

Hampstead Sewer Service Area

Current Conditions

Carroll County owns and operates the public sewer system that serves both the Town of Hampstead and adjoining areas in the county. The Hampstead SSA comprises approximately 1,572 acres, which are located in the northeast section of the County along MD 30 and serves 2,257 EDUs. See Map 22: Hampstead SSA. The plant discharges into Piney Run, within the headwaters of Loch Raven Reservoir.

The Hampstead sewer system consists of a collection system, six pumping stations, and a sewage treatment plant. The treatment plant is located southeast of the Town, near the boundary with Baltimore County. The treatment plant is accessed via a service road off of North Woods Trail.

The Hampstead WWTP provides advanced secondary treatment of domestic wastes using an activated sludge treatment process. Activated sludge plants use a variety of mechanisms and processes and dissolved oxygen to promote the growth of biological flocculants that substantially breaks down organic material. It also traps particulate material and can, under ideal conditions, convert ammonia to nitrite and nitrate ultimately to nitrogen gas. The plant has a design capacity of 0.900 mgd, with a three-year average flow from 2008-2010 of approximately 0.342 mgd, excluding estimated I&I. The three-year average flow from 2008-2010 of approximately 0.573 mgd, includes estimated I&I.

Since the mid 1990s, the plant has been the subject of litigation focused on alleged negative effects that the temperature of the plant's effluent may have on the receiving stream (Piney Run). As the plant was not previously subject to any temperature limitation, compliance violations were not found. However, as a result of the litigation and subsequent regulatory and policy changes, MDE modified the plant's NPDES permit. It placed a temperature limitation on the plant's effluent of 68° F (20° C) and added thermal monitoring requirements. The permit became effective on November 20, 2005.

When the temperature rises during the summer months, past monitoring data suggested that the temperature of the plant's effluent may exceed the permit limitation of 68° F (20° C) or upstream ambient temperature. As technical response to compliance, Carroll County has designed, but has not installed, chiller equipment, and has been issued a permit by MDE to construct the chiller system. Desiring to pursue an alternative that was both less costly and less energy consumptive, as well as potentially less environmentally invasive, Carroll County has worked with a consultant to evaluate different alternatives. The alternative selected by the County is to re-locate the discharge point of the Hampstead Wastewater Treatment Plant. As previously stated, the Hampstead WWTP currently discharges to North Piney Branch, which is a Designated Use Class III-P stream within the headwaters of Loch Raven Reservoir. In order to address the effluent temperature issue, the County proposes to re-locate the Hampstead discharge from North Piney Branch to one of the existing outfalls at the BTR property and to convey the sanitary wastewater from BTR to the Hampstead WWTP for treatment. The

BTR outfall discharges to an unnamed tributary of Deep Run, which is a Designated Use Class I-P stream in the watershed of Liberty Reservoir.

The County also plans to upgrade the Hampstead WWTP to meet ENR standards.

Upon completion of the ENR upgrade, if the upgraded plant is able to demonstrate via a sufficient record of operation that there are no compliance concerns and that the plant is able to meet all of the State's water quality and public health criteria, the County would then plan to submit an application to MDE to increase the permitted capacity of the WWTP from 0.900 mgd to 1.200 mgd. For planning purposes, the future proposed capacity increase to 1.200 mgd is shown in Table 27 in the "Future Planning" category. Likewise, for planning purposes, the sewer service area associated with the future proposed increase in capacity is shown on Map 22.

There are TMDL Wasteload Allocations for phosphorus, sediment and bacteria for Liberty Reservoir, as indicated below:

TP	2,498.81 lbs /year
TSS	60.75 tons /year
Bacteria	1,045 Billion MPN E. coli / year

In addition, the "Reservoir Watershed Management Agreement of 2005" (see page 31) and the "2005 Action Strategy for the Reservoir Watersheds" limit the phosphorus concentration of the effluent from the Hampstead WWTP and the total phosphorus load delivered to Liberty Reservoir, as indicated below:

"Hampstead WWTP will continue to meet the requirements of its NPDES discharge permit (issued by MDE in 1997), which requires an effluent phosphorus concentration below 0.3 mg/l."

"When a phosphorus loading goal has been established through the TMDL process for each reservoir, MDE, through its NPDES permit program, will not permit an increase in the total phosphorus load delivered to the reservoirs."

