

Section 2 | Existing Water Use

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Existing Water Use

The Local and Regional Water Supply Planning Regulation (9 VAC 25-780-70) requires information about existing water use. Water use information was obtained from VDH, DEQ, and local water utility departments. The Regulation requires the following information for each CWS in the planning area: the number of people served; the number of connections; the average and maximum daily withdrawal; the amount of water used; the peak day water use; and the disaggregated water use.

Additionally, the Regulation requires that, to the extent that information is available, for each CWS using stream intakes, the Regional Water Supply Plan shall include a qualitative description of existing in-stream beneficial uses within the planning area or outside the planning area that may be affected by the point of stream withdrawal.

The plan must include the amount of water used by self-supplied users that withdraw more than 300,000 gallons per month of surface water and groundwater for non-agricultural and agricultural use. The plan must also identify whether self-supplied users are located within the service area of a CWS.

Private residential wells and private business wells do not have to report their water withdrawals to DEQ unless they withdraw more than 300,000 gallons per month. The plan is required to include an estimate of water used by these self-supplied users. Domestic water use was assumed to be 75 gallons per person and household size was based on the 2000 census estimates. The per capita use was based on the USGS study “Private Domestic–Well Characteristics and the Distribution of Domestic Withdrawals among Aquifers in the Virginia Coastal Plain”. Annual use by small businesses was estimated based on the “Commonwealth of Virginia Guidance for Conducting a Comprehensive Public Drinking Water Supply Needs Assessment”.

This chapter summarizes the portion of the required regulatory data that most impacts water supply planning in the Hampton Roads region. A complete set of data addressing all of the regulatory requirements is included in Appendix A.

Existing Water Use – Peninsula Sub-Region

Publicly-owned CWS served 94% of the Peninsula sub-region’s population in 2007. The systems used a combined average of 57.93 mgd, not including water consumed during production processes. Newport News Waterworks, the largest publicly-owned CWS in the sub-region, used 48.16 mgd of water in 2007.

Privately-owned CWSs only operate in Gloucester, James City, and York Counties. The private systems used 0.045 mgd in 2007. That figure does not include the water used by the privately-owned CWSs in York County since water for those systems is purchased from Newport News Waterworks and the Williamsburg publicly-owned CWS.

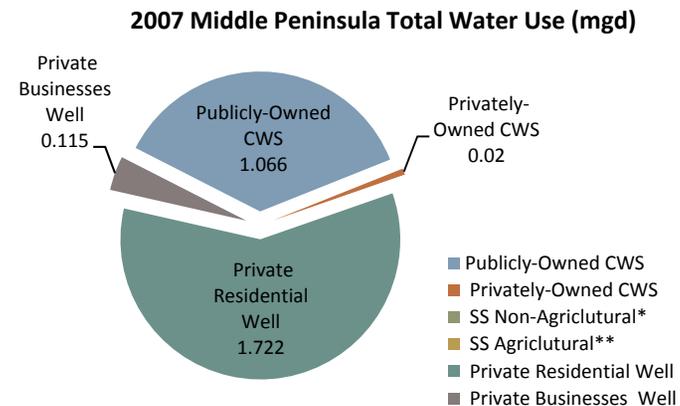
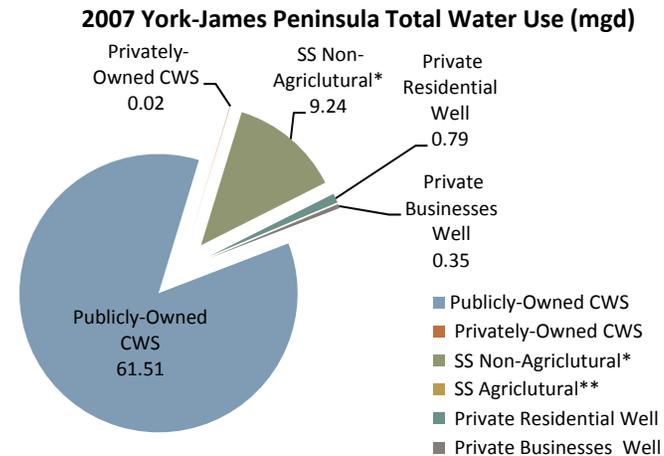
Private residential wells served approximately 33,384 people in 2007 in the Counties of Gloucester, James City and York. In 2007 private residential use required approximately 2.50 mgd, and all users lived outside a publicly-owned CWS service area.

An estimated 54 businesses were served by private wells in 2007; 36 businesses were located outside a publicly-owned CWS. The businesses served by private wells used a total of approximately 0.47 mgd in 2007.

In 2007, seven self-supplied non-agricultural users reported withdrawing more than 300,000 gallons per month of surface water; the systems used an average of 825 mgd. The largest user was the Yorktown Fossil Power Plant, which withdrew an estimated 817 mgd of surface water in 2007. The majority of the water was returned to the York River.

There were 13 self-supplied non-agricultural users who reported withdrawing more than 300,000 gallons per month of groundwater in 2007; these businesses used an average of 0.86 mgd. All the use occurred within a publicly-owned CWS service area. The largest user was Colonial Williamsburg Inn, which used 0.48 mgd.

Figure 2-1
2007 Peninsula Sub-Region Total Water Use (mgd)



*SS Non-Ag = Self-Supplied Non-Agricultural withdrawals > 300,000 gallons/month
 **Self-supplied does not include Yorktown Fossil Power Plant. Plant used 817 mgd in 2007. Most of the water was returned to the York River.

Publicly-Owned Community Water Systems

There are 23 publicly-owned CWSs operating in the Peninsula sub-region. Newport News Waterworks provides water to twelve of the systems in addition to the main Newport News Waterworks system. The majority of the sub-region’s population relies on a publicly-owned CWS. As a whole, the systems served approximately 477,855 people (94% of the total population) in 2007 (see Figure 2-2).

The total 2007 water use by Peninsula sub-region publicly-owned CWSs was 57.93 mgd. An additional 4.65 mgd of water was consumed during production processes. Water use by usage type is summarized below:

- **Residential use:** 29.45 mgd
- **Commercial, institutional, and light industrial (CIL) use:** 12.45 mgd
- **Heavy industrial use:** 9.69 mgd
- **Military use:** 3.11 mgd
- **Other:** 0.13 mgd
- **Unaccounted for water:** 3.11 mgd

Figure 2-3 and Table 2-1 provide detailed 2007 water use information for York-James Peninsula and Middle Peninsula publicly-owned CWSs.

**Figure 2-2
2007 Peninsula Sub-Region Locality Populations Served
by Publicly-Owned Community Water Systems**

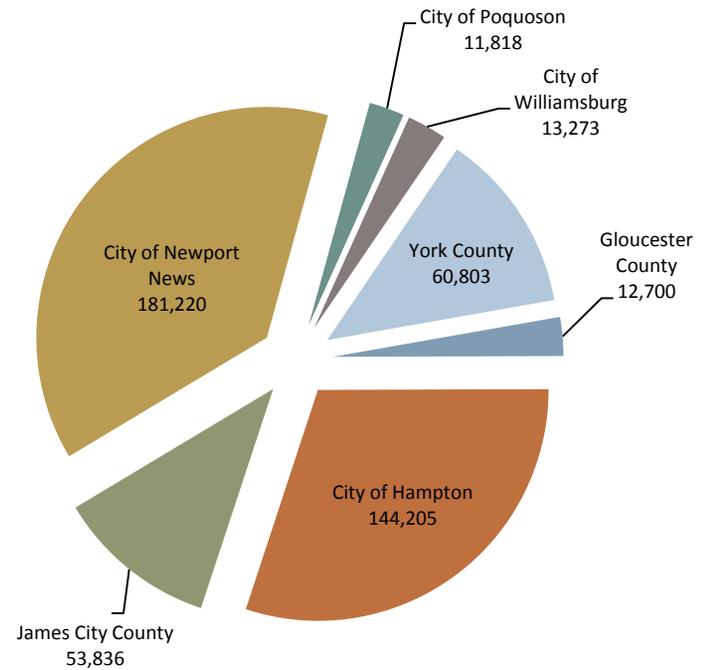
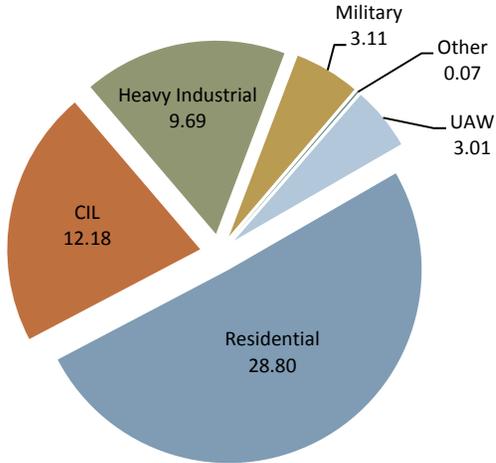


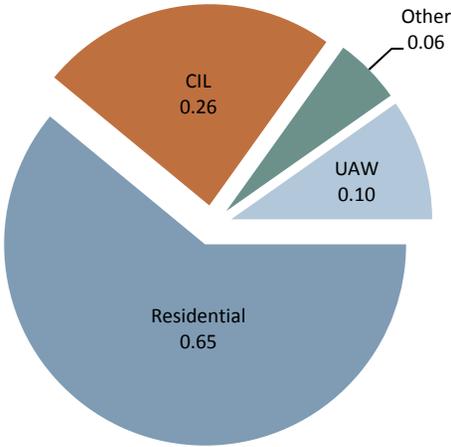
Figure 2-3
2007 Peninsula Sub-Region Publicly-Owned Community Water System Use by Type (mgd)

2007 York-James Peninsula Publicly-Owned Community Water System Use by Type (mgd)



CIL = Commercial, Institutional, Light Industrial
 UAW = Unaccounted for water

2007 Middle Peninsula Publicly-Owned Community Water System Use by Type (mgd)



CIL = Commercial, Institutional, Light Industrial
 UAW = Unaccounted for water

Table 2-1: Categories of Use for Peninsula Publicly-Owned Community Water Systems

(2007 data, all figures in mgd)

Water System Name	Residential	Commercial Institutional Light Industrial (CIL)	Heavy Industrial	Military	Other	Unaccounted for Losses	Total Water Use	Additional Production Losses
York-James Peninsula								
James City Service Authority - Glenwood Acres	0.006	0.000	0.000	0.000	0.000	0.000	0.006	0.000
James City Service Authority - Central System	3.107	1.673	0.000	0.000	0.000	0.251	5.031	0.790
James City Service Authority - Kings Village	0.010	0.000	0.000	0.000	0.000	0.000	0.010	0.000
James City Service Authority - Racefield	0.011	0.000	0.000	0.000	0.000	0.000	0.011	0.000
James City Service Authority – The Retreat	0.014	0.000	0.000	0.000	0.000	0.000	0.014	0.000
James City Service Authority - Ware Creek Manor	0.012	0.000	0.000	0.000	0.000	0.000	0.012	0.000
James City Service Authority - Wexford Hills	0.038	0.000	0.000	0.000	0.000	0.000	0.028	0.000
Newport News Waterworks	25.000	8.100	9.690	3.010	0.070	2.290	48.160	3.470
Newport News Waterworks - Lightfoot ¹	0.056	0.249	0.000	0.000	0.000	0.023	0.328	0.000
City of Williamsburg	0.560	2.168	0.000	0.097	0.000	0.440	3.265	0.071
Middle Peninsula								
Gloucester County WTP	0.650	0.255	0.000	0.000	0.057	0.104	1.066	0.314
Peninsula Sub-Region Total	29.454	12.445	9.690	3.107	0.127	3.108	57.931	4.645

1. In 2007, the Lightfoot System was operated by York County.

York-James Peninsula

Newport News Waterworks: Publicly-Owned Community Water System

Waterworks provided water service to approximately 410,000 people in the Peninsula sub-region in 2007. The service area includes the entire City of Newport News, Hampton, and Poquoson. Waterworks also serves a small portion of James City County and most of York County. The reported water use for Waterworks includes the following ten CWSs: Fort Monroe, Langley Air Force Base, Langley Family Housing, Fort Eustis, Yorktown Naval Weapons Station, Cheatham Annex, Carver Gardens, Nelson Park, York Terrace, and York Public Utilities. Waterworks' use was 48.16 mgd of finished water; an additional 3.47 mgd of raw water was consumed by production processes (e.g., backwashing filters, concentrate from the brackish groundwater treatment system) (see Table 2-1). The Lightfoot system was operated by York County in 2007. The system's use was 0.33 mgd.

