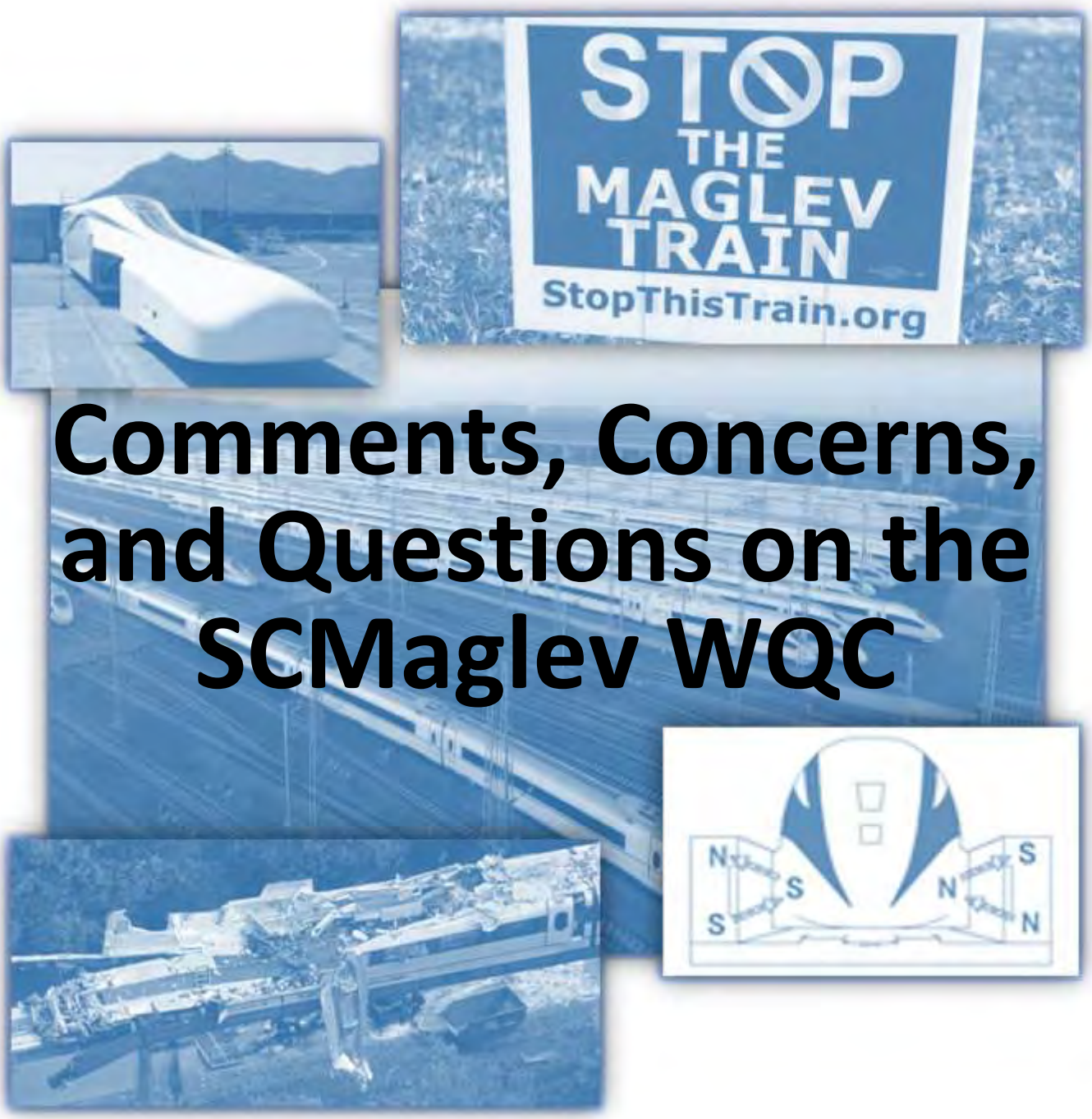
Maryland Coalition for Responsible Transit



Comments, Concerns, and Questions on the SCMaglev WQC

Submitted to:
The Maryland Department of Environment

November 15, 2023

MARYLAND
COALITION FOR
RESPONSIBLE
TRANSIT

November 9, 2023

Maryland Department of the Environment
Attn: Danielle A. Spendiff
Chief, Regulatory & Customer Service Division
Water & Science Administration
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Subject: MCRT Comments on the Baltimore-Washington Rapid Rail's SCMaglev Water Quality Certification Application

The Maryland Coalition for Responsible Transit (MCRT) has reviewed, researched, and assembled comments on the application of the Baltimore-Washington Rapid Rail (BWRR) Clean Water Act, Section 401 Water Quality Certification (WQC) for the Superconducting Magnetic Levitation (SCMaglev) train project. Our comments document is being delivered on a thumb drive in person, and via a MCRT Google Drive access link.

To access the MCRT Google Drive file folder, click on:
https://drive.google.com/drive/folders/12CcdxOsgrpJMyATgvwyBg-T__4IHNZ6Q.

To download the MCRT comments submission, move your cursor onto the three dots to the right of the file name "MCRT for MDE - Comments on SCMaglev WQC.docx."

Then click on the download icon  to download the document. After a minute or two, a window will pop up and you choose where you want to save a copy of the downloaded file.

The MCRT comments submission will also be delivered in person on a thumb drive.

Our review includes the BWRR February 7, 2023, WQC Request Package, Joint (Federal/State) Permit Application for Alteration of any Tidal Wetland and/or Tidal Waters in MD, Tier II Review Documents, and the WQC Request Correspondence. It is apparent that the materials and information provided by BWRR are woefully inadequate. The proposed WQC application significantly understates the negative impacts that building and operating the SCMaglev will have on our waterways and watersheds, including the Tier II Beaverdam Creek and Patuxent River—and ultimately the Chesapeake Bay—while overstating the offsetting benefits. The MCRT strongly encourages the Maryland Department of the Environment (MDE) to deny this certification.

The MDE must deny BWRR's WQC request because the necessary research, substantiated processes, protections, and analysis of environmental and social impacts regarding the SCMaglev train project to ensure it will not harm our state's waterways have not been provided.

The MCRT finds the BWRR WQC application deficient and misleading in six principal areas:

1. The application does not satisfy the antidegradation standards required to protect high-quality Tier II waters.
2. The environmental impacts on affected areas are significantly understated.
3. The impact on environmental justice communities is significantly understated.
4. The BWRR ridership estimate for the SCMaglev is significantly overstated. The population of Baltimore does not support these projections.
5. The resultant revenue projections, which are needed to maintain and operate the SCMaglev, are overstated.
6. The actual methodology, assumptions, and data on job creation are missing.

The MCRT requests the following:

(1) Before any record of decision is made to approve the building of the SCMaglev, Rules of Particular Applicability must be established, and the train's crashworthiness, structures, and systems must undergo and pass the same rigorous tests and evaluation process as other American ground-based rail systems.

(2) Before proceeding further to consider building the SCMaglev, given the current number of overstated values, understated impacts, and missing information and critical analyses needed to make an informed decision, a supplemental WQC submission should be developed, as well as

a supplemental draft environmental impact statement, to address the long list of issues, questions, and concerns contained in the comments submitted by the MCRT.

(3) The MCRT should be granted timely access to the *supplemental documentation* the MDE required of BWRR in its letter dated September 8, 2023, to allow sufficient time for the MCRT to review and comment on this additional material being provided as part of the WQC review process. The MDE has directed BWRR to submit those documents no later than November 16, 2023. Our concern is that after the public comment period has closed, *critical submissions by BWRR will not be able to be reviewed and commented on by the public*.

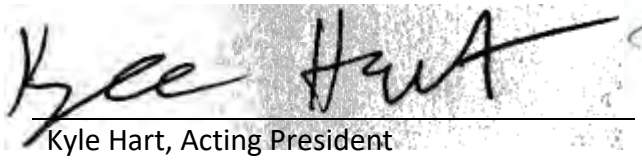
The MCRT reiterates its request that the MDE deny BWRR the Clean Water Act, Section 401 Water Quality Certification.

The MCRT acknowledges the University of Maryland's Francis King Carey Environmental Law Clinic for advising us in the development of these comments.

Please feel free to contact us if you have any questions about our submission or would like further information about the MCRT and our work. Our website is www.mcrt-action.org. Our email is MCRTaction@gmail.com.

Thank you for your efforts and for considering the many critical issues and concerns raised by the MCRT Board and its members in our submission.

Respectfully,



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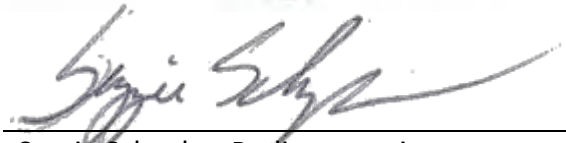

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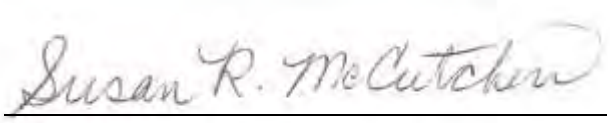

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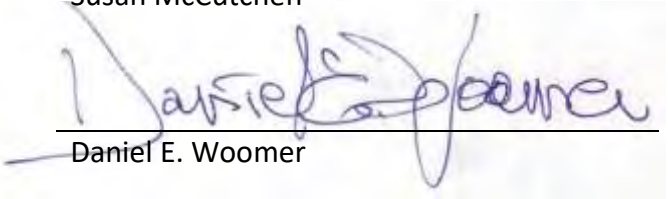

Daniel E. Woomer

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Preface

Baltimore-Washington Rapid Rail (BWRR) is well aware that they would not be able to mitigate the environmental damage they would bring to Maryland's Tier II waters. As such, they are required to submit a Social and Economic Justification (SEJ) package. Their arguments presented in the SEJ cannot justify this project due to the lack of substantiating information for the benefit claims they make. Their claims cannot be justified because they understate the impacts to Environmental Justice (EJ) neighborhoods—their schools, homes, and businesses.

Imagine living in a neighborhood where 15 to 20 construction vehicles and dump trucks are rumbling up and down the streets, stirring up dust, tearing up the road, and making simply being on your neighborhood streets a safety hazard. Visualize going to school or sitting in your home feeling vibrations, first from the construction and then from the train itself. Contemplate living in a neighborhood and not wanting a tunnel running underneath your home and property, but having the threat of your home and property being taken from you and your family by BWRR through the power of eminent domain to build that very tunnel, if you don't agree to an easement.

This project should not move forward; because it would diminish the residents' quality of life, because it would create unfair and inequitable living circumstances, because it would cause destruction that cannot be reversed, and because it would simply be untenable. The SCMaglev project cannot be justified. Accordingly, BWRR's Water Quality Certification application must be denied.

Introduction

The Maryland Coalition for Responsible Transit (MCRT) is submitting our 616 pages of comments regarding the Maryland Department of the Environment (MDE) potentially approving Baltimore-Washington Rapid Rail's (BWRR's) plan to build a Superconducting Magnetic Levitation (SCMaglev) transportation system between Baltimore and Washington, D.C. We are raising serious concerns and questions, based on BWRR's February 7, 2023, Water Quality Certification (WQC) justification materials, as presented in its application to the MDE, and in its Draft Environmental Impact Statement (DEIS) released on January 15, 2021. The MCRT is providing detailed comments prepared by our expert team, including an independent analysis of various aspects of the project sponsor's (BWRR's) claims, promises, and statements. Taking into consideration what has been presented in the applicant's WQC justification materials, as seen in the DEIS, we find significant legal and technical deficiencies. The MCRT **strongly urges the MDE to deny any permitting for building the SCMaglev train, just as we urge the Federal Railroad Administration (FRA) to withdraw and rework the DEIS, and to identify the <u>NO BUILD</u> alternative as preferable to the proposed SCMaglev project.**

Maryland Coalition for Responsible Transit and Citizens Against the SCMaglev

The **Maryland Coalition for Responsible Transit** (MCRT) is a nonprofit organization formed in 2020 to coordinate the efforts of the Maryland and Washington, D.C., communities and organizations, and our Japanese counterparts, increasingly joining forces to oppose the building and operation of the SCMaglev system. Our mission is to evaluate transit projects for social equity, environmental justice, economic viability, and community accessibility. The MCRT believes the Baltimore-Washington SCMaglev project must be stopped to allow the implementation of future transit projects that meet the criteria of accessibility and affordability for residents, with much less risk and impact to our residents and communities. Therefore, we support the SCMaglev's No Build option and are working to stop this project through the National Environmental Policy Act (NEPA) process, as well as the Maryland state permitting processes, specifically by building public capacity to respond to the initial DEIS and the subsequent permitting processes, hearings, and reviews, such as MDE's WQC process. The MCRT is actively gathering and sharing information on the environmental, ecological, community, and financial impacts that building and operating the SCMaglev would have on communities, counties, and Maryland. The MCRT is actively hosting and participating in community meetings and town halls and testifying in legislative hearings. We meet with and brief local, county, state, and federal elected officials, to share our accumulated knowledge and information. You can see MCRT's SCMaglev concerns and questions on our Facebook page www.facebook.com/MCRTaction, and our website at www.mcrt-acrtion.org. You can contact the MCRT at mcrtaction@gmail.com.

Citizens Against the SCMaglev (CATS) is an organization formed in 2016 when the public became aware of the initial proposal by BWRR and Northeast Maglev (TNEM) to build the first phase of Japan's JR Central's SCMaglev train between Baltimore, Maryland, and Washington, D.C. BWRR's long-term goal is to build the SCMaglev systems to New York City, New York, by way of Philadelphia, Pennsylvania, and on to Boston, Massachusetts. Community residents and activists began attending BWRR presentations and hearing details about their building plans and the operation of the SCMaglev. Community concerns arose as many fundamental questions were raised and routinely not answered by BWRR. Residents came together to represent the interests of their communities and formed CATS. CATS evolved into a confederation of scientists, engineers, experts, community organizations, and citizens in support of transportation infrastructure improvements that benefit our communities, Maryland, and the nation. CATS opposes the construction of an expensive transportation system serving a small minority of the wealthy at the cost of taxpayer funds far better appropriated to maintain and improve the transportation infrastructure needed and used daily by all residents, businesses, and commercial entities. CATS has written numerous articles and provided testimony on legislation in Annapolis and has met with elected officials in Washington, D.C., to share information that challenges the promises and claims made by BWRR. CATS has identified better high-speed rail and commuter rail alternatives, and presented analyses on the extreme environmental, ecological, community, and financial costs and impacts that building and operating the SCMaglev would have on communities, counties, and Maryland. See our CATS Facebook page at www.facebook.com/groups/citizensagainstSCMaglev and our Stop This Train website at www.stopthistrain.org.

