Preliminary Plan Checklist

(To be used as a guide only and not all inclusive of design requirements)

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DECLARATION AND SIGNATURE

I declare that all information provided is complete per the checklist above to the best of my knowledge and belief. I understand if information has not been included as required by this checklist, staff reserves the right to request additional information which may result in delays in review and/or additional review cycles.

Signature of Licensed Design Professional: _____

Name of Design Professional (Print): _____

Date: _____

GENERAL REQUIREMENTS

- Plans shall meet the requirements of the Union County Ordinance, North Carolina Administrative Code, Union County Water Specifications and Union County Water Policies or otherwise be considered incomplete.
- Conditional sketch plan letter comments shall be followed.
- Engineer to submit the following civil plans
  - Erosion & sediment control
  - Grading
  - Stormwater
  - Roadway widening (relocations are required case-by-case)
  - Driveway permit plans
- If the project is within the Goose Creek area, the engineer is to coordinate with US Fish and Wildlife and provide correspondence.
- Provide plan sheet size of 24"x36" unlocked pdf digital copy without untitled viewports
- Design is to be based on survey. Soft digs are required when near existing utilities.
- Digital data is required for plan approval.
- Show phasing. Phasing after plan approval will require revision to approved plans.
- Note: Any resubmittals require clouded revisions and comment response letter.

GENERAL PLAN REQUIREMENTS

- NC professional engineer seal, signature and date.
- Provide scale bar and label scale.
- Draw North arrow.
- Minimum text height 1/8-inch
- Do not hatch plans except for driveways and sidewalks
- Do not use keynotes
- Water and sewer to be shown combined in plan set. Water only plans and sewer only plans are not acceptable.

COVER SHEET REQUIREMENTS

- Provide the plan name – note if changed from approved Sketch Plan.
- Provide a vicinity map.
- Index that references sheet numbers.
- Provide the latest revision date for each sheet. Engineer's seal on cover to match latest revision date.
- Provide the name, contact name, address, phone number, and email address of the developer, owner, planning jurisdiction and engineering.

OVERALL UTILITY SHEET REQUIREMENTS

- Provide UCW General Notes under separate heading. (See separate document for Plan Notes.)
- State and show the estimated consumption of flow volumes for domestic water, irrigation, and fire flow in table format.
  - Residential units shall base the water capacity requested on the number of units planned per rule 18C .0409 Service Connections.
  - Commercial and industrial developments shall state water consumption as total gallons per day per rule 18C .0409 service connections. If the usage does not exist in rule .0409 wastewater design flow rates rule 02T .0114 may be used.

- Commercial projects are to label each structure and include flow rate calculations by structure in the table.

- ☐ State and show the estimated consumption of flow volumes for domestic sewer in table format per 02T .0114
  - Residential units shall base sewer capacity requested per Union County Water's Flow Reduction Letter for 12 Mile Creek WRF and Crooked Creek WRF.
    - Townhomes and Apartments use bedroom counts – 1bdrm 140 GPD, 2 bdrm 140 GPD, 3 bdrm 210 GPD, 4bdrm 280 GPD.
    - Single Family Homes – Use average of 4 bdrm at 280 GPD.
  - Residential units served by Charlotte Water's 6-mile pump station will need to base estimated consumption per Charlottes Flow Reduction letter at 190 GPD. *UC Water will send flow acceptance request to Charlotte when plans are nearing approval.*
  - Commercial and industrial developments shall state water consumption as total gallons per day per rule 02T .0114.
  - Commercial projects are to label each strucuture and include flow rate calculations by structure in the table.
- ☐ Provide separate water and sewer material summary in a table format.
  - Sewer pipe material and length
  - Manhole quantity
  - Lateral quantity separating size and type (domestic or commercial)
  - Water main material and length
  - Water meter quantity separating size and type (domestic or irrigation)
  - Valve quantity (excluding Fire Hydrant Assemblies)
  - Fire hydrant quantity
- ☐ Max scale 1" =200'
- ☐ Draw
  - Water main, water meters, valves, fire hydrants,
  - Sewer main, manholes,
  - Cluster mailboxes, retaining walls and signs or structures at subdivision entrance.
- ☐ Label
  - Water main (size only), common open space irrigation meters, and fire hydrants.
  - Manholes (provide number only),
  - Cluster mailboxes, retaining walls and signs or structures at subdivision entrance.
  - Lot numbers
- ☐ Show adjacent property lines. Label adjoining property by parcel identification number, plat cabinet and page number, deed book and page number.
- ☐ Provide off site street name(s), ROW width, state who maintains it, whether is dedicated or maintained and provide state route number
- ☐ Provide proposed on-site street names, ROW width, and state if it will be public or private.
- ☐ Identify parcel(s) to be developed with tax ID, plat cab and page number, deed book and page number.
- ☐ Show stormwater management pond(s)
- ☐ Show and label benchmark(s), providing point description, elevation, northing, easting, horizontal and vertical datum on the overall sheet.
- ☐ Provide sheet key showing detailed sheet limits.

