

**TOWN OF APEX
STANDARD SPECIFICATIONS & STANDARD DETAILS**

SUMMARY OF REVISIONS

Standard Specifications

Specification Section 1: Preliminary Considerations

- 1) 1.01 – Deleted purchasing provision of spec book (posted online upon Council approval); added requirement of signed construction plans in contractor's possession
- 2) 1.02a,b – Revised plan submittal from 10 to 12 sets.
- 3) 1.03a1 – Plan scale requirement added; deleted 18" x 24" plan sheet exception.
- 4) 1.03a2 – Revised requirement for plan/profile of water mains from 12-inch to 6-inch.
- 5) 1.03a6 – Added floodplain requirements reference to UDO.
- 6) 1.03a9 – Added cross section requirement for streets.
- 7) 1.03a14 – Revised signature blocks per current Technical Review Committee requirements.
- 8) 1.03b1 – Deleted 18" x 24" plan sheet exception.
- 9) 1.03b5 – Added floodplain requirements reference to UDO.
- 10) 1.06 – Revised format of AS-BUILT submittal to AutoCAD electronic file.
- 11) 1.06c5 – Added structural BMP requirement for AS-BUILT's.
- 12) 1.06c6 – Added requirement for outlet structure details and invert elevations.

Specification Section 2: General Provisions

** Soil Erosion & Sedimentation Control has been moved to Section 4.*

Specification Section 3: Streets

** Previous Section 4 Curb & Gutter, Driveways and Sidewalks has been incorporated into this Section.*

- 13) 3.02a – Added AASHTO A Policy on Geometric Design of Highways and Streets as design reference; deleted Greater Raleigh Urban Plan (obsolete).
- 14) 3.02b – Deleted pavement/right of way width table, reference revised detail 3.01.
- 15) 3.02d – Revised radius table to provide distinction between thoroughfare, collector, and residential street radii.
- 16) 3.02g – Deleted obsolete Peakway cross section dimensions.
- 17) 3.02i – Added reference to Unified Development Ordinance for sidewalk location requirements; added provision for valley curb in Townhome developments and other residential developments upon approval.

- 18) 3.02j – Revised design vehicle reference for turning vehicles in island design.
- 19) 3.03b – Deleted Marshall pavement mix type references; revised initial and final lift thickness to correspond with Superpave asphalt mixes; deleted fee in lieu provision for final lift; added tack coat requirement and replacement of cracked concrete replacement at valve and manhole covers.
- 20) 3.03c – Added contraction joint option of 15 feet for curb when a machine is used.

Specification Section 4: Soil Erosion & Sedimentation Control

** Curb & Gutter, Driveways and Sidewalks has been incorporated into Section 3.*

- 21) 4.01 – Added verbiage for certificate of compliance per phase of site rather than overall site; revised requirement for holding NPDES Notice of Intent onsite to apply to projects greater than 1 acre instead of 5; added requirement for S&E device installation prior to clearing; revised maximum time from 30 to 21 days for areas where work completed to remain denuded, and ground cover establishment in 21 calendar days instead of 30; added 3,600 cf/ac volume requirement for S&E devices and surface area based on 25-year, 24-hour storm event (Q_{25}).

Specification Section 5: Storm Drainage

- 22) 5.01 – Added 25-year design storm requirement for greenway cross-line pipes; added reinforced concrete pipe requirement for pipes; added restriction of structures within easements; consolidated maximum allowable outlet velocity regardless of pipe material, referred to Town Code; added restriction of acute angles between pipes at junctions; reduced maximum distance of continuous 36" pipe from 800 to 500 feet; pipe entering corner of structure restricted for 'waffle' boxes.
- 23) 5.02a – Deleted provision for metal pipe.
- 24) 5.02c – Deleted provision for metal pipe.
- 25) 5.03a – Revised required size of yard inlet boxes.
- 26) 5.03e – Deleted unnecessary manufacturer references for castings.
- 27) 5.05a – Clarified headwall and flared end section requirements based on pipe sizes.
- 28) 5.06 – Referred to DENR and the UDO for structural BMP design requirements; added requirement of certification and as-built submittal prior to approval of plat, certificate of occupancy, or development use.

Specification Section 6: Water Distribution

- 29) 6.01 – Added requirement of centering water lines within easements; no plantings or structures allowed in easement; proposed connections to existing "dead ends" may require upgrading or looping of existing line to satisfy the Town Water Supply Plan; restrained joint pipe required at stream crossings; 4 hour limitation for interruption of water service.

