ENGINEERING SPECIFICATIONS

STREETS

MAY 2024

CITY OF SANFORD NORTH CAROLINA

STREETS
ENGINEERING SPECIFICATIONS

Work performed under this specification shall consist of all materials and labor necessary to result in complete and ready for service street sections as detailed in the in the contract, plans and specifications. All technical standards referenced herein refer to the version that is current at the time of construction.

I. General

Unless otherwise stated, all materials and street construction methods shall conform to the applicable requirements as outlined in the latest revision of the North Carolina Department of Transportation's "*Standard Specifications for Roads and Structures," "Asphalt Quality Management System (QMS) Manual" and "Subdivision Roads Minimum Construction Standards"*.

Whenever the following terms are used in above said specifications, the intended meaning of such terms shall be as follows:

"State" or "Commission" shall be replaced by "City of Sanford"

"Resident Engineer" shall be replaced with "Director of Engineering"

"Sampling and Testing by Commission" shall be replaced with "sampling and testing by the City or authorized agent"

"Inspection by Commission" shall be replaced with "Inspection by City or its duly authorized representative"

II. Design

A. General

Street design shall conform to the standards set forth in the Unified Development Ordinance (UDO), NC DOT "*Standard Specifications for Roads and Structures", AASHTO "Geometric Design of Highways and Streets, The Green Book"* or the City's Standard Specifications and Details, whichever, in the opinion of the Director of Engineering, is applicable.

B. Pavement and Rights-of-Way Widths

Standard street widths are shown in the Standard Details. The Director of Engineering may require additional widening and related work as deemed necessary to provide for the safety and quality of roadway for the traveling public.

C. Grades

Unless necessitated by exceptional topography, street grades shall not be less than one half percent (0.5%).

The maximum grade allowed for a local street when approaching an intersection is five percent (5%) for the last 100 feet of pavement before the intersection.

The maximum grade allowed for a collector street or thoroughfare when approaching an intersection is two percent (2%) for the last 100 feet of pavement before the intersection. The beginning of the minimum grade allowed for a street approaching an intersection is measured at the curb-line extension of the intersecting street.

In all other areas, the maximum grade shall be 10%.

D. Sight Triangle

A sight triangle easement shall be provided at all intersections. Sight triangle easements shall be not be less than 10 feet by 70 feet.

The shorter dimension shall be the setback from the right-of-way of the major street, and the longer dimension shall be measured along the right-of-way of the major street.

Sight triangle easements shall be shown on the final plat for the developed tract.

Subdivision signs and plant materials placed within the sight triangle shall be limited to a height of 30 inches.

E. Alleys

All alleys shall either connect to the street right of way at each end or include a cul-de-sac. All alleys shall be private and built to the City of Sanford specifications.

Access easements shall be dedicated. No water or sewer utilities shall be allowed.

F. Street Lights

General

Street lights shall be installed by the electric utility company. The typical streetlight is a 9,500 lumen fixture (or greater) with mast arm lighting. Standard pole is grey fiberglass.

Street lights shall be placed at every intersection. For blocks over 300 feet, an additional light shall be placed in the middle of the block. For blocks over 400 feet an additional light is required every 150-200 feet where there is at least one occupied building between lights.

On dead end streets, a light is required on the dead end if the street is over 150 feetlong. On cul-de-sacs a light is required on the end regardless of length of the road.

Additional lights may be required by the City for streets with sharp turns or vertical curves to promote public safety.

Decorative Lighting

The City of Sanford will allow the installation of decorative lighting in residential areas providing the following conditions are met:

1. All lighting plans and fixtures must be approved by the public works director.

2. Light spacing shall be such that there is no degradation in the light reaching the street when compared to standard street lighting. Some style lights, such as acorn lighting, would require twice as many fixtures.

3. The developer shall be responsible for paying all costs above the costs normally paid by the City. The developer agrees to pay any associated contract termination

fees, and the City is relinquished from any associated costs should termination be necessary.

