

Appendix A

Summary Data Tables

Appendix A – Summary Data Tables

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General Tables

Surface Water Dischargers

Table A-1 provides the wastewater systems that discharge to surface waters and includes the NPDES permit ID, watershed, and permit effective dates.

Table A-1. Surface Water Dischargers

| Wastewater System | Permit ID | Watershed | Permit Issuance Date | Permit Expiration Date |
|--|------------------------|---|----------------------|------------------------|
| New Castle County | | | | |
| New Castle County - Delaware City WWTP | DE0021555 | 11. Delaware Bay (C&D Canal East) | 12/2/08 | 12/31/13 |
| New Castle County - Port Penn STP | DE0021539 | 11. Delaware Bay (C&D Canal East) | 12/2/08 | 12/31/13 |
| New Castle County - Water Farm #1 aka MOT Regional WWTP ¹ | DE0050547 | 12. Delaware Bay (Appoquinimink River) | 7/1/06 | 6/30/11 |
| Wilmington WWTP | DE0020320 | 02. Piedmont (Shellpot Creek) | 7/1/00 | 6/30/05 |
| Kent County | | | | |
| City of Harrington WWTP | DE0020036 ² | 19. Delaware Bay (Murderkill River) | 1/1/07 | 12/31/11 |
| Kent County Regional WWTP | DE0020338 ³ | 19. Delaware Bay (Murderkill River) | 11/1/06 | 10/31/11 |
| Sussex County | | | | |
| City of Lewes STP | DE0021512 | 22. Delaware Bay (Broadkill River) | 9/1/04 | 8/31/09 |
| City of Rehoboth Beach STP | DE0020028 | 39. Inland Bays/Atlantic Ocean (Rehoboth Bay) | 10/1/05 | 9/30/10 |
| City of Seaford WWTP | DE0020265 | 31. Chesapeake (Nanticoke River) | 6/1/08 | 5/31/13 |
| Delmar WWTP ⁴ | MD0020532 | 36. Chesapeake (Wicomico) | 7/1/07 | 6/30/12 |
| Sussex County - South Coastal Regional WWTF | DE0050008 | 45. Inland Bays/Atlantic Ocean (Little Assawoman) | 1/1/05 | 12/31/09 |
| Town of Bridgeville WWTF ¹ | DE0020249 | 31. Chesapeake (Nanticoke River) | 2/1/09 | 1/31/12 |
| Town of Laurel STP | DE0020125 | 35. Chesapeake (Broad Creek) | 6/1/09 | 5/31/14 |
| Town of Millsboro WWTF | DE0050164 | 40. Inland Bays/Atlantic Ocean (Indian River) | 6/1/00 | 5/31/05 |
| Town of Selbyville WWTF | DE0020010 | 45. Inland Bays/Atlantic Ocean (Little Assawoman) | 1/1/10 | 12/31/15 |
| Private | | | | |
| Tidewater - Milton Regional | DE0021491 | 22. Delaware Bay (Broadkill River) | 1/1/05 | 12/31/09 |

¹ MOT WWTP and the Town of Bridgeville WWTF have both surface water and groundwater discharge permits.

² The City of Harrington NPDES permit DE0020036 will not be reissued as Harrington has tied into the force main for Kent County and therefore will not need their NPDES permit.

³ This permit has been administratively extended. DNREC is currently working on the reissuance of the permit.

⁴ The Delmar treatment plant is located in Maryland but includes contributions from Delaware. Since the plant discharges to the Chesapeake Bay watershed, the TMDL-mandated wasteload allocations for nutrients and sediment will apply.

Groundwater Dischargers

Table A-2 provides the wastewater systems that have groundwater discharge permits and includes the permit ID, watershed, and permit effective dates.

Table A-2. Groundwater Dischargers

| Wastewater System | Permit ID | Watershed | Permit Issuance Date | Permit Expiration Date |
|--|-----------------|--|----------------------|------------------------|
| <i>New Castle County</i> | | | | |
| New Castle County - Lea Eara Farms WWTP | LTS 3035-92-08 | 11. Delaware Bay (C&D Canal East) | 6/24/08 | 6/23/10 |
| New Castle County - Water Farm #1 aka MOT Regional WWTP ⁵ | LTS 3005-93-06 | 12. Delaware Bay (Appoquinimink River) | 7/28/06 | 7/27/11 |
| Town of Middletown - Frog Hollow WWTF | LTS 3015-99-10 | 12. Delaware Bay (Appoquinimink River) | 8/5/10 | 8/4/15 |
| Town of Middletown - Middletown WWTP | LTS 3020-02-07 | 12. Delaware Bay (Appoquinimink River) & 27. Chesapeake (Sassafras River) ⁶ | 8/2/07 | 8/1/12 |
| <i>Sussex County</i> | | | | |
| Sussex County - Inland Bays Regional WWTF | LTS 5004-90-06A | 39. Inland Bays/Atlantic Ocean (Rehoboth Bay) | 9/5/06 | 9/4/11 |
| Sussex County - Piney Neck Regional WWTF | LTS-5003096-08 | 42. Inland Bays/Atlantic Ocean (Indian River Bay) | 7/22/08 | 7/21/13 |
| Sussex County - Wolfe Neck WWTF | LTS 5005-95-05 | 38. Inland Bays/Atlantic Ocean (Lewes-Rehoboth Canal) | 10/14/05 | 10/18/10 |
| Town of Bridgeville WWTF ⁵ | LTS 5006-07-09 | 32. Chesapeake (Gum Branch) | 2/13/09 | 2/12/14 |
| Town of Georgetown WRF | LTS-50 14-91-09 | 40. Inland Bays/Atlantic Ocean (Indian River) | 2/5/09 | 2/4/14 |
| <i>Private</i> | | | | |
| Artesian - Beaver Creek | 202902-OP | 22. Delaware Bay (Broadkill River) | 1/18/07 | 1/18/17 |
| Artesian - Heron Bay | 199889-OPB | 39. Inland Bays/Atlantic Ocean (Rehoboth Bay) | 4/30/07 | 4/30/17 |
| Artesian - Reserves at Lewes Landing | 207815-OPB | 22. Delaware Bay (Broadkill River) | 2/21/06 | 2/21/16 |
| Artesian - Stonewater Creek | 202221-OP-C | 39. Inland Bays/Atlantic Ocean (Rehoboth Bay) | 10/3/05 | 10/3/15 |

⁵ MOT WWTP and the Town of Bridgeville WWTF have both surface water and groundwater discharge permits.

⁶ This facility has discharge points in two watersheds.

| Wastewater System | Permit ID | Watershed | Permit Issuance Date | Permit Expiration Date |
|--|------------------|---|-----------------------------|-------------------------------|
| Artesian - Villages at Herring Creek | LTS 5009-04-09 | 39. Inland Bays/Atlantic Ocean (Rehoboth Bay) | 10/2/09 | 3/1/12 |
| Tidewater - Bay Front Regional | 204435-OPC | 39. Inland Bays/Atlantic Ocean (Rehoboth Bay) | 8/27/07 | 8/27/17 |
| Tidewater - Breeder's Crown | 188061-OPB | 19. Delaware Bay (Murderkill River) | 3/17/07 | 3/17/17 |
| Tidewater - Country Grove | 204220-OPB | 35. Chesapeake (Broad Creek) | 11/5/07 | 11/5/17 |
| Tidewater - Hart's Landing | 205963-OP | 39. Inland Bays/Atlantic Ocean (Rehoboth Bay) | 5/29/07 | 5/29/17 |
| Tidewater - Retreat | 197427-OPC | 39. Inland Bays/Atlantic Ocean (Rehoboth Bay) | 11/15/05 | 11/15/15 |
| Tidewater - The Ridings *In Process of Acquiring* | 208353-OP | 39. Inland Bays/Atlantic Ocean (Rehoboth Bay) | 3/18/09 | 3/18/14 |
| Tidewater - Trussum *Proposed* | N/A. | - | N/A. | N/A. |
| Tidewater - Wandendale *Proposed* | N/A. | - | N/A. | N/A. |

Collection Systems and Planning Areas

Table A-3 provides the wastewater systems have collection systems that collect waste and utilize other treatment plants for treatment. In addition, the proposed ANSWRF planning area was included in this list.

Table A-3. Collection Systems and Planning Areas

| Wastewater System |
|---|
| <i>New Castle County</i> |
| New Castle County - Water Farm #2 treated by Middletown WWTP - CS |
| City of Newark Sewer Authority treated by Wilmington WWTP - CS |
| New Castle County - North of the C&D treated by Wilmington WWTP - CS |
| <i>Kent County</i> |
| Camden-Wyoming Sewer and Water Authority treated by Kent County WWTP - CS |
| Dover Sewer Authority treated by Kent County WWTP - CS |
| Milford Sewer Authority treated by Kent County WWTP - CS |
| Town of Clayton treated by Kent County WWTP - CS |
| Town of Smyrna treated by Kent County WWTP - CS |
| <i>Sussex County</i> |
| Town of Greenwood treated by Bridgeville WWTF - CS |
| Sussex County Collection Systems - CS |
| <i>Private</i> |
| Artesian - ANSWRF *Proposed Planning Area* ⁷ |

⁷ Planning Area only.

Wastewater System Responsibilities and Ownership

Table A-4 presents wastewater collection, transmission, and treatment responsibilities as well as ownership (municipal, municipal authority, private investor owned, private non-investor owned).

Table A-4. Wastewater System Responsibilities and Ownership

| Wastewater System | Responsibilities | | Ownership | | | |
|---|------------------|-----------|-----------|-----------|------------------|----------------------|
| | Collection | Treatment | Municipal | Authority | Private Investor | Private Non-Investor |
| New Castle County | | | | | | |
| New Castle County - Delaware City WWTP | ✓ | ✓ | ✓ | - | - | - |
| New Castle County - Lea Eara Farms WWTP | ✓ | ✓ | ✓ | - | - | - |
| New Castle County - Port Penn STP | ✓ | ✓ | ✓ | - | - | - |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | ✓ | ✓ | ✓ | - | - | - |
| Town of Middletown - Frog Hollow WWTF | ✓ | ✓ | ✓ | - | - | - |
| Town of Middletown - Middletown WWTP | ✓ | ✓ | ✓ | - | - | - |
| New Castle County - Water Farm #2 treated by Middletown WWTP - CS | ✓ | - | ✓ | - | - | - |
| Wilmington WWTP | ✓ | ✓ | ✓ | - | - | - |
| New Castle County - North of the C&D treated by Wilmington WWTP - CS | ✓ | - | ✓ | - | - | - |
| City of Newark Sewer Authority treated by Wilmington WWTP - CS | ✓ | - | ✓ | - | - | - |
| Kent County | | | | | | |
| City of Harrington WWTP | ✓ | ✓ | ✓ | - | - | - |
| Kent County Regional WWTP | ✓ | ✓ | ✓ | - | - | - |
| Camden-Wyoming Sewer and Water Authority treated by Kent County WWTP - CS | ✓ | - | - | ✓ | - | - |
| Dover Sewer Authority treated by Kent County WWTP - CS | ✓ | - | ✓ | - | - | - |
| Milford Sewer Authority treated by Kent County WWTP - CS | ✓ | - | ✓ | - | - | - |
| Town of Clayton treated by Kent County WWTP - CS | ✓ | - | ✓ | - | - | - |
| Town of Smyrna treated by Kent County WWTP - CS | ✓ | - | ✓ | - | - | - |
| Sussex County | | | | | | |
| City of Lewes STP | ✓ | ✓ | - | ✓ | - | - |
| City of Rehoboth Beach STP | ✓ | ✓ | ✓ | - | - | - |
| City of Seaford WWTP | ✓ | ✓ | ✓ | - | - | - |
| Delmar WWTP | ✓ | ✓ | ✓ | - | - | - |
| Sussex County - Inland Bays Regional WWTF | ✓ | ✓ | ✓ | - | - | - |
| Sussex County - Piney Neck Regional WWTF | ✓ | ✓ | ✓ | - | - | - |
| Sussex County - South Coastal Regional WWTF | ✓ | ✓ | ✓ | - | - | - |
| Sussex County - Wolfe Neck WWTF | ✓ | ✓ | ✓ | - | - | - |
| Town of Georgetown WRF | ✓ | ✓ | ✓ | - | - | - |
| Town of Bridgeville WWTF | ✓ | ✓ | ✓ | - | - | - |

| Wastewater System | Responsibilities | | Ownership | | | |
|--|------------------|-----------|-----------|-----------|------------------|----------------------|
| | Collection | Treatment | Municipal | Authority | Private Investor | Private Non-Investor |
| Town of Greenwood treated by Bridgeville WWTF - CS | ✓ | - | ✓ | - | - | - |
| Town of Laurel STP | ✓ | ✓ | ✓ | - | - | - |
| Town of Millsboro WWTF | ✓ | ✓ | ✓ | - | - | - |
| Town of Selbyville WWTF | ✓ | ✓ | ✓ | - | - | - |
| Sussex County Collection Systems - CS | ✓ | - | ✓ | - | - | - |
| Private | | | | | | |
| Artesian - Beaver Creek | ✓ | ✓ | - | - | ✓ | - |
| Artesian - Heron Bay | ✓ | ✓ | - | - | ✓ | - |
| Artesian - Reserves at Lewes Landing | ✓ | ✓ | - | - | ✓ | - |
| Artesian - Stonewater Creek | ✓ | ✓ | - | - | ✓ | - |
| Artesian - Villages at Herring Creek | ✓ | ✓ | - | - | ✓ | - |
| Tidewater - Bay Front Regional | ✓ | ✓ | - | - | ✓ | - |
| Tidewater - Breeder's Crown | ✓ | ✓ | - | - | ✓ | - |
| Tidewater - Country Grove | ✓ | ✓ | - | - | ✓ | - |
| Tidewater - Hart's Landing | ✓ | ✓ | - | - | ✓ | - |
| Tidewater - Milton Regional | ✓ | ✓ | - | - | ✓ | - |
| Tidewater - Retreat | ✓ | ✓ | - | - | ✓ | - |
| Tidewater - The Ridings *In Process of Acquiring* | ✓ | ✓ | - | - | ✓ | - |
| Tidewater - Trussum *Proposed* | ✓ | ✓ | - | - | ✓ | - |
| Tidewater - Wandendale *Proposed* | ✓ | ✓ | - | - | ✓ | - |
| New Castle County Total | 10 | 7 | 10 | 0 | 0 | 0 |
| Kent County Total | 7 | 2 | 6 | 1 | 0 | 0 |
| Sussex County Total | 15 | 13 | 14 | 1 | 0 | 0 |
| Private Total | 14 | 14 | 0 | 0 | 14 | 0 |
| State | 46 | 36 | 30 | 2 | 14 | 0 |

Treatment Plant and Collection System Level Tables

General Level of Treatment

Table A-5 presents a description of the treatment level provided by each system (Primary, Secondary, Tertiary and Nutrient Removal).

Table A-5. General Level of Treatment

| Wastewater System | Primary Treatment | Secondary Treatment | Tertiary Treatment | Nitrogen Removal | Phosphorus Removal | Other |
|---|-------------------|---------------------|--------------------|------------------|--------------------|--|
| New Castle County | | | | | | |
| New Castle County - Delaware City WWTP | - | ✓ | ✓ | - | - | |
| New Castle County - Lea Eara Farms WWTP | - | ✓ | ✓ | - | - | Lagoon Storage for Spray |
| New Castle County - Port Penn STP | - | ✓ | - | - | - | |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | - | ✓ | ✓ | ✓ | ✓ | Solids - Aerobic Digester |
| Town of Middletown - Frog Hollow WWTF | - | ✓ | ✓ | - | - | Lagoon Storage for Spray |
| Town of Middletown - Middletown WWTP | - | ✓ | ✓ | - | - | Lagoon Storage for Spray |
| Wilmington WWTP | ✓ | ✓ | - | - | - | Solids Handling |
| Kent County | | | | | | |
| City of Harrington WWTP | ✓ | ✓ | - | - | - | |
| Kent County Regional WWTP | ✓ | ✓ | ✓ | ✓ | ✓ | Downflow filtration, Ferric Injection before filtration and adding carbon sources to remove phosphate, sludge handling |
| Sussex County | | | | | | |
| City of Lewes STP | - | ✓ | ✓ | ✓ | ✓ | |
| City of Rehoboth Beach STP | ✓ | ✓ | ✓ | ✓ | ✓ | Solids Handling |
| City of Seaford WWTP | ✓ | ✓ | ✓ | ✓ | ✓ | Solids Handling |
| Delmar WWTP | - | ✓ | ✓ | - | - | Solids Handling |
| Sussex County - Inland Bays Regional WWTF | - | ✓ | ✓ | ✓ | - | Storage Lagoons for Spray |
| Sussex County - Piney Neck Regional WWTF | - | ✓ | - | - | - | Storage Lagoons for Spray |
| Sussex County - South Coastal Regional WWTF | - | ✓ | ✓ | - | - | |
| Sussex County - Wolfe Neck WWTF | - | ✓ | - | - | - | Storage Lagoons for Spray |

| Wastewater System | Primary Treatment | Secondary Treatment | Tertiary Treatment | Nitrogen Removal | Phosphorus Removal | Other |
|---|--------------------------|----------------------------|---------------------------|-------------------------|---------------------------|--|
| Town of Georgetown WRF | - | ✓ | - | ✓ | ✓ | Some Solids, Storage lagoons for spray |
| Town of Bridgeville WWTF | - | ✓ | ✓ | - | - | Solids Handling |
| Town of Laurel STP | - | ✓ | ✓ | ✓ | ✓ | |
| Town of Millsboro WWTF | - | ✓ | ✓ | ✓ | - | Ultra Filtration, Solids Handling |
| Town of Selbyville WWTF | - | ✓ | ✓ | - | - | |
| Private | | | | | | |
| Artesian - Beaver Creek | - | ✓ | - | ✓ | - | |
| Artesian - Heron Bay | - | ✓ | - | ✓ | - | |
| Artesian - Reserves at Lewes Landing | - | ✓ | - | ✓ | - | |
| Artesian - Stonewater Creek | - | ✓ | - | ✓ | - | |
| Artesian - Villages at Herring Creek | - | ✓ | - | - | - | Storage Lagoon for Spray |
| Tidewater - Bay Front Regional | - | ✓ | ✓ | ✓ | - | |
| Tidewater - Breeder's Crown | - | ✓ | - | - | - | |
| Tidewater - Country Grove | - | ✓ | - | ✓ | - | |
| Tidewater - Hart's Landing | - | ✓ | ✓ | ✓ | - | |
| Tidewater - Milton Regional | ✓ | ✓ | ✓ | - | - | Some solids |
| Tidewater - Retreat | - | ✓ | - | ✓ | - | |
| Tidewater - The Ridings *In Process of Acquiring* | - | ✓ | ✓ | ✓ | - | |
| Tidewater - Trussum *Proposed* | - | ✓ | - | ✓ | - | |
| Tidewater - Wandendale *Proposed* | - | ✓ | ✓ | ✓ | ✓ | |
| New Castle County Total | 1 | 7 | 5 | 1 | 1 | |
| Kent County Total | 2 | 2 | 1 | 1 | 1 | |
| Sussex County Total | 2 | 13 | 10 | 7 | 5 | |
| Private Total | 1 | 14 | 5 | 11 | 1 | |
| State Total | 6 | 36 | 21 | 20 | 8 | |

Reported Unit Processes

Table A-6 presents reported unit processes for each treatment plant corresponding to preliminary, secondary, tertiary, disinfection, sludge, and other.

Table A-6. Reported Unit Processes

| Wastewater System | Category | Unit Process | Description |
|---|---------------------|--|--|
| New Castle County | | | |
| New Castle County - Delaware City WWTP | Preliminary | Equalization | Distribution - Incl. 150,000 gal EQ tank and two flow splitters |
| | Preliminary | Screens | Static Screen - Incl. dumpster |
| | Secondary | Secondary Sedimentation | Clarifier #1 (Train #1) |
| | Secondary | Secondary Sedimentation | Clarifier #2 (Train #2) |
| | Secondary | Aeration | Extended Aeration #1 (Train #1) |
| | Secondary | Aeration | Extended Aeration #2 (Train #2) |
| | Tertiary | Sand Filter Beds | Sand Bed #1 (Train #1, Incl. backwash and clearwell) |
| | Tertiary | Sand Filter Beds | Sand Bed #2 (Train #2, Incl. backwash and clearwell) |
| | Disinfection | Chlorination | Chlorine Contact Tank #1 (Train #1) |
| | Disinfection | Chlorination | Chlorine Contact Tank #2 (Train #2) |
| Sludge | Dewatering | Storage and Drying Beds (trucked to Wilmington WWTP) | |
| New Castle County - Lea Eara Farms WWTP | Preliminary | Screens | Bar Screen (manually cleaned) |
| | Preliminary | Grinder | Comminutor |
| | Secondary | Aeration | Aerated Lagoon |
| | Secondary | Pond/Lagoon | Facultative Polishing/Storage Lagoon |
| | Disinfection | Chlorination | Chlorine Contact Chamber |
| | Other | | Spray Irrigation (13.5 acres) |
| New Castle County - Port Penn STP | Preliminary | Screens | Bar Screen #1 (Train #1) |
| | Preliminary | Screens | Bar Screen #2 (Train #2) |
| | Preliminary | Grinder | Comminutor (bypasses screens) |
| | Preliminary | Equalization | Flow Eq. #1 (Train #1) |
| | Preliminary | Equalization | Flow Eq. #2 (Train #2) |
| | Preliminary | Equalization | Wet Well/Influent Pump/Dry Well |
| | Secondary | Aeration | Aeration #1 (Train #1) |
| | Secondary | Aeration | Aeration #2 (Train #2) |
| | Secondary | Secondary Sedimentation | Clarifier #1 (Train #1) |
| | Secondary | Secondary Sedimentation | Clarifier #2 (Train #2) |
| | Disinfection | Chlorination | Chlorine Contact #1 (Train #1) |
| | Disinfection | Chlorination | Chlorine Contact #2 (Train #2) |
| Sludge | Sludge Holding Tank | Sludge Holding (trucked to Wilmington WWTP) | |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | Preliminary | Equalization | Post Equalization Basin |
| | Preliminary | Screens | Two internally fed rotating drum screens |
| | Primary | Chemical Addition | |
| | Secondary | Sequencing Batch Reactor | Two Sequencing Batch Reactors - capable of biological nutrient removal |
| | Tertiary | Cloth Filters | Two tertiary cloth filters |
| | Disinfection | UV | Dual ultra-violet disinfection units |
| | Sludge | Aerobic Digestion | |

| Wastewater System | Category | Unit Process | Description |
|--|---------------|--|--|
| | Other | | Spray Irrigation (165 acres) |
| | Other | | Effluent flow metering |
| | Other | | Influent flow metering |
| Town of Middletown - Frog Hollow WWTF | Preliminary | Screens | Bar Screen |
| | Preliminary | Grinder | Grinder |
| | Preliminary | Grit Removal | Grit Station |
| | Primary | Chemical Addition | Alum Injection and Static Mixer (for Phosphorous) - After polishing lagoon and before sand filters |
| | Secondary | Aeration | Aerated Lagoon w/ baffle |
| | Secondary | Pond/Lagoon | Polishing/Storage Lagoon #1 |
| | Tertiary | Sand Filter Beds | Two sand filters in parallel - just after alum injection, includes backwash |
| | Tertiary | Lagoons | Storage Lagoon #2 - just before Cl2 #2 and spray irrigation |
| | Disinfection | Chlorination | Chlorine Injection #1 and Contact Tank - just after sand filters |
| | Disinfection | Chlorination | Chlorine Injection #2 - after lagoon #2 and before spray irrigation |
| | Other | | Two Filter Lift Pumps - before sand filters |
| | Other | | Influent Lift Pump |
| | Other | | Influent Meter |
| Other | | Spray Irrigation (115 acres) | |
| Town of Middletown - Middletown WWTP | Preliminary | Screens | Circular screen w/ bypass channel |
| | Secondary | Aeration | Aeration lagoon w/ baffle, two-cell, partial-mix, earthen |
| | Secondary | Pond/Lagoon | Polishing/storage lagoon |
| | Tertiary | Filter | 2 AquaDisk Filters |
| | Tertiary | Lagoons | Polishing/storage lagoon - earthen with bentonite/geotextile lagoon liners, rip-rap and cover |
| | Disinfection | Chlorination | Sodium Hypochlorite |
| | Other | | Effluent flow meter |
| | Other | | Electromagnetic influent Flow meter |
| | Other | | Seven 75 horsepower floating aerators |
| | Other | | Spray Irrigation (296 acres) |
| Wilmington WWTP | Preliminary | Grit Removal | |
| | Preliminary | Screens | |
| | Primary | Primary Sedimentation | Primary clarification |
| | Secondary | Activated Sludge | Biological |
| | Secondary | Secondary Sedimentation | Secondary clarification |
| | Tertiary | Lagoons | Polishing ponds |
| | Disinfection | Chlorination | Chlorination |
| | Sludge | Anaerobic Digestion | Anaerobic digestion |
| | Sludge | Dewatering | Gravity / centrifuge |
| | Sludge | Dewatering | Gravity belt thickening / filter press |
| Sludge | Stabilization | Polymer addition - For beneficial reuse (synthetic soil, agricultural soil amendment, or composting) | |

| Wastewater System | Category | Unit Process | Description |
|----------------------------|--------------|-------------------------------|--|
| Kent County | | | |
| City of Harrington WWTP | Preliminary | Screens | Bar Screen |
| | Preliminary | Grinder | Comminutor |
| | Primary | Dissolved Air Flotation (DAF) | DAF #1 |
| | Secondary | Pond/Lagoon | Lagoon #1 |
| | Secondary | Pond/Lagoon | Lagoon #2 |
| | Tertiary | Sand Filter Beds | |
| | Disinfection | Chlorination | |
| | Disinfection | Dechlorination | |
| | Sludge | Land Spreading | From DAF - solids from lagoons transferred to KC WWTP |
| | Sludge | Aerobic Digestion | From DAF - Incl. gravity thickener and lime stabilization |
| Kent County Regional WWTP | Preliminary | Screens | |
| | Preliminary | Grit Removal | |
| | Primary | Chemical Addition | Ferric for Phosphorus removal |
| | Secondary | Aeration | Extended Aeration - two large rectangular basins |
| | Secondary | Secondary Sedimentation | Secondary Clarifier - six round clarifiers |
| | Tertiary | Sand Filter Beds | Downflow Filtration - deep bed filter |
| | Disinfection | Ultra Violet (UV) | Three UV chambers w/ four channels each |
| | Sludge | Aerobic Digestion | |
| | Sludge | Dewatering | Belt Press - polymer stabilization added |
| | Sludge | Stabilization | Lime stabilization |
| | Sludge | Dewatering | Storage, post lime stabilization |
| | Sludge | Land Spreading | Truck to end user - Kentorganite, Class A Biosolid on farms |
| Other | | Influent metering | |
| Sussex County | | | |
| City of Lewes STP | Preliminary | Equalization | Emergency storage - "Off-line", 0.3 MG |
| | Preliminary | Equalization | Flow equalization - "Off-line", 0.5 MG |
| | Preliminary | Grit Removal | |
| | Secondary | Activated Sludge | Activated sludge in oxidation ditches - see interchannel clarifier and sand filter |
| | Secondary | Aeration | Extended aeration |
| | Tertiary | Sand Filter Beds | Rapid sand filtration - part of activated sludge/clarifier/ditch system |
| | Disinfection | UV | |
| | Sludge | Land Spreading | Hauled by contractor, Class A, also have option to landfill |
| | Sludge | Membrane | K-Pad |
| | Sludge | Dewatering | Sand Beds plus vacuum press |
| | Sludge | Dewatering | Sludge Storage - "Off-line", building, post-dried |
| City of Rehoboth Beach STP | Preliminary | Equalization | Emergency off-line diversion tanks - two 100' dia. (0.94 MG) |
| | Preliminary | Grit Removal | Grit Collector w/ dewatering screw |
| | Preliminary | Screens | Mechanical Bar Screens |

