

Summary

Project:	Arlington County Biosolids Upgrade	
Subject:	Biosolids Advisory Panel Meeting 4	
Date:	Thursday, June 30, 2022	
Location:	WebEx	
Attendees:	<p>John Bloom, C2E2 Sandra Borden, Crystal City Civic Association Joan McIntyre, EcoAction Arlington Claire Noakes, C2E2 Energy Committee Peter Robertson, Fiscal Affairs Advisory Commission Mary Glass, Arlington County Civic Federation Steve Young, Joint Facilities Advisory Commission</p>	<p>Mike Collins, Arlington County Department of Environmental Services Lisa Racey, Arlington County Water Pollution Control Bureau Mary Strawn, Arlington County Water Pollution Control Bureau Fasil Haile, Arlington County Water Pollution Control Bureau Wilbur Brown, Arlington County Water Pollution Control Bureau Peter Golkin, Arlington County Department of Environmental Services Brian Balchunas, HDR Miranda Mair, HDR Rahkia Nance, HDR Jessica Host, HDR</p>

Agenda

1. Introductions
2. Program Updates
3. WPCP Tour Recap
4. Brand/Website Preview
5. Confirmation of Biogas Utilization
6. Greenhouse Gas Emissions
7. Air Quality and Public Health
8. Renderings and Site Layout
9. Next Steps

Welcome and Introductions (R. Nance)

Rahkia Nance opened the meeting and welcomed attendees to the fourth advisory panel meeting. She shared details of how to use the WebEx virtual meeting platform and introduced the team.

Program Overview (M. Strawn)

Mary Strawn reminded the Advisory Panel about the overall scope of the program and the

program goals. The upgrades to the solids handling facilities will reduce the volume of biosolids produced, make a higher quality biosolids product, and generate biogas.

She explained that HDR is the program manager and acts in an advisory capacity for the County to help define the scope and implementation plans for the program. In the future, HDR will oversee the design and construction. HDR is prohibited in participating in any design or construction contracts for the program.

Mary explained the future solids handling process and its components and explained that the program is in its early stages and has a projected completion date of 2029. Since the February 2022 Advisory Panel meeting, the team has drafted the Facilities Plan, continued discussion on biogas utilization, and provided CIP updates. Currently the team is focused on procuring the delivery teams and finalizing the Facilities Plan.

WPCP Tour (M. Strawn)

Mary thanked those who participated in the WPCP tour in April. The County provided written answers to the questions raised during the tour. There were no follow-up questions presented at the meeting.

Brand/Website Preview (R. Nance)

Over the past several months the team has been working on a website that incorporates the branding that was developed with the County team. The mission, vision, and purpose statements are the result of several communications workshops.

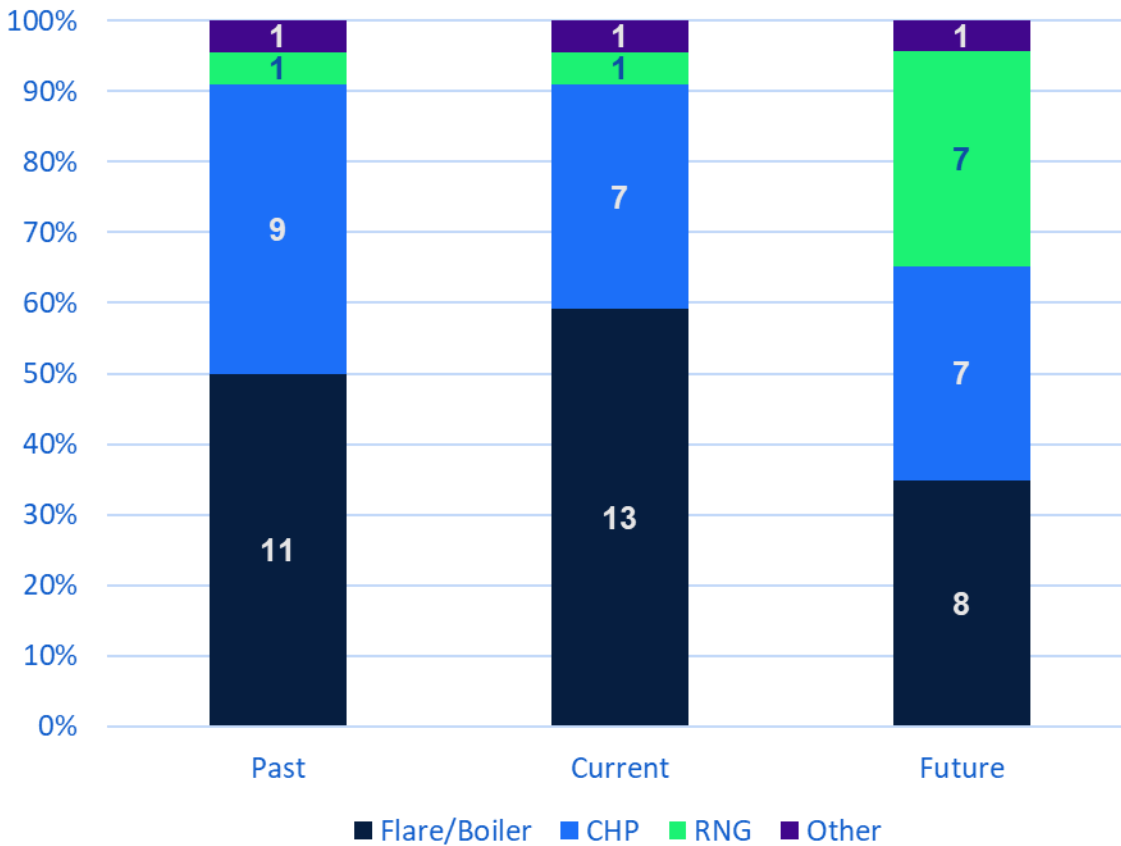
Rahkia shared a preview of the current website progress which includes: a home page, project updates, FAQs, resources, and a contact us page. She asked participants to review the FAQ page and provide any additional questions that should be added to the existing list.

Rahkia also shared a mockup of the FAQ page containing specific information about biosolids and PFAS.

Confirmation of Biogas Utilization (B. Balchunas)

Brian Balchunas led the discussion on biogas utilization. The key objective for the biogas utilization evaluation is to identify the best and most sustainable use of the biogas (a by-product of the treatment process) while meeting the steam demands of the process.