4. On going costs associated with decorative poles will be responsibility of HOA, only applied to developments with an HOA.

G. Curb and Sidewalk

The minimum width of sidewalk shall be 5 feet with a thickness of 4 inches. Sidewalks shall have a uniform cross slope of ¼-inch per foot toward the roadway.

Where sidewalk intersects with a driveway access, the sidewalk shall be 6 inches thick.

Curb and gutter on all residential streets shall be either standard 2'6" vertical curb and gutter, (Standard Detail SD-R-001) or rolled curb and gutter, (Standard Detail SD-R-002), which must be approved for use by the City.

Standard 18-inch median curb and gutter may be used on entrance islands and medians when deemed appropriate by the Director of Engineering.

H. Pavement Design

The DEVELOPER shall furnish a pavement design report produced and certified by a professional engineer, using AASHTO methodology.

The report shall be based on field and lab testing of in-place subgrade materials by a qualified geotechnical firm and shall incorporate the following criteria: 20-year design life, 4% annual growth rate, and appropriate traffic projections. Soil samples used for CBR tests shall occur at intervals no greater than 500 feet.

Should the pavement design reflect a cross section less than that listed below, then the pavement thickness listed in the table shall prevail.

Street type	CABC, inches	Asphalt, inches
Typical residential	8	2
Residential collector *	10	3

* This typically takes construction traffic for subsequent phases

The pavement design shall take into consideration staged construction and the impact of construction traffic.

I. Roadway Connectivity

Design of roadway stub-outs to adjacent properties, shall demonstrate the feasibility of extending the roadway onto the adjacent properties. Adequate information shall be provided that demonstrates tie-in to existing grade is feasible. In the event the roadway extension crosses a stream or creek, vertical and horizontal alignment design shall be provided, along with culvert calculations.

All street stubs to adjacent properties, or stubs to future phases, that exceed 150 feet shall provide an all-weather turn around suitable for fire and rescue equipment. Appropriately designed end of pavement transition must provide a turnaround for emergency vehicles with a 50’ radius. This shall apply to each individual phase of the subdivision.

III. Construction Requirements

A. General

All roadway subgrade, alley subgrade, storm sewer, and utility construction shall be inspected and approved by the City prior to placement of base course materials. All streets shall be cleared and graded for the full width of the right-of-way within 50 feet of any street intersection.
Construction traffic can accelerate deterioration of roads. To minimize this, construction shall be phased as follows:

- subgrade preparation
- ABC stone base and intermediate course.
- final surface course.

ABC stone base and intermediate course shall be designed to support construction traffic.

B. Placement of Asphalt Pavement

The final lift of surface course placement shall be delayed until such time as its placement is approved by the City, subject to the following conditions:

- Placement of the final lift of surface course shall occur after 80 percent of the units have been completed or at the direction of the Director of Engineering.

- Prior to placement of the surface course, the existing intermediate course shall be thoroughly cleaned and all cracks, spalling, and other failure shall be repaired to the satisfaction of the City. The tack coat shall be used on the road surface and the curb face.

- Cracked or damaged concrete shall be replaced to the satisfaction of the City prior to paving.

- Asphalt materials shall not be produced or placed under any of the following conditions:

  - during rainy weather or whenever moisture on the surface to be paved would prevent proper bond;
  - when the subgrade or base course is frozen or wet;
  - when temperatures, measured in the shade away from artificial heat at the location of the paving operation, do not meet the following criteria;

Material Type	Minimum Air Temperature	Minimum Ground Temperature
Prime & Tack Coat	40	40
Asphalt Base Course	40	40
Asphalt Intermediate Course	40	40
Asphalt Surface Course	50	50

- For tie-in to existing pavement, milling of 1 ½ inches shall occur ensure a smooth connection. Tie-in shall extend a minimum of one foot into the existing pavement.