| Wastewater System | Category | Unit Process | Description |
|----------------------|--------------|---|--|
| | Primary | Chemical Addition | Chem. add for phosphorus removal - Ferric Chloride (at end of treatment train) |
| | Secondary | Secondary Sedimentation | Two secondary clarifiers (7.2 max) |
| | Secondary | Filter Beds (oxidizing beds) | Two total barrier oxidation ditches |
| | Tertiary | Microscreening | Microscreening - 5.1 max (each microscreen, 2 units) |
| | Disinfection | Chlorination | Chlor tank - 2 chlor-dechlor trains |
| | Disinfection | Dechlorination | Dechlor tank - 2 chlor-dechlor trains |
| | Sludge | Aerobic Digestion | Aerobic digestion |
| | Sludge | Dewatering | Belt Press or land applied |
| | Sludge | Land Spreading | Land applied as a liquid or belt press |
| | Sludge | Land Filling | Off-site landfill |
| | Sludge | Dewatering | Thickening |
| | Other | Post-aeration | Post aeration, post disinfection |
| City of Seaford WWTP | Preliminary | Equalization | Three Equalization tanks - post primary clarifiers |
| | Preliminary | Screens | Screen |
| | Preliminary | Grit Removal | Velocity controlled grit chamber |
| | Primary | Primary Sedimentation | Two primary clarifiers |
| | Primary | Chemical Addition | Phosphorus removal |
| | Secondary | Secondary Sedimentation | Two clarifiers |
| | Secondary | Aeration | ENR-BNR - two anoxic tanks, Four oxic tanks |
| | Tertiary | Sand Filter Beds | Sand filters |
| | Disinfection | Chlorination | Two chlorine contact tank |
| | Disinfection | Dechlorination | |
| | Sludge | Dewatering | Belt press (filter) |
| | Sludge | Compost Facility | Composting w/ wood chips - Class A Biosolids, composting sold to public |
| | Sludge | Stabilization | Polymer |
| | Sludge | Sludge Holding Tank | Sludge blending tank, primary and secondary |
| | Other | | Blowers and Blower Building |
| | Other | | Primary Pump Station |
| Other | | Sludge Pump Station | |
| Delmar WWTP | Preliminary | Screens | |
| | Preliminary | Grit Removal | |
| | Preliminary | Equalization | EQ Basin and Surge Tank |
| | Primary | Chemical Addition | Alum (Phosphate) - tertiary line |
| | Primary | Chemical Addition | Methanol (Nit) - tertiary line |
| | Primary | Chemical Addition | Polymer - secondary and tertiary lines |
| | Secondary | Aeration | Two Anoxic/Oxic Basins |
| | Secondary | Secondary Sedimentation | Two Secondary Clarifiers |
| | Tertiary | Additional Sedimentation | Two clarifiers post rapid mix w/ polymer |
| | Tertiary | Denitrifying Filter Tank (methanol injection) | Denitrification w/ pre-mix chamber |
| | Disinfection | UV | Basin |
| | Sludge | Land Filling | |

| Wastewater System | Category | Unit Process | Description |
|---|--------------|-------------------------|---|
| | Sludge | Drying Beds | |
| | Sludge | Aerobic Digestion | Aerobic Digester |
| | Sludge | Dewatering | Drying beds |
| Sussex County - Inland Bays Regional WWTF | Preliminary | Screens | Bar Screens, Mechanical Screens |
| | Secondary | Secondary Sedimentation | Two Secondary Clarifiers |
| | Secondary | Aeration | Aeration Lagoon #1, in series w/ bypass |
| | Secondary | Aeration | Aeration Lagoon #2, in series w/ bypass |
| | Secondary | Aeration | Aeration Lagoon #3, in series w/ bypass |
| | Tertiary | Lagoons | Storage Lagoon, for spray storage, not true tertiary |
| | Disinfection | Chlorination | Chlorine Contact Tank |
| | Other | | Spray Irrigation (206 acres) |
| Sussex County - Piney Neck Regional WWTF | Preliminary | Screens | Mechanical Bar Screen |
| | Preliminary | Equalization | Split flow chamber |
| | Secondary | Aeration | Two aerated lagoons |
| | Tertiary | Lagoons | Storage lagoon, for spray storage, not true tertiary |
| | Disinfection | Chlorination | Chlorine Contact Chamber |
| | Other | | Spray fields - row crops, solid set spray |
| | Other | | Spray Irrigation (56 acres) |
| Sussex County - South Coastal Regional WWTF | Preliminary | Grit Removal | Grit Chamber |
| | Preliminary | Screens | Screening |
| | Preliminary | Equalization | Splitter Box |
| | Preliminary | Equalization | Surge Tank |
| | Secondary | Aeration | Three Aeration Tanks |
| | Secondary | Secondary Sedimentation | Three Secondary clarifiers |
| | Tertiary | Sand Filter Beds | Filtration type not stated |
| | Disinfection | Chlorination | Chlorine Contact Tank |
| | Sludge | Aerobic Digestion | Three Aerobic digesters |
| | Sludge | | Sludge storage lagoons |
| Sussex County - Wolfe Neck WWTF | Preliminary | Screens | Mechanical Bar Screen |
| | Secondary | Aeration | Three partially mixed aerated lagoons, in series w/ bypass to storage |
| | Secondary | Pond/Lagoon | Storage lagoon |
| | Disinfection | Chlorination | Two chlorine contact pipes |
| | Other | | Chlorine building w/ equip |
| | Other | | Irrigation pump station with 4x pumps |
| | Other | | Spray Irrigation (319 acres) |
| | Other | | Operations building |
| Town of Georgetown WRF | Preliminary | Screens | Mechanical bar screen w/ bypass |
| | Preliminary | Screens | Screw wash press |
| | Preliminary | Screens | Three static screens w/ bypass |
| | Preliminary | Equalization | Flow equalization tank |
| | Preliminary | Grit Removal | Vortex-type grit removal system |
| | Secondary | Aeration | Aeration, BioLac BNR System |
| | Secondary | Secondary Sedimentation | Internal Clarifier, BioLac BNR System |
| | Secondary | Aeration | Post-Clarifier Aeration, BioLac BNR System |
| | Tertiary | Lagoons | Storage lagoon |

| Wastewater System | Category | Unit Process | Description |
|--------------------------|--------------|---|---|
| | Tertiary | Lagoons | Storage lagoon w/ underdrains, for spray storage, not true tertiary |
| | Disinfection | Chlorination | Post-Storage |
| | Disinfection | Chlorination | Pre-Storage |
| | Sludge | Dewatering | Two sludge treatment/storage lagoons |
| | Other | | Two irrigation pump stations w/ five irrigation pumps |
| | Other | | Influent flow meter |
| | Other | | Spray Irrigation (461 acres) |
| Town of Bridgeville WWTF | Preliminary | Grit Removal | Four Grit Separators |
| | Preliminary | Equalization | EQ Basin, Flow Separator |
| | Preliminary | Screens | Static Screens |
| | Secondary | Rotating Biological Contactor | Two RBCs |
| | Secondary | Secondary Sedimentation | Two Secondary Clarifiers |
| | Tertiary | Sand Filter Beds | Three continuous backwash sand filters |
| | Disinfection | Chlorination | Chlorine Contact Chamber |
| | Disinfection | Dechlorination | Dechlorination |
| | Sludge | Anaerobic Digestion | Anaerobic Digester |
| | Sludge | Dewatering | Sludge Disposal - Gravity Thickener / Filter Press / Auger |
| | Sludge | Land Spreading | Land Application by Clean Delaware |
| | Sludge | Dewatering | Sludge Drying Beds |
| | Other | | Spray Irrigation (62.9 acres) |
| Town of Laurel STP | Preliminary | Grit Removal | Grit chamber |
| | Preliminary | Screens | Mechanical Bar Screen |
| | Primary | Chemical Addition | Alum (Phos) - tertiary line |
| | Primary | Chemical Addition | Methanol (Nit) - tertiary line |
| | Primary | Chemical Addition | |
| | Secondary | Secondary Sedimentation | Two Integrated Clarifiers – BNR System |
| | Secondary | Aeration | ENR/BNR basin/lagoon w/ pre anaerobic zone |
| | Tertiary | Denitrifying Filter Tank (methanol injection) | Denitrifying Filters |
| | Disinfection | UV | UV disinfection |
| | Sludge | Dewatering | Two sludge storage/treatment lagoons |
| | Other | | Sludge Handling Pumps |
| Town of Millsboro WWTF | Preliminary | Equalization | Flow Equalization |
| | Preliminary | Grit Removal | Grit Removal |
| | Preliminary | Screens | Communitor and Rotary Screens |
| | Primary | Chemical Addition | Phosphorus Removal |
| | Secondary | Aeration | Biological Treatment - Anoxic Basin, Anoxic Tank, Aeration Basin |
| | Tertiary | Microscreening | Membrane Filters |
| | Disinfection | UV | UV Disinfection |
| | Sludge | Aerobic Digestion | From aeration basins |
| | Sludge | Dewatering | Filter Press |
| Sludge | Land Filling | Off-site Landfill | |
| Town of Selbyville WWTF | Preliminary | Screens | Fine Screens |
| | Preliminary | Grit Removal | Grit Chamber |

| Wastewater System | Category | Unit Process | Description |
|---|--------------|-------------------------------|--|
| | Preliminary | Equalization | Splitter Box |
| | Secondary | Filter Beds (oxidizing beds) | Oxidation Ditch |
| | Secondary | Secondary Sedimentation | Secondary Clarifier |
| | Tertiary | Sand Filter Beds | Disc Filter (auto-backwash) |
| | Disinfection | Chlorination | Disinfection type not stated |
| | Sludge | Aerobic Digestion | |
| Private | | | |
| Artesian - Beaver Creek | Secondary | Sequencing Batch Reactor | RIBs disposal - Fluidyne ISAM |
| Artesian - Heron Bay | Secondary | Sequencing Batch Reactor | RIBs disposal - Fluidyne ISAM |
| Artesian - Reserves at Lewes Landing | Secondary | Activated Sludge | Biowheel w/ fixed film for denitrification. Drip Irrigation disposal |
| Artesian - Stonewater Creek | Secondary | Sequencing Batch Reactor | RIBs Disposal - Dual Aqua Aerobics |
| Artesian - Villages at Herring Creek | Secondary | Aeration | Aerated Lagoon |
| | Other | | Spray Irrigation (5.3 acres) |
| Tidewater - Bay Front Regional | Preliminary | Equalization | EQ tank (22,620 gal) |
| | Preliminary | Screens | Influent Screen |
| | Preliminary | Grit Removal | Trash Trap (4,847 gal) |
| | Secondary | Activated Sludge | Aeration Basic (13,535 gal) |
| | Secondary | Activated Sludge | Post-Anoxic Reactor (7,540 gal) |
| | Secondary | Activated Sludge | Pre-Anoxic Reactor (10,839 gal) |
| | Tertiary | Lagoons | Membrane Filtration Basin (20,106 gal, Kubota membranes) |
| | Tertiary | Lagoons | RIBs (6 for dual system (3 active, 3 spare)) |
| | Disinfection | Chlorination | Dosing Station |
| Tidewater - Breeder's Crown | Sludge | Sludge Holding Tank | Sludge Holding Tank (10,300 gal) |
| | Secondary | Membrane Biological Reactor | Parkson Georeactor-60 |
| | Secondary | Pond/Lagoon | Six RIBs |
| Tidewater - Country Grove | Secondary | Sequencing Batch Reactor | RIBs disposal - Fluidyne ISAM 30 |
| Tidewater - Hart's Landing | Secondary | Membrane Biological Reactor | Kubota Membrane provides tertiary level filtration; drip irrigation disposal |
| Tidewater - Milton Regional | Preliminary | Grit Removal | |
| | Primary | Primary Sedimentation | Clarigester |
| | Secondary | Rotating Biological Contactor | Rotating Biological Contactors |
| | Secondary | Secondary Sedimentation | Secondary clarifiers |
| | Tertiary | Sand Filter Beds | Continuous backwash sand filters |
| | Disinfection | Chlorination | |
| | Sludge | | Centrifuge |
| | Sludge | | Sludge Drying Beds |
| Tidewater - Retreat | Secondary | Sequencing Batch Reactor | Aqua Aerobics SBR - pressure dosed disposal beds |
| Tidewater - The Ridings *In Process of Acquiring* | Secondary | Sequencing Batch Reactor | Dual Aqua Aerobics |
| | Tertiary | Sand Filter Beds | Fine Screening Unit |
| | Disinfection | UV | |

Treatment Plant Back-up Power Supply

Table A-7 indicates the type(s) of back-up power supply options available to each treatment plant.

Table A-7. Treatment Plant Back-up Power Supply

| Wastewater System | On-site Generator (diesel/gasoline) | On-site Generator (natural gas/ propane from tank) | Portable Generator | None | Other |
|---|--|--|--------------------|------|---|
| New Castle County | | | | | |
| New Castle County - Delaware City WWTP | ✓ | - | - | - | |
| New Castle County - Lea Earra Farms WWTP | - | - | ✓ | - | |
| New Castle County - Port Penn STP | ✓ | - | - | - | |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | ✓ | - | - | - | |
| Town of Middletown - Frog Hollow WWTF | - | - | - | ✓ | |
| Town of Middletown - Middletown WWTP | - | - | - | ✓ | |
| Wilmington WWTP | - | - | ✓ | - | Secondary Feed |
| Kent County | | | | | |
| City of Harrington WWTP | ✓ | - | - | - | |
| Kent County Regional WWTP | ✓ | - | - | - | 1.2 MW Solar |
| Sussex County | | | | | |
| City of Lewes STP | ✓ | - | - | - | |
| City of Rehoboth Beach STP | - | - | - | ✓ | 2nd feed of normal power (same substation, different transformer) |
| City of Seaford WWTP | ✓ | - | - | - | |
| Delmar WWTP | ✓ | - | - | - | |
| Sussex County - Inland Bays Regional WWTF | ✓ | - | - | - | |
| Sussex County - Piney Neck Regional WWTF | ✓ | - | - | - | |
| Sussex County - South Coastal Regional WWTF | ✓ | - | - | - | |
| Sussex County - Wolfe Neck WWTF | - | ✓ | - | - | |
| Town of Georgetown WRF | ✓ | - | - | - | |
| Town of Bridgeville WWTF | ✓ | - | ✓ | - | |
| Town of Laurel STP | ✓ | - | - | - | |
| Town of Millsboro WWTF | ✓ | - | - | - | |
| Town of Selbyville WWTF | ✓ | - | - | - | |
| Private | | | | | |
| Artesian - Beaver Creek | ✓ | - | - | - | |
| Artesian - Heron Bay | ✓ | - | - | - | |

| Wastewater System | On-site Generator (diesel/gasoline) | On-site Generator (natural gas/ propane from tank) | Portable Generator | None | Other |
|---|--|--|--------------------|----------|-----------------------------------|
| Artesian - Reserves at Lewes Landing | ✓ | - | - | - | |
| Artesian - Stonewater Creek | ✓ | - | - | - | |
| Artesian - Villages at Herring Creek | ✓ | - | - | - | |
| Tidewater - Bay Front Regional | ✓ | - | ✓ | - | |
| Tidewater - Breeder's Crown | - | - | ✓ | - | |
| Tidewater - Country Grove | ✓ | - | ✓ | - | |
| Tidewater - Hart's Landing | ✓ | - | ✓ | - | |
| Tidewater - Milton Regional | ✓ | - | - | - | |
| Tidewater - Retreat | ✓ | - | - | - | |
| Tidewater - The Ridings *In Process of Acquiring* | ✓ | - | - | - | |
| Tidewater - Trussum *Proposed* | ✓ | - | - | - | |
| Tidewater - Wandendale *Proposed* | - | - | - | - | Multiple electric feeds available |
| New Castle County Total | 3 | 0 | 2 | 2 | 1 |
| Kent County Total | 2 | 0 | 0 | 0 | 1 |
| Sussex County Total | 11 | 1 | 1 | 1 | 1 |
| Private Total | 12 | 0 | 4 | 0 | 1 |
| State Total | 28 | 1 | 7 | 3 | 4 |

Treatment Plant Flow

Table A-8 presents flow data for each treatment plant.

Table A-8. Treatment Plant Flow Data

| Treatment Plant | Current Design Flow (MGD) | Peak Flow (MGD) | Average Daily Flow (MGD) | ADF as % of Design Flow | % of ADF from Domestic Source | 2020 Anticipated Flow (MGD) | 2030 Future Design Flow (MGD) | Exceeded Design Flow? | I/I issues? | I/I Comments |
|---|---------------------------|-----------------|--------------------------|-------------------------|-------------------------------|-----------------------------|-------------------------------|-----------------------|-------------|---|
| New Castle County | | | | | | | | | | |
| New Castle County - Delaware City WWTP | 0.57 | 1.2 | 0.33 | 57.9% | 90% | 0.38 | 0.45 | No | Yes | I/I has been identified in the Delaware City collector system. The Delaware City Sewer Rehabilitation capital improvement project has been a multi-year and multi-project program to reduce existing I/I in the collector and trunk lines in Delaware City. |
| New Castle County - Lea Earra Farms WWTP | 0.098 | 0.07 | 0.05 | 51.0% | 100% | 0.05 | 0 ⁸ | No | No | None (system is new). |
| New Castle County - Port Penn STP | 0.05 | 0.19 | 0.04 | 80.0% | 100% | 0.04 | 0.04 | No | Yes | I/I has been identified in the Port Penn collector system. Manhole frames and covers have been replaced under the Countywide Manhole rehabilitation capital improvement program. Evaluation of effectiveness to be reviewed. |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | 2.5 | 1.5 | 0.57 | 22.8% | 90% | 0.75 | 1.35 | No | No | No I/I issues. |
| Town of Middletown - Frog Hollow WWTF | 0.25 | 0.16 | 0.12 | 48.0% | 100% | 0.25 | 0.25 | No | No | None. |
| Town of Middletown - Middletown WWTP | 2.5 | 1.61 | 0.99 | 39.6% | 85% | 3 | 4 | No | No | Minimal, N/A. November report provided to DNREC. |

⁸ This facility is planned to be closed by this date.

| Treatment Plant | Current Design Flow (MGD) | Peak Flow (MGD) | Average Daily Flow (MGD) | ADF as % of Design Flow | % of ADF from Domestic Source | 2020 Anticipated Flow (MGD) | 2030 Future Design Flow (MGD) | Exceeded Design Flow? | I/I issues? | I/I Comments |
|----------------------------|---------------------------|-----------------|--------------------------|-------------------------|-------------------------------|-----------------------------|-------------------------------|-----------------------|-------------|--|
| Wilmington WWTP | 105 | 340 | 75 | 71.4% | 85% | 75 | 75 | No | - | City capturing 90% wet weather flows w/ CS thru real-time control. No plans to separate CS. Draft Long Term CSO Control Plan (LTCP) draft submitted in Sept 2010. CSO to tributaries of the Delaware River (Brandywine, Christina, Little Mill, and Shellpot). |
| Kent County | | | | | | | | | | |
| City of Harrington WWTP | 0.75 | 0.8 | 0.5 | 66.7% | 90% | 0.642 | 0.75 | Yes | Yes | Major I/I/wet-weather issue: can double flow - studies performed to find suspect areas (about 1/4 of town studied). Applied for grants to continue. Mostly inflow. Recent rehab includes inserts, slip lining, full replacements. |
| Kent County Regional WWTP | 16.3 | 18.6 | 12.19 | 74.8% | 74% | 15 | 18 | Yes | Yes | No Combined Sewer. Experience I/I problems from towns contributing to system. Much I/I from City of Dover (Pump Station #3): 1.5 MGD (Sept. 2010, dry) vs. 3.25 MGD (March 2010, wet). |
| Sussex County | | | | | | | | | | |
| City of Lewes STP | 1.5 | 1.15 | 0.675 | 45.0% | 90% | 1.1 | 1.3 | No | No | No I/I issue or combined sewers (resolved since last survey); 5% manhole renewal annually; plant able to handle coastal flooding. |
| City of Rehoboth Beach STP | 3.4 | 3.06 | 1.08 | 31.8% | 62% | 1.24 | 2 | No | No | No CSOs. No major I/I issue, but coastal flooding inflow issues. Can temp divert to storage tank (1 MG, steel) or oxidation ditches during flooding (both post-prelim treatment). |
| City of Seaford WWTP | 2 | 3 | 1 | 50.0% | 90% | 2 | 3 | No | Yes | I/I issues during rain events: increase up to 2 MGD. Funding on-going; Mixed bag of I/I issues and sewer types. Worst area is "Old Town" (central) CSO was eliminated in early 2000's. |
| Delmar WWTP | 0.65 | 2.2 | 0.35 | 53.8% | 95% | 1.5 | 2.5 | Yes | Yes | Experience I/I due to old lines and manholes. Identified critical areas and small upgrades such as inserts. Conducting some studies and smoke testing. No comprehensive study at this time. |

| Treatment Plant | Current Design Flow (MGD) | Peak Flow (MGD) | Average Daily Flow (MGD) | ADF as % of Design Flow | % of ADF from Domestic Source | 2020 Anticipated Flow (MGD) | 2030 Future Design Flow (MGD) | Exceeded Design Flow? | I/I issues? | I/I Comments |
|---|---------------------------|-----------------|--------------------------|-------------------------|-------------------------------|-----------------------------|-------------------------------|-----------------------|-------------|--|
| Sussex County - Inland Bays Regional WWTF | 2.13 | 0.8 | 0.55 | 25.8% | 89% | 2.8 | 3.7 | No | No | Study performed by consultants and County showed system did not meet EPA's definition of excessive I/I |
| Sussex County - Piney Neck Regional WWTF | 0.2 | 0.1 | 0.085 | 42.5% | 81% | 0.95 | 1.6 | No | No | Do not see excess I/I in this system. |
| Sussex County - South Coastal Regional WWTF | 9 | 6.8 | 2.3 | 25.6% | 80.6% | 8.1 | 16.6 | No | No | I/I issues resolved, sliplined all conc. pipes and inserts. |
| Sussex County - Wolfe Neck WWTF | 4 | 2.1 | 1.52 | 38.0% | 75% | 7 | 10 | No | No | Study performed in Fall 2010. Data showed facility did not have excessive I/I according to EPA standard of 275 gpcd. Facility had max daily flow per capita of 75.5 for 5 year period of study. |
| Town of Georgetown WRF | 1.3 | 1.6 | 0.85 | 65.4% | 92% | 1.18 | 2.5 | No | No | G-town I/I issues mostly in "Old Town": Eastern Side/Kimmytown. Brick MH/ TC pipes from 1930/40's see infiltration during storms, creates pipeline back-ups. See 50% instantaneous peak increases. Most inflow problems fixed. Some funding for studies rec'd. |
| Town of Bridgeville WWTF | 0.8 | 1 | 0.23 | 28.8% | 85% | 0.25 | 0.28 | No | Yes | Have I/I problem, but need to fully quantify. Nothing specific is being done to fix it. |
| Town of Laurel STP | 0.7 | 0.8 | 0.35 | 50.0% | 100% | 1 | 1.4 | No | Yes | I/I Problems identified; 200% instantaneous increase (not prolonged), assume due to combined system. Code enforcement on roof leaders, etc. Infiltration and other small issues repaired as-seen. |
| Town of Millsboro WWTF | 1.15 | 0.58 | 0.45 | 39.1% | 85% | 3 | 3 | Yes | Yes | Millsboro proper has no I/I issue. Stockley Hospital facilities has I/I issue (permitted 0.3 MGD), flows doubled late winter 2009/10), which is a private system working on upgrades (immediate upgrades done). |
| Town of Selbyville WWTF | 1.25 | 1.3 | 1.11 | 88.8% | 23% | 1.2 | 1.25 | No | No | <10%, not studied; no CSO. |

| Treatment Plant | Current Design Flow (MGD) | Peak Flow (MGD) | Average Daily Flow (MGD) | ADF as % of Design Flow | % of ADF from Domestic Source | 2020 Anticipated Flow (MGD) | 2030 Future Design Flow (MGD) | Exceeded Design Flow? | I/I issues? | I/I Comments |
|--|---------------------------|-----------------|--------------------------|-------------------------|-------------------------------|-----------------------------|-------------------------------|-----------------------|-------------|--|
| Private | | | | | | | | | | |
| Artesian - Beaver Creek | 0.05 | 0.036 | 0.021 | 42.6% | 100% | 0.15 | 0.3 | No | No | No I/I or CS. |
| Artesian - Heron Bay | 0.05 | 0.02 | 0.011 | 22.4% | 100% | 0.1 | 0.1 | No | No | No I/I or Combined sewers; system is new. |
| Artesian - Reserves at Lewes Landing | 0.03 | 0.01 | 0.005 | 16.7% | 100% | 0.03 | 0.03 | No | No | None. |
| Artesian - Stonewater Creek | 0.225 | 0.05 | 0.028 | 12.4% | 100% | 0.225 | 0.405 | No | No | Infiltration due to construction being corrected. |
| Artesian - Villages at Herring Creek | 0.03 | 0.016 | 0.009 | 28.5% | 100% | 0 | 0 ⁹ | No | No | None. |
| Tidewater - Bay Front Regional | 0.054 | 0.049 | 0.023 | 42.5% | 100% | 0.037 | 0.108 | No | No | N/A - it is a new system. |
| Tidewater - Breeder's Crown | 0.019 | 0.010 | 0.006 | 32.2% | 100% | 0.011 | 0.019 | No | No | None. |
| Tidewater - Country Grove | 0.054 | 0.020 | 0.009 | 17.3% | 100% | 0.031 | 0.054 | No | No | N/A. |
| Tidewater - Hart's Landing | 0.039 | 0.017 | 0.012 | 30.5% | 100% | 0.025 | 0.039 | No | No | None. |
| Tidewater - Milton Regional | 0.350 | 0.301 | 0.160 | 45.8% | 95% | 0.189 | 1.4 | No | No | Much has been addressed with bowls in manholes, repaired cleanouts, etc. During a heavy rain event flows may still increase by 50%. Investigating manhole repairs, fixing as needed, portions of the system has video'd. |
| Tidewater - Retreat | 0.048 | 0.021 | 0.008 | 15.6% | 100% | 0.028 | 0.048 | No | No | None. |
| Tidewater - The Ridings *In Process of Acquiring* | 0.070 | 0.031 | 0.006 | 8.1% | 100% | 0.039 | 0.07 | No | No | N/A. |
| Tidewater - Trussum *Proposed* | 0.4 | 0 | 0 | 0% | 100% | 0.079 | 0.4 | No | No | N/A. New. |

⁹ Facility is planned to be closed and turned over to Sussex County.

| Treatment Plant | Current Design Flow (MGD) | Peak Flow (MGD) | Average Daily Flow (MGD) | ADF as % of Design Flow | % of ADF from Domestic Source | 2020 Anticipated Flow (MGD) | 2030 Future Design Flow (MGD) | Exceeded Design Flow? | I/I issues? | I/I Comments |
|--------------------------------------|---------------------------|-----------------|--------------------------|-------------------------|-------------------------------|-----------------------------|-------------------------------|-----------------------|-------------|--------------|
| Tidewater - Wandendale *Proposed* | 1.45 | 0 | 0 | 0% | 100% | 0.158 | 1.45 | No | No | N/A. New. |
| New Castle County Total | 111.0 | 344.7 | 77.1 | 42.6% | 81.4% | 79.5 | 81.1 | 0 | 2 | |
| Kent County Total | 18.1 | 20.4 | 13.7 | 22.4% | 55.0% | 16.6 | 19.8 | 2 | 2 | |
| Sussex County Total | 28.1 | 24.5 | 10.6 | 16.7% | 73.1% | 31.3 | 49.1 | 2 | 5 | |
| Private Total | 2.9 | 0.6 | 0.3 | 12.4% | 93.1% | 1.1 | 4.4 | 0 | 0 | |
| State Total | 160.0 | 390.2 | 101.6 | 28.5% | 91.3% | 126.5 | 154.4 | 4 | 9 | |

Collection System Flow

Table A-9 presents flow data reported for each collection system surveyed. The survey did not require municipalities that provide collection/transmission only to report flows. Most municipalities provided estimated flows, although they do not have flow limits.