Waterworks is the only CWS in the Peninsula sub-region that has a stream intake. In addition to groundwater withdrawals and reservoir withdrawals, Waterworks withdraws from the Chickahominy River. The River's existing in-stream beneficial uses include anadromous fish use areas or reaches of alewife, blueback herring, striped bass, and yellow perch. The Chickahominy is listed on National Rivers Inventory for extensive, well developed cypress-gum swamp forest and bottomland hardwood forest which includes three rare, endemic and possibly endangered species of plants. The River is also sacred to the Chickahominy Indian tribe. The College of William and Mary rowing club practices on the river. Sections of the Chickahominy do not support recreation, aquatic life (estuary) or fish consumption. See "Section 3, Existing Resources" for more information.



Photo: Chickahominy River, HRPDC

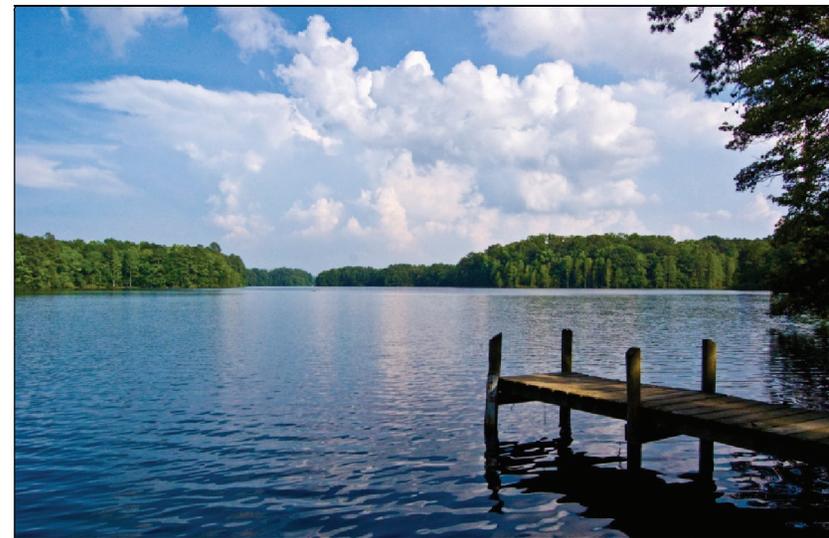


Photo: Harwoods Mill, HRPDC

JCSA: Publicly-Owned Community Water Systems

JCSA operates seven CWSs that all rely on groundwater. The systems provided water to approximately 46,000 people with a total use of 5.11 mgd in 2007. An additional 0.79 mgd of raw water was consumed during the brackish groundwater treatment process (see Table 2-1).

The City of Williamsburg: Publicly-Owned Community Water System

Williamsburg operates one CWS that relies on groundwater and surface water. The system provided water to approximately 13,273 people in 2007 with a total use of 3.27 mgd (see Table 2-1). An additional 0.07 mgd of raw water was consumed during the production process.

Middle Peninsula

Gloucester County: Publicly-Owned Community Water System

Gloucester County operates one CWS that relies on groundwater and surface water. The system provided water to approximately 12,700 people in 2007, with a total use of 1.07 mgd. An additional 0.31 mgd of raw water was consumed in production processes (see Table 2-1).

Privately-Owned Community Water Systems

There are 12 privately-owned CWSs operating in the Peninsula sub-region. The five systems that operate in York County purchase water from Newport News Waterworks or the City of Williamsburg (see Map 2-1). The water use for those residential systems is reported under the Waterworks and the City of Williamsburg systems.

Three privately-owned systems operate in Gloucester County and four operate in James City County. In 2007, the systems served a total of 835 people and used 0.03 mgd for residential use. The systems all rely on groundwater (see Table 2-2).

Table 2-2: 2007 Peninsula Privately-Owned Community Water System Use		
System	Population Served	Use (mgd)
York-James Peninsula:		
James City County		
Brooks' Duplexes	35	0.002
Greensprings Mobile Village	208	0.011
Heaths Mobile Homes	42	0.003
Shodon Mobile Estates	150	0.002
Middle Peninsula:		
Gloucester County		
Laurelwood Estates Trailer Park	175	0.001
R&L Trailer Park	45	0.004
Waterview Mobile Home Park	80	0.008

Self-Supplied Users Served by Private Residential or Private Business Wells

In 2007, the Peninsula sub-region was estimated to have approximately 33,384 people served by private residential wells (see Figure 2-4 and 2-5). Residential wells used an estimated 2.50 mgd in 2007. All of the residents served by a private well live outside a publicly-owned CWS service area. Residential wells use less than 300,000 gallons per month and serve less people than a CWS. Therefore, residential well owners are not required to report their withdrawals to DEQ or VDH. Water use was estimated based on 75 gallons per person per day.

The Cities of Hampton, Newport News, Poquoson, and Williamsburg do not have any population served by private residential wells. The following list is a summary of the self-supplied residential use in the Peninsula sub-region.

York-James Peninsula:

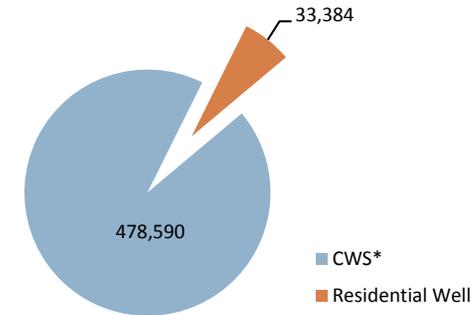
- James City County: 7,224 people. Use = 0.54 mgd.
- York County: 3,200 people. Use = 0.24 mgd.

Middle Peninsula:

- Gloucester County: 22,960 people. Use = 1.72 mgd.

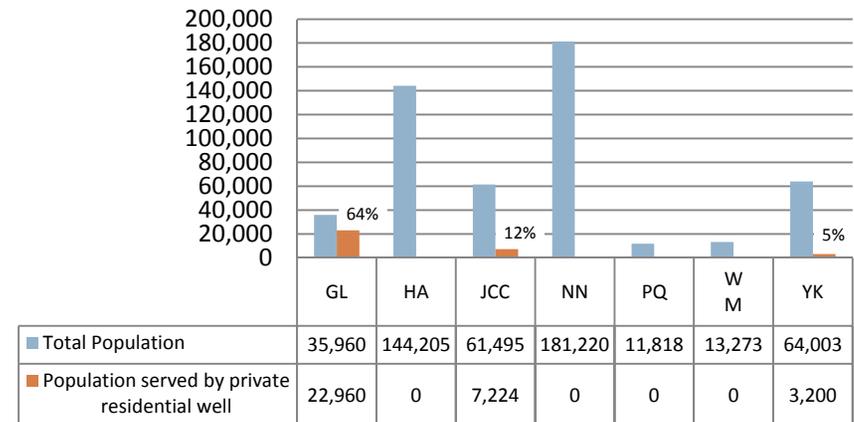
In 2007, 54 businesses used private wells; 18 of these businesses were located within a CWS service area. Like private residential wells, businesses that withdraw less than 300,000 gallons per day are not required to report their withdrawals to a state agency. Therefore, the use was calculated by following the VDH guidelines for calculating use by type of businesses. The estimated 2007 total demand for all 54 sub-region businesses using private wells was 0.47 mgd.

Figure 2-4
Peninsula Population Served by Private Residential Wells vs. CWSs



*CWS include publicly- and privately-owned systems.

Figure 2-5
Percent of Peninsula Population on Private Residential Wells



GL = Gloucester County | HA = City of Hampton | NN = City of Newport News
JCC = James City County | PQ = City of Poquoson | YK = York | WM = Williamsburg

Self-Supplied Users Withdrawing More Than 300,000 Gallons per Month

Non-Agricultural Users: Surface Water Use



Photo: Golden Horseshoe Golf Club, HRPDC

Seven self-supplied non-agricultural users reported withdrawing more than 300,000 gallons per month of surface water in 2007 (see Figure 2-6 and Table 2-3). Surface water was withdrawn from ponds, lakes, creeks, and the York River. All of the users are located within a publicly-owned CWS service area. The total average surface water use was 825

mgd in 2007, with the largest withdrawal of 817 mgd coming from the Yorktown Fossil Power Plant. The majority of the water withdrawn by the power plant is returned to the river.

Non-Agricultural Users: Groundwater Use



Photo: Dominion Terminal Associates, HRPDC

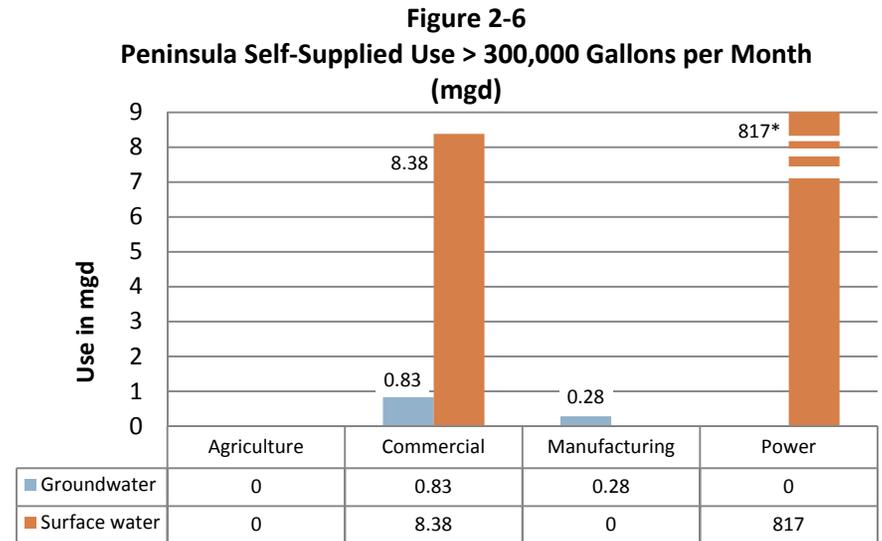
In 2007, 13 self-supplied users reported withdrawing more than 300,000 gallons per month of groundwater (see Figure 2-6 and Table 2-3). All of the users are located within a publicly-owned CWS service area. The total average groundwater use was 0.86 mgd in 2007. The largest groundwater withdrawal was from Colonial Williamsburg Inn, 0.48 mgd.