Brian discussed what other facilities were doing in the region and described the gas usage strategy of 22 water resource recovery facilities in Maryland, Virginia, and DC. The dark blue section represents facilities that are not beneficially using the biogas and flaring more often. The lighter blue section represents facilities that are using combined heat and power. The number of those facilities decreased from nine facilities to seven over the past several years. Brian mentioned that of the seven CHP facilities, four of the facilities have trouble staying online. Six facilities are planning to convert to renewable natural gas in the future.



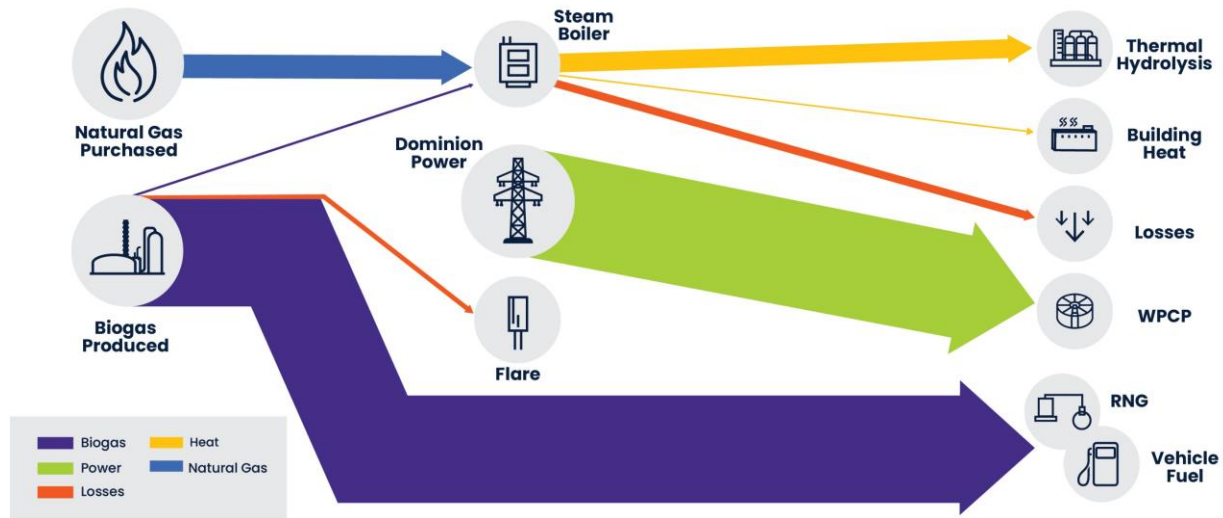
Arlington County is committed to figuring out how to beneficially use the gas beneficially and developed four alternatives that were considered. Ultimately, it was determined that Alternative 3: Renewable Natural Gas was the most beneficial option. Alternative 3 shows natural gas being used for the boiler and includes a provision to use renewable natural gas for the boiler.

Brian noted that if the RNG is used in the County, the greenhouse gas credits should remain with the County. Greenhouse gases were discussed in more detail later in the presentation.

BIOGAS RECOMMENDATIONS (M. STRAWN)

Mary shared that County staff has recommended proceeding with Alternative 3 – Renewable Natural Gas and that Department of Environmental Services leadership agrees with this recommendation. This recommendation was also presented to the County Board at the Utilities CIP Work Session on June 28.

The draft Biogas Utilization Report is being finalized after receiving comments from the Advisory Panel on the draft Report. There was no change to the recommendation from the draft report. There is preference for Alternative 3A (injected RNG into the pipeline) over Alternative 3B (converting RNG into compressed natural gas) due to the uncertainty of local RNG transportation. Pipeline injection allows a variety of customers instead of just one.



BIOGAS UTILIZATION: NEXT STEPS (M. STRAWN)

The County has additional work that needs to be completed, including technology evaluations and site visits.

In addition, there is coordination with natural gas utility and other utility stakeholders, and confirmation for commercial arrangement.

The County would appreciate brief written comments from the Advisory Panel on the biogas utilization approach by July 8, 2022.

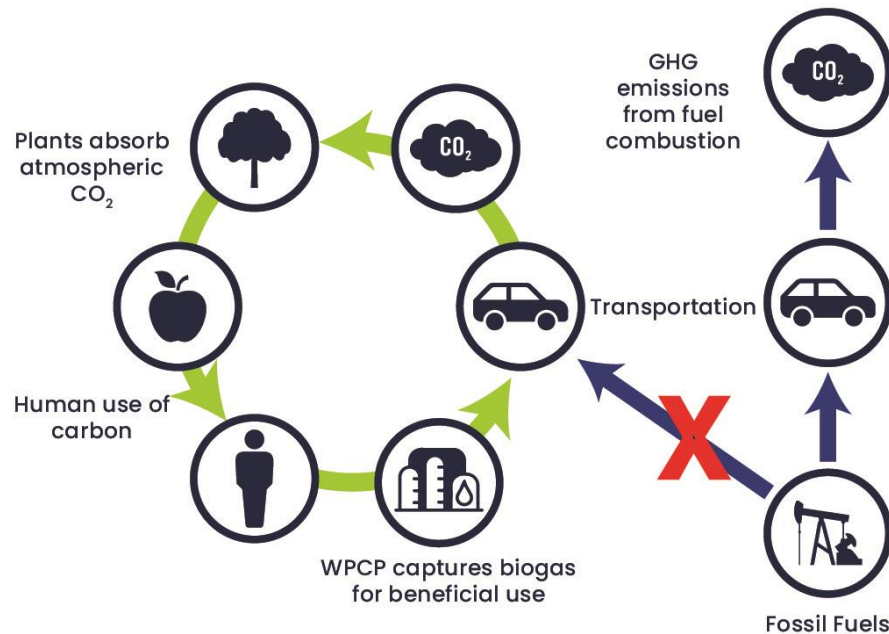
Greenhouse Gas Emissions (M. Mair)

Miranda provided an introduction to the seven major gases that the Intergovernmental Panel on Climate Change (IPCC) considers for greenhouse gas (GHG) emissions and explained that the project team considered more than carbon when examining these emissions. The term “carbon footprint” is used for simplicity, but the analysis is a complete greenhouse gas inventory. She explained the three scopes of GHG emissions:

- Scope 1: Direct emissions from the facility and have direct control over. These are typically related to fuel combustion on-site.
- Scope 2: Indirect emissions that are generated off-site, but influenced by the energy efficiency of operations on-site, such as purchasing electricity from the power grid.
- Scope 3: These emissions are the most complicated, as they involve the supply chain like the emissions associated with production of chemicals needed for treatment of biosolids, the transportation of those items, and the hauling of biosolids off-site.

