacing in accordance with AASHTO standards may be required for all other streets.
- Property lines at street intersections shall be rounded with a minimum radius of 20 feet. At an angle of intersection of less than 90 degrees, a greater radius may be necessary.

F. Sight Distance

Sight distance is the length of roadway visible to the driver. The minimum sight distance available on the roadway shall be sufficiently long to enable a vehicle traveling at or near the design speed to stop before reaching a stationary object in its path.

Minimum stopping sight distances shall be provided in both the horizontal and vertical planes for planned roadways as related to assumed driver's eye height and position. Where there are sight obstructions (such as walls, cut slopes, buildings, and other hazards) on the inside of curves, changes in roadway alignment may be required to obtain adequate stopping sight distance if the sight obstruction can not be removed. All sight distance lengths and methods of measuring sight distance along a roadway shall be in accordance with ASSHTO guidelines.

G. Intersection Sight Distance

Intersections should be planned and located to provide as much sight distance as possible. A basic requirement for all controlled intersections is that drivers must be able to see the control device well in advance of performing the required action. Stopping sight distance on all approaches is needed as a minimum. Obstruction-free sight triangles shall be provided in both the horizontal and vertical planes, as related to assumed driver's eye height and position. Sight distance lengths and methods of measuring intersection sight distance along a roadway shall be in accordance with ASSHTO guidelines.

Within the area of a defined sight triangle, there shall be no sight obstructing or partly obstructing wall, fence, sign, foliage, berming, or parked vehicles between the heights of twenty-four (24) inches and eight (8) feet above the curb line elevation or the nearest traveled way if no curbing exists.

Objects, which may be located in the sight distance triangle, are items such as: hydrants, utility poles, utility junction boxes, and traffic control devices provided these objects are located to minimize visual obstruction.

H. Turning Lanes

It may be necessary to construct lanes for right and left turns into a driveway or street for safety and capacity reasons or where roadway speeds and traffic volumes are high or if there are any substantial turning volumes.

I. Miscellaneous

- **Traffic Calming Devices:** The use of traffic calming devices such as raised intersections, landscaping bulb-outs, and traffic circles are encouraged as alternatives to conventional traffic control measures.
- **Other Design Criteria:** Design standards not specifically addressed in this ordinance must comply with the minimum design and construction criteria of the N. C. Department of Transportation.
- **Street Markers and Traffic Control Signs:** All street markers and traffic control signs posted in accordance with the Manual of Uniform Traffic Control Devices shall be installed by the developer prior to the issuance of any certificates of occupancy for any building on that street.

J. Utility Location

All utilities, other than lines used only to transmit electricity between generating stations or substations and three-phase electric power distribution lines shall be placed underground, and all ground or surface disruptions required for installation shall be rehabilitated to the original or an improved condition. Underground utilities except water and sewer should be located in alleys preferably. If no alley is provided, then a five (5) foot minimum easement for those utilities shall be provided behind the sidewalk located within either the right-of-way or a public utility easement. Water and sewer utilities should not be located near required street tree planting areas, and service lines must be laid perpendicular to those planting areas.

K. Street Lights: The developer shall install street lights on all streets.

L. Public Water and Sewer

- **Water Allocation:** In order to preserve and enhance property values, manage its limited water supply as a vital natural resource, promote economic development and incentivize smart growth practices, the allocation of Knightdale's potable water capacity shall be granted in accordance with the *Town of Knightdale Municipal Water Allocation Policy* (the "Policy") as amended from time to time. The goals and procedures contained in the policy are reviewed in May of each year and when appropriate readjusted by the Town Council. The Town's overall progress on policy goals are considered and the multipliers and/or point thresholds readjusted accordingly.
- **Connection to Public System:** Every lot proposed for subdivision within the Knightdale corporate limits or ETJ shall have connection to the public water and sewer systems if the subdivision of which it is a part, or any part thereof, is (without resort to crossing a ridge line such that the pumping of wastes would

be necessary) within the distances set out for the size of the entire subdivision as provided below:

Max. # of Dwellings	Distance from System
Up to 5 units	300 feet
6 to 14 units	450 feet
15 to 24 units	600 feet
25 or more units	1000 feet

All non-residential development within the Town’s Urban Service Area shall connect to the public water system whenever it is practicable in terms of distance and in accordance with Town Council policy on water and sewer extensions. In the case of family subdivisions, extensions of water shall be in accordance with the standards in Section 15.7(C).