In 2007, 54 businesses withdrew less than 300,000 gallons per day; 18 of these businesses are located within a CWS service area. The businesses are not required to report their withdrawals to DEQ. Therefore, the use was estimated based on the VDH guidelines for

demands for types of businesses. The estimated total demand in 2007 was 0.47 mgd.

Agricultural Users

No self-supplied agricultural users reported withdrawals that were more than 300,000 gallons per month to DEQ in 2007, nor did any agricultural users hold DEQ Ground Water Withdrawal Permits in 2007.



*Yorktown Fossil Power Plant withdrew 817 mgd. Majority of water is returned to the York River.

**Table 2-3: 2007 Peninsula Self-Supplied
Non-Agricultural Users > 300,000 Gallons per Month
(all figures in mgd)**

Water User Name	Source	Use	Estimated Annual Average Use
BASF Corporation Williamsburg	GW	Man	0.02
Busch Gardens Williamsburg	GW	Com	0.07
Colonial Williamsburg Inn	GW	Com	0.48
Deer Run Golf Course	SW	Com	0.08
Dominion Terminal Associates - Pier 11	GW	Man	0.12
Golden Horseshoe Golf Course	GW	Com	0.04
Golden Horseshoe Golf Course	SW	Com	0.18
James River Country Club	GW	Com	0.03
Kinder Morgan Bulk Terminal - Pier IX	GW	Man	0.09
Kingsmill Golf Course	SW	Com	0.28
Northrup Grumman Shipbuilding	SW	Com	8.15
Outdoor World Campground	GW	Com	0.01
Sanifill of Virginia - Big Bethel Landfill	GW	Com	0.08
Siemens Automotive - Newport News	GW	Man	0.04
The Pines Golf Course - Fort Eustis	GW	Com	0.06
Titan Ready Mix Plant - Rip Rap Road	GW	Man	0.02
Two Rivers Country Club	GW	Com	0.07
Williamsburg Country Club	SW	Com	0.05
Williamsburg National Golf Course	SW	Com	0.05
Yorktown Fossil Power Plant	SW	Pf	817.00

Com = Commercial | Man = Manufacturing | Pf = Fossil Power

GW = Groundwater | SW = Surface water

*All of the businesses listed are located within the service area of a publicly-owned community water system.

Existing Water Use – Southside Sub-Region

Publicly-owned CWSs served 92% of the Southside sub-region’s population in 2007. The entire populations of the Cities of Norfolk and Portsmouth are served by publicly-owned CWS. The publicly-owned CWSs in Chesapeake, Suffolk and Virginia Beach serve the dense population centers within each respective city, but do not cover the entire city. The areas not served by the publicly-owned CWSs are served by either private residential wells or privately-owned CWSs. In 2007, the sub-region’s publicly-owned CWSs used approximately 100.00 mgd, not including water consumed during production processes.

The Cities of Chesapeake and Suffolk are the only localities in the sub-region with privately-owned CWSs. Nine privately-owned CWSs served 7,500 people in 2007, 1% of the sub-region’s population. The systems used a combined average of 0.49 mgd.

Private residential wells are found in the southern and western portions of Chesapeake, Suffolk, and Virginia Beach. The majority of the private residential wells are in the City of Chesapeake. A total of 58,618 people, about 5% of the sub-region’s total population, were served by a private residential well in 2007. Private residential wells used approximately 4.40 mgd. Irrigation wells are not included. The majority of the wells are located outside publicly-owned CWS service areas.

In 2007, 49 businesses were served by private wells. These businesses used an estimated total of 0.40 mgd of water.

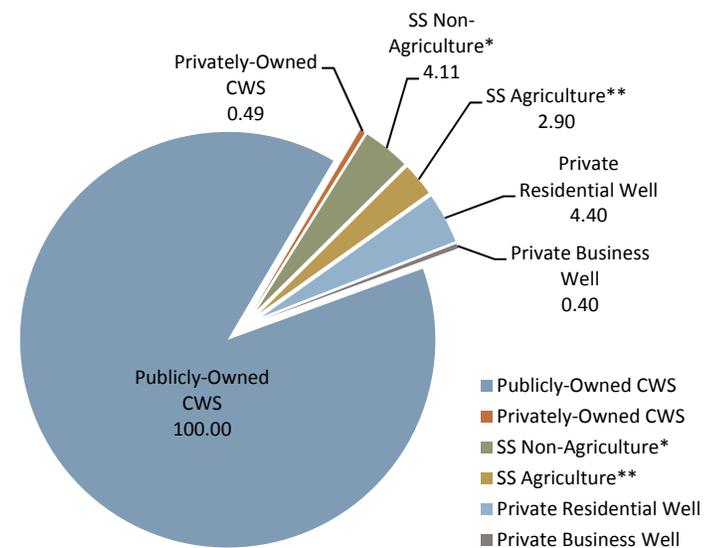
As for self-supplied non-agricultural users, 12 users reported withdrawing more than 300,000 gallons per month of surface water in 2007, with an average use of 522 mgd. The Chesapeake Energy Center had the largest withdrawal of surface water of 521 mgd. The majority of this withdrawal is returned to the Elizabeth River.

Additionally, the sub-region had 26 non-agricultural users that reported withdrawing more than 300,000 gallons per day of groundwater in 2007, with an average use of 3.11 mgd. Cogentrix

Virginia Leasing Company, a fossil power plant, had the largest withdrawal of 1.66 mgd.

The Southside sub-region is also home to many self-supplied agricultural users that reported withdrawing more than 300,000 gallons per month of surface water and/or groundwater. The reported use was 2.63 mgd of surface water and 0.26 mgd of groundwater. Figure 2-7 summarizes the total water use in the sub-region for 2007.

Figure 2-7
2007 Southside Total Water Use (mgd)



* SS Non-Agriculture = Self-Supplied Non-Agricultural withdrawals > 300,000 gallons/month. Does not include 521 mgd withdrawn by the Chesapeake Energy center; most of the water is returned to the Elizabeth River.

**SS Agriculture = Self-Supplied Agricultural withdrawals >300,000 gallons/month.

Publicly-Owned Community Water Systems

Nine publicly-owned CWSs operate in the Southside sub-region: three in Chesapeake, three in Suffolk, one in Norfolk, one in Portsmouth, and one in Virginia Beach. The majority of the sub-region’s population relies on publicly-owned CWSs. As a whole, the systems served a total of 977,626 people in 2007 (see Figure 2-8).

In addition to residential use, which had the highest use in 2007, publicly-owned systems served a variety of uses (see Figure 2-9):

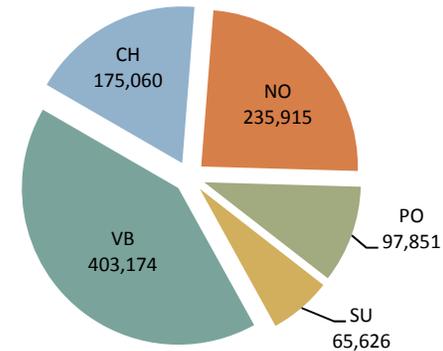
- **Residential use:** 59.65 mgd
- **CIL use:** 19.21 mgd
- **Heavy industrial use:** 2.04 mgd
- **Military:** 5.77 mgd
- **Other:** 1.86 mgd
- **Unaccounted for water:** 11.46 mgd

The total 2007 water use by publicly-owned CWSs was approximately 100.00 mgd; an additional 6.62 mgd was consumed during production processes.

The Cities of Norfolk and Portsmouth sell water to various CWSs within the Southside sub-region. Figure 2-9 reflects the sub-region’s water use as determined by the CWS that purchased the water and provided water service to the customer. See subsequent discussions on Norfolk and Portsmouth publicly-owned CWSs for details on water sales.

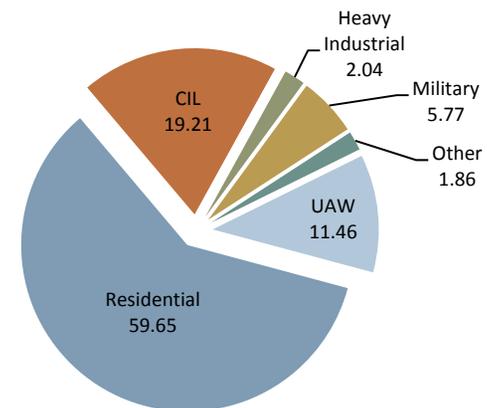
Figure 2-9 does not reflect 0.357 mgd of water sold by the City of Suffolk to the Western Tidewater Authority to serve uses located outside the sub-region. Use of this water is discussed in Section 2, “Existing Water Use – Western Tidewater.”

Figure 2-8
2007 Southside Population Served by Publicly-Owned Community Water Systems



CH = Chesapeake | NO = Norfolk | PO = Portsmouth | SU = Suffolk | VB = Virginia Beach

Figure 2-9
2007 Southside Publicly-Owned Community Water System Use by Type (mgd)



CIL = Commercial, Institutional, Light Industrial
UAW = Unaccounted for water

City of Chesapeake: Publicly-Owned Community Water Systems

The City of Chesapeake owns and operates three CWSs. The systems served 174,586 people in 2007. Residential use required 11.31 mgd; CIL use required 4.59 mgd; and the unaccounted water losses were 0.94 mgd in 2007 (see Figure 2-10).