Executive Summary

The MCRT assembled a team of experts from various fields and disciplines to review the SCMaglev WQC justification materials submitted to the MDE. (Short bios of our team are attached.) Their research, findings, comments, concerns, and questions about these materials are presented in our submission. BWRR's application relies heavily on the DEIS, which therefore will be addressed in our comments. The Northeast Maglev's website states: "The EIS provides responses to substantive DEIS comments and begins the FRA's final decision process."[1] Of note, the EIS process has been paused for over two years while problematic components of the project are being reviewed. Our review of the applicant's WQC justification materials found them to be just as problematic and deficient in the following areas as they were in the 2021 DEIS:

- The applicant's WQC justification materials fail to adequately address the requirements of federal and state law.

- The applicant's WQC justification materials understate and omit environmental impacts in key areas of water quality, wetlands, climate change, air quality, parkland, historic sites, and endangered and threatened species, among others.

- BWRR's Statement of Purpose and Need and Alternatives Analysis impermissibly favors the SCMaglev project over Viable Transit Alternatives outlined in the No Build Alternative.

- BWRR states in their Social and Economic Justification document that "The purpose of the SCMAGLEV Project is to provide new, reliable, safe, high-speed passenger transportation and significantly reduce travel time to meet the capacity and ridership needs of the Baltimore-Washington region."[2] The SCMaglev is not a local commuter train, therefor it will not provide a useable purpose for regional transportation needs. When considering all transportation associated needs of possibly using this train (driving from home to either a station or another mode of transportation to get to the SCMaglev terminus, parking, additional modes of transportation to the ultimate destination), using the SCMaglev is not going to save any appreciable amount of time, if any at all.

- The applicant's WQC justification materials, which violate NEPA segmentation principles, limits the scope of analysis to the Washington-to-Baltimore Corridor. The application ignores the project sponsor's clear plan to eventually extend the SCMaglev across the state of Maryland as it travels on to New York City and Boston. Before a ruling is made on BWRR's WQC, the MDE and the public should be informed of the **total impacts** that building and operating the SCMaglev would have on Maryland. Specifically, what are the impacts of building and operating the SCMaglev through Baltimore City and on to our borders with Pennsylvania or Delaware?

- BWRR fails to adequately address the greenhouse gas impacts from the tremendous energy use needed for the project in its WQC justification materials.

[1] See the Project Timeline and Status - The Northeast Maglev. Retrieved October 30, 2023. https://northeastmaglev.com/project/timeline/.
[2] BWRR. Maryland High-Quality Waters (Tier II) Social and Economic Justification Report. Page 9.

- BWRR's WQC justification materials fail to adequately analyze the project's impacts on meeting the Chesapeake Bay clean-up goals.

- The applicant's WQC justification materials, as well as its initial DEIS,[3] fail to prepare an adequate report to assess the project's use of parkland and historic resources.

- BWRR's WQC justification materials are deficient by failing to provide sufficient information and analysis on the project's serious impacts to Tier II waters, protected streams, wetlands, groundwater, and forest areas.

- The applicant's WQC materials were not complete. The MDE, in a letter to BWRR dated September 8, 2023, requested required and missing documentation. Any additional information from BWRR needs to be made available to the public for review and comment, as is our right.

- The applicant's WQC justification materials do not adequately analyze the project's serious impacts on federal and state listed rare, endangered, and threatened species. The same was true for the DEIS.

- The applicant's WQC justification materials, as did the DEIS, contain economic and ridership analysis based on inaccurate assumptions and outdated traffic data. In particular, the FRA provided the MCRT with a heavily-redacted ridership and demand study that makes it extremely challenging to provide meaningful comments and analysis. However, the MCRT and other analyses presented in our submission seriously question the level of ridership BWRR is projecting, as well as the resultant revenue income to operate and maintain the system.

- The applicant's WQC justification materials, as did the DEIS, contain serious errors and omissions in the analysis of the project's safety. The BWRR fails to adequately present data on the safety and crashworthiness of the SCMaglev, support structures, and systems.

- In both the applicant's WQC justification materials and the 2021 DEIS, BWRR fails to provide the financial, ridership, job creation, and other required data and analyses to **substantiate** BWRR's benefit claims and the viability of their financial model and forecasts.

- The applicant's WQC justification materials, as did the DEIS, contain a seriously deficient environmental justice (EJ) analysis. BWRR understates and fails to address the disruptive impact on residents and communities through which the SCMaglev would travel.

Considering these deficiencies, the MDE must address a long list of findings presented in our submission, the total and cumulative environmental impacts on all Tier II waterways, streams, wetlands, the Chesapeake Bay, and across the entire state of Maryland where an SCMaglev train would

[3] DEIS. Draft Section 4(f) Report.

potentially be built and operated before any consideration of granting the WQC. *This should also include TNEM plans to build a second set of guideways from New York City and Philadelphia to Washington. D.C., which has no stops in Maryland*. These issues include, but are not limited to:

- The need for a full, independent expert assessment of the serious and irrecoverable environmental and ecological damage and destruction that building the SCMaglev would bring to one of the last preserved research spaces on the East Coast so that the **full cost** to our state, counties, communities, and residents is identified and understood.

- The need for a full, independent expert assessment of the potential danger to human and wildlife health from emissions, pollution, building, and operating the SCMaglev would bring for these impacts to be known and quantified.

- The need for an independent expert assessment of the financial viability of the building and operating of the SCMaglev without the need of government subsidiaries (unlikely). If government subsidies are required (likely), quantification of the full scope and size of the subsidies and identification of the source of funds are needed.

- The need for an independent expert assessment comparing the negative impact to Tier II waters in building the SCMaglev versus continuing the enhancement and integration of the FRA's approved Amtrak Northeast Corridor (NEC) *Future Plan*.

- The need for an independent expert assessment of the ridership and financial claims of the applicant in operating the SCMaglev.

- If the SCMaglev is built, and to maintain Amtrak viability, any ridership and financial loss would need to be addressed through increased government subsidies. The level of increased subsidies, identification of the source of funding for increased subsidies, and the impact the loss of these funds would have on addressing other higher-priority transportation infrastructure projects (e.g., roads, bridges, tunnels) needs to be identified and quantified.

- The need for U.S. expert assessment of the safety of the train system, in a manner akin to the safety and crashworthiness assessments of Amtrak and other U.S. rail transportation systems.

- The need for the FRA to develop its rule of particular applicability (RPA) for the independent assessment of the SCMaglev system <u>BEFORE</u> the MDE decides on the WQC and the FRA itself completes and publishes its record of decision (ROD).

The SCMaglev project cannot be justified socially, economically, or environmentally. As such, BWRR's WQC application must be denied.

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I. Legal Considerations and Deficiencies

I. Legal Background

A. Section 401 of the Clean Water Act

Pursuant to Section 401 of the Clean Water Act (CWA),[4] a federal agency may not issue a permit or license to conduct any activity that may result in any discharge into waters of the United States without seeking water quality certification from the Environmental Protection Agency (EPA).[5] Where a discharge would originate in a state or authorized tribe, the applicant must seek water quality certification (WQC) from the state or tribe.[6] Section 401 assures " . . . that Federal licensing or permitting agencies cannot override State water quality requirements."[7]

A certification request for an individual license or permit must include the following to be considered complete: (1) the project proponent(s) and a point of contact; (2) the proposed project; (3) the applicable federal license or permit; (4) the location and nature of any potential discharge that may result from the proposed project and the location of receiving waters; (5) a description of any methods and means proposed to monitor the discharge and the equipment or measures planned to treat, control, or manage the discharge; and (6) a list of any other authorizations required for the proposed project, including all approvals or denials already received.[8]

The certifying authority must act on the water quality certification within a "reasonable period of time,"[9] which may not exceed one year.[10] The public must receive notice of the water quality certification request and, where the certifying authority deems appropriate, provide public hearings on the application.[11] After determining whether the water quality certification application complies with relevant provisions of the CWA or state law,[12] the certifying authority may grant, grant with conditions, deny, or expressly waive a certification request.[13] In granting a Section 401 certification with conditions, the certifying authority may require a federal license or permit to include conditions to

[4] 40 C.F.R. § 121.
[5] *Id.* § 121.3; *Overview of CWA Section 401 Certification*, United States U.S. Env't. Prot. Agency Environmental Protection Agency (EPA), https://www.epa.gov/cwa-401/overview-cwa-section-401-certification (Last updated Sept. 27, 2023).
[6] *Id.*
[7] Clean Water Act Section 401 Water Quality Certification Improvement Rule, 88 Fed. Reg. 66558, 66561 (Sept. 27, 2023) (to be codified at 40 C.F.R. parts 121, 122, and 123) (citing S. Rep. No. 92–414, at 69 (1971)).
[8] 40 C.F.R. § 121.5(b)(1)– (6). The applicant must also provide documentation of the timely submission of a pre-filing meeting request and statements of certification. *Id.* § 121.5(b)(7)– (9).
[9] *Id.* § 121.6(a).
[10] 33 U.S.C § 1341(a)(1).
[11] *Id.*
[12] The discharge must comply with sections 301, 302, 303, 305, and 307 of the Clean Water Act and applicable state law. *Id.*
[13] 40 C.F.R. § 121.7(a).

comply with relevant provisions of the CWA or state law.[14] If the certifying authority grants or waives the application, the federal agency may issue the permit or license.[15]

B. MDE Tier II Antidegradation Review

Each state must adopt water quality standards to "protect public health or welfare, enhance water quality and serve the purposes of the … [CWA]."[16] In serving the purpose of the CWA, states must set water quality criteria that protect designated uses of water[17] such as recreational uses and aquatic life/wildlife uses.[18] These water quality standards may be "more stringent" than required by the CWA.[19] As a part of their mandate to protect water quality, states must develop and adopt statewide antidegradation policies.[20] The EPA advises states to approach antidegradation policies on a "pollutant-by-pollutant and waterbody-by-waterbody basis."[21] Maryland has adopted regulations governing the review and issuance of water quality certifications.[22]

i. Maryland's Tier II Waters

Tier II waters are those with quality exceeding that necessary to "support the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water."[23] States may not allow a degradation in the quality of Tier II waters without undergoing a Tier II review process in which the (1) applicant sufficiently justifies the degradation based on economic or social development, and (2) the state "assure[s] water quality adequate to protect existing uses fully."[24] The Maryland Department of the Environment's (MDE's) antidegradation regulations further specify the meaning of Maryland Tier II waters: "[A] water body with water quality that measures significantly better[25] than that required by water quality standards to support its designated uses."[26] A Maryland Tier II watershed is "the area of land that contributes runoff to a Tier II waterbody and any discharges to streams upstream of and including the Tier II waterbody."[27]

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[14] 33 U.S.C § 1341(d).
[15] Clean Water Act Section 401 Water Quality Certification Improvement Rule, 88 Fed. Reg. 66558, 66561 (Sept. 27, 2023) (to be codified at 40 CFR parts 121, 122, and 123).
[16] 40 C.F.R. § 131.12(a)(2).
[17] *Id.* § 131.2.
[18] Each state must specify "appropriate water uses to be achieved and protected." *Id.* § 131.10(a).
[19] 40 C.F.R. § 131.4(a).
[20] *Id.* § 131.12(a).
[21] *Water Quality Standards Handbook Chapter 4: Antidegradation* 8 (2012), United State Env't EPA. Prot. Agency Office of Water, https://www.epa.gov/sites/default/files/2014-10/documents/handbook-chapter4.pdf
[22] Code of Maryland Regulations § 26.08.02.10.
[23] 40 C.F.R. § 131.12(a)(2).
[24] *Id.*
[25] "Significantly better" is a statistical benchmark in which there is at least 90 percent certainty that the mean of the available data is better than the applicable standard. COMAR 26.08.02.04-2(A).
[26] *Id.*
[27] *Id.*

ii. Assimilative Capacity

The assimilative capacity of Tier II water is a measure for determining when Tier II water quality "is diminished or degraded beyond natural changes in condition."[28] Applicants seeking water quality certification from MDE must demonstrate how they will configure or structure their project in a way that will "minimize the use of assimilative capacity of the water body."[29]

The Department is required to "compile and maintain a public list of the Tier II waters."[30]
The MDE identifies Tier II waters according to the health of a water's biological community, which is measured in terms of biotic integrity (IBI) scores. There are two types of IBI scores: (1) benthic IBI scores that measure the health of benthic macroinvertebrates,[31] and (2) fish IBI scores, which are an "attempt to quantify a biologist's best professional judgment . . . of the quality of a fish assemblage."[32] The MDE designates a water as Tier II where it has a fish IBI score and a benthic IBI score of 4.00 or greater.[33] Once a water is designated as Tier II, the MDE applies a multi-step analysis in which it (1) calculates available assimilative capacity, (2) calculates the Tier II assimilative capacity threshold, and (3) compares recent data to the Tier II assimilative capacity threshold.[34] Available assimilative capacity is measured by the difference between the Tier II baseline and the water quality criterion (represented by the Tier I IBI score of 3.00).[35] Unfortunately, it is unclear how the MDE calculates the Tier II baseline and whether the Tier II baseline is representative of both the fish IBI and benthic IBI scores.[36]

After determining available assimilative capacity, the MDE calculates the assimilative capacity threshold for the Tier II water by accounting for 25 percent natural variability.[37] To calculate remaining assimilative capacity, the MDE calculates the difference between the assimilative capacity threshold value and recent Maryland Biological Stream Survey data. The MDE also does not specify how recent these data must be. It is also unclear whether the MDE considers the current fish IBI and benthic IBI scores in this step.[38] Nor does the MDE articulate how recent the IBI scores must be to make an