- **Water and Sewer Mains:** All water and sewer main extensions and distribution/collection facilities which connect to the water distribution/sewerage collection systems of the Town shall be designed, constructed and installed in accordance with the City of Raleigh Public Utilities Handbook.

 - a. **Distribution and Collection Plans:** A water distribution plan shall be designed to create a complete circuit without dead-ends. Water mains shall be extended to the termination of the street right-of-way or where the street right-of-way intersects the boundaries of another phase of the same subdivision or another tract for subdivision. A sewerage collection plan shall be designed to extend sewer mains to the termination of the street right-of-way or natural drainageway where the street right-of-way intersects the boundaries of another phase of the same subdivision or another tract for subdivision.
 - b. **Sizing:** In determining line sizes, the engineer for the public system and the Project Engineer shall consider the zoning classification of adjacent tracts which could also be served by the mains if extended, the potential type and density of development which might be served, and the Town’s water distribution/sewer collection network plans.
- **Fire Hydrants:** Fire hydrants shall deliver sufficient water to provide adequate fire protection. Hydrants shall be located in accordance with the Town of Knightdale Standard Specifications and Construction Details.

17.5 Improvement Guarantees

If the developer submits an application to the Town for final plat approval prior to the completion of the required improvements, the developer shall provide security for said improvements in an amount not less than 125% of the cost of construction, engineering, and installation for the improvements of the approved Preliminary Plat which have not been completed by the developer nor approved by the Town at the time of final plat submission.

- A. **Surety Performance Bond(s):** The Land Use Administrator shall determine which improvements shall be covered by the security. The developer shall provide the Town Engineer with a list and description including unit cost and total cost for improvements to be covered, and engineering services. The amount of security shall be approved by the Town Engineer.

- B. Cash or Equivalent Security:** The security shall be in a form acceptable to the Town and may include, (a) U.S. currency deposited with the Town Manager, (b) a certified check deposited with the Town Manager, or (c) a money order deposited with the Town Manager.
- C. Guarantee Period:** The performance security guarantee shall remain in effect for a period of one (1) year, and may be renewed only one time for a period up to, but no more than, one (1) year.
- D. Release of Security:** Upon completion of the improvements and other actions guaranteed by the security arrangement, and the acceptance and approval of the same, the Town shall release the security to the developer with written confirmation from the Administrator.
- E. Warranty Period Security for Completed Improvements:** Whenever all improvements intended for dedication are completely installed, the developer shall provide security in one of the forms set out in Section 16.5 (B), guaranteeing to the Town, against defects for one (1) year, all utility taps, curbs, gutters, street pavement, sidewalks, drainage facilities, water and sewer lines and other improvements. The amount of security shall be approved by the Town Engineer and shall be not less than 25% of the cost for construction or installation of the improvements based upon unit costs and total costs provided by the Project Engineer. If the developer shall correct and rectify all defects arising within one (1) year, then the security shall be released; otherwise the Administrator shall notify the Town Council, the developer and surety that a default has occurred, and the Town Council shall proceed in accordance with defaults in security arrangements as set forth below.
- F. Defaults for Incomplete Improvements and Warranty Period:** If any portion of the required improvements for which security was given as set out in the above section shall fail to be completed, repaired, accepted or dedicated in accordance with the Preliminary and Final Plat and the terms and conditions for allowing the improvements to be completed subsequent to Final Plat approval and pursuant to a surety arrangement, then the Town shall notify the developer and the surety of the default and seek a formal explanation of the reason for the default.

If the Administrator finds that there is good cause for the improvements not being made on time, or that only a small delay in completing the improvements appears likely, then, upon a showing that the existing surety arrangement is still in effect or has been extended, the terms for the completion of the improvements may be modified. In any other event, the Administrator shall report to the Town Council that the security is in default, and the Town Council may take such actions as it deems necessary to enforce and collect the security, and shall use the proceeds to finance the completion of the improvements or the rebuilding and repairing of such improvements to proper specifications, and the completion of such other actions as may have been contemplated under said surety arrangements. Unused portions of the proceeds, if any, shall be returned to the surety.

