SECTION 300
STREETS

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301 General

Unless otherwise provided herein, all materials and street construction methods shall conform to the applicable requirements as outlined in the Standard Specifications for Roads & Structures, latest edition, as published by the NCDOT.

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

"State" or "Commission" shall be replaced by "Town of Apex".

"Resident Engineer" shall be replaced by "ENGINEER".

"Sampling and testing by Commission" shall be replaced by the words "sampling and testing by the TOWN or its authorized testing agent".

"Inspection by Commission" shall be replaced by "Inspection by TOWN or its duly authorized representative".

302 Design

A. General

Street design shall conform to the standards set forth in A Policy on Geometric Design of Highways and Streets as published by AASHTO, the Unified Development Ordinance, Standard Specifications for Roads and Structures as published by the NCDOT, Roadway Design Manual as published by the NCDOT, or the Town Standard Specifications and Details, whichever, in the opinion of the ENGINEER, is applicable.

All proposed roadways shall conform to the Apex Transportation Plan, and the Apex Peakway Development Policy.

B. Pavement & Right-of-Way Widths

Standard street widths are shown in the Standard Details. Actual street widths shall be in accordance with the Apex Transportation Plan or any interim plan effective at the time of plan submittal. Transitions and tapers between sections or at widenings shall be made in accordance with Section 302(A) of these Specifications. The ENGINEER may, at his discretion, 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 ~~1/2~~ 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.

Street grades at pedestrian crossing locations shall meet the following criteria or the latest

approved Federal Access Board standards whichever is more stringent.

1. 2% maximum cross slope for crossings located at approaches with a stop or yield condition; and
2. 5% maximum cross slope for crossings located at approaches without stop control.

Refer to the Street Geometric Standards Detail for maximum grades and vertical curve controls.

D. Radii of Curvature

Where a street centerline deflection of more than 5 degrees occurs, a curve shall be introduced. Refer to the Street Geometric Standards Detail for horizontal curve controls.

At intersections, all streets and commercial driveways shall be rounded with radii not less than:

Street Classification	Edge of Pavement Radius
Thoroughfares	50 feet
Collectors	40 feet
Residential	30 feet

E. Tangents

A centerline tangent of not less than 100 feet shall be provided between reverse curves on all streets. Reverse curves on super-elevated streets shall have a sufficient centerline tangent to accommodate entry and exit run-out, but not less than 100 feet.

F. Sight Triangle

A sight triangle easement shall be provided at all intersections. Sight triangle easements shall not be less than 10 feet by 70 feet. The 10-foot dimension shall be the setback from the right-of-way of the major street, and the 70-foot dimension shall be measured along the right-of-way of the major street. Sight triangle distances shall be increased if appropriate for traffic conditions and speed limits. Sight triangle easements shall be shown on the final plat for the developed tract.

Plant materials and subdivision signs placed within the sight triangle shall be limited to a mature height of 30 inches.

G. Apex Peakway Development (Apex Peakway)

Refer to the *Planning Department* for the Apex Peakway Development Policy.

H. Pavement Design

The pavement designs presented in the standard details shall be considered the minimum design requirements. 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 sample locations shall be as directed by the INSPECTOR. If the design structural coefficient exceeds that of the standard, the design structure shall be used.

I. Curb, Sidewalk, Driveways

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 C39. Detailed specifications for concrete shall conform to the specifications contained in Section 200. Joint fillers shall be a non-extruding joint material conforming to ASTM D1751.

The minimum thickness of a sidewalk shall be 4 inches. Sidewalks shall have a uniform slope perpendicular to the curb of 1/4-inch per foot toward the roadway. Sidewalks shall be installed during roadway construction and/or widening.

Where a sidewalk intersects with a driveway access, the sidewalk section shall be 6-inches thick. All sidewalks and greenways shall meet the current Americans With Disabilities Act (ADA) requirements.

Sidewalks shall be constructed on the north or east side of the roadway, and at locations as indicated by the Unified Development Ordinance and these specifications.

Curb and gutter, where required, shall be standard 30-inch combination curb and gutter. Upon the approval of the Town, 30-inch valley curb and gutter may be permitted in townhome developments. Standard 18-inch median curb and gutter may be used on entrance islands and medians when deemed appropriate by the ENGINEER.

