



## Donald Pennington Land Use Planners

Rodney C. Nanney, AICP

P.O. Box 464, Whitmore Lake, Michigan 48189 (734) 483-2271 Rodney@buildingplace.net

March 17, 2023

Larry Lindemann, Supervisor  
Freedom Township Board of Trustees  
11508 Pleasant Lake Road  
Manchester, MI 48158 (via email)

**Subject: Response to proposed development of an anaerobic digester facility.**

Dear Supervisor Lindemann:

Per your request, we have completed an evaluation of a proposal submitted via email on 3/9/2023 by Mr. John Penshorn, civil engineer from Stantec, regarding “a client who would like to build an anaerobic digester on an existing dairy farm in Freedom Township as a partnership with that farm.” As part of this evaluation, we have considered the specific description of the proposed facility included in Mr. Penshorn’s email, the general land use and development characteristics of anaerobic digesters at a commercial/industrial scale, and the applicable provisions of the Township Zoning Ordinance.

**A. Description of the proposed facility.** In his email, Mr. Penshorn described the proposed facility as follows:

*The general process is this: this digester would be a mixed-waste digester, with about 75% food waste and 25% cattle waste. The food waste would be trucked to the site from local schools/businesses, depackaged on site, and mixed into the digester. Delivery and depackaging would typically occur within a structure (not outdoors or subject to elements/wildlife). We do not plan to rezone the farm due to this project. The digester creates three products:*

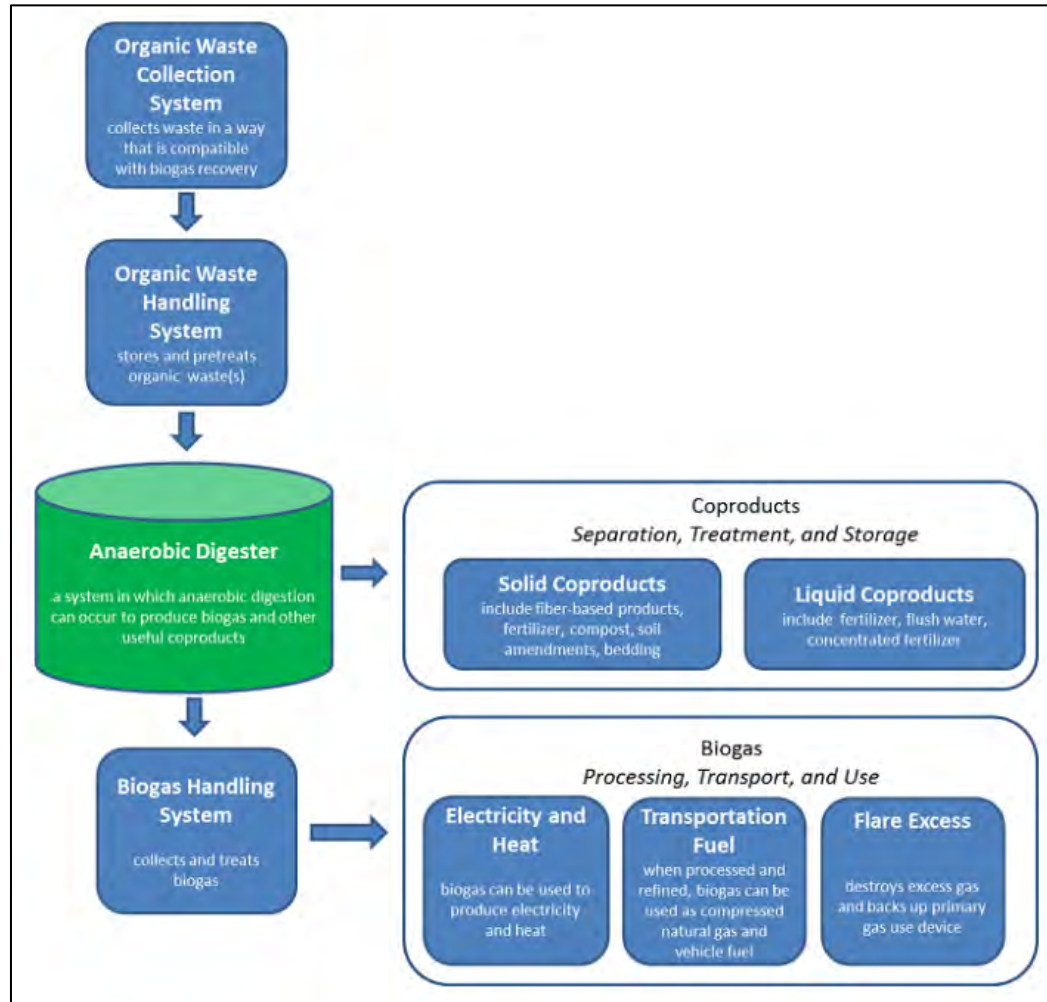
- *a gas which can be sold as natural gas to a local utility company. This will be supplied to the utility company either via direct pipeline or trucking to an existing injection point to the pipeline.*
- *a solid byproduct similar to straw which can be re-used as cattle bedding*
- *a liquid byproduct which can be stored in a lagoon and then used as fertilizer*

Mr. Penshorn indicates that the “typical setup takes about 10 acres, on average, including buildings, pavement, and stormwater.”

