SCOPE OF WORK
SOUTHPORT WASTEWATER SYSTEM STUDY AND DESIGN

Draft Engineering Report/Environmental Information Document

1. Meet with the Owner and prepare the Engineering Report/Environmental Information Document (ER/EID) in accordance with DWI’s guidance documents for wastewater treatment plant projects and collection system projects. The Owner is expecting to receive State Revolving Loan Funding (SRF) for this project and the ER/EID must be completed in accordance with the Division of Water Infrastructure (DWI) to enable the funding. Owner’s consultant (HDR) has previously prepared a Preliminary Engineering Report for this project which may be considered when developing the alternatives analysis for the ER/EID. Engineer shall update Alternative 2, contained in the HDR analysis, and shall also evaluate an alternative routing of the force main along Midway Road and Gilbert Road. Alternatives ruled out in the HDR analysis do not need to be reassessed unless necessary for DWI review. Include an opinion of probable construction cost for each alternative. Engineer shall complete the draft ER/EID and submit the required number of copies of the draft report to DWI and four copies to the Owner.

Engineering Report/Environmental Information Document

1. Respond to comments received from DWI’s review of the draft ER/EID. Submit the required number of copies of the revised report to DWI and four copies to the Owner.

Preliminary Design Phase

1. Meet with the Owner to review the objectives of the project, identity information needed, and develop a schedule for the project.

2. Prepare Preliminary Design Phase documents consisting of final design criteria, preliminary drawings, and outline specifications. The project includes:

   a. 750,000 gallon per day non-discharge wastewater facility to be located at the site of the existing BCPU Shallotte WWTP. Provide all components necessary to provide a complete treatment process that meets or exceeds all regulatory requirements. All portions of the facility shall be laid out so as to not impede a future expansion of the plant up to 5 MGD capacity. To ensure adequate spacing, provide a site layout plan showing the future expansion. Improvements shall include, but may not be limited to:

      1) Force main from the existing force main at Route 17 to the new influent headworks. The force main shall be sized to accommodate 750,000 gallons per day with an appropriate peaking factor applied.
      2) Influent headworks structure including two in-channel automated screens. The
capacity of each screen shall accommodate peak hourly rate of the combined flow to the Shallotte WWTP site.

3) Forced vortex grit removal system which can accommodate up to, and including, the peak hourly flow.

4) Two-chamber equalization basin (EQ) with a jet aeration system (capacity sufficient to accommodate variation of flow throughout the peak day, or 25% of peak day flow, whichever is greater). A bypass line for use during maintenance of the EQ basin.

5) Influent splitter box, immediately downstream of the EQ basin, and piping and valves as necessary to allow flow to be directed to the existing lagoons, or to the RAS/influent splitter box.

6) Influent splitter box to combine RAS (Return Activated Sludge) and influent, and split the combined flow between two oxidation ditches.

7) Two oxidation ditches each equipped with rotors and submersible mixers. The oxidation ditch system will include a control system to allow phased aeration or parallel vs. in-series options.

8) Two circular secondary clarifiers.

9) RAS/WAS pump station with two RAS pumps and two WAS pumps.

10) Two 2-disk cloth media filter units sized to accommodate peak flow.

11) Two chlorine contact tanks for disinfection with sodium hypochlorite.

12) Reclaimed water pump station with two reclaimed water pumps operated on VFDs to convey effluent to the proposed effluent disposal area on the Shallotte site located north of Mulberry Branch.

13) Non-potable water pump(s) and associated piping for facility and screening wash down.

14) 3.75 MG (0.75 MGD x 5 days) upset pond and associated return pump station and piping to transfer upset flow back to the head of the plant.

15) One aerobic digestion tank aerated with a jet aeration system sized to provide a minimum 30-day hydraulic retention time (HRT) for average permanent WAS at 1% solids. A minimum HRT of 30-days is required to meet requirements for Class B biosolids at temperatures greater than 20°C.

16) Tank for sludge storage/lime stabilization and offloading for sludge hauling.

17) Effluent disposal including infiltration ponds and ancillary facilities including groundwater lowering drainage system in accordance with setbacks for treatment systems designed to meet an effluent Total Nitrogen of less than 7 mg/l and a Total Phosphorus of less than 3 mg/l. Test borings shall be made across the site to determine potential areas for locating sufficient high rate infiltration basins to accommodate 750,000 gallons per day. Test each infiltration pond site to determine site specific potential loading capacity, shape and drain configuration for detailed computer simulations needed to support final design needed for NCDEQ permitting. This phase will focus on four areas at somewhat higher elevation so that potential gravity groundwater lowering options can be considered. This will include all work necessary to determine the number, location, and design of the high rate infiltration ponds. This phase includes meetings and response to comments and requests by the review agency.
18) Building structures including, but may not be limited to, a blower building to serve the equalization basins, RAW/WAS pump station, chemical feed and storage building, digested solids blower building, and two electrical buildings. The project does not include a new administration building or expansion to the existing administration building. The digested solids blower building shall include separate conditioned spaces for SCADA/operational control, restroom, sample handling/processing, and a potable water supply (on-site well or connection to the public water system).