C. Curb and Sidewalk

Concrete shall not be placed until all forms and subgrades have been approved by the Construction Inspector. Subgrade shall be excavated to the required depth, and shaped to the proper cross-section. Where tree roots are encountered, they shall be removed to a depth of 1 foot for the full width of the excavation. The subgrade shall be stable and thoroughly compacted.

Forms shall be set and maintained true to the required lines, grades, and dimensions. Forms shall be constructed with material of such strength and rigidity to prevent any appreciable deflection between supports. Straight forms shall be within a tolerance of ½ inch in 10 feet from a true line horizontally or vertically. Forms shall be thoroughly cleaned of all dirt, mortar and foreign material before being used. All inside form surfaces shall be thoroughly coated with commercial quality form oil.

Grooved construction joints shall be cut to a depth equal to at least 1/3 of the total slab thickness. The joint shall be no less than 1/8 inch in width and cut at intervals equal to the width of the sidewalk.

A half-inch (½ “) expansion joint filled with joint filler shall be placed between all rigid objects and placed no farther than 50 feet apart for sidewalks and curb and gutter, extending the full depth of the concrete with top of the filler half inch (½ “) below the finished surface. The surface of sidewalks shall be finished to grade and cross section with a float, troweled smooth, and finished with a broom.

D. Road Pavement Section

All roots, stumps and other unstable materials shall be removed from the subgrade. Where tree roots are encountered, they shall be removed the full width of the excavation.

E. Pavement Markings

All pavement markings shall be thermoplastic material unless otherwise directed by the Director of Engineering.

IV. Inspection

A. Subgrade Preparation

All cut and fill slopes shall be shaped and finished to conform to the typical cross section(s) shown on the plan. The contractor shall maintain adequate drainage on the project being graded at all times.

The developer/contractor shall maintain the street until final acceptance. This shall include keeping all drainage lines and structures free from sediment or any debris that may cause them to become clogged.

All storm drain pipes shall be Reinforced Concrete (RCP) within the City rights-of-way. Corrugated metal pipe (CMP) may be used on diameters greater than 60 inches.

The subgrade shall be compacted, and inspected prior to the placement of stone base. The subgrade shall then be proof-rolled by using a fully loaded tandem dump truck with a minimum gross weight of 20 tons. A current weight ticket shall be provided to the City Construction Inspector.

Should any "pumping" or displacement be observed during the proof-rolling, the defective area(s) shall be repaired by replacing defective material with suitable material, alternative stabilization methods accepted by the City of Sanford, or any combination thereof to the satisfaction of the City, and thoroughly compacted.

The proof rolling shall be repeated until there is no evidence of "pumping" or displacement. The proof-roll of subgrade shall also be redone if rain occurs prior to the placement of stone base course.
Curb shall be placed and backfilled prior to placement of the stone base.

B. ABC stone base and intermediate asphalt course

The aggregate base course (ABC) shall be inspected prior to placement of asphalt. Inspections shall be performed by proof-rolling and/or field density testing at the direction of the City Inspector. Stone base course shall be placed within 48 hours of the proof-roll of subgrade or the proof-roll shall be redone.

The City reserves the right to require that quarry tickets be presented to they Construction Inspector to enable a check for quantity at the specified final thickness. The base material shall then be inspected by the City Construction Inspector and upon acceptance and approval, the intermediate course may be placed.

The proof-roll shall be repeated if rain occurs prior to the placement of the intermediate asphalt course.

Intermediate asphalt course shall be placed within 48-hours of the proof-roll of the stone base course.

All asphalt material shall be placed and compacted in accordance with NC DOT requirements. The City reserves the right to require copies of delivery tickets to enable a check for quantity at the specified final thickness.

C. Asphalt surface course

The final lift of asphalt shall not be applied until 80% of the development has built out or at the direction of the Director of Engineering.

The intermediate asphalt course shall be inspected prior to placement of surface asphalt course.