The calculations are formed through detailed methodology from greenhouse gas guidelines called the Greenhouse Gas Protocol Guidelines that are developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). The guidelines are updated regularly and based on the latest climate science.

There is one category that is not added into the scopes: biogenic emissions. The carbon present in the wastewater stream is considered biogenic. Biogenic carbon is part of the short-term cycle of carbon emissions and has a natural cycle through the environment. Since the renewable natural gas displaces the use of fossil fuels, the biogenic emissions reduce the long-term greenhouse gas emissions. The user of the renewable natural gas will be able to claim Scope 1 emission reductions for use of the gas.



The calculation follows the three tiers of the Intergovernmental Panel on Climate Change. Most of the emissions calculations were based on Tier 3, which uses direct site-specific data as opposed to Tier 1, which uses national or regional default values.

The items included in the calculation methodology are the biosolids facility are the electricity use for solids handling processes, chemical transportation and production, transportation of biosolids for land application, fuel combustion for steam generation, and biogas production. It was noted that the analysis was completed around the solids handling processes only, as the remainder of the wastewater treatment plant is remaining unchanged.

Miranda presented two scenarios for greenhouse gas emissions based on projected 2037 emissions. The first scenario assumes the current emission profile for electricity (from Dominion Energy), as shown in the table below. Overall, the Scope 1, 2, and 3 emissions will increase to support the biogas upgrading and RNG production, but the benefit is because the RNG displaces fossil fuels. **The energy value of the RNG produced outweighs the energy required to produce it.**

Category	Lime Stabilization	THP, Anaerobic Digestion, RNG	Comment
Scope 1 – Direct (Natural Gas)	50	1,970	Fuel combustion (natural gas) for steam generation
Scope 2 – Indirect (Electricity)	1,420	3,300	Electricity for solids processing
Scope 3 – Indirect (Other)	3,860	1,940	Reduced truck traffic and chemicals
Total	5,340	7,210	
RNG Production	--	(6,150)	RNG displacing fossil fuel
Adjusted Total	5,340	1,050	Net difference of 4,290 metric tons/year

Project carbon footprint with current Dominion Energy emission profile in 2037

The second scenario assumes that Arlington County meets their renewable energy goals such that 100% of electricity is renewable by 2037. This scenario results in a greater greenhouse gas benefit between the existing processes and proposed facilities as shown in the table below:

Category	Lime Stabilization	THP, Anaerobic Digestion, RNG	Comment
Scope 1 – Direct (Natural Gas)	50	1,970	Fuel combustion (natural gas) for steam generation
Scope 2 – Indirect (Electricity)	0	0	Electricity is renewable
Scope 3 – Indirect (Other)	3,860	1,940	Reduced truck traffic and chemicals
Total	3,910	3,910	
RNG Production	--	(6,150)	RNG displacing fossil fuel
Adjusted Total	3,910	(2,240)	Net difference of 6,150 metric tons/year

Project carbon footprint with 100% renewable energy in 2037

The chart below compares the current solids processing to future solids processing and summarizes the benefits of the upgrade, including that the project results in net positive energy:



Air Quality and Public Health (M. Mair)

Miranda explained that the project team has examined impact to the air quality around the facility using the National Ambient Air Quality Standards (NAAQS). Dispersion modeling is not required by either state or federal regulations for a project of this scale, but the modeling demonstration was performed to provide additional transparency on local ambient air impacts for community stakeholders. The air quality analysis was performed with the same methodology as a regulatory analysis, following the Guideline on Air Quality Models (Appendix W to 40 CFR Part 51).

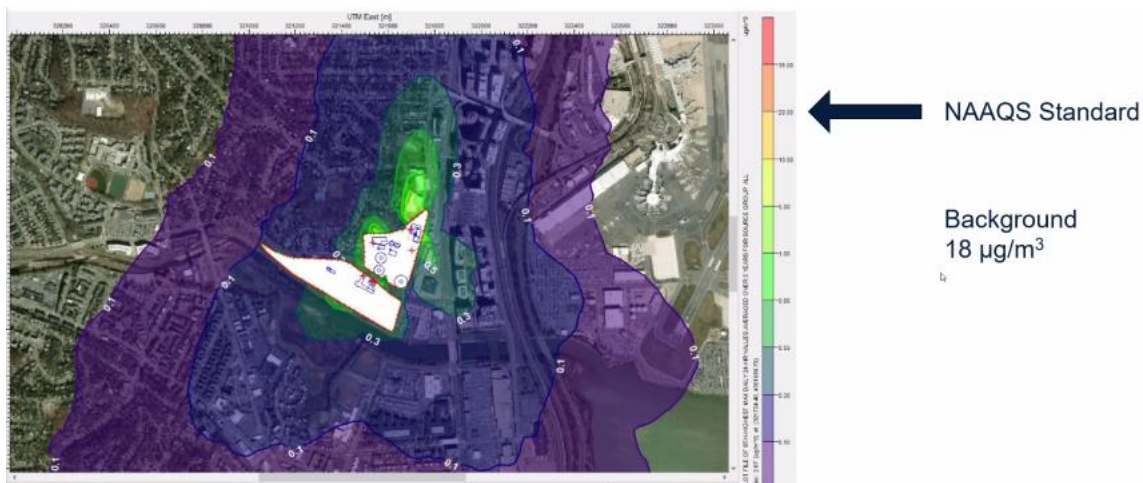
The team has calculated the potential to emit by assuming that all units are operating at maximum capacity 100% of the time without operational limits. This is the absolute worst-case scenario and not a realistic number. This results in a very conservative, over-prediction of ambient air impacts.

