COMMUNITY & ENVIRONMENTAL DEFENSE SERVICES

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July 9, 2026

Patricia & Kristofer Olson
22400 North Eighty Acres Road
Luther, Oklahoma 73054-9330

RE: Gaining Data Center Benefits While Safeguarding Luther Residents

Dear Mr. & Mrs. Olson:

As requested by you and many of the residents of the 168 households located within the one-mile possible area of concern extending from the proposed Beltline Energy Project-Luther Horizon Technology Park site, following are recommendations for enhancing Town of Luther ordinances to gain the benefits the 14 data center buildings may provide while safeguarding Luther residents.

Beltline Energy Project & Luther Horizon Technology Park
The proposed data center campus project appears to go by two names:

- Beltline Energy Project, and the
- Luther Horizon Technology Park

Beltline Energy Project documents are posted on the following Town of Luther webpage: http://townoflutherok.com/beltline-energy-project-information. The Luther Horizon Technology Park website is at: https://lutherhorizontechnologypark.com/#hero.

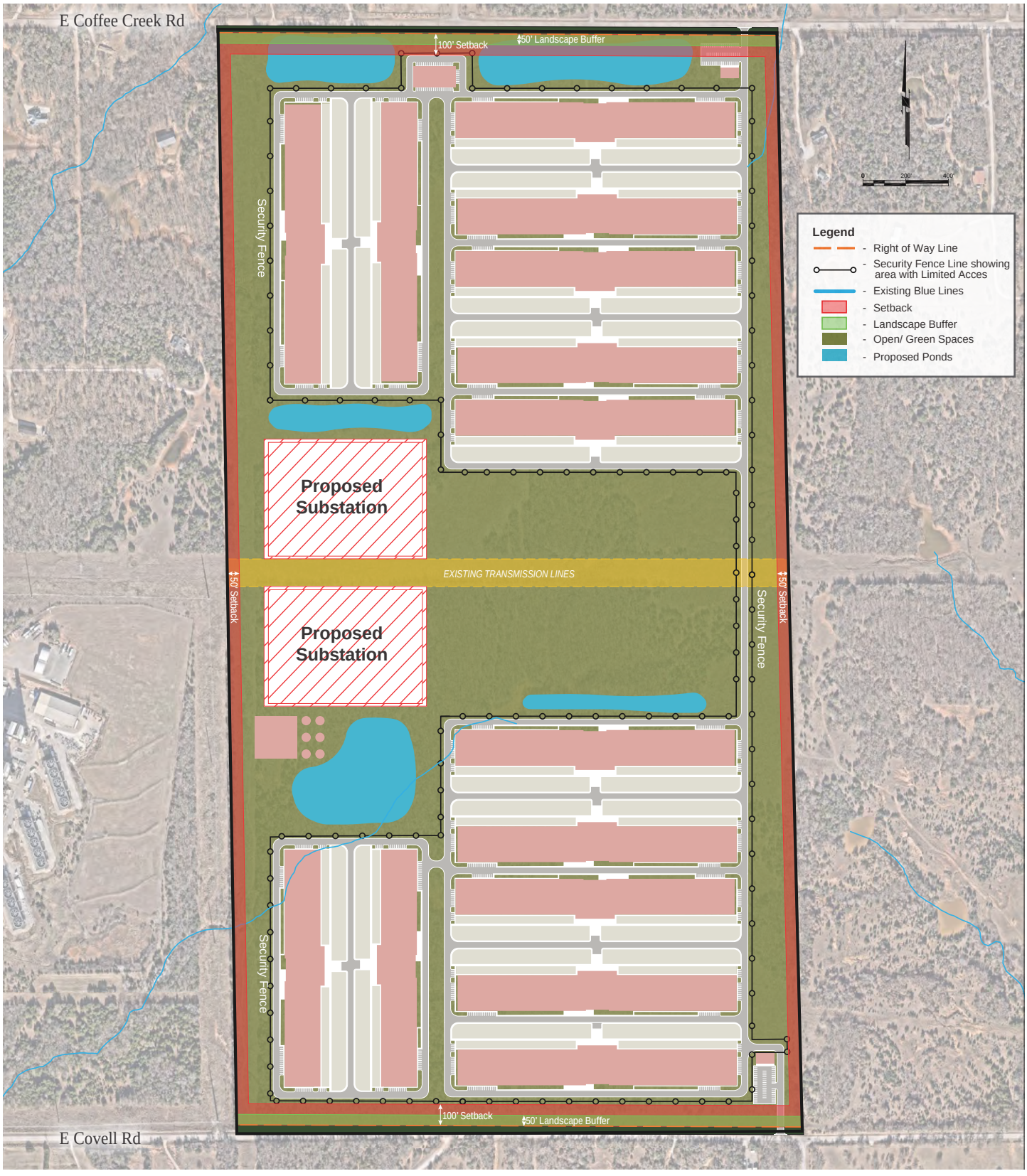
The Concept Plan on the next page of this letter appears in both Beltline Energy Project documents and on the Luther Horizon Technology Park website. Only the Beltline Energy Project is referenced on the Town of Luther *Data Center Status (7/24/25)* webpage. However, the two different names do not appear in either the Beltline Energy Project documents or on the Luther Horizon Technology Park website. Nevertheless, I have assumed they are the same project for the purpose of these recommendations.

Data Center Noise, Air Pollution & Other Possible Health-Environmental Impacts
Noise and air pollution tend to be the two factors that have the greatest adverse effect on those living near some data centers. Other concerns include excessive water consumption affecting other users, cooling water contaminants plus stormwater pollutants possibly fouling ground or surface waters, loss of property value by placing industrial structures within sight or sound of residential areas, light-trespass into homes and diminished nighttime celestial views, increased electricity costs, construction phase runoff pollution and dust, radiation, traffic and noise, as well as other impacts that may emerge over time.

EXHIBIT B

CONCEPTUAL SITE PLAN

JOHNSON & ASSOCIATES





Johnson & Associates, LLC
1 East Sheridan Avenue • Suite 200 • Oklahoma City, Oklahoma 73104 • 405.235.8075 • jaokc.com

Applicant Proposed Measures to Minimize Health & Environmental Impacts

The Luther Horizon Technology Park website lists the following proposed general measures to address impacts common to many data centers. While these proposed measures are a step in the right direction, they are not sufficient to ensure data center benefits will be gained without harm to Luther area residents. The proposed general measures are:

- Big buffers and setbacks between data centers, homes, parks, and nature areas.
- Strict limits on noise at the property line and required sound studies.
- Protections for drinking water and strict adherence to Town of Luther utilities requirements for cooling use.
- Required open space, landscaping, and wildlife-friendly design.
- Utility rules that make sure the data center pays its fair share.

