CITY OF NORFOLK DEPARTMENT OF UTILITIES
DESIGN AND CONSTRUCTION STANDARDS
Appendix F4 – Wastewater Pumping Station Design Checklist

General Drawing Requirements

_____ 1. The drawings are in accordance with the Standards and use of the Department's standard symbols or an appropriately labeled symbol key.
_____ 2. The drawings are clear and legible.
_____ 3. The City Seal is located adjacent to the front door.
_____ 4. The appropriate applications have been properly filled out and submitted:
   a. HRSD Flow Certification
   b. Dominion Virginia Power Request for Service
   c. Virginia Natural Gas Request for Service
   d. Department of Environmental Quality (DEQ) Submittal
_____ 5. Only sanitary wastes are collected and transported – no storm drains or surface water are shown entering the sanitary sewer system.
_____ 6. Any affected wetland areas or Resource Protection Areas (RPA) are properly shown and labeled.
_____ 7. Benchmark(s) are identified on the site plan and located every 500 feet along the route of the new sewer force main(s).
_____ 8. A north arrow and horizontal and vertical scale are included on each sheet, where applicable.
_____ 9. All existing easements are shown accurately, and proposed utility easements are shown on drawings. The existing easements reflect accurate record information.
_____ 10. Proposed and existing water and sewer lines are properly labeled with size and type of pipe, and the horizontal and vertical locations shown on the drawings.
_____ 11. All existing and proposed sanitary sewer, storm sewer, gas, telephone, power, any other utility lines, and all water services which cross or run parallel to the sewer line(s), are shown with horizontal and vertical separations given, where applicable. Subsurface exploration has been performed where potential conflicts exist, where applicable.
_____ 12. Adjacent road and drainage projects are shown as required.
_____ 13. Road names, state route numbers, and right-of-way widths are shown.
_____ 14. Stations ascend from left to right.
_____ 15. Proposed sewer lines are shown with reference distances from rights-of-way, boundaries, buildings, other utility lines, etc.
_____ 16. All subdivisions, property lines, and property markers (stones, rods, pins, pipes, monuments, etc.) are shown.

_____ 17. Location of existing houses, buildings, fences, wells and other structures are shown on drawings. In lawn or kept areas, trees and shrubs in the easements are shown (size and type).

_____ 18. All designs conform to the latest City and State erosion and sediment control rules, regulations, and ordinances.

_____ 19. The Design Engineer has coordinated the utility design and construction work with other Design Engineers where their projects connect or affect each other.

_____ 20. Locations of special features (concrete encasement, rip-rap stabilization at creek crossings, clay dams, etc.) are shown in sufficient detail.

_____ 21. All fill and cut areas are shown within the area of the existing and proposed sewer line(s).

_____ 22. Necessary easement plats onsite and/or offsite have been submitted in accordance with the Norfolk City Surveyor's Requirements for processing.

_____ 23. Pavement replacement and/or landscaping details are shown on all drawings.

_____ 24. Proposed and existing ground elevations are shown.

_____ 25. Contract Documents (drawings and specifications) have been submitted to the State Health Department for review and approval where applicable. A copy of transmittal letter is attached to checklist.

_____ 26. Alignment of utility in existing Virginia Department of Transportation (VDOT) right-of-way is consistent with City and VDOT guidelines. A copy of a transmittal letter to VDOT for their review is attached. The Design Engineer understands that a letter of approval from VDOT is required prior to final utility plan approval.

_____ 27. All sanitary sewer drawings are labeled with size, grade, length, direction of flow, and type and class of pipe(s) (with backup calculations on the type & class pipe needed, where applicable).

_____ 28. Manholes are labeled with rim and invert elevations; coordinates; and locations, size and inverts of drop stacks.

_____ 29. Deflection angles at all manholes or bearings of all lines are shown on the drawings.

_____ 30. Manholes are spaced a maximum of 300 feet apart.

_____ 31. All minimum finished floor elevations and basement elevations are to be shown on drawings, where applicable.

_____ 32. Ground coverage over sewer pipe meets the minimum criteria of 36-inches.

_____ 33. Is emergency pump connection shown and does it conform to standard detail?

_____ 34. Is an adequate buffer zone shown around the pumping station?

_____ 35. Is there an ample driveway that allows for the largest Department of Utilities vehicle to access the pumping station?

Wet Well Drawing Requirements

_____ 36. Is the wet well access hatch easily accessible and free from obstructions?
_____ 37. Are the bar screen and emergency bypass channel shown and are they easily accessible for maintenance?
_____ 38. Are the alarm levels and elevations shown?
_____ 39. Is the wet well designed to prevent solids deposition?
_____ 40. Is the wet well designed to prevent free-fall of sewer influent during normal operation?
_____ 41. Is there an isolation valve on the sewer influent line located in a valve vault outside of the wet well?
_____ 42. Is all interior metal Type 316L stainless steel?
_____ 43. Are all electrical fixtures in the wet well explosion-proof?
_____ 44. Are there appropriate flow-measuring device(s) and pressure recording device(s) shown?
_____ 45. Is an appropriate coating specified for the interior of the wet well?

Pump Room Drawing Requirements

_____ 46. Is there sufficient (minimum 3 feet) clearance between pieces of equipment, pipes, and structural elements?
_____ 47. Is there sufficient access and handling equipment to facilitate removal and reinstallation of pumps and motors? Does the beam extend through the door to facilitate loading and unloading?
_____ 48. Is the sump pump properly sized with the discharge into the wet well above the wet well high-level elevation?
_____ 49. All lights and switches easily accessible?
_____ 50. All valve operators shall be accessible from the pump room floor or stair landing.
_____ 51. Is there an appropriate backflow prevention device on any potable water supply line?
_____ 52. Is there a gate valve on the suction line?
_____ 53. Is there a check valve and a gate valve on the discharge line?
_____ 54. Is the control system in accordance with Department Standards?
_____ 55. Is there sufficient lighting? Is the lighting shielded?

Design Considerations

_____ 56. Does the pumping station meet the requirements of Class I Reliability?
_____ 57. Has a capacity analysis of the influent collection system been completed in accordance with the Department Standards?
_____ 58. Has a pump sizing analysis been completed in accordance with the Department Standards?

_____ 59. If the pumps are larger than 50 hp, has the Design Engineer performed a cost analysis to determine if three or more pumps is more cost effective for the Department?

_____ 60. Has the system curve been determined and transposed to a manufacturer's pump performance curve?

_____ 61. Has hydraulic transient control been considered by the Design Engineer?

_____ 62. Has a ventilation analysis been completed to ensure proper air changes in the wet well and the pump house?

_____ 63. Is the lifting equipment properly sized for the largest piece of equipment in the pumping station?

_____ 64. Has the effect of hydraulic thrust been considered and addressed?