Prior to placement of the surface course, the existing intermediate course shall be thoroughly cleaned and all cracks, spalling, and other failure shall be repaired to the

satisfaction of the City. A tack coat shall be used on the road surface and the curb face. Any damages shall be replaced or repaired prior to paving.

The Construction Inspector reserves the right to require the Contractor to provide random core samples by an independent testing laboratory to demonstrate actual thickness of base and surface courses. A certified testing laboratory shall take core samples and the results shall be presented to the Construction Inspector. Should the cores reveal insufficient thickness, the Contractor shall provide a solution acceptable to the Director of Engineering or designee.

The cost of any additional testing shall be borne by the Developer and/or Contractor.

D. Street Widening

For street widening operations, the existing edge line of the travel lane shall be saw cut. The final asphalt lift shall overlap the saw cut edge by at least 6" onto the existing roadway cross-section. The objective is to have the joint between new and old asphalt to be offset from the joint between subgrades (this overlap shall exclude the overlay).

- Valve boxes and manholes shall initially be set at an elevation to be flush with the first course of asphalt, and then raised when the to be flushed with the final course.

V. Repair

A. Asphalt

Distressed Pavement Section - In City maintained roadways the distressed pavement section shall be saw cut one (1') foot beyond the distressed area to a minimum depth of five (5") inches. The saw cut pavement section shall be excavated to a minimum depth of five (5") inches. All material shall be removed and disposed of properly.

Trench/Utility Cut Patch - In City maintained roadways, the pavement shall be saw cut one (1') foot beyond either side of the trench line. Pavement patch shall adhere to the City of Sanford standard detail SD-R-03.

The City reserves the right to request that additional pavement be milled beyond the saw cut to ensure a proper seal of the area being patched.

The City's Construction Inspector will verify that the proper depths have been achieved and all asphalt has been placed and compacted per NC DOT requirements.

B. Concrete

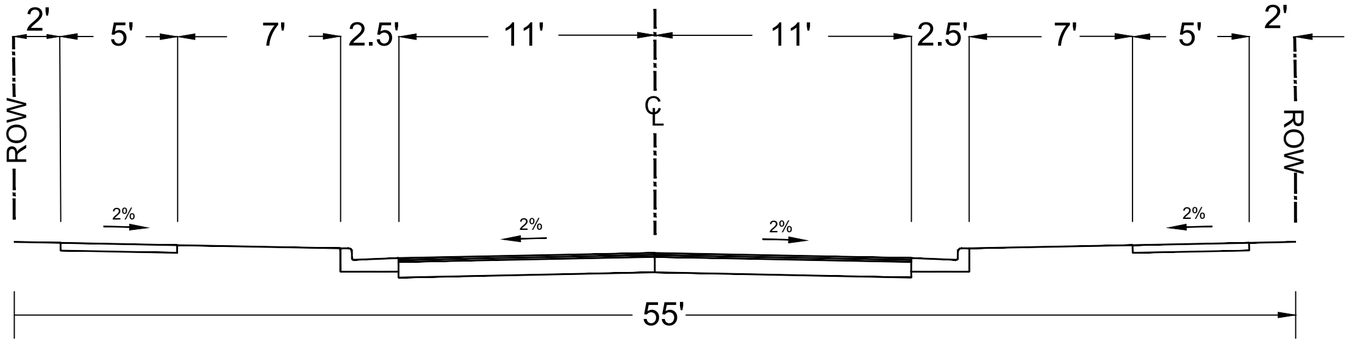
All sidewalks shall meet the current requirements set forth in the Federal Highway Administration (FHWA), Public Right-of-Way Accessibility Guidelines (PROWAG) and Americans with Disabilities Act (ADA).

Concrete for curb and gutter, driveways, or sidewalks shall be Portland cement concrete having a 28-day strength of 3000 psi when tested in accordance with ASTM C-39.