The following more specific measures also appear on the Luther Horizon Technology Park website:

- **Protect drinking water and wells:**
  - The project will not draw on private wells or local drinking water supplies for its cooling needs.
  - For cooling operations, the project is evaluating the use of treated wastewater for cooling rather than potable drinking water. This approach helps avoid placing additional demand on water resources used by neighboring homes and farms.
  - The project is being planned with attention to emerging Oklahoma groundwater policy, including Senate Bill 259, which would restrict groundwater use for open-air evaporative cooling at data centers and favor low-consumptive, recirculating cooling systems.
  - Air-cooled Chillers (Closed Loop): Eliminates cooling tower water consumption entirely — requiring only minimal makeup water for the closed chilled water loop at commissioning.
  - Direct to Chip Cooling (Liquid to Chip): Water circulates in a sealed, direct-to-chip system rather than through open evaporative towers. This eliminates continuous water loss through evaporation, reducing freshwater consumption by up to 70% compared to traditional cooling tower-based design
  - Potable water use will be limited to everyday building needs: restrooms, fire protection, landscaping, and office operations.
  - If treated wastewater is used for cooling, it would be coordinated with the City of Oklahoma City and would not use Luther infrastructure or Luther treated wastewater supplies. Oklahoma City already has a similar system in place with the neighboring OG&E Redbud Energy Facility.

- **Keeping the site greener than a typical industrial project:**
  - Lighting must be full cut-off, downcast, dark-sky compliant to minimize glare, spillover, and skyglow.

    - Generators and cooling equipment are focused toward the interior of the site, with generators enclosed in non-reflective, sound-attenuated housing and equipment oriented to avoid off-site impacts.
    - Maximum lot coverage, including buildings and paving, is limited to 75% of the SUP area, preserving open space within the project site.

- **Sound - What to expect at the property line:**
    - Noise level at the 320-acre site property line will be less than 65 dBA.
    - Generator testing limited to before 4 PM Monday through Friday.
    - Tree buffers and setbacks help keep the campus quiet, low-profile, well-landscaped, and well-maintained.

The following measures appear in the applicant (Beltline Energy Project) document *The Town Of Luther Specific Use Permit Sup Master Design Statement For BLE Landholdings, LLC*, dated June 2, 2026:

- All exterior lighting must be full cut-off, downcast and dark-sky compliant, with LED lights 3000K or lower in color temperature. The maximum pole height is 20 feet. Developer shall submit a photometric plan showing foot-candle levels with any application with the Town for construction. Lighting must not exceed 1 foot-candle levels for any property line not along NE 206th St.
- The height of any building shall not exceed eighty-five (85) feet as measured to the roofline. Rooftop equipment shall be permitted and screened in accordance with Section 9.4. Towers that are accessory to the Project shall not exceed 150 feet in height and shall not be located within 200 feet of any property boundary.
- All buildings shall be set back a minimum of fifty (50) feet from all property lines. Provided that, buildings shall be set back a minimum of one hundred (100) feet from NE 206th St and E Coffee Creek Rd.
- Operational noise limits shall not exceed 65 dBA at the property line. This does not take into account background noise levels from outside of this parcel.
- Cooling Towers and Backup Power Generators shall not be located within any setbacks, as defined in Section 9.14.
- Generators shall be enclosed within non-reflective, sound-attenuated housing.
- Generator testing is only allowed Monday through Friday, from 10:00 a.m. to 4:00 p.m., except in the case of emergencies.

Proposed Measures Must Be *Required* & *Enforceable*; Not Just *Promised*

As demonstrated by the research cited in this letter, noise and air pollution have affected the health and quality of life of those living within one mile of some *(but not all)* data centers. On the next page is a 2026 aerial on which the applicant's Concept Plan is overlain. The **red circle** extends one mile from the 320-acre data center site boundary. There are at least 168 existing households within one mile of the site. However, the site abuts properties slated for rural residential development according to Figure 3: Future Land Use Plan, on page 25 of the *Town of Luther Comprehensive Plan*. Therefore, a number of other homes could be built within one mile, assuming data center issues due not inhibit growth as explained in the section of this letter headed *Compatibility, Visual & Property Value Impacts*.

