NEBRASKA

DEPT. OF ENVIRONMENT AND ENERGY

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Water Main and Sanitary/Storm Sewer Separations

The Department recognizes the challenges and difficulties in designing and installing distribution mains, especially in areas fraught with existing utilities. This guide is developed to assist design engineers with sewers and water main separation design and installation. In the design and installation of water mains, design engineers must strive to achieve the separation distances required for water mains and fire hydrants from sanitary sewer, storm sewer and other potential sources of contamination as per the Recommended Standards for Water Works, 2007 Edition (RSFWW). In cases where it is ***impractical*** to achieve those separations required in the RSFWW, the protocols provided in this document should be followed to be considered substantial conformance by the Department.

I. Sanitary Sewer and Water Main Separations

A. Sanitary sewer and water main horizontal separations for parallel installations.

1. Scenario 1
    - **a.** A 10-foot radial separation is considered equivalent to the 10-foot horizontal separation requirement if the water main is above the sanitary sewer and not within 5 feet horizontally.

2. Scenario 2
    - **a.** If the horizontal separation is **greater than 8 feet but less than 10 feet**, the installation would be acceptable if the following is provided:
        - **i.** Engineer's professional opinion that the water quality in the water main will not be impacted based on an evaluation of the proposed installation and soil conditions; **and**
        - **ii.** Reasons are provided as to why it is not practical to provide the 10 feet of separation.

3. Scenario 3
    - **a.** If the horizontal separation is **greater than 4 feet but less than 8 feet**, the installation would be acceptable if the following is provided:
        - **i.** Engineer's professional opinion that the water quality in the water main will not be impacted based on an evaluation of the proposed installation and soil conditions;
        - **ii.** Reasons are provided as to why at least 8 feet of separation cannot be provided; **and**
        - **iii.** The water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer **or**
        - **iv.** The engineer may encase either the water or sewer pipe for protection (rigid welded piping or cement/concrete-at least 4 to 6 inches thick etc.) at locations where the separation cannot be met **or**
        - **v.** The sewer pipe needs to be water works grade 150 psi pressure rated pipe meeting AWWA Standards and pressure tested to ensure water tightness **or**
        - **vi.** An alternate method of protection with approval from the Department prior to construction.

4. Scenario 4
    a. If the horizontal separation **is less than 4 feet, written approval from the Department is required prior to installation.**

B. Sanitary sewer and water main vertical separations at crossings.

1. Scenario 1
    a. If the water main **is above** the sanitary sewer pipe and the vertical separation is **greater than 12 inches but less than 18 inches**, the installation would be acceptable if the following is provided:
        i. Engineer's professional opinion that the water quality in the water main will not be impacted based on an evaluation of the proposed installation and soil conditions;
        ii. Reasons are provided as to why the 18-inch separation cannot be met; **and**
        iii. One full length of water pipe needs to be located so that both joints will be as far from the sanitary sewer crossing as possible.

2. Scenario 2
    a. If the water main **is above** the sanitary sewer pipe and the vertical separation is **greater than 6 inches but less than 12 inches**, the installation would be acceptable if the following is provided:
        i. Engineer's professional opinion that the water quality in the water main will not be impacted based on an evaluation of the proposed installation and soil conditions;
        ii. Reasons are provided as to why at least 12 inches separation cannot be met;
        iii. One full length of water pipe needs to be located so that both joints will be as far from the sanitary sewer crossing as possible;
        iv. Proper support is provided to prevent settlement and breaking pipe; **and**
        v. The engineer may encase either the water or sewer pipe for protection (rigid welded piping or cement/concrete-at least 4 to 6 inches thick etc.) for at least 12 feet on each side of the crossing with the ends sealed **or**
        vi. The sewer pipe needs to be water works grade 150 psi pressure rated pipe meeting AWWA Standards and be pressure tested to ensure water tightness **or**
        vii. An alternate method of protection with approval from the Department prior to construction.

3. Scenario 3
    a. If the water main **is below** the sanitary sewer, and the vertical separation is **greater than 6 inches but less than 18 inches**, the installation would be acceptable if the following is provided:
        i. Engineer's professional opinion that the water quality in the water main will not be impacted based on an evaluation of the proposed installation and soil conditions;
        ii. Reasons are provided as to why at least 18 inches separation cannot be met;
        iii. One full length of water pipe needs to be located so that both joints will be as far from the sanitary sewer crossing as possible;
        iv. Proper support is provided to prevent settlement and breaking pipe; **and**
        v. The engineer may encase either the water or sewer pipe for protection (rigid welded piping or cement/concrete-at least 4 to 6 inches thick etc.) for at least 12 feet on each side of the crossing with the ends sealed **or**
        vi. The sewer pipe needs to be water works grade 150 psi pressure rated pipe meeting AWWA Standards and be pressure tested to ensure water tightness **or** An alternate method of protection with approval from the Department prior to construction.

