

March 1, 2022

75-101 Plain Street, LLC  
c/o GFI Partners, LLC  
Attn: Bill Buckley  
133 Pearl Street, Suite 300  
Boston, MA 02110

***Re: Air Quality Assessment for 75 Plain Street, Hopedale, MA***

Ref. 4681

Dear Bill:

Tech Environmental, Inc. (Tech) has conducted a qualitative assessment of the potential air quality impacts of a warehouse development located at 75 Plain Street in Hopedale, MA (herein referred to as the Project). It is our understanding that the primary sources of air pollution from the Project are diesel burning trucks coming to and from the facility. Presented below is a qualitative evaluation of diesel truck activities associated with the Project, focusing on fine particulate matter ( $PM_{2.5}$ ).

### **Diesel Exhaust Emissions**

Particulate matter (PM) is a widespread air pollutant, consisting of a mixture of solid and liquid particles suspended in the air. Commonly used indicators describing PM that are relevant to health refer to the mass concentration of particles with a diameter of less than 10  $\mu m$  ( $PM_{10}$ ) and of particles with a diameter of less than 2.5  $\mu m$  ( $PM_{2.5}$ ).  $PM_{2.5}$ , often called fine PM, also comprises ultrafine particles having a diameter of less than 0.1  $\mu m$ .

PM is a mixture with physical and chemical characteristics varying by location. Common chemical constituents of PM include sulfates, nitrates, ammonium, other inorganic ions such as ions of sodium, potassium, calcium, magnesium and chloride, organic and elemental carbon, crustal material, particle-bound water, metals (including cadmium, copper, nickel, vanadium and zinc) and polycyclic aromatic hydrocarbons (PAH). In addition, biological components such as allergens and microbial compounds are found in PM.

Primary PM and the precursor gases can have both man-made (anthropogenic) and natural (non-anthropogenic) sources. Anthropogenic sources include combustion engines (both diesel and gasoline), solid-fuel (coal, lignite, heavy oil and biomass) combustion for energy production in households and industry, other industrial activities (building, mining, manufacture of cement, ceramic and bricks, and smelting), and erosion of the pavement by road traffic and abrasion of brakes and tires. Secondary particles are formed in the air through chemical reactions of gaseous pollutants. They are products of atmospheric transformation of nitrogen oxides (mainly emitted by traffic and some industrial processes) and sulfur

dioxide resulting from the combustion of sulfur-containing fuels. Secondary particles are mostly found in PM<sub>2.5</sub>.<sup>1</sup>

Diesel engine exhaust is emitted from a broad range of diesel engines; the on-road diesel engines of trucks, buses and cars and the off-road diesel engines that include locomotives, marine vessels and heavy-duty equipment. Diesel engine exhaust is composed of two phases: either gas or particle. The gas phase is composed of many urban hazardous air pollutants, such as acetaldehyde, acrolein, benzene, 1,3-butadiene, formaldehyde and polycyclic aromatic hydrocarbons. The particle phase also has many different types of particles that can be classified by size or composition. The size of diesel particulates that are of greatest health concern are those that are in the categories of fine (i.e., PM<sub>2.5</sub>), and ultra fine particles. The composition of these fine and ultra fine particles may be composed of elemental carbon with adsorbed compounds such as organic compounds, sulfate, nitrate, metals and other trace elements.

### **Applicable Air Quality Regulations**

Under the authority of the Clean Air Act, as amended, the U.S. Environmental Protection Agency (EPA) established a set of National Ambient Air Quality Standards (NAAQS) for various ‘criteria’ air pollutants. These standards are intended to protect the public health and welfare. Primary NAAQS are established at levels intended to protect public health, including sensitive population groups, with an adequate margin of safety. Secondary NAAQS are set at levels designed to protect the public by accounting for the effects of air pollution on vegetation, soil, materials, and other aspects of the general welfare. Currently, there are NAAQS for seven criteria pollutants: ozone (O<sub>3</sub>), nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), coarse and fine particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), sulfur dioxide (SO<sub>2</sub>), and lead (Pb). The NAAQS are summarized in the attached Table 1. States can develop ambient standards provided that they are at least as stringent as the federal standards. The Massachusetts ambient air quality standards (MAAQS) are identical to the NAAQS.

Over the last several years, EPA promulgated multiple new vehicle emissions standards including heavy duty diesel trucks that will reduce particulate matter emissions by up to 90%.<sup>2</sup> Furthermore, the NAAQS set by EPA are designed to protect public health and the environment. The standards are developed based on a variety of scientific studies, including the results of epidemiologic studies that evaluate how human health has been affected by pollutant concentrations in the past. These standards are periodically reviewed and updated based on recent scientific developments. On December 14, 2012, EPA revised the NAAQS for PM<sub>2.5</sub> and for the first time included near-roadway monitoring requirements for PM<sub>2.5</sub>. The annual standard was reduced from 15.0 micrograms per cubic meter (ug/m<sup>3</sup>) to 12.0 ug/m<sup>3</sup>. EPA has confirmed that most of the U.S. already meets the new standard, including all of Massachusetts.

