(1) **we feel that the VibraTech modeling methodology is insufficiently rigorous**. It appears that Vibratech did not do any estimation of measurement error, environmental variabilities nor modeling uncertainties and hence cannot quantify or guarantee the accuracy of its studies. I have more details on this point below.

Please see Vibra-Tech's responses in Further Discussion.

(2) **there is no mention of increased rail traffic in either study.** Tyoga Container may say they are not interested in rail traffic but apparently their proposed tenants are. For example, the following document shows Ohio Logistics' (owner of ST Logistics) intention to expand its business into rail operations: *https://rail.ohio.gov/wps/portal/gov/ordc/about-ordc/news-and-events/ordc-approves-grant-for-ohio-logistics*. **Will the Planning Board require that Tyoga Container and its tenants never use their railroad access?** If that is an operating assumption in the approval process, please put it in writing.

Increased rail traffic was never mentioned to Vibra-Tech, nor was it addressed in the Traffic Impact Study conducted by Larson Design Group. This question should be directed to and answered by others.

(3) **regarding the noise study, the TNM 3.0 model VibraTech used is not appropriate for our situation.** It makes sense to use the TNM model when there is a steady stream of noise from a highway which can be approximated by an effective constant noise level. In our case, peak noise is more important. (Please see my previous e-mail to you for a description of Hunt's measured 85 dBA peak noise data from 2005.) When one considers the disturbance caused by individual truck passes on an otherwise quiet neighborhood street, **one-hour time averages are simply not relevant**. Surely the VibraTech people know this.

The Zoning Law for the Village of Painted Post states that the Residential Standards for continuous airborne noise are 65 dBA (Ld) during daytime hours (7:00 AM to 10:00 PM) and 55 dBA (Ln) during nighttime hours (10:00 PM to 7:00 AM). This relevant noise ordinance is clearly based upon overall daytime and nighttime (cumulative Leq noise levels) and not on maximum or peak sound pressure levels.

Vibra-Tech's intent and subsequent analysis were to evaluate the overall noise levels from the increase in truck traffic and compare the results directly to the Village's Standard, which again is based on cumulative Leq noise levels and not on maximum or peak sound pressure levels. As stated in the report, in order to perform this analysis, Vibra-Tech calculated the day and nighttime noise levels using the FTA Option A - the methods described for Transit Noise due to new traffic

noise sources, with no changes to the existing road. The Residential Land Use Category 2 – Outdoor LDN noise parameter was used for noise at the nearest building façade.

In addition, Vibra-Tech used the TNM 3.0 model to project overall noise levels from the increase in truck traffic. This was done to confirm the results obtained using the FTA calculations. The TNM 3.0 model confirmed the results of the FTA calculations. The higher of the two results were used in our report.

FTA Transit Noise and Vibration Impact Assessment Manual September 2018 states that cumulative noise exposure is used to assess transit noise for residential land uses. The report further states that the maximum noise level reached during a single noise event is not appropriate for transit noise impact assessment. Cumulative noise impact for residential land uses is used by Federal agencies (e.g., HUD, FAA, and EPA) and has wide international acceptance.

(4) the vibration study used the term "fully loaded truck" to describe one weighing 42,000.00 pounds (with no pictures of the load). However, we believe such trucks have a maximum loaded weight of 80,000 pounds. The man from Tyoga Container said their trucks "cube out" before they "max out." This means their trucks are fully loaded by volume, not by weight. Since Tyoga Container traffic will comprise less than 20 percent of the passes, we question the relevance of this VibraTech study. We recall that someone on the Planning Board asked about this but did not get a straight answer. **Will the Planning Board limit approval to trucks under 42,000 lbs?** How would that work?

Vibra-Tech conducted its field measurements of vibration using the truck and information provided by Tyoga Container.