19) Facilities to offload materials with high percentage of solids.

20) Piping and valves necessary to reroute existing influent lines to the proposed headworks.

21) Odor control equipment and associated building/enclosure.

22) In-plant piping to collect all drains (tank, scum, floor, etc.) and pump the flow to the proposed headworks.

b. A high-level master plan for the City of Southport wastewater service area to determine preliminary location(s) of future wastewater basins, pump station(s) and connection point(s) to the existing force main on NC 211. The future pump station(s) shall be considered in the force main design analysis (Item c).

c. Force main to convey flow to the West Brunswick Regional Water Reclamation Facility. The route of the new force main shall be as described in Alternate 2, contained in the PER, or along an alternative route (approximately 21,200 feet in length) from the intersection of Midway Road and NC 211, along Midway Road to Gilbert Road, and then along Gilbert Road to the existing force main at the intersection of Gilbert Road and Clemmons Road. The Engineer shall also perform a beneficial-use analysis of the capacity in the existing force main. Perform hydraulic modeling using the SewerCAD hydraulic model to determine the size of the force main that will be required to meet the Owner’s collection system design requirements as established in the Brunswick County Pump Station Design Guidance document. The size of the force main in the Midway-Gilbert option shall not be smaller than the upstream piping. The cost of designing the more expensive option shall be included in the Engineer’s fee proposal along with a deduct if the less expensive alternate is chosen.

d. Addition of two new water master meters to serve the Rivermist subdivision near Southport. One to be located on J. Swain Boulevard and the other to be located on Winifred Street. The vaults will be approximately 920 feet from Route 211. BCPU will bid and administer a construction contract for these vaults. Engineer shall design and provide plan and detail sheets of the meters, vaults, and associated valves and piping. Material specifications shall be included on the plan/detail sheets.

3. Field surveys and topographic and SUE as needed for design purposes. The survey shall include approximately 100 acres of area on the Shallotte site and entrance road, the area around the entrance to the facility, an access road to the new plant site and effluent disposal area, the area for the new plant, and the area for the effluent disposal infiltration ponds and groundwater lowering drainage piping routes. SUE services include Level A, B, C, and D
services for the treatment plant site, for the utilities along Forest Street Extension to the entrance to the plant, and for the force main route along Midway Road and Gilbert Road. Unit pricing for Level A vacuum excavations shall be provided.

4. Based on the information contained in the Preliminary Design Phase documents, prepare a revised opinion of probable Construction Cost.

5. Furnish two review copies of the Preliminary Design Phase documents and any other deliverables to Owner.

6. Revise the Preliminary Design Phase documents and any other deliverables in response to Owner’s comments and furnish two review copies of the revised Preliminary Design Phase documents, revised opinion of probable Construction Cost, and any other deliverables to the Owner.

**Final Design Phase**

After acceptance by Owner of the Preliminary Design Phase documents, revised opinion of probable Construction Cost, and other deliverables, the Engineer shall:

1. Prepare final Drawings and Specifications. At the 90% level of completion, Engineer will provide drawings and specifications to Owner for review. Engineer will meet with Owner to discuss any changes to be made before submitting documents for regulatory approval.

2. Provide technical criteria, written descriptions, and design data for use in filing applications for permits from, or approvals of, governmental authorities having jurisdiction to review or approve the final design of the project; assist Owner in consultations with such authorities; and revise the Drawings and Specifications in response to directives from such authorities. Submit permit applications to governmental authorities and act as the Agent of the Owner. The following permits may be required for this project:

   a. NCDEQ DWR Non-Discharge Permit
   b. NCDEQ Land Quality Section Sediment and Erosion Control Permit
   c. NCDEQ DWR State Stormwater
   d. NCDOT Encroachment Agreement
   e. Building Permit (initiate process which will be completed by contractor)
   f. Nationwide Corps of Engineers General Permit
   g. CAMA Consistency Permit
   h. Local Planning and Zoning
It is assumed that a COE Individual Permit will not be required for this project. All permit fees are to be paid by the Engineer.

3. Test each basin site to determine site specific potential loading capacity, shape and drain configuration for detailed computer simulations needed to support final design needed for NCDEQ permitting. This phase includes meetings and response to comments and requests by the review agency.

4. Prepare and furnish Bidding Documents for review by Owner. The work will be separated into two prime contracts which will be bid separately. One prime contract will be for the force main to convey flow to the West Brunswick Regional Water Reclamation Facility and the other prime contract will be for the improvements at the Shallotte Wastewater Treatment Plant.

5. Revise the Bidding Documents in accordance with comments and instructions from the Owner and submit seven copies of the Bidding Documents, a revised opinion of probable Construction Cost, and any other deliverables to the Owner.