Proposed Beltline Energy Project & Luther Horizon Technology Park

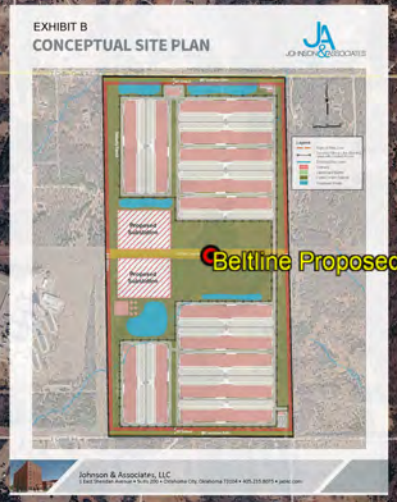
Legend

One-Mile Possible Area of Concern

NE 234th St

N Luther Rd

N Triple X Rd



66

Google Earth

Image © 2026 Airbus

N

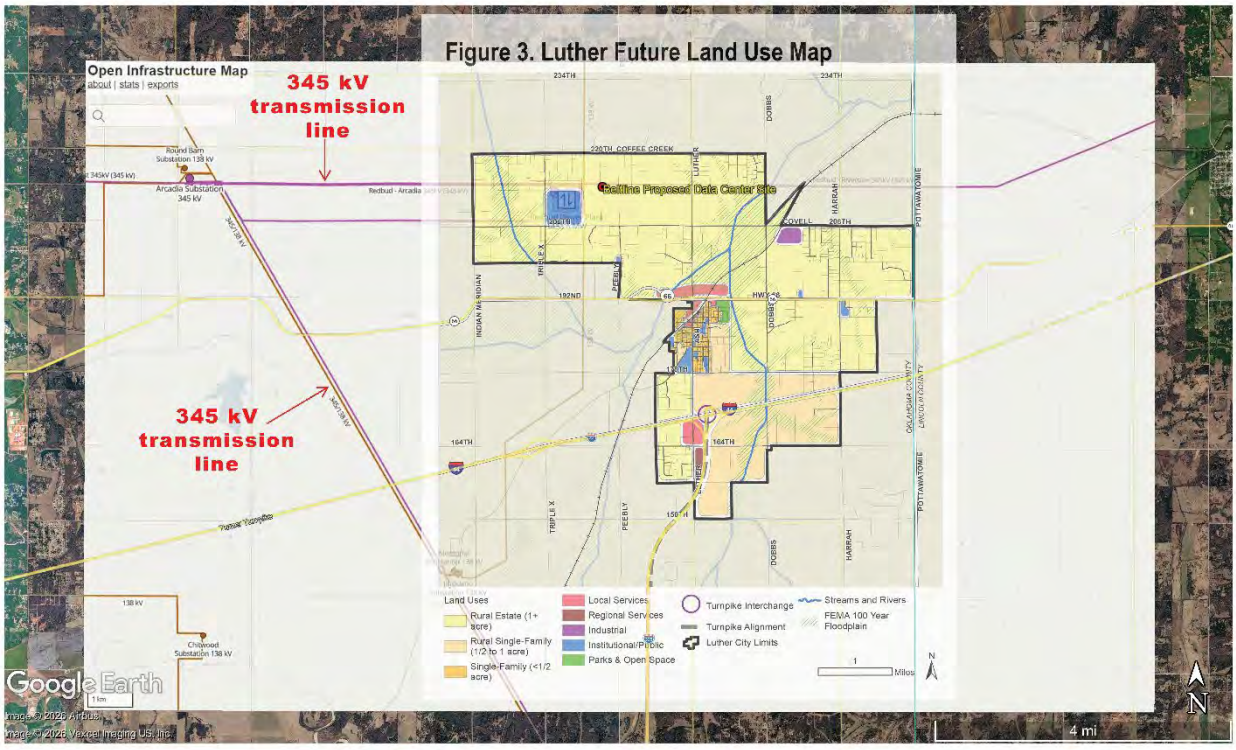
1 mi

Research by CEDS and others indicates that only 10% to 18% of data centers emit noise area residents found disturbing. The purpose of this letter is to propose changes to Town of Luther ordinances to increase the likelihood - but cannot guarantee - that the proposed data centers will be among those causing minimal adverse effects to area residents by ensuring that the measures ***promised*** by the applicant will be ***required, delivered,*** and are ***fully enforceable*** through Town of Luther Ordinance text amendments.

A number of measures **NOT** listed in applicant documents are also required to gain data center benefits while safeguarding Luther and other area residents. These additional safeguards are described in these recommendations as well.

Data Centers As A Townshipwide Issue & Need for a Comprehensive Plan Update
While I understand that the immediate focus of you and your neighbors is the proposed Beltline-Luther Horizon Technology Park project, a larger concern should also be considered: ***The possibility of data centers locating elsewhere in Luther and other nearby locations.***

Data centers tend to locate along transmission lines operating at 230 kilovolts (kV) or higher. Below is *Figure 3: Luther Future Land Use Map* from page 25 of the *2018 Town of Luther Comprehensive Plan*, overlain on a 2026 aerial photo. Also overlain on the aerial is a screenshot from the somewhat dated Open Infrastructure Map which shows a 345 kV transmission line passing through the northern portion of the Luther Future Land Use Area and another 345 kV line running to the southwest of Luther. Of course, the proposed Beltline data centers adjoin the 345 kV transmission line and the Redbud (power plant) Energy Facility.



As mentioned earlier, the Luther Future Land Use Map adopted by the Mayor and Trustees in 2018, designated the northern portion of Luther for Rural (residential) Estates. Industrial development, like data centers - a Heavy Industrial use - were slated for the purple area shown on page 6, above. This industrial area is on the south side of NE 206th Street between North Dobbs Road and Blackjack Road. It appears the industrially zoned area remains vacant according to recent aerial photos.

Given the potential for data center development elsewhere within the Town of Luther, I urge you to call upon the Town of Luther Mayor and Trustees to consider first amending the *Town of Luther Comprehensive Plan* to address the unique land use and quality of life impacts posed by data centers. The amendment process would likely result in goals and objectives specific to data centers that differ from those in the current 2018 plan.

I also suggest urging the Mayor and Trustees to consider restricting data centers to the Industrial District and requiring a Conditional Use Permit which ***may*** provide greater opportunity for public input and for resolving issues than the Specific Use Permit referenced in applicant documents. I use the qualifier "may" since I am not an attorney.

Most Data Centers Appear Benign; But Will This Be True In The Long Term?
Data center negative effects are by no means universal and inevitable. As stated earlier, research conducted by CEDS and others indicates only 10% to 18% of data center emit sufficient noise to impair quality of life for area residents. Recommendations are offered in this letter to minimize the likelihood that Luther residents will suffer adverse effects while still gaining the benefits data center can provide.

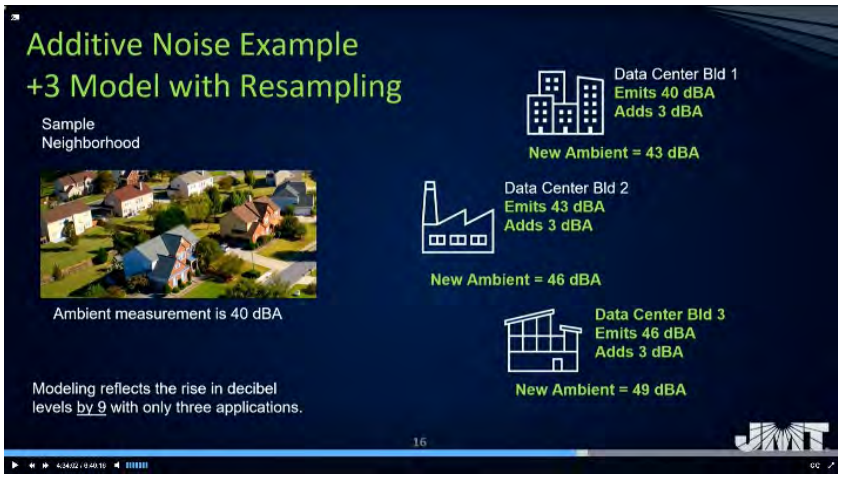
However, data centers are relatively new land uses.

It can take a decade or two before the full effects – both positive and negative – of new land uses like data centers are fully known. Perhaps the most worrisome unknown is how often data center backup diesel generators - the source of noise and air pollution emissions - will run. While it is claimed these engines mostly operate for short periods, last June all backup generators in Loudoun County, Virginia – those at the 256 data centers and other locations - were required to operate continuously for ***24 hours, for several days*** prompting numerous noise and air pollution complaints from many area residents. As explained a bit later in this letter, there could be 280 to 420 backup diesel generators at the Beltline- Luther Horizon Technology Park. It must be assumed that occasionally an emergency will arise which requires that all generators run continuously for an extended period as has happened in Loudoun County and elsewhere.

Data Center Inspection-Enforcement Challenges
Data centers present inspection-enforcement challenges that are somewhat unique. Data center secrecy and lack of full disclosure have been a problem for area residents, reviewers, and regulators elsewhere. Even issues that seem straight-forward and easily regulated like noise have proven to be a challenge.