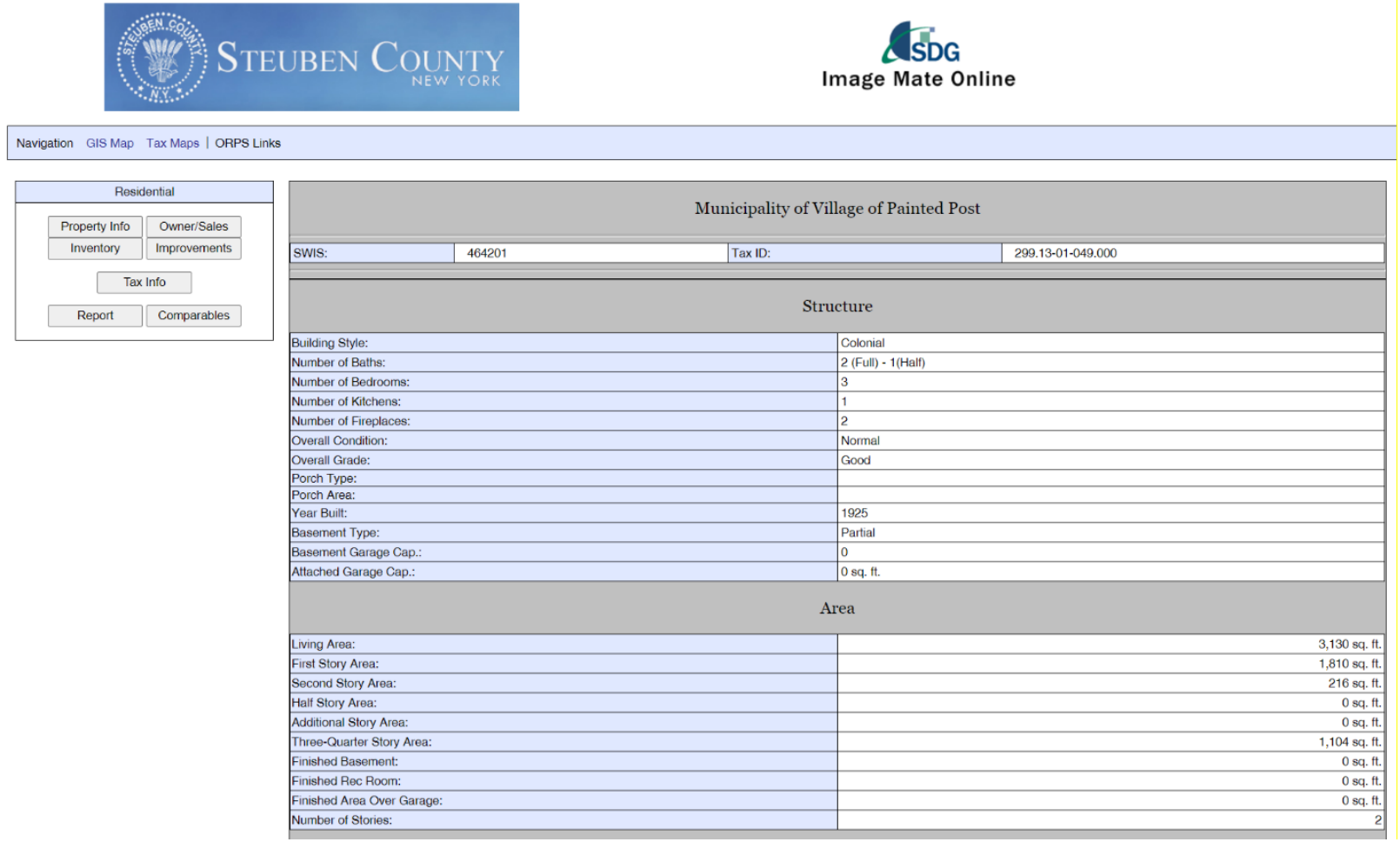
(5) **the vibration report does not explain how VibraTech modeled the anticipated vibration impact**, what software they used, and how it was applied. We have no way to understand their assumptions or their results. We know that there are errors. For example, the VibraTech report says my house is made of wood and has a half-basement. My house is made of brick (double layer). It has a full basement. I question how carefully the rest of the input data was collected. Even the best models can fail when the input data is incorrect.