DETAILED PLAN GENERAL REQUIREMENTS

- Do not duplicate plan view pages. Provide 1" overlap between pages plan but keep to a minimum.
- Sewer plans are to have matchlines located at manholes.
- Maximum scale is 1" =40'. Draw townhomes and projects with similar density at 1" =30'.
- Profile vertical scale is to be exaggerated at 1/10th of horizontal scale.
- Plan and profile must be shown on the same sheet with profile over plan view.
- Sewer is to be profiled with longest section first. Spurs are to be placed in order of downstream to upstream.
- Offsite water main extensions and 12-in and larger water main are to be profiled.
- Provide construction sequence in existing subdivisions.
- Staddle manhole connections are to be profiled nearest upstream and downstream structure. Not to be located in flood plain.
- Bores are to be profiled.

DETAILED PLAN VIEW REQUIREMENTS

- Provide off site street name(s), ROW width, state who maintains it, whether is dedicated or maintained and provide state route number
- Provide proposed on-site street names, ROW width, and state if it will be public or private.
- Any congested areas to shown within a 1" = 10' scale inset.
- Draw
  - Water main, water meters, backflow preventers and fire hydrants
  - Sewer main, and manholes
  - Stormwater pipes, cluster mailboxes, retaining walls, signs or structures at subdivision entrance, light poles, trees, electric cabinet. (show as grey)
  - Driveway locations, sidewalk locations providing concrete hatching for both.
  - Parcel lines, easements, building envelope and setback
  - Bore pits, pavement open cut limits.
  - Other utilities. I.e., electric cabinets and line, gas, septic fields etc. (label as grey)
  - 100-Year Flood Plain Elevation
- Label
  - Water main – size, material, bends, tees/cross, and restrained joint DIP length.
    - Provide typical label for offset to back of curb or edge of pavement, typical depth, typical material
  - Label water main to stormwater crossings with ground, bottom of upper pipe, top of lower pipe and provide separation distance.
  - Water meters type (domestic or irrigation) and size
  - Backflow preventer – size. (Size to match meter size.)
  - Manhole ID
  - Sewer main bearing and length, stationing, and alignment name
  - Provide sewer flow direction arrows.
  - Stormwater pipe size and material, cluster mailbox, entrance signs and electric cabinet (label as grey)
  - Parcel lines, Lot numbers, easements, building envelope, setback and address for commercial buildings. Provide Deed Book Page and/or Plat Cabinet and File
  - Bore pits, pavement open cut limits.
  - Other utilities. I.E., electric cabinets and line, gas, septic fields etc. (label as grey)
  - 100-Year Flood Plain Elevation

DETAILED PROFILE VIEW REQUIREMENTS

- ☐ Draw (sewer profile)
  - Manholes
  - Sewer pipe materials legend
  - Sewer main length, slope, and hatch materials per legend.
  - Crossing utilities and parallel storm water (do not include storm water structures)
  - 100-year flood plain elevation and headwater elevation at culverts
  - Ductile iron sewer laterals as crossing.
- ☐ Label (sewer profile)
  - Manhole ID, station(s), rim elevation, invert elevation(s), provide tie in existing manhole permit number and date, GIS manhole ID number.
  - Sewer main length, slope, and provide length of material.
  - Crossings – size, material, and dimension separation
  - Ductile iron sewer lateral material, size, and lot number
  - 100-year flood plain elevation
- ☐ Draw (water profile) required for offsite extensions, road crossings and bores.
  - Crossing utilities and storm water
  - Legend showing materials.
  - Materials per legend, bends, bore pit dimension, encasement pipe, existing utilities, air release valves, road edge of pavement and right-of-way.
- ☐ Label (water profile) required for offsite extensions, road crossings and bores.
  - Crossings – size, material, and dimension separation
  - Size, bends, bore pit dimension, encasement pipe, existing utilities, crossings with separation, air release valves, road edge of pavement (crossing) and right-of-way (crossing).