In order to evaluate the technical feasibility of expanding the capacity of the Hampstead WWTP to 1.200 mgd and of re-locating the Hampstead discharge to the Liberty Reservoir Watershed, Carroll County requested that MDE conduct a preliminary analysis of the County's ability to comply with the requirements of the "2005 Action Strategy for the Reservoir Watersheds" as well as to meet the TMDL limits for Liberty Reservoir. MDE's preliminary analysis indicates that if the Hampstead WWTP were upgraded to meet ENR standards and if the discharge point of the WWTP were re-located to the outfall of BTR (which discharges to a tributary of Deep Run in the watershed of Liberty Reservoir), it would be technically possible for the WWTP to comply with the phosphorus limits established in the Action Strategy and the phosphorus, sediment and bacteria Wasteload Allocations established by the TMDL for Liberty Reservoir. It is

anticipated that the Wasteload Allocations assigned to the BTR facility to meet the TMDL for Liberty Reservoir would be sufficient to support the discharges from both the BTR facility and the upgraded Hampstead WWTP.

Carroll County submitted an application for an AEL (Alternate Effluent Limit) in connection with its application for a renewal discharge permit. On, July 9, 2004, Carroll County submitted a Study Plan for AEL for review by MDE. On December 21, 2005, Carroll County submitted its Final Report in connection with its Study Plan to the MDE. MDE requested additional information resulting in Carroll County submitting a supplemental report to MDE on May 7, 2006.

Based on the analysis and documentation submitted to MDE requesting AEL Carroll County believes that it has demonstrated that the temperature of the treated effluent discharged thus far has done no harm to the thriving indigenous community of shellfish, fish, wildlife in and on Piney Run. MDE is currently reviewing Carroll County's request for an AEL, thus it remains pending. The plant is being operated under a Consent Judgment Agreement that places any violations in abeyance until the resolution of the AEL process.

The state issued a draft permit, incorporating the AEL, on August 19, 2013. The AEL is proposed to be applicable only up to an annual average flow of 0.750 mgd. Additional study, analysis and approval by MDE is required if exceedance of the 0.750 mgd is to occur. The County has been actively engaged in discussions with MDE regarding the draft permit. In late 2014, County representatives proposed to MDE the relocation of the current outfall, as part of the plant upgrade to Enhanced Nutrient Removal (ENR) scheduled to be completed by 2017. The flows would be piped and discharged into the Patapsco River watershed approximately 1 mile to the west of its current location. The proposed plan as shown on Map 22 reflects the pipeline path and relocated outfall location as agreed upon with MDE.

Inventory of Existing Sewerage Treatment Plants, Interceptors, Sewage Pumping Stations, and Force Mains

See Tables 19A-19D for Hampstead SSA infrastructure.

Table 19A: Hampstead SSA Treatment Plant

WWTP Treatment Type	Points of Discharge	WWTP Design Capacity (mgd)	Average Flows (mgd)	Method of Sludge Disposal
Extended aeration	Piney Run	.900	.573	Sludge press; cake form is trucked to Northern Landfill

Discharge Permit Number: 88DP0594C NPDES Number: MD0022446

Table 19B: Hampstead SSA Interceptors

Interceptor	Diameter (inches)	Average Day Flow (mgd)	Design Flow (mgd)
Main Interceptor	15	n/a	n/a

Map 22



Table 19C: Hampstead SSA Pumping Stations

Pumping Station	Coordinate Location*	# of Pumps	Capacity of Each Pump (mgd)	Normal Pumping Capacity (mgd)	Average Day Pumping (mgd)
Eagle Ridge	N 393817.83 W76 7154.74	2	n/a	0.196	0.004
North Carroll Farms Station #20	N 713011.99 E 1352660.68	2	0.168	n/a	n/a
North Station #8	N 710613.53 E 1352919.14	2	0.040	n/a	0.025
Small Crossings Station #9	N 709347.37 E 1354734.57	2	0.018	n/a	n/a
Shiloh Station #11	N 704552.54 E 1349785.75	3	0.500	n/a	n/a
Roberts Field Station #14	N 701892.64 E 1358892.42	2	0.031	n/a	n/a
Hampstead WWTP	N 703565.58 E 1358927.42	3	0.900	n/a	n/a
Total		16	1.657	.196	.004

* Coordinate locations are Maryland State Plane 1983 Datum.

Table 19D: Hampstead SSA Force Mains

Force Main	Maximum Day Pumpage in MGD (date)	Diameter (inches)	Design Flow (mgd)
Shiloh Station #11	No Flow Meter	10	1.000
North Station #8	No Flow Meter	6	-
Small Crossings Station #9	No Flow Meter	4	-
Roberts Field #14	No Flow Meter	4	-
North Carroll Farms #20	No Flow Meter	4	-
Eagle Ridge	No Flow Meter	6	-
Total			1.000

* Provided Design Average Daily Flow for Design Flow.

