

Location of Clusters

Overall, three clusters are being considered for development (see Appendix 1):

- Buckeystown (Eastalco Alcoa Works Site)
- Urbana
- Brunswick

Each cluster will have **4 distinct campuses** (in turn each campus will have 4 data centers – a total of 16 data centers per cluster).

Water and Wastewater Service Demand

The data centers are designed to use direct evaporative cooling (see Figure 1), which requires water to achieve the necessary cooling. On average, cooling water will be cycled up 3 times before being discharged as wastewater.

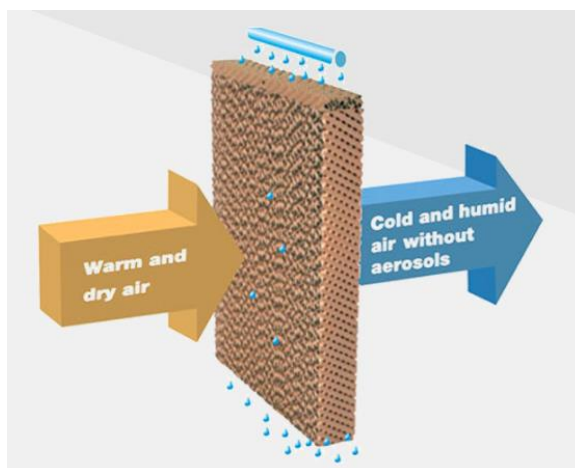


Figure 1: Direct Evaporative (adiabatic) cooling process
Source: <https://www.evapco.eu/>

Cooling water and wastewater demand per datacentre/campus/cluster can be found listed in the table below.

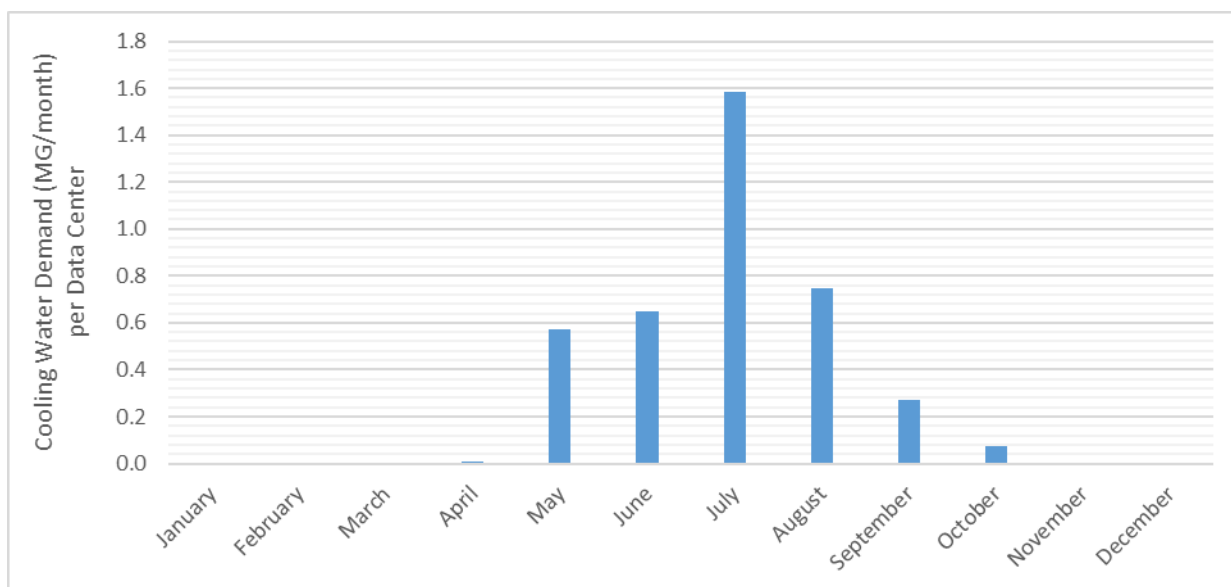
	Buckeystown	Urbana	Brunswick
Gallons per day			
Peak day per Cluster	2,720,000	2,720,000	2,720,000
Avg per AZ (peak month)	880,000	880,000	880,000
Avg per AZ (annualized)	224,000	224,000	224,000
Peak day per Campus	680,000	680,000	680,000
Avg per campus (peak month)	220,000	220,000	220,000
Avg per campus (annualized)	56,000	56,000	56,000
Peak day per Bldg/data center	170,000	170,000	170,000
Avg per bldg/data center (peak month)	55,000	55,000	55,000
Avg per bldg (annualized)	14,000	14,000	14,000
Net Consumptive Use			
% used for cooling	60	60	60
% returned as wastewater after cooling	40	40	40
Per Cluster			
# campuses	4	4	4
#data centers/bldgs	16	16	16

In summary, each campus, **on the peak day of the year**, would demand 680,000 gallons of cooling water per day, of which 408,000 gallons would be evaporated, and 272,000 will be discharged as wastewater.