As described above, EPA has taken steps in reducing overall particulate matter emissions and improving PM<sub>2.5</sub> ambient air quality standards. These regulatory standards have significantly reduced PM emissions, including from diesel trucks, in the past decade and will continue to do so in the future for the Project site. This means that emissions from these Project sources will continue to reduce in the future.

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<sup>1</sup> World Health Organization Regional Office of Europe, Health Effects of Particulate Matter, 2013.

<sup>2</sup> <https://www.arb.ca.gov/msprog/onroadhd/reducstd.htm>.

## Existing Air Quality

The Massachusetts Department of Environmental Protection (MassDEP) currently operates air monitors in various locations throughout the Commonwealth. The closest, most representative, MassDEP monitors to the Project for CO, NO<sub>2</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, and SO<sub>2</sub> are located at Summer Street in Worcester. The closest, most representative, MassDEP monitor to the Project for Pb is located at Harrison Avenue in Boston. And, the closest, most representative, MassDEP monitor to the Project for O<sub>3</sub> is located at East Hartford Avenue in Uxbridge.

Table 2 summarizes the MassDEP air monitoring data, for the most recent available, complete, three-year period (2018-2020), that are considered to be representative of the Project area. The attached Table 2 shows that the existing air quality in the Project area is generally much better than the NAAQS. For example, the current 24-hour and annual average concentrations of PM<sub>10</sub> and PM<sub>2.5</sub> are all well below the NAAQS and range from 25% to 49% of each applicable standard. The highest monitored impact relative to a NAAQS is for ozone (90% of NAAQS). Although, ozone is a regional air pollutant on which the small amount of additional traffic generated by this Project will not have a significant impact.

## Potential Impacts from the Project

As part of this qualitative analysis a comparison of the size and operations of the proposed Project to the MBTA Dudley Station, and its air quality impacts, was performed. Dudley Station is a ground-level bus station located in Dudley Square, Roxbury, Boston that processes up to 200 buses per hour during peak times.<sup>3</sup> Dudley Station is also adjacent to, and just a few hundred feet from, the MassDEP Harrison Avenue long-term air monitoring station.<sup>4</sup>

The 2020 annual average PM<sub>2.5</sub> air concentration at the Harrison Avenue monitoring station was 6.37 ug/m<sup>3</sup> and the 2020 24-hour average PM<sub>2.5</sub> air concentration was 12.7 ug/m<sup>3</sup>, both of which are less than half the applicable NAAQS. Also, the historical PM<sub>2.5</sub> air concentration at the Harrison Avenue monitoring station has reduced 25%<sup>5</sup> from 2011 to 2020, primarily due to more stringent EPA emissions standards for diesel buses and trucks. This trend will continue in the future as older diesel vehicles are replaced with newer and cleaner emitting ones.

With a much fewer number of trucks at the Project in Hopedale, PM<sub>2.5</sub> concentrations in the areas surrounding the Project should logically be much lower than those historically measured near Dudley Station in Roxbury, Boston. Therefore, the PM<sub>2.5</sub> concentrations in the areas surrounding the Project would also be in compliance with the applicable NAAQS and will continue to trend lower due to more stringent EPA emissions standards for diesel trucks.

Furthermore, the corporations of many potential tenants for the Project have signed onto *The Climate Pledge*<sup>6</sup> with a commitment to be net-zero carbon across their businesses by 2040. A potential tenant with such a commitment would need to implement electric delivery vehicles into their fleet in the near future

<sup>3</sup> City of Boston, Dudley Square Vision Initiative Transportation Action Plan Draft Report, 2009.

<sup>4</sup> 1157 Harrison Avenue, Boston, MA.

<sup>5</sup> MassDEP, Massachusetts 2020 Air Quality Report, June 2021, Figure 8.

<sup>6</sup> 217 Signatories as of 1/5/2022: <https://www.theclimatepledge.com/us/en/Signatories>

to demonstrate that commitment. And, the electrification of the delivery fleet by the tenant would continue to decrease emissions produced by the Project.

### **Idling Trucks**

Lastly, it is our understanding that the Project will comply with the Massachusetts anti-idling law which will minimize air quality impacts from truck exhaust associated with the Project. The goal of the anti-idling law is to improve air quality by reducing unnecessary air pollution from idling vehicles. MGL 90 s16A and 310 CMR 7.11 state that all motor vehicles shall not idle in excess of five (5) minutes, unless:

- 1) The vehicle is being serviced, provided that operation of the engine is essential to the repair; or
- 2) The vehicle delivering or accepting goods for which engine assisted power is necessary; or
- 3) The vehicle is engaged in an operation for which the engine power is necessary for an associated power need.

Please call me at (781) 890-2220 x30 if you have any questions.