During testimony before the Prince William County, Virginia Board of Supervisors, noise expert David Nelson explained that data centers are one of the very few industrial land uses that emit a low-frequency hum. The get a sense of the impact data center hum can have on area residents see the four-minute news clip at: https://www.youtube.com/watch?v=JflFFqbZ1X8. To appreciate the complexity of monitoring and enforcing data center noise limits see Mr. Nelson's March 2025 presentation to the Prince William County, Virginia Board of Supervisors, which began at 4:18:00 and is posted at: https://pwcgov.granicus.com/player/clip/3614?view_id=23&redirect=true. Mr. Nelson also explained why Town staff need specialized training and equipment to enforce the noise limits essential to safeguarding those living near data centers.

To further complicate the issue of data center noise, at 4:31:18 Mr. Nelson explains why the noise added from multiple data center buildings-campuses, like the 14 Beltline proposed buildings, creates a need for something I've rarely seen in 40 years of helping find win-win solutions to citizen-land use concerns – a *Comprehensive Noise Control Plan*. The noise added by each additional data center building is illustrated in Slide 16 to the right.



Data Center Public Accountability Essential

Due to the uncertainty surrounding data centers I have been urging those living near proposed sites to initiate their own monitoring program such as that recommended in the CEDS *Data Center Monitoring* webpage: https://ceds.org/data-center-monitoring/. I recommend urging the Mayor of Luther and the Trustees to explore options for including area residents in data center inspections of non-proprietary areas such as backup diesel generators and monitoring while making the results of both easily available to all Luther residents.

DATA CENTER AIR POLLUTION HEALTH IMPACTS

Most data centers rely on numerous backup diesel generators to provide electricity in the event of transmission grid power outages. The Concept Plan on the second page of this letter does not show any backup diesel generators. There are references to generators in applicant documents and the Luther Horizon Technology Park website but no specifics are provided such as the number of generators and other details essential to assessing potential impacts. Similar data centers have 20 to 30 of these school bus size (50 x 14 feet) generators, like those pictured to the right, at each data center



building. Given that the Concept Plan shows 14 proposed quarter-million square foot data center buildings, there could be 280 to 420 backup diesel generators at the Beltline- Luther Horizon Technology Park.

The carbon monoxide, particulates, sulfur dioxide, nitrous oxides, and other pollutants emitted from data center diesel generators can pose a significant regional and local public health risk. The research presented below indicates that a single data center with just 42 generators may adversely affect the health of those living at least 0.6-miles away and possibly miles further under some circumstances.

The impact zone of multiple data centers when clustered together, such as the data center campus proposed for the Beltline-Luther Horizon Technology Park, may affect those living even more distant. The research also indicates it is difficult to predict where and when a data center impact zone will expand to affect an even larger number of area residents. This is why all proposed data center designs should be based on something like the Washington state health impact assessment protocol with realistic worse-case assumptions. It appears that only Washington state and perhaps California require an assessment of local – those living within a mile or so - data center health impacts. The Regional Air Quality Impacts can be substantial too as also explained below. Data centers should only be approved when it is proven that absolute limits on hours of generator operation, generator emissions controls, alternate power supplies, and other measures will safeguard those living near and far from a proposed data center.

Local Health Impacts

Some states, such as Washington, require a Health Impact Assessment (HIA) for the immediate vicinity of a proposed data center while many other states only assess health effects at the regional level. Figure 6 to the right is from an example of a local HIA, which was for the CyrusOne data center proposed for Quincy, Washington.

Note that in Figure 6, the furthest home impacted by the proposed CyrusOne data center, with just 42 backup diesel generators, was 0.6-miles away. Figure 6 also shows three other data centers nearby. The maximally affected home due to the cumulative effects of all four data centers was 0.75-miles from the Cyrus One site.

Other Washington state HIAs have shown that a potential exists for relatively high short-term nitrogen dioxide (NO_2) impacts miles downwind (due to terrain

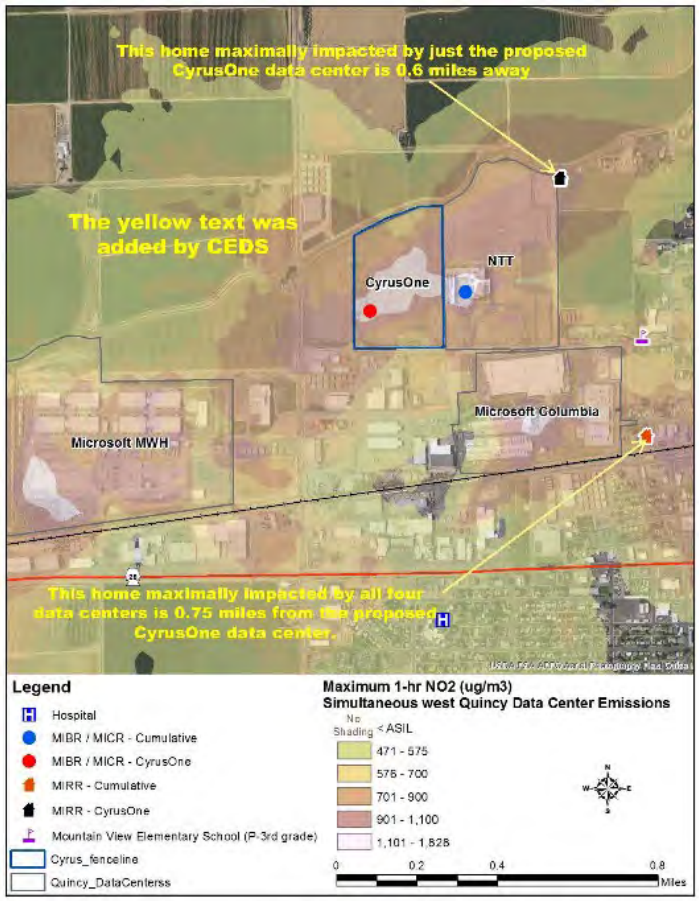


Figure 6: Maximum NO_2 concentrations attributable to simultaneous west side Quincy outage emissions and key receptor locations evaluated in the HIA

and conversion rate of NO in plume to NO_2). That said, these high impacts likely only occur during outage scenarios when multiple engines (diesel generators) operate at the same time as happened in Loudoun County, VA in July 2025. Furthermore, the meteorology that produces these high concentrations (somewhat infrequent) combined with the likelihood of an outage (very infrequent for reliable power systems) leads to a low probability occurrence. Therefore, areas near the facilities (within a few hundred meters) are more likely to experience higher short-term NO_2 levels compared to those areas farther downwind.