Table A-9. Collection System Flow Data

| Collection System | Current Design Flow (MGD) | Peak Flow (MGD) | Average Daily Flow (MGD) | % of ADF from Domestic Source | 2020 Anticipated Flow (MGD) | 2030 Future Design Flow (MGD) | Exceeded Design Flow? | I/I issues? | I/I Comments |
|---|---------------------------|-----------------|--------------------------|-------------------------------|-----------------------------|-------------------------------|-----------------------|-------------|---|
| New Castle County | | | | | | | | | |
| New Castle County - Water Farm #2 treated by Middletown WWTP - CS | - | - | 0.02 | - | - | - | No | No | None, WF#2 collection system is relatively new. |
| New Castle County - North of the C&D treated by Wilmington WWTP - CS | - | 150 | 50 | - | - | - | No | Yes | I/I in the service area is acceptable, with localized cases of excessive I/I. Several projects within the NCC Capital Improvements Programs are actively investigating, identifying and correcting excessive I/I. |
| City of Newark Sewer Authority treated by Wilmington WWTP - CS | - | - | 3.5 | - | - | - | - | - | Currently quantifying Inflow and Infiltration problem; no combined sewer. |
| Kent County | | | | | | | | | |
| Camden-Wyoming Sewer and Water Authority treated by Kent County WWTP - CS | - | 0.98 | 0.7 | 78 | 1 | - | No | No | I/I approx. 40% increase in average flow) for existing (mostly pre-1995 system: vitrified clay, 10% from post-1995 installations). Exfiltration also an issue. Complete fix not financially realistic. Fix upon finding or known target areas. |
| Dover Sewer Authority treated by Kent County WWTP - CS | - | 8.3 | 5.4 | 75 | - | - | No | Yes | 5 yr CIP incl. smoke testing/video. Also using GIS. Formal study of 2% city in 2006 and just finishing. Purchased truck and doing "as-you-go". More cost effective. |
| Milford Sewer Authority treated by Kent County WWTP - CS | - | 4 | 2.5 | 70 | - | - | No | Yes | 2009: 32%, 2010: 43%, 2011: 26%. Formal I/I report avail April 2011. Est. \$15-20M to repair. Old system (brick, terra cotta, some flooding issues), mostly center of Milford (old town). Lots of unnecessary pumping (electrical waste and wear on equipment). |

| Collection System | Current Design Flow (MGD) | Peak Flow (MGD) | Average Daily Flow (MGD) | % of ADF from Domestic Source | 2020 Anticipated Flow (MGD) | 2030 Future Design Flow (MGD) | Exceeded Design Flow? | I/I issues? | I/I Comments |
|--|---------------------------|-----------------|--------------------------|-------------------------------|-----------------------------|-------------------------------|-----------------------|-------------|--|
| Town of Clayton treated by Kent County WWTP - CS | - | 0.35 | 0.23 | 75 | - | - | No | Yes | "Old Town" received planning grant for I/I study (~\$30K) matching. Will include 5 year CIP. Otherwise do repairs when an issue is seen. No combined sewer. Believe it's an inflow problem and infiltration has been resolved. |
| Town of Smyrna treated by Kent County WWTP - CS | - | - | 0.64 | 96 | 0.96 | 1.28 | No | No | No I/I issue. Continue maintenance to continue non-issue. |
| Sussex County | | | | | | | | | |
| Town of Greenwood treated by Bridgeville WWTF - CS | 0.086 | 0.12 | 0.085 | 85 | 0.1 | 0.114 | No | Yes | I/I is an issue. 33% increase in wet weather (instantaneous only). Camera studies being performed, Haven't identified all sources, fixed some areas. |
| Sussex County Collection Systems - CS | - | - | - | - | - | - | No | No | No I/I issues in any of these 4 districts (Blades, Dewey Beach, Ellendale, or Henlopen Acres). |

Wastewater Systems with I/I Issues

Table A-10 presents those facilities (treatment and collection) that have experienced I/I issues.

Table A-10. Wastewater Systems with I/I Issues

| Wastewater System | I/I Issues? | I/I Comments |
|--|-------------|--|
| <i>New Castle County</i> | | |
| New Castle County - Delaware City WWTP | Yes | I/I has been identified in the Delaware City collector system. The Delaware City Sewer Rehabilitation capital improvement project has been a multi-year and multi-project program to reduce existing I/I in the collector and trunk lines in Delaware City. |
| New Castle County - Port Penn STP | Yes | I/I has been identified in the Port Penn collector system. Manhole frames and covers have been replaced under the Countywide Manhole rehabilitation capital improvement program. Evaluation of effectiveness to be reviewed. |
| New Castle County - North of the C&D treated by Wilmington WWTP - CS | Yes | I/I in the service area is acceptable, with localized cases of excessive I/I. Several projects within the NCC Capital Improvements Programs are actively investigating, identifying and correcting excessive I/I. |
| <i>Kent County</i> | | |
| City of Harrington WWTP | Yes | Major I/I wet-weather issue which can double the flow. Studies have been performed to find suspect areas (about 1/4 of town studied). Applied for grants to continue. Mostly inflow. Recent rehab includes inserts, sliplining, full replacements. |
| Kent County Regional WWTP | Yes | No Combined Sewer. Experience I/I problems from towns contributing to system. Much of the I/I is from the City of Dover (Pump Station #3): 1.5 MGD (Sept. 2010, dry) vs. 3.25 MGD (March 2010, wet). |
| Dover Sewer Authority treated by Kent County WWTP - CS | Yes | 5 yr. CIP includes smoke testing/video. Also using GIS. Formal study of 2% city in 2006 and just finishing. Purchased truck and doing "as-you-go". More cost effective. |
| Milford Sewer Authority treated by Kent County WWTP - CS | Yes | 2009: 32%, 2010: 43%, 2011: 26%. Formal I/I report avail April 2011. Est \$15-20M to repair. Old system (brick, terra cotta, some flooding issues), mostly center of Milford (old town). Lots of unnecessary pumping (electrical waste and wear on equipment). |
| Town of Clayton treated by Kent County WWTP - CS | Yes | "Old Town" received planning grant for I/I study (~\$30K) matching. Will include 5 year CIP. Otherwise do repairs when an issue is seen. No combined sewer. Believe it's an inflow problem and infiltration has been resolved. |
| <i>Sussex County</i> | | |
| City of Seaford WWTP | Yes | I/I issues during rain events: increase up to 2 MGD. Funding on-going; Mixed bag of I/I issues and sewer types. Worst area is "Old Town" (central) CSO was eliminated in early 2000's. |
| Delmar WWTP | Yes | Experience I/I due to old lines and manholes. Identified critical areas and small upgrades such as inserts. Conducting some studies and smoke testing. No comprehensive study at this time. |

| Wastewater System | I/I Issues? | I/I Comments |
|--|-------------|---|
| Town of Bridgeville WWTF | Yes | Have I/I problem, but need to fully quantify. Nothing specific is being done to fix it. |
| Town of Greenwood treated by Bridgeville WWTF - CS | Yes | I/I is an issue. 33% increase in wet weather (instantaneous only). Camera studies being performed, Haven't identified all sources, fixed some areas. |
| Town of Laurel STP | Yes | I/I Problems ID'd. 200% instantaneous increase (not prolonged), assume due to combined system. Code enforcement on roof leaders, etc. Infiltration and other small issues repaired as seen. |
| Town of Millsboro WWTF | Yes | Millsboro proper has no I/I issue. Stockley Hospital facilities has I/I issue (permitted 0.3 MGD), flows doubled late winter 2009/10), which is a private system working on upgrades (immediate upgrades done). |

Treatment Plant NH3-N, TN, and TP Limits and Compliance

Table A-11 presents ammonia (NH3), total nitrogen (TN) and total phosphorus (TP) average influent strength data and indicates whether a treatment facility has limits, expects to receive limits, and whether they have experienced non-compliance for 2 or more consecutive months within the last 2 years. Numerical limits for TN and TP are included for surface water dischargers from the Permit Compliance System (PCS) and NPDES permits when available.

Groundwater permit limit information is also included. Where excessive levels of soil phosphorus are encountered, as defined by the Delaware Nutrient Management Commission, soil phosphorus levels must be tested in accordance with the University of Delaware soil testing methods. If the soil phosphorus levels become excessive, the permittee must perform a Phosphorus Site Index (PSI) study of the site be submitted to the Groundwater Discharges Section within 30 days of completion of the study. Based on the results of the PSI study, the Groundwater Discharges Section may require the permittee to submit a plan for Groundwater Discharges Section review and approval detailing steps the permittee will take to reduce the phosphorus loading rates at the site.

Table A-11. Treatment Plant NH3-N, TN, and TP Limits and Compliance

| Wastewater System | Surface Water Discharge? | Ammonia Nitrogen | | | Total Nitrogen | | | | Total Phosphorus | | | | | |
|---|--------------------------|--|-------------------------|--------------------------|--|-------------------------------|------------------------------|-------------------|-------------------------------|----------------------------------|-------------------------------|------------------------------|-------------------|-------------------------------|
| | | Average NH3-N Influent Strength (mg/L) | NH3-N Removal Required? | Non-compliance with NH3? | TN Limit | TN Limit Anticipated <5 years | No TN Limit, not anticipated | TN non-compliance | TN anticipated non-compliance | TP Limit | TP Limit Anticipated <5 years | No TP Limit, not anticipated | TP non-compliance | TP anticipated non-compliance |
| New Castle County | | | | | | | | | | | | | | |
| New Castle County - Delaware City WWTP | ✓ | 16 to 20 | - | | - | - | ✓ | | | - | - | ✓ | | |
| New Castle County - Lea Eara Farms WWTP | | 21 to 30 | - | | 300 lbs/acre/year | - | - | - | | PSI Study | - | - | - | |
| New Castle County - Port Penn STP | ✓ | 16 to 20 | - | | - | - | ✓ | | | - | - | ✓ | | |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | ✓ | 21 to 30 | ✓ | - | 10.4 lbs/dy avg ¹⁰ 15.6 lbs/dy max 3,796 lbs/yr avg | - | - | - | | 4.2 lbs/dy max 2.1 lbs/dy avg | - | - | - | |
| Town of Middletown - Frog Hollow WWTF | | | - | | 250 lbs/acre/year | - | - | - | | - | - | ✓ | | |

¹⁰ These numeric limits are for Total Kjeldahl Nitrogen (TKN). Daily TKN limits (10.4 lbs/day average and 15.6 lbs/day maximum) are seasonal from May-November.

| Wastewater System | Surface Water Discharge? | Ammonia Nitrogen | | | Total Nitrogen | | | | Total Phosphorus | | | | | |
|---|--------------------------|--|-------------------------|---|---|-------------------------------|------------------------------|-------------------|-------------------------------|--|-------------------------------|------------------------------|-------------------|-------------------------------|
| | | Average NH3-N Influent Strength (mg/L) | NH3-N Removal Required? | Non-compliance with NH3? | TN Limit | TN Limit Anticipated <5 years | No TN Limit, not anticipated | TN non-compliance | TN anticipated non-compliance | TP Limit | TP Limit Anticipated <5 years | No TP Limit, not anticipated | TP non-compliance | TP anticipated non-compliance |
| Town of Middletown - Middletown WWTP | | | - | | 400 lbs/acre/year | - | - | - | | - | - | ✓ | | |
| Wilmington WWTP | ✓ | 16 to 20 | - | | - | - | ✓ | | | - | - | ✓ | | |
| Kent County | | | | | | | | | | | | | | |
| City of Harrington WWTP | ✓ | 21 to 30 | - | | 140 lbs/dy avg 9,125 lbs/yr avg | - | - | ✓ | | 0.75 lbs/dy avg 55 lbs/yr avg | - | - | ✓ | |
| Kent County Regional WWTP ¹¹ | ✓ | 21 to 30 | - | | 751 lbs/dy avg 1,126 lbs/dy max 274,115 lbs/yr avg | - | - | - | | 62.5 lbs/dy avg 93.7 lbs/dy max 22,812 lbs/yr avg | - | - | - | |
| Sussex County | | | | | | | | | | | | | | |
| City of Lewes STP | ✓ | 21 to 30 | - | | 100 lbs/dy avg 8 mg/L avg | - | - | - | | 25 lbs/dy avg 2 mg/L avg | - | - | - | |
| City of Rehoboth Beach STP | ✓ | 21 to 30 | - | | 24,300 lb/yr max | - | - | - | | 5,308 lbs/yr max | - | - | - | |
| City of Seaford WWTP | ✓ | 30 to 50 | - | | 135 lbs/dy avg ¹² 49,086 lbs/yr max | - | - | - | | 34 lbs/dy avg 50 lbs/dy max 2 mg/L avg 3 mg/L max | - | - | - | |
| Delmar WWTP ¹³ | ✓ | < 15 | ✓ | Yes - Design issues have been ongoing since 1996. | 16 lbs/dy avg ¹⁴ 85 lbs/dy max 2.5 mg/L avg 12 mg/L max | - | - | ✓ | | 2.7 lbs/dy avg 4.1 lbs/dy max 0.93 mg/L avg 1.41 mg/L max | - | - | ✓ | |
| Sussex County - Inland Bays Regional WWTF | | 30 to 50 | - | | 250 lbs/acre/year | - | - | ✓ | | - | ✓ | - | - | |
| Sussex County - Piney Neck Regional WWTF | | 30 to 50 | - | | 300-350 lbs/acre/year | - | - | - | | PSI Study | - | - | - | |

¹¹ Daily TN and TP limits are seasonal from May-September.

¹² The daily TN limit (135 lbs/dy avg) is seasonal from May-November.

¹³ Maryland MDE permit.

¹⁴ These numeric limits are for Ammonia Nitrogen (As N). Total Nitrogen requirement is monitoring only. Interim limits are NH3-N 2.6 mg/L avg (Apr-Sep) and 14 mg/L avg (Oct-Mar) and TP 0.5 mg/L.

| Wastewater System | Surface Water Discharge? | Ammonia Nitrogen | | | Total Nitrogen | | | | Total Phosphorus | | | | | |
|---|--------------------------|--|-------------------------|--------------------------|---|-------------------------------|------------------------------|-------------------|-------------------------------|--|-------------------------------|------------------------------|-------------------|-------------------------------|
| | | Average NH3-N Influent Strength (mg/L) | NH3-N Removal Required? | Non-compliance with NH3? | TN Limit | TN Limit Anticipated <5 years | No TN Limit, not anticipated | TN non-compliance | TN anticipated non-compliance | TP Limit | TP Limit Anticipated <5 years | No TP Limit, not anticipated | TP non-compliance | TP anticipated non-compliance |
| Sussex County - South Coastal Regional WWTF | ✓ | 21 to 30 | - | | - | - | ✓ | - | | - | - | ✓ | - | |
| Sussex County - Wolfe Neck WWTF | | 30 to 50 | - | | 396 lbs/acre/year | - | - | - | | PSI Study | - | - | - | |
| Town of Georgetown WRF | | 21 to 30 | - | | ✓ | - | - | - | | - | - | ✓ | - | |
| Town of Bridgeville WWTF ¹⁵ | ✓ | 30 to 50 | - | | 52.9 lbs/dy avg 19,312 lbs/yr max 300 lbs/acre/year | - | - | ✓ | | 13.4 lbs/dy avg 4,909 lbs/yr max | - | - | ✓ | |
| Town of Laurel STP ¹⁶ | ✓ | 30 to 50 | - | | 33 lbs/dy avg 12,045 lbs/yr avg | - | - | - | | 8.4 lbs/dy avg | - | - | - | |
| Town of Millsboro WWTF | ✓ | 30 to 50 | - | | - | ✓ | - | - | | 4.56 lbs/dy avg 9.22 lbs/dy max 2 mg/L max | - | - | ✓ | |
| Town of Selbyville WWTF | ✓ | 30 to 50 | - | | - | - | ✓ | - | | - | - | ✓ | - | |
| Private | | | | | | | | | | | | | | |
| Artesian - Beaver Creek | | 30 to 50 | - | | 0.01843 lbs/day 10 mg/L | - | - | - | | - | - | ✓ | - | |
| Artesian - Heron Bay | | 30 to 50 | - | | 0.01843 lbs/day 10 mg/L | - | - | - | | - | - | ✓ | - | |
| Artesian - Reserves at Lewes Landing | | 30 to 50 | - | | 0.01843 lbs/day 10 mg/L | - | - | - | | - | - | ✓ | - | |
| Artesian - Stonewater Creek | | 30 to 50 | - | | 10 mg/L | - | - | - | | - | - | ✓ | - | |
| Artesian - Villages at Herring Creek | | 30 to 50 | - | | 380 lbs/acre/year | - | - | - | | PSI Study | - | - | - | |
| Tidewater - Bay Front Regional | | | - | | 0.01843 lbs/day 10 mg/L | - | - | - | | - | - | ✓ | - | |
| Tidewater - Breeder's Crown | | | - | | - | - | ✓ | - | | - | - | ✓ | - | |
| Tidewater - Country Grove | | | - | | 0.01843 lbs/day | - | - | - | | - | - | ✓ | - | |

¹⁵ Daily TN and TP limits (52.9 lbs/day average TN and 13.4 lbs/day average TP respectively) are seasonal from May-November.

¹⁶ The daily TN limit (33 lbs/day average) is seasonal from May-November.

| Wastewater System | Surface Water Discharge? | Ammonia Nitrogen | | | Total Nitrogen | | | | | Total Phosphorus | | | | |
|---|--------------------------|--|-------------------------|--------------------------|---------------------------------------|-------------------------------|------------------------------|-------------------|--|------------------|-------------------------------|------------------------------|-------------------|-------------------------------|
| | | Average NH3-N Influent Strength (mg/L) | NH3-N Removal Required? | Non-compliance with NH3? | TN Limit | TN Limit Anticipated <5 years | No TN Limit, not anticipated | TN non-compliance | TN anticipated non-compliance | TP Limit | TP Limit Anticipated <5 years | No TP Limit, not anticipated | TP non-compliance | TP anticipated non-compliance |
| Tidewater - Hart's Landing | | | - | | 10 mg/L 0.01843 lbs/day 10 mg/L | - | - | - | | - | - | ✓ | - | |
| Tidewater - Milton Regional | ✓ | | - | | - | ✓ | - | - | May need to upgrade for TN limit; 48 months to meet the new limits in the permit | - | ✓ | - | - | |
| Tidewater - Retreat | | | - | | 0.01843 lbs/day 10 mg/L | - | - | - | | - | - | ✓ | - | |
| Tidewater - The Ridings *In Process of Acquiring* | | | - | | 0.01843 lbs/day 10 mg/L | - | - | - | | - | - | ✓ | - | |
| Tidewater - Trussum *Proposed* | | | - | | - | ✓ | - | - | | - | ✓ | - | - | |
| Tidewater - Wandendale *Proposed* | | | - | | - | ✓ | - | - | | - | ✓ | - | - | |
| New Castle County Total | 4 | | 1 | 0 | 4 | 0 | 3 | 0 | 0 | 2 | 0 | 5 | 0 | 0 |
| Kent County Total | 2 | | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 |
| Sussex County Total | 9 | | 1 | 1 | 10 | 1 | 2 | 3 | 0 | 9 | 1 | 3 | 3 | 0 |
| Private Total | 1 | | 0 | 0 | 10 | 3 | 1 | 0 | 0 | 1 | 3 | 10 | 0 | 0 |
| State Total | 16 | | 2 | 1 | 26 | 4 | 6 | 4 | 0 | 14 | 4 | 18 | 4 | 0 |

Treatment Plant Influent Strength

Table A-12 summarizes average influent strength with respect to biochemical oxygen demand (BOD) and total suspended solids (TSS).

Table A-12. Treatment Plant Influent Strength

| Treatment Plant | Influent Strength |
|---|--|
| <i>New Castle County</i> | |
| New Castle County - Delaware City WWTP | Below Normal (<150 mg/L BOD and TSS) - Cause Unknown |
| New Castle County - Lea Eara Farms WWTP | Normal (150-250 mg/L BOD and TSS) |
| New Castle County - Port Penn STP | Normal (150-250 mg/L BOD and TSS) |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | Normal (150-250 mg/L BOD and TSS) |
| Town of Middletown - Frog Hollow WWTF | Normal (150-250 mg/L BOD and TSS) |
| Town of Middletown - Middletown WWTP | Normal (150-250 mg/L BOD and TSS) |
| Wilmington WWTP | Normal (150-250 mg/L BOD and TSS) |
| <i>Kent County</i> | |
| City of Harrington WWTP | Normal (150-250 mg/L BOD and TSS) |
| Kent County Regional WWTP | Above Normal (>250 mg/L BOD and TSS) - Cause food processing |
| <i>Sussex County</i> | |
| City of Lewes STP | Normal (150-250 mg/L BOD and TSS) |
| City of Rehoboth Beach STP | Normal (150-250 mg/L BOD and TSS) |
| City of Seaford WWTP | Above Normal (>250 mg/L BOD and TSS) - Cause unknown |
| Delmar WWTP | Above Normal (>250 mg/L BOD and TSS) - Cause food processing |
| Sussex County - Inland Bays Regional WWTF | Normal (150-250 mg/L BOD and TSS) |
| Sussex County - Piney Neck Regional WWTF | Normal (150-250 mg/L BOD and TSS) |
| Sussex County - South Coastal Regional WWTF | Normal (150-250 mg/L BOD and TSS) |
| Sussex County - Wolfe Neck WWTF | Normal (150-250 mg/L BOD and TSS) |
| Town of Georgetown WRF | Normal (150-250 mg/L BOD and TSS) |
| Town of Bridgeville WWTF | Normal (150-250 mg/L BOD and TSS) |
| Town of Laurel STP | Normal (150-250 mg/L BOD and TSS) |
| Town of Millsboro WWTF | Normal (150-250 mg/L BOD and TSS) |
| Town of Selbyville WWTF | Above Normal (>250 mg/L BOD and TSS) - Cause food processing |
| <i>Private</i> | |
| Artesian - Beaver Creek | Above Normal (>250 mg/L BOD and TSS) - Cause unknown |
| Artesian - Heron Bay | Normal (150-250 mg/L BOD and TSS) |
| Artesian - Reserves at Lewes Landing | Above Normal (>250 mg/L BOD and TSS) - Cause unknown |
| Artesian - Stonewater Creek | Above Normal (>250 mg/L BOD and TSS) - Cause unknown |
| Artesian - Villages at Herring Creek | Above Normal (>250 mg/L BOD and TSS) - Cause |

| Treatment Plant | Influent Strength |
|---|-----------------------------------|
| | unknown |
| Tidewater - Bay Front Regional | Normal (150-250 mg/L BOD and TSS) |
| Tidewater - Breeder's Crown | Normal (150-250 mg/L BOD and TSS) |
| Tidewater - Country Grove | Normal (150-250 mg/L BOD and TSS) |
| Tidewater - Hart's Landing | Normal (150-250 mg/L BOD and TSS) |
| Tidewater - Milton Regional | Normal (150-250 mg/L BOD and TSS) |
| Tidewater - Retreat | Normal (150-250 mg/L BOD and TSS) |
| Tidewater - The Ridings *In Process of Acquiring* | Normal (150-250 mg/L BOD and TSS) |
| Tidewater - Trussum *Proposed* | Normal (150-250 mg/L BOD and TSS) |
| Tidewater - Wandendale *Proposed* | Normal (150-250 mg/L BOD and TSS) |

Treatment Plant Influent Strength Summary

Table A-13 presents a summary of the range of treatment plant influent strength data collected during the survey at the county and state levels.

Table A-13. Treatment Plant Influent Strength Summary

| | Below Normal <i>(<150 mg/L BOD and TSS)</i> | Normal <i>(150-250 mg/L BOD and TSS)</i> | Above Normal <i>(>250 mg/L BOD and TSS)</i> |
|--------------------------|--|--|--|
| New Castle County | 1 | 6 | 0 |
| Kent County | 0 | 1 | 1 |
| Sussex County | 0 | 10 | 3 |
| Private | 0 | 10 | 4 |
| State | 1 | 27 | 8 |

Treatment Plant Effluent Non-Compliance

Table A-14 summarizes effluent non-compliance and causes at treatment plants.

Table A-14. Summary of Treatment Plant Non-Compliance Events

| Treatment Plant | Non-compliance | Cause |
|---|--|---|
| New Castle County | | |
| New Castle County - Delaware City WWTP | No | N/A. |
| New Castle County - Lea Eara Farms WWTP | Monitoring Well Nitrates | Lagoon leak |
| New Castle County - Port Penn STP | No | N/A. |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | No | N/A. |
| Town of Middletown - Frog Hollow WWTF | No | N/A. |
| Town of Middletown - Middletown WWTP | pH | Algae bloom in lagoons |
| Wilmington WWTP | No | N/A. |
| Kent County | | |
| City of Harrington WWTP | Instantaneous (BOD/TSS/Fecal), but otherwise answer is "No". | System overload during major storm (didn't breach though). |
| Kent County Regional WWTP | Nothing for 2 consecutive months (see system report in Appendix B for individual instances). | Washout, Toxic Shock |
| Sussex County | | |
| City of Lewes STP | No | N/A. |
| City of Rehoboth Beach STP | No | N/A. |
| City of Seaford WWTP | No | N/A. |
| Delmar WWTP | TSS | Operational Issues, Equipment Failure, Design Issues. |
| Sussex County - Inland Bays Regional WWTF | No | N/A. |
| Sussex County - Piney Neck Regional WWTF | No | N/A. |
| Sussex County - South Coastal Regional WWTF | No | N/A. |
| Sussex County - Wolfe Neck WWTF | No | N/A. |
| Town of Georgetown WRF | No | N/A. |
| Town of Bridgeville WWTF | No | N/A. |
| Town of Laurel STP | No | N/A. |
| Town of Millsboro WWTF | pH, TSS, Coliform, BOD | Temp issue due to construction/startup. Back in compliance. |
| Town of Selbyville WWTF | TSS, Total Residual Chlorine, BOD | Equipment Failure |
| Private | | |
| Artesian - Beaver Creek | No | N/A. |
| Artesian - Heron Bay | No | N/A. |
| Artesian - Reserves at Lewes Landing | No | N/A. |
| Artesian - Stonewater Creek | No | N/A. |

| Treatment Plant | Non-compliance | Cause |
|---|---|---|
| Artesian - Villages at Herring Creek | No | N/A. |
| Tidewater - Bay Front Regional | No | N/A. |
| Tidewater - Breeder's Crown | BOD excursion for 2 consecutive months, DNREC aware, no violation issued at this time | Design Issues |
| Tidewater - Country Grove | No | N/A. |
| Tidewater - Hart's Landing | No | N/A. |
| Tidewater - Milton Regional | Instantaneous chlorine, no violation | Equipment Failure |
| Tidewater - Retreat | No | N/A. |
| Tidewater - The Ridings *In Process of Acquiring* | TSS, temporary issue, no violation | Low temperature, low flows created algae in dose tank, corrected by chlorinating. |
| Tidewater - Trussum *Proposed* | No | N/A. |
| Tidewater - Wandendale *Proposed* | No | N/A. |
| New Castle County Total | 2 | |
| Kent County Total | 2 | |
| Sussex County Total | 3 | |
| Private Total | 3 | |
| State Total | 10 | |

Sewer Service Area Tables

Sewer Service Area Summary

Table A-15 presents a summary of sewer service areas including, square mileage, number of pump stations, number of holding tanks and total holding tank capacity, number of sewer service districts and number of households serviced.

