

**DIVISION OF WATER QUALITY
CONSTRUCTION GRANTS & LOANS SECTION
FAST TRACK AUDIT CHECKLIST**

CERTIFICATION

	Yes	No	N/A
1. Did the engineer submit a certificate of completion utilizing the appropriate page of the issued permit?	_____	_____	_____
2. Was the certificate of completion fully executed by a P.E.?	_____	_____	_____
3. Were the construction record drawings submitted?	_____	_____	_____
4. Were the construction record drawings stamped, signed, and dated by the design engineer?	_____	_____	_____
5. Were the engineering calculations submitted?	_____	_____	_____
6. Were the engineering calculations stamped, signed, and dated by the design engineer?	_____	_____	_____

REFERENCES AND DOCUMENTATION

1. Did all materials used in the design comply with accepted standards, good engineering standards, and are they in compliance with 15A NCAC 2H.022, as well as minimum design criteria?	_____	_____	_____
--	-------	-------	-------

PUMP DESIGN

1. Are the pumps designed to convey raw, unscreened wastewater?	_____	_____	_____
2. Does the pump selection meet the duty requirements, as well as the physical and chemical characteristics of the wastewater being conveyed ?	_____	_____	_____
3. Are the pumps capable of passing three-inch solids, trash, or stringy materials?	_____	_____	_____
4. If the answer to 3 is no, are mechanical means of solids reduction utilized? (Manual bar screens are not acceptable)	_____	_____	_____

Yes No N/A

5. Are the pump suction and discharge openings a minimum of four inches for all pumps except grinder pumps? _____ _____ _____

NUMBER AND CAPACITY OF PUMPS

1. Are the pumps capable of conveying the peak hourly wastewater flow with the largest single pump out of service? _____ _____ _____
2. Is the capacity of the pump capable of pumping the “built-out” design flow? _____ _____ _____
3. Has a peaking factor of at least 2.5 been used to calculate the peak hourly wastewater flow? _____ _____ _____
4. Is the pump capable of maintaining a minimum velocity of 2.0 fps through its suction and discharge piping and the force main? _____ _____ _____

PUMP SELECTION METHODOLOGY

1. Were pump curves submitted? _____ _____ _____
2. Was a system curve plotted? _____ _____ _____
3. Was static head calculated? _____ _____ _____
4. Was friction head calculated? _____ _____ _____
5. Were minor losses (i.e. fittings, valves, etc.) calculated? _____ _____ _____
6. If applicable, was pressure head calculated? _____ _____ _____
7. Was total dynamic head calculated? _____ _____ _____
8. Was the proper Hazen-Williams friction coefficient used? _____ _____ _____

CYCLE AND PUMP RUN TIMES

1. Is automatic pump alternation provided? _____ _____ _____
2. Are the pumps operating between two and eight times per hour at design daily flow? _____ _____ _____

- | | Yes | No | N/A |
|---|-------|-------|-------|
| 3. If the pumps cycle less than two times per hour, have odor control and corrosion measures been considered? | _____ | _____ | _____ |
| 4. Are pump run times excessive? | _____ | _____ | _____ |

SITE SELECTION AND SECURITY

- | | | | |
|---|-------|-------|-------|
| 1. Is the pump station site served by a hard surface road with a minimum width of 12 feet, constructed with a minimum of a six-inch layer of compacted ABC stone, and located above the 100-year flood elevation? | _____ | _____ | _____ |
| 2. Is the pump station site/structure secure? | _____ | _____ | _____ |
| 3. Is adequate lighting provided? | _____ | _____ | _____ |
| 4. Are OSHA-required safety placards provided and readily visible? | _____ | _____ | _____ |