Regional Air Quality Impacts

In a 2025 paper, *The Unpaid Toll: Quantifying and Addressing the Public Health Impact of Data Centers*, researchers estimated that:

> "Assuming that the actual emissions are 10% of the permitted level as a reference case that reflects both the historical reports and future demand response projections, the [data center] backup generators could already cause 14,000 asthma symptom cases and 13-19 deaths each year among other health implications, resulting in a total annual public health burden of $220-300 million throughout the U.S."
>
> "Moreover, even short-term (hours to days) $PM_{2.5}$ [2.5-micron particulate matter] exposure is harmful and deadly, accounting for approximately 1 million premature deaths per year from 2000 to 2019 and representing 2% of total global deaths."

Further insights into the regional implications of data center diesel generator air pollution were provided in the 2026 paper *Localized Air Pollution Impacts from Data Centers in Northern Virginia*.

Northern Virginia has more data centers than any other place in the world. In this 2026 study, researchers reviewed emissions data for 138 data centers with Virginia Department of Environmental Quality (DEQ) air discharge permits. As of 2022-2023, data center emissions accounted for a small percentage of carbon monoxide (CO), nitrous oxide (NOx), and 2.5-micron particulate matter ($PM_{2.5}$) released to the atmosphere from all Northern Virginia sources. However, on average data centers were emitting just 3% to 5% of the pollution ***allowed*** by DEQ air discharge permits. Some data centers though were emitting far more than the average:

> "…we find that 14 out of 104 facilities emitted **20%** or more of their allotted totals in 2023, for at least one of the three pollutants. In some cases, the data centers emitted more than **40%** of their total permitted emissions for a given pollutant."

Among the key findings were:

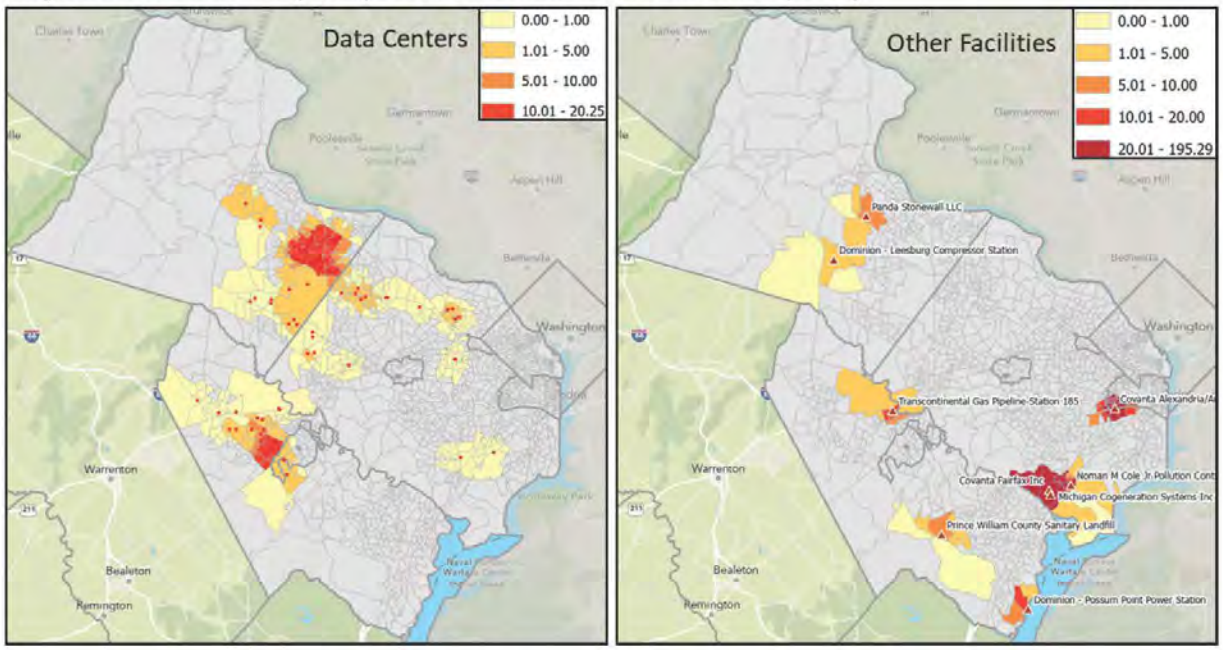
> "If Northern Virginia data centers were to emit their ***total allowed pollution***, per their DEQ permits, this would significantly increase the region's total point source air pollution, for all pollutants other than SO_2 (sulfur dioxide). Point-source emissions would increase by about **90%** for CO and VOC (volatile organic compounds), **145%** for VOC, and **235%** for NOx. Total emissions (including mobile, etc.) would only increase by less than 5% for most pollutants but would increase **45%** for NOx."

The researchers compared data center emissions with other major sources in Northern Virginia such as landfills, waste incinerators, and power plants. The comparison revealed:

"Permitted data center emissions would be ***orders of magnitude higher*** than those from these other facilities, particularly for CO, NOx, and VOC." [if all were emitting the maximum allowed by DEQ discharge permits]

The researchers examined emissions from multiple data centers clustered within the U.S. Census Bureau block groups as shown in Figure 4, below, which is from the 2026 study.

Figure 4. Concentrations of Nitrous Oxides (NOx) Emissions (tons / sq. mi.) from Northern Virginia Data Centers (2023) versus Select Other Facilities (2022)



Sources: Virginia DEQ data and U.S. EPA National Emissions Inventory 2022 v2 Emissions Modeling Platform. Analysis by Virginia Commonwealth University research team.

The researchers commented:

"Perhaps more notably, the combined local emissions exposure from clusters of data centers can sometimes even exceed the pollution exposure associated with a natural gas power plant:

- Some block groups receive much more NOx exposure from data centers, compared to the highest block group NOx exposures from Dominion - Possum Point."

The researchers found significant correlations pointing to:

"inequitable environmental impacts from data center emissions, across various demographic categories."

For example:

"Census block groups with **higher** estimated (2023) concentrations of CO and NOx from data centers tend to have **lower** household income levels, **fewer** residents with college degrees, and **fewer** owner-occupied housing units…"

The map on the left side of Figure 4, above shows nitrous oxides (NOx) emissions, in tons per year, from Northern Virginia data centers by census block group. Each of the red dots on the left side of Figure 4 is an individual data center. Emissions are highest (10.01 – 20.25 tons per year) where multiple data centers are located within the same or adjacent block groups. However, a single data center can elevate NOx throughout a block group covering a relatively large area. For example, the northernmost data center in Figure 4, is located in a block group where NOx emissions are 1.01 – 5.00 tons per year. The data center is about 1.5 miles from the perimeter of this block group.

Reducing Data Center Air Pollution

The U.S. Environmental Protection Agency has established air pollution emission standards applicable to data center backup generators. The most protective standard is Tier-4.