- 30) 6.02a – Deleted requirement of 3 feet horizontal separation between water and sewer; deleted requirement of sewer concrete encasement when crossing water line.
- 31) 6.02b – Deleted backflow prevention requirement, which will be covered in a separate manual produced by Public Works
- 32) 6.02d – Fire flow requirements revised to match the current 2006 NC Fire Code requirements.
- 33) 6.02e – Deleted provision for 4” water main in short cul-de-sacs.
- 34) 6.02f – Added requirements for hydrant lines: 8” line for multiple hydrants, no bends or services on hydrant legs; added distance parameters for hydrant positioning; added requirement of tagged hydrants prior to approval.
- 35) 6.02g – Deleted requirement of main line valves located at all fire hydrant legs, spacing shown in table suffices; added manufacturer specification and post indicator valve type for fire lines.
- 36) 6.02h1 – Eliminated service placement on hydrant legs and fire lines, and gang meters for single family residences. Revised language and sizing for services.
- 37) 6.02h2 – Revised service line and number of service branches for ¾” service.
- 38) 6.02j – Deleted - residual flow requirement stated in 6.02d.
- 39) 6.03a – Added restrained joint pipe and ball-and-socket pipe to pipe materials.
- 40) 6.03b – Revised pressure class requirements based on depth; deleted manufacturer names.
- 41) 6.03c – Revised pressure rating requirement of hydrants from 150 psi to 250 psi; deleted manufacturer names; added hydrant restraint options.
- 42) 6.03d – Revised pressure rating requirement of valves from 200 psi to 250 psi.
- 43) 6.03e – Added approval of DPW for butterfly valves 16” or greater; butterfly valve manhole diameter increased from 4’ to 5’.
- 44) 6.03f – US Foundry added as alternate manufacturer to East Jordan Iron Works.
- 45) 6.03g – Revised pressure rating requirement of tapping sleeve from 200 psi to 250 psi. Added restriction of using tapping sleeves to connect pipes of equal diameter. Added requirement of ductile tapping sleeve for pit cast pipe.
- 46) 6.03h – Deleted specific manufacturer for tapping saddles.
- 47) 6.03i – Deleted description of blow-off assembly in favor of revised detail 6.06.
- 48) 6.03j – Deleted pressure rating for fittings (AWWA standards suffice).
- 49) 6.03k* – New item “k”. Added requirement of air release valves at crest locations.
- 50) 6.03k1 – Deleted 4-inch main size – no longer practical. Added requirement of material consistency between water main and water meter.
- 51) 6.03k2,3,5 – Deleted specific manufacturer of service saddles, corporation stops, and meter setters (AWWA standards suffice).
- 52) 6.03l7 – Meter box requirements revised to accommodate radio-read meters.

- 53) 6.04a – New item “a”. Added provision for abandonment of existing water mains to include removal when outside roadway.
- 54) 6.04c – Revised rock excavation replacement material from stone to screenings.
- 55) 6.04d – Deleted unnecessary maximum joint deflection table (AWWA standards suffice). Use of mechanical fitting for pipe plug while construction not in progress.
- 56) 6.04f – Added compaction test requirement for backfilling water line in roadway.
- 57) 6.05 – Added restrained joint ductile iron pipe for boring.
- 58) 6.06 – Referenced detail for repair of pavement open cuts.
- 59) 6.09 – Added requirement of Town representative for all system valve operations. Hydrostatic testing expanded to include fire hydrants and valves. Four-inch main removed from ‘allowable leakage’ table.

Specification Section 7: Sanitary Sewers

- 60) 7.01a – Added requirement of centering sewer within easements, accounting for future upstream development and evaluating downstream capacity in design, following natural topography; deleted 3 feet horizontal separation (impractical) and added requirement of sewer matching water material when lateral separation cannot be met; landscaping added to specified list of repairs Town is not responsible for when damaged or removed during maintenance activities.
- 61) 7.01b – Deleted table of variable sewer easement widths based on diameter in favor of 20 feet standard; clarified table of increased easement widths based on increased sewer depths; deleted easement variation due to cross slope (depth table suffices); added 14 feet minimum width for residential easement access gate; deleted provision for allowing plantings and structures in sewer easements.
- 62) 7.01c – Added requirement to avoid lateral connection angles against flow of main; deleted concrete encasement for waterway crossings; deleted stone bedding at depth requirement (covered in later section); deleted concrete encasement requirement where sewer and water cross; storm line and sewer vertical separation increased from 12 to 24 inches.
- 63) 7.01e – Added reference to capacity fee schedule for daily flow design requirements; revised minimum sewer slopes, included additional pipe diameters.
- 64) 7.01f – Reduced drop manhole pipe invert difference from 30 to 18 inches; flat top manholes for outfalls and non-traffic areas, concentric for roadway; maximum chimney height of 22 inches, maximum of 2 grade ring courses, sealing/bolting of frames to manholes, and 5-foot manholes required in cul-de-sacs.
- 65) 7.01g – Clarified service lateral requirements; revised bedding at depth requirement; revised language regarding allowance of service lateral locations in sidewalks, and restriction at curbs and driveways.