The Northwest River System is the largest system, and served approximately 102,434 people in 2007. The City of Chesapeake purchased 6.45 mgd of raw water from the City of Norfolk to supplement supply for this system. The system’s 2007 use was 11.17 mgd. An additional 4.46 mgd was consumed in the production process. Residential use was 7.40 mgd and CIL use was 3.00 mgd. The Northwest River System withdraws water from the Northwest River. The River’s existing in-stream beneficial uses include designation on the National Rivers Inventory list. The river is also an estuarine system that consists of deepwater tidal habitats and

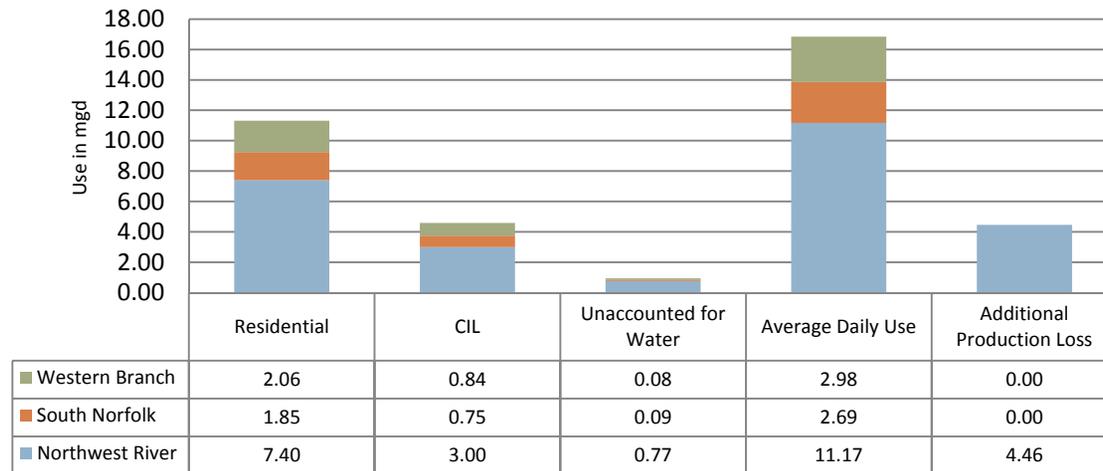
adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed or sporadic access to the open ocean. The water quality of the river is impaired, and there are sections that do not support recreation and aquatic life. See “Section 3, Existing Resources” for more information about in-stream beneficial uses.

The South Norfolk System served 33,512 people in 2007. The City of Chesapeake purchased 2.69 mgd of finished water from the City of Norfolk to supply this system. Residential use was 1.85 mgd, and CIL use was 0.75 mgd.

The Western Branch System served 38,640 people in 2007. The City of Chesapeake purchased 2.98 mgd of finished water from the City of Portsmouth to supply this system. Approximately 474 Chesapeake residents buy water directly from the City of Portsmouth. Residential use of approximately 0.14 mgd attributed to these customers is included in the City of Portsmouth’s use information.

Figure 2-10

2007 City of Chesapeake Publicly-Owned CWS Use by Type (mgd)



City of Norfolk: Publicly-Owned Community Water System

The City of Norfolk owns and operates one CWS that serves the city’s entire population, which was 235,915 people in 2007.

The City of Norfolk system’s total use in 2007 was 28.73 mgd (see Figure 2-11). An additional 1.86 mgd was used in the production process. Residential use was 11.10 mgd, CIL use was 5.20 mgd, heavy industrial use was 2.04 mgd, military use was 4.79 mgd, other use was 0.55 mgd, and unaccounted for losses were 5.05 mgd. The 2007 total system use does not include the additional 43.36 mgd sold by Norfolk to other CWSs. The 2007 unaccounted for losses of 5.05 mgd include losses associated with the delivery of water sold to other CWSs.

In Figure 2-11, military water use of 4.79 mgd includes 0.09 mgd sold to the Navy at Craney Island, 3.52 mgd sold to the Navy installations located in the City of Norfolk (Norfolk Naval Base), and 1.18 mgd sold to military installations in Virginia Beach (Dam Neck, Little Creek Amphibious Base, NAS Oceana, Fort Story, and Camp Pendleton).

Norfolk’s water sales include:

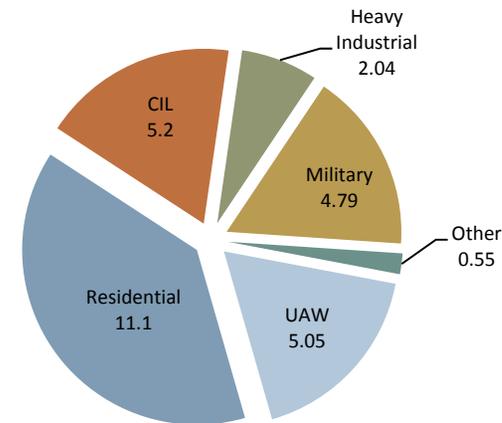
- 2.69 mgd of finished water to the City of Chesapeake’s South Norfolk CWS;
- 6.45 mgd of raw water to the City of Chesapeake’s Northwest River CWS; and
- 3.0 mgd of raw water for drought relief to the City of Portsmouth’s CWS (existing contract for up to 10 mgd).

The City of Norfolk has a cost of service contract with the City of Virginia Beach to treat and wheel water supplied from Lake Gaston. In 2007, Norfolk provided Virginia Beach with 36.26 mgd of finished water under this contract.

A portion of Norfolk’s supply comes from stream intakes of the Blackwater River and the Nottoway River. The in-stream beneficial uses of these rivers include anadromous fish reaches, trout and other significant fisheries. Additionally, a segment of the Nottoway River

that is upstream from the Norfolk intake has been designated into Virginia’s Scenic River Program. A segment of the Blackwater River upstream from the Norfolk intake has been designated a Blueway trail. Segments of both rivers are listed on the Nationwide Rivers Inventory. Both rivers are palustrine systems. A palustrine system includes all non-tidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, farmed wetlands, and similar wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 parts per thousand. The Blackwater River has water quality use impairments according to the VDH SWAP evaluation. Aquatic life, fish consumption, and recreation are not supported in large sections of the river. See “Section 3, Existing Resources” for more information on in-stream beneficial use.

Figure 2-11
2007 City of Norfolk Publicly-Owned CWS Use by Type (mgd)



CIL = Commercial, Institutional, Light Industrial
UAW = Unaccounted for Water

City of Portsmouth: Publicly-Owned Community Water System

The City of Portsmouth owns and operates one CWS that serves the entire city’s population. In 2007, the system served 97,851 people. The system’s total use was 10.99 mgd in 2007 (see Figure 2-12). An additional 0.30 mgd was used in the production process. In Figure 2-12, residential use in Portsmouth includes 0.14 mgd purchased directly by 474 Chesapeake residents that are not within the City of Chesapeake’s Western Branch CWS service area. Military use of 0.98 consists of water used by Norfolk Naval Shipyard.

Portsmouth’s 2007 water sales of 5.56 mgd include 2.98 mgd to the City of Chesapeake for the Western Branch System (the Cities’ contractual agreement is for 3.0 mgd) and 2.58 mgd to the City of Suffolk.

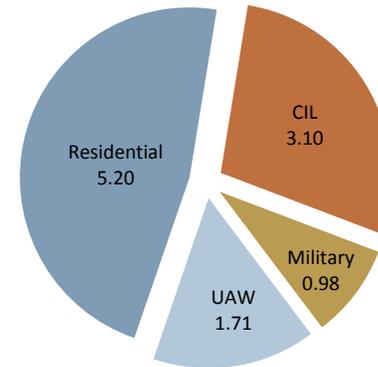
City of Suffolk: Publicly-Owned Community Water Systems

The City of Suffolk owns and operates three CWSs. The systems served 65,626 people in 2007. Figure 2-13 describes the 7.37 mgd total water use across Suffolk’s publicly-owned CWSs. System use does not include water sold to other CWSs.

The Main System has the largest service area and provides water for approximately 64,600 people. In 2007, the City of Suffolk purchased 2.58 mgd from the City of Portsmouth for this system and the 2007 use was 7.29 mgd. Residential use was 5.67 mgd; CIL use was 0.62 mgd; unaccounted for losses totaled 1.00 mgd. The city also operates the Whaleyville System and Holland System. Both systems served about 500 people each and used an average of 0.04 mgd each in 2007. Both systems only serve residential customers (see Figure 2-13).

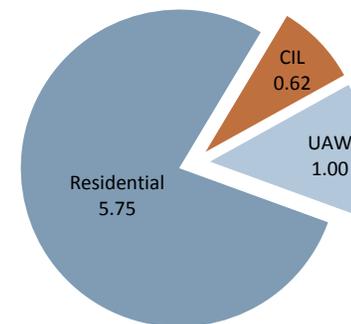
Suffolk sold 0.36 mgd from the Main System through the Western Tidewater Water Authority (WTWA) to Isle of Wight County to supply the Newport Development Service District. Use of this water is described in Section 2, “Existing Water Use – Western Tidewater.” See Section 1, “Existing Sources - Southside Sub-Region” for more information on the WTWA.

Figure 2-12
2007 City of Portsmouth Publicly-Owned CWS Use by Type (mgd)



CIL = Commercial, Institutional, Light Industrial
 UAW = Unaccounted for water

Figure 2-13
2007 City of Suffolk Publicly-Owned CWS Use by Type (mgd)



CIL = Commercial, Institutional, Light Industrial
 UAW = Unaccounted for Water

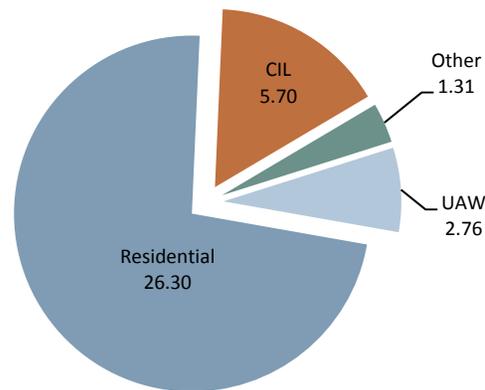
City of Virginia Beach: Publicly-Owned Community Water System

The City of Virginia Beach operates one CWS. The system provided water to 403,174 people in 2007. Residential use required 26.3 mgd; CIL use required 5.7 mgd; other use was 1.31 mgd; and unaccounted for losses totaled 2.76 mgd (see Figure 2-14).

The City of Virginia Beach has a cost of service contract with the City of Norfolk to treat and wheel water supplied from Lake Gaston. In 2007, Norfolk provided Virginia Beach with 36.26 mgd of finished water under this contract.

There are several CWSs within Virginia Beach that serve military installations: Dam Neck, Little Creek Amphibious Base, NAS Oceana, Fort Story, and Camp Pendleton. Each of these systems are served by the City of Norfolk and do not have their own source water or treatment facilities. The water demands for these systems are not reflected in Figure 2-14 (refer to Figure 2-11 for more information).

Figure 2-14
2007 City of Virginia Beach Publicly-Owned CWS Use by Type (mgd)



CIL = Commercial, Institutional, Light Industrial
 UAW = Unaccounted for Water



Photo: Lake Gaston, www.city-data.com

Privately-Owned Community Water Systems

Nine privately-owned CWSs, located in the Cities of Chesapeake and Suffolk, served approximately 1% of the total south-side population in 2007. The systems served 7,490 people and used a total of 0.49 mgd. Residential demand was 0.38 mgd and military demand was 0.11 mgd.

Chesapeake: Privately-Owned Community Water Systems

Six privately-owned CWSs operate in Chesapeake. Together the systems served 7,250 people and used a total of 0.47 mgd. The Naval Support Activity – NW Annex system is the only system that serves military use rather than residential use (see Table 2-4).