4. Scenario 4
    a. If the vertical separation between the sewer line and the water main **will be less than 6 inches, written approval from the Department is required prior to installation.**

II. Storm Sewer and Water Main Separations

In general, the pollution hazards from a storm sewer are not as significant as a sanitary sewer since the storm sewer does not have flow in it year-round. However, during rainstorm events, it may carry surface runoff which contains chemical pollutants, but the pathogenic microbial impact is likely to be less than that of a sanitary sewer. For storm sewer and water main separation, the protocols provided in Sections II.A and II.B must be followed.

A. Storm sewer and water main horizontal separations for parallel installations.

1. Scenario 1
    - **a.** If the horizontal separation is **greater than 4 feet but less than 10 feet**, the installation would be acceptable if the following is provided:
        - **i.** Engineer's professional opinion that the water quality in the water main will not be impacted based on an evaluation of the proposed installation and soil conditions;
        - **ii.** Reasons are provided as to why the 10 feet of separation cannot be met; **and if necessary,**
        - **iii.** Additional protection deemed necessary by the design engineer.

2. Scenario 2
    - **a.** If the horizontal separation **will be less than 4 feet, written approval from the Department is required prior to installation.**

B. Storm sewer and water main vertical separations at crossings.

1. Scenario 1
    - **a.** If the water main **is above** the storm sewer pipe and the vertical separation is **greater than 6 inches but less than 18 inches**, the installation would be acceptable if the following is provided:
        - **i.** Engineer's professional opinion that the water quality in the water main will not be impacted based on an evaluation of the proposed installation and soil conditions;
        - **ii.** Reasons are provided as to why the 18-inch separation cannot be met; **and**
        - **iii.** One full length of water pipe needs to be located so that both joints will be as far from the storm sewer crossing as possible - preference shall be given to keep joints further from any sanitary sewer than a storm sewer.

2. Scenario 2
    - **a.** If the water main **is below** the storm sewer pipe and the vertical separation is **greater than 6 inches but less than 18 inches**, the installation would be acceptable if the following is provided:
        - **i.** Engineer's professional opinion that the water quality in the water main will not be impacted based on an evaluation of the proposed installation and soil conditions;
        - **ii.** Reasons are provided as to why the 18-inch separation cannot be met;
        - **iii.** One full length of water pipe needs to be located so that both joints will be as far from the storm sewer crossing as possible - preference shall be given to keep joints further from any sanitary sewer than a storm sewer;
        - **iv.** Proper support is provided to prevent settlement and breaking pipe; **and**
        - **v.** The engineer may encase either the water or sewer pipe for protection (rigid welded piping or cement/concrete-at least 4 to 6 inches thick etc.) for at least 12 feet on each side of the crossing with the ends sealed **or**
        - **vi.** The sewer pipe needs to be water works grade 150 psi pressure rated pipe meeting AWWA Standards and be pressure tested to ensure water tightness (the storm sewer pipe needs be watertight when pressure tested to at least 10 psi test pressure) **or**
        - **vii.** An alternate method of protection with approval from the Department prior to construction.

3. Scenario 3
    a. If the vertical separation between the storm sewer and the water main **will be less than 6 inches, written approval from the Department is required prior to installation.**

III. Force Main Separations

At least **10 feet of horizontal separation** between water mains and sanitary sewer force mains must be provided. There must be at least **18 inches of vertical separation** at crossings between water mains and force mains and one full length of water pipe shall be located so both joints will be as far from the sewer as possible at the crossing. **Where it is impossible to meet these separation requirements for force mains, the installation must not proceed prior to consulting and obtaining written approval from the Department.**

IV. Fire Hydrants Separations

A. Fire Hydrants and Sanitary Sewer Separations

1. Hydrant drains must not be connected to or located within **10 feet of sanitary sewers. Where it is impossible to provide 10 feet of horizontal separation between sanitary sewer and fire hydrant drains, written approval from the Department is required prior to installation.**

B. Fire Hydrants and Storm Sewer Separations

1. Where it is impractical to meet the 10-foot horizontal separation requirement for storm sewer and hydrant drains, less than 10 feet of horizontal separation would be acceptable if the following is provided:
    a. Engineer's professional opinion that the water quality in the water main will not be impacted based on an evaluation of the proposed installation and soil conditions;
    b. Reasons are provided as to why the 10 feet of horizontal separation cannot be met; **and**
    c. At least 5 feet of horizontal separation is provided.

2. **Where it is impossible to provide at least 5 feet of horizontal separation between storm sewers and hydrant drains, written approval from the Department is required prior to installation.**