The air permitting here does not require operational constraints. The upgraded facility will remain below Title V Major Source thresholds, such that the current minor air permit status of the facility will be unchanged, as shown in the table below:

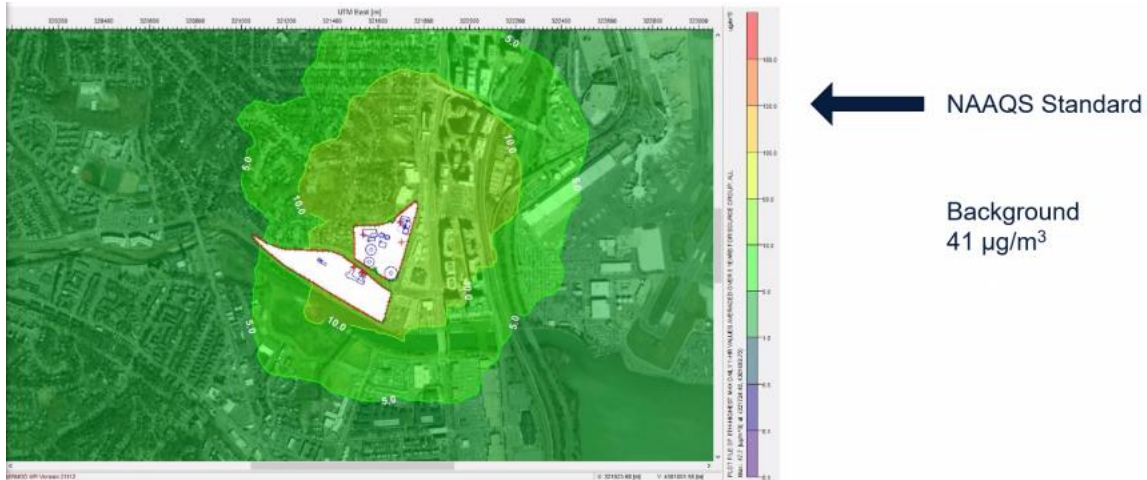
Pollutant	Existing Facility	Project Emissions	Post Project Total	Title V Major Source Threshold
PM/PM ₁₀ /PM _{2.5}	7.8	2.2	10.0	100
NO _x	24.3	17.8	42.1	100
SO ₂	6.1	3.4	9.5	100
CO	31.7	33.5	65.2	100
VOC	4.0	2.3	6.3	50

The project team completed air emissions modeling for the entire WPCP, including the existing emitting units (not analyzed in the carbon footprint) and new emitting units to show holistic ambient air impacts. Modeling was done for short-term and long-term scenarios in accordance with the NAAQS. The short-term scenario was modeled using the potential to emit values for hourly operations, reflecting worst case. The long-term scenario was modeled using expected emissions from annual operations. All modeling was done utilizing the most recent five years of meteorological data (2016-2021) and calculated impacts for two different potential site layouts. The results from the modeling were added to measured background concentrations for the various pollutants and compared to NAAQS standards to provide a complete picture of ambient air quality surrounding the WPCP.

The chart below shows the WPCP facility remaining within a safe NAAQS range at maximum potential to emit. The image below is the impact map for PM_{2.5} on a short-term (24-hr) basis. The color scale is calibrated to the PM_{2.5} 24-hr NAAQS of 35 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) and shows the facility has a maximum short-term impact (with all units firing at maximum capacity) of less than 3.0 $\mu\text{g}/\text{m}^3$. Combined with existing monitored PM_{2.5} data (18 $\mu\text{g}/\text{m}^3$), the concentrations surrounding the WPCP are well-below the NAAQS.



The image below is the impact map for NO₂ on a short-term (1-hr) basis. The color scale is calibrated to the NO₂ 1-hr NAAQS of 188 $\mu\text{g}/\text{m}^3$ and shows the facility has a maximum short-term impact (with all units firing at maximum capacity) of less than 50 $\mu\text{g}/\text{m}^3$. Combined with existing monitored NO₂ data (41 $\mu\text{g}/\text{m}^3$), the concentrations surrounding the WPCP are well-below the NAAQS.

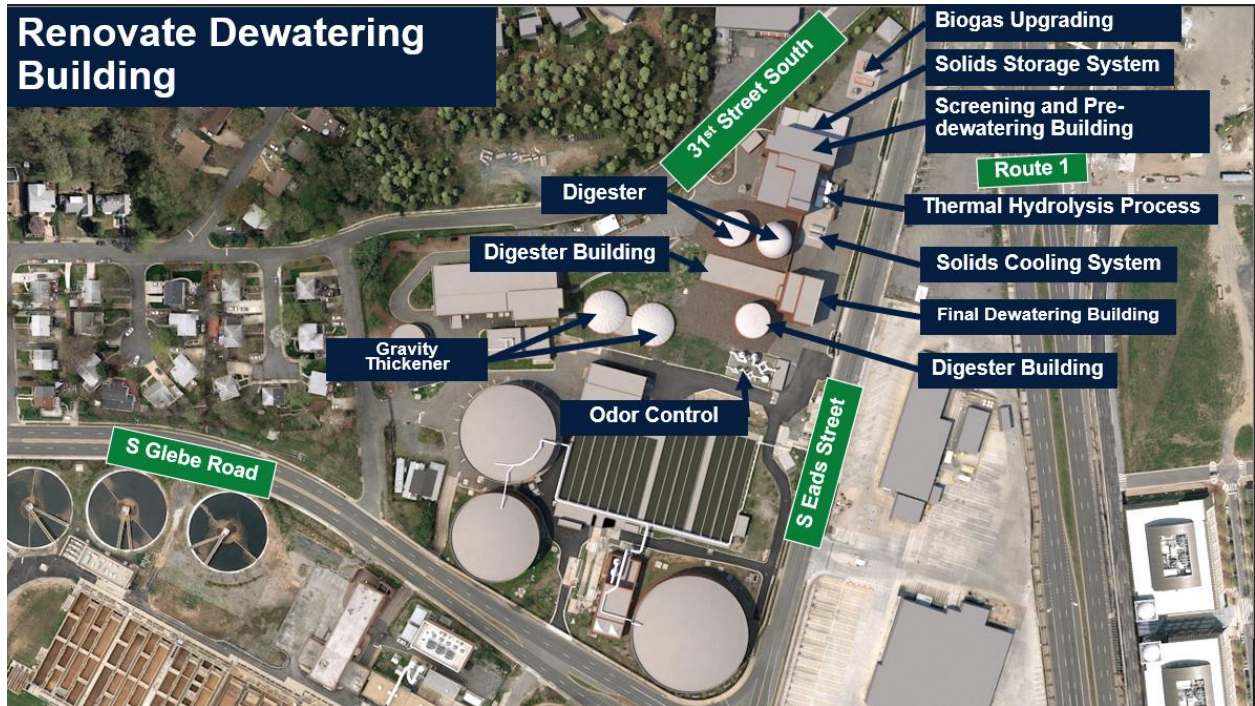


Renderings and Site Layout (M. Strawn)

