

# SUDAS Revision Submittal Form

**Status Date:** As of 4/28/2022 **Topic:** Separation of water mains from sewer mains  
**Manual:** Design Specifications **Manual Location:** Section 2D-1, F; 3C-1, G; and 4C-1, G  
4010, 3.12; 4020, 3.08; and 5010, 3.06

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## Requested Revision:

From Section 2D-1 (General Information for Storm Sewer Design):

### F. Separation of Water Mains from Storm Sewer Mains

The following comply with the Iowa Department of Natural Resources separation requirements. These requirements do not apply to ditches, culverts, and subdrains.

- 1. Horizontal Separation of Gravity Storm Sewers from Water Mains:** Separate gravity storm sewer mains from water mains by a horizontal distance of at least 10 feet unless: Separate storm sewers and water mains by at least 10 feet measured edge to edge unless it is impossible to do so. When not possible to maintain a 10 feet horizontal separation, maintain a minimum separation of 3 feet and utilize one of the following within 10 feet measured edge to edge:
  - The top of a sewer main is at least 18 inches below the bottom of the water main, and
  - The sewer is placed in a separate trench or in the same trench on a bench of undisturbed earth at a minimum horizontal separation of 3 feet from the water main.

When it is impossible to obtain the required horizontal clearance of 3 feet and a vertical clearance of 18 inches between sewers and water mains, the sewers must be constructed of water main materials meeting the requirements of SUDAS Specifications Section 5010, 2.01. However, provide a linear separation of at least 2 feet.

- a. Construct the water main of ductile iron pipe with gaskets impermeable to hydrocarbons.
  - b. Enclose the water main in a watertight casing pipe with evenly spaced annular gap and watertight end seals.
  - c. Construct storm sewer pipe of water main materials.
  - d. Construct storm sewers of reinforced concrete pipe with gaskets manufactured according to ASTM C 443.
- 2. Separation of Storm Sewer Force Mains from Water Mains:** Separate storm sewer force mains and water mains by a horizontal distance of at least 10 feet unless:
    - a. The force main is constructed of water main materials meeting a minimum pressure rating of 150 psi and the requirements of SUDAS Specifications Section 5010, 2.01, and
    - b. The sewer force main is laid at least 4 linear feet from the water main.
  - 3. Vertical Separation of Storm Sewers and Water Main Crossovers:** Vertical separation of storm sewers crossing under any water main should be at least 18 inches when measured from the top of the sewer to the bottom of the water main. If physical conditions prohibit the separation, the sewer may be placed not closer than 6 inches below a water main or 18 inches above a water main. Maintain the maximum feasible separation distance in all cases. The sewer and water pipes must be adequately supported and have watertight joints. Use a low permeability soil for backfill material within 10 feet of the point of crossing.

Where the storm sewer crosses over or less than 18 inches below a water main, locate one full length of sewer pipe of water main material or reinforced concrete pipe (RCP) with flexible O-ring gasket joints so both joints are as far as possible from the water main.

- a. Vertically separate storm sewers from water mains by at least 18 inches measured between the outside edges of the water main and the storm sewer. Maintain the maximum feasible separation distance in all cases. Ensure the sewer and water pipes are adequately supported. Use a low permeability soil for backfill material within 10 feet of the point of crossing.

- b. When impossible to maintain an 18 inch vertical separation when the water main crosses over the storm sewer, maintain a minimum vertical separation of 6 inches and utilize one of the following within 10 feet measured edge-to-edge centered on the crossing:
  - 1) Construct the water main of ductile iron pipe with gaskets impermeable to hydrocarbons.
  - 2) Enclose the water main in a watertight casing pipe with evenly spaced annular gap and watertight end seals.
  - 3) Construct storm sewer pipe of water main materials.
  - 4) Construct storm sewers of reinforced concrete pipe with gaskets manufactured according to ASTM C 443.

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From Design Section 3C-1 [(Sanitary Sewer) Facility Design]

## G. Crossings and Clearances

### 2. Protection of Water Supplies: (from Iowa DNR's Iowa Wastewater Facilities Design Standards, Chapter 12, Section 12.5.8)

- a. **Wells:** Do not lay sewers constructed of standard sewer materials within 75 feet of a public well or 50 feet of a private well. Sewers constructed of water main materials may be laid within 75 feet of a public well and within 50 feet of a private well but no closer than 25 feet to either.
- b. **Horizontal Separation of Gravity Sanitary and Combined Sewers from Water Mains:** Gravity sewer mains shall be separated from water mains by a horizontal distance of at least 10 feet unless Separate sanitary and combined sewers and water mains by at least 10 feet measured edge to edge unless it is impossible to do so. When not possible to maintain a 10 feet horizontal separation, maintain a minimum separation of 3 feet and utilize one of the following within 10 feet measured edge to edge:
  - 1) the top of a sewer main is at least 18 inches below the bottom of the water main, and
  - 2) the sewer is placed in a separate trench or in the same trench on a bench of undisturbed earth at a minimum horizontal separation of 3 feet from the water main.