Table A-15. Summary of Sewer Service Areas

| Wastewater System | Service Area (square miles) | Pump Stations | Holding Tanks | Holding Tank Capacity (Gallons) |
|---|--------------------------------|---------------|---------------|---------------------------------------|
| <i>New Castle County</i> | | | | |
| New Castle County - Delaware City WWTP | 5.00 | 3 | 0 | N/A. |
| New Castle County - Lea Earra Farms WWTP | 0.50 | 2 | 0 | N/A. |
| New Castle County - Port Penn STP | 0.50 | 1 | 0 | N/A. |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | 22.00 | 18 | 5 | 61,000 |
| New Castle County - North of the C&D treated by Wilmington WWTP - CS | 250.00 | 127 | 12 | 75,000 |
| Town of Middletown - Frog Hollow WWTF | 0.50 | 3 | 0 | N/A. |
| Town of Middletown - Middletown WWTP | 11.80 | 19 | 0 | N/A. |
| New Castle County - Water Farm #2 treated by Middletown WWTP - CS | 17.00 | 3 | 1 | 1,000 |
| Wilmington WWTP | 8.50 | 3 | 1 | 3,000,000 |
| City of Newark Sewer Authority treated by Wilmington WWTP - CS | 15.00 | 3 | 0 | N/A. |
| New Castle County - North of the C&D treated by Wilmington WWTP - CS | 250.00 | 127 | 12 | 75,000 |
| <i>Kent County</i> | | | | |
| City of Harrington WWTP | 3.62 | 8 | 0 | N/A. |
| Kent County Regional WWTP | 47.50 | 85 | 0 | N/A. |
| Camden-Wyoming Sewer and Water Authority treated by Kent County WWTP - CS | 3.75 | 7 | 0 | N/A. |
| Dover Sewer Authority treated by Kent County WWTP - CS | 23.40 | 41 | 0 | N/A. |
| Milford Sewer Authority treated by Kent County WWTP - CS | 10.30 | 17 | 0 | N/A. |
| Town of Clayton treated by Kent County WWTP - CS | 2.00 | 6 | 2 | 300,000 |
| Town of Smyrna treated by Kent County WWTP - CS | 4.50 | 11 | 0 | N/A. |
| <i>Sussex County</i> | | | | |
| City of Lewes STP | 4.63 | 32 | 0 | N/A. |
| City of Rehoboth Beach STP | 1.00 | 7 | 0 | N/A. |
| City of Seaford WWTP | 5.00 | 15 | 0 | N/A. |
| Delmar WWTP | 7.00 | 11 | 0 | N/A. |
| Sussex County - Inland Bays Regional WWTF | 15.87 | 87 | 0 | N/A. |
| Sussex County - Piney Neck Regional WWTF | 3.66 | 7 | 0 | N/A. |
| Sussex County - South Coastal Regional WWTF | 33.17 | 106 | 0 | N/A. |
| Sussex County - Wolfe Neck WWTF | 19.94 | 89 | 0 | N/A. |

| Wastewater System | Service Area (square miles) | Pump Stations | Holding Tanks | Holding Tank Capacity (Gallons) |
|--|--|----------------------|----------------------|--|
| Town of Georgetown WRF | 4.50 | 21 | 0 | N/A. |
| Town of Bridgeville WWTF | 2.38 | 2 | 0 | N/A. |
| Town of Greenwood treated by Bridgeville WWTF - CS | 0.69 | 2 | 0 | N/A. |
| Town of Laurel STP | 2.73 | 3 | 0 | N/A. |
| Town of Millsboro WWTF | 2.00 | 9 | 0 | N/A. |
| Town of Selbyville WWTF | 5.00 | 12 | 2 | 20,000,000 |
| Sussex County Collection Systems - CS | 5.60 | 20 | 0 | N/A. |
| Private | | | | |
| Artesian - Beaver Creek | 0.64 | 2 | 0 | N/A. |
| Artesian - Heron Bay | 0.58 | 2 | 0 | N/A. |
| Artesian - Reserves at Lewes Landing | 0.14 | 1 | 0 | N/A. |
| Artesian - Stonewater Creek | 1.00 | 2 | 0 | N/A. |
| Artesian - Villages at Herring Creek | 0.20 | 1 | 0 | N/A. |
| Tidewater - Bay Front Regional | 0.40 | 3 | 0 | N/A. |
| Tidewater - Breeder's Crown | 0.10 | 1 | 0 | N/A. |
| Tidewater - Country Grove | 0.16 | 1 | 0 | N/A. |
| Tidewater - Hart's Landing | 0.15 | 2 | 0 | N/A. |
| Tidewater - Milton Regional | 1.65 | 11 | 0 | N/A. |
| Tidewater - Retreat | 0.22 | 2 | 0 | N/A. |
| Tidewater - The Ridings *In Process of Acquiring* | 0.34 | 1 | 0 | N/A. |
| Tidewater - Trussum *Proposed* | 22.90 | - | - | - |
| Tidewater - Wandendale *Proposed* | 22.50 | - | - | - |
| New Castle County Total | 330.8 | 182 | 19 | 3,137,000 |
| Kent County Total | 95.1 | 175 | 2 | 300,000 |
| Sussex County Total | 113.2 | 423 | 2 | 20,000,000 |
| Private Total | 51.0 | 29 | 0 | 0 |
| State Total | 590.0 | 809 | 23 | 23,437,000 |

Pump Station Back-up Power Source

Table A-16 presents information collected from the surveyed entities about the back-up power supply options they have available for pump stations (on-site generator, portable generator, battery, none and other).

Table A-16. Pump Station Back-up Power Source

| Wastewater System | On-site Generator (diesel/gasoline) | Other On-site Generator (natural gas or propane) | Other On-site Generator (natural gas or propane) | Portable Generator | Battery | None | Other |
|---|--|---|---|--------------------|---------|------|---|
| New Castle County | | | | | | | |
| New Castle County - Delaware City WWTP | ✓ | - | - | ✓ | - | - | Gov. Bacon State Facility Pump Station |
| New Castle County - Lea Eara Farms WWTP | ✓ | - | - | - | - | - | |
| New Castle County - Port Penn STP | ✓ | - | - | ✓ | - | - | |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | ✓ | - | - | ✓ | - | - | |
| Town of Middletown - Frog Hollow WWTF | ✓ | - | - | - | - | - | |
| Town of Middletown - Middletown WWTP | ✓ | ✓ | - | - | - | - | |
| New Castle County - Water Farm #2 treated by Middletown WWTP - CS | ✓ | - | - | ✓ | - | - | |
| Wilmington WWTP | ✓ | - | - | ✓ | - | - | Secondary Feeds |
| City of Newark Sewer Authority treated by Wilmington WWTP - CS | ✓ | - | - | ✓ | - | - | |
| New Castle County - North of the C&D treated by Wilmington WWTP - CS | ✓ | - | ✓ | ✓ | - | - | Dual Power |
| Kent County | | | | | | | |
| City of Harrington WWTP | - | - | - | - | - | ✓ | 1 small generator at friendship village. Usually borrow portable from KCWWTP. |
| Kent County Regional WWTP | ✓ | - | ✓ | - | - | - | |
| Camden-Wyoming Sewer and Water Authority treated by Kent County WWTP - CS | ✓ | - | - | - | - | - | Bypass Pump |
| Dover Sewer Authority treated by Kent County WWTP - CS | ✓ | - | - | ✓ | - | - | |
| Milford Sewer Authority treated by Kent County WWTP - CS | ✓ | - | - | ✓ | - | - | 9 diesel, 8 have hookups for portable. |
| Town of Clayton treated by Kent County WWTP - CS | ✓ | - | - | - | - | - | |
| Town of Smyrna treated by Kent County WWTP - CS | ✓ | - | - | ✓ | - | - | |
| Sussex County | | | | | | | |
| City of Lewes STP | ✓ | - | - | ✓ | - | ✓ | |

| Wastewater System | On-site Generator (diesel/gasoline) | Other On-site Generator (natural gas or propane) | Other On-site Generator (natural gas or propane) | Portable Generator | Battery | None | Other |
|--|--|---|---|--------------------|----------|----------|-------------------------|
| City of Rehoboth Beach STP | ✓ | - | - | ✓ | - | - | Dual Feed at main power |
| City of Seaford WWTP | - | - | - | ✓ | - | ✓ | Only 1 is none |
| Delmar WWTP | ✓ | - | - | - | - | - | Bypass gravity feeds |
| Sussex County - Inland Bays Regional WWTF | ✓ | - | - | ✓ | - | ✓ | |
| Sussex County - Piney Neck Regional WWTF | ✓ | - | - | - | - | - | |
| Sussex County - South Coastal Regional WWTF | ✓ | - | - | ✓ | - | - | |
| Sussex County - Wolfe Neck WWTF | ✓ | - | - | ✓ | - | ✓ | |
| Town of Georgetown WRF | ✓ | ✓ | - | ✓ | - | - | |
| Town of Bridgeville WWTF | ✓ | - | - | - | - | - | |
| Town of Greenwood treated by Bridgeville WWTF - CS | ✓ | - | - | - | - | - | |
| Town of Laurel STP | ✓ | - | - | - | - | - | |
| Town of Millsboro WWTF | ✓ | - | - | - | - | ✓ | |
| Town of Selbyville WWTF | ✓ | - | - | ✓ | - | - | |
| Sussex County Collection Systems - CS | ✓ | - | - | ✓ | - | ✓ | |
| Private | | | | | | | |
| Artesian - Beaver Creek | ✓ | - | - | - | - | ✓ | |
| Artesian - Heron Bay | ✓ | - | - | - | - | - | |
| Artesian - Reserves at Lewes Landing | ✓ | - | - | - | - | - | |
| Artesian - Stonewater Creek | ✓ | - | - | - | - | - | |
| Artesian - Villages at Herring Creek | ✓ | - | - | - | - | - | |
| Tidewater - Bay Front Regional | ✓ | - | - | - | - | - | |
| Tidewater - Breeder's Crown | - | - | - | ✓ | - | - | |
| Tidewater - Country Grove | ✓ | - | - | - | - | - | |
| Tidewater - Hart's Landing | ✓ | - | - | - | - | - | |
| Tidewater - Milton Regional | ✓ | - | - | ✓ | - | - | |
| Tidewater - Retreat | ✓ | - | - | - | - | - | |
| Tidewater - The Ridings *In Process of Acquiring* | ✓ | - | - | - | - | - | |
| Tidewater - Trussum *Proposed* | - | - | - | - | - | - | |
| Tidewater - Wandendale *Proposed* | - | - | - | - | - | - | |
| New Castle County Total | 10 | 1 | 1 | 7 | 0 | 0 | 3 |
| Kent County Total | 6 | 0 | 1 | 3 | 0 | 1 | 3 |
| Sussex County Total | 14 | 1 | 0 | 9 | 0 | 6 | 3 |
| Private Total | 11 | 0 | 0 | 2 | 0 | 1 | 0 |
| State Total | 41 | 2 | 2 | 21 | 0 | 8 | 9 |

Treatment Plants Population Served

Table A-17 presents current and future population served information for each treatment plant, including resident and non-resident populations. Non-residents include those individuals served by the neighboring collection systems summarized in Table A-18.

Table A-17. Treatment Plants Population Served

| Wastewater System | Current | | | Future - 2030 | | |
|---|----------|-------------|---------|---------------|-------------|---------|
| | Resident | Nonresident | Total | Resident | Nonresident | Total |
| New Castle County | | | | | | |
| New Castle County - Delaware City WWTP | 2,621 | 0 | 2,621 | 2,781 | 0 | 2,781 |
| New Castle County - Lea Eara Farms WWTP | 492 | 0 | 492 | 512 | 0 | 512 |
| New Castle County - Port Penn STP | 676 | 0 | 676 | 988 | 0 | 988 |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | 11,786 | 200 | 11,986 | 23,287 | 0 | 23,287 |
| Town of Middletown - Frog Hollow WWTF | 1,254 | 0 | 1,254 | 1,254 | 0 | 1,254 |
| Town of Middletown - Middletown WWTP | 15,056 | 100 | 15,156 | 25,000 | 7,500 | 32,500 |
| Wilmington WWTP | 70,850 | 409,947 | 480,797 | 70,850 | 409,947 | 480,797 |
| Kent County | | | | | | |
| City of Harrington WWTP | 3,161 | 300 | 3,461 | 3,600 | 300 | 3,900 |
| Kent County Regional WWTP | 37,130 | 62,870 | 100,000 | 39,130 | 65,870 | 105,000 |
| Sussex County | | | | | | |
| City of Lewes STP | 7,500 | 80 | 7,580 | 11,250 | 900 | 12,150 |
| City of Rehoboth Beach STP | 1,495 | 100 | 1,595 | 1,595 | 100 | 1,695 |
| City of Seaford WWTP | 7,200 | 800 | 8,000 | 15,000 | 1,600 | 16,600 |
| Delmar WWTP | 4,523 | 30 | 4,553 | 7,037 | 30 | 7,067 |
| Sussex County - Inland Bays Regional WWTF | 20,111 | 0 | 20,111 | 145,526 | 0 | 145,526 |
| Sussex County - Piney Neck Regional WWTF | 2,903 | 0 | 2,903 | 3,653 | 0 | 3,653 |
| Sussex County - South Coastal Regional WWTF | 67,791 | 560 | 68,351 | 95,420 | 616 | 96,036 |
| Sussex County - Wolfe Neck WWTF | 41,454 | 0 | 41,454 | 442,638 | 0 | 442,638 |
| Town of Georgetown WRF | 6,422 | 500 | 6,922 | 12,286 | 1,000 | 13,286 |
| Town of Bridgeville WWTF | 2,013 | 1,125 | 3,138 | 4,500 | 1,489 | 5,989 |
| Town of Laurel STP | 3,668 | 8 | 3,676 | 5,300 | 8 | 5,308 |
| Town of Millsboro WWTF | 2,600 | 100 | 2,700 | 14,000 | 100 | 14,100 |
| Town of Selbyville WWTF | 2,230 | 560 | 2,790 | 2,453 | 616 | 3,069 |
| Private | | | | | | |
| Artesian - Beaver Creek | 400 | 0 | 400 | 2,500 | 0 | 2,500 |
| Artesian - Heron Bay | 440 | 0 | 440 | 1,113 | 0 | 1,113 |
| Artesian - Reserves at Lewes Landing | 81 | 0 | 81 | 243 | 0 | 243 |
| Artesian - Stonewater Creek | 812 | 0 | 812 | 3,375 | 0 | 3,375 |
| Artesian - Villages at Herring Creek | 300 | 0 | 300 | 0 | 0 | 0 |

| Wastewater System | Current | | | Future - 2030 | | |
|---|----------------|----------------|----------------|----------------|----------------|------------------|
| | Resident | Nonresident | Total | Resident | Nonresident | Total |
| Tidewater - Bay Front Regional | 189 | 0 | 189 | 845 | 0 | 845 |
| Tidewater - Breeder's Crown | 146 | 0 | 146 | 165 | 0 | 165 |
| Tidewater - Country Grove | 145 | 0 | 145 | 434 | 0 | 434 |
| Tidewater - Hart's Landing | 348 | 0 | 348 | 353 | 0 | 353 |
| Tidewater - Milton Regional | 2,994 | 0 | 2,994 | 4,101 | 2,330 | 6,431 |
| Tidewater - Retreat | 211 | 0 | 211 | 397 | 0 | 397 |
| Tidewater - The Ridings *In Process of Acquiring* | 120 | 0 | 120 | 551 | 0 | 551 |
| Tidewater - Trussum *Proposed* | 0 | 0 | 0 | 2,328 | 0 | 2,328 |
| Tidewater - Wandendale *Proposed* | 0 | 0 | 0 | 4,655 | 0 | 4,655 |
| New Castle County Total | 102,735 | 410,247 | 512,982 | 124,672 | 417,447 | 542,119 |
| Kent County Total | 40,291 | 63,170 | 103,461 | 42,730 | 66,170 | 108,900 |
| Sussex County Total | 169,910 | 3,863 | 173,773 | 760,658 | 6,459 | 767,117 |
| Private Total | 6,186 | 0 | 6,186 | 21,060 | 2,330 | 23,390 |
| State Total | 319,122 | 477,280 | 796,402 | 949,120 | 492,406 | 1,441,526 |

Collection System Population Served

Table A-18 presents current and future population served information for each collection system, including resident and non-resident populations. Non-residents include estimates of those individuals served by the neighboring collection systems, so totals would be duplicative and are not included.

Table A-18. Collection System Population Served

| Wastewater System | Current | | | Future - 2030 | | |
|---|----------|-------------|---------|---------------|-------------|---------|
| | Resident | Nonresident | Total | Resident | Nonresident | Total |
| New Castle County | | | | | | |
| New Castle County - Water Farm #2 treated by Middletown WWTP - CS | 7,870 | 0 | 7,870 | 16,553 | 0 | 16,553 |
| City of Newark Sewer Authority treated by Wilmington WWTP - CS | 30,230 | 0 | 30,230 | 30,947 | 0 | 30,947 |
| New Castle County - North of the C&D treated by Wilmington WWTP - CS | 379,717 | 30,230 | 409,947 | 393,631 | 30,947 | 424,578 |
| Kent County | | | | | | |
| Camden-Wyoming Sewer and Water Authority treated by Kent County WWTP - CS | 3,241 | 100 | 3,341 | 6,500 | 200 | 6,700 |
| Dover Sewer Authority treated by Kent County WWTP - CS | 37,479 | 300 | 37,779 | 39,226 | 300 | 39,526 |
| Milford Sewer Authority treated by Kent County WWTP - CS | 9,302 | 227 | 9,529 | 19,273 | 470 | 19,743 |
| Town of Clayton treated by Kent County WWTP - CS | 2,200 | 20 | 2,220 | 3,450 | 25 | 3,475 |
| Town of Smyrna treated by Kent County WWTP - CS | 10,000 | 2,000 | 12,000 | 20,000 | 2,000 | 22,000 |
| Sussex County | | | | | | |
| Town of Greenwood treated by Bridgeville WWTF - CS | 1,125 | 0 | 1,125 | 1,489 | 0 | 1,489 |
| Sussex County Collection Systems - CS | 12,500 | 0 | 12,500 | 12,500 | 0 | 12,500 |

Financial Tables

Wastewater System Rates and Revenue Analysis

Table A-19 presents average annual wastewater system rates for each district. Total annual residential revenue is presented for each wastewater system. These data are grouped with the response to the questions on whether the community/utility believes that it has sufficient revenue based on these current rates. The comments column provides some additional details about revenue sufficiency.

Table A-19. Wastewater System Rates and Revenue Sufficiency Analysis

| Wastewater System | Average Sewer Rate (\$/year) | Total Annual Residential Revenue (\$) | Sufficient Revenue at Current Rates | Sufficient Rates Comments |
|---|------------------------------|---------------------------------------|-------------------------------------|---|
| New Castle County | | | | |
| New Castle County - Delaware City WWTP | \$269.00 | \$242,638 | Yes | N/A. |
| New Castle County - Lea Eara Farms WWTP | \$269.00 | \$75,051 | Yes | N/A. |
| New Castle County - Port Penn STP | \$269.00 | \$44,116 | Yes | N/A. |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | \$269.00 | \$642,372 | Yes | N/A. |
| Town of Middletown - Frog Hollow WWTF | \$184.83 | \$86,500 | Yes | N/A. |
| Town of Middletown - Middletown WWTP | \$184.83 | \$1,038,375 | No | Contract costs for plant O&M are ahead of the number of customers. The lag time to reach the break even date is dependent on the growth rate. |
| New Castle County - Water Farm #2 treated by Middletown WWTP - CS | \$269.00 | \$8,877 | Yes | N/A. |
| Wilmington WWTP | \$189.36 | \$3,578,525 | No | Water and sewer are combined fund. Expect to be on track by FY 2012. |
| City of Newark Sewer Authority treated by Wilmington WWTP - CS | \$350.00 | \$2,764,650 | Yes | N/A. |
| New Castle County - North of the C&D treated by Wilmington WWTP - CS | \$269.00 | \$31,742,269 | Yes | N/A. |
| Kent County | | | | |
| City of Harrington WWTP | \$571.11 | \$771,000 | Yes | N/A. |
| Kent County Regional WWTP | \$319.25 | \$5,169,004 | Yes | N/A. |
| Camden-Wyoming Sewer and Water Authority treated by Kent County WWTP - CS | \$313.35 | \$730,732 | Yes | Revenue to expenditure must be 120%. |

| Wastewater System | Average Sewer Rate (\$/year) | Total Annual Residential Revenue (\$) | Sufficient Revenue at Current Rates | Sufficient Rates Comments |
|--|-------------------------------------|--|--|---|
| Dover Sewer Authority treated by Kent County WWTP - CS | \$491.31 | \$4,974,514 | Yes | W/WW is the same fund. Previously W was supporting WW, recent I/I adjustment fixes. W/WW is meeting all debt covenants and financial obligations regardless. |
| Milford Sewer Authority treated by Kent County WWTP - CS | \$407.86 | \$1,625,747 | Yes | N/A. |
| Town of Clayton treated by Kent County WWTP - CS | \$373.20 | \$422,089 | Yes | Recently increased rates (passed by council). |
| Town of Smyrna treated by Kent County WWTP - CS | \$303.00 | \$1,128,372 | Yes | N/A. |
| Sussex County | | | | |
| City of Lewes STP | \$795.06 | \$1,931,988 | Yes | Recent rate increase. |
| City of Rehoboth Beach STP | \$360.79 | \$898,001 | Yes | Rates will increase in future to finance cost of alternative effluent discharge ocean outfall. |
| City of Seaford WWTP | \$446.88 | \$812,875 | Yes | Breakeven enterprise funds (O&M), but no major set-aside to start major capital improvements. |
| Delmar WWTP | \$276.85 | \$504,151 | Yes | Just revised rates to meet new upgrades. |
| Sussex County - Inland Bays Regional WWTF | \$631.49 | \$4,904,804 | Yes | N/A. |
| Sussex County - Piney Neck Regional WWTF | \$412.48 | \$229,339 | Yes | N/A. |
| Sussex County - South Coastal Regional WWTF | \$512.92 | \$11,580,762 | Yes | N/A. |
| Sussex County - Wolfe Neck WWTF | \$705.80 | \$9,517,713 | Yes | N/A. |
| Town of Georgetown WRF | \$656.89 | \$1,273,047 | Yes | Council recently approved rate increase. |
| Town of Bridgeville WWTF | \$336.00 | \$307,776 | Yes | Recently increased rates, July 2010. |
| Town of Greenwood treated by Bridgeville WWTF - CS | \$696.00 | \$313,200 | Yes | N/A. |
| Town of Laurel STP | \$678.00 | \$899,706 | Yes | N/A. |
| Town of Millsboro WWTF | \$475.20 | \$1,335,312 | No | Current O&M is covered. New plant depreciation and interest on loans exceeds income from WW. Plant was constructed for Plantation Lakes (80% impact fees, 20% townspeople), but development is stalled. |
| Town of Selbyville WWTF | \$652.03 | \$871,764 | Yes | N/A. |
| Sussex County Collection Systems - CS | \$396.23 | \$1,645,529 | Yes | N/A. |
| Private | | | | |
| Artesian - Beaver Creek | \$900.00 | \$146,700 | No | Due to reduced rate of build-out. |
| Artesian - Heron Bay | \$900.00 | \$158,400 | No | Due to reduced rate of build-out. |
| Artesian - Reserves at Lewes Landing | \$900.00 | \$45,900 | No | Due to reduced rate of build-out. |

| Wastewater System | Average Sewer Rate (\$/year) | Total Annual Residential Revenue (\$) | Sufficient Revenue at Current Rates | Sufficient Rates Comments |
|--|------------------------------|---------------------------------------|-------------------------------------|--|
| Artesian - Stonewater Creek | \$900.00 | \$292,500 | No | Due to reduced rate of build-out. |
| Artesian - Villages at Herring Creek | \$900.00 | \$38,700 | No | Due to reduced rate of build-out. |
| Tidewater - Bay Front Regional | \$960.00 | \$73,920 | No | The number of proposed EDUs are not meeting projections due to the economy. The rates need adjusting and a rate filing is anticipated in 2011. Currently operating at a deficit, but no transfers from other enterprises are needed. |
| Tidewater - Breeder's Crown | \$1,125.00 | \$63,000 | No | Currently operating at a deficient, but no transfers from other enterprises are necessary. Operating expenses are higher than anticipated and customer connections didn't occur as anticipated. The rates need adjusting and a rate filing is anticipated in 2011. |
| Tidewater - Country Grove | \$1,025.00 | \$60,475 | Yes | N/A. |
| Tidewater - Hart's Landing | \$995.00 | \$141,290 | No | The number of proposed EDUs are not as projected due to the economy. The rates need adjusting and a rate filing is anticipated in 2011. Currently operating at a deficit, but no transfers from other enterprises needed. |
| Tidewater - Milton Regional | \$350.00 | \$449,750 | No | We are currently running deficiently, but no transfers from other enterprises are necessary. The number of EDUs are lower than projected. It is anticipated that rates will be adjusted in 2012. |
| Tidewater - Retreat | \$850.00 | \$73,100 | No | The number of proposed EDUs are not as projected due to the economy. The rates need adjusting and a rate filing is anticipated in 2011. Currently operating at a deficit, but no transfers from other enterprises needed. |
| Tidewater - The Ridings *In Process of Acquiring* | \$1,245.00 | \$61,005 | - | Currently do not own. Acquisition expected to be complete by 3-15-11. |
| Tidewater - Trussum *Proposed* | NA | NA | NA | Proposed Facility. |
| Tidewater - Wandendale *Proposed* | NA | NA | NA | Proposed Facility. |
| New Castle County | \$252 | \$40,223,374 | 8 | |
| Kent County | \$397 | \$14,821,458 | 7 | |
| Sussex County | \$536 | \$37,025,967 | 14 | |
| Private | \$789 | \$1,604,740 | 1 | |
| State | \$554 | \$93,675,539 | 30 | |

Reserve Account Summary

Table A-20 presents a summary of the status of a community's or utility's reserve account. Information is included about whether each wastewater system has a reserve account, if it is restricted to wastewater, the percent value compared to overall revenue. Comments are presented about any restrictions related to the reserve account.