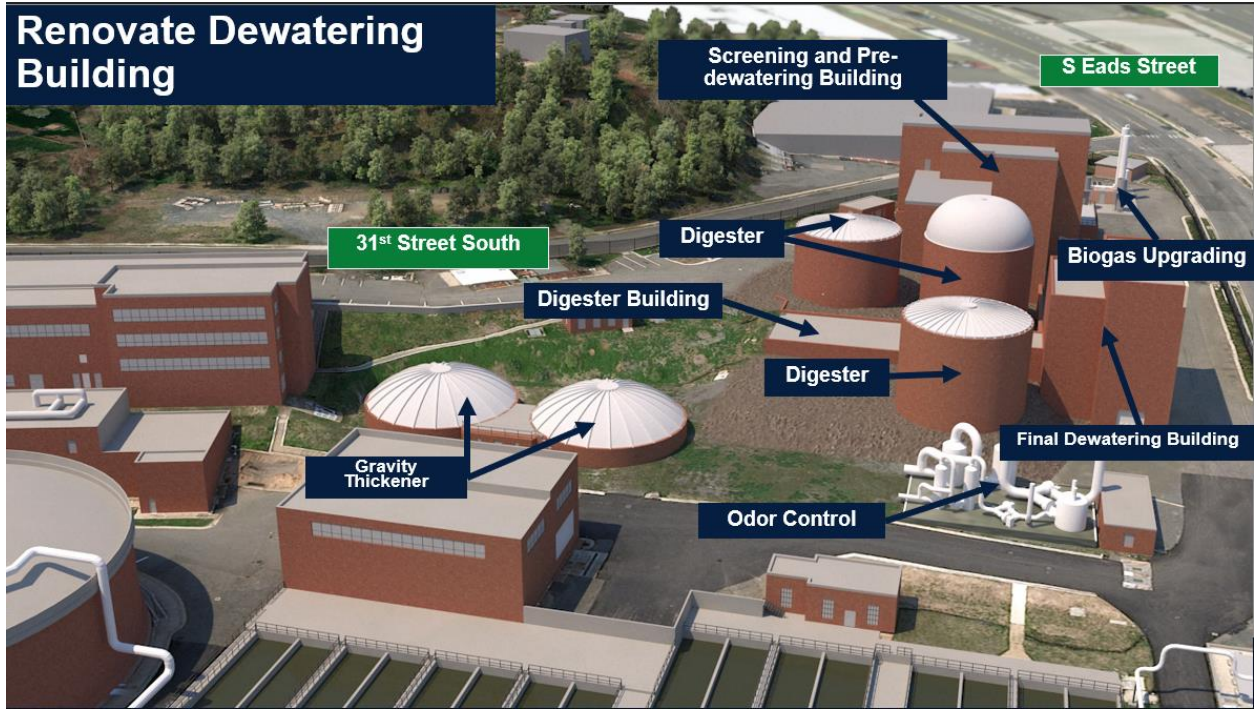
The County is moving forward with two site options at this time and will decide how to move forward with the design-build contractor. Maintaining operations during construction will be a key consideration for choosing the site layout.

Option 1: Renovate Dewatering Building

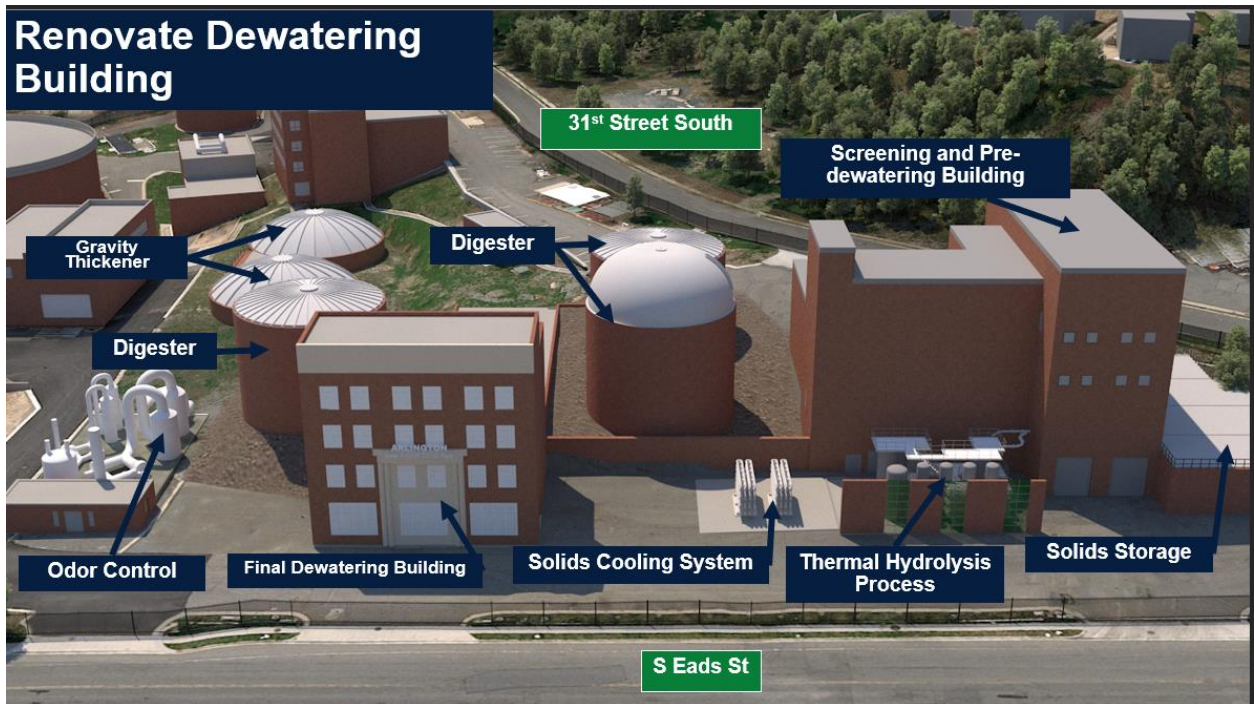
The shell of the existing dewatering building could be repurposed and the functions inside the building would be changed significantly. The existing dewatering building would need to be removed from surface during construction prior to the new facilities being operational. This would require temporary biosolids dewatering onsite.