When it is impossible to obtain the required horizontal clearance of 3 feet and a vertical clearance of 18 inches between sewers and water mains, construct the sewers of water main materials meeting both a minimum pressure rating of 150 psi and the requirements of Sections 8.2 and 8.4 of the "Iowa Standards for Water Supply Distribution Systems" (SUDAS Specifications Section 5010, 2.01) or enclose the water main in a watertight casing pipe with an evenly spaced annular gap and watertight end seals. . However, provide a linear separation of at least 2 feet.

### c. Horizontal Separation of Water Mains from Sanitary and Combined Sewer Manholes:

Ensure water pipes do not pass through or come in contact with any part of a sanitary or combined sewer manhole. Maintain a minimum horizontal separation of 3 feet.

- d. **Separation of Sanitary Sewer Force Mains from Water Mains:** Separate sanitary sewer force mains and water mains by a horizontal distance of at least 10 feet unless:
  - 1) the force main is constructed of water main materials meeting a minimum pressure rating of 150 psi and the requirements of Section 8.2 and 8.4 of the "Iowa Standards for Water Supply Distribution Systems" (SUDAS Specifications Section 5010, 2.01) and
  - 2) the sewer force main is laid at least 4 linear feet from the water main.
- e. **Separation of Sanitary Sewers and Water Main Crossovers:** Vertically separate sanitary sewers crossing under any water main by at least 18 inches when measured from the top of the sewer to the bottom of the water main. If physical conditions prohibit the separation, do not place the sewer closer than 6 inches below a water main or 18 inches above a water main. Maintain the maximum feasible separation distance in all cases.

When the sanitary sewer crosses over or is less than 18 inches below a water main utilize one of the following within 10 feet measured edge-to-edge horizontally, centered on the crossing: locate

one full length of sewer pipe of water main material so both joints are as far as possible from the water main. Ensure the sewer and water pipes are adequately supported and have watertight joints. Use a low permeability soil for backfill material within 10 feet of the point of crossing.

- 1) Construct sanitary sewer pipe of water main material.
- 2) Enclose the water main in a watertight casing pipe with an evenly spaced annular gap and watertight end seals.

- f. **Exceptions:** Should physical conditions exist such that exceptions to b through e above are necessary, the design engineer must detail how the sewer and water main are to be engineered to provide protection equal to that required by these sections.

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From Design Section 4C-1 [(Water Main) Facility Design]:

## G. Separation of Water Mains from Sewer Mains

The following comply with the Iowa Department of Natural Resources separation requirements.

1. **Horizontal Separation of Gravity Sanitary and Combined Sewers from Water Mains:** Separate gravity sanitary and combined sewer mains from water mains by a horizontal distance of at least 10 feet unless:
  - a. The top of a sewer main is at least 18 inches below the bottom of the water main, and
  - b. The sewer is placed in a separate trench or in the same trench on a bench of undisturbed earth at a minimum horizontal separation of 3 feet from the water main.

Maintain the maximum feasible separation distance in all cases. When it is impossible to obtain the required horizontal clearance of 3 feet and a vertical clearance of 18 inches between sewers and water mains, provide a linear separation of at least 2 feet and one of the following:

- a. Construct sanitary and combined sewers must be constructed of water main materials meeting the requirements of SUDAS Specifications Section 5010, 2.01. However, provide a linear separation of at least 2 feet.
  - b. Enclose the water main in a watertight casing pipe with an evenly spaced annular gap and watertight end seals.
2. **Horizontal Separation of Water Mains from Sanitary and Combined Sewer Manholes:** Ensure water pipes do not pass through or come in contact with any part of a sanitary or combined sewer manhole. Maintain a minimum horizontal separation of 3 feet.
  3. **Separation of Sanitary Sewer Force Mains from Water Mains:** Separate sanitary sewer force mains and water mains by a horizontal distance of at least 10 feet unless:
    - a. The force main is constructed of water main materials meeting a minimum pressure rating of 150 psi and the requirements of SUDAS Specifications Section 5010, 2.01, and
    - b. The sewer force main is laid at least 4 linear feet from the water main.
  4. **Separation of Sanitary and Combined Sewers and Water Main Crossovers:** Vertically separate sanitary and storm combined sewers crossing under any water main by at least 18 inches when measured from the top of the sewer to the bottom of the water main. If physical conditions prohibit the separation, do not place the sewer closer than 6 inches below a water main or 18 inches above a water main. Maintain the maximum feasible separation distance in all cases. Ensure the sewer and water pipes are adequately supported and have watertight joints. Use a low permeability soil for backfill material within 10 feet of the point of crossing.

Where the sanitary sewer crosses over or less than 18 inches below a water main, utilize one of the following within 10 feet measured edge-to-edge horizontally, centered on the crossing:

- a. locate one full length of Construct sewer pipe of water main material so both joints are as far as possible from the water main.
- b. Enclose the water main in a watertight casing pipe with an evenly spaced annular gap and watertight end seals.

Where the storm sewer crosses over or less than 18 inches below a water main, locate one full length of sewer pipe of water main material or reinforced concrete pipe (RCP) with flexible O-ring gasket joints so both joints are as far as possible from the water main.

- 5. Horizontal Separation of Storm Sewers from Water Mains:** Separate storm sewers and water mains by at least 10 feet measured edge to edge unless it is impossible to do so. When impossible to maintain a 10 feet horizontal separation, maintain a minimum separation of 3 feet and utilize one of the following within 10 feet measured edge-to-edge:
- Construct the water main of ductile iron pipe with gaskets impermeable to hydrocarbons.
  - Enclose the water main in a watertight casing pipe with evenly spaced annular gap and watertight end seals.
  - Construct storm sewer pipe of water main materials.
  - Construct storm sewers of reinforced concrete pipe with gaskets manufactured according to ASTM C 443.

- 6. Vertical Separation of Storm Sewers and Water Main Crossovers:** Vertically separate storm sewers from water mains by 18 inches measured between the outside edges of the water main and the storm sewer. Maintain the maximum feasible separation distance in all cases. Ensure the sewer and water pipes are adequately supported. Use a low permeability soil for backfill material within 10 feet of the point of crossing.

When impossible to maintain an 18 inch vertical separation when the water main crosses over the storm sewer, maintain a minimum vertical separation of 6 inches and utilize one of the following within 10 feet measured edge-to-edge centered on the crossing:

- Construct the water main of ductile iron pipe with gaskets impermeable to hydrocarbons.
- Enclose the water main in a watertight casing pipe with evenly spaced annular gap and watertight end seals.
- Construct storm sewer pipe of water main materials.
- Construct storm sewers of reinforced concrete pipe with gaskets manufactured according to ASTM C 443.

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From Section 4010 (Sanitary Sewers), 3.12 (Conflicts):

- A. Horizontal Separation of Gravity Sanitary and Combined Sewers from Water Mains:** Separate gravity sanitary and combined sewer mains from water mains by a horizontal distance of at least 10 feet unless:

- The top of a sewer main is at least 18 inches below the bottom of the water main, and
- The sewer is placed in a separate trench or in the same trench on a bench of undisturbed earth at a minimum horizontal separation of 3 feet from the water main.
- When it is impossible to obtain the required horizontal clearance of 3 feet and a vertical clearance of 18 inches between sewers and water mains, provide a linear separation of at least 2 feet and one of the following:
  - ~~The~~ Construct sanitary and combined sewers ~~must be constructed~~ of water main materials meeting the requirements of Section 5010, 2.01. ~~However, provide a linear separation of at least 2 feet.~~
  - Enclose the water main in a watertight casing pipe with an evenly spaced annular gap and watertight end seals.

- B. Horizontal Separation of Water Mains from Sanitary and Combined Sewer Manholes:** Ensure water pipes do not pass through or come in contact with any part of a sanitary or combined sewer manhole. Maintain a minimum horizontal separation of 3 feet.

**C. Separation of Sanitary Sewer Force Mains from Water Mains:** Separate sanitary sewer force mains and water mains by a horizontal distance of at least 10 feet unless:

1. The force main is constructed of water main materials meeting a minimum pressure rating of 150 psi and the requirements of Section 5010, 2.01 and
2. The sewer force main is laid at least 4 linear feet from the water main.