Table A-20. Reserve Account Summary

| Wastewater System | Reserve Account | Reserve Account Restricted to Wastewater | Reserve Account % Value Compared to Operating Revenue | Comments |
|---|-----------------|--|---|---|
| New Castle County | | | | |
| New Castle County - Delaware City WWTP | Yes | Yes | 20% | Two reserve accounts: Sewer Fund Budget Reserve Account and the Sewer Rate Stabilization Reserve Account. |
| New Castle County - Lea Eara Farms WWTP | Yes | Yes | 20% | Two reserve accounts: Sewer Fund Budget Reserve Account and the Sewer Rate Stabilization Reserve Account. |
| New Castle County - Port Penn STP | Yes | Yes | 20% | Two reserve accounts: Sewer Fund Budget Reserve Account and the Sewer Rate Stabilization Reserve Account. |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | Yes | Yes | 20% | Two reserve accounts: Sewer Fund Budget Reserve Account and the Sewer Rate Stabilization Reserve Account. |
| Town of Middletown - Frog Hollow WWTF | Yes | Yes | 193% | See main Middletown plant. |
| Town of Middletown - Middletown WWTP | Yes | Yes | 193% | For sewer capital within 10 years via impact fees (not for O&M). \$2.6M (reserve) vs. \$1.37M (annual budget). |
| New Castle County - Water Farm #2 treated by Middletown WWTP - CS | Yes | Yes | 20% | Two reserve accounts: Sewer Fund Budget Reserve Account and the Sewer Rate Stabilization Reserve Account. |
| Wilmington WWTP | No | No | NA | City considering adopting a new reserve policy. |
| City of Newark Sewer Authority treated by Wilmington WWTP - CS | Yes | Yes | 180% | Account is restricted to WW but no internal restrictions. Operating revenue \$4.1M. Reserve is \$7.4M. |
| New Castle County - North of the C&D treated by Wilmington WWTP - CS | Yes | Yes | 20% | Two reserve accounts: Sewer Fund Budget Reserve Account and the Sewer Rate Stabilization Reserve Account. |
| Kent County | | | | |
| City of Harrington WWTP | Yes | Yes | 23% | Escrow account for future debt service. Impact reserve account for future installations or major repairs. |
| Kent County Regional WWTP | Yes | Yes | 7% | Funds are shared/overlapped. "Working capital reserve fund", "capital emergency reserve fund", (not "accounts"), are restricted. Operating revenue and % reserve do not include debt service. |
| Camden-Wyoming Sewer and Water Authority treated by Kent County WWTP - CS | Yes | Yes | 10% | N/A. |
| Dover Sewer Authority treated by Kent County WWTP - CS | Yes | Yes | 8% | Must keep min 8% + 2% for cap imp + \$0.5M for emergency. Restrictions: one set by Council, one by ordinance. |

| Wastewater System | Reserve Account | Reserve Account Restricted to Wastewater | Reserve Account % Value Compared to Operating Revenue | Comments |
|--|-----------------|--|---|---|
| Milford Sewer Authority treated by Kent County WWTP - CS | Yes | Yes | 39% | Must be approved by council. |
| Town of Clayton treated by Kent County WWTP - CS | No | No | N/A. | Part of rate increase is to create a dedicated reserve account. |
| Town of Smyrna treated by Kent County WWTP - CS | Yes | No | N/A. | Not reserved for WW. The Town of Smyrna has 3 million rainy day fund which can be used for capital construction but has to be authorized by Town Council. This reserve is combined with water and other public works. |
| Sussex County | | | | |
| City of Lewes STP | Yes | Yes | 59% | Per cash reserve policy: 25% for OM, 2% for net asset cost/risk management, 15% of current capital budget (for future project funding), 15% set aside for 5 year CIP. |
| City of Rehoboth Beach STP | Yes | Yes | 2% | Reserve is for treatment plant. |
| City of Seaford WWTP | Yes | Yes | 5% | Emergencies or minor capital improvements. |
| Delmar WWTP | Yes | No | 9% | Emergency repairs or can take out a portion for a major project. Water and Sewer reserve fund is combined. |
| Sussex County - Inland Bays Regional WWTF | Yes | Yes | N/A. | None. |
| Sussex County - Piney Neck Regional WWTF | Yes | Yes | N/A. | None. |
| Sussex County - South Coastal Regional WWTF | Yes | Yes | N/A. | None. |
| Sussex County - Wolfe Neck WWTF | Yes | Yes | N/A. | None. |
| Town of Georgetown WRF | No | No | N/A. | Holding 2 years of impact fees for future projects. Establishing reserve account part of new plan. |
| Town of Bridgeville WWTF | Yes | Yes | 15% | No formal restrictions (repairs only). Also, Greenwood pays into a sinking fund (1% per year) for repairs in Bridgeville (repairs must be approved by council). |
| Town of Greenwood treated by Bridgeville WWTF - CS | Yes | Yes | 15% | Emergency repairs only. % is approximated. |
| Town of Laurel STP | Yes | No | 1% | Reserve is W/WW capital reserve for projects (leftover impact fees, etc.). No active O&M/enterprise reserve. |
| Town of Millsboro WWTF | Yes | Yes | 20% | %WW is from June 30, 2010. Reserve may be used for debt service, emergency repairs, or major renovations. |
| Town of Selbyville WWTF | Yes | No | 84% | Marked as restricted, but not required. |
| Sussex County Collection Systems - CS | Yes | Yes | N/A. | None. |
| Private | | | | |

| Wastewater System | Reserve Account | Reserve Account Restricted to Wastewater | Reserve Account % Value Compared to Operating Revenue | Comments |
|---|-----------------|--|---|---|
| Artesian - Beaver Creek | N/A. | N/A. | N/A. | N/A. |
| Artesian - Heron Bay | N/A. | N/A. | N/A. | N/A. |
| Artesian - Reserves at Lewes Landing | N/A. | N/A. | N/A. | N/A. |
| Artesian - Stonewater Creek | N/A. | N/A. | N/A. | N/A. |
| Artesian - Villages at Herring Creek | N/A. | N/A. | N/A. | N/A. |
| Tidewater - Bay Front Regional | N/A. | N/A. | N/A. | TESI does not need a reserve account because they are obligated under the PSC to have no interrupted service and to make investments as req'd as explained in #11. The PSC requires proper financing to ensure uninterrupted service. |
| Tidewater - Breeder's Crown | N/A. | N/A. | N/A. | Same as above. |
| Tidewater - Country Grove | N/A. | N/A. | N/A. | Same as above. |
| Tidewater - Hart's Landing | N/A. | N/A. | N/A. | Same as above. |
| Tidewater - Milton Regional | N/A. | N/A. | N/A. | Same as above. |
| Tidewater - Retreat | N/A. | N/A. | N/A. | Same as above. |
| Tidewater - The Ridings *In Process of Acquiring* | N/A. | N/A. | N/A. | Same as above. |
| Tidewater - Trussum *Proposed* | N/A. | N/A. | N/A. | Same as above. |
| Tidewater - Wandendale *Proposed* | N/A. | N/A. | N/A. | Same as above. |
| New Castle County Total | 9 | 9 | 69% | |
| Kent County Total | 6 | 5 | 12% | |
| Sussex County Total | 14 | 11 | 14% | |
| Private Total | 5 | 0 | 0% | |
| State Total | 34 | 25 | 24% | |

Rate and Bill Computation Summary

Table A-21 presents a summary of the different methods used to compute customer bills and rates. Data on this table includes both residential and commercial/industrial/contract users.

Table A-21. Rate/Bill Computation Summary

| Wastewater System | Customer Rate/Bills Computation Method | | | | Commercial/Industrial/Contract Methods |
|--|--|---------|--------------------------|--------------------------------------|--|
| | EDU | Metered | Front-footage Assessment | Description | |
| New Castle County | | | | | |
| New Castle County - Delaware City WWTP | - | ✓ | - | Countywide Average. | Based on Flow/BOD/SS with billing multipliers. |
| New Castle County - Lea Eara Farms WWTP | - | ✓ | - | Countywide Average. | Based on Flow/BOD/SS with billing multipliers. |
| New Castle County - Port Penn STP | - | ✓ | - | Countywide Average. | Based on Flow/BOD/SS with billing multipliers. |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | - | ✓ | - | Countywide Average. | Based on Flow/BOD/SS with billing multipliers. |
| Town of Middletown - Frog Hollow WWTF | - | ✓ | - | Metered by water usage. | See main Middletown plant. |
| Town of Middletown - Middletown WWTP | - | ✓ | - | Metered by water usage. | Water Consumption (no separate sewer meter for comm./ind.). NCC has sewer meter @ PS (\$43.74/1000 gals incl. impact fee, user fee alone is \$2.65/1000 gal). |
| New Castle County - Water Farm #2 treated by Middletown WWTP - CS | - | ✓ | - | Countywide Average. | Based on Flow/BOD/SS with billing multipliers. |
| Wilmington WWTP | - | ✓ | - | | Most comm./ind. bills computed same as residents. About 40 high-strength customers on sewer surcharge (flow, BOD, TSS equation). 5 industrial is Noramco, ICI, Amtrak, Cherry Island (DSWA), and IPC. NCC on contract. |
| City of Newark Sewer Authority treated by Wilmington WWTP - CS | - | ✓ | - | Metered by water usage. | Based on characteristics and strength (Flow/BOD/TSS) with billing multipliers. No municipal contract users. |
| New Castle County - North of the C&D treated by Wilmington WWTP - CS | - | ✓ | - | Countywide Average. | Based on Flow/BOD/SS with billing multipliers. |
| Kent County | | | | | |
| City of Harrington WWTP | - | - | - | Flat Fee - Inside and Outside Rates. | Flow only. Limits are set on BOD, TSS, and Oil/Grease and are tested. |
| Kent County Regional WWTP | ✓ | - | - | | All comm./ind./MHP/contracts pay \$2.34 per 1000 gal. |

| Wastewater System | Customer Rate/Bills Computation Method | | | | Commercial/Industrial/Contract Methods |
|---|--|---------|--------------------------|--|--|
| | EDU | Metered | Front-footage Assessment | Description | |
| Camden-Wyoming Sewer and Water Authority treated by Kent County WWTP - CS | ✓ | - | - | | \$0.24 on top of KCWW fees. Rates same (resid.: monthly, comm.: quarterly). |
| Dover Sewer Authority treated by Kent County WWTP - CS | - | ✓ | - | Metered by water usage. | No muni contract users. Flow-based only same as residential, no BOD/TSS. Some may have separate sewer meter. Hunters Point has single sewer meter. |
| Milford Sewer Authority treated by Kent County WWTP - CS | - | ✓ | - | | Most off water meter, some have separate sewer meter. Same rate as residents, flow-based only. |
| Town of Clayton treated by Kent County WWTP - CS | - | ✓ | - | Metered by water usage; Some Unincorp Kent County estimated. | Same as residential (flow-based, no BOD or TSS fee). |
| Town of Smyrna treated by Kent County WWTP - CS | - | ✓ | - | Metered by water usage. | Smyrna bills Clayton @ Clayton metering station (maintained by Clayton). Kent bills Smyrna full flow @ PS1 maintained by County (meter and PS). Large users are still billed by water meter. |
| Sussex County | | | | | |
| City of Lewes STP | - | ✓ | - | | No industry or contract users; no pretreatment systems. Commercial same as resident but larger fee comm. users and larger meters. |
| City of Rehoboth Beach STP | - | ✓ | - | Metered by water usage. | Same as residential (off water meter). |
| City of Seaford WWTP | ✓ | - | - | | BASF, Orient Chem., Proceno Plating (Blades), Nanticoke Memorial, Allan's Hatchery, Seaford HS, 3 elem. schl., 1 middle schl. Most metered of water, some sewer meter (incl. Blades). Surcharge rates (TSS, BOD, nutrients, etc.) per individual agreements. |
| Delmar WWTP | ✓ | ✓ | ✓ | | Breckenridge (non-metered MHP) is flat fee per EDU. Commercial is metered and converted to EDU, flow only. |
| Sussex County - Inland Bays Regional WWTF | ✓ | - | ✓ | | Same as residents. |
| Sussex County - Piney Neck Regional WWTF | ✓ | - | ✓ | | Same as residents. |
| Sussex County - South Coastal Regional WWTF | ✓ | - | ✓ | | Same as residents. |
| Sussex County - Wolfe Neck WWTF | ✓ | - | ✓ | | Same as residents. |

| Wastewater System | Customer Rate/Bills Computation Method | | | | Commercial/Industrial/Contract Methods |
|--|--|---------|--------------------------|--|---|
| | EDU | Metered | Front-footage Assessment | Description | |
| Town of Georgetown WRF | ✓ | ✓ | - | | See service area for comm. (some sewer meter, some water meter). Agreement with Sussex County for E-dale is an operational expense ratio (audited). |
| Town of Bridgeville WWTF | - | ✓ | - | | Metered (comm. and contract), or self-reporting via a pre-treatment ordinance (industrial). Flow based rates considering BOD/nutrients/TSS/etc. |
| Town of Greenwood treated by Bridgeville WWTF - CS | ✓ | - | - | | No industrial or contracts. Commercial is flow based (1 meter unit / 200 gal/day). 6,000 gal/month is one EDU. |
| Town of Laurel STP | ✓ | ✓ | - | | Metered like residential but different rate (no sewer meters). |
| Town of Millsboro WWTF | - | ✓ | - | Metered by water usage. Some residents have separate water meter for irrigation. | Flow only same as residential. Pretreatment and standards in ordinance. Testing done at lab effluent (Intervet/Merck) but no required pretreatment at this time. Stockley, school, and Woodlands have sewer meters. |
| Town of Selbyville WWTF | - | ✓ | - | | Commercial same as residential (based off water meter). Separate, special agreement with a single large industrial user (Mountaire). |
| Sussex County Collection Systems - CS | ✓ | - | ✓ | | Same as residents. |
| Private | | | | | |
| Artesian - Beaver Creek | ✓ | - | - | | Clubhouse and WTP is multiple EDU. |
| Artesian - Heron Bay | ✓ | - | - | | N/A. |
| Artesian - Reserves at Lewes Landing | ✓ | - | - | | Clubhouse, no WTP on-site. |
| Artesian - Stonewater Creek | ✓ | - | - | | Clubhouse (public at Independence) at each plus WTPs treated as multi-EDU. |
| Artesian - Villages at Herring Creek | ✓ | - | - | | No clubhouse or WWTP. |
| Tidewater - Bay Front Regional | ✓ | - | - | | N/A. |
| Tidewater - Breeder's Crown | ✓ | - | - | | N/A. |
| Tidewater - Country Grove | ✓ | - | - | | N/A. |
| Tidewater - Hart's Landing | ✓ | - | - | | N/A. |
| Tidewater - Milton Regional | - | ✓ | - | Metered by water usage. | \$40 flat + \$3/1,000 gal. (same rate as residents). Estimate EDU ~1,500gal/quarter. |
| Tidewater - Retreat | ✓ | - | - | | N/A. |

| Wastewater System | Customer Rate/Bills Computation Method | | | Description | Commercial/Industrial/ Contract Methods |
|---|--|-----------|--------------------------|-------------|--|
| | EDU | Metered | Front-footage Assessment | | |
| Tidewater - The Ridings *In Process of Acquiring* | ✓ | - | - | | N/A. |
| Tidewater - Trussum *Proposed* | ✓ | - | - | | N/A. |
| Tidewater - Wandendale *Proposed* | ✓ | - | - | | N/A. |
| New Castle County Total | 0 | 10 | 0 | | |
| Kent County Total | 2 | 4 | 0 | | |
| Sussex County Total | 10 | 8 | 6 | | |
| Private Total | 13 | 1 | 0 | | |
| State Total | 25 | 23 | 6 | | |

Median Household Income

Table A-22 presents median household income (MHI) and additional potential revenues generated from increases in user fees based on three increased sewer rate scenarios (1.0, 1.5, 2.0, and 2.5 percent, respectively). The additional revenue scenarios are marked with a dash if the average rate as a percent of MHI is already at or above those levels, as no additional revenue would be generated.

Table A-22. Median Household Income

| Wastewater System | Average Sewer Rate | Median Household Income (MHI) | Average Rate as % of MHI | Additional Revenue | | | |
|---|--------------------|-------------------------------|--------------------------|--------------------|------------------|------------------|------------------|
| | | | | MHI 1.0% revenue | MHI 1.5% revenue | MHI 2.0% revenue | MHI 2.5% revenue |
| New Castle County | | | | | | | |
| New Castle County - Delaware City WWTP | \$269.00 | \$62,293 | 0.432 | \$319,245 | \$600,186 | \$881,128 | \$1,162,069 |
| New Castle County - Lea Eara Farms WWTP | \$269.00 | \$62,293 | 0.432 | \$98,746 | \$185,645 | \$272,544 | \$359,443 |
| New Castle County - Port Penn STP | \$269.00 | \$62,293 | 0.432 | \$58,045 | \$109,125 | \$160,205 | \$211,285 |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | \$269.00 | \$62,293 | 0.432 | \$845,185 | \$1,588,963 | \$2,332,742 | \$3,076,520 |
| Town of Middletown - Frog Hollow WWTF | \$184.83 | \$54,129 | 0.341 | \$166,823 | \$293,485 | \$420,147 | \$546,809 |
| Town of Middletown - Middletown WWTP | \$184.83 | \$54,129 | 0.341 | \$2,002,592 | \$3,523,076 | \$5,043,560 | \$6,564,043 |
| New Castle County - Water Farm #2 - treated by Middletown WWTP - CS | \$269.00 | \$62,293 | 0.432 | \$11,680 | \$21,958 | \$32,236 | \$42,515 |
| Wilmington WWTP | \$189.36 | \$45,623 | 0.415 | \$5,043,309 | \$9,354,227 | \$13,665,144 | \$17,976,061 |
| City of Newark Sewer Authority treated by Wilmington WWTP - CS | \$350.00 | \$53,357 | 0.656 | \$1,450,019 | \$3,557,354 | \$5,664,689 | \$7,772,024 |
| New Castle County - North of the C&D treated by Wilmington WWTP - CS | \$269.00 | \$62,293 | 0.432 | \$41,764,094 | \$78,517,275 | \$115,270,457 | \$152,023,638 |
| Kent County | | | | | | | |
| City of Harrington WWTP | 571.11 | \$40,204 | 1.421 | - | \$43,131 | \$314,508 | \$585,885 |
| Kent County Regional WWTP | 319.25 | \$48,073 | 0.664 | \$2,614,495 | \$6,506,245 | \$10,397,995 | \$14,289,744 |
| Camden-Wyoming Sewer and Water Authority treated by Kent County WWTP - CS | 313.35 | \$62,069 | 0.505 | \$716,717 | \$1,440,441 | \$2,164,166 | \$2,887,891 |

| Wastewater System | Average Sewer Rate | Median Household Income (MHI) | Average Rate as % of MHI | Additional Revenue | | | |
|--|--------------------|-------------------------------|--------------------------|--------------------|------------------|------------------|------------------|
| | | | | MHI 1.0% revenue | MHI 1.5% revenue | MHI 2.0% revenue | MHI 2.5% revenue |
| Dover Sewer Authority treated by Kent County WWTP - CS | 491.31 | \$50,239 | 0.978 | \$112,185 | \$2,655,534 | \$5,198,884 | \$7,742,233 |
| Milford Sewer Authority treated by Kent County WWTP - CS | 407.86 | \$42,257 | 0.965 | \$58,617 | \$900,799 | \$1,742,981 | \$2,585,163 |
| Town of Clayton treated by Kent County WWTP - CS | 373.20 | \$56,466 | 0.661 | \$216,541 | \$535,856 | \$855,172 | \$1,174,487 |
| Town of Smyrna treated by Kent County WWTP - CS | 303.00 | \$66,853 | 0.453 | \$1,361,234 | \$2,606,037 | \$3,850,839 | \$5,095,642 |
| Sussex County | | | | | | | |
| City of Lewes STP | \$795.06 | \$63,281 | 1.256 | - | \$374,605 | \$1,143,469 | \$1,912,333 |
| City of Rehoboth Beach STP | \$360.79 | \$66,817 | 0.540 | \$765,075 | \$1,596,612 | \$2,428,150 | \$3,259,687 |
| City of Seaford WWTP | \$446.88 | \$49,275 | 0.907 | \$83,438 | \$531,594 | \$979,750 | \$1,427,906 |
| Delmar WWTP | \$276.85 | \$34,842 | 0.795 | \$130,322 | \$447,558 | \$764,795 | \$1,082,031 |
| Sussex County - Inland Bays Regional WWTF | \$631.49 | \$48,422 | 1.304 | - | \$736,601 | \$2,617,069 | \$4,497,538 |
| Sussex County - Piney Neck Regional WWTF | \$412.48 | \$47,375 | 0.871 | \$34,066 | \$165,769 | \$297,471 | \$429,174 |
| Sussex County - South Coastal Regional WWTF | \$512.92 | \$50,537 | 1.015 | - | \$5,534,604 | \$11,239,726 | \$16,944,848 |
| Sussex County - Wolfe Neck WWTF | \$705.80 | \$50,537 | 1.397 | - | \$704,659 | \$4,112,116 | \$7,519,573 |
| Town of Georgetown WRF | \$656.89 | \$41,412 | 1.586 | - | - | \$332,082 | \$733,364 |
| Town of Bridgeville WWTF | \$336.00 | \$34,532 | 0.973 | \$8,537 | \$166,694 | \$324,850 | \$483,007 |
| Town of Greenwood treated by Bridgeville WWTF - CS | \$696.00 | \$46,236 | 1.505 | - | - | \$102,924 | \$206,955 |
| Town of Laurel STP | \$678.00 | \$36,795 | 1.843 | - | - | \$76,833 | \$320,968 |
| Town of Millsboro WWTF | \$475.20 | \$35,571 | 1.336 | - | \$164,006 | \$663,778 | \$1,163,551 |
| Town of Selbyville WWTF | \$652.03 | \$47,096 | 1.384 | - | \$72,746 | \$387,583 | \$702,420 |
| Sussex Co. Collection Systems - CS | \$396.23 | \$50,537 | 0.784 | \$453,272 | \$1,502,673 | \$2,552,074 | \$3,601,475 |
| Private | | | | | | | |
| Artesian - Beaver Creek | \$900.00 | \$65,773 | 1.368 | - | \$14,115 | \$67,720 | \$121,325 |

| Wastewater System | Average Sewer Rate | Median Household Income (MHI) | Average Rate as % of MHI | Additional Revenue | | | |
|---|--------------------|-------------------------------|--------------------------|--------------------|--------------------|---------------------|---------------------|
| | | | | MHI 1.0% revenue | MHI 1.5% revenue | MHI 2.0% revenue | MHI 2.5% revenue |
| Artesian - Heron Bay | \$900.00 | \$49,484 | 1.819 | - | - | \$15,784 | \$59,330 |
| Artesian - Reserves at Lewes Landing | \$900.00 | \$50,074 | 1.797 | - | - | \$5,175 | \$17,944 |
| Artesian - Stonewater Creek | \$900.00 | \$49,484 | 1.819 | - | - | \$29,146 | \$109,558 |
| Artesian - Villages at Herring Creek | \$900.00 | \$52,878 | 1.702 | - | - | \$6,775 | \$18,144 |
| Tidewater - Bay Front Regional | \$960.00 | \$47,727 | 2.011 | - | - | - | \$17,954 |
| Tidewater - Breeder's Crown | \$1,125 | \$55,179 | 2.039 | - | - | - | \$14,251 |
| Tidewater - Country Grove | \$1,025 | \$47,727 | 2.148 | - | - | - | \$9,922 |
| Tidewater - Hart's Landing | \$995.00 | \$47,727 | 2.085 | - | - | - | \$28,141 |
| Tidewater - Milton Regional | \$350.00 | \$40,313 | 0.868 | \$68,272 | \$327,283 | \$586,294 | \$845,305 |
| Tidewater - Retreat | \$850.00 | \$47,727 | 1.781 | - | - | \$8,990 | \$29,513 |
| Tidewater - The Ridings *In Process of Acquiring* | \$1,245 | \$47,727 | 2.609 | - | - | - | - |
| Tidewater - Trussum *Proposed* | - | \$49,484 | - | - | - | - | - |
| Tidewater - Wandendale *Proposed* | - | \$54,881 | - | - | - | - | - |
| New Castle County Average | \$252 | \$58,100 | 0.435 | \$5,175,974 | \$9,775,129 | \$14,374,285 | \$18,973,441 |
| Kent County Average | \$397 | \$52,309 | 0.807 | \$846,632 | \$2,098,292 | \$3,503,506 | \$4,908,721 |
| Sussex County Average | \$536 | \$46,884 | 1.166 | \$245,785 | \$999,843 | \$1,868,178 | \$2,952,322 |
| Private Average | \$921 | \$50,442 | 1.837 | \$68,272 | \$170,699 | \$102,841 | \$115,581 |
| State Average | \$554 | \$51,231 | 1.126 | \$2,538,370 | \$4,025,124 | \$5,051,537 | \$6,270,969 |

Rates by User Charge Area

Table A-23 presents the number of households, total annual residential revenue, and the average sewer rate by user charge area.