G. Final Acceptance of Improvements

1. The subdivider shall be responsible for:
 - a. Providing all engineering services (including the cost of testing materials and performance of soil compaction tests) and furnishing plans and specifications consistent with those in this chapter and the Standard Specifications and Construction Details Manual.
 - b. Paying the entire initial cost of all improvements required under this chapter.
 - c. Payment to the Town of all fees and charges required by the Town including, but not limited to, the costs of permits, inspections, utility taps and acreage fees, at such times as payments are specified under the various codes, fee schedules or resolutions of the Town.
2. The Town shall be responsible for the inspection and approval of all construction work.

H. Maintenance of Dedicated Areas until Acceptance

All facilities and improvements with respect to which the developer makes an offer of dedication to public use, shall be maintained by the developer, his successors and assigns, until such offer of dedication is accepted by the Town Council or other appropriate authority. No street shall be maintained by the Town, no street dedication shall be accepted for ownership and maintenance, no construction improvement permits shall be issued, nor shall water, sewer or other Town facilities or services be extended to or connected with any subdivision for which a plat is required to be approved unless and until such Final Plat has been approved by the Town of Knightdale.

17.6 Incomplete Improvements Guarantee for Zoning & Special Use Permit

In cases when weather conditions would make it unreasonable for the Zoning Compliance Permit or Special Use Permit recipient to comply with all of the requirements of the Unified Development Ordinance prior to commencing the intended use(s) or occupying any buildings the developer shall provide security for such improvements in an amount not less than 125% of the cost to construct or install the improvements.

- A. Surety Performance Bond(s):** The specific improvements requested to be covered and the amount of security shall be approved by the Land Use Administrator. The developer shall provide the Land Use Administrator with a list and description including unit cost and total cost for improvements to be covered.
- B. Cash or Equivalent Security:** The security shall be in a form acceptable to the Town and may include: A) a deposit of U.S. currency with the Town Manager; or B) a deposit of a certified check with the Town Manager; or C) a deposit of a money order with the Town Manager.
- C. Guarantee Period:** The performance security guarantee shall remain in effect for a period determined by the Land Use Administrator. The time period may range from a

few days up to, but no more than, one year. Such performance security guarantees shall not be renewable under any circumstance.

17.7 Performance Security for Stormwater BMP Installation and Maintenance

A. The Town of Knightdale may, at its discretion, require the submittal of a performance security or bond with surety, cash escrow, letter of credit or other acceptable legal arrangement prior to issuance of a permit in order to:

1. Ensure that the structural BMPs are installed by the permit holder as required by the approved stormwater management plan, and/or
2. Maintained by the owner as required by the operation and maintenance agreement.

B. Amount

1. Installation

The amount of an installation performance security shall be the total estimated construction cost of the BMPs approved under the permit, plus 25%.

2. Maintenance

The amount of a maintenance performance security shall be the present value of an annuity of perpetual duration based on a reasonable estimate of the annual cost of inspection, operation and maintenance of the BMPs approved under the permit, at a discount rate that reflects the jurisdiction's cost of borrowing minus a reasonable estimate of long term inflation.

C. Uses of Performance Security

1. Forfeiture Provisions

The performance security shall contain forfeiture provisions for failure, after proper notice, to complete work within the time specified, or to initiate or maintain any actions which may be required of the applicant or owner in accordance with this ordinance, approvals issued pursuant to this ordinance, or an operation and maintenance agreement established pursuant to this ordinance.

2. Default

Upon default of the owner to construct, maintain, repair and, if necessary, reconstruct any structural BMP in accordance with the applicable permit or operation and maintenance agreement, the Stormwater Administrator shall obtain and use all or any portion of the security to make necessary improvements based on an engineering estimate. Such expenditure of funds shall only be made after requesting the owner to comply with the permit or maintenance agreement. In the event of a default triggering the use of installation performance security, the Town of Knightdale shall not return any of the unused deposited cash funds or other security, which shall be retained for maintenance.

3. Costs in Excess of Performance Security

If Town of Knightdale takes action upon such failure by the applicant or owner, the Town of Knightdale may collect from the applicant or owner for the difference should the amount of the reasonable cost of such action exceed the amount of the security held.

4. Refund

Within sixty days of the final approval, the installation performance security shall be refunded to the applicant or terminated, with the exception of any amount attributable to the cost (plus 25%) of landscaping installation and ongoing maintenance associated with the BMPs covered by the security. Any such landscaping shall be inspected one (1) year after installation with replacement for compliance with the approved plans and specifications and, if in compliance, the portion of the financial security attributable to landscaping shall be released.

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