J. Entranceway Islands

Islands shall be limited to such a size as to allow adequate turning room for larger vehicles. The minimum pavement width for both the entrance and exit lanes shall be 20 feet. Islands shall accommodate the turn radius of a WB-62 design vehicle, as outlined in A Policy on Geometric Design of Highways and Streets, AASHTO, current edition. The island shall not extend into the turnout of the intersection.

K. Trench Drains

All entrances with irrigation systems shall require a trench drain directly behind the curb and gutter. The trench shall be a minimum of 12 inches wide and 18 inches deep. A 4-

inch perforated pipe shall be laid at the bottom of the ditch in the center. The ditch shall then be backfilled with washed stone wrapped in the appropriate geotextile fabric. The perforated pipe shall drain to a catch basin.

L. Alleys

All alleys shall either connect to the street right of way at each end or include a cul-de-sac.

303 Construction Requirements

A. General

All roadway subgrade, alley subgrade, storm sewer, and utility construction shall be inspected and approved by the TOWN 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. Additional street clearing and grading shall be as follows:

Future Development - where planned roadways are to be built (i.e. the Peakway, roads in other phases, or roads by other developers), the rough grading shall be completed in areas where it shall impact homeowners or businesses in the phase currently under construction.

Major Streets & Thoroughfares - the full width of the right-of-way.

Collector Streets - the full width of the right-of-way.

Urban Street & Urban Cul-de-Sac - the full width of the right-of-way on the sidewalk side, and 8 feet back of curb on the “non-sidewalk” side.

B. Placement of Asphalt Pavements

Typical surface course shall have a total thickness of not less than as shown on the Standard Details, and shall be placed in 2 lifts.

Following initial lift, the CONTRACTOR shall provide temporary drains at catch basins to allow streets to drain and to eliminate ponding at the low points. Catch basin modifications shall be repaired at the time of final surface paving.

The second lift placement shall be delayed during the period of initial residential construction activity and until such time as its placement is approved by the ENGINEER, subject to the following conditions:

> Placement of the second lift shall be no earlier than 12 months after placement of the first lift and only after 75 percent of the Certificates of

Occupancy have been issued for the subdivision or phase of subdivision under construction.

Prior to placement of the final lift of pavement, the existing initial lift shall be thoroughly cleaned and all cracks, spalling, and other failure shall be repaired to the satisfaction of the ENGINEER. A tack coat shall be used on the road surface and the curb face. Furthermore, any cracked concrete that is around valve covers and manhole covers shall be replaced 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° F	40° F
Asphalt Base Course	40° F	40° F
Asphalt Intermediate Course	40° F	40° F
Asphalt Surface Course	50° F	50° F

- between December 15 and March 16 for surface course material that is to be the final layer of pavement;

- when intermediate or base course will not be covered with surface course during the same calendar year or within 15 days of placement if the plant mix is placed in January or February; a sand seal is required when the intermediate or base is not covered as required.

C. Curb and Sidewalk

The 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 with such rigidity to prevent any appreciable deflection between supports. Straight forms shall be within a tolerance of 1/2-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.

Contraction joints shall be cut to a depth equal to at least 1/3 of the total slab thickness. The contraction joint shall be no less than 1/8 inch in width. Contraction joints shall be spaced at 5-foot intervals for sidewalk and spaced at 10-foot intervals for curb and gutter, or 15-foot intervals when a machine is used. A 1/2-inch 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 the top of the filler 1/4-inch 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. Refer to the Standard Detail.

D. Utility Conduits

Buried conduits for low voltage utility installations shall be installed in accordance with the Standard Detail. All residential and commercial driveways shall have at minimum one 3-inch diameter Schedule 40 PVC conduit installed across the entire width of the driveway, extending 1 foot beyond the edges of the driveway. Conduits shall be sealed at each end with an unglued PVC cap.

For all lots that require sidewalk along the road frontage, conduits shall be installed below the sidewalk in accordance with the Standard Detail. All sidewalks, along a lot frontage, shall have at minimum 2 individual 3-inch diameter Schedule 40 PVC conduits installed across the entire width of the sidewalk, extending 1 foot beyond the edges of the sidewalk. Sidewalk conduits shall be installed on both sides of the lot and at a location of approximately 1 foot inside of the lot's property line. Conduits shall be sealed at each end with an unglued PVC cap.

