

*Potential Impacts on  
Brickbottom Artists  
Buildings*

Green Line Extension Project

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# 1

## Introduction

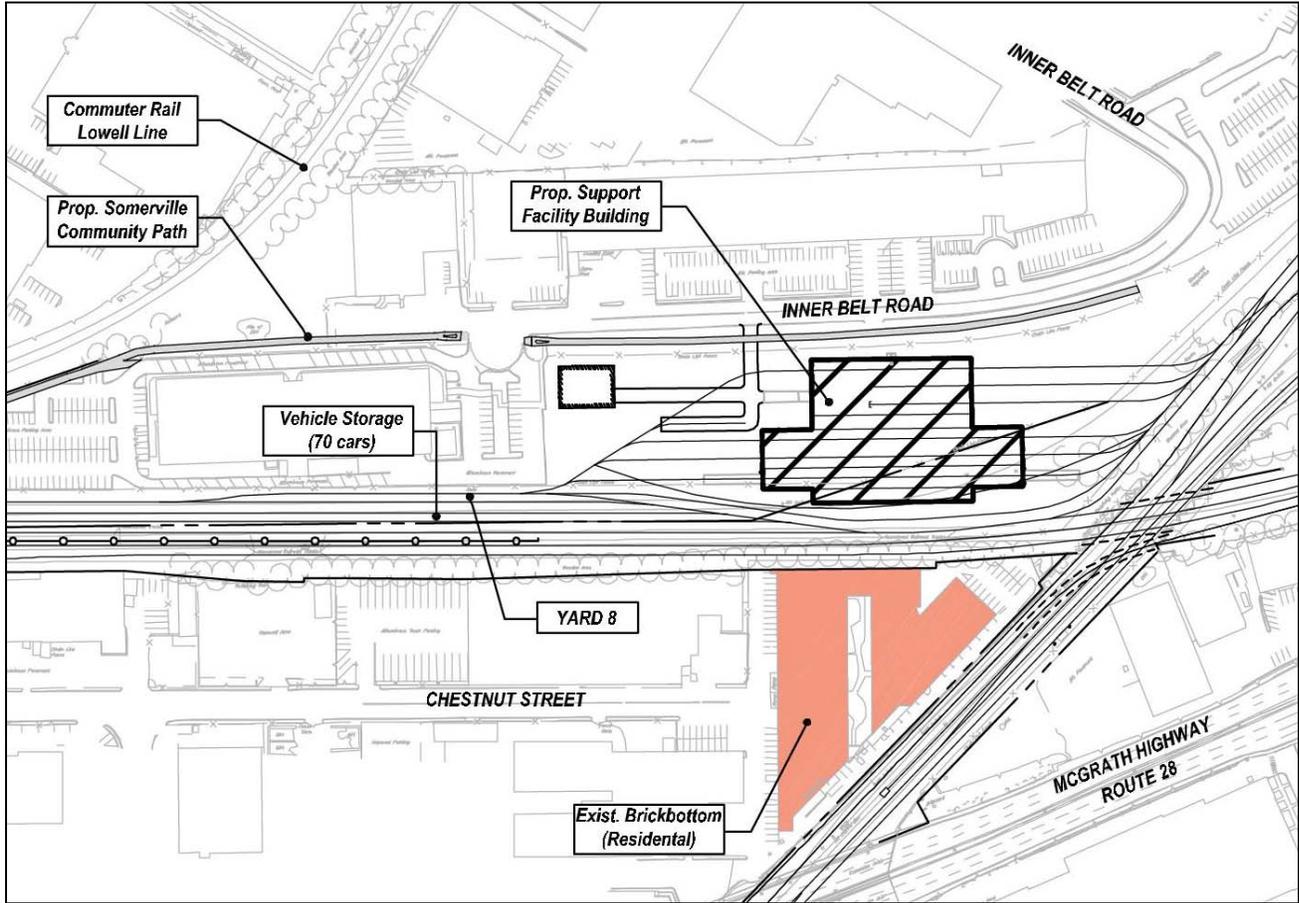
Elected officials and members of the public have requested more specific analysis of the noise, vibration, and air quality impacts anticipated from the Green Line Extension Project to the Brickbottom Artists Buildings. The Brickbottom community is made up of a three-building mixed residential/working space located next to the MBTA right-of-way in the Brickbottom neighborhood of eastern Somerville. The Buildings are east of the proposed Brickbottom Station and across the MBTA right-of-way from Yard 8, the proposed site for the new Green Line Extension support facility.