STRUCTURAL DESIGN

- | | | | |
|--|-------|-------|-------|
| 1. Are all of the pump station structures protected from vehicular traffic? | _____ | _____ | _____ |
| 2. Are buoyancy calculations for all structures included? | _____ | _____ | _____ |
| 3. Are the structures protected from the 100-year flood by elevating the structures at least 2 feet above that elevation, or provide water tight ports of entry? | _____ | _____ | _____ |
| 4. Are fillets or sloped bottoms of the pump station designed to avoid the accumulation of grit and solids? | _____ | _____ | _____ |
| 5. Are there projections into the wet well that would allow deposition of solids under normal operating conditions? | _____ | _____ | _____ |
| 6. Is there sufficient submergence of the pumps or pump suction piping to prevent vortexing? | _____ | _____ | _____ |
| 7. Is there sufficient submergence of submersible pumps to prevent overheating? | _____ | _____ | _____ |
| 8. Is the wet well of sufficient depth to provide emergency storage volume? | _____ | _____ | _____ |

PIPING AND VALVES

	Yes	No	N/A
1. On pumps, except grinder pumps, is the suction and/or discharge piping a minimum of four inches in diameter and capable of passing three-inch solids?	_____	_____	_____
2. Is the velocity of the wastewater within the suction and/or discharge piping between two and eight feet per second?	_____	_____	_____
3. Is there a full-closing shut-off valve on the discharge piping of each pump, or on the suction piping of each dry well pump?	_____	_____	_____
4. Is there a check valve on the discharge piping of each pump?	_____	_____	_____
5. Are there flexible pipe joints between pump station structures to allow for settlement?	_____	_____	_____
6. Is cross-connection control for potable water provided?	_____	_____	_____

APPURTENANCES

1. Can all pumps and equipment be readily removed from the pump station or wet well?	_____	_____	_____
--	-------	-------	-------

VENTILATION

1. Does the pump station have adequate ventilation to meet all codes and standards?	_____	_____	_____
2. Does the pump station have a gooseneck-type vent that has an elevation set two feet above the 100-year flood elevation and contains an insect/bird screen of corrosion-resistant material?	_____	_____	_____
3. For pump stations having a dry well or other enclosed pump station structure into which routine operator entry is required, is a positive pressure ventilation system provided?	_____	_____	_____

OTHER EQUIPMENT

1. Does the pump station have a heater(s) and/or humidifier?	_____	_____	_____
2. Is the floor of the pump station sloped to facilitate drainage?	_____	_____	_____

Yes No N/A

3. If gravity drainage is not possible, is the station provided with sump pump?

FORCE MAIN DESIGN

1. Except for grinder pumps, is the force main a minimum of four-inch diameter?
2. Is the velocity of the wastewater within the force main a minimum of two feet per second?
3. Is adequate blockage/anchorage supplied?
4. Is protection required for surge and/or water hammer?
5. Are air release and/or vacuum relief valves required?
6. Is there either a minimum of three feet of cover over the force main or ferrous pipe material used?
7. Is adequate separation maintained between the force main, natural features, utilities, etc.?

GRAVITY SEWERS

1. Is the collection system designed at “built-out” flow quantities?
2. Does the downstream sewer receiving the proposed flow have the capacity to carry its peak flow *plus* the peak flow of the proposed system?
3. If the proposed sewer is a public gravity sewer, is the minimum diameter eight inches?
4. If the proposed sewer is a private gravity sewer, is the minimum diameter six inches?
5. Is ferrous pipe material used if the gravity sewer has less than three feet of cover?
6. Is the gravity sewer designed above minimum slope for the diameter pipe utilized?

		Yes	No	N/A
7.	Is the gravity sewer designed to flow half full at average daily design flow?	_____	_____	_____
8.	Is the gravity sewer designed to maintain a minimum flow velocity of two feet per second?	_____	_____	_____
9.	Is the gravity sewer installed on uniform slope between manholes?	_____	_____	_____
10.	When the velocity of the wastewater exceeds 15 feet per second, has high velocity protection been provided?	_____	_____	_____
11.	When gravity sewer slopes are equal to or greater than 20 percent, has the sewer been anchored?	_____	_____	_____
12.	Does the gravity sewer have straight alignment between manholes?	_____	_____	_____
13.	When a smaller sewer joins a larger one, has the larger sewer been lowered sufficiently to maintain the same energy gradient?	_____	_____	_____
14.	Have the proper pipe materials and couplings been utilized for the conditions in which the pipe is being installed (e.g. industrial waste, exceptional external loads, etc.)?	_____	_____	_____