Option 1- Overall Site Layout



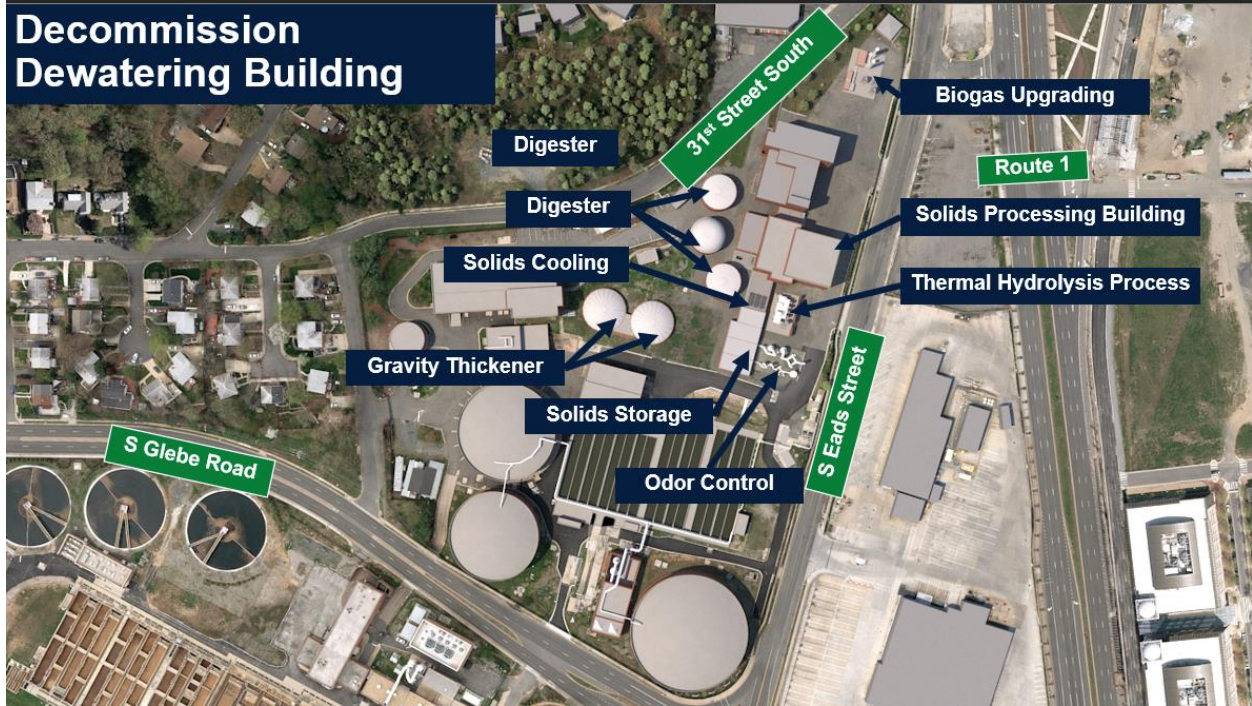
Option 1 – view from S. Glebe.



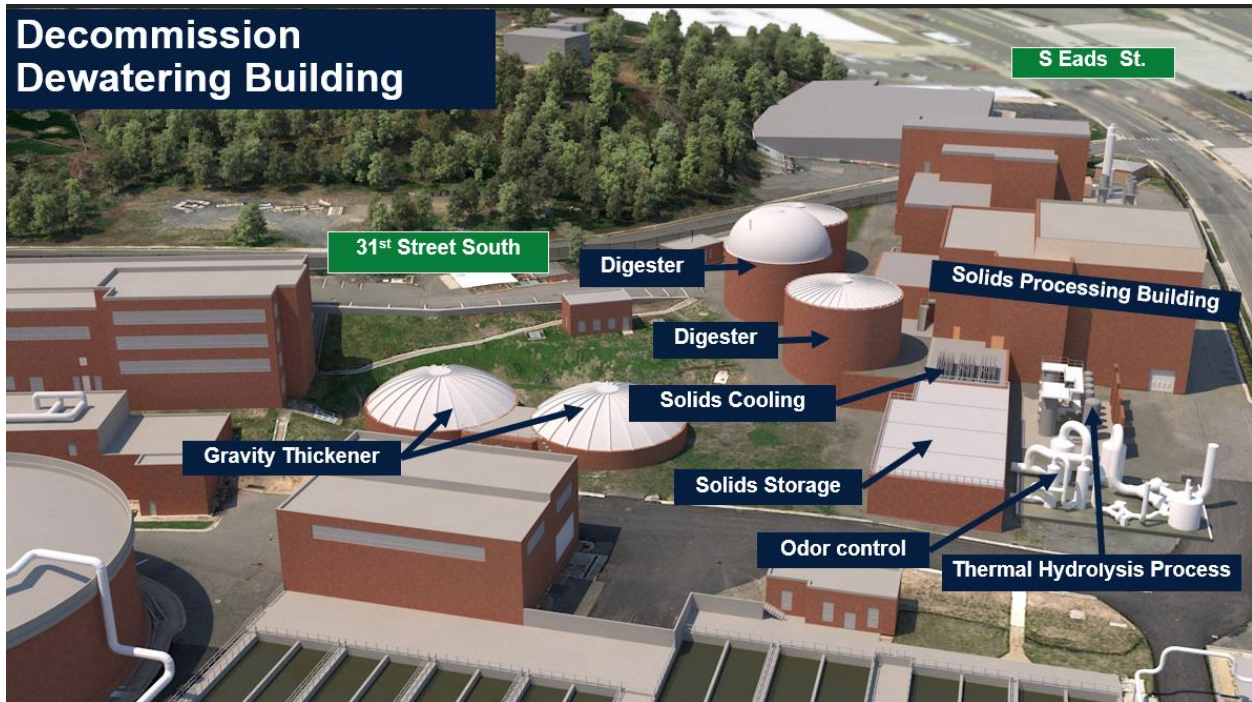
Option 1 – view from S. Eads St.