Table A-23. Rates by User Charge Area

| Wastewater System | User Charge Area | Contract User | # of Households | Total Annual Residential Revenue | Average Sewer Rate |
|--|----------------------------|---------------|-----------------|----------------------------------|--------------------|
| New Castle County | | | | | |
| New Castle County - Delaware City WWTP | Delaware City | | 637 | \$171,353 | \$269.00 |
| | Unincorp - New Castle Cnty | | 265 | \$71,285 | \$269.00 |
| New Castle County - Lea Eara Farms WWTP | Unincorp - New Castle Cnty | | 279 | \$75,051 | \$269.00 |
| New Castle County - Port Penn STP | Unincorp - New Castle Cnty | | 164 | \$44,116 | \$269.00 |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | Middletown | ✓ | | | |
| | Odessa | | 122 | \$32,818 | \$269.00 |
| | Townsend | | 517 | \$139,073 | \$269.00 |
| | Unincorp - New Castle Cnty | | 1,749 | \$470,481 | \$269.00 |
| Town of Middletown - Frog Hollow WWTF | Middletown | | 468 | \$86,500 | \$184.83 |
| Town of Middletown - Middletown WWTP | Middletown | | 5,618 | \$1,038,375 | \$184.83 |
| | Unincorp - New Castle Cnty | ✓ | | | |
| New Castle County - Water Farm #2 - treated by Middletown WWTP - CS | Unincorp - New Castle Cnty | | 33 | \$8,877 | \$269.00 |
| Wilmington WWTP | Unincorp - New Castle Cnty | ✓ | | | |
| | Wilmington | | 18,898 | \$3,578,525 | \$189.36 |
| City of Newark Sewer Authority treated by Wilmington WWTP - CS | Newark | | 7,899 | \$2,764,650 | \$350.00 |
| New Castle County - North of the C&D treated by Wilmington WWTP - CS | Arden | | 2,652 | \$713,388 | \$269.00 |
| | Ardencroft | | 2,652 | \$713,388 | \$269.00 |
| | Bellefonte | | 6,629 | \$1,783,201 | \$269.00 |
| | Delaware County, PA | ✓ | | | |
| | Elsmere | | 6,629 | \$1,783,201 | \$269.00 |
| | New Castle | | 3,978 | \$1,070,082 | \$269.00 |
| | Newark | ✓ | | | |
| | Newport | | 3,978 | \$1,070,082 | \$269.00 |
| | Unincorp - New Castle Cnty | | 91,483 | \$24,608,927 | \$269.00 |
| Kent County | | | | | |
| City of Harrington WWTP | Farmington | | 150 | \$99,000 | \$660.00 |
| | Harrington | | 1,200 | \$672,000 | \$560.00 |
| Kent County Regional WWTP | Bowers Beach | | 347 | \$142,437 | \$410.48 |
| | Camden | ✓ | | | |
| | Cheswold | | 1,259 | \$394,772 | \$313.56 |
| | Clayton | ✓ | | | |
| | Dover | ✓ | | | |
| | Felton | | 1,047 | \$349,237 | \$333.56 |
| | Frederica | | 404 | \$134,758 | \$333.56 |

| Wastewater System | User Charge Area | Contract User | # of Households | Total Annual Residential Revenue | Average Sewer Rate |
|---|----------------------------|---------------|-----------------|----------------------------------|--------------------|
| | KCSSD - Bakers Choice | | 86 | \$42,921 | \$499.08 |
| | KCSSD - Burtonwood Village | | 122 | \$37,186 | \$304.80 |
| | KCSSD - Capital Park | | 243 | \$74,066 | \$304.80 |
| | KCSSD - Carlisle Village | | 240 | \$73,152 | \$304.80 |
| | KCSSD - Colony West | | 195 | \$55,029 | \$282.20 |
| | KCSSD - DAFB | | 2,829 | \$798,344 | \$282.20 |
| | KCSSD - Dykes Branch | | 1,155 | \$373,943 | \$323.76 |
| | KCSSD - Garrison Lake I | | 316 | \$96,317 | \$304.80 |
| | KCSSD - Garrison Lake II | | 95 | \$28,956 | \$304.80 |
| | KCSSD - Garrison Lake IV | | 121 | \$36,881 | \$304.80 |
| | KCSSD - Garrison Lake V | | 972 | \$296,266 | \$304.80 |
| | KCSSD - Generals Green | | 327 | \$99,670 | \$304.80 |
| | KCSSD - Isaacs Branch | | 2,263 | \$689,762 | \$304.80 |
| | KCSSD - Little Heaven | | 27 | \$7,619 | \$282.20 |
| | KCSSD - North Magnolia | | 69 | \$19,472 | \$282.20 |
| | KCSSD - Northeast | | 220 | \$113,784 | \$517.20 |
| | KCSSD - Pickering Beach | | | | |
| | KCSSD - Royal Grant | | 207 | \$63,094 | \$304.80 |
| | KCSSD - South Central | | 870 | \$382,104 | \$439.20 |
| | KCSSD - Tidbury Branch | | 1,755 | \$534,924 | \$304.80 |
| | Kenton | | 133 | \$63,388 | \$476.60 |
| | Little Creek | | 132 | \$47,298 | \$358.32 |
| | Magnolia | | 757 | \$213,625 | \$282.20 |
| | Milford | ✓ | | | |
| | Smyrna | ✓ | | | |
| Wyoming | ✓ | | | | |
| Camden-Wyoming Sewer and Water Authority treated by Kent County WWTP - CS | Camden | | 1,469 | \$460,311 | \$313.35 |
| | Unincorp - Kent Cnty | | 70 | \$21,935 | \$313.35 |
| | Wyoming | | 793 | \$248,487 | \$313.35 |
| Dover Sewer Authority treated by Kent County WWTP - CS | Dover | | 10,125 | \$4,974,514 | \$491.31 |
| Milford Sewer Authority treated by Kent County WWTP - CS | Milford | | 3,895 | \$1,582,149 | \$406.20 |
| | Unincorp - Kent Cnty | | 91 | \$43,598 | \$479.10 |
| | Unincorp - Sussex Cnty | | | | |
| Town of Clayton treated by Kent County WWTP - CS | Clayton | | 1,131 | \$422,089 | \$373.20 |
| Town of Smyrna treated by Kent County WWTP - CS | Clayton | ✓ | | | |
| | Smyrna | | 3,724 | \$1,128,372 | \$303.00 |
| Sussex County | | | | | |
| City of Lewes STP | Lewes | | 2,400 | \$1,896,192 | \$790.08 |
| | Unincorp - Sussex Cnty | | 30 | \$35,796 | \$1,193.19 |
| City of Rehoboth Beach STP | Dewey Beach | ✓ | | | |
| | Henlopen Acres | ✓ | | | |
| | Rehoboth Beach | | 2,200 | \$715,000 | \$325.00 |
| | Unincorp - Sussex Cnty | | 289 | \$183,001 | \$633.22 |

| Wastewater System | User Charge Area | Contract User | # of Households | Total Annual Residential Revenue | Average Sewer Rate |
|--|--------------------------------------|---------------|-----------------|----------------------------------|--------------------|
| City of Seaford WWTP | Blades | ✓ | | | |
| | Seaford | | 1,819 | \$812,875 | \$446.88 |
| Delmar WWTP | Delmar | | 1,809 | \$498,434 | \$275.53 |
| | Unincorp - Wicomico Cnty (MD) | | 12 | \$5,717 | \$476.44 |
| Sussex County - Inland Bays Regional WWTF | SCSSD - IB - Angola | | 135 | \$123,120 | \$912.00 |
| | SCSSD - IB - Long Neck | | 6,833 | \$4,222,384 | \$617.94 |
| | SCSSD - IB - Oak Orchard | | 799 | \$559,300 | \$700.00 |
| Sussex County - Piney Neck Regional WWTF | Dagsboro-Frankford | | 556 | \$229,339 | \$412.48 |
| Sussex County - South Coastal Regional WWTF | Bethany Beach | | 3,721 | \$1,201,883 | \$323.00 |
| | Fenwick Island | | 5,983 | \$2,339,353 | \$391.00 |
| | Millville | | 2,395 | \$1,848,940 | \$772.00 |
| | Ocean View | | 1,150 | \$715,300 | \$622.00 |
| | SCSSD - SC - Bay View Ests | | 162 | \$163,944 | \$1,012.00 |
| | SCSSD - SC - Cedar Neck | | 1,690 | \$1,128,920 | \$668.00 |
| | SCSSD - SC - Holts Landing | | 500 | \$356,000 | \$712.00 |
| | SCSSD - SC - Jhnsns Crnr | | 62 | \$54,560 | \$880.00 |
| | SCSSD - SC - Miller Creek | | 413 | \$391,524 | \$948.00 |
| | SCSSD - SC - N. Bethany | | 979 | \$1,422,487 | \$1,453.00 |
| | SCSSD - SC - S Ocean View | | 262 | \$209,862 | \$801.00 |
| | SCSSD - SC - Sea Country Ests | | 40 | \$30,280 | \$757.00 |
| | | Selbyville | ✓ | | |
| | South Bethany | | 5,221 | \$1,717,709 | \$329.00 |
| Sussex County - Wolfe Neck WWTF | SCSSD - WN - W. Rehoboth Expsn. Area | | 13,485 | \$9,517,713 | \$705.80 |
| | Ellendale | ✓ | | | |
| Town of Georgetown WRF | Georgetown | | 1,881 | \$1,220,619 | \$648.92 |
| | Unincorp - Sussex Cnty | | 57 | \$52,429 | \$919.80 |
| Town of Bridgeville WWTF | Bridgeville | | 916 | \$307,776 | \$336.00 |
| | Greenwood | ✓ | | | |
| Town of Greenwood treated by Bridgeville WWTF - CS | Greenwood | | 450 | \$313,200 | \$696.00 |
| Town of Laurel STP | Laurel | | 1,327 | \$899,706 | \$678.00 |
| Town of Millsboro WWTF | Millsboro | | 2,810 | \$1,335,312 | \$475.20 |
| Town of Selbyville WWTF | Selbyville | | 1,113 | \$688,324 | \$618.44 |
| | Unincorp - Sussex Cnty | | 224 | \$183,440 | \$818.93 |
| Sussex Co. Collection Systems - CS | Blades | | 449 | \$169,192 | \$376.82 |
| | Dewey Beach | | 2,978 | \$1,117,167 | \$375.14 |
| | Ellendale | | 474 | \$213,774 | \$451.00 |
| | Golf Village | | 37 | \$6,623 | \$179.00 |
| | Henlopen Acres | | 169 | \$99,397 | \$588.15 |
| | Woodlands of MLBO | | 46 | \$39,376 | 856.00 |

| Wastewater System | User Charge Area | Contract User | # of Households | Total Annual Residential Revenue | Average Sewer Rate |
|---|------------------------|---------------|-----------------|----------------------------------|--------------------|
| Private | | | | | |
| Artesian - Beaver Creek | Unincorp - Sussex Cnty | | 163 | \$146,700 | \$900.00 |
| Artesian - Heron Bay | Unincorp - Sussex Cnty | | 176 | \$158,400 | \$900.00 |
| Artesian - Reserves at Lewes Landing | Unincorp - Sussex Cnty | | 51 | \$45,900 | \$900.00 |
| Artesian - Stonewater Creek | Unincorp - Sussex Cnty | | 325 | \$292,500 | \$900.00 |
| Artesian - Villages at Herring Creek | Unincorp - Sussex Cnty | | 43 | \$38,700 | \$900.00 |
| Artesian - ANSWRF *Proposed Planning Area* | | | | NA | NA |
| Tidewater - Bay Front Regional | Unincorp - Sussex Cnty | | 77 | \$73,920 | \$960.00 |
| Tidewater - Breeder's Crown | Unincorp - Kent Cnty | | 56 | \$63,000 | \$1,125.00 |
| Tidewater - Country Grove | Unincorp - Sussex Cnty | | 59 | \$60,475 | \$1,025.00 |
| Tidewater - Hart's Landing | Unincorp - Sussex Cnty | | 142 | \$141,290 | \$995.00 |
| Tidewater - Milton Regional | Milton | | 1,285 | \$449,750 | \$350.00 |
| Tidewater - Retreat | Unincorp - Sussex Cnty | | 86 | \$73,100 | \$850.00 |
| Tidewater - The Ridings *In Process of Acquiring* | Unincorp - Sussex Cnty | | 49 | \$61,005 | \$1,245.00 |
| Tidewater - Trussum *Proposed* | Unincorp - Sussex Cnty | | 950 | NA | NA |
| Tidewater - Wandendale *Proposed* | Unincorp - Sussex Cnty | | 1,900 | NA | NA |

Debt Borrowing Limits and Wastewater Allocation

Table A-24 summarizes the debt borrowing limit, the portion of the debt allocated to wastewater enterprises and the amount of the debt allocation actually used. The comments provide additional details about the borrowing limits, allocations or use.

Table A-24. Debt Borrowing Limits and Wastewater Allocation

| Wastewater System | Debt Borrowing Limit (millions) | Allocation of Limit to Wastewater (millions) | Amount of allocation used (million\$) | Comments |
|--|---------------------------------|--|---------------------------------------|--|
| New Castle County | | | | |
| New Castle County - Delaware City WWTP | NA | NA | NA | NCC does not have a set borrowing limit on wastewater enterprises, though it is one performance measure acknowledged by their bond rating agencies. Debt is 18% FY2010. NCC policy limit is 20%. |
| New Castle County - Lea Eara Farms WWTP | NA | NA | NA | NCC does not have a set borrowing limit on wastewater enterprises, though it is one performance measure acknowledged by their bond rating agencies. Debt is 18% FY2010. NCC policy limit is 20%. |
| New Castle County - Port Penn STP | NA | NA | NA | NCC does not have a set borrowing limit on wastewater enterprises, though it is one performance measure acknowledged by their bond rating agencies. Debt is 18% FY2010. NCC policy limit is 20%. |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | NA | NA | NA | NCC does not have a set borrowing limit on wastewater enterprises, it is one performance measure acknowledged by their bond rating agencies. Debt is 18% FY2010. NCC policy limit is 20%. |
| Town of Middletown - Frog Hollow WWTF | NA | NA | NA | See main Middletown plant. |
| Town of Middletown - Middletown WWTP | \$96.7 | \$0.0 | \$30.5 | GO Bonds. Referendum debt is 15%, of this 4% resolution. |
| New Castle County - Water Farm #2 treated by Middletown WWTP - CS | NA | NA | NA | NCC does not have a set borrowing limit on wastewater enterprises, it is one performance measure acknowledged by their bond rating agencies. Debt is 18% FY2010. NCC policy limit is 20%. |
| Wilmington WWTP | \$0.0 | \$0.0 | \$53.6 | No borrowing limit. Sewer capital is primarily funded through SRF Loans, Grants, or long-term GO bonds. City does not have funding adequacy to cash finance capital projects. |
| City of Newark Sewer Authority treated by Wilmington WWTP - CS | NA | NA | NA | Newark doesn't have the authority to borrow for wastewater services at this point, but do for other public works services. |
| New Castle County - North of the C&D treated by Wilmington WWTP - CS | NA | NA | NA | NCC does not have a set borrowing limit on wastewater enterprises, it is one performance measure acknowledged by their bond rating agencies. Debt is 18% FY2010. NCC policy limit is 20%. |

| Wastewater System | Debt Borrowing Limit (millions) | Allocation of Limit to Wastewater (millions) | Amount of allocation used (million\$) | Comments |
|---|---------------------------------|--|---------------------------------------|--|
| Kent County | | | | |
| City of Harrington WWTP | \$5.2 | \$0.0 | \$5.0 | The \$5M is for the FM upgrade to KCWWTP. |
| Kent County Regional WWTP | \$382.0 | \$0.0 | \$52.0 | Debt borrowing limit is about 12% of assessed value. |
| Camden-Wyoming Sewer and Water Authority treated by Kent County WWTP - CS | \$0.0 | \$0.0 | \$0.3 | No limit, it's whatever the authority can handle based on user fees. |
| Dover Sewer Authority treated by Kent County WWTP - CS | \$0.0 | \$0.0 | \$6.8 | No GO bonds (general obligation), revenue bonds only on utils, so no max borrowing limit (just need to meet debt covenant). Bonded in 2005 as well. Now include Stimulus Funds, leveraging SRF if rate stays lower than bond market. |
| Milford Sewer Authority treated by Kent County WWTP - CS | \$0.0 | \$0.0 | \$3.0 | No limit but subject to referendum. Upcoming \$4.5M debt for wastewater (some I&I). |
| Town of Clayton treated by Kent County WWTP - CS | \$1.0 | \$0.0 | \$0.0 | \$800K already used for new water treatment plant. |
| Town of Smyrna treated by Kent County WWTP - CS | \$108.0 | \$0.0 | \$4.5 | Borrowing limit is 12% total assessed value of \$900M. Potential outstanding debt in projects sheet via stimulus. |
| Sussex County | | | | |
| City of Lewes STP | \$20.0 | \$14.0 | \$12.0 | Some Bonds, Most debt is recent plant upgrades through State Revolving Funds (projects are "finished"). |
| City of Rehoboth Beach STP | \$18.2 | \$16.0 | \$0.0 | Grant application \$32 million for improvements (total estimated cost for transmission/plant/outfall). Current treatment plant is paid off. |
| City of Seaford WWTP | \$248.9 | \$0.0 | \$5.5 | Charter can't do over \$2M w/o going to referendum. Borrowing limit is set in Charter at 25%. |
| Delmar WWTP | \$33.0 | \$0.0 | \$0.2 | Cannot exceed 25% of assessment. |
| Sussex County - Inland Bays Regional WWTF | NA | NA | NA | Sussex County declined to disclose debt information or reserve amount. |
| Sussex County - Piney Neck Regional WWTF | NA | NA | NA | Sussex County declined to disclose debt information or reserve amount. |
| Sussex County - South Coastal Regional WWTF | NA | NA | NA | Sussex County declined to disclose debt information or reserve amount. |
| Sussex County - Wolfe Neck WWTF | NA | NA | NA | Sussex County declined to disclose debt information or reserve amount. |
| Town of Georgetown WRF | \$33.9 | \$0.0 | \$14.8 | Per charter, cannot exceed 75% of assessed value. Using past Grants and SRF. |
| Town of Bridgeville WWTF | \$0.0 | \$0.0 | \$4.6 | No debt borrowing limit. Debt service is \$350,000/year. Total current debt is \$5.8M (80% sewer). GO bonds. |
| Town of Greenwood treated by Bridgeville WWTF - CS | NA | NA | NA | Currently no debt for sewer, but \$1.4M just for water. No debt borrowing limit (it's what residents approve). |
| Town of Laurel STP | \$19.0 | \$0.0 | \$4.1 | Anything past \$15M goes to referendum. \$4M is remaining principal of WWTP. Will increase w/ USDA Phase I (add'l \$2M). |

| Wastewater System | Debt Borrowing Limit (millions) | Allocation of Limit to Wastewater (millions) | Amount of allocation used (million\$) | Comments |
|---|---------------------------------|--|---------------------------------------|--|
| Town of Millsboro WWTF | \$36.0 | \$33.0 | \$25.9 | 4.2 million SRF Loan for treatment plant upgrades; 1.9 million STAG for transmission and disposal; Development Fees. |
| Town of Selbyville WWTF | \$12.3 | \$0.0 | \$7.1 | May borrow up to 50% of property assessment value (\$24,515,866: Feb 2011). |
| Sussex County Collection Systems - CS | NA | NA | NA | Sussex County declined to disclose debt information or reserve amount. |
| Private | | | | |
| Artesian - Beaver Creek | NA | NA | NA | N/A. |
| Artesian - Heron Bay | NA | NA | NA | N/A. |
| Artesian - Reserves at Lewes Landing | NA | NA | NA | N/A. |
| Artesian - Stonewater Creek | NA | NA | NA | N/A. |
| Artesian - Villages at Herring Creek | NA | NA | NA | N/A. |
| Tidewater - Bay Front Regional | NA | NA | NA | Middlesex (parent company) provides working funds and capital investment funds as a combination of equity contribution or debt to establish a capital structure that is consistent with public utility regulatory practices. |
| Tidewater - Breeder's Crown | NA | NA | NA | Same as above. |
| Tidewater - Country Grove | NA | NA | NA | Same as above. |
| Tidewater - Hart's Landing | NA | NA | NA | Same as above. |
| Tidewater - Milton Regional | NA | NA | NA | Same as above. |
| Tidewater - Retreat | NA | NA | NA | Same as above. |
| Tidewater - The Ridings *In Process of Acquiring* | NA | NA | NA | Same as above. |
| Tidewater - Trussum *Proposed* | NA | NA | NA | Same as above. |
| Tidewater - Wandendale *Proposed* | NA | NA | NA | Same as above. |
| New Castle County Total | \$97 | \$0 | \$84 | |
| Kent County Total | \$496 | \$0 | \$72 | |
| Sussex County Total | \$421 | \$63 | \$74 | |
| Private Total | \$0 | \$0 | \$0 | |
| State Total | \$1,014 | \$63 | \$230 | |

Future Capital Project Costs

Table A-25 presents the information collected about planned or projected future capital wastewater projects. No information is included here for private facilities and the projects are listed by funding municipality rather than be wastewater system.

Table A-25. Future Capital Project Costs

| Municipality | Project | Capital Project Costs | | |
|--|--|-----------------------|--------------|--------------|
| | | Prior to 2011 | 2011-2016 | After 2016 |
| New Castle County | | | | |
| New Castle County ¹⁷ | Wilmington, BRANDYWINE HUNDRED NORTH REHAB PHASE 1 | \$56,303,000 | \$25,965,000 | \$0 |
| | Wilmington, TURKEY RUN INTERCEPTOR REHAB | \$4,250,000 | \$0 | \$0 |
| | Wilmington, BRANDYWINE HUNDRED SOUTH REHAB PHASE 2 | \$0 | \$27,250,000 | \$6,000,000 |
| | Wilmington, BRANDYWINE HUNDRED SOUTH REHAB PHASE 1 | \$52,442,000 | \$27,660,000 | \$0 |
| | Wilmington, OLD STATE RD INTERCEPTOR | \$450,000 | \$1,500,000 | \$0 |
| | Wilmington, BOXWOOD ROAD SANITARY SEWER IMPROVEMENTS | \$1,600,000 | \$600,000 | \$0 |
| | Wilmington, SOUTH CHRISTIANA INTERCEPTOR ANALYSIS | \$1,000,000 | \$3,500,000 | \$6,000,000 |
| | Wilmington, SPECIAL SERVICES COMPLEX | \$3,250,000 | \$0 | \$0 |
| | Wilmington, AIRPORT ROAD PUMP STATION UPGRADE | \$1,500,000 | \$0 | \$0 |
| | Wilmington, BRANDYWINE HUNDRED NORTH REHAB PHASE 2 | \$0 | \$20,580,000 | \$6,700,000 |
| | Wilmington, ELECTRICAL POWER DISTRIBUTION UPGRADES | \$2,000,000 | \$250,000 | \$0 |
| | Wilmington, RICHARDSON PARK PUMP STATION UPGRADE | \$1,000,000 | \$0 | \$0 |
| | Wilmington, BRIDLESHIRE FARMS SEPTIC ELIM | \$3,400,000 | \$0 | \$0 |
| | Multiple, SOUTHERN SEWER SERVICE AREA | \$61,370,000 | \$9,000,000 | \$26,950,000 |
| | Wilmington, FIELDSTONE CROSSING OUTFALL UPGRADE | \$600,000 | \$150,000 | \$0 |
| | Multiple, PUMP STATION REHABILITATION | \$3,735,000 | \$5,500,000 | \$800,000 |
| | Wilmington, CHRISTIANA RIVER FORCE MAIN | \$925,000 | \$3,000,000 | \$500,000 |
| | Wilmington, SEPTAGE RECEIVING STATION UPGRADE | \$300,000 | \$1,300,000 | \$0 |
| | Multiple, COUNTYWIDE MANHOLE REHAB | \$3,500,000 | \$4,500,000 | \$1,000,000 |
| | Multiple, ASSET MANAGEMENT | \$1,200,000 | \$1,750,000 | \$0 |
| | Multiple, DELDOT COORDINATION PROJECT | \$10,630,000 | \$9,600,000 | \$2,000,000 |
| Multiple, SEWER REPAIRS & REHABILITATION | \$7,190,000 | \$10,800,000 | \$2,300,000 | |
| Multiple, COUNTYWIDE TRENCHLESS REHAB | \$0 | \$5,000,000 | \$1,000,000 | |
| Multiple, MOBILE RADIO SYSTEM UPGRADE | \$900,000 | \$0 | \$0 | |

¹⁷ Capital needs for New Castle County were summarized on the County level for all New Castle County owned facilities including Delaware City WWTP, Lea Eara Farms WWTP, Port Penn STP, MOT WWTP, Water Farm #2 CS, and the North of the C&D CS.

| Municipality | Project | Capital Project Costs | | |
|---|--|-----------------------|--------------|-------------|
| | | Prior to 2011 | 2011-2016 | After 2016 |
| Wilmington | GLASGOW AREA SEWER IMPROVEMENTS | \$0 | \$1,400,000 | \$0 |
| | Multiple, BACKWATER VALVE IMPROVEMENT | \$1,100,000 | \$400,000 | \$100,000 |
| | MOT AREA MAINTENANCE BASE | \$0 | \$500,000 | \$0 |
| | STATE ROAD INTERCEPTOR UPGRADE | \$1,000,000 | \$0 | \$0 |
| | Multiple, WASTEWATER TREATMENT PLANTS/DISCHARGE ELIMINATION AND CLEAN WATER ACT EVALUATIONS | \$270,000 | \$150,000 | \$50,000 |
| | MILL CREEK INTERCEPTOR RELIEF | \$2,300,000 | \$4,000,000 | \$1,500,000 |
| | BRANDYWINE HUNDRED CLEARWATER PROGRAM | \$2,550,000 | \$2,500,000 | \$0 |
| | WHITE CLAY SEWER BASIN REHAB | \$3,500,000 | \$26,400,000 | \$0 |
| | NORTH DELAWARE INTERCEPTOR SYSTEM | \$26,107,000 | \$33,740,000 | \$5,900,000 |
| | RIVER RD IMPROVEMENTS | \$1,130,000 | \$0 | \$0 |
| | PIKE CREEK IMPROVEMENTS | \$3,000,000 | \$5,250,000 | \$0 |
| | Multiple, GENERAL SEWER IMPROVEMENT | \$1,400,000 | \$2,100,000 | \$450,000 |
| | WHITE CLAY CREEK PUMP STATION REHAB | \$3,350,000 | \$0 | \$0 |
| | DEL CITY SEWER REHAB. | \$4,250,000 | \$3,000,000 | \$0 |
| | HYDE RUN RELIEF | \$7,628,000 | \$0 | \$0 |
| | KIRKWOOD TRUNK LINE | \$0 | \$6,600,000 | \$0 |
| | STONEY CREEK PS UPGRADE | \$13,850,000 | \$0 | \$0 |
| | PUMP STATION METERS (city of wilm.) | \$461,000 | \$0 | \$0 |
| | NAAMANS P/S UPGRADE | \$1,200,000 | \$0 | \$0 |
| | BUTTONWOOD P/S UPGRADE | \$1,000,000 | \$0 | \$0 |
| | TERMINAL AVE P/S UPGRADE | \$1,350,000 | \$0 | \$0 |
| | CHRISTIANA PUMP STATION UPGRADE | \$1,000,000 | \$0 | \$0 |
| | DEL CITY TREATMENT PLANT REHAB. | \$6,250,000 | \$1,250,000 | \$0 |
| Water Farm 1, TOWNSEND PIPE & MANHOLE REHAB | \$100,000 | \$250,000 | \$0 | |
| Water Farm 1, WATER FARM #1 IMPROVEMENTS | \$11,740,000 | \$0 | \$0 | |
| EDGEMOOR P/S UPGRADE | \$1,350,000 | \$0 | \$0 | |
| Town of Middletown (Middletown and Frog Hollow) | Frog Hollow sludge removal from aeration lagoon (cost a prelim. estimate) | NA | \$200,000 | \$0 |
| | Modification to existing test RIBS on Ford and VonCroy Farms for University Study | NA | \$100,000 | \$0 |
| | RIBS at existing Ford and VonCroy Farms | NA | \$0 | \$2,405,000 |
| | Various upgrades, rehabilitation, and new installations to laterals, force mains, pump stations, and filters | NA | \$3,000,000 | \$0 |
| | PLC implementation on 3 regional lift stations that flow to headworks of Middletown Wastewater Treatment Plant | NA | \$50,000 | \$0 |
| | Two filters at existing Industrial Drive filter plant location | NA | \$0 | \$1,500,000 |