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The cooling water demand of our data centers is seasonal, and between October and April, we use little to no cooling water as we primarily rely on ambient air to cool our data centers.

Monthly cooling water demand for a data center of ours during a typical metrological year varies as follows:



Source of Water and Discharge Locations

The proposed water sources and wastewater discharge locations for each cluster is summarized below:

Cluster	Water Source	Wastewater Discharge Locations
Buckeystown	<ul style="list-style-type: none"> Reclaimed Water from Ballenger McKinney Plant 	<ul style="list-style-type: none"> Ballenger McKinney Plant
Urbana	<ul style="list-style-type: none"> 2 Campuses – Potable Water Supply from Frederick County/ City of Urbana 2 Campuses – Water from Monocacy River with potable water potentially as back-up 	<ul style="list-style-type: none"> City of Urbana and Monocacy River or Little Bennett Creek
Brunswick	<ul style="list-style-type: none"> Potomac River 	<ul style="list-style-type: none"> Potomac River

The peak day /monthly demands on the Monocacy River, Little Bennet Creek and Potomac River would be:

River	Cluster	To Service	Water		Wastewater	
			Peak Day (MG per day)	Peak Month (MG per month)	Peak Day (MG per day)	Peak Month (MG per month)
Monocacy River	Urbana	Per Campus	0.68	6.4	0.27*	2.6*
		Total (2 Campus)	1.36	12.8	0.54*	5.1*
Little Bennett Creek	Urbana	Per Campus	N/A	N/A	0.27*	2.6*
		Total (2 Campus)	N/A	N/A	0.54*	5.1*
Potomac River	Brunswick	Per Campus	0.68	6.4	0.27	2.6
		Total (4 Campus)	2.72	25.6	1.09	10.2

* For Urbana we will either discharge to Monocacy River or to Little Bennet Creek (we are also actively evaluating whether 2 Campus can directly discharge to Urbana's sewer system)

Confidential

Temperature of Discharged Water

Because the cooling process is adiabatic, no heat is exchanged into the cooling water. Rather the air temperature is reduced when energy is used to change the phase of water from liquid to vapor (reduces temperature, increases humidity). Thus, the temperature of the cooling water discharge will be at or below ambient dry-bulb conditions.

Quality of Discharged Water

The contaminants in the wastewater will be directly related to the influent water quality. When pure water evaporates into the filtered air stream, the total dissolved salts (TDS) of the remaining water in the cooling unit's sump will increase. This sump water will be recycled and reused until the cycles of concentration (CoC) reaches approximately 3.0 times the cooling water quality. At this point, the water will be discharged to drain and the cooling unit refilled with fresh water.

The only routine water treatment is filtration, maintenance of the chlorine residual at 2 ppm total chlorine, and UV disinfection. In the rare event that a routine AHU bacteria test triggers a corrective response, chlorine (bleach) will be added to the Cooling Unit's basin. Approximately 50 gallons of water will be disinfected, and then the chlorine residual neutralized to less than 1 ppm before discharging the water.