DETAIL SHEET REQUIREMENTS

- ☐ Verify all necessary details are included and are the latest.
- ☐ Do not renumber details. Place details in order.
- ☐ Provide any required restrained joint calculations.
- ☐ Provide a typical cross section for each road showing and dimensioning the following.
  - Right-of-way, easements
  - Water lines, water meters, sewer main, and sewer cleanouts
  - Back of curb, pavement limits, sidewalk, trees, light poles, and cluster mailboxes

DESIGN REQUIREMENTS

GENERAL DESIGN

- Plans are to meet 10-State water and sewer design standards
- Trees, utility poles, stormwater structures, cluster mailboxes, signs, etc. Are to provide 5 ft. Minimum separation to water/sewer infrastructure.
- Trees, utility poles, stormwater structures, cluster mailboxes, signs, etc., are not allowed within UCW's water and sewer easements.
- Other utilities cannot encroach into UCW's water and sewer easement unless crossing perpendicular. At no time are utility structures, cabinets, vaults, and poles etc., permitted in easements.
- Water meters and sewer cleanouts are not to be placed in hardscape.
- Services are to be placed as close to the center of the lot as practical.
- Services are not closer than 5 ft. To a property line or building envelope.
- Preferred separation between services is 3.0 ft. Minimum separation is 1.0'.
- Services are to provide 1.0' separation to driveway.
- Place water meter and cleanout at edge right-of-way or easement.
- Bores require encasement. Pipe in encasement is to be restrained joint DIP.
- When sewer is installed over water a minimum of 20 LF DI is required for both pipes.

WATER DESIGN

- Water main not located within ROW shall be centered in a 15 ft water easement.
- Place water main within ROW by a minimum of 5 ft or grant additional easement.
- Place the water main next to roadways and under the center of the sidewalk (if applicable). Cross county water is not allowed.
- Place water main a minimum of 1 ft. + 1:1 ratio to the back-of-curb or edge-of-pavement.
- Minimum vertical separation
    - Min separation to storm and sewer is 2.0ft or DIP.
    - Min separation to storm is 1.0' with DIP.
    - Min separation to sewer is 1.5 ft.
    - Min separation to gas 2.0 ft or DIP. Min separation with DIP 1.0'
    - Min separation to communications and power is 1.0 ft.
- Minimum horizontal separation
    - Min separation to sewer is 10.0 ft.
    - Min separation to gas stormwater, communications and power is 5.0 ft.
    - Min separation to retaining walls and structures is 7.5' with engineer's cross section and letter of no impact to maintenance operations.
- DIP required under roadways.
- Water lines 12" and larger are required to be DIP.
- Restraint joint DIP requires 54 LF minimum before and after all valves, bends, tee branch, before reducers/plugs, etc. 12" and larger main will need to provide engineering calculations. DIPRA standard is preferred.
- The water main shall have a minimum cover of 3.0 ft. and a maximum cover of 7.0 ft. Cover reduction to 2.5' may be considered if using DIP.
- Hydrants are to be installed every 1000 LF (max 500 LF in residential subdivisions or 400 LF commercial to the center of front setback). Fire hydrant separation to be measured along roadways.

- Private hydrants shall be painted silver.

- Fire department connection to be place no further than 100 LF from a fire hydrant.
- A minimum of 2 valves are required per Tee: 3 valves per cross.
- Valves are to be located at the Tee when possible.
- Valve boxes are not to be in driveways and roadways.
- Maximum inline valve spacing is 2000 LF or every other hydrant.
- All residential subdivisions must have domestic and irrigation meters for each lot.
- At relocation of watermain show nearest gate valve in each direction.
- Provide a mainline future extension with blow off at all phase lines.
- No connections are to be made on the water main after the last 6-inch or larger gate valve at future main extension.
- The proposed grade over UCW's water easement shall not be greater than 5:1.
- Meters 2-inch and larger must justify use by providing calculations of requested flow in gallons per day and peak flow in gallons per minute. To qualify for a 2.0-inch or larger meter the peak demand must exceed the maximum continuous safe flow provided in separate Meter Sizing document.