[28] *Tier II Assimilative Capacity*, Maryland Department. of the Environment (MDE), https://mde.maryland.gov/programs/Water/TMDL/WaterQualityStandards/Pages/Tier-II-AC.aspx (Last updated June 2021).
[29] COMAR § 26.08.02.04-2(G)(3).
[30] COMAR § 26.08.02.04-2(B). The most recent list of Tier II waters was published on January 24, 2023. *Tier II Data Table*, MDE, (Jan. 1, 2024). https://mde.maryland.gov/programs/water/TMDL/WaterQualityStandards/Documents/Tier_II_Updates/Antidegradation-Tier-II-Data-Table.pdf.
[31] *Index of Biotic Integrity* at 3, Watershed Science Institute (n.d.), https://www.wcc.nrcs.usda.gov/ftpref/wntsc/strmRest/wshedCondition/IndexOfBioticIntegrity.pdf
[32] *Chapter 8 (Part B): Fish Protocols*, EPA, https://archive.epa.gov/water/archive/web/html/ch08b.html (last visited Oct. 21, 2023).
[33] *Tier II Assimilative Capacity*, Maryland Department. of the Environment (MDE), https://mde.maryland.gov/programs/Water/TMDL/WaterQualityStandards/Pages/Tier-II-AC.aspx (Last updated June 2021).
[34] *Id.*
[35] *Id.*
[36] *See infra* section II.C.
[37] *Tier II Assimilative Capacity*, Maryland Department. of the Environment (MDE), https://mde.maryland.gov/programs/Water/TMDL/WaterQualityStandards/Pages/Tier-II-AC.aspx (Last updated June 2021).
[38] *See infra* section II.C.

assimilative capacity calculation or how it considers new development that has occurred since an IBI score was generated.

iii. Tier II Review

The MDE must prevent degradation to high-quality Tier II waters from permitted activities.[39] An applicant for proposed amendments to county plans, a wetlands and waterways permit, water quality certification, or discharge permits in a Tier II watershed that will result in a new or increased discharge into Tier II waters must complete Tier II antidegradation review.[40] Tier II review applies to applications and approvals for local, state, and federal entities and projects.[41] The goal of Tier II review is "no net change" in water quality for Tier II waters.[42] To complete Tier II review, applicants must provide a report with responses to questions, forms, and other supporting documentation.[43] Tier II review involves a four-step review process: (1) Identification of Impacts; (2) Avoidance Alternatives Analysis; (3) Minimization Alternatives Analysis; and (4) SEJ [Social and Economic Justification] for Unavoidable Impacts.[44]

1. Identification of Impacts

The preliminary step in the Tier II review process is to determine whether and how a project, such as one seeking a nontidal wetlands or waterways construction permit, will impact Tier II waters.[45] The applicant must assess impacts to in-stream water quality or resources that support in-stream water quality.[46] In-stream water quality impacts may include "changes in dissolved oxygen, pH, temperature, or other pollutants such as copper and ammonia found in effluent."[47] Impacts to resources that support in-stream water quality may include "landscape changes that contribute to declines in biological water quality, such use conversion from forest to non-forest, modification or removal of stream buffers, or increasing impervious surfaces."[48]

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[39] COMAR § 26.08.02.04-2(G)(3).
[40] *Id.*
[41] *Tier II Review*, MDE, https://mde.maryland.gov/programs/Water/TMDL/WaterQualityStandards/Pages/Tier-II-Review.aspx (Last updated February, 2022).
[42] *Id.*
[43] *Id.*; COMAR § 26.08.02.04-2(E).
[44] *Id; Tier II Review*, MDE, https://mde.maryland.gov/programs/Water/TMDL/WaterQualityStandards/Pages/Tier-II-Review.aspx (Last updated Feb. 2022).
[45] *Tier II Determination of No Additional Review*, MDE, https://mde.maryland.gov/programs/water/TMDL/WaterQualityStandards/Documents/Tier-II-Forms/TierII_NoAdditionalReview_v1.1.pdf (Last updated Jan. 4, 2023).
[46] *Tier II Review*, MDE, https://mde.maryland.gov/programs/Water/TMDL/WaterQualityStandards/Pages/Tier-II-Review.aspx (Last updated Feb. 2022).
[47] *Id.*
[48] *Id.*

2. Avoidance Alternatives Analysis

Where a proposed project would impact the water quality of Tier II waters, the applicant must evaluate reasonable alternatives to eliminate or reduce discharges or impacts.[49] Reasonability considerations may include "property availability, site constraints, natural resource concerns, size, accessibility, and cost to make the property suitable for the project."[50] The applicant must provide an "overall project purpose and site selection criteria" to aid assessing the reasonableness of alternatives.[51] The site selection criteria should not be "so narrowly construed as to limit the results to one site with no other possible alternatives," but it should not be "too broadly written creating too many alternatives to effectively consider."[52] The applicant must also provide a statement with three available alternative properties for further evaluation.[53] The MDE requires applicants to provide sufficient detail in their alternatives analysis. The MDE Alternatives Analysis Form instructs: "The level of detail for the alternative analysis process should appropriately match the complexity of the project. . . ."[54] The analysis should consider "factors such as resource impacts to Tier II watersheds in terms of impervious cover, forest cover loss, riparian buffer impacts, public comment, etc."[55]

Alternatives may include "modifying wastewater treatment, relocating outfalls to places outside of Tier II watersheds, rerouting other support infrastructure such as roads, pipelines, powerlines, etc. to avoid intersecting Tier II watersheds,[56] and evaluating alternative sites outside of the Tier II watershed."[57] The analysis must include "cost data and estimates to determine the cost effectiveness and feasibility of the alternatives."[58] In evaluating possible alternatives, the applicant must report the following information to the MDE: (1) the results of the initial search; (2) a map of alternatives relative to a preferred route or site and Tier II streams/catchment; (3) a summarizing the analysis of each site; and (4) a detailed narrative describing the outcome of this analysis.[59]

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[49] COMAR § 26.08.02.04(H); *Id.* § 26.08.02.04-2(E).
[50] *Antidegradation Review Report Form Alternatives Analysis- No Discharge Alternative* at 4, MDE, https://mde.maryland.gov/programs/water/TMDL/WaterQualityStandards/Documents/Tier-II-Forms/TierII_NoDischargeAnalysis_Form.pdf (Last updated Jan. 4, 2023).
[51] *Id.*
[52] *Id.*
[53] *Id.*
[54] *Id.*
[55] *Id.*
[56] *Tier II Review*, MDE, https://mde.maryland.gov/programs/Water/TMDL/WaterQualityStandards/Pages/Tier-II-Review.aspx (Last updated Feb. 2022).
[57] *Antidegradation Review Report Form Alternatives Analysis- No Discharge Alternative* at 1, MDE, https://mde.maryland.gov/programs/water/TMDL/WaterQualityStandards/Documents/Tier-II-Forms/TierII_NoDischargeAnalysis_Form.pdf (Last updated Jan. 4, 2023).
[58] COMAR § 26.08.02.04-2(G)(1).
[59] *Antidegradation Review Report Form Alternatives Analysis- No Discharge Alternative* at 2, MDE, https://mde.maryland.gov/programs/water/TMDL/WaterQualityStandards/Documents/Tier-II-Forms/TierII_NoDischargeAnalysis_Form.pdf (Last updated Jan. 4, 2023).

Feasible and cost effective alternatives will be required as a condition to the permit or authorization.[60] If there is no cost-effective alternative that would avoid direct discharge or water quality impacts, but the potential to further minimize the use of assimilative capacity, the applicant must include information regarding how it will minimize use of assimilative capacity in its application.[61] If the MDE finds that the applicant's proposal to minimize use of assimilative capacity is inadequate, then then the applicant may subject an SEJ justification to justify the impacts of the chosen project option.[62]

3. Minimization Alternatives Analysis

Sufficient riparian buffers, ample watershed forest cover, and lower levels of impervious cover "are essential to maintaining high-quality waters."[63] Accordingly, if the applicant finds that alternatives that would avoid impacts to these resources are not "cost effective and feasible," the applicant must "provide the Department with plans to configure or structure the discharge or other regulated activities that may cause a potential water quality impact so as to minimize" the use of assimilative capacity of the Tier II water.[64] The MDE requires applicants to, first, demonstrate minimization of impacts, and, second, propose mitigation where avoidance of impacts is not possible.[65] Both the minimization and mitigation analyses are applicable to "all areas of the whole and complete project within a Tier II watershed."[66]

First, the applicant must identify any minimization practices used when developing the project,[67] such as design, siting, treatment, or configuration.[68] For minimized impacts to Tier II stream buffers and forest cover, and avoided or minimized new impervious cover, the applicant must accurately calculate impacts, describe minimization efforts, and provide an exhibit demonstrating the minimized or avoided impact.[69] Some ways that applicants can minimize impacts to Tier II waters include treatment modification, design modification to reduce impacts, and avoidance of impacts. The MDE may require monitoring (such as stream monitoring and biological monitoring of fish and benthics), additional best

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[60] *Id.* § 26.08.02.04-2(H)(1).
[61] *Id.* § 26.08.02.04-2(H)(2)–(4).
[62] *Id.*
[63] *Antidegradation Review Report Form Alternatives Analysis - Minimization Alternatives*, MDE at 2, https://mde.maryland.gov/programs/water/TMDL/WaterQualityStandards/Documents/Tier-II-Forms/TierII_Minimization_Form.pdf (Last updated Jan. 4, 2023).
[64] COMAR § 26.08.02.04-2(G)(2).
[65] *Tier II Review*, MDE, https://mde.maryland.gov/programs/Water/TMDL/WaterQualityStandards/Pages/Tier-II-Review.aspx (Last updated Feb. 2022).
[66] *Antidegradation Review Report Form Alternatives Analysis - Minimization Alternatives* at 1, MDE at 2, https://mde.maryland.gov/programs/water/TMDL/WaterQualityStandards/Documents/Tier-II-Forms/TierII_Minimization_Form.pdf (Last updated Jan. 4, 2023).
[67] *Id.* at 1.
[68] *Tier II Review*, MDE, https://mde.maryland.gov/programs/Water/TMDL/WaterQualityStandards/Pages/Tier-II-Review.aspx (Last updated Feb. 2022).
[69] *Id.* at 2-6.

management practices,[70] expanded stream buffers, and studies, as special conditions on the water quality certification.[71]

For impacts that are considered unavoidable,[72] the applicant must propose mitigation measures to reduce impact to Tier II water quality.[73] Mitigation is considered "an integral part of the minimization process."[74] Mitigation is "required for unavoidable net forest cover loss, and any impervious cover increase that is not treated with environmental site design."[75] For impacts to Tier II streams and buffers and forest cover, and for any proposed new impervious surfaces, the applicant must explain in detail how they will mitigate impacts and quantity and justify remaining unavoidable impacts.[76] The MDE's preference for mitigation is as follows, in order: (1) in-kind, on-site; (2) on-kind, off-site; (3) out-of-kind, on-site; and (4) out-of-kind, off-site.[77] In-kind mitigation must occur at a target ratio of 1:1, acre-for-acre.[78] In-kind mitigation is the MDE's preferred mitigation method for "land disturbing activities" that result in forest loss.[79] Out-of-kind conservation mitigation must occur at a 2:1 ratio, acre-for-acre.[80] The applicant must report how they identified sites for mitigation, provide the location of proposed mitigation sites, and have a plan explaining how areas identified for mitigation will be protected in perpetuity.[81]

If there is some assimilative capacity remaining in the Tier II water once the applicant completes the minimization alternatives analysis, the Tier II review ends.[82] If the Tier II water has no AC left, the

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[70] A "best management practice" is "a practice or combination of practices considered by a State to be the most effective means (including technological, economic, and institutional considerations) of preventing or reducing the amount of pollution by nonpoint sources to a level compatible with water quality goals." 40 C.F.R. 130.2(Q).
[71] *Antidegradation Review Report Form Alternatives Analysis - Minimization Alternatives* at 1, MDE at 2, https://mde.maryland.gov/programs/water/TMDL/WaterQualityStandards/Documents/Tier-II-Forms/TierII_Minimization_Form.pdf (Last updated Jan. 4, 2023); *see also Tier II Review*, MDE, https://mde.maryland.gov/programs/Water/TMDL/WaterQualityStandards/Pages/Tier-II-Review.aspx (Last updated Feb. 2022).
[72] The MDE considers the following impacts unavoidable: Impacts due to existing infrastructure, buildings, stormwater management, or other requirements for construction to meet standards and regulations, such as those pertaining to minimum right-of-way or design standards. *Tier II Review*, MDE, https://mde.maryland.gov/programs/Water/TMDL/WaterQualityStandards/Pages/Tier-II-Review.aspx (Last updated Feb. 2022).
[73] *Antidegradation Review Report from Tier II Resource Mitigation*, MDE, https://mde.maryland.gov/programs/water/TMDL/WaterQualityStandards/Documents/Tier-II-Forms/TierII_Mitigation_Form_v1.0.pdf (Last updated Jan. 4, 2023).
[74] *Tier II Review*, MDE, https://mde.maryland.gov/programs/Water/TMDL/WaterQualityStandards/Pages/Tier-II-Review.aspx (Last updated Feb. 2022).
[75] *Antidegradation Review Report from Tier II Resource Mitigation* at 2-5, MDE, https://mde.maryland.gov/programs/water/TMDL/WaterQualityStandards/Documents/Tier-II-Forms/TierII_Mitigation_Form_v1.0.pdf (Last updated Jan. 4, 2023).
[76] *Ibid.* at 5.
[77] *Ibid.* at 6.
[78] *Id.*
[79] *Ibid.* at 7.
[80] *Ibid.* at 7.
[81] *Ibid.* at 6.
[82] COMAR § 26.08.02.04-2(G)(2).

applicant must provide a "more substantial justification for remaining impacts" through an SEJ analysis.[83]

4. Social and Economic Justification for Unavoidable Impacts

An applicant must provide an SEJ if (1) there is no "available cost-effective alternative to the discharge or water quality impacts," or (2) "the cumulative degradation resulting from nonpoint source pollution and any other permitted discharges would diminish[84] water quality."[85] The MDE will not grant WQC for a project based on a satisfactory SEJ alone; the SEJ is considered alongside the three prior steps of the applicant's tier II review. An applicant's project may not qualify for an SEJ unless all the following conditions are met:

> (1) the watershed affecting the Tier II water must be located in a priority funding area;[86] (2) MDE must find, in consultation with the Maryland Department of Planning, that the local jurisdiction in which the watershed affecting Tier II waters are located is using, to the extent reasonably practical, innovative development approaches[87] to minimize impacts to water quality from development; (3) physical development is necessary to accommodate the projected growth within the watershed, and use of innovative development approaches are maximized to the extent reasonably practicable to encourage redevelopment, reuse, and infill development; and (4) the Department of Planning's growth projections for the watershed affecting the Tier II waters demonstrate that additional physical development of undeveloped land is required to accommodate the projected growth and that development is consistent with the applicable county master plan.[88]

The MDE requires applicants to produce a report demonstrating "that an economic hardship and/or public benefit overrides the value of ecological services or water quality benefit that the Tier II water segment provides."[89] The SEJ report must include:

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[83] *Id.* § 26.08.02.04-2(G)(3)–(4).