Sludge Management

The Hampstead Sewage Treatment Plant generates approximately 1,022 wet tons of sludge per year. The wet sludge is processed through a screw press process and deposited in roll off dumpsters. Dry sludge is taken to the Northern Landfill for ultimate disposal. See Table 19E for Hampstead SSA Sludge Management.

Table 19E: Hampstead SSA Sludge Management

Quantity (tons/yr)	Quality	Method of Disposal/Use	Permit #s	Future Disposal Method	Problems
1,022 wet 174 dry (15% solid)	Digested liquid sludge, 1% solids, aerobic digestion	Dewatered sludge transported to Carroll County Northern Landfill	2008-SLF-2596 S-91-06-2595-BE	No change anticipated	None

Allocation Procedure

Sewage capacity is allocated on a “first come, first served” basis. The amount of the allocation is based on meter size (e.g., for residential units served by a 5/8-inch meter, the County allocates 225 gpd). Sewage flows are allocated to development following final approval of the record plat or site plan mylars by the County Bureau of Engineering. A maximum of 25 sewer hook-ups may be approved per quarter for each development.

As of 2011, the Board of County Commissioners has 41,850 gallons of the treatment plant’s capacity reserved for industrial uses.

Needs Analysis

Because much of the Hampstead sewer system dates to the 1970s, numerous components are showing their age. A continual process to update and upgrade the system is being undertaken. In particular, there are two clarifiers in use currently that treat 700,000 gallons of sewage. Ideally there should be two clarifiers to handle the *full* capacity of the wastewater treatment plant, *plus* two additional clarifiers that would create redundancy for the full system. Existing clarifiers will be used with ENR upgrade. Third new clarifier is for processing and fourth clarifier will be added when we the plant is expanded to 1.200 MGD.

In 2009, the County hired a consultant to complete the *Hampstead Sewer System Preliminary Infiltration & Inflow Study*. The study identified specific locations where I&I were occurring throughout the Hampstead sewer system. It estimated that approximately 325,000 gallons (or 57 percent) of treatment capacity were being lost to I&I. The study also identified locations where improvements could be targeted to recapture the greatest amount of capacity. Based on these targeted improvements, it was estimated that approximately 105,000 gallons of capacity currently being lost to I&I could be recaptured. However, in 2011, some of these improvements were completed. Pipes leading into the WWTP and running under a tributary of North Piney Branch were lined, for a measured reduction in I&I of 100,800 gpd.

The County continues to work towards resolving the thermal limitations issue with MDE. Until these issues are resolved, several potential projects (including Enhanced Nutrient Removal upgrades) remain on hold. See Table 19F for Hampstead SSA sewage problem areas.

Table 19F: Hampstead SSA Sewage Problem Areas

Location	Population (Where Applicable)	Nature Of Problem	Status
Green mount	214	Septic Problems, small lots, and limited soil capabilities	Under Study

Planned Projects and Recommendations

See Table 19G for Hampstead SSA priority projects.

Project Name	Planning Category	Description	Location	Capacity Added
Hampstead Trade Center	Priority (S-3) 5 Years	Pumping station, 8" collector line, force main	Hampstead North Business Center	0 MGD
IDA Property	Future (S-5) 10 Years	Pumping station, 8" collector line, force main	IDA property west of MD 30.	0 MGD
Upgrade WWTP	Priority (S-3) 5 Years	Upgrade treatment process to ENR	Existing WWTP	0 MGD
Hampstead Sewer Main Upgrade	Priority (S-3) 5 Years	Replace 4,750 feet of existing clay pipes per year starting in FY19	Throughout Town	0 MGD
West Hampstead Collector Sewer Main Repair	Priority (S-3) 5 Years	Repair the clay sewer mains	Carroll Street, Houcksville Road, Gill Avenue and Shiloh Road	0 MGD
Gravity Sewer Main	Priority (S-3) 5 Years	Install 2,600 feet of 10" force main on Houcksville Road near MD 30 and 3,100 feet northwest of the Hampstead WWTP	Houcksville Road to Treatment Plant	0 MGD
New Force main	Priority (S-5) 10 Years	Upgrade force main to 16" and any additional projects that need to occur with this upgrade.	Shiloh Pump Station to Blackrock Road	0 MGD

Long-Term Recommendations (10+ years)

- ◆ Implement the targeted improvements to the collection system recommended in the I&I study.
- ◆ Possibly install additional clarifiers at the WWTP
- ◆ Identify specific industrial areas for which Commissioner-reserved treatment capacity will be used, to avoid preemption of the capacity by other development.
- ◆ Implement any projects associated with the resolution of the thermal limitation issue, including possible discharge chillers or their alternatives.
- ◆ Undertake Enhanced Nutrient Removal upgrades to the wastewater treatment plant, pending resolution of the thermal limitation issue.