

## PLAN REVIEW CHECKLIST FOR DESIGN OF DONATED PROJECTS

### FIRST SUBMITTAL:

- 1) Two sets of Plans
- 2) Topographic Overlay: Include project boundary, topographic elevations and entire drainage basin (if possible)
- 3) CMUD As-Builts of existing water and sewer systems highlighting connection points

### PLANS:

#### COVER SHEET: General Information:

- 1) 24"x36" sheets (entire set); 1"=100' or 1"=200' scale
- 2) Entire project boundary, connecting streets, North Arrow, adjacent property owners including deed book, page number and tax code information
- 3) Drainage features through the project
- 4) CMUD Donated Projects General Notes, CDOT Note (if applicable), CMUD Legend
- 5) Design Company, Survey Company, Developer information including contact person and e-mail address
- 6) Vicinity Map showing project location and closest major intersection
- 7) Typical Street Cross Sections (can be shown on permit or water distribution sheet) including building set back lines, location of proposed water lines, water meters, dimensions of: sidewalks, planting strips, pavement, right-of-ways, parking lanes, and additional CMUD Easement (if applicable)
- 8) Sheet Index: Street names, Trunk lines designated by manhole numbers each sheet
- 9) Duke Power, Railroad, Gas right-of-ways and widths
- 10) Do not show sidewalks, planting strips, sewer laterals or water services
- 11) Summary Block, Inside City Block checked "yes" or "no"

#### COVER SHEET: Sanitary Sewer Information:

- 1) Existing sewer line sizes larger than 8-inch, manholes (not shaded), sewer right-of-ways (not shaded) and widths, flow directions, CMUD job numbers, file numbers and CMUD sewer features ID# (provided by CMUD on first review)
- 2) Proposed sewer line sizes larger than 8-inch, manholes (shaded) numbered consecutively beginning with the first proposed downstream manhole, distance between each manhole and flow directions
- 3) Proposed sewer right-of-ways (shaded), widths and bearings on off street sewer

**COVER SHEET: Water Information:**

- 1) Existing water lines, sizes, valves (not shaded), fire hydrants (not shaded), CMUD job numbers, file numbers and CMUD water features ID # (provided by CMUD on first review)
- 2) Distance to existing fire hydrants (not shaded) and existing shut-off valves (not shaded) at tie in locations
- 3) Proposed water lines bolder than road features, sizes, lengths, fire hydrants (shaded) and valves (shaded)

**PERMIT SHEET:**

- 1) Complete all applicable information
- 2) NC Professional Engineer Seal, Sign and date permit form

**WATER DISTRIBUTION SHEET:**

- 1) Entire project on one sheet (if possible) using maximum 1"=100' scale for single family sites and 1"=50' scale for multifamily or commercial sites
- 2) Details of 1"=50' scale required for construction in existing road right-of-ways, at bore locations or complex work zones
- 3) Typical street cross sections (if not on cover sheet or permit sheet) including building set back lines, location of proposed water lines, water meters, dimensions of: sidewalks, planting strips, pavement, right-of-ways, parking lanes, and additional CMUD easement (if applicable)
- 4) Label existing water lines, sizes, valves (not shaded), tees, crosses, distance to existing fire hydrants (not shaded), distance to existing shut-off valves (not shaded) at tie-in locations, CMUD job numbers, file numbers, and CMUD water features ID # (provided by CMUD on first review)
- 5) Label proposed water lines (show bolder than road features), length of each size every street, distance from back of curb, valves (shaded), fire hydrants (shaded), tees, crosses, bends, lengths of restrained joint ductile iron pipe and calculations per DIPRA program. Show water meters (not to be located in future driveways) including irrigation meters; label if larger than 5/8"
- 6) Sidewalks, planting strips, parking lanes shown and widths labeled
- 7) Gate valves and fire hydrants located at curb radius points in intersections (10' from curb RP if ADA ramp is required), gate valves 3' from tees or crosses at other locations
- 8) Gate valve required at change in pipe diameter, 2 gate valves at tees, 3 at crosses
- 9) Maximum of 10 lots on dead-end 2-inch main, 20 lots on looped 2-inch main

- 10) Water main alignment designed on the same side of the road the entire length unless a variance is allowed by CMUD
- 11) Water line terminates 10' past the property line (driveway when applicable) in cul-de-sacs
- 12) Water line terminates at the end of pavement/sidewalk on stub streets
- 13) Connect all water lines within the project except cul-de-sacs and temporary ends
- 14) Profiles required for 16-inch and larger water lines; air releases at high points
- 15) Water/storm drain crossing elevations (including ground) for 42" and larger storm pipes
- 16) Profiles and cross sections required when water main is near large culverts or retaining walls. Retaining wall tie-back geogrid influence area must be clearly indicated; water main must be located outside influence area