As shown in Table 2, below, which was prepared by the Better Data Center Project, Tier-4 compliant generators release far less carbon monoxide, particulates and nitrogen oxides than the Tier-2 engines in use at many data centers. Reliance on combined cycle natural gas turbines as a backup power source along with Tier-4 compliant generators slashes all three air pollutants to a far greater and healthful degree.

Table 2: Emissions standards for ≥560 kW generators[1] compared to power plants using combined cycle natural gas turbines (NGCC)

Tier	CO (g/kWh)	NOx (g/kWh)	PM (g/kWh)
Tier 2	3.5	5.5[2] (120x higher than NGCC)	0.2
Tier 4 final (2015)[3]	3.5	0.67 (15x higher than NGCC)	0.03
% reduced from Tier 2→4	*0%*	*88%*	*85%*
NGCC	0.023–0.068	0.03–0.11[4]	0.0023–0.0068
% reduced Tier 4→NGCC	*98–99%*	*84–96%*	*77–92%*

[1] Although they can also have health impacts, SO_2 emissions are not included in Table 1 because they are not regulated for generators. SO_2 emissions are driven by the sulfur content of the fuel, which is commonly regulated to <0.0015% (source: Virginia DEQ air permits).
[2] Tier 2 generators are regulated for the combination of non-methane hydrocarbons (NMHC) and NOx at 6.4 g/kWh (see Table 2 of 40 CFR 1039, appendix I). EPA modeling guidelines assume NOx emissions comprise 5.5 g/kWh (EPA420-P-04-009, Table 5).
[3] Tier 4 limits can be found in Table 1 of §1039.101 (40 CFR 1039.101).
[4] This is the 25–75th percentile range for plants operating between 2020–2024, from CAMPD data.

In addition to Tier-4 compliant engines, the Better Data Center Design publication *Diesel Generators at Data Centers: Status, Impacts, and Protective Practices* recommends Battery Energy Storage Systems (BESS):

> "Several hours of battery capacity could be used during short grid disturbances (seconds to minutes) and would cover the vast majority of longer-term power outages (typically 1–5 hours) experienced by data centers. They could also be used for demand response programs."

There is a concern regarding BESS fires and the difficulty in suppressing BESS fires but according to the Massachusetts Executive Office of Energy and Environmental Affairs:

"BESS related fires are rare if designed with sufficient safety protections and are installed, operated, and maintained in a manner that maintains the system safely — as demonstrated by the many systems currently operating safely."

I understand there is a concern that local fire protection services may lack the equipment and training needed to ensure BESS are *"designed with sufficient safety protections and are installed, operated, and maintained in a manner that maintains the system safely."* This concern is magnified by the potential for dry weather grass fires in the Luther area. Should a data center applicant propose BESS then the Town of Luther must ensure that the system and local fire services meet the requirements set forth in NFPA 855, Standard for the Installation of Stationary Energy Storage Systems (2026) which is summarized in the National Fire Protection Association (NFPA) Energy Storage Systems Safety Fact Sheet. The applicant must be required to provide the initial and ongoing funds required by local fire departments to obtain the equipment and training essential to ensuring data center Battery Energy Storage Systems remain safe.

Neither the Beltline Energy Project documents nor the Luther Horizon Technology Park website mention of a Health Impact Assessment, what USEPA Tier standard the 280 to 420 backup diesel generators will meet, or the use of Battery Energy Storage Systems (BESS) to minimize the frequency and duration of generator operation.

RECOMMENDATIONS: Air Pollution & Luther Data Center Ordinance

The following measures will reduce the likelihood that the health of Luther residents will not be harmed by data center backup generator air pollution emissions though even these measures may not completely eliminate the threat.

1. A Health Impact Assessment must be conducted to determine if a data center project - whether it be one building or a campus with many buildings - will affect the health of those living near and far. The assessment should consider effects upon those living near the site boundary out to one mile then at greater distances. Additionally, the assessment should focus on those most vulnerable to air pollution, who are the young and old and spend long periods in the vicinity such as school students, assisted living facility residents, day care facilities, and hospitals. The Assessment should conform to the methods and standards employed by the Washington state Department of Ecology when conducting data center Health Impact Assessments. The assessment should be conducted by an expert selected by the Town of Luther and paid for by the applicant. The data center project must then institute controls, design changes, generator reductions, and other measures that will resolve any significant adverse health effects revealed by the Health Impact Assessment.

2. Due to the uncertainty of how often generators will run for long periods, all data centers should be required to utilize:
    a. Generators meeting USEPA Tier-4 emission standards,
    b. Battery Energy Storage Systems (BESS) to minimize the amount of time generators must operate, and

c. Routine testing of backup generators should be infrequent, of short duration, and limited to weekdays at a time when area residents are not sleeping and nearby school classes are not in session.

DATA CENTER NOISE: HEALTH & QUALITY OF LIFE IMPACTS

Data center noise can disturb those living up to a mile away. The noise can come from the following data center components:

- Air handling units,
- Air-cooled chillers,
- Backup diesel generators,
- Cooling towers, and
- Indoor servers though this is more an issue for those working inside a data center.

Data centers are one of the very few uses, besides power plants and gas compression stations, that generate low-frequency noise which has been described as a hum. This noise has proven to be very disturbing to those living near some, but not all, data centers. To appreciate the penetrating nature of low-frequency data center noise, think of a car with deep bass music blasting from inside and how that noise is heard outside the car even at a considerable distance and with car windows closed. If the car passes near a home, the noise easily passes through windows and walls.

In the introduction to this letter, it was suggested that the four-minute news clip at the following link could provide a sense of the impact along with the science of data center low-frequency noise: https://www.youtube.com/watch?v=JflFFqbZ1X8. The clip focuses on a data center located in Prince William County, Virginia which has more data centers then most U.S. counties.

At first one might think a data center hum would not be particularly disturbing. However, the hum becomes a constant nuisance which has made life quite miserable for those living near some, but not all data centers. Once the hum is noticed the mind cannot ignore it. As noise expert David Nelson said, ***"our minds never get a chance to rest."***

The noise described in the four-minute news clip was particularly disturbing to those living within 1300 feet of a data center. The study at the following link indicates data center noise may be an issue up to 0.75-miles away: https://app.box.com/s/0mefhonpq91bzq2e77l1q9mxrrc6iyb1. The point where data center noise impacts become unlikely may be at one-mile distant.

It appears that low-frequency noise is most likely if a data center is air-cooled while a liquid (water) cooled system may be quieter. A ***closed-cycle*** water cooled system can be used to prevent excessive water consumption and possible aquatic resource impacts due to cooling water discharges.