Vibration calculations for passing trucks were made based on FTA Transit Noise and Vibration Impact Assessment Manual September 2018 FTA Report No. 0123, Section 6. This is not a computer program or model, but an equation.

Structure descriptions were taken from the Steuben County Municipality of Village of Painted Post tax assessment records. The structure at 240 W Water Street is listed with a partial basement.

https://scnygis.maps.arcgis.com/apps/webappviewer/index.html?id=52e7258379e24f27a634111d2493d386

https://imo.steubencountyny.gov/IMO/propdetail.aspx?swis=&printkey=2990130001049000



Municipality of Village of Painted Post

SWIS:	464201	Tax ID:	299.13-01-049.000

Structure

Building Style:	Colonial
Number of Baths:	2 (Full) - 1(Half)
Number of Bedrooms:	3
Number of Kitchens:	1
Number of Fireplaces:	2
Overall Condition:	Normal
Overall Grade:	Good
Porch Type:	
Porch Area:	
Year Built:	1925
Basement Type:	Partial
Basement Garage Cap.:	0
Attached Garage Cap.:	0 sq. ft.

Area

Living Area:	3,130 sq. ft.
First Story Area:	1,810 sq. ft.
Second Story Area:	216 sq. ft.
Half Story Area:	0 sq. ft.
Additional Story Area:	0 sq. ft.
Three-Quarter Story Area:	1,104 sq. ft.
Finished Basement:	0 sq. ft.
Finished Rec Room:	0 sq. ft.
Finished Area Over Garage:	0 sq. ft.
Number of Stories:	2

Table 6-12 of the FTA manual provides vibration reduction factors as vibration passes from the soil to the building foundation. This is known as “coupling loss.” In general, the heavier the building construction, the greater the coupling loss. Structures classified as “Wood-Frame Houses” provide a reduction of -5 dB between the ground vibration and foundation vibration. 1 to 2-story masonry buildings have a greater reduction of -7 dB, and 3 to 4-story masonry buildings have a reduction of -10 dB. Vibra-Tech used the smallest reduction factor of -5 dB for all structures West Water Street, except for the commercial structures at 117 and 130 West Water Street, for which a -10 dB coupling loss was used.

FURTHER DISCUSSION OF ITEM (1)

In each study, Vibratech apparently took one set of measurement data and fed it to a computer program to predict whether any negative impacts will occur. Miraculously, they do not. But life isn't that simple. Measurement data sets are influenced by many variables, computer programs have approximations built in to them, and engineers can use the programs incorrectly. Part of modeling an environmental impact is to first understand the ranges of uncertainties in the program inputs and any known systematic biases in the model, in addition to confirming that the model assumptions are valid. Then one uses this statistical information to deduce the probability that the model will exceed some specified threshold level of noise or vibration. It usually involves running the model many times with randomly perturbed input parameters according to reasonable, specific probability distributions. To save time, one often leverages a previously performed sensitivity analysis to know which parameters are most important to the model. Then one tries to quantify the distribution statistics of the model outputs.

There are many potential variables that can influence model performance, such as the weather, the traffic, the types of trucks, their weights and speeds, the train schedule, the day of the week, whether the ground is soft, hard or frozen, the side of the street you put the measurement equipment on, whether it is placed close to the flood wall or far away from it. etc. etc. How representative are the results from any one test then? What is the range of possible results? The reports don't say.

Vibra-Tech used the FTA calculation and the TNM 3.0 model for noise level predictions. These are standard methods used by federal agencies (FTA and FHWA) for evaluating vehicular traffic noise. Vibra-Tech did not collect noise data from passing trucks on West Water Street for this study, but rather used a reference sound exposure level for truck noise in both the equation and model.

Vibration calculations for passing trucks were made based on the FTA Transit Noise and Vibration Impact Assessment Manual September 2018 FTA Report No. 0123, Section 6. This is not a computer program or model, but an equation.