### **SANITARY SEWER PLAN & PROFILE SHEETS:**

- 1) 1"=40' horizontal and 1"=4' vertical scales
- 2) Plans begin at existing sewer system and progress with proposed manhole (shaded) numbering and stationing in ascending order
- 3) CMUD sewer feature ID # on existing sewer (provided by CMUD on first review)
- 4) Match lines at manholes only, label corresponding sheet numbers in plan view
- 5) Profile view should be directly over plan view when possible and run left to right (downstream to upstream)
- 6) Show and label (per CMUD legend) existing road features: utilities, trees, mailboxes, driveways, roadside ditches, culverts, retaining walls, etc. for extensions that parallel existing roads and at connection points. Retaining wall tie-back geogrid influence area must be clearly indicated; sewer main and easement located outside influence area
- 7) Sewer mains should not cross under retaining walls; when allowed by CMUD under hardship conditions, casing pipe is required within influence zone
- 8) Label bearings, distances, flow directions, and sewer right-of-way widths (shaded) on all sections of proposed off street sewer
- 9) Adjacent property owner information, deed book, page number and tax code
- 10) Label existing CMUD easements (not shaded), width, deed book and page number. Provide recorded document if proposed sewer is to be installed in existing easement
- 11) Drainage patterns that continue beyond the limits of the project must be served by providing acceptable horizontal and vertical locations of the proposed sewer system and dedicating any necessary easements within the project beyond the CMUD required termination point of the pipe. Include profile 300' past the project property line

- 12) Outfalls that parallel creeks should be designed with the top of pipe a minimum of 2' below the creek flow line (show/label in profile) and with horizontal consideration of Streamside Zones (show/label in plan view). Manhole rims or vents must be 2' above the 100 year flood elevation (show/label in profile).
- 13) Outfalls that parallel impounded water (lakes and ponds) shall be ductile iron pipe when more than 6 feet below full pond. Anti-seep collars required to prevent groundwater movement along trench; bedding shall be flowable fill to spring line
- 14) Sewer systems should terminate in a street with the exception of trunk lines that will be extended along a drainage pattern in the future
- 15) Manholes in subdivision streets located a minimum 4' from center of manhole to proposed curb, pipe a minimum 2' from center of pipe to curb, manholes in stub streets terminate 7 ½' from the edge of pavement
- 16) Match crown of smaller pipe to crown of larger pipe
- 17) Drop manholes require 5' from rim to top of incoming pipe (label elevation) and a minimum 2 ½' outside drop structure from bottom of pipe to invert "in" elevation at the manhole base; .2 drop is required through manholes on 15-inch and smaller diameter mains
- 18) Inside drops are allowed in 5' diameter and larger manholes; unpiped inside drops are not permitted
- 19) Sewer laterals shown in plan view and located at center of lots where possible; note size if larger than 4-inch
- 20) Label distances and bearings to existing upstream and downstream manholes from proposed manhole; provide CMUD As-Built and field survey elevation information
- 21) Slopes calculated to 2 decimal points (.00)
- 22) Show storm drain systems, sizes and easements in plan view; inside and outside diameter of parallel storm drain and crossings in profile view
- 23) Label all inverts (including outside drop information when applicable) at manholes with multiple intersecting pipes and manhole number for each incoming pipe
- 24) Label type of frame and cover for each manhole in plan view
- 25) Sewer pipe depths exceeding 14' will not be acceptable in most cases
- 26) Ductile iron pipe is required to be installed within proposed lot limits
- 27) Provide road profile 300' past the property line at stub streets
- 28) Show water lines, sizes, and fittings; reference Water Distribution Sheet number for detailed labeling

- 29) Sewer lines that terminate at a proposed subdivision entrance must be designed at an acceptable vertical and horizontal location to allow future street main extensions along the existing road. The terminal manhole shall be located on the shoulder of the road within NDOT jurisdiction.
- 30) Show/label water lines, gas mains, utility crossings information in profile
- 31) Clearly indicate any planned/future community pool site; the lateral that serves the pool must be 4-inch diameter only. A separate lateral for other pool/clubhouse facilities may be larger than 4-inch if necessary

APPROVED BY:



N. Michael Garbark, PE  
Installation & Development Services Division Manager

DATE:

12/31/14