[84] Water quality is considered diminished if the assimilative capacity is cumulatively reduced by more than 25 percent from the baseline water quality of either benthic or fish "in terms of biotic integrity' value used to make the Tier II stream designation. COMAR § 26.08.02.04-2(I)(2).

[85] COMAR § 26.08.02.04-2(I)(1)(a)–(b).

[86] A "priority funding area" is defined in the State Finance and Procurement Article, § 5-7B-02, Annotated Code of Maryland. *Id.* § 26.08.02.04-2(J)(1)(a).

[87] These approaches "include, but are not limited to, innovative stormwater management and sediment and erosion control design practices, green building design techniques, nutrient removal technology for septic systems, innovative technologies designed to reduce point source discharges of pollutants, uniform building codes designed to remove impediments to rehabilitation projects, model infill development guidelines designed by the Maryland Department of Planning, and transit-oriented development." *Id. Id.* § 26.08.02.04-2(J)(2).

[88] *Id.* 26.08.02.04-2(J)(1)(a)–(b).

[89] *Social and Economic Justification – Outline for Private Entities*, MDE, https://mde.maryland.gov/programs/water/TMDL/WaterQualityStandards/Documents/Tier-II-Forms/PrivateEntity_SEJ_Outline_V1.0.pdf (last updated July 28, 2020).

> (1) factors including, but not limited to, the extent and duration of the impact from the proposed discharge or regulated activity and the existing uses of the water body; (2) economic impacts that result from treatment beyond the costs to meet technology-based or water quality-based requirements; (3) the cost of maintaining high water quality in Tier II waters and the economic benefit of maintaining Tier II waters; (4) a determination of whether the costs of pollution controls needed to maintain the Tier II water would limit growth or development in the watershed including Tier II water.[90]

In the MDE's Antidegradation Review Report Forms - Social and Economic Justification Outline for Private Entities, the Department further instructs applicants to discuss the economic importance and benefit of the project during construction and operation; the social importance and benefit to the community, environment, impacts on property value, the recreation value, and other quality of life benefits.[91] The Department also directs applicants to report on the economic impact of restoring degraded stream resources such as impacts to resources necessary to maintain high-quality waters; costs of 1:1 in-kind mitigation for all net forest cover loss based on area market value; and estimate cost of stream restoration, per linear foot, based on area market value.[92]

II. The Maryland Department of the Environment Must Deny Baltimore-Washington Rapid Rail's Water Quality Certification Request

The Superconducting Magnetic Levitation (SCMaglev) transportation system proposed by Baltimore-Washington Rapid Rail (BWRR) would negatively impact Tier II waters.[93] Specifically, impacts within the Beaverdam Creek and Patuxent River Upper watersheds, which contain the Tier II segments of Beaverdam Creek I, Beaverdam Creek II, and Patuxent Creek I,[94] would total nearly 5,000 acres.[95] The SCMaglev Train Maintenance Facility (TMF) and collocated Maintenance of Way facilities would be located in the Beltsville Agricultural Research Center (BARC),[96] which is located within the Beaverdam Creek Watershed. The SCMaglev alignment would run above sections of Beaverdam Creek I and II.[97]

The MDE must deny BWRR's WQC request because BWRR does not satisfy the standards of Tier II review under Section 401 of the CWA. BWRR's Tier II review is insufficient because: (1) the MDE and BWRR do not adequately identify the impacted Tier II waters; (2) BWRR does not sufficiently investigate and identify impacts to the Tier II waters; (3) the MDE and BWRR do not explain whether

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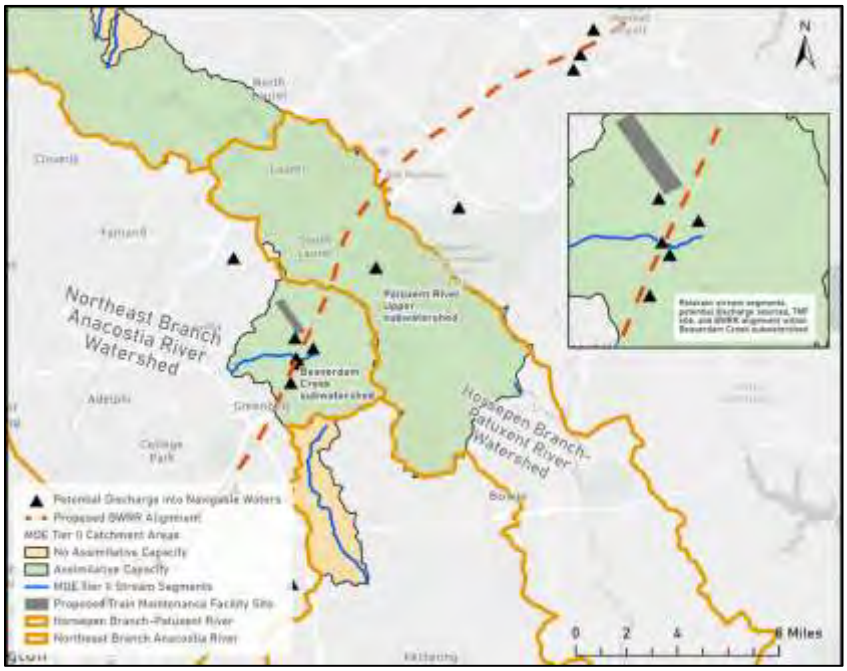
[90] COMAR § 26.08.02.04-2(K)(1)–(4).
[91] *Social and Economic Justification – Outline for Private Entities*, MDE, https://mde.maryland.gov/programs/water/TMDL/WaterQualityStandards/Documents/Tier-II-Forms/PrivateEntity_SEJ_Outline_V1.0.pdf (last updated July 28, 2020).
[92] *Id.*
[93] *Notice of Public Informational Hearings Application for Water Quality Certification 23-WQC-007* at 1, MDE (August 25, 2023).
[94] *Id.*
[95] *Id.*
[96] Exhibit G Tier II Antidegradation Analysis at 1, 19, Baltimore-Washington Rapid Rail (BWRR) (March 1, 2022).
[97] Exhibit C Water Quality Certification Site Layout at 17, BWRR.

Beaverdam Creek I, Beaverdam Creek II, and Patuxent Creek I have remaining AC; (4) BWRR's Tier II alternatives analysis is inadequate; (5) BWRR does not propose sufficient minimization or mitigation of impacts to the Tier II waters; and (6) BWRR does not adequately justify the impacts its proposed project will have on the Tier II waters.

A. The Maryland Department of the Environment and Baltimore-Washington Rapid Rail Fail to Correctly Identify the Tier II Waters that Would be Impacted by the Superconducting Magnetic Levitation Project

Before submitting an application for Water Quality Certification ("WQC") under Section 401 of the CWA for the SCMaglev project,[98] BWRR was required to "determine whether the receiving water body is in a Tier II watershed by consulting the list of Tier II waters."[99] The MDE maintains a public list of Tier II waters,[100] as required by law.[101] Neither the MDE nor BWRR correctly identify the Tier II waters that would be impacted by the SCMaglev project.

The SCMaglev project would directly impact the following Tier II waters: Beaverdam Creek I, Beaverdam Creek II, and Patuxent River I (see Figure 1).



[98] 40 C.F.R. § 121.
[99] COMAR § 26.08.02.04-2(A).
[100] *Tier II Data Table*, MDE, https://mde.maryland.gov/programs/water/TMDL/WaterQualityStandards/Documents/Tier_II_Updates/Antidegradation-Tier-II-Data-Table.pdf (updated Jan. 24, 2023); *see also Maryland Tier II High Quality Waters (2022)*, MDE, https://mdewin64.mde.state.md.us/WSA/TierIIWQ/index.html (interactive mapping tool to locate Maryland Tier II waters).
[101] COMAR § 26.08.02.04-2(B) ("The Department shall compile and maintain a public list of the Tier II waters.").

Figure 1 (Created by Haley Mullen, M.S., Doctoral Student, Center for Geospatial Information Science, Department of Geographical Sciences, University of Maryland)

The MDE has only identified "Beaverdam Creek I Watershed" as impacted by the proposed project. This is in error. Beavercreek I Watershed is not the correct name of the Tier II catchment impacted by the project. Instead, the SCMaglev project would impact the Tier II catchment referred to as the Beaverdam Creek II on the Maryland High-Quality Waters Tier II Mapping tool.[102] Although BWRR correctly identifies that the SCMaglev project would impact the Beaverdam Creek II catchment, it confuses the public by referring to the catchment as a "watershed." Adding to the confusion, the Beaverdam Creek II catchment does not follow the U.S. Geological Survey (USGS) system of hydrologic unit code (HUC) boundaries.[103]

These sub-watersheds are located with 12-digit HUC watersheds. The USGS delineates watersheds based on surface hydrologic features into hydrologic units (HU).[104] Each HU "is a drainage area delineated to nest a multi-level, hierarchical drainage system."[105] An HU can "accept surface water directly from upstream drainage areas, and indirectly from associated surface areas."[106] The Beaverdam Creek Watershed is located within the Northeast Branch Anacostia River Watershed,[107] and the Patuxent River Upper Watershed is located within the Horsepen Branch-Patuxent River Watershed.[108]

While BWRR correctly identifies that the SCMaglev project would impact Patuxent River, a Tier II water located within the Patuxent River Upper Watershed, BWRR fails to identify both Tier II stream segments located within the Beaverdam Watershed—Beaverdam Creek I and Beaverdam Creek II. BWRR proposes 3,269 acres of impacts—forest cover loss, new impervious surfaces, and stream buffer impacts—within this watershed before mitigation.[109] Surface water drainage anywhere within this watershed will impact both Beaverdam Creek I and Beaverdam Creek II.[110] BWRR should have identified both Beaverdam Creek I and Beaverdam Creek II as Tier II waters that would be impacted by the SCMaglev project using the publicly available resources for identifying Tier II waters.[111]

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[102] *Maryland Tier II High Quality Waters (2022)*, MDE, https://mdewin64.mde.state.md.us/WSA/TierIIWQ/index.html (Last visited Oct. 30, 2023).
[103] *Hydrologic Unit Maps*, U.S. Geological Survey (USGS), https://water.usgs.gov/GIS/huc.html (Last modified Apr. 14, 2023).
[104] *Id.*
[105] *Id.*
[106] *Id.*
[107] *Locate Your Stream Site by 12-digit HUC - 020700100203 Northeast Branch Anacostia River*, USGS, https://water.usgs.gov/wsc/a_api/wbd/subwatershed02/020700100203.html (Last visited Oct. 23, 2023)
[108] *Locate Your Stream Site by 12-digit HUC - 020600060401 Horsepen Branch-Patuxent River*, USGS, https://water.usgs.gov/wsc/a_api/wbd/subwatershed02/020600060401.html (Last visited Oct 23, 2023).
[109] *Exhibit G* at 1 Table 1.
[110] *See Hydrologic Unit Codes: HUC 4, HUC 8, and HUC 12*, EPA EnviroAtlas (n.d.), https://enviroatlas.epa.gov/enviroatlas/datafactsheets/pdf/Supplemental/HUC.pdf ("The Watershed Boundary Database (WBD) maps the full areal extent of surface water drainage for the U.S. using a hierarchical system of nesting hydrologic unit at various scales, each with an assigned hydrological unit code (HUC)").
[111] *See supra* note 3.

Even more confounding is that the MDE identifies a different set of Tier II waters than BWRR. In the Notice of Public Informational Hearings on the Application for WQC 23-WQC-0007, the MDE states that "[i]mpacts are proposed within the Tier II watersheds of Beaverdam Creek I and Patuxent River I."[112] Nowhere does the MDE identify Beaverdam Creek II as an impacted Tier II water. BWRR, however, reports in its February 7, 2023, WQC Request Package that it is Beaverdam Creek II and Patuxent River I that will be impacted by the project.[113]

It is a serious and consequential error for both the MDE and BWRR to not analyze both Beaverdam Creek I and Beaverdam Creek II as Tier II waters impacted by the SCMaglev project. Without proper identification of the impacted Tier II segments, BWRR's Tier II analysis is flawed at every step. BWRR is required to identify impacts to all Tier II waters to be impacted by the project, propose alternatives, and minimize and mitigate where alternatives are not feasible.[114] BWRR does not consider impacts to both Beaverdam Creek I and Beaverdam Creek II. BWRR's SEJ report is also improper without consideration of the impacts to both sections of Beaverdam Creek.

This confusion requires the MDE to deny BWRR's WQC request. MDE's notice to the public is defective because it does not properly identify all "waters that are designated as Tier II."[115] The MDE must issue a corrected notice of BWRR's WQC application that properly identifies all impacted Tier II waters and hold hearings to include consideration of both the Beaverdam Creek I and Beaverdam Creek II segments. Since the MDE cannot accomplish this before the one-year WQC decision deadline of February 7, 2023,[116] it must deny the WQC request.

B. Baltimore-Washington Rapid Rail Does Not Sufficiently Investigate and Identify Impacts to Tier II Waters

Central to the Tier II review process is the identification of impacts to Tier II waters.[117] Where impacts are identified, they must be avoided.[118] Where impacts cannot be avoided, they must be minimized or mitigated.[119] Where impacts cannot be minimized or mitigated, they must be justified.[120] Given the critical importance of identifying impacts to Tier II waters, the MDE made identifying impacts the first

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[112] *Notice of Public Informational Hearings on the Application for Water Quality Certification 23-WQC-0007*, MDE (Aug. 25, 2023), https://mde.maryland.gov/programs/water/WetlandsandWaterways/Documents/23-WQC-0007_SCMAGLEV%20WQC%20Hearing%20Notice.pdf.
[113] *Exhibit G* at 1.
[114] COMAR § 26.08.02.04-2(E); *see also Tier II Review*, MDE, https://mde.maryland.gov/programs/Water/TMDL/WaterQualityStandards/Pages/Tier-II-Review.aspx (Last updated Feb., 2022).
[115] COMAR § 26.08.02.04-2(L)(2).
[116] 33 U.S.C § 1341(a)(1); *BWRR SCMagLev Project*, MDE, https://mde.maryland.gov/programs/water/WetlandsandWaterways/Pages/SCMAGLEV.aspx (Last visited Oct. 29, 2023).
[117] *See* COMAR § 26.08.02.04-2; *Tier II Review,* MDE, https://mde.maryland.gov/programs/Water/TMDL/WaterQualityStandards/Pages/Tier-II-Review.aspx (Last updated Feb., 2022).
[118] COMAR § 26.08.02.04-2(G)(1)–(2).
[119] *Id.* § 26.08.02.04-2(G)(3).
[120] *Id.* § 26.08.02.04-2(I).

required step in the Tier II review process.[121] BWRR does not satisfy this step because of a . . . [*summary of how impacts where not properly identified*] (1) lack of studying/assessing; (2) lack of transparency about impacts it is aware of; and (3) failure to include several important, obvious impacts.