MANHOLES

1.	Does the distance between manholes exceed 425 feet? If so, has documentation been included with the record drawings showing that the owner has the capability to perform cleaning and maintenance at the greater distances?	_____	_____	_____
2.	Where cleanouts are utilized in lieu of manholes on private sewers, does the distance between clean outs exceed 100 feet?	_____	_____	_____
3.	Is an outside drop pipe, fully encased in concrete (or ferrous material), provided for a sewer entering a manhole 2.5 feet above the manhole invert?	_____	_____	_____
4.	Is the minimum diameter of the manhole four feet with a minimum access diameter of 22 inches?	_____	_____	_____
5.	Is the minimum diameter for an inside drop manhole five feet?	_____	_____	_____
6.	If applicable, is a bench having a minimum slope of ½ inch per foot (4 percent) provided on either side of every manhole channel?	_____	_____	_____

	Yes	No	N/A
7. Is the invert elevation of any service lateral, service connection, or drop manhole pipe above the bench service?	_____	_____	_____
8. Are the manholes protected from a 100-year flood?	_____	_____	_____
9. Where high flow velocities are expected, are the manholes protected against displacement?	_____	_____	_____
10. Where corrosive conditions are expected, are the manholes protected against the corrosive materials?	_____	_____	_____

SEWERS IN RELATION TO STREAMS AND OTHER BODIES OF WATER

1. Are the tops of all sewers entering or crossing a stream sufficiently deep below the stream bed to protect the sewer line?	_____	_____	_____
2. Are the sewers located along streams, lakes, or impoundments at least 10 feet outside the stream bank?	_____	_____	_____
3. Is there a minimum of 50 feet between sewers and waters classified as WS-II, WS-III, B, SA, ORW, HGW, or SB?	_____	_____	_____
4. Are the sewer stream crossings as near perpendicular to the stream flow as possible?	_____	_____	_____
5. Are the sewers entering or crossing streams constructed of ferrous pipe with mechanical joints?	_____	_____	_____
6. For aerial crossings, is the sewer protected from freezing and pier supports from frost heave or settlement?	_____	_____	_____
7. Is proper joint technology, such as flanged or restrained joints, adequately supported to prevent excessive flexion, or a combination of both utilized?	_____	_____	_____
8. Are aerial sewers designed such that the bottom of the pipe is above the 25-year flood elevation of the stream?	_____	_____	_____
9. Are anti-seepage collars utilized where there is a potential to drain wetlands?	_____	_____	_____

PROTECTION OF POTABLE WATER SUPPLIES AND STORM SEWERS

	Yes	No	N/A
1. Are there any physical connections between a public or private water system and a sewer or sewer appurtenance?	_____	_____	_____
2. Is a minimum of 100 feet maintained between any private or public water supply and the proposed sewer?	_____	_____	_____
3. Is ferrous pipe material utilized if a minimum of 100 feet cannot be maintained between a private or public water supply and a proposed sewer?	_____	_____	_____
4. If a sewer is proposed within 200 feet of an existing water works unit, were all basins, wells, or other treatment units shown on the plans?	_____	_____	_____
5. Was the proposed sewer line designed a minimum of 10 feet horizontally from a proposed water main, or was there a minimum distance of 18 inches vertically between the bottom of the waterline and the top of the sewer? (Water and sewer cannot be placed in the same ditch.)	_____	_____	_____
6. If the vertical and horizontal distances between a water line and the proposed sewer line cannot be obtained, do the materials for both the water and sewer ferrous pipe meet the public water supply design standards?	_____	_____	_____
7. Is there a minimum separation of 12 inches between storm sewers and sanitary sewers, or is ferrous pipe material specified?	_____	_____	_____
8. When water and sewer lines cross without maintaining 18 inches separation, is the sewer constructed of ferrous pipe material, or is either the water line or sewer line in a water tight carrier pipe extending 10 feet either side of the crossing?	_____	_____	_____

END