**D. Separation of Sanitary and Combined Sewers and Water Main Crossovers:**

1. Vertically separate sanitary sewers crossing under any water main ~~should be~~ by at least 18 inches when measured from the top of the sewer to the bottom of the water main. If physical conditions prohibit the separation, do not place the sewer closer than 6 inches below a water main or 18 inches above a water main. Maintain the maximum feasible separation distance in all cases.
2. Where the sanitary sewer crosses over or is less than 18 inches below a water main, ~~locate one full length of~~ utilize one of the following within 10 feet measured edge-to-edge horizontally, centered on the crossing:
  - a. Construct sewer pipe of water main material ~~so both joints are as far as possible from the water main. The sewer and water pipes must be adequately supported and have watertight joints. Use a low permeability soil for backfill material within 10 feet of the point of crossing.~~
  - b. Enclose the water main in a watertight casing pipe with an evenly spaced annular gap and watertight end seals.

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From Section 4020 (Storm Sewers), 3.08 (Conflicts):

**A. Horizontal Separation of Gravity Storm Sewers from Water Mains:** Separate storm sewers and water mains by at least 10 feet measured edge to edge unless it is impossible to do so. When not possible to maintain a 10 feet horizontal separation, maintain a minimum separation of 3 feet and utilize one of the following within 10 feet measured edge to edge:

- ~~1. Separate gravity storm sewer mains from water mains by a horizontal distance of at least 10 feet unless:
  - The top of a sewer main is at least 18 inches below the bottom of the water main, and
  - The sewer is placed in a separate trench or in the same trench on a bench of undisturbed earth at a minimum horizontal separation of 3 feet from the water main.~~
- ~~2. When it is impossible to obtain the required horizontal clearance of 3 feet and a vertical clearance of 18 inches between sewers and water mains, the sewers must be constructed of water main materials meeting the requirements of Section 5010, 2.01. However, provide a linear separation of at least 2 feet.~~
  1. Construct the water main of ductile iron pipe with gaskets impermeable to hydrocarbons.
  2. Enclose the water main in a watertight casing pipe with evenly spaced annular gap and watertight end seals.
  3. Construct storm sewer pipe of water main materials.
  4. Construct storm sewers of reinforced concrete pipe with gaskets manufactured according to ASTM C 443.

**B. Separation of Storm Sewer Force Mains from Water Mains:** Separate storm sewer force mains and water mains by a horizontal distance of at least 10 feet unless:

1. The force main is constructed of water main materials meeting a minimum pressure rating of 150 psi and the requirements of Section 5010, 2.01 and
2. The sewer force main is laid at least 4 linear feet from the water main.

### C. Vertical Separation of Storm Sewers and Water Main Crossovers:

1. ~~Vertical separation of storm sewers crossing under any water main should be at least 18 inches when measured from the top of the sewer to the bottom of the water main. If physical conditions prohibit the separation, the sewer may be placed not closer than 6 inches below a water main or 18 inches above a water main. Maintain the maximum feasible separation distance in all cases. The sewer and water pipes must be adequately supported and have watertight joints. Use a low permeability soil for backfill material within 10 feet of the point of crossing.~~
  2. ~~Where the storm sewer crosses over or less than 18 inches below a water main, locate one full length of sewer pipe of water main material or reinforced concrete pipe (RCP) with flexible gasket joints meeting ASTM C 443 so both joints are as far as possible from the water main.~~
1. Vertically separate storm sewers from water mains by at least 18 inches measured between the outside edges of the water main and the storm sewer. Maintain the maximum feasible separation distance in all cases. Ensure the sewer and water pipes are adequately supported. Use a low permeability soil for backfill material within 10 feet of the point of crossing.
  2. When impossible to maintain an 18 inch vertical separation when the water main crosses over the storm sewer, maintain a minimum vertical separation of 6 inches and utilize one of the following within 10 feet measured edge-to-edge centered on the crossing:
    - a. Construct the water main of ductile iron pipe with gaskets impermeable to hydrocarbons.
    - b. Enclose the water main in a watertight casing pipe with evenly spaced annular gap and watertight end seals.
    - c. Construct storm sewer pipe of water main materials.
    - d. Construct storm sewers of reinforced concrete pipe with gaskets manufactured according to ASTM C 443.