No scientific or technical study commissioned or referenced to better understand impacts on Tier II Beaverdam Creek II and Patuxent Creek I is cited in BWRR's 2023 WQC Request Package or its Tier II Review Document.[122] Aside from preparing a Draft Environmental Impact Statement,[123] as required under National Environmental Policy Act, BWRR has not studied or addressed the particular impacts of the SCMaglev project on Tier II water quality. The project would create nearly 5,000 acres of impacts, including forest cover loss, new impervious surfaces, and stream buffer impacts.[124] The project would undoubtedly cause long-lasting harm to these Tier II waters. These impacts are so significant that the MDE has required BWRR to justify them with an SEJ report.[125] The MDE must deny the WQC request for the SCMaglev project because BWRR has failed to carefully investigate and research these significant impacts.

BWRR does not offer a clear, transparent description of the impacts to Tier II waters that it has identified. In the Maryland High-Quality Waters (Tier II) Antidegradation Review Report, BWRR describes the proposed impacts to Beaverdam Creek II and Patuxent Creek I in very general terms.[126] BWRR states that it would clear 257 acres of forest, create 204 acres of impervious surfaces, and impact 2,808 acres of stream buffers in Beaverdam Creek II for the proposed SCMaglev project.[127] BWRR states that it would clear 56 acres of forest, create 18 acres of impervious surfaces, and impact 1,526 acres of stream buffers in Patuxent River I.[128]

1. The Beaverdam Creek Watershed and Patuxent River Upper Watershed are Home to Biodiverse Forests that are Protective of Tier II Water Quality

BWRR does not adequately identify how forest loss from the SCMaglev will harm water quality. Rather than analyzing the variety of impacts the project would have on the forests in the Beaverdam Creek Watershed and Patuxent River Upper Watershed, BWRR broadly refers to "forest cover loss" without a deeper look at the impact of this loss. Watershed forest cover is "directly linked to in-stream

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[121] *Tier II Review,* MDE, https://mde.maryland.gov/programs/Water/TMDL/WaterQualityStandards/Pages/Tier-II-Review.aspx (Last updated Feb., 2022).
[122] 2023 WQC Request Package, BWRR (Feb. 7, 2023), https://mde.maryland.gov/programs/water/WetlandsandWaterways/Pages/SCMAGLEV.aspx.
[123] *Draft Environmental Impact Statement*, Baltimore-Washington Superconducting MagLev Project (Jan., 2021), https://www.bwmaglev.info/project-documents/deis#draft-environmental-impact-statement-deis.
[124] *Exhibit G* at 1 Table. 1.
[125] *Notice of Public Informational Hearings on the Application for Water Quality Certification 23-WQC-0007*, MDE (Aug. 25, 2023), https://mde.maryland.gov/programs/water/WetlandsandWaterways/Documents/23-WQC-0007_SCMAGLEV%20WQC%20Hearing%20Notice.pdf.
[126] *Exhibit G*.
[127] *Exhibit G* at 1 Table. 1.
[128] *Id.*

biodiversity and health."[129] There will be many impacts on Tier II water quality if BWRR is permitted to clear 313 acres of forest in the Beaverdam Creek Watershed and Patuxent River Upper Watershed, including, but not limited to, loss of biodiversity, habitat fragmentation, decreased groundwater filtration, and increased runoff. The MDE may be able to presume what these impacts will be, but it is up to BWRR as the applicant to explain exactly how forest loss will harm water quality in these specific stream segments.[130]

According to the MDE, Maryland's "healthiest streams are associated with the most undisturbed forested watersheds."[131] BWRR does not consider or acknowledge the biodiversity of forests in the Patuxent River Upper Watershed and Beaverdam Creek Watershed. The Patuxent River Upper Watershed contains several forest habitat types. The Watershed is home to upland forests, which are composed of white oak, northern red oak, southern red oak, pitch pine, red maple, American beech, cherry, walnut, hickory, and sweetgum trees.[132] The Watershed also has bottomland or floodplain hardwood forest with river birch, green ash, sycamore, pin oak, swamp white oak, willow oak, black oak, red maple, black gum, sweetgum, yellow poplar, American elm, and sweetbay magnolia.[133] The Beaverdam Creek Watershed has rich tree biodiversity, including birch, elm, alder, willow, red maple, sycamore, and beech, in its watershed wetlands.[134]

By omitting any discussion of the forest resources that would be lost to the SCMaglev project, BWRR disregards the value of these forests, which are already being cut down rapidly. Conversion of forest for development purposes is the "leading cause of canopy loss in the state."[135] This forest loss for development is most pronounced in Central Maryland counties, including Prince George's County, where a significant portion of this project will be located.[136] Anne Arundel County, which is also in the train's path, has lost "more than 300 acres of forest per year between 2010 and 2017, a rate equal to losing more than half a football field of forest each day."[137]

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[129] *MD Solar 1- Shugart Valley Place* at 4, MDE (Aug. 28, 2019), https://mde.maryland.gov/programs/Water/WetlandsandWaterways/Pages/MD_Solar_1.aspx

[130] *Tier II Review,* MDE, https://mde.maryland.gov/programs/Water/TMDL/WaterQualityStandards/Pages/Tier-II-Review.aspx (Last updated Feb., 2022) (Requiring applicants to identify impacts as the first step in Tier II review).

[131] *Id.*

[132] *Patuxent Research Refuge Comprehensive Conservation Plan* at 3-21, U.S. Fish and Wildlife Service (USFWS) (Oct. 2013), https://www.fws.gov/sites/default/files/documents/PWR_2022_RevisedCCP.pdf.

[133] *Id.*

[134] *Characterization of the Anacostia River Watershed in Prince George's County* at 13*, Maryland*, Maryland Department of Natural Resources and Prince George's County (Mar. 2005), https://dnr.maryland.gov/waters/Documents/WRAS/ar_char.pdf.

[135] *Susan Minnemeyer*, *Technical Study on Changes in Forest Cover and Tree Canopy in Maryland* at 77, College of Agricultural and Natural Resources, University of Maryland (Nov. 2022), https://agnr.umd.edu/sites/agnr.umd.edu/files/files/documents/Hughes%20Center/Maryland%20Forest%20Technical%20Study_Use_Final_Web.pdf.

[136] *Id.* at 11.

[137] Codi Yeager and A.J. Metcalf, *The Forest for the Trees*, The Chesapeake Bay Foundation (Oct. 18, 2019), www.cbf.org/blogs/save-the-bay/2019/10/the-forest-for-the-trees.html.

BWRR does not discuss any of the important ecosystem services that would be lost by cutting down 313 acres of forest. The biodiverse forests of the Beaverdam Creek Watershed and Patuxent River Upper Watershed filter out nitrogen, phosphorus, and sediment pollution from runoff to keep it from entering the Tier II waters.[138] Riparian forest buffers along Beaverdam Creek I, Beaverdam Creek II, and Patuxent River I also help maintain a stable temperature in these waters,[139] reduce erosion,[140] and provide wildlife habitat.[141] In clearing these forests, BWRR proposes to create 222 new acres of impervious surface,[142] which would increase the "amount and rapidity of stormwater or surface runoff."[143] At the same time, BWRR states that 1,526 acres of stream buffers will be "impacted."[144] BWRR neither describes the current condition of these buffers nor does it offer any analysis as to what these stream buffer "impacts" would be. By removing forest cover, adding impervious surfaces, and "impacting" stream buffers, BWRR would rapidly facilitate the depreciation of water quality in Beaverdam Creek I, Beaverdam Creek II, and Patuxent River I. The MDE must deny BWRR's WQC request for because it lacks specificity in identifying impacts associated with removing forest cover.

2. BWRR Baltimore-Washington Rapid Rail Does Not Identify Impacts on the Northeast Branch Anacostia Watershed

BWRR overlooks the water quality impact of the SCMaglev project on the Northeast Branch Anacostia Watershed. The Beaverdam Creek Watershed is located within the 12-digit HUC Northeast Branch Anacostia Watershed (see Figure 2).[145]

[138] *Forest Loss*, The Chesapeake Bay Foundation, https://www.cbf.org/issues/forest-loss/index.html (Last visited Oct. 22, 2023).
[139] *Id.*
[140] *Id.*
[141] *Riparian Forest Buffers*, U.S. Department of Agriculture (USDA), https://www.fs.usda.gov/nac/practices/riparian-forest-buffers.php (Last visited Oct. 22, 2023).
[142] *Exhibit G* at 1 Table. 1.
[143] *Urbanization – Stormwater Runoff*, EPA, https://www.epa.gov/caddis-vol2/urbanization-stormwater-runoff (Last updated March 20, 2023).
[144] *Exhibit G*.
[145] *Locate Your Stream Site by 12-digit HUC – 020700100203 Northeast Branch Anacostia River*, USGS, https://water.usgs.gov/wsc/a_api/wbd/subwatershed02/020700100203.html (last visited Oct. 22, 2023).

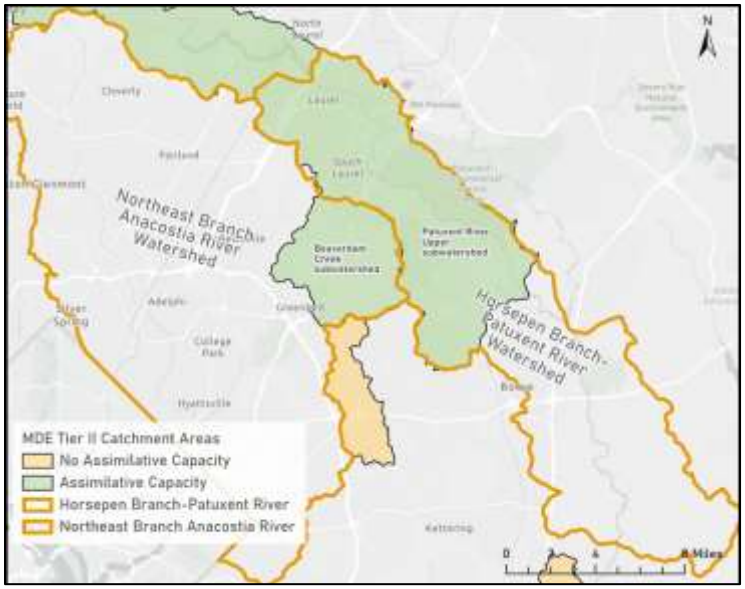

Figure 2 (Created by Haley Mullen, M.S., Doctoral Student, Center for Geospatial Information Science, Department of Geographical Sciences, University of Maryland)

As discussed above, an HU can "accept surface water directly from upstream drainage areas, and indirectly from associated surface areas."[146] Some of the discharges and runoff that enter the Beaverdam Creek Watershed via Beaverdam Creek I and Beaverdam Creek II will make their way into the 12-digit HUC Northeast Branch Anacostia Watershed. For over a decade, conservation groups and local governments have fought hard to improve the water quality of the Anacostia River.[147] The watershed surrounding the Anacostia River, including the Beaverdam Creek Watershed, "serve as the river's natural 'kidneys.'"[148] If the MDE approves BWRR's WQC request, the progress achieved for the Anacostia River would be jeopardized.

3. Baltimore-Washington Rapid Rail Does Not Discuss the Threat of Increased Nitrogen, Phosphorus, and Sediment Pollution

Construction of the SCMaglev project would result in damaging increases in pollution loads of nutrients, sediment, and toxic contaminants. Systemic, long-term increases in pollution loads could result from the conversion, filling, or degradation of porous, bio-active resource lands such as forests, wetlands, and mixed open areas into impervious surfaces.[149]

[146] *Hydrologic Unit Maps*, USGS, https://water.usgs.gov/GIS/huc.html (Last modified Apr. 14, 2023).
[147] Will Schick, *By 2025, We Could Fish and Swim in the Once Notoriously Polluted Anacostia River*, *Greater Greater Washington* (Dec. 17. 2019), https://ggwash.org/view/75019/are-we-really-going-to-be-able-to-swim-and-eat-fish-from-the-anacostia-by-2025.
[148] *Id.*
[149] *See supra* Section IV.A.

This runoff would interfere with compliance with the Chesapeake Bay Total Daily Maximum Load (TMDL).[150] The Chesapeake Bay and many of its tributary rivers and streams are listed as impaired waterways under Section 303(d) of the CWA. As a result of those impairments, the Chesapeake Bay states, including Maryland, asked the EPA to develop a TMDL for nitrogen, phosphorous, and sediment in the Chesapeake Bay and its tributaries. Under the TMDL framework, new or expanding loads to an impaired water body must be accounted for and fully offset so there is no increase in pollution.[151] It is highly likely that the SCMaglev, as proposed, will result in new pollution loads from construction activity and permanent land conversion from forest to urbanized uses. To our knowledge, these increases are not accounted for in the state's TMDL allocations.

In its Tier II Review, BWRR must examine the contribution to changes in pollution loads caused by discharges and increased runoff into Tier II waters and identify any conflicts with the Chesapeake Bay TMDL. Because this has not been done, the application is deficient and WQC must be denied.