Figure 1-1 shows the proposed support facility (with Green Line vehicle storage) and the Brickbottom Artists Buildings. The Artists Buildings are approximately 95 feet from the support facility site and are separated from the site by an existing wall topped with a chain-link fence, vegetation next to the fence, and the existing MBTA right-of-way.

The noise, vibration, and air quality analyses provided to date have combined the effects of the entire Green Line Extension Project – rail activity plus the support facility – on the Brickbottom Artists Buildings. Elected officials and members of the public have asked for an explanation and quantification of how much of the Project’s impacts on the Artists Buildings would be due to the support facility by itself.

This technical memorandum describes the specific impacts of the support facility on the Brickbottom Artists Buildings.

Figure 1-1 Proposed Green Line Support Facility



## Impact Assessment

This section discusses the impacts expected to the Brickbottom Artists Buildings from the proposed Green Line support facility. Impact categories assessed include:

- Noise;
- Vibration;
- Air quality, and
- Visual environment.

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### 2.1 Noise

The Green Line Extension Project includes modifications to existing noise sources, such as moving the existing MBTA commuter rail lines. Therefore, noise impact is assessed according to the increase in cumulative noise exposure. Noise sources have a cumulative effect on the Day-Night Sound Level (Ldn) measurements used to determine noise impacts. Any additional noise sources generated by the Green Line Extension would increase the Ldn values for the Brickbottom Artists Buildings.

The existing noise levels at the Artists Buildings are 57.6 dBA<sup>1</sup> due to the existing rail operations in the MBTA right-of-way. Based on the Federal Transit Administration’s (FTA) *Transit Noise and Vibration Impact Assessment Guidance Manual*, noise impact criteria are determined in part by comparisons to existing noise levels. For the Artists Buildings, the criteria for classifying “moderate” and “severe” noise impacts are 60.0 dBA and 63.5 dBA, respectively.

Combined with the noise from the commuter rail, new Green Line mainline operations alone would increase noise levels at the Artists Buildings to 75.3 dBA. These new levels would constitute a “severe” impact on the Artists Buildings. By contrast, the support facility alone would increase noise levels at the Artists

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<sup>1</sup> The human ear can detect a wide range of frequencies from about 20 Hz to 17,000 Hz. However, because the sensitivity of human hearing varies with frequency, the A-weighting system is commonly used when measuring environmental noise to provide a single number descriptor that correlates with human subjective response. Sound levels measured using this weighting system are called “A-weighted” sound levels, and are expressed in decibel notation as “dBA.” The A-weighted sound level is widely accepted by acousticians as a proper unit for describing environmental noise.

Buildings to 69.9 dBA. These would also constitute a “severe” impact but are significantly lower than the noise levels from Green Line mainline operations, due in part to the Artists Buildings’ relatively greater distance from the support facility compared to their distance from the Green Line mainline.

The combined noise level of the mainline operations and the support facility would be 76.4 dBA, which would constitute a severe impact. Since noise is a cumulative metric and not simply an additive one, the support facility would increase noise levels by only 1.1 dBA when combined with the operation of the Green Line Extension. Noise mitigation such as sound insulation would be provided to reduce indoor noise levels in order to meet the FTA’s standards.

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## 2.2 Vibration

Vibration levels have been projected for the closest trains operating on the two Green Line Extension mainline tracks (approximately 18 feet and 32 feet from the Artists Buildings) and also for the closest support facility tracks (46 feet from the Buildings). Vibration impacts are assessed for maximum levels, as vibration – unlike noise – is not a cumulative metric. The FTA threshold for vibration impacts for residential spaces such as the Artists Buildings is 72 VdB.<sup>2</sup> The FTA standards do not distinguish between “moderate” and “severe” vibration impacts.

Vibration levels from trains on the near track (18 feet away) would be 77 VdB. These levels would constitute an impact based on the 72 VdB criterion. Vibration mitigation such as ballast mats would be provided to reduce these impacts.

For the far track (32 feet away), vibration levels are expected to be 67 VdB. These would not exceed the impact criterion and are milder than the vibration levels from the near track, resulting in no overall change to maximum vibration levels. Therefore, the far track has no notable vibration impact on the Artists Buildings.

For the support facility tracks at Yard 8 (on the other side of the MBTA right-of-way and a minimum of 46 feet away), vibration levels are expected to be even lower. These levels would not exceed the impact criterion, would not increase maximum vibration levels, and would not have an impact on the Artists Buildings.