| Municipality | Project | Capital Project Costs | | |
|---|---|-----------------------|-------------|--------------|
| | | Prior to 2011 | 2011-2016 | After 2016 |
| | SBR plant at existing Industrial Drive location; possible alternate treatment method with baffle system | NA | \$0 | \$16,500,000 |
| | Vehicle Replacements (Collection and Transport) | NA | \$60,000 | \$60,000 |
| | Vehicle Replacements (WWTP) | NA | \$0 | \$0 |
| | Saint Anne's Spray Facility permitting | NA | \$20,000 | \$0 |
| | Headworks capacity increase / improvements | NA | \$0 | \$500,000 |
| | SCADA upgrades | NA | \$108,000 | \$0 |
| City of Wilmington | SRF, Headworks, WWTP (Clean Water SRF) | NA | \$2,500,000 | \$0 |
| | GO, Annual Minor Sewer Construction (GO Bond) | NA | \$4,000,000 | \$750,000 |
| | GO, Headworks, WWTP (GO Bond) | NA | \$109,000 | \$0 |
| | GO, Major Sewer Improvements (GO Bond) | NA | \$533,700 | \$2,000,000 |
| | SRF, Major Sewer Improvements (Clean Water SRF) | NA | \$9,500,000 | \$0 |
| | SRF, Kentmere & Union CSO (Clean Water SRF) | NA | \$1,700,000 | \$0 |
| | GO, Real Time Control System (GO Bond) | NA | \$1,700,000 | \$0 |
| | OTHER, Real Time Control System (STAG Grant) | NA | \$240,000 | \$0 |
| | GO, South Wilmington Wetland Park (GO Bond) | NA | \$4,000,000 | \$1,000,000 |
| | GO, Drainage Ditch Replacement-Christiana Ave (GO Bond) | NA | \$200,000 | \$0 |
| | GO, Sewer Separation & Flow Monitoring (GO Bond) | NA | \$3,500,000 | \$0 |
| | GO, Stormwater Drainage Project - New (GO Bond) | NA | \$4,200,000 | \$900,000 |
| | SRF, 11th St Pumping Station Upgrade (Clean Water SRF) | NA | \$500,000 | \$4,000,000 |
| | GO, Urban Forest Mgmt Program (GO Bond) | NA | \$1,050,000 | \$250,000 |
| | OTHER, 2018 Sewer Placeholder (Cash Financing) | NA | \$0 | \$8,000,000 |
| | SRF, Force Main Sampling & Flow Monitoring (SRF Funded) | NA | \$1,700,000 | \$0 |
| GO, Stormwater Mitigation (Water Quality) - New (GO Bond) | NA | \$750,000 | \$0 | |
| City of Newark Sewer Authority | S0904, Sanitary Sewer Study | \$225,000 | \$2,900,000 | NA |
| | SEQSF, Vehicle/Equipment Replacement Program | \$0 | \$275,000 | NA |
| | S1001, Replace Pumps & Controls at Cooches Bridge | \$0 | \$150,000 | NA |
| | S0903, Easement Sewer Jet | \$40,000 | \$0 | NA |
| | S0801, Repair Sewer Line Crossings-Christina Creek | \$1,000,000 | \$0 | NA |
| | S0902, Reline/Replace Sewer Line on Elkton Rd. | \$20,000 | \$0 | NA |
| | S0802, Replace Pumps & Controls at Bellevue Road | \$40,000 | \$0 | NA |

| Municipality | Project | Capital Project Costs | | |
|--|---|-----------------------|--------------|------------|
| | | Prior to 2011 | 2011-2016 | After 2016 |
| Kent County | | | | |
| Kent County | Treatment Plant Upgrades | \$7,732,000 | \$39,070,000 | NA |
| | Conveyance System Upgrades | \$2,732,000 | \$6,820,000 | NA |
| | Sanitary Sewer Districts | \$12,385,328 | \$5,266,000 | NA |
| | Pump Station Upgrades | \$555,000 | \$1,245,000 | NA |
| | Equipment | \$350,000 | \$100,000 | NA |
| City of Harrington | Long Term I&I Strategy Estimate | NA | \$4,200,000 | NA |
| | Misc Upgrades | NA | \$2,640,000 | NA |
| | 10.5 mi Force Main to KC Regional, Plant Downgrade | NA | \$1,200,000 | NA |
| Camden-Wyoming Sewer & Water Authority | Septic elimination, Existing homes, Route 10, and existing Tamarac/Burwood development | NA | \$350,000 | NA |
| | Sanitary Sewer Survey, Flushing, video taping, and smoke testing of the sanitary sewer system. | NA | \$50,000 | NA |
| | Replacement of Old North Road gravity sanitary sewer system, Approx. 1,400 LF sanitary sewer main and 9 manholes | NA | \$162,500 | NA |
| | Rehabilitation of existing manholes, Especially in flood prone areas | NA | \$150,000 | NA |
| | Upgrades to Yellow Transmission Line, Includes creek crossing | NA | \$75,000 | NA |
| | Pipe and manhole replacement, Approx. 70 LF of cast iron pipe replacement, Manhole #91-92 | NA | \$7,000 | NA |
| | Pipe and manhole replacement, Approx. 29 LF of vitrified clay pipe replacement, Manhole #106-107 | NA | \$2,900 | NA |
| | Pipe and manhole replacement, Approx. 350 LF of conveyance pipe (Issac Branch), Manhole #15-16 | NA | \$35,000 | NA |
| | Large-scale replacement of existing sanitary sewer collection system, Approx. 47,200 LF of vitrified clay sanitary sewer main, 130 manholes | NA | \$3,800,000 | NA |
| Replacement of Mechanic Street gravity sanitary sewer system, Approx. 3,000 LF sanitary sewer main, 12 manholes, and 75 laterals | NA | \$823,500 | NA | |
| Dover Sewer Authority | Heatherfield Pump Station Upgrade | \$40,000 | \$229,200 | NA |
| | Misc. Sewer System Improvements | \$33,000 | \$195,000 | NA |
| | Energy efficient motor replacements | \$45,248 | \$0 | NA |
| | Hazletville Road Interceptor | \$0 | \$770,000 | NA |
| | Sliver Lake Pump Station Replacement/Upgrade | \$0 | \$427,000 | NA |
| | Westover Pump Station & Force Main Upgrade | \$0 | \$768,800 | NA |
| | Mckee Road Pump Station Communicator Replacement | \$0 | \$55,000 | NA |
| | Dover East Pump Station & Force Main | \$0 | \$253,800 | NA |
| U S 13 East Dover Bypass | \$3,075,981 | \$0 | NA | |

| Municipality | Project | Capital Project Costs | | |
|-------------------------|---|-----------------------|-------------|------------|
| | | Prior to 2011 | 2011-2016 | After 2016 |
| | South Governors Avenue Sewer Main Upgrade | \$281,088 | \$0 | NA |
| | Tar Ditch Interceptor Upgrade | \$518,230 | \$0 | NA |
| | SCADA System Technology Upgrade | \$79,300 | \$254,900 | NA |
| | Delaware State University Pump Station Replacement | \$360,473 | \$0 | NA |
| | Fox Hall Retreat Force Main Rerouting | \$107,200 | \$0 | NA |
| | Brandywine Pump Station Replacement | \$0 | \$402,000 | NA |
| | Vehicles & Equipment - Wastewater | \$8,300 | \$572,650 | NA |
| | Baltray Pump Station Replacement | \$0 | \$125,000 | NA |
| | Acorn Lane Pump Station Replacement | \$359,823 | \$0 | NA |
| | Fox Hall Pump Station Replacement | \$52,000 | \$375,900 | NA |
| | Delaware State University Force Main Rerouting | \$26,800 | \$286,500 | NA |
| | Lepore Road Pump Station Replacement | \$0 | \$402,000 | NA |
| | Rolling Acres Pump Station Replacement | \$0 | \$52,000 | NA |
| | Dover Brook Gardens Pump Station Upgrade | \$0 | \$65,000 | NA |
| | Vehicles & Equipment (Split W/WW 50%) Eng/Insp/Mtrng (Wastewater portion) | \$0 | \$20,500 | NA |
| | Inflow/Infiltration Removal/System Improvements | \$1,800,000 | \$5,000,000 | NA |
| Milford Sewer Authority | Delaware Ave Sewer Main Replace | \$0 | \$50,000 | NA |
| | Portable Generator | \$35,000 | \$0 | NA |
| | N. Front Street Sewer Replacement | \$1,301,872 | \$0 | NA |
| | Muffin Monster - Wendy's Lift Station | \$0 | \$35,000 | NA |
| | Muffin Monster - Fisher Ave Lift Station | \$0 | \$50,000 | NA |
| | Pump Station Improv | \$0 | \$1,900,000 | NA |
| | Grinder/SCADA | \$46,000 | \$0 | NA |
| | PS. Generator Project | \$50,000 | \$0 | NA |
| | Charles St Sewer Main Replace. | \$0 | \$60,000 | NA |
| | I & I Study & Projects | \$500,000 | \$9,050,000 | NA |
| | SE 2nd St PS | \$40,000 | \$0 | NA |
| | Sewer Extensions to unserved areas | \$0 | \$300,000 | NA |
| | Sewer Vacuum Truck | \$0 | \$250,000 | NA |
| | Replace valves - Fisher Ave Lift Station | \$0 | \$55,000 | NA |
| North Shore Pumping St. | \$14,000 | \$0 | NA | |
| Town of Clayton | I&I - Studying now, cost unknown | NA | \$1,428,571 | \$571,429 |
| | Minor Planned repair/Upgrades | NA | \$2,000,000 | \$0 |

| Municipality | Project | Capital Project Costs | | |
|-----------------------------|---|-----------------------|--------------|------------|
| | | Prior to 2011 | 2011-2016 | After 2016 |
| Town of Smyrna | Green Meadows Pump Station Upgrades, Replacement of the existing duplex suction lift pumps in Green Meadows Subdivision and approximately 1,975 linear feet of associated force main. | NA | \$195,000 | NA |
| | East Commerce Street Sewer Replacement, Replacement of approximately 653 linear feet of old sewer main and all service connections along E.Commerce St. | NA | \$516,000 | NA |
| | North Main Street Sewer Replacement, Replacement of approximately 386 linear feet of old sewer main and all service connections along N. Main. | NA | \$458,000 | NA |
| | West Commerce Street Sewer Replacement, Replacement of approximately 348 linear feet of old sewer main and all service connections along W. Commerce St. | NA | \$401,000 | NA |
| | North Duck Creek Sewer Extension, Extend the Town's sewer system north of duck Creek and provide public sewer services to existing units currently on failing septic systems and future developments. | NA | \$1,650,000 | NA |
| | Greens Branch Pump Station Upgrades, Replacement of the existing failing shaft-driven dry pit pumps in Greens Branch Pump Station and upgrades of electrical controls at the pump station. | NA | \$520,000 | NA |
| | New Street Pump Station Upgrades, Upgrade the existing pump station located on New St., including converting old ejector pump to new centrifugal submersible pumps. | NA | \$277,130 | NA |
| | West Cummins Street Sewer Replacement, Replacement of approximately 618 linear feet of old sewer main and all service connections along W.Cummins St. | NA | \$495,000 | NA |
| Sussex County | | | | |
| Sussex County ¹⁸ | DAGS.FRANKFORD SEWER - CLAYTON AVENUE PS | NA | \$2,000,000 | NA |
| | COLLECTION SYSTEM IMPROVEMENTS | NA | \$169,000 | NA |
| | MARSH ISLAND/JOY BEACH SEWER | NA | \$3,904,000 | NA |
| | HOLT'S LANDING EXPANSION - MALLARD CREEK | NA | \$1,249,083 | NA |
| | MAGNOLIA SHORES | NA | \$700,000 | NA |
| | HERRING CREEK NORTH SEWER DISTRICT | NA | \$6,410,000 | NA |
| | CLAYTON AVENUE PUMP STATION AND FORCEMAIN | NA | \$4,275,000 | NA |
| | ANGOLA SEWER - NORTH EXPANSION | NA | \$3,800,000 | NA |
| | MILLER CREEK EXPANSION - TANGLEWOOD | NA | \$4,214,709 | NA |
| | OAK ORCHARD EXPANSION | NA | \$15,764,939 | NA |
| | PUMPING EQUIPMENT | NA | \$2,720,000 | NA |
| | ANGOLA SEWER DISTRICT | NA | \$19,800,000 | NA |

¹⁸ Capital needs for Sussex County were summarized on the County level for all Sussex County owned facilities including Inland Bays WWTF, Piney Neck WWTF, South Coastal WWTF, Wolfe Neck WWTF, and Sussex County CS

| Municipality | Project | Capital Project Costs | | |
|------------------------|--|-----------------------|--------------|------------|
| | | Prior to 2011 | 2011-2016 | After 2016 |
| | IBRWF - EXPANSION | NA | \$15,089,000 | NA |
| | DAGS. FRANKFORD - SR 26 EXPANSION | NA | \$5,200,000 | NA |
| | MILLVILLE EXPANSION - BEAVER DAM | NA | \$2,095,984 | NA |
| | MIDDLEFORD & CONCORD SEWER EXPANSION | NA | \$1,800,000 | NA |
| | WESTERN SUSSEX REGIONAL FACILITY | NA | \$8,050,000 | NA |
| | HOLT'S LANDING SEWER EXPANSION | NA | \$6,000,000 | NA |
| | GENERAL PLANT CAPITAL | NA | \$1,898,962 | NA |
| | PINEY NECK RD - SEWER EXPANSION | NA | \$2,684,000 | NA |
| | TREATMENT & DISPOSAL EQUIPMENT | NA | \$667,080 | NA |
| | WEST REH. SEWER - TREATMENT EXPANSION | NA | \$22,700,000 | NA |
| | DEWEY/HENLOPEN TREATMENT CONTRIBUTION | NA | \$13,500,000 | NA |
| | SCRWF - PUMP STATION 30, FM & UPGRADES | NA | \$18,250,000 | NA |
| | MILLVILLE SEWER - CONTRACT F - AND DENTON MILLS | NA | \$8,312,183 | NA |
| | OAK ORCHARD SEWER DISTRICT - RIVERROAD | NA | \$1,548,000 | NA |
| | JOHNSON CORNER | NA | \$8,300,000 | NA |
| | RT. 26 PHASE III | NA | \$2,684,000 | NA |
| | VINES CREEK SEWER DISTRICT | NA | \$6,000,000 | NA |
| City of Lewes | Donovan Smith 4" & 6" lines | NA | \$309,500 | NA |
| | New WWTP Outfall Pipe Renewal | NA | \$350,000 | NA |
| | Manhole Replacement/Rehab | NA | \$221,025 | NA |
| | Sewer Master Plan | NA | \$35,000 | NA |
| | Sewer Lift Station Renewal | NA | \$202,000 | NA |
| | Lift Station SCADA | NA | \$0 | NA |
| | New Road to Lift Station #3 upgrade | NA | \$80,000 | NA |
| | Bay Avenue Sewer | NA | \$1,150,000 | NA |
| City of Rehoboth Beach | WWTP Improvements, Upgrade/replace various equipment, install new effluent filter, provide emergency power | \$1,510,000 | \$6,040,000 | NA |
| | Ocean Outfall, Construct ocean outfall from beach to diffuser located approximately 6,000 ft offshore | \$3,720,000 | \$14,880,000 | NA |
| | Pump Station and Force Main , Construct new effluent pump station at WWTP and force main to new ocean outfall at beach | \$1,050,000 | \$4,200,000 | NA |
| City of Seaford | Computer | NA | \$1,400 | NA |
| | Secondary clarifier launder recoating | NA | \$7,000 | NA |
| | Fiber splicing to lift stations | NA | \$2,559 | NA |
| | Sludge flow meter | NA | \$3,000 | NA |

| Municipality | Project | Capital Project Costs | | |
|------------------------|---|-----------------------|-------------|------------|
| | | Prior to 2011 | 2011-2016 | After 2016 |
| | Flow meter | NA | \$3,000 | NA |
| | Oxic tank membrane replacement | NA | \$32,000 | NA |
| | Front end loader for sludge disposal | NA | \$125,000 | NA |
| | Portable generator | NA | \$25,000 | NA |
| | Shoreline stabilization (interceptor) | NA | \$120,000 | NA |
| | Compost bay underdrains | NA | \$15,000 | NA |
| | Fuel storage cabinet | NA | \$800 | NA |
| | Primary waste pump | NA | \$5,000 | NA |
| | Phone system | NA | \$10,000 | NA |
| | 3 computer replacements | NA | \$3,900 | NA |
| | Lift station RTU replacement | NA | \$7,000 | NA |
| Delmar Sewer Authority | Bi-State/Connelly Mill Pump Sta. | NA | \$1,719,611 | NA |
| | WWTP upgrade w/ ENR/BNR | NA | \$6,000,000 | NA |
| | Storage Shed - Pole Shed | NA | \$0 | NA |
| | Lab Cabinets - Restored | NA | \$4,020 | NA |
| | Alarm System Pump Stations | NA | \$18,000 | NA |
| | Lawn Mower | NA | \$8,000 | NA |
| | Line Replacement / Slip Lining Pipe | NA | \$1,575,000 | NA |
| | Sewer Main Imp. Spruce / Walnut | NA | \$988,412 | NA |
| | I&I Study | NA | \$70,000 | NA |
| | 1st Street/ - Sewer Imps | NA | \$235,000 | NA |
| | Stage Rd #2 Pump Station | NA | \$700,786 | NA |
| | Winch to Raise Basket Pine St. /PS | NA | \$2,300 | NA |
| Lift Station Cleaning | NA | \$14,000 | NA | |
| Town of Georgetown | Capmark 1/2 & 3/4 | NA | \$29,306 | NA |
| | South Bedford Street Pump Station | NA | \$139,114 | NA |
| | General Capital Expenditures (Previous Loans, etc.) | NA | \$2,691,460 | NA |
| | Small Capital Improvement Costs | NA | \$5,382,518 | NA |
| | Staff Expenditures | NA | \$3,142,207 | NA |
| Town of Bridgeville | HVAC- Main Building, Unkn Qnty | NA | \$100,000 | NA |
| | HS- Raw Effluent Pumps | NA | \$0 | NA |
| | I & I Reduction Project | NA | \$0 | NA |
| | GSI Sewer System | NA | \$0 | NA |
| | Supervisory Control and Data Acquisition | NA | \$0 | NA |
| | Wet Well w/ variable speed drive raw pumps | NA | \$0 | NA |

| Municipality | Project | Capital Project Costs | | |
|-------------------|---|-----------------------|-------------|------------|
| | | Prior to 2011 | 2011-2016 | After 2016 |
| | Disinfection System | NA | \$0 | NA |
| | Digester Metal Dome or Aerobic Digester | NA | \$0 | NA |
| | RBC Gearboxes (2) | NA | \$0 | NA |
| | Raw Pump Wet Well, Pump Only | NA | \$30,000 | NA |
| | Effluent Pump Contact Tank, Pump Only | NA | \$30,000 | NA |
| | Sludge Pump Clarifier, Pump Only | NA | \$30,000 | NA |
| | Comminutor, Assume 1 unit | NA | \$50,000 | NA |
| | RBC Gearbox Replacement (2), Assume \$200K each | NA | \$400,000 | NA |
| | Digester Mixer, Assume motor/mixer only | NA | \$100,000 | NA |
| | Utility Mapping/Schedule, Unkn Qty | NA | \$100,000 | NA |
| | Effluent Pump Contact Tanks (2) | NA | \$0 | NA |
| | Raw Pump Wet Wells (2) | NA | \$0 | NA |
| | Comminutor Wet Well | NA | \$0 | NA |
| | Auxiliary Generator | NA | \$0 | NA |
| | Clarifier Center Drive | NA | \$0 | NA |
| | Digester Mixer | NA | \$0 | NA |
| | Uni-Loader or similar universal machine | NA | \$0 | NA |
| | New Roof- all of WWTP | NA | \$0 | NA |
| | Entrance Door replacements | NA | \$0 | NA |
| | Driveway Re-surfacing | NA | \$0 | NA |
| | New Control Panel & Chatter Box Alarm | NA | \$0 | NA |
| | Digester Boiler | NA | \$0 | NA |
| | GATEWAY- Wet Wells | NA | \$0 | NA |
| | Sludge Pump Clarifiers (2) | NA | \$0 | NA |
| Town of Laurel | Laurel North Side Pumping Station Replacement | NA | \$648,718 | NA |
| Town of Laurel | Laurel South Side Pumping Station Replacement | NA | \$439,595 | NA |
| Town of Laurel | Laurel WWTF Replacement | NA | \$5,983,831 | NA |
| Town of Millsboro | Miscellaneous | NA | \$1,118,100 | NA |
| Town of Millsboro | Millsboro Middle School Irrigation-Contract F | NA | \$282,000 | NA |
| Town of Millsboro | Beneficial Reuse Transmission-Contract G | NA | \$4,689,000 | NA |
| Town of Millsboro | Aquifer Recharge Facility-Contract H | NA | \$4,370,700 | NA |
| Town of Millsboro | Aquifer Recharge land purchase | NA | \$9,200,000 | NA |
| Town of Millsboro | WW & Beneficial Reuse Transmission-Contract E | NA | \$1,380,000 | NA |

Future Capital Financing Options

Table A-26 presents the reported information on the financing options from 2011-2016 for the future capital projects listed in Table A-25.

Table A-26. Future Capital Financing Options

| Municipality | Municipal Bank Financing | Municipal Bond Issue | Municipal Request to the Clean Water State Revolving Fund (SRF) | Municipal requests to USDA | Municipal Sinking Fund, other asset replacement cost savings | Other Financing Method | No funding source indicated | Total |
|---|--------------------------|----------------------|---|----------------------------|--|------------------------|-----------------------------|---------------|
| <i>New Castle County</i> | | | | | | | | |
| New Castle County | \$0 | \$245,445,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$245,445,000 |
| Town of Middletown (Middletown and Frog Hollow) | \$60,000 | \$3,000,000 | \$0 | \$0 | \$478,000 | \$0 | \$0 | \$3,538,000 |
| City of Wilmington | \$0 | \$20,042,700 | \$15,900,000 | \$0 | \$0 | \$240,000 | \$0 | \$36,182,700 |
| City of Newark Sewer Authority | \$0 | \$0 | \$0 | \$0 | \$3,325,000 | \$0 | \$0 | \$3,325,000 |
| <i>Kent County</i> | | | | | | | | |
| Kent County | \$0 | \$0 | \$24,045,000 | \$5,266,000 | \$22,770,000 | \$420,000 | \$0 | \$52,501,000 |
| City of Harrington | \$0 | \$0 | \$4,200,000 | \$400,000 | \$0 | \$0 | \$3,440,000 | \$8,040,000 |
| Camden-Wyoming Sewer & Water Authority | \$455,900 | \$0 | \$5,000,000 | \$0 | \$0 | \$0 | \$0 | \$5,455,900 |
| Dover Sewer Authority | \$0 | \$0 | \$5,408,810 | \$240,000 | \$0 | \$4,606,440 | \$0 | \$10,255,250 |
| Milford Sewer Authority | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$11,750,000 | \$11,750,000 |
| Town of Clayton | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$3,428,571 | \$3,428,571 |
| Town of Smyrna | \$0 | \$0 | \$4,512,130 | \$0 | \$0 | \$0 | \$0 | \$4,512,130 |
| <i>Sussex County</i> | | | | | | | | |
| Sussex County | \$0 | \$69,258,542 | \$0 | \$21,638,272 | \$46,025,640 | \$3,020,300 | \$49,843,186 | \$189,785,940 |
| City of Lewes | \$0 | \$0 | \$0 | \$0 | \$2,347,525 | \$0 | \$0 | \$2,347,525 |
| City of Rehoboth Beach | \$3,234,000 | \$0 | \$13,392,000 | \$8,494,000 | \$0 | \$0 | \$0 | \$25,120,000 |
| City of Seaford | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$360,659 | \$360,659 |
| Delmar Sewer Authority | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$11,335,129 | \$11,335,129 |
| Town of Georgetown | \$0 | \$0 | \$0 | \$0 | \$11,384,605 | \$0 | \$0 | \$11,384,605 |
| Town of Bridgeville | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$840,000 | \$840,000 |
| Town of Laurel | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$7,072,144 | \$7,072,144 |
| Town of Millsboro | \$0 | \$0 | \$6,336,800 | \$14,303,000 | \$0 | \$400,000 | \$0 | \$21,039,800 |

Wastewater Reuse Tables

Reuse Currently or Planned for Each Treatment Plant

Table A-27 presents the reported wastewater reuse option categories in use or under consideration by each treatment plant. Comments present details.

Table A-27. Reuse Currently or Planned for Each Treatment Plant

| Wastewater System | Irrigation - Ag | Commercial/ Industrial | Residential | Municipal Sludge | Other | Comments |
|---|-----------------|---------------------------|-------------|---------------------|---|---|
| New Castle County | | | | | | |
| New Castle County - Delaware City WWTP | No | No | No | No | No | Del City appears to be too small to have any worthwhile impact or cost-justifiable reason to change. |
| New Castle County - Lea Eara Farms WWTP | Yes | No | No | No | No | Spray application on crops used for livestock feed. |
| New Castle County - Port Penn STP | No | No | No | No | No | Port Penn appears to be too small to have any worthwhile impact or cost-justifiable reason to change. |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | Yes | No | No | No | No | Spray application on crops used for livestock feed. |
| Town of Middletown - Frog Hollow WWTF | No | Yes | No | No | No | Spraying on golf course. |
| Town of Middletown - Middletown WWTP | Yes | Planned | Planned | No | Yes, planning reuse on golf courses, currently reuse in Parks | Golf Course planned. In final permitting for park area. Comm./Ind. is concrete pipe/mix plant possibility (nothing in place). Local residents have option to discuss reuse. Clear regulatory guidance not in place, would like more creative options. |
| Wilmington WWTP | No | No | No | Yes | No | Industry is DuPont Edgemore, possibly Spray Cherry Island for Dust Control. |
| Kent County | | | | | | |
| City of Harrington WWTP | No | No | No | No | No | Cost analysis on connecting to KCWWTP vs. spray system showed obvious choice. Storage lagoon is what killed price. 8 miles to Frederica (not including Farmington). |
| Kent County Regional WWTP | No | No | No | Yes | Yes - water reclaimed at plant 100,000 gpd | 100% sludge reuse. Been purchasing land around plant for spray, about 700 acres to date. 10 years down road per estimated EDU's. |
| Sussex County | | | | | | |
| City of Lewes STP | No | No | Planned | Yes | Yes - plant internal recirculation | Impact Area 7 for residential reuse (New Development). No major land or industry available to accept effluent. Also interested in shallow injection of effluent to act as a saltwater barrier. |

| Wastewater System | Irrigation - Ag | Commercial/ Industrial | Residential | Municipal Sludge | Other | Comments |
|---|-----------------|---------------------------|-------------|---------------------|--|--|
| City of Rehoboth Beach STP | No | No | No | Yes | No | N/A. |
| City of Seaford WWTP | No | No | No | Yes | Yes - planning reuse on golf courses | See below for Ag and state lands. Hoopers Landing Golf Course, 1/4 mile from plant, 90 acres purchased (200 total, but concerned about leased land). Studying soil for past year incl. est. nutrient loadings per superintendent records. |
| Delmar WWTP | No | No | No | No | No | No local industry for industrial reuse, not feasible for residential. Solids go to belt press, aerobic digester, drying bed, and landfill. |
| Sussex County - Inland Bays Regional WWTF | Yes | No | No | Yes | No | 175 acres on-site for sludge spreading; spray on Ag land - more spray sites |
| Sussex County - Piney Neck Regional WWTF | Yes | No | No | Yes | No | N/A. |
| Sussex County - South Coastal Regional WWTF | No | No | No | Yes | Yes - recycling effluent for plant processes | No local farmer interest or land availability for crop irrigation. |
| Sussex County - Wolfe Neck WWTF | Yes | No | No | No | No | Spray for Ag use. Have permit for Class B sludge (any facility) but no need at this time for this facility. |
| Town of Georgetown WRF | Yes | No | No | Yes | No | See permit for spray sites. DDR in to DNREC for woods spray site. Sludge to land application every 5-10 years. |
| Town of Bridgeville WWTF | Yes | No | No | Yes | No | Need to complete plant upgrades. Said no to residential, though there is residential near spray field. There appears to be a large opportunity for ag and residential irrigation or drip systems if plant upgrades could be completed. |
| Town of Laurel STP | Planned | No | No | No | Yes - planning of reuse via RIBs | Not anticipating DNREC to elim. NPDES permit, but don't see availability to increase capacity due to loadings. Found 2-3 farms for spray (800 acres, 140 acres) or RIBs (50-60 acres), only 400 yds away. Need guidance on land purchasing vs. control rights. |
| Town of Millsboro WWTF | Planned | Planned | Planned | No | Yes - planning of reuse via RIBs | Line to spray/RIBs site will run down residential streets. Infrastructure is in for pumping to middle school fields and little league fields (Fall 2011). Not seeing much sludge but interested in mulching. NRG expressed interest but nothing official. |

| Wastewater System | Irrigation - Ag | Commercial/ Industrial | Residential | Municipal Sludge | Other | Comments |
|--|-----------------|---------------------------|-------------|---------------------|--|--|
| Town of Selbyville WWTF | No | No | No | No | No | Land has high water table (1986 study). Mountaire currently has own W/WWTP's and recycles water. May be interested in water recycling for future projects (such as commercial/residential irrigation), but existing infrastructure is not equipped for it. |
| Private | | | | | | |
| Artesian - Beaver Creek | No | No | No | Yes | Yes - RIBs | Not enough flows for ag spray - recharge through RIBs. |
| Artesian - Heron Bay | No | No | No | Yes | Yes - RIBs | Not enough flows for ag spray - recharge through RIBs. |
| Artesian - Reserves at Lewes Landing | No | No | No | Yes | Yes - Drip Irrigation | Not enough flows for ag spray - recharge through drip system. |
| Artesian - Stonewater Creek | No | No | No | Yes | Yes - RIBs | Not enough flows for ag spray - recharge through RIBs. |
| Artesian - Villages at Herring Creek | Yes | No | No | No | No | N/A. |
| Tidewater - Bay Front Regional | No | No | No | Yes | Yes - RIBs (Aquifer recharge) | RIBs being used. Clean Delaware does land application of sludge. |
| Tidewater - Breeder's Crown | No | No | No | Yes | Yes - RIBs | Clean Delaware does land application of sludge. 6,000 gpd; not enough for spray app. |
| Tidewater - Country Grove | No | No | No | Yes | Yes - RIBs (Groundwater recharge) | Clean Earth does land application of sludge. |
| Tidewater - Hart's Landing | No | No | No | Yes | Yes - Drip Irrigation in open space | Clean Delaware does land application of sludge. |
| Tidewater - Milton Regional | Planned | No | No | Yes | No | Looking at all options including spraying on nearby farms (500 acres). Compost with Blessings site. |
| Tidewater - Retreat | No | No | No | Yes | Yes - Subsurface disposal - groundwater recharge | Clean Delaware does land application of sludge. |
| Tidewater - The Ridings *In Process of Acquiring* | No | No | No | Yes | Yes - Drip Irrigation | Clean Delaware does land application of sludge. |
| Tidewater - Trussum *Proposed* | No | No | No | Planned | Yes - planning of reuse via RIBs | Clean Delaware does land application of sludge. |
| Tidewater - Wandendale *Proposed* | Planned | No | No | Planned | Yes - planning of reuse via RIBs | No financial or regulatory incentive to do residential purple pipe. |

Reuse Currently or Planned for Each Collection System

Table A-28 presents the reported wastewater reuse option categories in use or under consideration by each collection system. Comments present details.