4. Baltimore Washington Rapid Rail Does Not Sufficiently Identify Impacts from Construction and Tunneling

BWRR does not offer the necessary detail to evaluate the impact of the construction and tunneling plans on Tier II waters. For example, BWRR does not identify impacts from tunneling spoils, construction stormwater, or the demolition of buildings located at the Beltsville Agricultural Research Center (BARC) a listed Superfund site.[152] The MDE cannot approve BWRR's WQC request without a publicly available analysis of all such impacts.

a. Impacts From Tunneling Spoils

In its Maryland High-Quality Waters (Tier II) Antidegradation Review Report, BWRR states that "[t]he Project will generate approximately 25 million cubic yards of spoils, mostly from tunneling excavation."[153] BWRR claims that "excess spoils from tunnel boring and land grading will be disposed of in ways that avoid or minimize impacts on wetlands and streams."[154] In terms of long-term storage, BWRR states that the spoils will not be disposed of in Tier II watersheds, but that they are "coordinating with Maryland agencies on potential beneficial use of spoils on the Chesapeake Bay shoreline and island enhancement projects."[155]

[150] Chesapeake Bay Total Maximum Daily Load (TMDL), EPA, https://www.epa.gov/chesapeake-bay-tmdl (Last updated Sept. 6, 2023).
[151] 33 U.S.C. § 1313(d).
[152] *NPL Site Narrative for Beltsville Agricultural Research Center (USDA)*, EPA (May 31, 1994), https://semspub.epa.gov/work/03/900213.pdf.
[153] *Exhibit G* at 7 Table 3.
[154] *Id.*
[155] *Id.*

BWRR's Construction Planning Memorandum brings these claims of safe spoil management and storage into question. In that document, BWRR describes "stockpiling the spoils"[156] at launch sites and that transportation of spoils to a final destination "can be via dump truck or heavy rail (CSX)."[157] BWRR does not provide further details about the plan for handling the spoils in a manner that will prevent them from being discharged into the Tier II waters. There is no information regarding how the launch sites will be managed to avoid runoff from the spoils or to keep the spoils from blowing into the Tier II waters. If spoils will be moved by dump truck, BWRR must analyze the impact of increased truck traffic and associated sediment discharge onto local roads from spoil on truck tires or falling off a truck. BWRR does not provide any assurances about how it will prevent spillage of the spoils into waters adjacent to local roads in the Northeast Branch Anacostia River or Horsepen Branch-Patuxent River watersheds during transportation.

In terms of long-term storage of the spoils, BWRR states in the Construction Planning Memorandum that the "material can potentially be useful as daily cover for local landfills . . . and/or fill for local or future projects."[158] This is inconsistent with the intended uses stated in BWRR's Maryland High-Quality Waters (Tier II) Antidegradation Review Report where the company states that a potential beneficial use of spoils could be placement on the Chesapeake Bay shoreline and island enhancement projects.[159] Those locations are not identified nor does BWRR explain how the spoils will leave the truck or train transporting them and be distributed along the Chesapeake Bay shoreline, presumably by barge. Again, the details are woefully absent and the likely impact associated with such a spoil plan is not analyzed. Without a clear plan in place, in which the impacts of different long-term storage impacts are weighed, the public and the MDE are denied the opportunity to consider how this aspect of the project will impact Tier II or Chesapeake Bay water quality.

In its Memorandum on Tunneling Impacts, BWRR states that its tunnel boring machines will utilize "various environmentally friendly foams and soil conditioners to plasticize/liquidize the excavated material in the excavation chamber."[160] BWRR claims that "[t]hese conditioning agents and foams have been carefully developed for environmental friendliness and to achieve practically no aquatic toxicity per Organisation for Economic Co-operation and Development . . . guidelines as well as rapid biodegradation."[161] The MDE and the public should not be required to rely on BWRR's assertions that these substances will not harm Tier II waters. The MDE must require BWRR to disclose the name and main ingredients in these substances and where they will be dispersed so the MDE and the public may sufficiently evaluate BWRR's application.

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[156] *Exhibit I Construction Planning Memorandum* at 15, BWRR (May 14, 2020), https://mde.maryland.gov/programs/water/WetlandsandWaterways/SiteAssets/Lists/SCMAGLEV/NewForm/Exhibit%20I%20-%20BWRR-MEM-0021-R0%20Construction%20Plan%20Rev2%2020.05.14.pdf

[157] *Id.* at 20.

[158] *Exhibit G* at 7 Table 3.

[159] *Id.*

[160] *Exhibit J Memorandum on Tunneling Impacts* at 2, BWRR (Nov. 2, 2022), https://mde.maryland.gov/programs/water/WetlandsandWaterways/SiteAssets/Lists/SCMAGLEV/NewForm/Exhibit%20J%20-%20Tunneling%20Memo.pdf.

[161] *Id.*

b. Impacts From Construction Stormwater

If the MDE permits BWRR to clear 313 acres of forest cover and create 222 acres of new impervious surfaces, the loss of natural filtration provided by the forests will result in increased stormwater runoff into the Tier II waters. As discussed, "water runs off from developed surfaces in higher volumes, at greater speeds, and carries with it a wider variety of pollutants than from undisturbed landscapes."[162] Untreated or uncontrolled stormwater will degrade the water quality of Beaverdam Creek I, Beaverdam Creek II, and Patuxent Creek I by bringing sediment, nutrients, and other pollutants into these Tier II waters.[163] According to the MDE, even the best stormwater management will still cause "alterations to flow and other stream hydrologic response patterns that negatively impact biological stream health."[164]

BWRR only offers one sentence on stormwater management in its Construction Planning Memorandum, which says that "[s]tormwater retention areas will be contained within the TMF footprint."[165] Although BWRR also offers a "Summary of Stormwater Treatments,"[166] this two-page document merely alludes to "standard erosion control practices" to manage water discharges. Once again, BWRR asks the public and the MDE to trust them to figure out key details later. The MDE cannot approve BWRR's WQC request because it does not fully consider the impacts of construction stormwater or provide a plan to manage construction stormwater.

c. Impacts From Demolishing the Beltsville Agricultural Research Center's Superfund Buildings

A closer analysis of BWRR's SEJ report follows; however, for purposes of impacts to Tier II waters, the report states that BWRR would remove 14 "dangerous" BARC buildings containing "a mix of asbestos, mercury, lead, and refrigerant, among others."[167] BWRR explains that it would remove these buildings,

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[162] Jennifer Dindinger et al., *Watershed Restoration and Stormwater Management* at 6, University of Maryland Extension (June 2020), https://extension.umd.edu/sites/extension.umd.edu/files/publications/Basic%20Principles%20of%20Watershed%20Restoration%20and%20Stormwater%20Management%20in%20the%20Chesapeake%20Bay%20Region.pdf.

[163] *See id.* at 8.

[164] *MD Solar 1- Shugart Valley Place* at 4, MDE (Aug. 28, 2019), https://mde.maryland.gov/programs/Water/WetlandsandWaterways/Pages/MD_Solar_1.aspx.

[165] *Exhibit I Construction Planning Memorandum* at 46, BWRR (May 14, 2020), https://mde.maryland.gov/programs/water/WetlandsandWaterways/SiteAssets/Lists/SCMAGLEV/NewForm/Exhibit%20I%20-%20BWRR-MEM-0021-R0%20Construction%20Plan%20Rev2%2020.05.14.pdf.

[166] *Exhibit H Summary of Stormwater Treatments*, BWRR (n.d.), https://mde.maryland.gov/programs/water/WetlandsandWaterways/SiteAssets/Lists/SCMAGLEV/NewForm/Exhibit%20H%20-%20SummaryStormwaterTreatmentTable_05042021rev0.pdf.

[167] *Maryland High Quality Tier Waters (Tier II) Social and Economic Justification Report* at 19-20, BWRR (March 1, 2022), https://mde.maryland.gov/programs/water/WetlandsandWaterways/SiteAssets/Lists/SCMAGLEV/NewForm/SCMAGLEV_Tier_II_SEJ_MDE_R2_22.03.01.pdf.

which are part of a Superfund site,[168] because it is concerned about leakage of the toxins into the Tier II waters.[169] However, BWRR does not offer any detail about how it will safely demolish the buildings without causing these toxins to leak into the watershed. Without a publicly available plan for this building removal, the MDE cannot properly evaluate impacts to Tier II waters.

C. The Maryland Department of the Environment Does Not Provide a Clear, Workable Formula for Calculating Assimilative Capacity

The public cannot discern how the MDE calculates AC and remaining AC from its regulations and agency guidance. As a result, the public cannot properly evaluate the WQC applications requiring Tier II review, such as BWRR's 2023 WQC Request Package. This lack of transparency violates the spirit of the statutorily mandated public participation requirements for permits to discharge into waters of the State.[170]

Maryland regulations provide that assimilative capacity is measured by the difference between the quality of the Tier II water at the time it was designated as such (the "Tier II baseline") and the water quality criterion of the Tier II water at issue.[171] The MDE's webpage on "Tier II Assimilative Capacity" [172] provides an ambiguous formula for calculating assimilative capacity: the Tier II baseline minus the water quality criterion (the Tier I IBI score of 3.00). The MDE states that a Tier II baseline is "represented by the baseline index of biotic integrity (IBI) scores used to initially designate a stream as Tier II (i.e. a fish and benthic score of 4.00)."[173] The MDE offers an "Assimilative Capacity Analysis" example, in which the first step is to calculate available AC.[174] There, to calculate AC, the MDE subtracts the Tier I water quality criterion of 3.00 from an example benthic IBI score of 5.00 and concludes that available assimilative capacity is 2.00.[175] However, the MDE does not consider the fish IBI score in the example, suggesting that the agency only considers the benthic score. Such scores are reported for each Tier II water and are an important part of evaluating AC.[176] Fish IBI scores are an

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[168] *Demolition of 22 Buildings at the Henry A. Wallace Beltsville Agricultural Research Center Beltsville* at 3-22*, Maryland*, USDA (January 2020), *www.ars.usda.gov/ARSUserFiles/80000000/Draft%20Environmental%20Assessment%202020/USDA-ARS_BARC_22_Building_Demo_EA_2020JAN22.pdf* .

[169] *Maryland High Quality Tier Waters (Tier II) Social and Economic Justification Report* at 20, BWRR (March 1, 2022), https://mde.maryland.gov/programs/water/WetlandsandWaterways/SiteAssets/Lists/SCMAGLEV/NewForm/SCMAGLEV_Tier_II_SEJ_MDE_R2_22.03.01.pdf.

[170] Md. Code § 1-601(a)(3); *see also* COMAR § 26.08.02.04-2(M)(1).

[171] *Id.* § 26.08.02.04-2(A)(a)–(b).

[172] *Tier II Assimilative Capacity*, MDE, https://mde.maryland.gov/programs/Water/TMDL/WaterQualityStandards/Pages/Tier-II-AC.aspx (June 2021).

[173] *Id.*

[174] *Id.*

[175] *Id.*

[176] *Tier II Data Table*, MDE, https://mde.maryland.gov/programs/water/TMDL/WaterQualityStandards/Documents/Tier_II_Updates/Antidegradation-Tier-II-Data-Table.pdf (updated Jan. 24, 2023);

"attempt to quantify a biologist's best professional judgment . . . of the quality of a fish assemblage,"[177] in a waterbody and are an important measure of Tier II water quality.

Here, the proposed rail line will travel just to the north of Patuxent River I which flows through the Patuxent Research Refuge. The refuge was "[c]reated to conserve and protect wildlife and wildlands through research, Patuxent Research Refuge offers 13,000 acres of tranquil forest, meadow, and wetlands amid a densely populated urban area."[178] There, the river is home to at least 55 species of fish,[179] including bluegill, bass, catfish, black crappie, white crappie, shad, carp, and yellow perch.[180] Beaverdam Creek I and Beaverdam Creek II habitat for smallmouth bass.[181] The MDE must include fish IBI scores, an important measure of water quality, in its calculation of Tier II baselines generally and during its review of BWRR's WQC application. The Maryland Coalition for Responsible Transit asserts that if fish scores are considered, the MDE will find that the relevant Tier II waters have little to no AC. Thus, the WQC should be denied.

D. Baltimore-Washington Rapid Rail Does Not Consider the Current Water Quality of the Impacted Tier II Waters and Does Not Calculate Remaining Capacity

BWRR's WQC application is inadequate because it does not consider whether the Tier II waters (Beaverdam Creek I, Beaverdam Creek II, and Patuxent Creek I) have remaining AC. Where alternatives are not cost-effective and feasible, the applicant must demonstrate to the MDE how they will "configure or structure the discharge or other regulated activities that may cause a potential water quality impact so as to minimize the use of assimilative capacity of the water body."[182] It is impossible for the public to discern whether BWRR's proposal will minimize the use of assimilative capacity for two reasons: (1) the MDE does not provide a clear, workable formula for calculating assimilative capacity; and (b2) BWRR does not report any analysis of the current water quality of the impacted Tier II waters.

In its WQC request, BWRR does not inform the MDE or the public on the current health of Beaverdam Creek I, Beaverdam Creek II, or Patuxent Creek I, or how much assimilative capacity remains in these waters. In addition, the IBI scores for these Tier II waters are more than 20 years old and should not be considered accurate for purposes of determining assimilative capacity. Therefore, the MDE must deny BWRR's WQC request and require new biological evaluation of the Tier II segments before considering any future applications for this project. Without current water quality data on these Tier II waters, neither the MDE nor the public can properly evaluate BWRR's WQC application.

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[177] *Chapter 8 (Part B): Fish Protocols*, EPA, https://archive.epa.gov/water/archive/web/html/ch08b.html (last visited Oct. 21, 2023).
[178] *Patuxent Research Refuge*, USFWS, https://www.fws.gov/refuge/patuxent-research (Last visited Oct. 30, 2023).
[179] *Patuxent Research Refuge Comprehensive Conservation Plan* at 3-17, USFWS (Oct. 2013), https://www.fws.gov/sites/default/files/documents/PWR_2022_RevisedCCP.pdf.
[180] *Id.* at 3-35.
[181] *Characterization of the Anacostia River Watershed in Prince George's County* at 19*, Maryland*, Maryland Department of Natural Resources and Prince George's County (Mar. 2005), https://dnr.maryland.gov/waters/Documents/WRAS/ar_char.pdf.
[182] COMAR § 26.08.02.04-2(G)(2).

An applicant for a WQC is required to prepare an SEJ if (a) no cost-effective alternative to the discharge or water quality impacts is available or (b) the cumulative degradation resulting from nonpoint source pollution and any other permitted discharges would diminish water quality.[183] Water quality is considered diminished if assimilative capacity of the Tier II water is cumulatively reduced by more than 25 percent from the Tier II baseline.[184]

The MDE has required BWRR to justify proposed "unavoidable" impacts to Tier II waters with an SEJ report[185] because BWRR asserts that there is no "available cost-effective alternative to the discharge or water quality impacts."[186] In its SEJ report, BWRR states it has been required to justify its impacts to Tier II waters because "the project has location specific restrictions that prevent complete avoidance of Tier II watersheds." BWRR makes no mention of whether the SEJ report is required because the project would also diminish water quality, which is a second reason justification may be required. In fact, BWRR's WQC Request Package completely dodges any investigation or analysis of exactly how much the SCMaglev project would diminish the water quality of Tier II waters relative to how much AC these waters have remaining. Instead, BWRR summarily lists aquatic life data collected by the Maryland Biological Stream Survey (MBSS) in the late 1990s and early 2000s.[187]

The MBSS offers a Stream Health Index Map in which it reports data from volunteer-collected water samples.[188]A sample taken from Beaverdam Creek I in 2011 indicates an IBI Score (fish or benthic are not specified) of 2.71 (fish or benthic are not specified).[189] A sample taken from Beaverdam Creek I in 2013 close to where the water crosses under the Baltimore-Washington Parkway indicates an IBI score of only 1.57.[190] For Beaverdam Creek II, a sample collected in 2006, close to where the water crosses under the Baltimore-Washington Parkway indicates an IBI score of 1.86.[191]A sample collected from Beaverdam Creek II in 2011 indicates an IBI score of 3.57.[192] The MBSS does not have any sample data reported for Patuxent River I.[193] There is no additional publicly available data on the current biological status of Beaverdam Creek I, Beaverdam Creek II, or Patuxent Creek I.