Suffolk: Privately-Owned Community Water Systems

Within the City of Suffolk, privately-owned CWSs served 243 people in 2007. The use for Hobson Village Waterworks and Hobson Mt. Lebanon Waterworks was not available from VDH or DEQ. The total use for the three privately-owned CWSs in Suffolk was estimated to be 0.02 mgd, based on 75 gallons per person (see Table 2-5).

Table 2-4: 2007 Chesapeake Privately-Owned CWS Use
(all figures in mgd)

System	Avg. Use
Indian River Water Co.	0.116
VDOC – Saint Brides Correctional Center	0.228
Plantation Mobile Home Park	0.007
Sunray Artesian Water Supply	0.004
Sunray Water Co.	0.005
Naval Support Activity – NW Annex	0.109
TOTAL	0.470

Table 2-5: 2007 Suffolk Privately-Owned CWS Use
(all figures in mgd)

System	Avg. Use
Birdsong	0.007
Hobson Village Waterworks	0.005
Hobson Village Mt. Lebanon Waterworks	0.008
TOTAL	0.020

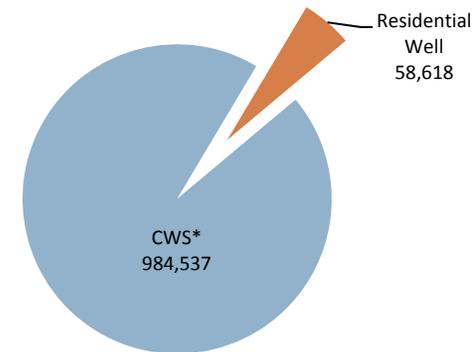
Self-Supplied Users Served by Private Residential or Private Business Wells

The Southside sub-region was estimated to have 58,618 people served by private residential wells in 2007 (see Figures 2-15 and 2-16). Residential wells used an estimated 4.40 mgd in 2007. Residential wells are located outside CWS service areas. Residential well owners are not required to report their withdrawals to DEQ or VDH. Water use for the systems was estimated assuming 75 gallons per person per day. The City of Norfolk and Portsmouth do not have any population served by self-supplied water systems.

- **City of Chesapeake:** 33,600 people. Use = 2.52 mgd
- **City of Suffolk:** 20,164 people, Use = 1.51 mgd
- **City of Virginia Beach:** 4,851 people. Use = 0.36 mgd

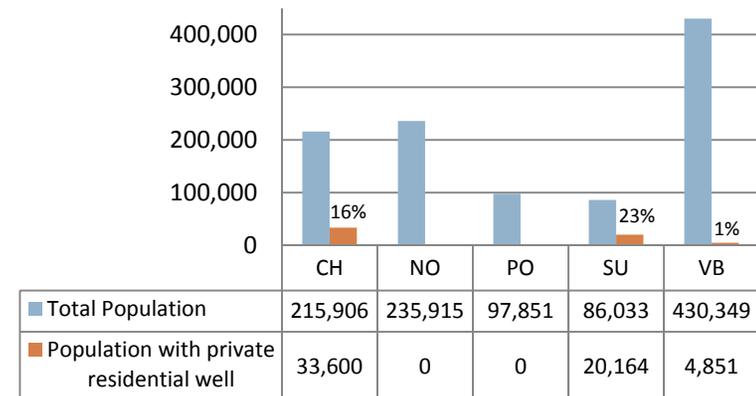
Businesses using private wells totaled 49 in 2007; 29 of these businesses were located within a CWS service area. These businesses withdraw less than 300,000 gallons per day are not required to report their withdrawals to a state agency. Therefore, the use was calculated by following the VDH guidelines for calculating use by type of businesses. The estimated total demand in 2007 was 0.40 mgd.

Figure 2-15
Southside Population Served by Private Residential Well vs. CWS



*CWSs include publicly- and privately-owned systems.

Figure 2-16
Percent of Southside Population on Private Residential Wells



CH = Chesapeake | NO = Norfolk | PO = Portsmouth | SU = Suffolk | VB = Virginia Beach

Self-Supplied Users Withdrawing More Than 300,000 Gallons per Month

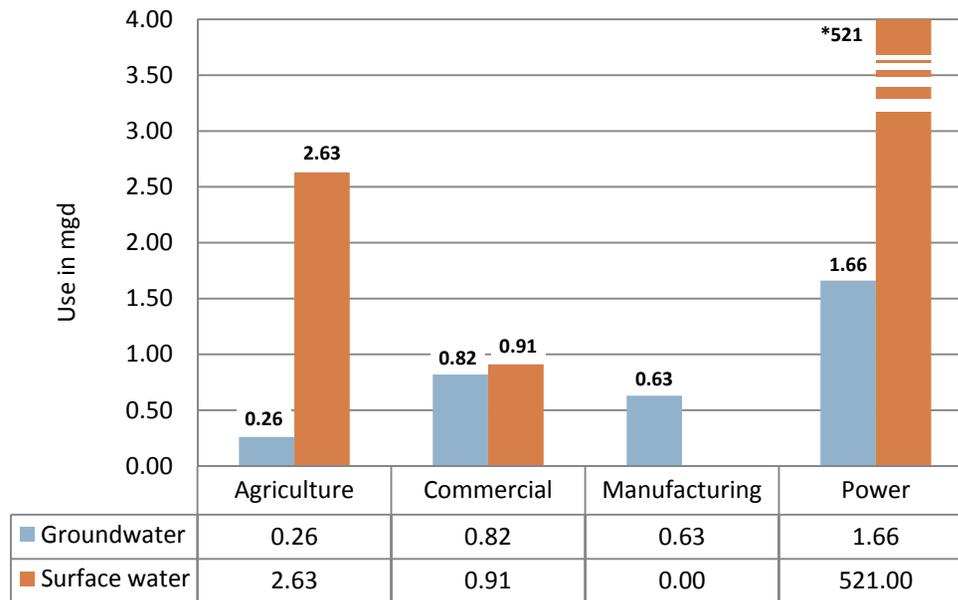
Non-Agricultural Users: Surface Water Use

Twelve self-supplied non-agricultural users reported withdrawing more than 300,000 gallons per month of surface water in 2007 (see Figure 2-17 and Table 2-6). Four of the users also withdrew groundwater. The total average water use was 522 mgd. The Chesapeake Energy Center used the largest amount of surface water, 521 mgd. The majority of the water was returned to the Elizabeth River. All of the users are located within a publicly-owned CWS service areas.

Non-Agricultural Users: Groundwater Use

Twenty-six self-supplied non-agricultural users reported withdrawing more than 300,000 gallons per month of groundwater in 2007 (see Figure 2-17 and Table 2-6). The total average use was 3.11 mgd in 2007. All but one of the systems are located within a CWS service area. In 2007, Cogentrix Virginia Leasing Corporation used the largest amount of groundwater per day at 1.66 mgd.

Figure 2-17
2007 Southside Self-Supplied Use > 300,000 gallons per month (mgd)



*Chesapeake Energy Center withdraws 521 mgd; majority of this water is returned to the Elizabeth River.

Table 2-6: 2007 Southside Self-Supplied Non-Agricultural Users >300,000 Gallons Per Month

(all figures in mgd)

System or Business	Source	Use	Estimated Annual Average Use	System or Business	Source	Use	Estimated Annual Average Use
Albert G Horton, Jr Veterans Cemetery	GW	Com	0.01	Elizabeth Manor Golf and Country Club	SW	Com	0.04
BASF	GW	Man	0.24	Hell's Point Golf Club	SW	Com	0.10
Bayshore Concrete Products	GW	Man	0.01	Heron Ridge Golf Course	SW	Com	0.15
Bayville Golf Club	GW	Com	0.04	J H Miles and Company - Norfolk Processing Plant	GW	Man	0.15
Bow Creek Golf Course	GW	Com	0.02	National Linen & Uniform Service	GW	Com	0.02
Broad Bay Country Club	GW	Com	0.03	Oceana Golf Course	GW	Com	0.07
Cahoon Plantation Golf Course	GW	Com	0.05	Princess Anne Country Club	GW	Com	0.13
Capital Concrete Incorporated - Stapleton Street Plant	GW	Man	0.02	Princess Anne Country Club	SW	Com	0.06
Cavalier Golf & Yacht Club	SW	Com	0.05	Redwing Golf Course	SW	Com	0.12
Cavalier Golf and Yacht Club	GW	Com	0.09	Servitex Division of Alsco	GW	Man	0.03
Cedar Point Golf Course	SW	Com	0.07	Sewells Point Golf Club	SW	Com	0.05
Chesapeake Energy Center	SW	Pf	521	SPSA Regional Landfill	GW	Man	0.03
BASF (Ciba Specialty Chemicals) - Suffolk Plant	GW	Man	0.07	Tidewater Area Central Hospital Laundry, Inc	GW	Com	0.06
Cintas Corporation / Omni Services, Inc.	GW	Man	0.06	Titan Virginia Ready-Mix LLC Campostella Ready Mix Plant	GW	Man	0.02
City of Virginia Beach - Kempsville Greens Golf Course	GW	Com	0.01	Titan Virginia Ready-Mix LLC Oceana Plant	GW	Man	0.01
Cogentrix Virginia Leasing Corporation	GW	Man	1.66	Titan Virginia Ready-Mix LLC Port Norfolk Plant	GW	Man	0.01
Cypress Point Golf Course	SW	Com	0.07	TPC Golf Course (Virginia Beach National Golf Course)	GW	Com	0.08
Eagle Haven Golf Course, NAB Little Creek	SW	Com	0.03	TPC of Virginia Beach LLC	SW	Com	0.17
Elizabeth Manor Golf and Country Club	GW	Com	0.10	US Navy - Norfolk Naval Base, Sewells Point Golf Course	GW	Com	0.08

GW = Groundwater | SW = Surface water | Com = Commercial | Man = Manufacturing | Pf = Fossil Power

Agricultural Users

In 2007, three agricultural users reported withdrawing more than 300,000 gallons per month of surface water and/or groundwater in 2007 (see Table 2-7).

The annual average use of surface water by agricultural users was 2.63 mgd in 2007. The annual average use of groundwater was 0.26 mgd. The majority of this use occurs outside existing CWS service areas. In 2007, the largest groundwater and surface water user was the Greenbrier Farms Nursery in Chesapeake which withdrew 0.11 mgd of groundwater and 2.44 mgd of surface water.

Two users did not report withdrawals in 2007, but hold DEQ Ground Water Withdrawal Permits: Lancaster Farms, located in Suffolk, holds a permit for 0.03 mgd; and Norfolk City Nursery, located in Chesapeake, holds a permit for 0.007 mgd.

The amount of water needed to support livestock was estimated based on data from the USDA National Agricultural Statistics Service. Water use for cows was estimated to be 0.13 mgd in 2007. Water use by horses was 0.09 mgd. The calculation is based on 12 gallons per day per cow and per horse.