<sup>2</sup> Ground-borne vibration is typically characterized in terms of the “smoothed” root-mean-square (RMS) vibration velocity level, in decibels (VdB), with a reference quantity of one micro-inch per second. VdB is used in place of dB to avoid confusing vibration decibels with sound decibels. Vibration levels in terms of RMS velocity have been found to correlate most suitably to human response to vibration in buildings and is the metric commonly used in American and International standards.

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## 2.3 Air Quality

Air quality projections are based on the emissions from stationary and mobile sources. As the proposed support facility would be used solely to service Green Line vehicles – which are powered by electricity – there will be no atmospheric emissions associated with the vehicles being serviced at the facility. The facility itself will not generate any additional emissions. The only emissions associated with the facility would be from the employee parking lot. Vehicles in this lot would have no effect on air quality at the Artists Buildings due to the distance of the lot from the Artists Buildings. For these reasons, the support facility is projected to have no air quality impacts on the Artists Buildings.

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## 2.4 Visual Environment

The support facility would result in some visual changes to the local area. Yard 8 would be used to store Green Line train cars when not in use, and an adjacent support facility building would be required for actual maintenance activities. The building would be approximately 40 feet tall on its east side (farthest from the Brickbottom Artists Buildings) and 30 feet tall on its west side (closest to the Artists Buildings). Based on topography and building heights, the roof of the Artists Buildings would be approximately 16.5 feet higher than the tallest part of the support facility building.

Yard 8 has been in continuous use as a rail facility since 1835, and commuter and freight rail traffic currently operate on the tracks between the Brickbottom Artists Buildings and Yard 8. Green Line train cars would use the layover tracks mostly at night. Therefore, the use of Yard 8 for Green Line car storage would not result in a major visual change.

Yard 8 and the proposed support facility building site are located across the right-of-way from the Brickbottom Artists Buildings. Fences and vegetation would obscure the support facility from ground level on Fitchburg Street, but the support building would be visible from the north- and east-facing windows of the Artists Buildings. Due to the surrounding industrial lots and existing buildings, the Artists Buildings would be the only residential properties facing the support facility. Given the existing industrial and commercial buildings visible from this area, which are similar in type to the support facility, the support facility would result in only a minor change to the local landscape.

The support facility would be an enclosed building, resulting in minimal light exposure to the surrounding area. Any outdoor lighting would be directed downward and towards the building with fixture hoods to prevent any direct lighting impacts on nearby buildings, including the Brickbottom Artists Buildings.



Development of “air rights” over the support facility has been discussed as a part of future economic development. Building a structure to cover the layover tracks and support facility could completely obscure the support facility as a whole. Any such structure would likely introduce additional visual changes and decrease the overall industrial character of the neighborhood.

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## Conclusions

The support facility would slightly increase noise levels at the Brickbottom Artists Buildings from 75.3 dBA (Green Line operations with no support facility) to 76.4 dBA (Green Line operations and support facility combined). Noise mitigation measures such as sound insulation would be provided to reduce these impacts, and the Executive Office of Transportation will work closely with the City of Somerville and the Brickbottom Artists community to develop a noise mitigation program that addresses residents' concerns about noise impacts associated with the Green Line Extension Project. The proposed support facility would have no impact on vibration levels due to the distance from the Artists Buildings, and it would have no impact on air quality due to the use of electric trains and the distance from the employee parking lot. The building for the support facility would change the local visual environment slightly by introducing an additional industrial building to this largely commercial/industrial neighborhood.

In the absence of the proposed support facility, the site selected may be redeveloped for other uses that would have similar or greater impacts on the local neighborhood. The proposed support facility building site is zoned for industrial use and other related uses. Somerville zoning would allow a 50-foot-high commercial or industrial building without invoking any special permits, and an existing building permit already issues for this site would allow a pair of 64-foot-high buildings. By contrast, the proposed support facility building would be only 30 feet high on its west side and 40 feet high on its east side. The Artists Buildings would be approximately 16.5 feet higher than the tallest part of the support facility building. Redevelopment of the proposed support facility site for a different use could result in a taller building with a greater visual impact. Based on the City of Somerville's stated plans for redevelopment and the local zoning regulations, future development on this site appears likely and could have a greater overall aesthetic impact on the Brickbottom Artists Buildings than the proposed support facility.

The supporting detailed environmental analyses will be provided in the Draft Environmental Impact Report/Environmental Assessment for the Green Line Extension Project.