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[183] COMAR § 26.08.02.04-2(I)(1)(a)–(b).
[184] *Id.* § 26.08.02.04-2(I)(2).
[185] *Notice of Public Informational Hearings on the Application for Water Quality Certification 23-WQC-0007*, MDE (Aug. 25, 2023), https://mde.maryland.gov/programs/water/WetlandsandWaterways/Documents/23-WQC-0007_SCMAGLEV%20WQC%20Hearing%20Notice.pdf.
[186] COMAR § 26.08.02.04-2(G)(2).
[187] *Exhibit G Aquatic Life Data*, BWRR (n.d.), https://mde.maryland.gov/programs/water/WetlandsandWaterways/SiteAssets/Lists/SCMAGLEV/NewForm/Exhibit%20E%20-%20StreamHealth_MBSS_221103_Compiled.pdf.
[188] *Stream Health Index Map*, MBSS, https://maryland.maps.arcgis.com/apps/webappviewer/index.html?id=30ee9336f8d54e4ebf971c3a1a7576ed
[189] *Id.*
[190] *Id.*
[191] *Id.*
[192] *Id.*
[193] *Id.*

The MDE must deny BWRR's WQC request and require new water quality sampling to be done before considering any future applications for this project. Without current biological survey data on these Tier II waters, neither the MDE nor the public can properly evaluate BWRR's WQC application. With this current water quality data and greater transparency from the MDE on how to calculate assimilative capacity and remaining assimilative capacity, all stakeholders would have the opportunity to understand the true impact of the SCMaglev project on Tier II waters.

E. Baltimore-Washington Rapid Rail's Tier II Alternatives Analysis is Inadequate

Since BWRR's proposed SCMaglev project would impact the water quality of Tier II waters, BWRR must evaluate reasonable alternatives to eliminate or reduce discharges or impacts to these waters.[194] BWRR's alternatives analysis at the Tier II review stage[195] is inadequate. The MDE requires "[t]he level of detail for the alternative analysis process" to "appropriately match the complexity of the project. . . ."[196] Rather than offering a detailed analysis of "factors such as resource impacts to Tier II watersheds in terms of impervious cover, forest cover loss, riparian buffer impacts, public comment, etc.,"[197] BWRR concludes in a few sentences that there is no alternative route outside of Tier II watersheds.[198] While BWRR refers to the alternatives analysis done in its March 2021 Joint Permit Application for a Nontidal Wetlands Permit and Tidal Wetlands License Application, this prior analysis is not part of the mandatory Tier II review process and cannot substitute for an alternatives analysis at this stage. BWRR has essentially skipped the avoidance alternatives analysis—step two of the Tier II review process.[199] The MDE must deny BWRR's WQC request because it is missing this essential step.

F. Baltimore-Washington Rapid Rail Does Not Propose Sufficient Minimization or Mitigation of Impacts to Tier II Waters

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[194] COMAR § 26.08.02.04(H); *Id.* § 26.08.02.04-2(E).

[195] *Maryland High-Quality Waters (Tier II) Antidegredation Review Report Alternatives Analysis- No Discharge Alternative*, BWRR (Mar. 29, 2021), https://mde.maryland.gov/programs/water/WetlandsandWaterways/SiteAssets/Lists/SCMAGLEV/NewForm/MAGLEV%20Tier%20II%20Minimization%20Alternatives%20Package_Compiled_210819.pdf.

[196] *Antidegradation Review Report Form Alternatives Analysis- No Discharge Alternative* at 4, MDE, https://mde.maryland.gov/programs/water/TMDL/WaterQualityStandards/Documents/Tier-II-Forms/TierII_NoDischargeAnalysis_Form.pdf (Last updated Jan. 4, 2023).

[197] *Id.*

[198] *Maryland High-Quality Waters (Tier II) Antidegradation Review Report Alternatives Analysis- No Discharge Alternative* at 3, BWRR (Mar. 29, 2021), https://mde.maryland.gov/programs/water/WetlandsandWaterways/SiteAssets/Lists/SCMAGLEV/NewForm/MAGLEV%20Tier%20II%20Minimization%20Alternatives%20Package_Compiled_210819.pdf.

[199] *Tier II Review*, MDE, https://mde.maryland.gov/programs/Water/TMDL/WaterQualityStandards/Pages/Tier-II-Review.aspx (Last updated Feb., 2022).

Even if the MDE finds that BWRR provided a sufficient analysis of reasonable alternatives that do not require direct discharge to Tier II waters,[200] the MDE must deny BWRR's WQC request because BWRR's minimization alternatives analysis is grossly inadequate. The MDE cannot assure water quality adequate to protect existing uses[201] in Beaverdam I, Beaverdam II, and Patuxent River I unless BWRR sufficiently demonstrates with sufficient detail how it will minimize and mitigate impacts to these Tier II waters. The MDE requires that an applicant for a WQC first demonstrate minimization of impacts and second propose mitigation where avoidance of impacts is not possible.[202] Both the minimization and mitigation analyses are applicable to "all areas of the whole and complete project within a Tier II watershed."[203]

There are several instances in the Alternatives-Analysis-Minimization Alternatives Report where BWRR does not offer a complete and comprehensible explanation of how it will minimize and mitigate impacts to Tier II waters. Additionally, there is reason to doubt whether BWRR will be able to follow through on some of its minimization and mitigation plans. There are many instances in which BWRR uses qualifiers such as "in most cases," "where possible," and "where feasible."[204] In doing so, BWRR avoids commitment to minimization and mitigation measures necessary to prevent harm to the impacted Tier II waters.

First, BWRR presents a table listing "minimization and avoidance treatment" measures to minimize impacts to the "Beaverdam Creek 2 Watershed" (the Beaverdam Creek Watershed).[205] However, they do not offer a similar table describing measures to minimize impacts to the "Patuxent River I Watershed" (the Patuxent River Upper Watershed) or Beaverdam Creek 1.[206]

Next, BWRR's reforestation and conservation plans are flawed in several important ways. For example, to achieve the mandatory 1:1 ratio for in-kind, off-site mitigation of forest cover loss, BWRR reached out to landowners to see if they would be willing to enter into landowner agreements to reforest or conserve forests on their property.[207] The Alternatives Analysis Minimization Alternatives Report presented the "approximate best-case results based on the site search and landowner response to BWRR solicitations."[208] BWRR's outreach to landowners in 2021 drew little interest. In the Patuxent

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[200] *Maryland High-Quality Waters (Tier II) Antidegradation Review Form Alternatives Analysis- No Discharge Alternative* at 1, BWRR (Mar. 29, 2021), https://mde.maryland.gov/programs/water/WetlandsandWaterways/SiteAssets/Lists/SCMAGLEV/NewForm/MAGLEV%20Tier%20II%20Minimization%20Alternatives%20Package_Compiled_210819.pdf.
[201] Md. Code. § 131.12(a)(2).
[202] *Tier II Review*, MDE, https://mde.maryland.gov/programs/Water/TMDL/WaterQualityStandards/Pages/Tier-II-Review.aspx (Last updated Feb. 2022).
[203] *Antidegradation Review Report Form Alternatives Analysis - Minimization Alternatives* at 1, MDE at 2, https://mde.maryland.gov/programs/water/TMDL/WaterQualityStandards/Documents/Tier-II-Forms/TierII_Minimization_Form.pdf (Last updated Jan. 4, 2023).
[204] *Exhibit G.* at 6 Table 3.
[205] *Exhibit G* at 19 Table 4.
[206] *Id.* at 12-17.
[207] *Appendix D SCMagLev Tier II Watersheds Off-Site Reforestation and Conservation Site Search*, BWRR (Dec. 10, 2021)
[208] *Appendix* D at 9.

River Upper Watershed, BWRR reached 43 landowners, and only six indicated interest.[209] Despite conducting two rounds of outreach to hundreds of landowners in the Beaverdam Creek Watershed, BWRR does not report any landowner interest in entering into an agreement.[210] The outreach to landowners in both watersheds took place over two years ago. Landowners may have changed their minds at this point.

BWRR has admitted that its mitigation will not fully address the impacts its project will cause. BWRR concedes that, due to "the lack of property owner responsiveness," 1:1 in-kind, off-site reforestation "does not appear to be achievable"[211] in the Beaverdam Creek Watershed. It appears that BWRR has overstated the off-site reforestation potential around the Patuxent River Upper Watershed. A cross-reference between Appendix D Attachment D3[212] and Google Maps suggests that the entirety of the identified landowner parcels near Patuxent River I are not available for reforestation because they are already forested, have bodies of water on them, or contain developed or impervious surfaces.

As a result, BWRR's estimation of fully mitigated impacts is significantly overstated. As discussed below, BWRR does not adequately justify the impacts of the SCMaglev project. There is even greater reason to question the claims of the SEJ report because hundreds of acres of forest cover loss may go unmitigated. The MDE must deny the WQC application because BWRR has not shown that it can successfully mitigate forest cover loss.

Moreover, the landowner agreements will not be finalized until "later phases of the project."[213] Landowners who have expressed interest in entering into landowner agreements could decide to back out after the MDE decides on BWRR's WQC request. Another concern is that BWRR does not state any specifications for these potential landlord agreements to reforest or conserve forests. BWRR puts off creating an on-site and off-site planting plan until "the final design."[214] BWRR admits that "details of compensation, type of plantings, and specific schedules are not yet available."[215] As a result, there is no assurance that BWRR will require landowners to plant or maintain trees representative of the biodiversity in the impacted watersheds. Even if BWRR does plant trees of such biodiversity, new trees will not offer the same value to the watershed as existing mature trees. Additionally, it is unclear whether BWRR will provide ongoing monitoring of land to ensure adherence to the agreements. Without specific plans for the terms and management of landowner agreements available for public review, the MDE cannot grant BWRR's WQC request.

Next, BWRR forgoes any detail as to how it will minimize and mitigate impacts from the 222 acres of new impervious surfaces it will create. BWRR merely offers that the new impervious surfaces will be

[209] *Exhibit G* at 16; *Appendix D SCMagLev Tier II Watersheds Off-Site Reforestation and Conservation Site Search* (Appendix D) at 4, BWRR (Dec. 10, 2021).
[210] *Exhibit G at 23; Appendix D SCMagLev Tier II Watersheds Off-Site Reforestation and Conservation Site Search* at 7, BWRR (Dec. 10, 2021).
[211] *Ibid.* at 24.
[212] *Appendix D Attachment D3*. at pdf pgs. 63-67.
[213] *Exhibit G* at 17.
[214] *Ibid.* at 11.
[215] *Ibid.* at 2.

treated with Stormwater Management Environmental Site Design (SWM ESD) to the Maximum Extent Practicable. Again, BWRR puts off key planning to protect Tier II water quality for later. BWRR states that its Stormwater Management Plan will be provided as part of the Stormwater Concept Design review and approval process, which "will be provided when the project design is further developed."[216]

The MDE expressed dissatisfaction with BWRR's lack of planning to manage stormwater runoff in a September 8 letter to BWRR: "The information provided in the Certification request is limited to demonstration that sufficient footprint exists to construct stormwater BMPs and gives a description of stormwater discharge points and a summary of BMP treatment recommendations . . . ."[217] "For significant projects of this type and scale," the MDE stated, "a request for Certification should include a concept-level Stormwater Management Plan that has been submitted and reviewed by the appropriate authority, thereby demonstrating how Maryland's water quality standards are minimally and conceptually planned to be met."[218] The MDE must deny BWRR's WQC request, because, as the Department itself says, "a statement that [BWRR] will obtain [all state or other required authorizations] later is . . . not [a] sufficient demonstration that water quality standards will not be violated."[219]

BWRR's monitoring plan for Tier II minimization and mitigation also falls short. BWRR states that "sites will be monitored for a minimum of five years," and in that time "[r]eports will provide visuals of establishment progress, as well as narrative descriptions."[220] Monitoring must be required for more than five years since the ongoing impacts of train operation would continue as long as the train is in operation. The SCMaglev project will have a significant detrimental impact on Tier II water quality, yet BWRR does not provide any water quality monitoring plans. BWRR does not express any intention to track basic water quality parameters, such as dissolved oxygen, turbidity, temperature, pH, and conductivity, or monitor the discharge of solvents or toxics discharged from the TMF. Monitoring the extensive infrastructure in terms of long-term construction, materials integrity, stormwater management, pollution controls, and ongoing mitigation measures should be an integral part of BWRR's operational and fiscal responsibility.

BWRR's application does not exhibit the level of care, detail, and diligence required to protect water quality in Beaverdam I, Beaverdam II, and Patuxent River I while pursuing the SCMaglev project. Accordingly, the MDE must deny BWRR's WQC request.

G. Baltimore-Washington Rapid Rail Does Not Adequately Justify Impacts to Tier II Waters

[216] *Ibid.* at 1.
[217] Letter from Danielle A. Spendiff, MDE, to Mr. Neb Sertsu, BWRR at 3-4 (Sept. 8, 2023), https://mde.maryland.gov/programs/water/WetlandsandWaterways/SiteAssets/Lists/SCMAGLEV/NewForm/23-WQC-0007%20(BWRR)_MDE%20WQC%20Comments_09082023.pdf.
[218] *Id.*
[219] *Id.*
[220] *Exhibit G* at 11.

BWRR has not met its burden to demonstrate "that an economic hardship and/or public benefit overrides the value of ecological services or water quality benefit"[221] that Beaverdam I, Beaverdam II, and Patuxent River I provide. First, BWRR has not made a good-faith effort to avoid, minimize, and mitigate impacts. Second, BWRR's labor and ridership projects are questionable. See Section 6 - Financial Stability and Ridership Projection Issues. Third, BWRR does adequately consider the ecological and social value of healthy Tier II waters. Therefore, the MDE cannot approve BWRR's WQC request.