If the Beltline Energy Project & Luther Horizon Technology Park does utilize:

- Direct to chip cooling vs. air-cooling, and
- "Operational noise limits shall not exceed 65 dBA at the property line. This does not take into account background noise levels from outside of this parcel," and
- "Generators shall be enclosed within non-reflective, sound-attenuated housing," and

- "Generator testing is only allowed Monday through Friday, from 10:00 a.m. to 4:00 p.m., except in the case of emergencies."

…then these measures will certainly help to reduce the potential for noise impacts. However, the measures are not enough as explained in the Backup Generator Noise section of this letter. Regardless of the cooling system, the Town of Luther should adopt a data center noise ordinance ***before*** granting any approvals or taking other actions that may exempt a proposed data center from noise safeguards.

The only noise limit in the current Town of Luther Ordinances appears to be the following sentence from Part 10: Offenses and Crimes, Section 10-301.B:

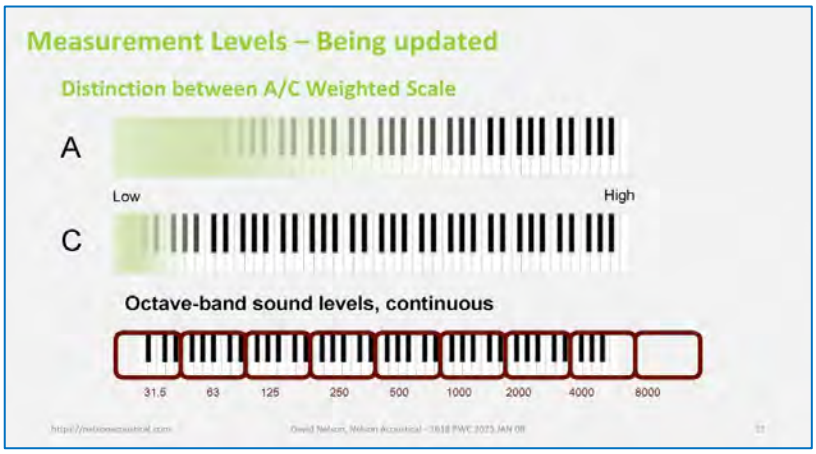
> "Disturbing the peace is the doing of any of the following in such a manner as would foreseeably alarm or disturb the peace of another or others:
>
> 8. Making unnecessarily loud, offensive noises;"

While the applicant has proposed limiting noise to…

> "Operational noise limits shall not exceed 65 dBA at the property line. This does not take into account background noise levels from outside of this parcel."

The 65 dBA limit is not sufficient to safeguard area residents from noise that has made life miserable for those living near some data centers.

In addition to A-weighted decibel (dBA) limits a data center ordinance must establish C-weighted decibel and octave band limits too. Low-frequency data center noise falls below the reliable detection limits of the A-weighted decibel scale, as shown in the illustration to the right, hence the need for octave band and C-weighted limits.



A very informative memo documenting the technical need for the octave band and C-weighted data center standards is available at: https://app.box.com/s/jgwnmbza74d07cga6tyv07f4x2qryq7e. The memo was written by acoustic engineer David Nelson. The octave band levels in Table 1, below, are the same as shown in Tables 4 and 5 of Mr. Nelson's memo.

On March 18, 2025, Mr. Nelson provided the Prince William County, Virginia Supervisors with an explanation of why the octave band as well as dBA and dBC limits were essential to preventing excessive data center noise. The presentation begins at: 4:18:00 (4 hours:18 minutes) in the video posted at: https://pwcgov.granicus.com/player/clip/3614?view_id=23&redirect=true. Following is Mr. Nelson's recommended noise limits which I urge the Town of Luther to consider.

A-Weighted Decibels (dBA): Following are the A-weighted (dBA) maximum permissible sound levels (Leq) at residential boundaries recommended by Mr. Nelson:

- Daytime dBA 60, and
- Nighttime dBA 55

C-Weighted Decibels (dBC): Limits on C-weighted decibels are also needed to resolve data center low-frequency noise impacts. Here are the recommended dBC limits in residential zoning districts again from Mr. Nelson's memo:

- No source of steady tonal sound may exceed the limits outlined below when measured at any location at or within a residential property boundary in a residential zoning district.
- Maximum permissible C-weighted sound level at the receiving property:
  - Daytime 73 dBC;
  - Nighttime 68 dBC.
- The limits above may not be exceeded over a five-minute interval.

Octave Bands: Table 1, below, presents Octave Band limits recommended by Mr. Nelson in his memo.

Table 1: Recommended Octave Band Sound Pressure Levels for Residential Zoning District

Octave Band (Hz)	Daytime Maximum dBZ	Nighttime Maximum dBZ
31.5	65	60
63	60	55
125	55	50
250	50	45
500	45	40
1000	41	36
2000	38	33
4000	36	31
8000	35	30

Again, all three noise limits, octave band, C- and A-weighted, are essential for ensuring data center noise does not harm Luther residents.

Backup Generator Noise

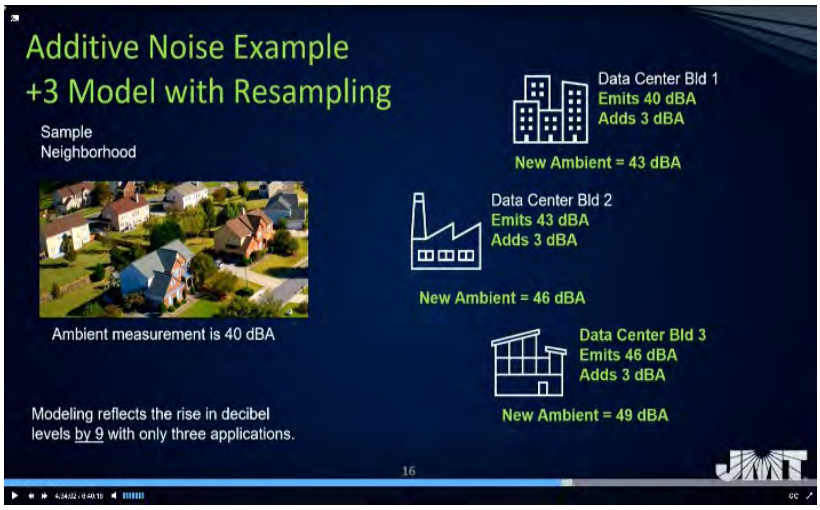
While it is often claimed that diesel generators will seldom operate longer than brief testing periods, there have and will continue to be instances where noisy generators run for longer periods. As previously mentioned, during a June 2025 heat wave in Loudoun County, Virginia, data centers were ordered to run backup diesel generators for several days due to concerns about insufficient power provided by the transmission line grid.