The seismographs employed for this study were laboratory calibrated to industry standards and installed using the manufacturer's recommendations by experienced Vibra-Tech personnel. To account for measurement variation, the vibration levels input into the FTA equation were taken from the 99% upper confidence curve of the collected data associated with the observed road conditions. All measured vibration levels were below the 99% upper confidence curve. Further, the predicted indoor vibration was increased by 6 dB to account for the potential of resonant amplification in the building, as recommended by the FTA.

Table 6-12 of the FTA manual provides vibration reduction factors as vibration passes from the soil to the building foundation. This is known as "coupling loss." In general, the heavier the building construction, the greater the coupling loss. Structures classified as "Wood-Frame Houses" provide a reduction of -5 dB between the ground vibration and foundation vibration. 1 to 2-story masonry buildings have a greater reduction of -7 dB, and 3 to 4 story masonry buildings have a reduction of -10 dB. Vibra-Tech used the smallest reduction factor of -5 dB for all structures West Water Street, except for the commercial structures at 117 and 130 West Water Street, for which a -10dB coupling loss was used.

As an example of poor engineering practice, please consider this statement from the noise study conclusion, page 16:

"The total nighttime (Ln) noise from existing ambient plus additional proposed truck noise is 54.8. This level is below the nighttime 55 dBA limit."

How convenient. The new noise level will always be 0.2 dB (4.7%) below the legal limit. The future noise level is known to three significant digits and is always the same. Everything is great. But wait, the 54.8 number is based on a predictive model and one measurement set. What is the uncertainty in this prediction? Is it +/- 0.1 dB? +/- 1 dB? More? A good study would give the probability that the noise level exceeds the limit, based on some assumed statistical distribution of errors. It certainly would not make a blanket statement that the noise will never exceed 55 dBA. Of course it will. The question is how frequently.

(Imagine a weatherman saying "The nighttime temperature in Painted Post is always 54.8 degrees.")

It turns out that in this case, we can at least look up the modeling error. Below I attach a chart with government validation data for the TNM 3.0 noise model that VibraTech says it used. (I found it

here: *https://www.fhwa.dot.gov/environment/noise/traffic_noise_model/tnm_v30/validation_report/tnm3_validation_report.pdf*) It compares model to measurement. If the model predictions perfectly matched the data, the data points would all lie on the black diagonal line. The spread of points is the error. The root mean square error is evidently about 3 dB. Some errors are larger than 5 dB. Three decibels may not sound like a lot, but a 3 dB increase is equivalent to a factor of 2, a doubling of noise power. A five decibel increase is larger than triple the power. That's a sizeable error when you are basing your project approval argument on a 0.2 dB margin.
An interesting fact depicted in the plot is that the average modeling error is -0.53 dB. The minus sign means that, over all conditions studied, the model tends to underestimate the noise power by 0.53 dB, or 13%. Thus, there is a good chance that the 54.8 dB predicted by the model will be 55.3 dB (or more) in reality. Possibly a lot more. An unbiased report would have at least flagged this possibility.

Vibra-Tech's original analysis showed that the amount of nighttime truck passes would exceed the nighttime noise standard of 55 dBA (Ln) at both 100% and 75% buildout, but would fall just under 55 dBA (Ln) at 50% buildout. Tyoga then stated that the nighttime truck passes would not exceed the number of passes projected for 50% buildout. **However, Tyoga Container has now stated that there will be no nighttime truck traffic (10 PM to 7 AM).**

In the report associated with the provided plot (Measured Overall Level vs TNM 3.0 Overall Level), the TNM 3.0 has smaller magnitudes in average prediction errors within distances less than 125 feet (under predicts by 0.17 dB for average pavements). The furthest predictions made in our report were 50 feet.

SImilar concerns apply to the vibration study. Somehow they came up with predicted vibration levels, based on some undocumented analysis on one set of data, taken on one day under some conditions, with a partially loaded truck. We can't reproduce their results. What is the margin of error? My house is one of the ones in the vibration "red" zone. VibraTech says its "borderline," minor inconvenience, not to worry. How much money would you bet on that?

Please refer to above answers related to the prediction of vibration levels.