WATER CALCULATIONS

- Cover
  - Project name
  - Engineer and developer's contact information
  - Engineer's certification
- Section 1 – overview
  - Water project summary.
  - Project location and general description.
  - Total number of parcels and associated usage designations per 18C or 02T in table format similar to overall sheet requirements
  - Phasing.
    - What's been constructed to date.
    - What remains to be constructed
  - Brief description of assets being installed in table format similar to overall sheet
  - Estimated consupmtion per overall sheet requirements
  - Maximum daily demand (include domestic and irrigation)
- Section 2 – required fire flow
  - State required fire flow and maximum daily demand.
  - State fire hydrant calculation results
  - Provide conclusion. State whether system is adequate or if improvments are necessary
- Section 3 - model analysis of proposed water distribution system
  - Model results with schematic. Schematic to identify pipes, nodes and pump.
  - Provide system curve i.e. pump curve.
  - Fire flow analysis – show fire hydrants can maintain fire flow plus maximum daily demand.
  - Results table - include junctions, pipe diameter, flow demand, pressure, pipe length
  - Provide UCW supplied hydrant test results.

SEWER DESIGN

- ☐ The sewer main and easement outside of the ROW must be centered in a 20.0' sewer easement and located within common open space.
- ☐ Place manholes at the center of the road.
- ☐ Proposed sewer lines within existing DOT roads must be within a minimum of 5 feet of the ROW line and must be on a minimum of 1/1 plus 5 ft. ratio offset from EOP.
- ☐ Manholes rims are to provide 2.5 ft separation from edge of curb. Dimension separation from manhole rim to curb if not centered in roadway.
- ☐ Laterals cannot cross property lines.
- ☐ Minimum sewer pipe vertical separation.
  - Min separation to storm and sewer is 2.0ft or DIP.
  - Min separation to storm is 1.0' with DIP.
  - Min separation to water pipe is 1.5 ft.
  - Min separation to gas 2.0 ft.
  - Min separation to communications and power is 1.0 ft.
- ☐ Minimum sewer pipe horizontal separation
  - Min separation to water is 10.0 ft.
  - Min separation to gas stormwater, communications and power is 5.0 ft.
  - Min separation to retaining walls and structures is 10.0' with engineer's cross section and letter of no impact to maintenance operations.
- ☐ The sewer pipe and laterals minimum cover is 3 ft. and a maximum cover of 14 ft.
- ☐ Sewer pipe material cover requirements are as follows. (material requirements are independent of what is allowable per county specifications)
  - DIP for less than 3.0ft or more than 18 ft.
  - SDR-26 for depth greater than 10 ft but less than 18 ft.
  - SDR-35 for depth greater than 3.0 ft but less than 10 ft.
- ☐ Minimum slope of 8 in sewer is 0.50%
- ☐ Maximum distance between manholes is 400 LF.
- ☐ No acute sewer connections allowed.
- ☐ Connections at manholes are to have a minimum of 42° separation. Maximum three upstream connections at a manhole.
- ☐ Place manhole rim at 2.0 ft above grade when not located within streets or landscaped areas
- ☐ Match crowns when connecting to larger diameter sewer at a manhole.
- ☐ 0.20 ft drop is required in manholes. If a larger drop is necessary, a minimum of 2.5 ft outside drop is required. (Only use outside drops, when necessary) No benching allowed.
- ☐ Taps cannot be made on corrugated pipe.
- ☐ Sewer is required to terminate at manholes.
- ☐ Manholes with rim elevation at or below 100-year flood plain elevation are to be sealed.
- ☐ Provide headwater calculations where manholes are adjacent to culverts. Head water elevations that are at or above the rim elevations will need to be sealed.
- ☐ Space vents at 1000 ft intervals. Install vents 3.0' above 100yr flood elevation
- ☐ Verify each lot has a sewer lateral and can gravity flow to sewer.
  - Lots are to have finished floor elevation more than 4.5' above sewer invert at connection plus 1.0% or provide finish floor and cleanout elevation.
- ☐ 8-inch sewer laterals require manholes instead of cleanouts.

- ☐ Transition from public to private sewer is to be done at a manhole.
- ☐ Stream crossings are to be between 75 & 105 degrees.
- ☐ An ingress-egress-regress easement shall be provided for all major outfall lines.
- ☐ Place (2) 6’ gates with fence extended to edge of easement on outfall lines and roads
- ☐ Manholes are to be minimum of 4.0 feet. Flat top structures are not allowed.
- ☐ Maximum two pipe material transitions between manholes
- ☐ Interceptor lines shall not change pipe materials between manholes. No reduction in downstream pipe size allowed.
- ☐ Sewer lines are to be designed to follow the natural drainage basins. Future 20.0’ sewer easements are required at natural drainage patterns. Show creeks and ditches which parallel sewer in profile to determine the need for future easements.
- ☐ Provide future sewer profiles with future sewer main shown at 1.0%.
- ☐ Future sewer easements require an additional 40 ft temporary construction easement.