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From Section 5010 [(Water Main) Pipe and Fittings], 3.06 (Conflicts):

### A. Horizontal Separation of Gravity Sewers from Water Mains:

#### 1. Sanitary and Combined Sewers:

- 1a. Separate gravity sanitary and combined sewer mains from water mains by a horizontal distance of at least 10 feet unless:
  - 1) The top of a sewer main is at least 18 inches below the bottom of the water main, and
  - 2) The sewer is placed in a separate trench or in the same trench on a bench of undisturbed earth at a minimum horizontal separation of 3 feet from the water main.
- 2b. Maintain the maximum feasible separation distance in all cases. When it is impossible to obtain the required horizontal clearance of 3 feet and a vertical clearance of 18 inches between sewers and water mains, provide a linear separation of at least 2 feet and one of the following:
  - 1) Construct sanitary and combined sewers must be constructed of water main materials meeting the requirements of Section 5010, 2.01. However, provide a linear separation of at least 2 feet.
  - 2) Enclose the water main in a watertight casing pipe with an evenly spaced annular gap and watertight end seals.

#### 2. Storm Sewers: Separate storm sewers and water mains by at least 10 feet measured edge-to-edge unless it is impossible to do so. When impossible to maintain a 10 feet horizontal separation, maintain a minimum separation of 3 feet and utilize one of the following within 10 feet measured edge-to-edge:

- a. Construct the water main of ductile iron pipe with gaskets impermeable to hydrocarbons.
- b. Enclose the water main in a watertight casing pipe with evenly spaced annular gap and watertight end seals.
- c. Construct storm sewer pipe of water main materials.

- d. Construct storm sewers of reinforced concrete pipe with gaskets manufactured according to ASTM C 443.

**B. Horizontal Separation of Water Mains from Sanitary and Combined Sewer Manholes:** Ensure water pipes do not pass through or come in contact with any part of a sanitary or combined sewer manhole. Maintain a minimum horizontal separation of 3 feet.

**C. Horizontal Separation of Sewer Force Mains from Water Mains:** Separate sewer force mains and water mains by a horizontal distance of at least 10 feet unless:

1. The force main is constructed of water main materials meeting a minimum pressure rating of 150 psi and the requirements of Section 5010, 2.01 and
2. The sewer force main is laid at least 4 linear feet from the water main.

**D. Vertical Separation of Sewers and Water Main Crossovers:**

**1. Sanitary and Combined Sewers:**

- 1a. Vertically separate sanitary and ~~storm~~ combined sewers crossing under water mains by at least 18 inches when measured from the top of the sewer to the bottom of the water main. If physical conditions prohibit the separation, do not place the sewer closer than 6 inches below a water main or 18 inches above a water main. Maintain the maximum feasible separation distance in all cases. Ensure the sewer and water pipes are adequately supported and have watertight joints. Use a low permeability soil for backfill material within 10 feet of the point of crossing.
- 2b. Where the sanitary sewer crosses over or less than 18 inches below a water main, utilize one of the following within 10 feet measured edge-to-edge horizontally, centered on the crossing:
  - 1) ~~locate one full length of sewer pipe~~ Construct sanitary and combined sewers of water main material so both joints are as far as possible from the water main meeting the requirements of Section 5010, 2.01.
  - 2) Enclose the water main in a watertight casing pipe with an evenly spaced annular gap and watertight end seals.
3. ~~Where the storm sewer crosses over or less than 18 inches below a water main, locate one full length of sewer pipe of water main material or reinforced concrete pipe (RCP) with flexible gasket joints meeting ASTM C 443 so both joints are as far as possible from the water main.~~

**2. Storm Sewers:**

- a. Vertically separate storm sewers from water mains by at least 18 inches measured between the outside edges of the water main and the storm sewer. Maintain the maximum feasible separation distance in all cases. Ensure the sewer and water pipes are adequately supported. Use a low permeability soil for backfill material within 10 feet of the point of crossing.
- b. When impossible to maintain an 18 inch vertical separation when the water main crosses over the storm sewer, maintain a minimum vertical separation of 6 inches and utilize one of the following within 10 feet measured edge-to-edge centered on the crossing:
  - 1) Construct the water main of ductile iron pipe with gaskets impermeable to hydrocarbons.
  - 2) Enclose the water main in a watertight casing pipe with evenly spaced annular gap and watertight end seals.
  - 3) Construct storm sewer pipe of water main materials.
  - 4) Construct storm sewers of reinforced concrete pipe with gaskets manufactured according to ASTM C 443.

**Reason for Revision:** Updating to comply with Iowa DNR's recent changes.

**Comments:** None.