All conduits shall be marked with a 2-inch brass cap, cast into the concrete curb and/or the sidewalk to indicate the location of the buried conduit. Brass caps shall be stamped with the words "Utility Conduit Crossing" in ⅜-inch tall lettering. All caps shall be held true to final elevation, within the forms, prior to and during placement of concrete, by the use of a 12-inch long rebar stake. One cap shall be installed at each individual utility conduit installation.

E. Pavement Markings

All pavement markings shall be thermoplastic material meeting NCDOT specifications, unless otherwise directed by the Engineer.

304 Inspection

A. Proof-Rolling

Street embankments shall be graded and compacted as described in Section 200 of these Specifications. After all utilities and storm sewers have been installed, the subgrade shall

be fine graded and restored to required grade, and then proof-rolled by using a fully loaded tandem dump truck or a fully loaded water truck. Should any “pumping” or displacement be observed during the proof-rolling, the defective area(s) shall be repaired by replacing defective material w/suitable material, alternative stabilization methods such as fabric, Geo-Grid, lime, etc., or any combination thereof to the satisfaction of the TOWN and thoroughly compacted. The proof rolling shall be repeated until there is no evidence of “pumping” or displacement.

Recommendations from outside sources such as soils engineers and technicians may be suggested. However, the TOWN shall have authority for approval of additional measures.

B. Compaction Testing - Subgrade

Upon completion of the proof rolling, the DEVELOPER/CONTRACTOR shall furnish to the ENGINEER a report from a certified soils testing laboratory. The report shall present the results of a Proctor analysis demonstrating that the subgrade compaction is acceptable in accordance with standard requirements of NCDOT in all of the significant fill areas. The subgrade shall then be inspected by the INSPECTOR, and upon its acceptance and approval, the stone base course may be placed. However, no stone base may be placed prior to backfilling behind the curb.

The cost of laboratory testing of subgrade compaction shall be borne by the DEVELOPER/ CONTRACTOR.

C. Base Course & Surface Course Inspection Requirements

The Town reserves the right to require that quarry tickets be presented to the INSPECTOR to enable a check for yield at the specified final thickness. The base material shall then be inspected by the INSPECTOR, and upon acceptance and approval, the surface course may be placed.

Surface course shall be placed and compacted in accordance with NCDOT requirements. Copies of delivery tickets shall be furnished to the INSPECTOR to enable a check for yield at the specified final thickness. Density testing shall be performed for each lift of asphalt and reports shall be furnished to the INSPECTOR.

Should there be a question as to the final thickness of aggregate base course or surface course, the INSPECTOR reserves the right to require the DEVELOPER/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 INSPECTOR. Should the cores reveal insufficient thickness, the CONTRACTOR shall provide additional surface course as may be required or shall furnish other remedial measures as may be acceptable to the INSPECTOR. The cost of compaction testing and coring work shall be borne by the DEVELOPER.

D. Curb and Sidewalk

No concrete shall be placed until the forms, necessary conduits, and subgrades have been inspected and approved by the INSPECTOR. Where stone is used underneath the driveway and/or over conduits, it shall be compacted ABC stone. Washed stone shall not be permitted.

Conduits shall be installed to the depths and locations indicated in the Standard Detail prior to inspection. Conduit trenches shall be left open until inspection. Trenches shall be backfilled with excavated material after inspection and prior to placing concrete. Brass location caps shall be in place prior to inspection.

NO EXCEPTION: For all lots that require sidewalk along the road frontage, sidewalk shall be formed and ready for inspection at the time of the driveway inspection. Sidewalk may be installed prior to, but under no circumstances later than the time of the driveway installation.

305 Certification

The Town of Apex shall require the following certification from an engineer registered in the state of North Carolina prior to final acceptance of any TOWN maintained streets:

I _____, PE hereby certify that the construction of *(Street Names)* in *(Phase #)* of *(Development Name)* is/are in accordance with the minimum pavement design standards and layout submitted and approved by the Town of Apex on *(Date of Approval)*.

_____
Name

S E A L

_____
Date