6. Prepare Bid and Design checklist and attachments for SRF approval to bid projects.

Bidding and Negotiating Phase

After acceptance by Owner of the Bidding Documents the Engineer shall:

1. Assist Owner in advertising for and obtaining bids or proposals for the work and, where applicable, maintain a record of prospective bidders to whom Bidding Documents have been issued, conduct pre-bid conferences, and receive and process contractor deposits or charges for the Bidding Documents.

2. Issue addenda as necessary to clarify, correct, or change the Bidding Documents.

3. Provide information or assistance needed by Owner in the course of any negotiations with prospective contractors.

4. Consult with Owner as to the acceptability of subcontractors, suppliers, and other individuals and entities proposed by prospective contractors for those portions of the work.

5. Evaluate and determine the acceptability of "or equals" and substitute materials and equipment proposed by bidders.

6. Attend the bid opening, prepare bid tabulation sheets, and assist Owner in evaluating bids or proposals and in assembling and awarding contracts for the work. Provide a Recommendation of Award letter to Owner.

7. Prepare conformed construction drawings and specifications for construction phase that reflect any changes made during the bidding process.
Construction Phase

Upon successful completion of the Bidding and Negotiating Phase, and upon written authorization from Owner, Engineer shall:

1. Consult with Owner and act as Owner’s representative as provided in the Construction Contract. The construction period is assumed to cover a period of eighteen months. Sufficient construction oversight shall be included such that Engineer can certify project. Make visits to the site at intervals appropriate to the various stages of construction to observe the progress of Contractor’s executed work. Owner’s inspector will provide daily inspection and coordination.

2. Assist Owner in the selection of an independent testing laboratory.

3. Conduct a Pre-Construction Conference prior to commencement of work at the site.

4. Receive, review, and determine the acceptability of any and all schedules that Contractor is required to submit to Engineer, including the Progress Schedule, Schedule of Submittals, and Schedule of Values.

5. Establish reference points, baselines, and benchmarks for locating the work.

6. Issue necessary clarifications and interpretations of the Contract Documents as appropriate to the orderly completion of Contractor’s work.

7. Recommend change proposals, change orders and work change directives to Owner, as appropriate, and prepare change orders and work change directives as required.

8. Review and approve or take other appropriate action in respect to Shop Drawings and Samples and other data which Contractor is required to submit, but only for conformance with the information given in the Contract Documents and compatibility with the design concept of the completed project as a functioning whole as indicated by the Contract Documents.

9. Evaluate and determine the acceptability of substitute or “or-equal” materials and equipment proposed by Contractor.

10. Require such tests of Contractor’s work as deemed reasonably necessary, and receive and review tests and approvals required by Laws and Regulations or the Contract Documents. Engineer’s review of such tests will be for the purpose of determining that the results certified indicate compliance with the Contract Documents.

11. Provide testing and review as necessary to confirm the infiltration basins, as constructed, will serve the intended purpose and provide the desired minimum capacity.
12. Provide written recommendations on all duly submitted issues relating to the acceptability of Contractor’s work or the interpretation of the requirements of the Contract.

13. Based on Engineer’s observations of the work completed, Engineer shall process pay requests.

14. Receive, review, and transmit to Owner, schedules, guarantees, bonds, certificates, or other evidence of insurance required by the Contract Documents, certificates of inspection, tests and approvals, shop drawings, samples, and other data in accordance with the Contract Documents.

15. Promptly after notice from Contractor that Contractor considers the entire work ready for its intended use, in company with Owner and Contractor, visit the project to determine if the work is substantially complete and prepare a punchlist with Owner. Deliver a Certificate of Substantial Completion to Owner and Contractor after the Engineer considers the work substantially complete.

16. Conduct a final visit to the project to determine if the completed work of Contractor is acceptable so that Engineer may recommend, in writing, final payment to Contractor.

17. Prepare Record Drawings and furnish Record Drawings to Owner.

18. Assemble into a comprehensive manual, the operation and maintenance manuals of various equipment submitted by Contractor. Two copies of the manual(s) shall be forwarded to Owner when they have been satisfactorily prepared.

19. Provide required closeout documentation to DWI.

Post-Construction Phase

During the Post-Construction Phase Engineer shall:

1. Visit the project to observe any apparent defects in the work, assist Owner in consultations and discussions with Contractor concerning correction of any such defects, and make recommendations as to replacement or correction of defective work, if any.

2. Visit the project within one month before the end of the Construction Contract’s warranty period to ascertain whether any portion of the work is subject to correction.

3. Provide testing and certification of the operation of the infiltration basins that is required by the North Carolina Department of Environmental Quality. The cost of installing a well in the effluent disposal area shall be included in the fee to provide water for testing purposes in lieu of extending a potable water line to this area. A power source, to be provided by the Contractor, shall be included in the design documents.

End of Scope of Work