Whether diesel or propane, backup generators should be located within full acoustic enclosures. The applicant has proposed "sound-attenuated housing" though it is unclear if is the same as "full

acoustic enclosures." Generators complying with Tier-4 USEPA emission standards should be required since they are quieter by half compared to the Tier-2 generators common to data centers.

As an additional noise safeguard, whenever possible data center buildings should be used to block backup generators and other noise-producing equipment by locating each on the far side of buildings from homes, schools, hospitals, etc. Routine testing of backup generators should be infrequent, of short duration, and limited to weekdays at a time when area residents are not sleeping and nearby school are not in session.

Proof must be provided prior to data center approval that the enclosures and any other proposed measures will reduce noise levels to the dBA, dBC, and octave band limits recommended above. This proof must come from a noise impact study conducted by an independent expert selected by the Town of Luther and paid for with funds provided by the data center applicant.



The applicant must also be required to provide a *Comprehensive Noise Control Plan* showing that the additive effect of all data center noise sources will not exceed the three noise limits. Slide 16 to the right, from the David Nelson presentation, illustrates the additive effect of the noise emitted by each additional data center building. The *Comprehensive Noise Control Plan* should also be reviewed by an independent expert selected by the Town of Luther and paid for with funds provided by the data center applicant.

Noise Enforcement

In addition to adopting a noise ordinance with the above dBA, dBC and octave band limits, the Town of Luther must ensure compliance staff have the training and equipment needed to enforce these more complicated noise restrictions. However, should a data center exceed noise limits then a conflict of interest may inhibit corrective action. What if a town or county has become heavily dependent on data center economic benefits and data center owners-operators refuse to correct noise limit violations? The relatively small fines for exceeding noise limits may have little effect on the behavior of extremely wealthy corporations. This is another reason why jurisdictions should require data centers to use the most effective and reliable designs to protect area residents rather than relying heavily on enforcement. In the case of data center noise, a quiet, lower-impact cooling system like closed-cycle water would be more effective and reliable than air-cooling systems along with Tier-4 generators within full acoustic enclosures.

RECOMMENDATIONS: Noise Pollution & Luther Data Center Ordinance

The following measures will reduce the likelihood that the health of Luther residents will be harmed by data center noise pollution.

1. Adopt the A-weighted (dBA), C-weighted (dBC), and octave band (dBZ) noise limits recommended by David Nelson.

2. Require a *Comprehensive Noise Control Plan* which proves that the noise emitted by all sources proposed for a site will not exceed the recommended noise limits. For example, a Comprehensive Noise Control Plan for the Beltline Energy Project & Luther Horizon Technology Park should address the additive noise from each of the 14 proposed data center buildings.

3. Possible measures for preventing noise impacts to area residents may include, from most effective to least:

    a. Require Tier-4 compliant generators,

    b. Require that the 280 to 420 backup diesel generators be housed within full acoustic enclosures with baffles, louvers, or even hospital grade mufflers if needed,

    c. Employ alternatives to air-cooling such as liquid (water) cooling (preferably closed-cycled to minimize water consumptions),

    d. Locate fans, chillers, and other possible noise-emitting equipment on the ground – not on rooves.

    e. If homes or other noise-sensitive land uses are located to one side of data center buildings place noisy equipment and generators on the far side so the building may block the noise.

    f. Require earth berms, acoustical walls, and forest buffers between noise sources and site boundaries though these measures alone are inadequate in many cases.

COMPATIBILITY, VISUAL & PROPERTY VALUE IMPACTS

The U.S. Department of Housing and Urban Development Environmental Assessment Factors and Categories eGuide webpage notes:

> "Certain types of land uses may be incompatible with one another. For example, it may be incompatible to locate a new housing development in a newly industrialized area. The potential noise, odors, truck traffic, air pollution, and scale of industrial development are often incompatible with housing and can have an adverse effect on residential development. Land uses that are known to be incompatible are often separated to minimize or prevent adverse effects."

A 2007 Georgia State University study, *Retail Proximity and Residential Values or Do Nearby Stores Really Run Down Property Values?*, concluded that: Being within 300 feet of commercial uses can reduce home value, but not at a distance of 1,000 feet or greater.

In *The Impact of Industrial Sites on Residential Property Values: A Hedonic Pricing Analysis for The Netherlands*, the researchers found that "Houses located within 250 meters (820 feet) from a site are predicted to sell at 14.9 per cent less than houses located beyond a distance of 2,250 meters (1.4 miles) from an industrial site (the reference group), ceteris paribus."

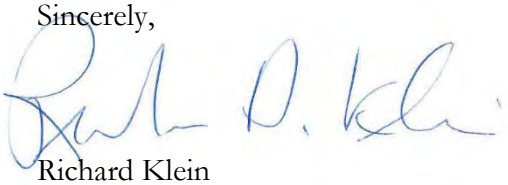
The Concept Plan indicates proposed data center buildings will be slightly more than a ***hundred feet*** from properties envisioned for future Rural Residential development. A mere 100 feet is not the "*Big buffers and setbacks between data centers, homes"* promised in applicant documents.

I recommend urging Town of Luther officials to adopt a more reasonable setback between areas in residential use or residentially zoned (such as the Rural Residential District adjoining the data center site) and proposed data center buildings, parking lots, substations and other industrial features. Specifically, Town official should consider a graduated industrial setback based on structure height *(visibility at a distance)* such as that adopted by Goochland County, Virginia calls for:

- A data center and all of its exterior mechanical equipment, including generators, cannot be located within 300 feet of residentially zoned property or a mixed-use development with residential uses *(if structure height is 60 feet or less)*;
- Structures greater than 60 feet and no greater than 80 feet in height require a 500-foot setback;
- Structures greater than 80 feet in height cannot be located on any property adjacent to a residentially zoned property, mixed-use development with residential uses, or property zoned A-2 that is not subject to TOD regulations;
- The setback area must be permanently preserved in a natural condition with trees, other vegetation, and earth berms, if necessary, to screen data center buildings and other data center industrial features from view.

Should you or Town officials have any questions about these recommendations, I can be reached at 410-654-3021 or Rklein@ceds.org.

Sincerely,



Richard Klein

cc: Honorable Terry Arps, Mayor – Town of Luther
Honorable Carla Cruthers, Vice Mayor – Town of Luther

Honorable Jerrod Davis, Trustee – Town of Luther
Honorable Jeff Schwarzmeier, Trustee – Town of Luther
Honorable Cindy Taylor, Trustee – Town of Luther & Planning Commission Liason
Steven Cholity, Town of Luther Planning Commission
Patrice Christy, Town of Luther Planning Commission
Cecelia Taft, Chair – Town of Luther Planning Commission
Andrew Ungerecht, Town of Luther Planning Commission
Rian Harkins, Luther Town Manager/Clerk-Treasurer