- 66) 7.02a – Revised depth criteria for pipe materials: 8-15” diameter pipe less than or equal to 13’ depth shall be PVC pipe; any pipe greater than 15” diameter shall be DIP; any diameter pipe greater than 13’ depth shall be DIP.
- 67) 7.02b – Added requirement of ceramic epoxy coating for 1200 feet of gravity sewer connecting to force main.
- 68) 7.02c – Deleted 18”-27” PVC specifications.
- 69) 7.02d – Deleted 8”-18” Ribbed PVC Pipe specifications.
- 70) 7.02e – Deleted 21”-24” Ribbed PVC Pipe specifications.
- 71) 7.02f – Deleted Reinforced Concrete Pipe specifications.
- 72) 7.02g – Added poly feet requirement to bore casing spiders.
- 73) 7.03a – Deleted masonry provision for manhole construction; clarified width/depth table.
- 74) 7.03b3 – Clarified use of flat top manholes in non-traffic areas.
- 75) 7.03c – Deleted requirement of manhole steps.
- 76) 7.03d – Revised weight minimums for manhole rings and covers.
- 77) 7.04a – Added requirement of maintaining consistent material throughout sewer services.
- 78) 7.04e – Deleted Ribbed PVC Pipe specifications.
- 79) 7.05b – Added restriction of stream discharge.
- 80) 7.07 – Revised pipe bedding classifications.
- 81) 7.08 – Deleted (covered in 7.02a).
- 82) 7.09 – Deleted (covered in 7.02a).
- 83) 7.10 – Deleted (covered in 7.02a).
- 84) 7.14a – Added maximum for grade ring adjustments; added protective epoxy coating requirement for manholes within 1200 feet of force main.
- 85) 7.15 – Added requirement of service connections via wyes for new mains, saddles for connection to existing main only; revised the service drop cleanout requirement from 30 to 18 inches.
- 86) 7.17 – Referenced detail for repair of pavement open cuts.
- 87) 7.18b – Deleted conditional testing language regarding low pressure air tests for portions of sewer lines.
- 88) 7.18e – Revised approval authority to Public Works Department; deleted option of outside consultant to provide camera inspection service.
- 89) 7.18f – Added vacuum testing specification for manholes.

Specification Section 8: Waste Water Pump Stations

- 90) 8.01 – Added requirement for adherence to Town Policy on Private Pump Stations and Force Mains.
- 91) 8.02a – Deleted flooded suction package type dry pit pump stations and temporary grinder type pump stations as options. Submersible pump station with guide rail pump removal system is sole option.
- 92) 8.02b – Added requirement of diesel or propane for standby power generators.

- 93) 8.02c – Added 9-gauge requirement for fence materials; gates shall be slide type; increased gate opening from 12 to 16 feet; access road shall include concrete apron in right of way and be asphalt.
- 94) 8.02e – Added gate valve requirement for pump discharge line.
- 95) 8.02f – Added requirement of buoyancy collars for pump station structures; 3 feet clearance between check valve and vault wall; wet well structures to be circular or rectangular with vertical walls.
- 96) 8.02g – Added removable extension ladder requirement in lieu of manhole steps; minimum horizontal clearance of 10 feet between the chains and handrail around hatch opening.
- 97) 8.02h – Deleted provision for 3-phase power service on 3 horsepower or greater (now applies to all pump stations); added lockout capability requirement for electrical alternating relay; added acceptable manufacturers of control panel; added float control system requirements; soft start for ≥ 40 horsepower; horn signaling; labeling requirement for all functions and wiring; all outside panels require canopy covering.
- 98) 8.02i – Added alarm dialer description.
- 99) 8.03a – Revised length of power and control cable from 30 to 50 feet.
- 100) 8.03d – Added requirement for operation and maintenance manuals prior to pump start-up.
- 101) 8.04 – Deleted Package Type pump station specifications.
- 102) 8.06a – Added diesel as alternate generator type for standby power; Added exclusion of natural gas as fuel source.
- 103) 8.06f – Added sound retention enclosure requirement as generator system accessory.
- 104) 8.06h – Added minimum 250 gallon tank capacity requirement.
- 105) 8.06k – Replaced Onan with Airman as standby power generator manufacturer option.
- 106) 8.06n – Revised submittal data copies from 6 to 3 along with 2 copies of shop drawings.
- 107) 8.06o – Revised operating instructions copies from 6 to 3.
- 108) 8.07b – Replaced ductile iron cement mortar seal coat lining requirement with 401-type ceramic epoxy.
- 109) 8.07c – Deleted provision for PVC pipe for private force mains.
- 110) 8.08b – Added 10-foot elevation change for air valve requirement; valves to be installed in manhole.
- 111) 8.08d – Deleted provision for PVC force main.