Table 2-7: 2007 Southside Self-Supplied Agricultural Users >300,000 gallons per month
(all figures in mgd)

System or Business	Source	Estimated Annual Average Use
Bennetts Creek Nursery	GW	0.04
Bennetts Creek Nursery	SW	0.03
Greenbrier Farms Nursery	SW	2.44
Greenbrier Farms Nursery	GW	0.11
Williams Cattle Co LLC	SW	0.06

GW = Groundwater | SW = Surface water



Photo: Farm, HRPDC

Existing Water Use – Western Tidewater

Unlike the other two sub-regions in Hampton Roads, a significant portion of the Western Tidewater sub-region’s population relies on private residential wells. The City of Franklin and the Towns of Smithfield and Windsor are the only localities in the sub-region where the majority of the population is served by publicly-owned CWSs. In 2007, 49% of the population was served by private residential wells, with a total estimated annual average use of 2.59 mgd. Approximately 35 businesses were served by private wells that used an estimated annual average of 0.26 mgd.

In 2007, 24 publicly-owned CWSs served 41% of the sub-region’s population and used an average of 4.17 mgd. The remaining population is served by one of 40 privately-owned CWSs that used an average of 2.26 mgd for all uses. The majority of the privately-owned CWSs are located in Isle of Wight County and Southampton County.

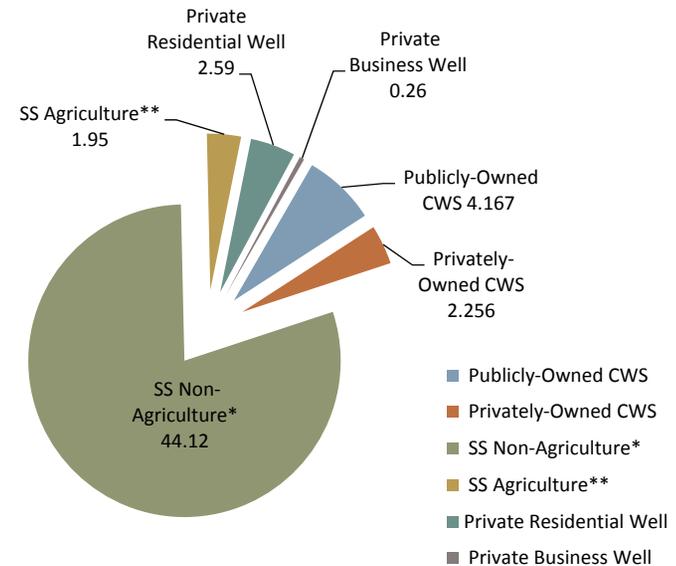
Two self-supplied users reported to DEQ withdrawing more than 300,000 gallons per month of surface water for non-agricultural use in 2007; one user is located within a CWS service area. These systems used an average of 4.22 mgd. This amount does not include 1,774 mgd of surface water withdrawals from the James River by the Surry Nuclear Power Plant, which returns almost all of the water to the river.

Additionally, the sub-region had 10 self-supplied non-agricultural users that reported withdrawing more than 300,000 gallons per month of groundwater. The majority of the users are within a CWS service area. In 2007, the systems used an average of 39.9 mgd; the largest use totaled 32.37 mgd by the International Paper Franklin Mill Plant.

There were 13 self-supplied agricultural users who reported withdrawing more than 300,000 gallons per month of surface water

or groundwater in 2007. Groundwater use was 0.38 mgd, and surface water use was 1.57 mgd.

Figure 2-18
2007 Western Tidewater Total Water Use (mgd)



* SS Non-Agriculture = Self-Supplied Non-Agricultural withdrawals > 300,000 gallons/month. Does not include Surry Nuclear Power Plant surface water withdrawals of 1,774 mgd, as most of the water is returned to the James River.

** SS Agriculture = Self-Supplied Agricultural withdrawals > 300,000 gallons/month.

Publicly-Owned Community Water Systems



Photo: Windsor, HRPDC

Twenty-four publicly-owned CWSs served 41% of the sub-region’s population and used an average of 4.17 mgd in 2007 (see Figure 2-19 and Figure 2-20). The City of Franklin and the Towns of Smithfield and Windsor serve nearly their entire populations, while the Counties of Isle of Wight, Southampton, and Surry provide public water service to less than 25% of their residents.

The Towns of Smithfield and Windsor sell water from their publicly-owned systems to areas of Isle of Wight County. The City of Franklin sells water from its system to areas of Southampton County and Isle of Wight County. Service agreements and usage are further described in the locality-specific discussions.

Figure 2-19
2007 Western Tidewater Population Served by Publicly-Owned Community Water Systems

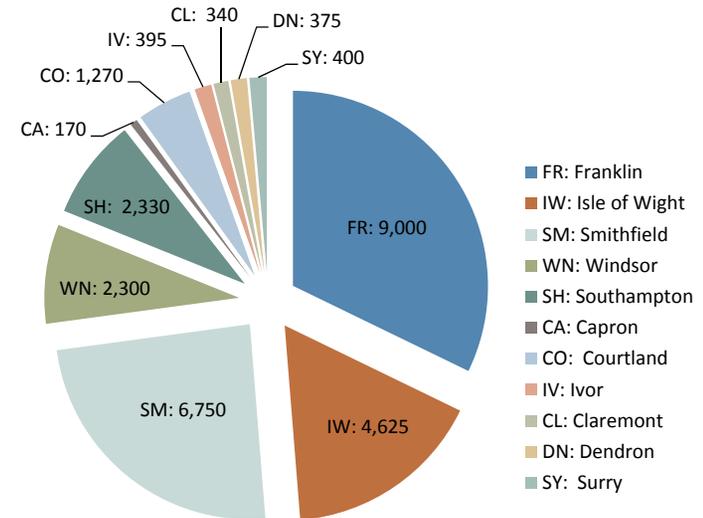
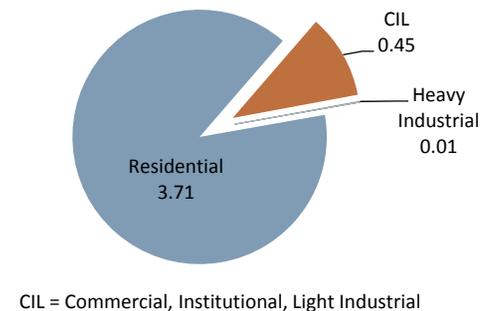


Figure 2-20
2007 Western Tidewater Publicly-Owned Community Water System Use by Type (mgd)



Isle of Wight County: Publicly Owned Community Water Systems

Isle of Wight County has delineated three Development Service Districts (DSD): Newport DSD, located along the southeast border of the Town of Smithfield; Windsor DSD, located around the town line of Windsor; and Camptown DSD, located along the east border of the City of Franklin. The County’s long range land use plan is to direct the majority of new residential, commercial and industrial growth to the development service districts.

The Newport DSD publicly-owned CWS receives surface water from the Western Tidewater Water Authority (WTWA). Isle of Wight County purchased 0.36 mgd from the Western Tidewater Water Authority for the Newport DSD in 2007. At that time, the DSD served 1,280 people. Residential demand was 0.232 mgd and CIL demand was 0.125 mgd. Five privately-owned CWSs are located within the Newport DSD. Over time it is expected that two to three of the systems will switch to the Newport DSD publicly-owned CWS.

The Windsor DSD purchases groundwater from the Town of Windsor. As of 2007, the Windsor DSD supplied CIL uses in the Shirley T. Holland Industrial Park, located within the DSD, and did not serve any residential customers. Isle of Wight County’s agreement with the Town of Windsor is for up to 0.224 mgd. The 2007 CIL use was 0.01 mgd.

The Camptown DSD purchases water from the City of Franklin for residential and CIL use. However, the Camptown DSD did not serve any CIL use customers in 2007. The 2007 water use was an average of 0.090 mgd for approximately 900 people.

In 2007, Isle of Wight County owned and operated nine publicly-owned CWSs that served only residential customers in small neighborhoods. These non-DSD systems provided water to 2,441 people in 2007. In 2010, the County purchased the infrastructure for the Queen Anne’s Court system and connected it to the WTWA source.

Table 2-8 summarizes the publicly-owned CWSs in Isle of Wight County.

Table 2-8: 2007 Isle of Wight County Publicly-Owned CWS Use		
<i>(all figures in mgd)</i>		
System	Residential Use	CIL Use
Bethel Heights	0.004	0.000
Days Point Subdivision	0.011	0.000
Gatling Pointe ¹	0.500	0.000
Rushmere - Burwell’s Bay	0.011	0.000
Smithfield Heights -Sandy Mount Manor	0.029	0.000
Tormentor Creek Estates	0.005	0.000
Carrsville	0.016	0.000
Thomas Park Community	0.005	0.000
Zuni	0.005	0.000
Camptown Development Service District ²	0.090	0.000
Newport Development Service District ³	0.232	0.125
Windsor Development Service District ⁴	0.000	0.005
TOTAL	0.908	0.130

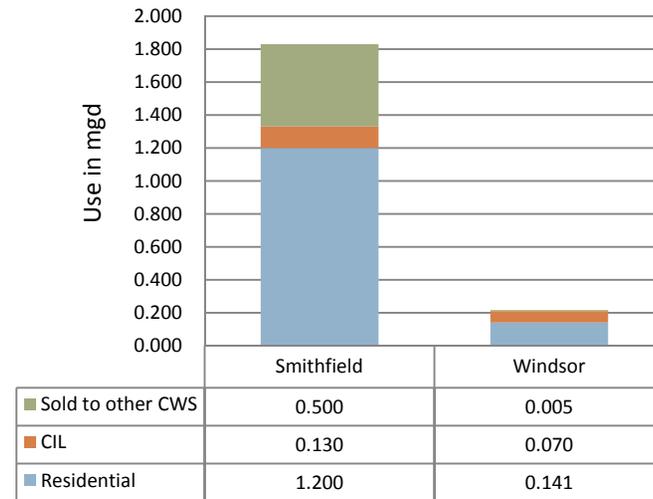
1. Gatling Pointe receives water from Town of Smithfield
2. Camptown DSD receives water from City of Franklin.
3. Newport DSD receives water from Western Tidewater Water Authority
4. Windsor DSD received water from the Town of Windsor

Towns of Smithfield and Windsor: Publicly-Owned Community Water System

The Town of Smithfield’s system served 6,750 people in 2007. The total demand for residential use and CIL use was 1.330 mgd. An additional 0.500 mgd was sold to the Gatling Pointe CWS in Isle of Wight County (see Figure 2-21). Smithfield’s 2007 water demand was significantly greater than the average annual water demand of 0.83 mgd for 2004 to 2006 and 2008 to 2010. The 2007 annual demand reflects increased water use for extensive construction activity, including frequent water tank draining and water main flushing.