Table A-28. Reuse Currently or Planned for Each Collection System

| Wastewater System | Irrigation - Ag | Commercial/ Industrial | Residential | Municipal Sludge | Other | Comments |
|---|-----------------|---------------------------|-------------|---------------------|-------|--|
| New Castle County | | | | | | |
| New Castle County - Water Farm #2 treated by Middletown WWTP - CS | Planned | No | No | No | No | Working on 900 acre set-aside for Water Farm #2. Originally thought would need to implement in 15 years, now more like 30 (population growth). |
| City of Newark Sewer Authority treated by Wilmington WWTP - CS | No | No | No | No | No | Would consider a package plant if someone was interested. |
| New Castle County - North of the C&D treated by Wilmington WWTP - CS | No | No | No | No | No | NCC is densely populated. |
| Kent County | | | | | | |
| Camden-Wyoming Sewer and Water Authority treated by Kent County WWTP - CS | No | No | No | No | No | 10 miles to Frederica. Former plant abandoned in 1970's near Isaac's Branch. |
| Dover Sewer Authority treated by Kent County WWTP - CS | No | No | No | No | No | No treatment. Interested in hearing more about "helper" solutions such as pretreatment, waste-stream separation/reuse options for industries, holding tanks, etc., but otherwise not many options seen. 12 miles to Frederica. |
| Milford Sewer Authority treated by Kent County WWTP - CS | No | No | No | No | No | 7 miles to Frederica. Could do package systems on growth areas for reuse but no point, KC is set up to handle it. |
| Town of Clayton treated by Kent County WWTP - CS | No | No | No | No | No | 25 miles to Frederica. |
| Town of Smyrna treated by Kent County WWTP - CS | No | No | No | No | No | 25 miles to Frederica, so no point in re-running line. |
| Sussex County | | | | | | |
| Town of Greenwood treated by Bridgeville WWTF - CS | No | No | No | No | No | No treatment facility. |
| Sussex County Collection Systems - CS | No | No | No | No | No | N/A. |

Statewide Reuse Options Considered (Treatment Plants)

Table A-29 presents a statewide summary of wastewater reuse options being considered by treatment plants, by reuse option type.

Table A-29. Statewide Reuse Options Considered

| | No | No, but Interested | Yes, but not viable | Yes, some planning performed | Yes, currently implementing some reuse now |
|-----------------------------------|----|--------------------|---------------------|------------------------------|--|
| Irrigation - Agriculture | 14 | 5 | 4 | 4 | 9 |
| Commercial/ Industrial Use | 23 | 7 | 3 | 2 | 1 |
| Residential Use | 26 | 5 | 2 | 3 | 0 |
| Municipal Sludge Reuse | 6 | 7 | 0 | 2 | 21 |
| Other Reuse | 13 | 4 | 0 | 5 ¹⁹ | 14 |

¹⁹ The Town of Middletown (Middletown WWTP) is planning reuse on golf courses, but it was not tallied here, as it already has reuse in its parks.

Irrigation Reuse Water Data – Treatment Plants

Table A-30 summarizes the information from the responses related to reuse water for irrigation. This table includes questions and descriptions of whether each system meets Unlimited Public Access Site Limitations and a description of the availability of agricultural lands.

Table A-30. Irrigation Reuse Water Data – Treatment Plants

| Wastewater System | Meets Unlimited Public Access Limitations | Unlimited Public Access Comments | Nearby Interested Ag Lands |
|---|---|--|--|
| <i>New Castle County</i> | | | |
| New Castle County - Delaware City WWTP | No | NCC did not comment on N-P, etc. for Del City and it is not in current permit. Get N-P DMR data to see what effluent strength is. | Some study has been done, but not in depth. NCC's general view is that they are interested, but not actively pursuing, reuse. It does not appear that the installation costs justify a project. Permit limits are being met and population growth is slow. |
| New Castle County - Lea Earra Farms WWTP | No | High Nitrogen load. | Some study has been done, but not in depth. NCC's general view is that they are interested, but not actively pursuing, reuse. It does not appear that the installation costs justify a project. Permit limits are being met and population growth is slow. |
| New Castle County - Port Penn STP | No | NCC did not comment on N-P, etc. for Port Penn and it is not in current permit. Get N-P DMR data to see what effluent strength is. | Some study has been done, but not in depth. NCC's general view is that they are interested, but not actively pursuing, reuse. It does not appear that the installation costs justify a project. Permit limits are being met and population growth is slow. |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | No | High Nitrogen load. | Some study has been done, but not in depth. NCC's general view is that they are interested, but not actively pursuing, reuse. It does not appear that the installation costs justify a project. Permit limits are being met and population growth is slow. |
| Town of Middletown - Frog Hollow WWTF | Yes | N/A. | N/A, system is contained and effluent is already utilized for reuse. |
| Town of Middletown - Middletown WWTP | Yes | N/A. | Some interest from add'l farmers. May not be able to meet add'l farm demands (req'd detention time at plant). |
| Wilmington WWTP | No | Effluent is chlorinated. | None. |

| Wastewater System | Meets Unlimited Public Access Limitations | Unlimited Public Access Comments | Nearby Interested Ag Lands |
|---|---|--|--|
| Kent County | | | |
| City of Harrington WWTP | No | N/A taking system off-line. | N/A taking system off-line. |
| Kent County Regional WWTP | Yes | Meets unlimited upon completion of tertiary project (funding in place, next 24 months). | Interest is great if farmers have control of valve. Questions about cost and ability to keep pressure. |
| Sussex County | | | |
| City of Lewes STP | Yes | Recently upgraded secondary treatment train at plant. | None. |
| City of Rehoboth Beach STP | | N/A. | N/A. |
| City of Seaford WWTP | Yes | Tertiary. | WWTP is close to State-owned Forestry. Some ag, available and interest but haven't looked into detailed agreements w/ farmers. |
| Delmar WWTP | Yes | Will meet standards once ENR/BNR system is installed. | Land is available in Maryland. Farmers do not want to assume responsibility for nutrient management, water management, or solids. |
| Sussex County - Inland Bays Regional WWTF | No | Biolac proposed effluent: BOD, TSS - 15, TN - 10. | Sussex County owns 2,188 acres. |
| Sussex County - Piney Neck Regional WWTF | No | BOD=26, TSS=25, fecal <1 (OK). | Adjacent land owner and contract farmer is interested in expanding the effluent spray application to 23 acres. County owns an additional 158 for spray expansion. |
| Sussex County - South Coastal Regional WWTF | No | Does not meet TSS/BOD req'ts. | None. |
| Sussex County - Wolfe Neck WWTF | No | TSS = 19.7 (>10), BOD = 18.2 (>10), Fecal Coliform <1 (OK). | Land is limited Expansion of land application not considered viable. County conducting analysis of WW handling options. One solution presented in the report included sending excess flow from Rehoboth to the IBRWF for treatment and disposal. Maybe RIBs. |
| Town of Georgetown WRF | No | Think could probably meet standards but don't have official tertiary treatment (filtration) system. | No other ag landowners have shown interest. |
| Town of Bridgeville WWTF | No | N/P too high. Treatment system is outdated. Also, effluent line to both stream and spray is damaged. | Utilizing 80 acres at Tatman Farm site (abt 66 under pivot). 900 acre lease on Wheatley property (next to existing). Says recent passing of a senate bill (#129, 2009) saying allowed to spray add'l nutrients during growing season. |
| Town of Laurel STP | Yes | Already low due to TMDL. | 2-3 farms for spray (800 acres, 140 acres) or RIBs (50-60 acres) 400 yards away. |

| Wastewater System | Meets Unlimited Public Access Limitations | Unlimited Public Access Comments | Nearby Interested Ag Lands |
|---|--|--|---|
| Town of Millsboro WWTF | Yes | Recent plant upgrades. | Spray/RIBs sites in final design. Plantation Lakes golf course expressed interest but nothing official. |
| Town of Selbyville WWTF | No | High N/P. | Ag lands are available, but water table is too high. |
| Private | | | |
| Artesian - Beaver Creek | No | No filtration. | N/A. |
| Artesian - Heron Bay | No | No filtration. | N/A. |
| Artesian - Reserves at Lewes Landing | No | N/A. | N/A. |
| Artesian - Stonewater Creek | No | N/A. | N/A. |
| Artesian - Villages at Herring Creek | No | Restricted spray site. | N/A. |
| Tidewater - Bay Front Regional | Yes | MBR Treatment, TN < 5, BOD < 5, TSS < 5. | This facility would not generate enough flow to meet peak agronomic demands. |
| Tidewater - Breeder's Crown | No | Secondary treatment. | Not enough to meet agronomic demands (6,000 - 18,000 gpd) |
| Tidewater - Country Grove | No | Could spray on non-consumptive use crops. | There are farms nearby, but flow will not meet agronomic demands. |
| Tidewater - Hart's Landing | Yes | N/A. | Farms nearby, but flow will not meet agronomic demands. |
| Tidewater - Milton Regional | No | Not required to meet the standard under current permit, but may be under new permit. Not sure if meet standard or not. | Nearby farmers are interested. |
| Tidewater - Retreat | No | N/A. | Not enough flow to meet agronomic demands. |
| Tidewater - The Ridings *In Process of Acquiring* | - | N/A. | Farms nearby, but not enough flow to meet agronomic demands. |
| Tidewater - Trussum *Proposed* | Yes | N/A. | There are several farms nearby. |
| Tidewater - Wandendale *Proposed* | Yes | Subject to TMDL and will have tertiary treatment via MBR. | Spray site planned. The farm fields where spray will take place is "existing" Ag land. |
| New Castle County Total | 2 | | |
| Kent County Total | 1 | | |
| Sussex County Total | 5 | | |
| Private Total | 4 | | |
| State Total | 12 | | |

Irrigation Reuse Water Data – Collection Systems

Table A-31 summarizes the information from the responses related to reuse water for irrigation. This table includes questions and descriptions of whether each system meets Unlimited Public Access Site Limitations and a description of the availability of agricultural lands.

Table A-31. Irrigation Reuse Water Data – Collection Systems

| Wastewater System | Meets Unlimited Public Access Limitations | Unlimited Public Access Comments | Nearby Interested Ag Lands |
|---|---|--|--|
| New Castle County | | | |
| New Castle County - Water Farm #2 treated by Middletown WWTP - CS | No | No treatment plant managed by NCC for WF#2. Currently piped to Middletown. | Some study has been done, but not in depth. NCC's general view is that they are interested, but not actively pursuing, reuse. It does not appear that the installation costs justify a project. Permit limits are being met and population growth is slow. |
| City of Newark Sewer Authority treated by Wilmington WWTP - CS | No | Not treating wastewater. | UD Ag possibly. |
| New Castle County - North of the C&D treated by Wilmington WWTP - CS | No | No treatment plant managed by NCC for Wilmington Collection System. Currently piped to Wilmington. | Some study has been done, but not in depth. NCC's general view is that they are interested, but not actively pursuing, reuse. It does not appear that the installation costs justify a project. Permit limits are being met and population growth is slow. |
| Kent County | | | |
| Camden-Wyoming Sewer and Water Authority treated by Kent County WWTP - CS | No | N/A. | N/A. |
| Dover Sewer Authority treated by Kent County WWTP - CS | No | N/A. No treatment. | None. Asked about possibility of Del State having small educational facility and said probably not due to many factors. Pumping to Frederica and back makes little sense. |
| Milford Sewer Authority treated by Kent County WWTP - CS | No | N/A. | N/A. |
| Town of Clayton treated by Kent County WWTP - CS | No | No treatment or pretreatment. | N/A. |
| Town of Smyrna treated by Kent County WWTP - CS | - | N/A. | N/A. |
| Sussex County | | | |
| Town of Greenwood treated by Bridgeville WWTF - CS | No | N/A. | Available around Greenwood, but no pipeline infrastructure. |
| Sussex County Collection Systems - CS | - | N/A. | N/A. |

General Reuse System Information – Treatment Plants

Table A-32 presents reuse information, including narrative comments on permit requirements, other available methods and new technologies being considered or employed.

Table A-32. General Reuse System Information – Treatment Plants

| Wastewater System | Permit Requirements Satisfied with Reuse | Options other than Reuse | New Technologies |
|---|--|--|---|
| New Castle County | | | |
| New Castle County - Delaware City WWTP | N/A. Current permit is met and no anticipated issues. | N/A. Haven't looked into plant modification. | None. |
| New Castle County - Lea Earra Farms WWTP | N/A. | N/A. | N/A. |
| New Castle County - Port Penn STP | N/A. Current permit is met and no anticipated issues. | N/A. Haven't looked into plant modification. | None. |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | Currently meeting permits. | Existing NPDES permit for winter discharges during frozen conditions. | N/A. |
| Town of Middletown - Frog Hollow WWTF | N/A. | N/A. | Not at this time. |
| Town of Middletown - Middletown WWTP | Currently utilizing reuse but not being allowed to count toward disposal capacity. | N/A. | Considering solar and wind through grant funding. |
| Wilmington WWTP | N/A. | Nothing appears viable at this time. | Working with DSWA landfill to start methane capture project from digester (\$40M). Thermal Dryer for Solids "Thermal Dryer Renewable Energy Facility". Solar at Rock Manor WTP and Public Works new Admin Bldg. |
| Kent County | | | |
| City of Harrington WWTP | N/A, taking system off-line. | Sending waste to KCWWTP. | Looked into solar but now N/A. |
| Kent County Regional WWTP | Don't need it now, possibly in future. | N/A. | 1.2 MW solar panels for 100% elec on sunny days, HVAC with effluent (heat exchangers / heat pumps), 3 passive solar greenhouses for drying (1/4 acre each w/ heated floors), not interested in methane capture (expertise issue, and only 20%). |
| Sussex County | | | |
| City of Lewes STP | N/A. | NPDES permit: Looking for alternatives/options for nutrient offset (trading) program for Inland Bays (N/P needs to be "0") through reforestation, wetland buffers/BMPs, relocate livestock manure, storage to match tidal influence. | Solar panel hot water heater, plant is new so no major retrofits, doing process control efficiency now. #1 effluent quality in State, best biosolids in the State. |

| Wastewater System | Permit Requirements Satisfied with Reuse | Options other than Reuse | New Technologies |
|---|--|---|--|
| City of Rehoboth Beach STP | Nutrient Loadings to Inland Bays - changing to ocean outfall so N/A. | Nutrient trading and various discharge options were studied, and ocean outfall is only viable option. Ocean outfall eliminates current discharge to Inland Bays thereby achieving compliance with the consent order. | Looking to upgrades solids from Class B to Class A. |
| City of Seaford WWTP | N/A - Not exceeding limits. | Current NPDES, RIBS if can find land, County has lots of land (reciprocal agreement). | Looking into solar, and looking into access to green credits for green projects. |
| Delmar WWTP | N/A - upgrades should meet the requirements. | Don't know. | None. |
| Sussex County - Inland Bays Regional WWTF | Current upgrades meet future limits. | N/A. | See South Coastal response. |
| Sussex County - Piney Neck Regional WWTF | N/A. | N/A. | N/A. |
| Sussex County - South Coastal Regional WWTF | All permits and anticipated permits being met. | Expansion of plant (Hydraulic capacity of ocean outfall is 22 MGD). | Class "A" Biosolids w/ liming agent for pH adjustment by local farmers. |
| Sussex County - Wolfe Neck WWTF | Meeting current administrative permit requirements, but unsure how to meet upcoming performance standards. | N/A. | Getting solar at one plant soon. Recent study for wind energy, not sure of result. |
| Town of Georgetown WRF | N/A, Currently using reuse to meet permit req's. | N/A. | Not at this time. |
| Town of Bridgeville WWTF | Nutrient Loadings. If the plant gets fixed/upgraded, could meet NPDES annual TMDL loads (winter discharge only), not sure about daily loads. | Currently still have NPDES point discharge permit. | Got \$120K for energy audit upgrades (light bulbs, doors, windows, pump motors, etc.). |
| Town of Laurel STP | N/A, but may get more flow capacity w/ spray site (dual permit). | NPDES. | Not at this time but considering it. Did energy audit: got "low hanging fruit" (lights, HVAC, variable speed motors, etc.). |
| Town of Millsboro WWTF | Already stated. Switching to spray. It is Millsboro's understanding that their NPDES permit will be eliminated. | N/A. Deep well injection studied and not feasible (couldn't find a lens to discharge to, and cost in general was not viable). | Interested in anything paid for by grants. |
| Town of Selbyville WWTF | N/A. | NPDES permit: Looking for alternatives/options for nutrient offset (trading) program for Inland Bays (N/P needs to be "0") through reforestation, wetland buffers/BMPs, relocate livestock manure, storage to match tidal | Solar panel hot water heater, plant is new so no major retrofits, doing process control efficiency now. #1 effluent quality in State, best biosolids in the State. |

| Wastewater System | Permit Requirements Satisfied with Reuse | Options other than Reuse | New Technologies |
|--|--|---|---|
| | | influence. | |
| Private | | | |
| Artesian - Beaver Creek | N/A. | Ocean outfall. | No anaerobic digester so no methane capture, basic items like switching to T8 bulbs, maybe solar but would need referendum and matching funds for competitive grants. |
| Artesian - Heron Bay | N/A. | N/A. | Currently looking at efficiency options but none at moment. |
| Artesian - Reserves at Lewes Landing | N/A. | N/A. | Currently looking at efficiency options but none at moment. |
| Artesian - Stonewater Creek | N/A. | N/A. | Currently looking at efficiency options but none at moment. |
| Artesian - Villages at Herring Creek | N/A. | N/A. | Currently looking at efficiency options but none at moment. |
| Tidewater - Bay Front Regional | N/A. | N/A. | None. |
| Tidewater - Breeder's Crown | N/A. | N/A. | We consider regionalization in all of our plans for cost, energy, and resource efficiency. |
| Tidewater - Country Grove | Could spray on crops for non-direct consumption. Flow is too low for agronomic demand. | N/A. | TESI considers regionalization in all plans for cost, energy, and resource efficiency. |
| Tidewater - Hart's Landing | N/A, meeting current permit requirements. | RIBS | TESI considers regionalization in all plans for cost, energy, and resource efficiency. |
| Tidewater - Milton Regional | N/A. | N/A. | TESI considers regionalization in all plans for cost, energy, and resource efficiency. |
| Tidewater - Retreat | Could spray on crops for non-direct consumptive use. | Will be cheaper to upgrade to a new plant for NPDES permit. | TESI considers regionalization in all plans for cost, energy, and resource efficiency. |
| Tidewater - The Ridings *In Process of Acquiring* | N/A. | N/A. | TESI considers regionalization in all plans for cost, energy, and resource efficiency. |
| Tidewater - Trussum *Proposed* | N/A. | N/A. | TESI considers regionalization in all plans for cost, energy, and resource efficiency. |
| Tidewater - Wandendale *Proposed* | N/A. | N/A. | TESI considers regionalization in all plans for cost, energy, and resource efficiency. |

General Reuse System Information – Collection Systems

Table A-33 presents reuse information, including narrative comments on permit requirements, other available methods and new technologies being considered or employed.

Table A-33. General Reuse System Information – Collection Systems

| Wastewater System | Permit Requirements Satisfied with Reuse | Options other than Reuse | New Technologies |
|---|--|-------------------------------------|--|
| <i>New Castle County</i> | | | |
| New Castle County - Water Farm #2 treated by Middletown WWTP - CS | N/A. | N/A. | None. |
| City of Newark Sewer Authority treated by Wilmington WWTP - CS | N/A. | N/A. | None at this time. |
| New Castle County - North of the C&D treated by Wilmington WWTP - CS | N/A. | N/A. | None. |
| <i>Kent County</i> | | | |
| Camden-Wyoming Sewer and Water Authority treated by Kent County WWTP - CS | N/A. | N/A. | None. |
| Dover Sewer Authority treated by Kent County WWTP - CS | N/A. | Continue to discharge to KC system. | Solar panels on admin buildings. |
| Milford Sewer Authority treated by Kent County WWTP - CS | N/A. | N/A. | Part of discussion for any new facilities but nothing in works. Mostly efficiency upgrades through electrical utility. |
| Town of Clayton treated by Kent County WWTP - CS | N/A. | N/A. | Solar on Water Treatment Plant. |
| Town of Smyrna treated by Kent County WWTP - CS | N/A. | N/A. | N/A. |
| <i>Sussex County</i> | | | |
| Town of Greenwood treated by Bridgeville WWTF - CS | N/A. | N/A. Connected to Bridgeville. | None. |
| Sussex County Collection Systems - CS | N/A. | N/A. | N/A. |

Facility Upgrades and Costs for Reuse Upgrade Options – Treatment Plants

Table A-34 presents reported facility upgrades for reuse options and their estimated costs.

Table A-34. Facility Upgrades and Costs for Reuse Upgrade Options – Treatment Plants

| Wastewater System | Upgrades Needed | Costs (\$) |
|---|---|-------------|
| New Castle County | | |
| New Castle County - Delaware City WWTP | N/A. | |
| New Castle County - Lea Earra Farms WWTP | N/A. | |
| New Castle County - Port Penn STP | N/A. | |
| New Castle County - Water Farm #1 aka MOT Regional WWTP | N/A. | |
| Town of Middletown - Frog Hollow WWTF | N/A. | |
| Town of Middletown - Middletown WWTP | Continued Expansion (2 filters) and Treatment/Infrastructure to Concrete Plant. | \$2,000,000 |
| Wilmington WWTP | Tertiary Treatment. | |
| Kent County | | |
| City of Harrington WWTP | Storage Lagoon. | |
| Kent County Regional WWTP | N/A, funding is in place. | |
| Sussex County | | |
| City of Lewes STP | N/A. | |
| City of Rehoboth Beach STP | Minor plant upgrades would be required for ag reuse. | |
| City of Seaford WWTP | Infrastructure (lines, pumping, etc.). | |
| Delmar WWTP | Pipeline and Spray equipment. | |
| Sussex County - Inland Bays Regional WWTF | N/A. | |
| Sussex County - Piney Neck Regional WWTF | N/A. | |
| Sussex County - South Coastal Regional WWTF | N/A. | |
| Sussex County - Wolfe Neck WWTF | Filters. | \$1,000,000 |
| Town of Georgetown WRF | Tertiary Treatment and Additional land and transmission infrastructure. | |
| Town of Bridgeville WWTF | None, but plant needs to be majorly upgraded/repared. | |
| Town of Laurel STP | Infrastructure (Pipes, Pumps, etc.). | |
| Town of Millsboro WWTF | None in plant and Currently permitting transmission and infrastructure for spray. | |
| Town of Selbyville WWTF | Piping and equipment and Land Acquisition. | |
| Private | | |
| Artesian - Beaver Creek | N/A. | |
| Artesian - Heron Bay | N/A. | |
| Artesian - Reserves at Lewes Landing | N/A. | |
| Artesian - Stonewater Creek | N/A. | |
| Artesian - Villages at Herring Creek | N/A. | |
| Tidewater - Bay Front Regional | N/A. | |
| Tidewater - Breeder's Crown | Filtration, disinfection (plant has no disinfection). | |
| Tidewater - Country Grove | N/A. | |
| Tidewater - Hart's Landing | N/A. | |
| Tidewater - Milton Regional | Infrastructure (pipes/pumps/etc.), Get plant to unlimited access standard. | |

| Wastewater System | Upgrades Needed | Costs (\$) |
|---|------------------------|-------------------|
| Tidewater - Retreat | N/A. | |
| Tidewater - The Ridings *In Process of Acquiring* | N/A. | |
| Tidewater - Trussum *Proposed* | N/A. | |
| Tidewater - Wandendale *Proposed* | N/A. | |

Facility Upgrades and Costs for Reuse Upgrade Options – Collection Systems

Table A-35 presents reported facility upgrades for reuse options and their estimated costs.

Table A-35. Facility Upgrades and Costs for Reuse Upgrade Options – Collection Systems

| Wastewater System | Upgrades Needed | Costs (\$) |
|---|-----------------|------------|
| <i>New Castle County</i> | | |
| New Castle County - Water Farm #2 treated by Middletown WWTP - CS | N/A. | |
| City of Newark Sewer Authority treated by Wilmington WWTP - CS | N/A. | |
| New Castle County - North of the C&D treated by Wilmington WWTP - CS | N/A. | |
| <i>Kent County</i> | | |
| Camden-Wyoming Sewer and Water Authority treated by Kent County WWTP - CS | N/A. | |
| Dover Sewer Authority treated by Kent County WWTP - CS | N/A. | |
| Milford Sewer Authority treated by Kent County WWTP - CS | N/A. | |
| Town of Clayton treated by Kent County WWTP - CS | N/A. | |
| Town of Smyrna treated by Kent County WWTP - CS | N/A. | |
| <i>Sussex County</i> | | |
| Town of Greenwood treated by Bridgeville WWTF - CS | N/A. | |
| Sussex County Collection Systems - CS | N/A. | |