Option 2 – Decommission Dewatering Building

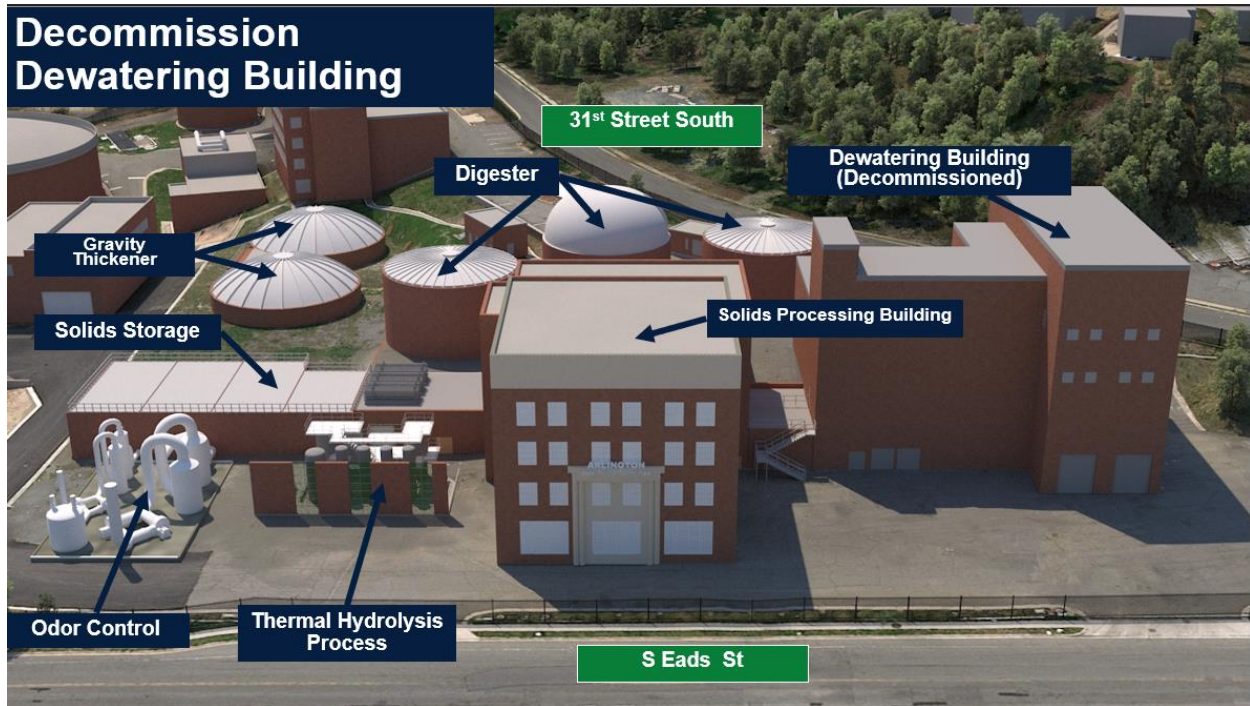
With this option the existing Dewatering Building would run throughout construction and all new facilities would be constructed. The existing dewatering building would be decommissioned at the end of construction. The main advantage is that the facility would not need temporary biosolids dewatering. The main disadvantage is that the site would be more congested.



Option 2 – overall site layout



Option 2 – view from S. Glebe



Option 2 – view from S. Eads St.

Next Steps (R. Nance)

Rahkia thanked the group for attending and for their input during the meeting.

Mary noted that the group will reconvene in the fall. The County will notify the group of the website launch and any additional outreach opportunities.

Outstanding items:

- HDR will revise the rendering slides with the buildings labeled before distributing to the group.

Question	Response
<p>During the February 2022 meeting, a series of slides showed the low-end assumption for the cost of renewable biogas was \$6.38. I would like to understand if that includes the subsidized costs. I understand that natural gas is being sold for less than \$6. What is the cost of the current renewable gas cost and does this change any of the financial assumptions?</p>	<p>The values being referenced are for the Renewable Identification Numbers (RIN), which is the market-based pricing for the Renewable Fuel standard program. Prices for RINs are significantly higher than the commodity price of the gas. The prices shown during the February meeting reflected the historical prices from 2016 through 2021. \$6/MMBtu represents the lowest daily value seen over that five-year period. Today the price of RIN is \$3, which is roughly \$40 per MMBtu. This is the value in the open market.</p>

Question	Response
	<p>At these prices, the financial incentives would be significantly greater than those presented in the report.</p> <p>Brian noted that the biogas utilization report has been updated to reflect recent increases in electricity prices.</p>
<p>I find the Mission, Vision, and Purpose to be somewhat confusing because it does not say anything about the state-of-the-art facility. These elements should be more specific to the project, not just the outcomes.</p>	<p>That is good input. The language was kept general, but the County does not want to obscure the message of what the upgrades are about.</p>
<p>I suggest sensitivity to the need to talk about GHG reduction goals to be broader than just carbon emissions. I think there was text earlier that consistently talked about carbon emissions where it should have referred to GHG emissions.</p>	<p>The project team will update this text.</p>
<p>On PFAS, the Q&A is consistent with what you have told us over time which is that there is low risk. What we have been asking is if the biosolids are tested or have been tested? I think that the public will want to know this too. I think that is a key question to add to the website.</p>	<p>The County has not tested yet but we have had several discussions about this. There are some issues concerning testing PFAS at low levels and multiple PFAS compounds to choose from. The County wants to confirm what to test for and what the results would tell us.</p>
<p>While we don't have a lot of industrial activity, we do have a major airport and military operations which are sometimes considered risk factors for PFAS.</p>	<p>The County does accept the flow from the Reagan National Airport and firefighting foam. It is a potential source of PFAS input to the plant.</p>
<p>This topic is of particular concern to people. It would be useful to say what the plans are to test for PFAS given the recent publicity</p>	<p>Agreed.</p>
<p>This issue (PFAS) will continue to intensify. EPA just changed their level from 70 to 35.</p>	<p>Yes, the EPA did make some recent changes on the <u>drinking water</u> side. It was a <u>health advisory, not a rule</u>, but does give an indication on the direction.</p>
<p>The Alternative 3 chart is slightly different than what we have seen in the past. Is there a reason the gas is a thin line to the steam boiler?</p>	<p>This diagram would be the most financially attractive because of RINs value. The system will be designed such that the County can choose to maximize RNG use onsite or maximize injection into the pipeline. Details of the commercial aspects with the gas utility need to be finalized. The County will make sure from an engineering and construction perspective that the County can use their own renewable natural gas, which may or may not be injected into the natural gas pipeline prior to use.</p>
<p>Is it more advantageous to sell the natural gas to the utilities to make a profit?</p>	<p>Yes, that is correct. There are a lot of details of what those negotiations will look like</p>