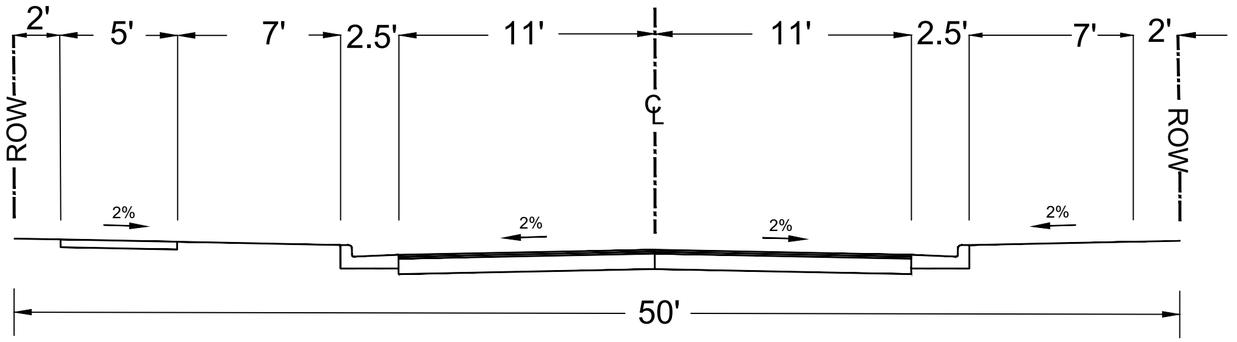
The City Construction Inspector will inspect and mark any damaged concrete structures in the pavement section prior to the placement of the surface course.

The damaged curb and gutter shall be replaced such that no additional joints shall be created. Prior to placing concrete, the contractor shall contact the City for an inspection.

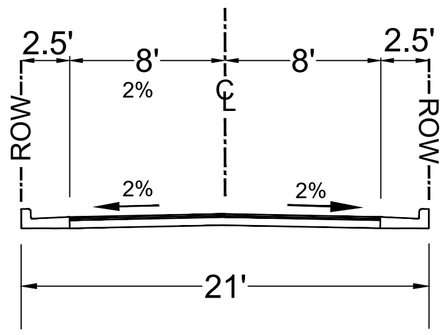
APPENDIX: Street Typical Sections



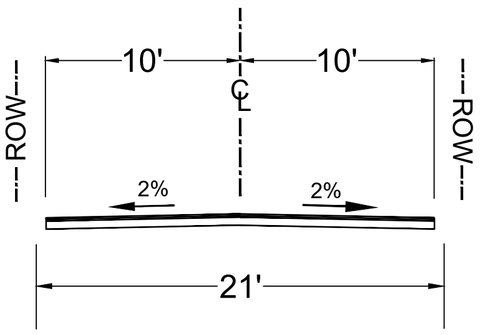
RESIDENTIAL STREET
55' ROW



RN-20 RESIDENTIAL STREET
50' ROW



PRIVATE RESIDENTIAL ALLEY
WITH CURB & GUTTER *



PRIVATE RESIDENTIAL ALLEY
NO CURB & GUTTER *

*ALLEY NOTES:

1. ALL RESIDENTIAL ALLEYS SHALL BE PRIVATE.
2. A MINIMUM PAVEMENT WIDTH OF 20' SHALL BE PROVIDED FOR ALL RESIDENTIAL ALLEY'S.
3. NO PUBLIC UTILITIES SHALL BE LOCATED WITHIN ALLEY RIGHTS-OF-WAY.
4. A MINIMUM 20' PUBLIC ACCESS EASEENT SHALL BE PROVIDED WIHTIN ALL PRIVATE ALLEYS

TYPICAL STEET SECTIONS

City of Sanford Engineering Dept - P.O. Box 3729 - Sanford, NC 27331

Dwg. No. SD-R-002	
Date: 12/07/23	
Scale: Not To Scale	
Drawn By: Staff	