**B. General land use and development characteristics of anaerobic digesters.** The following is an excerpt from the U.S. Environmental Protection Agency (EPA) website at <https://www.epa.gov/agstar/how-does-anaerobic-digestion-work>:

*Anaerobic digestion (AD) is a process through which bacteria break down organic matter—such as animal manure, wastewater biosolids, and food wastes—in the absence of oxygen. Anaerobic digestion for biogas production takes place in a sealed vessel called a*

reactor, which is designed and constructed in various shapes and sizes specific to the site and feedstock conditions. These reactors contain complex microbial communities that break down (or digest) the waste and produce resultant biogas and digestate (the solid and liquid material end-products of the AD process) which is discharged from the digester.



The following are photos of some example facilities:



Photos from <https://www.epa.gov/> (left) and <https://www.biocycle.net/> (right)

Since Mr. Penshorn’s proposal also references potential lagoon storage of “a liquid byproduct which can be stored...and then used as fertilizer,” the following additional information from the EPA website is relevant:

### Covered Lagoon

In a **covered anaerobic lagoon** design, methane is recovered and piped to the combustion device from a lagoon with a flexible cover. Some systems use a single cell for combined digestion and storage.

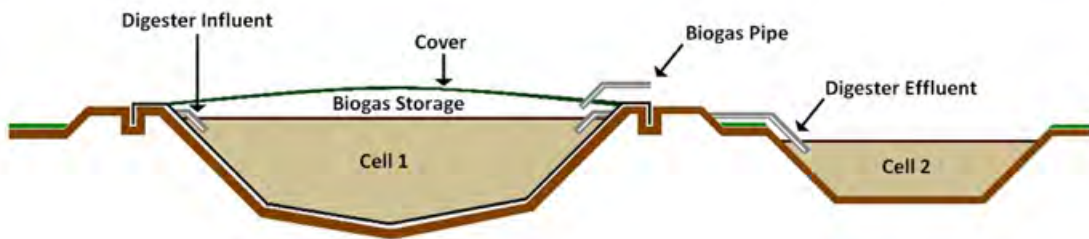


Diagram of a covered anaerobic lagoon showing 2 cells, where the first cell collects the digester influent and traps the biogas and the second cell collects the digester effluent



Photo of a covered anaerobic lagoon

Excerpt from <https://www.epa.gov/agstar/anaerobic-system-design-and-technology>

- C. **Applicable provisions of the Zoning Ordinance.** Mr. Penshorn’s proposal is to develop the anaerobic digester facility on an existing but unidentified farm parcel, which presumably is in the AR (Agricultural-Resource) zoning district. He suggests that the proposal could potentially be considered through a conditional use permit application.

Article 4.0 (Land Use Table) lists the allowable land uses in the various zoning districts. In addition to conservation areas, farms, hunting preserves, and rural residential uses, the allowable land uses in the AR District include the following more intensive uses subject to a conditional use permit approval:

- Agricultural research and development facilities and laboratories
- Agricultural service establishments
- Composting facility

- Extraction operations
- Farm labor housing
- Livestock auction yard
- Sportsman's clubs and ranges
- Veterinary clinic

**Anaerobic digesters are not listed as an allowable land use in the AR District, and in our determination are not reasonably similar to any listed use in the zoning district.**

Although some older zoning ordinances once included a catch-all "Other uses not listed in this Section" as an allowable conditional or special use, this is no longer common and the Township's Zoning Ordinance does not include this option.

Based on the general characteristics of anaerobic digesters and the specific description provided by Mr. Penshorn, **it is our further determination that the proposed facility also cannot reasonably be considered a lawful accessory use to a farming operation.**

**It is our determination that the proposed anaerobic digester is an industrial-scale operation** best suited for location within the Township's Industrial-Research (I-1) District. This determination is based in part on the specific description provided by Mr. Penshorn, which includes references to importation of 75% of input materials as non-agricultural food waste. Other considerations include the potential impacts of chemicals, odors, pollution, non-agricultural truck traffic, lagoons, and the facility's material storage needs on surrounding land uses and the intended character and appearance of the Township's agricultural areas as expressed in the adopted Township Master Plan.

**The proposed facility is entirely consistent with "Intensive Industrial Operations Not Otherwise Listed in this Table," which is an allowable conditional use in the I-1 zoning district,** subject to the specific use standards listed in Section 5.502 of the Zoning Ordinance.

## Conclusion

Mr. Penshorn's proposed anaerobic digester facility would need to be located in the I-1 (Industrial-Research) zoning district, subject to conditional use permit and site plan approvals and the requirements of Section 5.502 (Intensive Industrial Operations). **There is no option for consideration of this facility as an allowable use in the AR (Agricultural-Resource) zoning district.**

Please contact us with any questions about this information.

Respectfully submitted,

**Rodney C. Nanney, AICP**  
Township Planning Consultant

Cc: John Penshorn, Stantec, 2321 Club Meridian Dr Suite E, Okemos MI 48864 (via email to john.penshorn@stantec.com); Matt Little, Planning Commission Chair (via email).