Question	Response
	relative to the Renewable Identification Number market and the commodity sale of the gas. The total net-energy use will be the same regardless of whether the County uses the RNG onsite or injects it into the pipeline and uses natural gas.
The gas that we put out onto the gas grid will flow to the nearest off taker and the wastewater treatment plant is the nearest off taker. A lot of the gas injected into the grid is likely to cycle back into the wastewater treatment plant.	Yes, that is correct for the physical molecules of gas.
Mary mentioned the Board and I am very interested in the governance process for what we are doing. Who and what is the board?	This is referring to the Arlington County Board for the 10-year CIP approval. Any contracts with the natural gas utility will also be approved through the Board, as will the contract with the firm that will design and construct the upgrades. Governance will continue to be discussed in the future.
What does it mean that it is hard to keep combined heat and power online? Were they older? What are the factors and viability of the process?	The project team does not have specifics other than talking to other facilities but can take it under advisement to try to get more specifics. These are large internal combustion engines running 24/7 so the maintenance required is extensive. CHP is expensive to maintain and operate.
I have seen a study that although the assumption it is biogenic in their study they found up to 23% of the carbon emissions from wastewater was due to things like cleaning products from laundry and dishes and a lot of those are petroleum-based and not biogenic. Do you have a comment on that finding? (Note, the study was shared with the project team)	That is a fair point. Wastewater is not a perfect feedstock, and a lot of things end up there that should not be there. This shows there are carbon sources that get in there that are not intended to be there. The type of wastewater being analyzed in the study would need to be investigated further.
Following up on the biogenic emissions graphic, on composting I am very involved in soil health aspects. My understanding is 30% of human generated carbon is caught up in soil which is a potential carbon sink. I have a hesitation in thinking that everything is being circulated and we don't need to account for it. I would be more comfortable with a 30% decrease on the biogas emissions we are producing because otherwise it would have gone into the soil. If you don't reference it at all or reference that you are leaving it out it will raise questions.	The County did look into the carbon for land application of biosolids, and additional analysis is in the report. There is a lot of research that has been done in other parts of the country and the science is behind carbon sequestration is being evaluated. In the full technical report, it is mentioned in detail why the County decided to leave this out of the analysis. Once approved, this document will be made available to the public.

Question	Response
<p>This process is going to produce gas and biosolids, which will both have carbon in it. Understanding that depending on what the agricultural tactics used is how long it will stay in the soil is uncertain.</p>	<p>It will be less because the County will be converting carbon to biogas. The County will continue to discuss and evaluate this issue for the technical document.</p>
<p>I still get confused if someone else is taking credit for the renewables how can we take credit for reducing our carbon emissions.</p>	<p>This is a holistic look at the carbon emissions and the overall benefit and reduction. As the project team discussed in the biogas utilization section, the County still thinks if the gas commodity is sold in Arlington County for transportation purposes, then Arlington County could take the credit for their GHG calculations.</p>
<p>It is being presented that we are sharply reducing the carbon footprint. Who gets the credit?</p>	<p>It is more beneficial to let someone else take credit for burning it and Arlington County gets the credit for the RINs. Wherever the brown gas is sold there will be multiple transactions where someone buys the gas itself and the RIN market. Our analysis is whoever buys the gas commodity could then take that as a Scope 1 reduction for themselves. You are paying for a renewable power source and there are two markets—the RIN market and the physical gas market.</p>
<p>Did you account for emissions during construction? If not, how do you make this an apples-to-apples comparison?</p>	<p>This analysis does not include construction of infrastructure emissions. This is to understand the value of biogas. Since building the facilities is a single occurrence, the project team is focused on the operational aspects on an ongoing basis.</p>
<p>I think it is important to note the selling of RINs in the chart and if it is not clear how the accounting works for that.</p>	<p>Agreed. The project team is updating this section in the report and will be as transparent as possible.</p>
<p>What year was the emissions modeling done?</p>	<p>Modeling was done for all hourly weather observations using the most recent five years (2016 – 2021) of meteorological data.</p>
<p>Gunston Middle School and Oakridge Elementary are outside of the impact map for emissions?</p>	<p>They are shown in the upper left of the map and they are not in the main area of the emissions impact.</p>
<p>Concerned about the waste gas burner emissions and how they may impact some of the nearby residences. Also concern about pollutants and other trace elements of chemicals that could be more problematic.</p>	<p>Everything that is shown in the results includes the waste gas burner. There are other chemicals, and they are modeled and regulated differently. They did not reach a level that required additional analysis but can analyze if the community is interested.</p>
<p>I am curious about the flaring because you can send the gas offsite through the pipeline.</p>	<p>With pipeline injection, the need to flare is minimized. The County did include the waste gas flaring in the emissions analysis. We do not intend to flare frequently, and the County</p>

Question	Response
	will do everything possible to minimize its use. The financial modeling assumed flaring 5% of the time but we are trying to do less than that in reality. Having to flare rather than beneficially use the gas on- or off-site is the last resort. .
Are you looking at embedded carbon in the decommission scenario?	That is something the County is considering and is a benefit in retaining the dewatering building. There are sustainability and financial considerations and that will be evaluated with the designers and builders.
Will a tape of this meeting be available if some Civ Fed members have more questions?	No, this meeting is not being recorded but a detailed summary will be sent along with the presentation.
What is the program's next steps with the Board?	The 10-year CIP for the entire County has been submitted to the board for their approval. The next time the County will engage with them is the contractor award stage. Right now, we are in the Request for Qualifications process and then move into the Request for Proposals phase.

CHAT:

- Mike Collins to everyone: 6:05 PM
 - going to fill up my water bottle - brb
- Mary Glass to everyone: 6:07 PM
 - Can you show the slide with the participants again?
- Rahkia Nance to everyone: 6:57 PM
 - Sure thing!
- John Bloom to everyone: 7:07 PM
 - Here
- John Bloom to everyone: 7:07 PM
 - Here's the article I mentioned:
- John Bloom to everyone: 7:08 PM
 - <https://www.climatecentral.org/news/sewage-plants-overlooked-co2-source-20840>
- Brian Balchunas to everyone: 7:13 PM
 - Thanks, John!
- Claire Noakes to everyone: 7:16 PM
 - Developing robust and specific calculations is very helpful, thank you for the effort
- Mary Glass to everyone: 7:36 PM

- what year was the modeling done?
- Claire Noakes to everyone: 7:40 PM
 - Just to confirm, Gunston Middle School and Oakridge Elementary are outside of the impact map?
- Mary Glass to everyone: 7:47 PM
 - Will a tape of this meeting be available if some Civ Fed members have more questions.
- Steve Young to everyone: 7:55 PM
 - Labels/highlighting would be helpful!