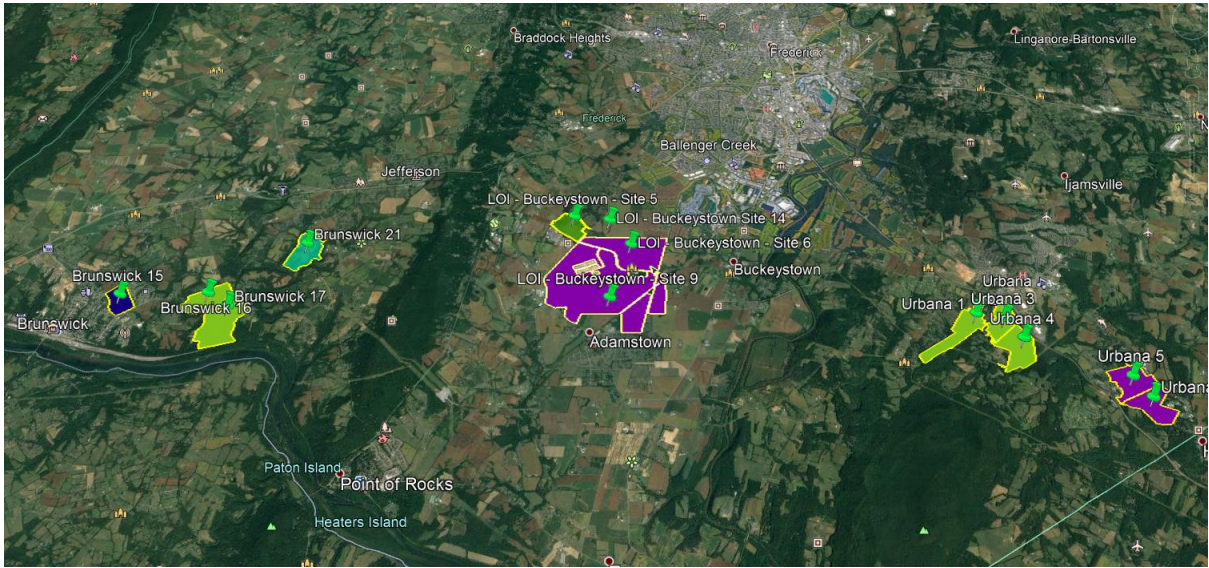
There will be no measureable addition of Biological Oxygen Demand (BOD) or other organic loading, as there is no risk of air-side contamination from the filtered air stream. The bacteria levels in the water system will be measured routinely to maintain a clean system and manage bacterial growth.

Questions of MDE

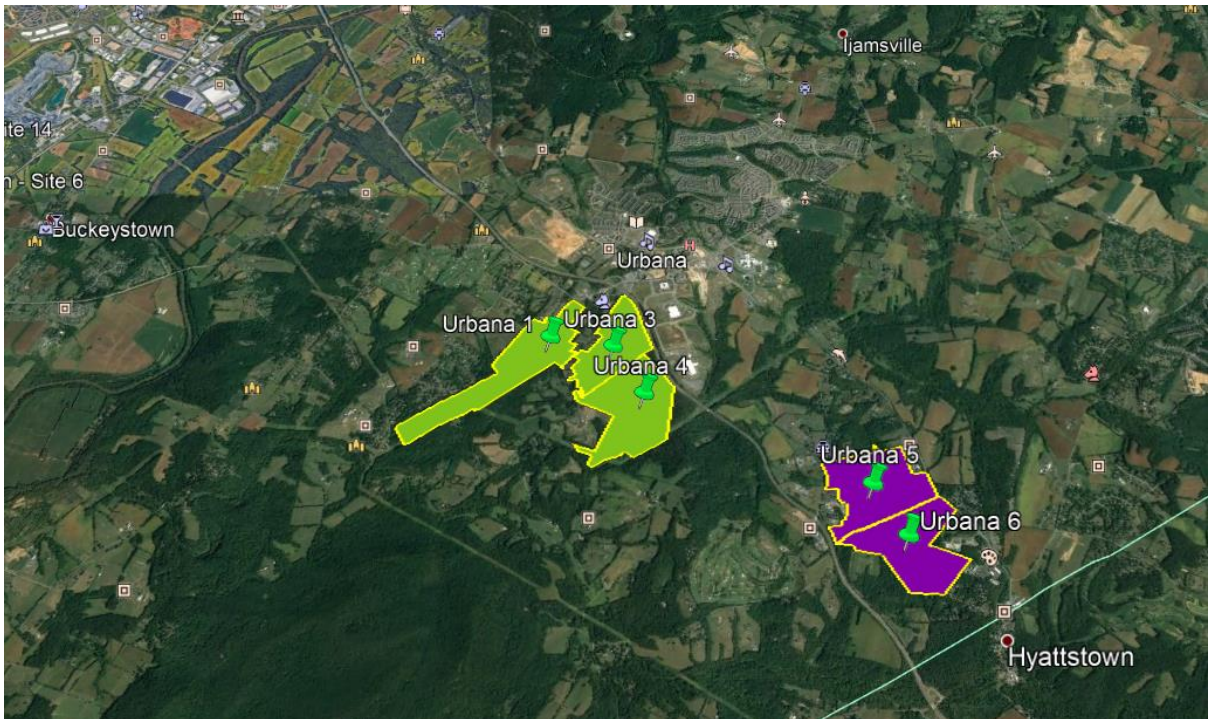
1. Comment on whether sufficient capacity is available in the Potomac and Monocacy Rivers to meet the water demands estimated above?
 - a. Comment on regulatory timelines, procedures and requirements for withdrawing water in quantities listed above. Particularly advise of any storage requirements that might apply. Should storage requirements apply, are there any other options available (e.g., reducing consumptive use during certain periods)?
2. Comment on the possibility of discharging wastewater to Potomac, Monocacy River and Little Bennet Creek in quantities listed above?
 - a. Comment on regulatory timelines, procedures and applicable discharge standards
 - b. Comment on permit modifications which would be required for the Ballenger-McKinney WWTP NPDES discharge permit to allow the use of reclaimed wastewater effluent.
3. Assuming local geotechnical conditions are favourable, comment on the possibility of reusing wastewater at each campus through groundwater recharge?