The Town of Windsor’s system served 2,300 people, and the total demand for residential and CIL use was 0.211 mgd in 2007. An additional 0.005 mgd was sold to the Windsor DSD in Isle of Wight County. The water service agreement enables the provision of up to 0.224 mgd to the Windsor DSD. The Town holds a DEQ Ground Water Withdrawal Permit for 0.540 mgd (see Figure 2-21).

Figure 2-21
2007 Isle of Wight County: Smithfield and Windsor
Publicly-Owned CWS Use by Type (mgd)



Southampton County: Publicly-Owned Community Water Systems

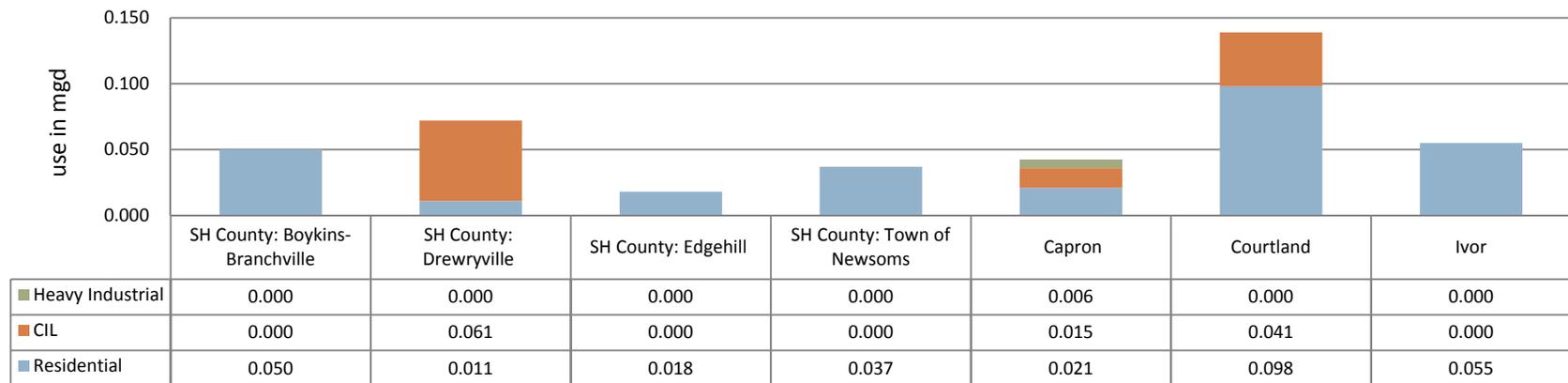
Southampton County owns and operates four publicly-owned CWSs. The systems served 2,330 people in 2007. Residential demand was 0.12 mgd and CIL demand was 0.06 mgd (see Figure 2-22).

The Incorporated Towns of Capron, Courtland and Ivor each own and operate a publicly-owned CWS. Capron’s system served 167

people. Residential demand was 0.21 mgd, CIL demand was 0.02 mgd and heavy industrial demand was less than 0.01 mgd in 2007.

Courtland’s system served 1,270 people, and used 0.10 mgd for residential demand and 0.04 mgd for CIL demand in 2007. Ivor’s system served 395 people and used 0.06 mgd for residential demand in 2007 (see Figure 2-22).

Figure 2-22
2007 Southampton County, Towns of Capron, Courtland, and Ivor Publicly-Owned CWS Use by Type (mgd)



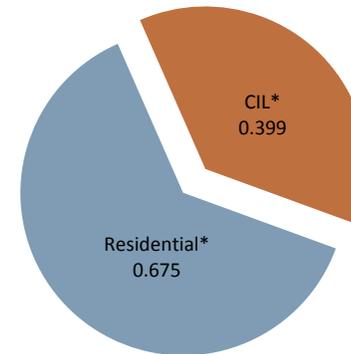
City of Franklin: Publicly-Owned Community Water System

The City of Franklin’s publicly-owned CWS served 9,000 people in 2007 and includes two residential areas in Southampton County: Cypress Manor subdivision and a portion of Regency Estates subdivision. The system’s total water use in 2007 was 1.074 mgd, which includes residential and CIL use.

Actual 2007 use information does not differentiate between residential and CIL water use. It is possible to estimate 2007 residential use as 0.675 mgd, based on the population served by the CWS and the VDH guidelines of 75 gallons per person per day for domestic use (see Figure 2-23). Given the total water use information for the system, CIL use can then be assumed to be approximately 0.399 mgd. CIL customers include the Pretlow Industrial Park in Franklin and three industrial/commercial sites in Southampton County.

An additional 0.090 mgd of water was sold to the Camptown Development Service District in Isle of Wight County.

Figure 2-23
2007 City of Franklin Publicly-Owned CWS
Use by Type (mgd)



CIL = Commercial, Institutional, Light Industrial
 UAW = Unaccounted for Water
 *Estimated use



Photo: Downtown Franklin, www.wsws.org

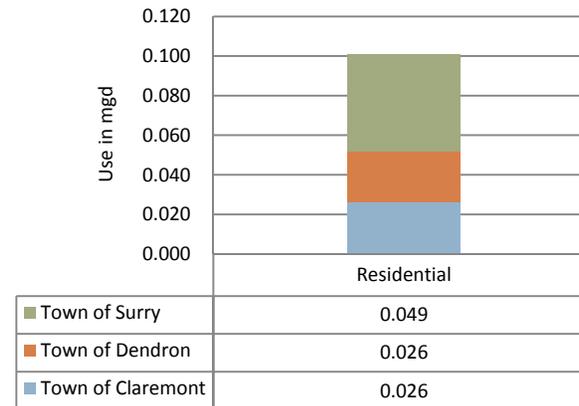
Surry County: Publicly-Owned Community Water Systems

In Surry County, the Incorporated Towns of Claremont, Dendron and Surry each own and operate a publicly-owned CWS that serves only residential use (see Figure 2-24). The Town of Claremont’s system served 343 people, and used 0.026 mgd in 2007. Dendron’s system served 375 people, and used 0.026 mgd in 2007. Surry’s system served 400 people, and used 0.049 mgd in 2007.



Photo: Claremont, VA – James River www.city-data.com

Figure 2-24
2007 Surry County Publicly-Owned CWS
Use by Type (mgd)



Privately-Owned Community Water Systems

Forty privately-owned CWS operate in the Western Tidewater sub-region. Together the systems served 7,096 people and used 2.256 mgd in 2007 (see Table 2-9). The City of Franklin and the Towns of Smithfield and Windsor do not have any privately-owned CWSs. Isle of Wight County has the largest population served by privately-owned CWSs.

Isle of Wight County: Privately-Owned Community Water Systems

In Isle of Wight County, 25 privately-owned CWS served 4,148 people and used 1.762 mgd of groundwater in 2007. All water use was residential, with the exception of the Zuni Presbyterian Training Center which hosts CIL uses. Although 13 systems have withdrawals that meet the threshold for a DEQ Ground Water Withdrawal Permit, only 3 of the systems held a permit in 2007.

In 2007, five privately-owned systems are located within the Newport Development Service District's service area: Red Oaks Mobile Home Community, Queen Anne's Court, Ashby Subdivision, Cannon Acres, and Brewer's Creek Subdivision. In 2010, the infrastructure for the Queen Anne's Court system was purchased by the County and connected to the WTWA source.

One privately-owned system is located within the Windsor Development Service District. It can be expected that over time, half those systems will switch to the service district's publicly-owned

CWS. These six systems are the only systems that are located within a publicly-owned CWS service area in the County.

Southampton County: Privately-Owned Community Water Systems

In 2007, 13 privately-owned CWS operate in Southampton County. The systems served a total of 2,630 people and used an average of 0.473 mgd in 2007. All water use was residential with the exception of the Southampton Correctional Complex, which hosts CIL uses. Seven systems had withdrawals that met the threshold for a DEQ Ground Water Withdrawal Permit, yet only four systems held permits in 2007. All of the privately-owned CWS in Southampton County are located outside the publicly-owned CWS service areas.

Surry County: Privately-Owned Community Water Systems

Surry County has two privately-owned CWSs that serve only residential demand. Guilford Heights served 150 people and used 0.009 mgd in 2007. Scotland Heights served 170 people and used 0.012 mgd in 2007. The Scotland Heights system meets the threshold for a DEW Ground Water Withdrawal Permit, yet did not hold a permit in 2007. Both of the systems are located outside the publicly-owned CWS service areas.

Table 2-9: 2007 Western Tidewater Privately-Owned Community Water System Use

County	System Name	Use	System Name	Use
Isle of Wight	Ashby Subdivision	0.062	Owen's Subdivision	0.008
	Brewer's Creek	0.029	Queen Anne's Court ¹	0.009
	Cannon Acres	0.015	Red Oaks Mobile Community	0.039
	Bob Steele Waterworks	0.004	Rescue Waterworks	0.011
	Cherry Grove Acres	0.015	Rushmere Shores	0.006
	Clydes Dale Mobile Home Park	0.027	Smithfield Apts	0.009
	Deer Run	0.007	Smithfield MHP	0.008
	Duck's Trailer Court	0.001	Springfield Downs Subdivision	0.012
	Edwards Trailer Park	0.011	Turner Property	0.007
	James River Shores	0.012	Willing Workers Club	0.003
	Lawne's Point	0.001	Wrenn's Mill Estates	1.437
	Longview Acres	0.014	Zuni Presbyterian Training Center ²	0.004
	The Oaks Mobile Estates Trailer Court	0.011		
	ISLE OF WIGHT COUNTY TOTAL USE			1.762
Southampton	Sedley	0.028	Scottswood Subdivision	0.030
	Darden's Mill Estates	0.012	Silverleaf Mobile Home Park	0.010
	Kingsdale Subdivision (Artis)	0.006	Southampton Correctional Complex ²	0.268
	Kingsdale Subdivision (Moseley)	0.003	Southampton Meadows Mobile Home Park	0.067
	Nottoway Gardens	0.020	Fieldcrest Manufactured Home Community	0.008
	Nottoway Shores	0.008	White Tail Park	0.007
	Southampton County Jail Farm ²	0.006		
SOUTHAMPTON COUNTY TOTAL USE			0.473	
Surry	Guilford Heights	0.009	Scotland Heights	0.012
	SURRY COUNTY TOTAL USE			0.021

1. The Queen Anne's Court system was purchased by Isle of Wight County in 2010 and connected to the Western Tidewater Water Authority source.

2. Water use in these systems is for CIL uses (no residential use).

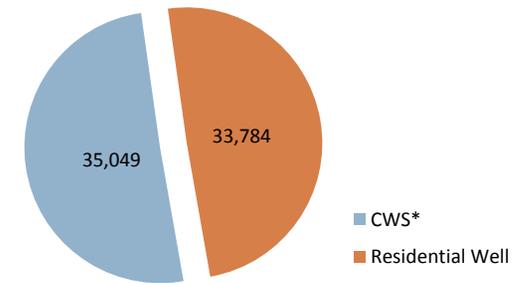
Self-Supplied Users Served by Private Residential or Private Business Wells

An estimated 33,780 people, 49% of the Western Tidewater sub-region population, were served by private residential wells in 2007 (see Figures 2-25 and 2-26). The majority of the wells are located outside a publicly-owned CWS. The estimated total private residential well demand in 2007 was 2.59 mgd. Residential wells use less than 300,000 gallons per month and serve less people than a CWS. Therefore, residential well owners are not required to report their withdrawals to DEQ or VDH. Water use for these systems was calculated using the VDH guideline of 75 gallons per person per day for homes, locality-specific population per household factors, and estimates of the number of households served by residential wells.