Sincerely yours,

TECH ENVIRONMENTAL, INC.

A handwritten signature in blue ink that reads "Marc C. Wallace". The signature is fluid and cursive, with "Marc C." on top and "Wallace" below it.

Marc C. Wallace, QEP, INCE  
Vice President

4681/Report/75 Plain Street Air Quality Letter

**TABLE 1****MASSACHUSETTS AND NATIONAL AMBIENT AIR QUALITY STANDARDS**

Pollutant	Averaging Time	NAAQS ( $\mu\text{g}/\text{m}^3$ )
SO <sub>2</sub>	1-hour <sup>P</sup> 3-hour <sup>S</sup> Annual <sup>P</sup> (Arithmetic Mean)	196 <sup>a</sup> 1,300 <sup>b</sup> 80
CO	1-hour <sup>P</sup> 8-hour <sup>P</sup>	40,000 <sup>b</sup> 10,000 <sup>b</sup>
NO <sub>2</sub>	1-hour <sup>P</sup> Annual <sup>P/S</sup> (Arithmetic Mean)	188 <sup>c</sup> 100
PM <sub>10</sub>	24-hour <sup>P/S</sup>	150
PM <sub>2.5</sub>	24-hour <sup>P/S</sup> Annual <sup>P</sup> (Arithmetic Mean) Annual <sup>S</sup> (Arithmetic Mean)	35 <sup>d</sup> 12 <sup>e,f</sup> 15
O <sub>3</sub>	8-hour <sup>P/S</sup>	137 <sup>g</sup>
Pb	Rolling 3-Month Avg. <sup>P/S</sup>	0.15

P = primary standard; S = secondary standard.

<sup>a</sup> 99th percentile 1-hour concentrations in a year (average over three years).

<sup>b</sup> One exceedance per year is allowed.

<sup>c</sup> 98th percentile 1-hour concentrations in a year (average over three years).

<sup>d</sup> 98th percentile 24-hour concentrations in a year (average over three years).

<sup>e</sup> Three-year average of annual arithmetic means.

<sup>f</sup> As of January 15, 2013, the U.S. EPA lowered the PM<sub>2.5</sub> annual primary standard from 15  $\mu\text{g}/\text{m}^3$  to 12  $\mu\text{g}/\text{m}^3$ .

<sup>g</sup> Three-year average of the annual 4th-highest daily maximum 8-hour ozone concentration must not exceed 0.070 ppm (137  $\mu\text{g}/\text{m}^3$ ) (effective December 28, 2015) and the annual PM<sup>10</sup> standard was revoked in 2006.

**TABLE 2**  
**REPRESENTATIVE EXISTING AIR QUALITY IN THE PROJECT AREA**

Pollutant, Averaging Period	Monitor Location	Value ( $\mu\text{g}/\text{m}^3$ )	NAAQS ( $\mu\text{g}/\text{m}^3$ )	Percent of NAAQS
CO, 1-hour	Summer Street, Worcester	2,426	40,000	6%
CO, 8-hour	Summer Street, Worcester	1,260	10,000	12%
NO <sub>2</sub> , 1-hour	Summer Street, Worcester	84.6	188	45%
NO <sub>2</sub> , Annual	Summer Street, Worcester	21.5	100	22%
Ozone, 8-hour	East Hartford Avenue, Uxbridge	123	137	90%
PM <sub>10</sub> , 24-hour	Summer Street, Worcester	37	150	25%
PM <sub>2.5</sub> , 24-hour	Summer Street, Worcester	12.9	35	37%
PM <sub>2.5</sub> , Annual	Summer Street, Worcester	5.9	12	49%
Lead, Quarterly	Harrison Avenue, Boston	0.007	0.15	5%
SO <sub>2</sub> , 1-hour	Summer Street, Worcester	7.5	196	4%

Source: MassDEP, <https://www.mass.gov/lists/massdep-air-monitoring-plans-reports-studies>, downloaded October, 29, 2021.

Notes:

- (1) Annual averages are highest measured during the most recent three-year period for which data are available (2018 - 2020). Values for periods of 24-hours or less are highest, second-highest over the three-year period unless otherwise noted.
- (2) The eight-hour ozone value is the 3-year average of the annual fourth-highest values, the 24-hour PM<sub>2.5</sub> value is the 3-year average of the 98th percentile values, the annual PM<sub>2.5</sub> value is the 3-year average of the annual values – these are the values used to determine compliance with the NAAQS for these air pollutants.
- (3) The one-hour NO<sub>2</sub> value is the 3-year average of the 98th percentile values and the one-hour SO<sub>2</sub> value is the 3-year average of the 99th percentile values
- (4) The one-hour ozone standard was revoked by the US EPA in 2005; the annual PM<sub>10</sub> standard was revoked in 2006 and the 3-hour SO<sub>2</sub> standard was revoked by the US EPA in 2010.