Appendix A

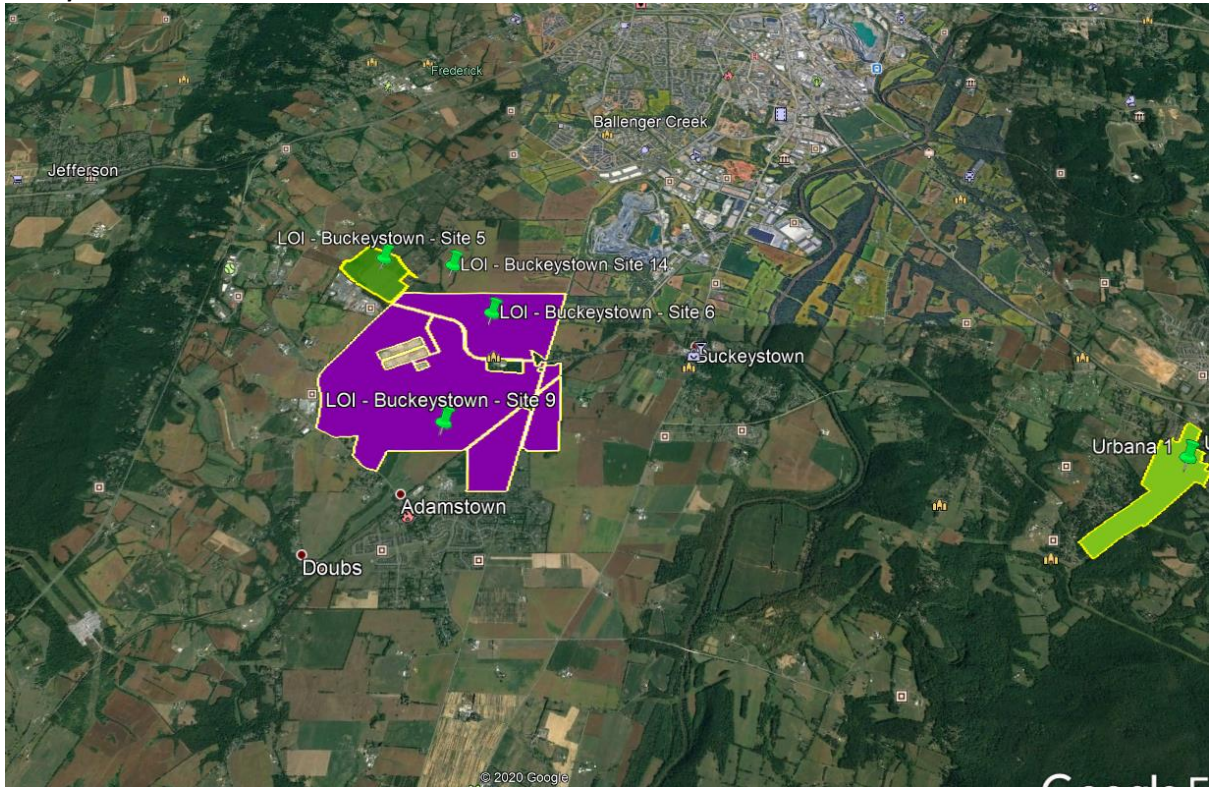
Overview of Three Clusters



Urbana Cluster



Buckeystown Cluster



Brunswick Cluster