- **Isle of Wight County:** 16,093 people. Use = 1.26 mgd.
- **Southampton County:** 12,152 people. Use = 0.91 mgd.
- **Surry County:** 5,534 people. Use = 0.42 mgd.

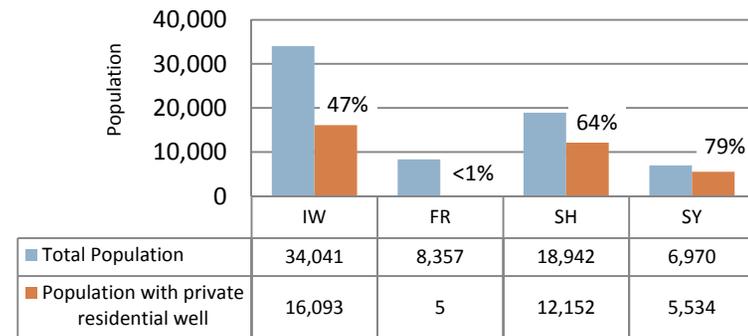
There were 35 businesses served by private wells in 2007, with an estimated total demand of 0.27 mgd. Like private residential wells, businesses that withdraw less than 300,000 gallons per day are not required to report their withdrawals to a state agency. Therefore the use was calculated by following the VDH guidelines for calculating use by type of businesses.

Figure 2-25
2007 Western Tidewater Population Served by Private Residential Wells vs. CWS



*CWS includes publicly- and privately-owned systems

Figure 2-26
2007 Percent of Western Tidewater on Private Residential Wells (mgd)



Self-Supplied Users Withdrawing More Than 300,000 Gallons per Month

Non-Agricultural Users: Surface Water Use

In 2007, two self-supplied users withdrawing more than 300,000 gallons per month of surface water for non-agricultural use: International Paper Franklin Mill Plant and the Dominion Surry Nuclear Power Plant (see Table 2-10 and Figure 2-27). International Paper withdrew an average of 4.22 mgd from the Blackwater River in 2007 for manufacturing paper. The Power Plant withdrew an average of 1,774 mgd from the James River in 2007. The water is used for cooling and is largely a non-consumptive use. The Plant discharges close to 100% of the withdrawal back to the James River.



Photo: Blackwater River, www.virginiatrailguide.com

Non-Agricultural Users: Groundwater Use

Ten self-supplied users reported withdrawals of greater than 300,000 gallons per month of groundwater for non-agricultural use (see Table 2-10). The systems used a combined average of 39.9 mgd in 2007. At the time, the largest self-supplied user of groundwater was the International Paper Franklin Mill Plant, which used 32.4 mgd.

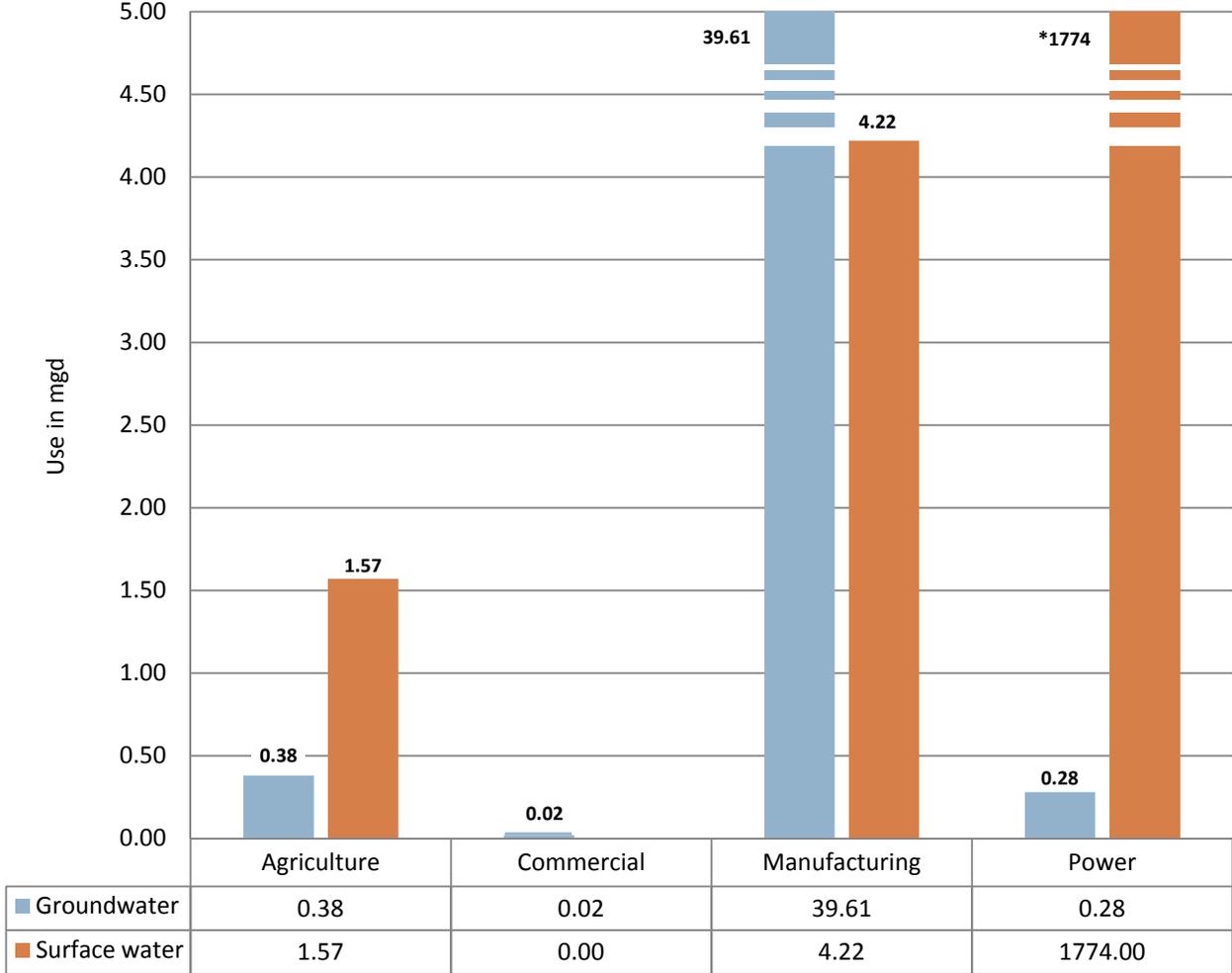
Table 2-10: 2007 Western Tidewater Self-Supplied Non-Agricultural Users >300,000 gallons per month

(all figures in mgd)

System or Business	Source	Use	Estimated Annual Average Use
Hercules Incorporated	GW	Man	5.26
International Paper Franklin Mill Plant	SW	Man	4.22
International Paper Franklin Mill Plant	GW	Man	32.37
Narricot Industries Incorporated	GW	Man	0.09
Richmond Cold Storage Incorporated	GW	Man	0.02
Smithfield Foods Incorporated - Gwaltney	GW	Man	1.35
Smithfield Foods Incorporated - Packing Company	GW	Man	0.50
Smithfield Packing Co. Inc - Ham and Products Division	GW	Man	0.02
Southampton County Agribusiness Industrial Park	GW	Com	0.01
Surry County Public Schools	GW	Com	0.01
Surry Nuclear Power Plant	SW	Pn	1,774.00
Surry Nuclear Power Plant	GW	Pn	0.28

Com = Commercial | Man = Manufacturing | Pn = Nuclear Power
 GW = Groundwater | SW = Surface water

Figure 2-27
2007 Western Tidewater Self-Supplied Use > 300,000 gallons per month (mgd)



Agricultural Users

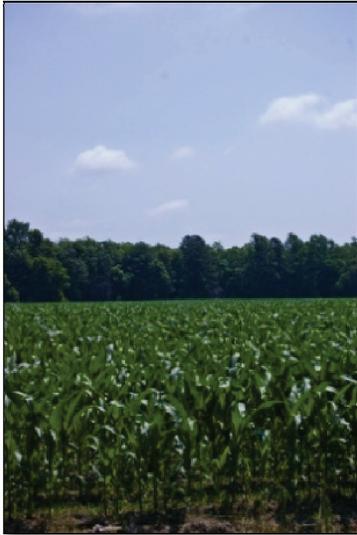


Photo: Farm, HRPDC

In 2007, 13 self-supplied agricultural users reported withdrawing more than 300,000 gallons per month of surface water and/or groundwater. Groundwater use was 0.38 mgd, and surface water use was 1.57 mgd in 2007. The largest agricultural use of surface water was by the Franklin Turfgrass Inc. - River Road Farm with 0.60 mgd. Murphy Brown LLC Isle of Wight Farms - Carrolls 1-5 had the largest groundwater use in 2007 with 0.12 mgd (see Table 2-11).

Based on the U.S. Department of Agriculture National Agricultural Statistics Service data for the Western Tidewater sub-region, cattle used an average of 0.05 mgd of surface water and the same amount of groundwater in 2007.

Horses used an average of 0.01 mgd of surface water and the same amount of

groundwater in 2007. The calculation is based on 12 gallons per day per cow and per horse. The number of cattle and horses in Isle of Wight County estimated by the USDA National Agricultural Statistics Service was used to calculate the water needs of these livestock. Based on 7,900 cattle and 1,900 horses, livestock water use was approximately 60,000 gallons per day (0.06 mgd).

Table 2-11: 2007 Western Tidewater Self-Supplied - Agricultural Users >300,000 gallons per month

(all figures in mgd)

System or Business	Source	Estimated Annual Average Use
Phillip Edwards	SW	0.01
Bennett Creek Wholesale Nursery	SW	0.40
Cox Farm	SW	0.02
Davis Farm	SW	0.05
Davis Farm	GW	0.03
Franklin Turfgrass Inc.-River Road Farm	SW	0.60
Gray Lumber Company - Bacons Castle Farm	SW	0.09
John T Butler, Jr	SW	0.05
Murphy Brown LLC Isle of Wight Farms - Carrolls 1-5	GW	0.12
Murphy Brown LLC Smithfield Carrolls Farm 16-17	GW	0.04
Murphy Brown LLC Smithfield Carrolls Farm 6-8	GW	0.06
Murphy Brown LLC Smithfield Carrolls Farm 9, 10, 21	GW	0.07
Southern Belle Turf Farms	SW	0.02
Sunset View Farm	SW	0.29

GW = Groundwater | SW = Surface water

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