Standard Details

Note: Deleted details indicated with previously used number enclosed by parentheses (). These numbers now apply to other/new details.

Details Section 2: General Provisions

** Soil Erosion & Sedimentation Control has been moved to Section 4.*

- 112) 2.16 – Deleted gravel greenway detail, increased width of asphalt greenway from 8' to 10', increased stone base depth, added keyed concrete detail.

Details Section 3: Streets

- 113) 3.01-1 – Revised detail for alley (20' pavement, 30' right of way), minor residential street (27' B-B roadway, 50' right of way), and major residential street (35' B-B roadway, 60' right of way).
- 114) 3.01-2 – Revised detail for minor collector (same widths as minor residential street, but increased pavement structure) and major collector street (same widths as major residential street, but increased pavement structure).
- 115) 3.01-3 – Revised detail for 3-lane (43' B-B roadway, 70' right of way) and 5-lane (69' B-B roadway, 100' right of way) thoroughfares.
- 116) 3.01-4 – Revised detail for 4-lane median divided thoroughfares, with 10' multi-use path (71' B-B roadway, 100' right of way) which applies to the Peakway, and without multi-use path (75' B-B roadway, 100' right of way).
- 117) 3.02 – Revised cul-de-sac detail with minor adjustments to road and right of way radii.
- 118) 3.03 – Added median curb and valley curb details.
- 119) 3.09 – Increased wheel chair ramp width from 3'4" to 4 feet to match NC accessibility code and the Americans with Disabilities Act of 1990 (ADA) Accessibility Guidelines.
- 120) 3.10 – Revised detail for location of utilities in roadway cross section.
- 121) 3.13 – Revised trench and pavement repair section to remove concrete patch option and correct asphalt depth.
- 122) 3.14 – Revised geometric design standards to consolidate street classifications.
- 123) 3.16 – Increased minimum taper length to 4:1 to match NCDOT's standard for Pavement Widening Taper.
- 124) 3.17 – New speed hump detail.
- 125) 3.18 – New speed table / elevated crosswalk detail.
- 126) 3.19 – New high visibility (mid-block) crosswalk detail.
- 127) 3.20 – New bicycle rack detail.

Details Section 4: Soil Erosion & Sedimentation Control

- 128) (2.02) – Deleted Gravel & Rip Rap Basin/Outlet detail – obsolete.
- 129) (2.09) – Deleted Gravel & Rip Rap Filter Basin – obsolete.

- 130) 4.11 – Revised sediment basin details to include 3,600 cubic feet storage requirement, 25-year storm surface area requirement, and porous baffles for Riser-Barrel Basin, Skimmer Basin, and Custom Basin.

Details Section 6: Water Distribution

- 131) (6.01) – This pipe bedding detail has been moved to Section 7 and consolidated into Detail 7.01.
- 132) (6.02) – This pipe bedding detail has been moved to Section 7 and consolidated into Detail 7.01.
- 133) 6.01-1 – Removed manufacturer names per revised specification text.
- 134) 6.01-2 – Added maximum angle of copper tubing into meter setter.
- 135) 6.02 – Raised meter bypass above bottom of vault to prevent being covered by stone.
- 136) 6.03 – Extended bypass line and added gate valve.
- 137) 6.04 – Revised valve location to be positioned on main in lieu of on 2-inch line.
- 138) 6.05 – Added statement to exclude services on hydrant legs.
- 139) 6.09 – New detail for standard valve cover and fire line valve cover.
- 140) 6.12 – Revised air release manhole such that it is positioned on the main rather than offset via 2" line.
- 141) 6.17 – Removed opening at bottom of butterfly valve manhole; increased diameter from 4' to 5'.
- 142) 6.19 – New detail for sprinkler riser and fire department connection.

Details Section 7: Sanitary Sewers

- 143) 7.01 – Previous pipe bedding detail 6.01 moved to this section of details and consolidated to 2 classes of bedding.
- 144) 7.02 – Sewer service bedding increased from 4" to 6" per revised specification text.
- 145) 7.04 – Added the following requirements: epoxy coating for manholes within 1200 feet of force main connection; rubber "O" ring seal with frame; maximum of 2 grade rings and 22-inch chimney height.
- 146) 7.05-1 – Revised manhole cover with engraved Town seal.
- 147) 7.05-2 – Revised manhole cover for watertight applications.
- 148) 7.06 – Revised manhole cover with engraved Town seal.
- 149) 7.07 – Revised drop requirement from 30" invert difference to 18"; revised tee to show opening for vertical access.
- 150) 7.08 – Revised drop requirement from 30" invert difference to 18".
- 151) 7.09 – Revised air release valve type.
- 152) 7.10 – Revised sewer service depth special case to 13' to match revised specifications.
- 153) (7.13) – Deleted previous detail for concrete encasement at stream crossing.