BWRR does not properly arrive at the SEJ step in the Tier II review process. An applicant must provide an SEJ if (1) there is no "available cost-effective alternative to the discharge or water quality impacts"; or (2) "the cumulative degradation resulting from nonpoint source pollution and any other permitted discharges would diminish[222] water quality."[223] However, as discussed, BWRR has not made sufficient attempts to explore avoidance alternatives and minimization and mitigation measures.

Even if BWRR properly arrives at the justification step in the Tier II review process, it does not adequately justify impacts on Tier II waters. As discussed in the employment section of these comments, there are several discrepancies in BWRR's labor projections. For example, with respect to ridership, the usage of the SCMaglev is unlikely to be what BWRR claims it will be due to factors including high ticket prices and an outflow of high-income earners from the region. The SCMaglev project is reliant on farebox revenue to cover operating costs[224] and will not succeed without significant ridership. BWRR's inability to secure funding for construction at this point is also concerning.[225] Without adequate funds to construct and operate the project, BWRR may begin to build and then later abandon the project, leaving behind long-lasting damage to Tier II waters.

The MDE instructs applicants to discuss the benefit of Tier II waters to the community and the environment, as well as impacts on property value, recreational value, and other quality of life benefits.[226] BWRR does not consider the economic value of healthy Tier II waters. The economic value of healthy watersheds, including "water filtration and storage, air filtration, carbon storage, nutrient cycling, soil formation, recreation, food and timber" are often "under-valued when making land use decisions."[227] Additionally, BWRR is dismissive of the social and recreational value of the Beaverdam

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[221] *Social and Economic Justification – Outline for Private Entities*, MDE, https://mde.maryland.gov/programs/water/TMDL/WaterQualityStandards/Documents/Tier-II-Forms/PrivateEntity_SEJ_Outline_V1.0.pdf (last updated July 28, 2020).

[222] Water quality is considered diminished if AC is cumulatively reduced by more than 25 percent from the baseline water quality of either benthic or fish IBI value used to make the Tier II stream designation. COMAR § 26.08.02.04-2(I)(2).

[223] COMAR § 26.08.02.04-2(I)(1)(a)–(b).

[224] *Maryland High Quality Waters (Tier II) Social and Economic Justification Report* at 15, BWRR (Mar. 1, 2022), https://mde.maryland.gov/programs/water/WetlandsandWaterways/SiteAssets/Lists/SCMAGLEV/NewForm/SCMAGLEV_Tier_II_SEJ_MDE_R2_22.03.01.pdf.

[225] *Id.*

[226] *Social and Economic Justification – Outline for Private Entities*, MDE, https://mde.maryland.gov/programs/water/TMDL/WaterQualityStandards/Documents/Tier-II-Forms/PrivateEntity_SEJ_Outline_V1.0.pdf (last updated July 28, 2020).

[227] *The Economic Benefits of Protecting Healthy Watersheds* at pdf pg. 1, EPA (Apr. 2012), www.epa.gov/sites/default/files/2015-10/documents/economic_benefits_factsheet3.pdf.

Creek and Patuxent River Upper watersheds. The BARC and the Patuxent Research Refuge, cherished public access sites, could be eliminated or reduced and would be made less enjoyable for public use by the SCMaglev project. BWRR does not merely demonstrate indifference to the value of these public resources, but disdain. BWRR scoffs at the ecological value of the BARC by arguing it is "not a pristine untouched habitat."[228]

The MDE must deny BWRR's WQC request because BWRR does not properly account for the costs and benefits of this project and does not justify impacts to Tier II waters.

H. Baltimore-Washington Rapid Rail May Not Add to the Water Quality Certification Request Record After November 16, 2023

The MDE must "provide public notice of each application for certification"[229] and allow for public comment. After "the closing date for receipt of written comments . . ." the MDE shall "consider the testimony and other information presented," "prepare a written decision," and "[p]ublish the decision in the Maryland Register."[230] The MDE must not accept supplemental information from BWRR after the November 16, 2023, public comment submission deadline. To do so would frustrate the purpose of the public comment period.

In a September 8, 2023, letter from the MDE to BWRR, the MDE requested that they supplement their WQC request with additional information concerning the potential impacts to water in areas already overburdened by pollution and sensitive populations, construction and operational impacts on water quality, and any additional best management practices or mitigation measures that may be implemented for unavoidable impacts.[231] In this letter, the MDE requested that BWRR provide this supplemental information on or before November 2, 2023.[232] In a reply letter from BWRR to the MDE dated October 19, 2023, BWRR claims that the MDE granted an extension to submit the requested supplemental material by December 4, 2023.[233]

However, in a reply letter from the MDE to BWRR dated October 25, 2023, the department clarifies that "a formal extension to the requested response date of November 2, 2023, was not granted . . .

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[228] *Maryland High Quality Waters (Tier II) Social and Economic Justification Report* at 24, BWRR (Mar. 1, 2022), https://mde.maryland.gov/programs/water/WetlandsandWaterways/SiteAssets/Lists/SCMAGLEV/NewForm/SCMAGLEV_Tier_II_SEJ_MDE_R2_22.03.01.pdf.
[229] COMAR § 26.08.02.10(C)(1).
[230] *Id.* § 26.08.02.10(3)(a)–(c).
[231] Letter from Danielle A. Spendiff, MDE, to Neb Sertsu, BWRR (Sept. 8, 2023), https://mde.maryland.gov/programs/water/WetlandsandWaterways/SiteAssets/Lists/SCMAGLEV/NewForm/23-WQC-0007%20(BWRR)_MDE%20WQC%20Comments_09082023.pdf.
[232] *Id.* at 2.
[233] *Id.* at 6.

."[234] Despite this clarification, the MDE walks back its commitment to the November 2 (now November 16 due to an extension) deadline later in the letter and states that "[t]he Department would accept additional information as it becomes available after [November 16] provided sufficient information exists for review of new material and a timely WQC decision, and will be available as schedules allow for communication and coordination in this regard."[235] It is contrary to the public participation procedures provided for in WQC decision-making for the MDE to allow BWRR to submit supplemental material after the close of the comment period. BWRR failed to meet its burden in its initial WQC, submitted on February 7, 2023. With only a few months remaining to decide about BWRR SCMaglev certification, the MDE should deny the WQC request.

I. Tier II Review Conclusion

BWRR does not meet the legal requirements set forth by Section 401 of the CWA that protect high-quality Tier II waters from degradation. The MDE must deny BWRR's water quality certification request because BWRR does not provide a satisfactory Tier II review.

[234] Letter from Neb Sertsu, BWRR, to Danielle A. Spendiff, MDE, to Mr. Neb Sertsu, BWRR (Oct. 19, 2023), https://mde.maryland.gov/programs/water/WetlandsandWaterways/SiteAssets/Lists/SCMAGLEV/NewForm/BWRR%20Letter%20re%20MDE%20Comments%20on%20WQC%20Application_10192023.pdf.
[235] Letter from Danielle A. Spendiff, MDE, to Neb Sertsu, BWRR (Oct. 25, 2023), https://mde.maryland.gov/programs/water/WetlandsandWaterways/SiteAssets/Lists/SCMAGLEV/NewForm/23-WQC-0007%20(BWRR)_MDE%20Response_10252023.pdf.

II. Environmental Concerns

In addressing water quality certification requests, it is the role of our trusted civil servants at the Maryland Department of the Environment (MDE) to examine the material presented and determine whether a proposed project will harm Maryland waterways and whether harmful effects are avoidable or may be justified and/or mitigated.

Baltimore-Washington's (BWRR's) Water Quality Certification (WQC) application does not demonstrate the level of specificity and accuracy required by the MDE to grant this certification. There are several flaws in the application, including the lack of specificity regarding stormwater treatments, aquatic life data that are nearly 20 years old, and reporting on different impacted Tier II waters than the MDE in the agency's public notice. The Maryland Coalition for Responsible Transit (MCRT) has many concerns regarding the permanent and very significantly damaging impacts on the functional capacity of the watersheds and the downstream implications.

The MCRT supports the "No Build" option due to the many inequities of the project, as discussed throughout this comment submission. The cost to the environment will be significant, especially in the alignment that is east of the Baltimore-Washington Parkway (BW Parkway). If a different alignment is selected, as indicated in the exchange below, the monetary cost of the project would make it infeasible. Any decision to move forward with this project is going to have deep and irreversible consequences and impacts. In the Joint Permit Application (JPA), the U.S. Army Corps of Engineers (USACE) comments:

> Exhibit E of the JPA seems to indicate that permanent wetland impacts associated with alignment J are similar to the permanent wetland impacts associated with alignment J1. Permanent wetland impacts for the BARC Train Maintenance Facility (TMF) on either alignment appear to be the same. However, when examining the project as a whole, Exhibit F appears to show that build alternative J1-03 would have comparable total wetland impacts as compared to J-03, and would have less overall impacts to NTWSSC, waterways, and floodplains. Additionally, Exhibit I: Appendix A: Alternatives Comparison Matrix shows that aggregated alternatives G through L, on alignment J1, minimize and/or entirely reduce land acquisitions needed from certain Federal Properties, particularly National Park Service, Patuxent Research Refuge, Fort Meade, Secret Service, and NASA land. . . . The Corps recognizes these alternatives may be more costly and may have a greater number of residential properties within 200 feet of the alignment. However, alternatives along alignment J1 should be retained for analysis in the case that one or more of the Federal properties is unable to authorize the SCMAGLEV system.[236]

The response from BWRR indicated that the cost of the project, if it did not take federal lands, would make any other alternative not feasible, and therefore would be the end of the project:

[236] Maryland Department of the Environment (MDE). Water Quality Certification: SCMaglev. Joint Permit Application, Exhibit R. Item #2. USACE-2. Page 2. March 11, 2021.

> While the J1-03 alignment may appear to have less impact, the reduction in surface impacts comes at the expense of added tunneling which would render this project no longer viable as it would add ~$1-Billion in added tunneling cost, plus ~1.7-Million cubic yards of tunnel spoils to be disposed. Additionally, the J1-03 alignment would daylight in the Greenbelt Forest Refuge. . . . Use of federal land is paramount to this project's success as the incremental costs associated with the J1 alternative make it unattainable. Further, BWRR remains committed to minimizing impacts to residential properties and avoiding residential displacements to the greatest extent possible.[237]

Making federally-owned land available to private companies sets a dangerous precedent. Other private corporations could build landfills. Mining companies could claim "public good" and destroy land owned by the Beltsville Agricultural Research Center (BARC), Patuxent Research Refuge (PRR), or National Aeronautics and Space Administration (NASA). They could create an unnecessary and inconveniently located industrial zone, as well as impact federally-owned land in other parts of the United States. This may become a major part of the impact of the project. Building the Superconducting Magnetic Levitation (SCMaglev) train on public lands opens them up for similar development. Industrial development for private corporations currently is not permitted in these landscapes. Just as the SCMaglev is touted as providing future good to the region, it also sets the stage for future loss and diminishment of this remnant conservation land. Some of the impacts include:

- If built, the last and largest green space between Baltimore and Washington, D.C., will be weakened and partially disassembled. Green Corridor—the area that covers Greenbelt Park, the Greenbelt Forest Preserve (Forest Preserve), the BARC, and the PRR—is the largest span of contiguous forest and conservation lands in the Baltimore-Washington region. Building in these areas, whether intended to be permanent or "temporary" will cause irreversible damage.

- If built, recreational runners, walkers, and bicyclists will lose a large part of what is a relatively safe, nature-focused public road network where they can exercise in a healthy environment.

The Land and Water Conservation Fund of 1965 (LWCF), Section 6(f), requires the National Park Service (NPS) to approve any conversion of lands purchased with LWCF assistance. According to the Forest Preserve's Advisory Board's January 25, 2018, memorandum on legal protections for the Forest Preserve, Parcel 1 was purchased in part by LWCF funds, through Maryland's Program Open Space. The NPS will consider conversion of an LWCF property only if certain requirements are met. Prerequisites for conversion approval include, but are not limited to, the NPS determining that all practical alternatives to the conversion have been evaluated and that the proposed replacement property is of equal usefulness. Although replacement properties do not have to be adjacent to or close by the converted site, generally the property should serve the same community. However, it may be difficult for a replacement site to serve the same community, given the lack of nearby private greenspace that could meet the same use.

[237] *Id*.

The SCMaglev project will directly and negatively impact up to 88.9 acres of property owned by the NPS. All these impacts will be focused around the historic and scenic BW Parkway, which was established in 1950 by Congress. The legislation designated the new road as "a limited access road primarily to provide a protected, safe, and suitable approach for passenger-vehicle traffic to the National Capital . . . "[238] More importantly, this 1950s legislation gave the authority to "the Secretary of the Interior, with the concurrence of the Secretary of Commerce" to "control the location, limit the number of access points, and regulate the use of said parkway . . . "[239] While BWRR's Draft Environmental Impact Statement (DEIS) highlights that impacts to the BW Parkway would be "difficult to mitigate," we view this assessment to be greatly understated. These impacts would be impossible to mitigate. Massive viaducts along the BW Parkway will permanently alter its historic importance as a scenic entrance into our nation's capital. There are numerous portions along the BW Parkway where the viaducts will be visible in perpetuity, and any screening will lose its efficacy for six months of the year. These impacts are in complete contradiction of the 1950 enabling legislation for the BW Parkway.

III. Total Maximum Daily Loads: Negative Impacts on Meeting the Chesapeake Bay Clean-Up Goals

Each SCMaglev build alternative would directly and permanently impact affected watersheds because of grading, vegetative clearing, new structures, and conversion of pervious to impervious surfaces, ranging from 900 to 1,100 acres of overall disturbance.[240] The greatest total impact occurs in the Anacostia Watershed, the longest segment for the proposed tunnel and aqueduct for build alternatives J and J1, which BWRR states is their preferred alignment alternative.

With approximately 200 acres of permanent impact proposed for any of the train maintenance facility (TMF) site alternatives, it is anticipated that both the Anacostia and the Little Patuxent Watersheds will experience a change in watershed function, specifically its ability to filter and store water in the soil, and may risk a change in status of stronghold watersheds.[241] Hydrology patterns in and surrounding any of the TMF sites will also be altered, which may influence seeps and low-lying areas that may support sensitive species.[242] These changes to the existing physical environment of these Tier II waters can have repercussions further downstream in the Chesapeake Bay due to the inability to filter water at the current capacity attributable to the loss of acreage in forests, the loss of stream buffers in the

[238] 1950 enabling legislation on the Baltimore-Washington Parkway (BW Parkway). www.loc.gov/law/help/statutes-at-large/81st-congress/session-2/c81s2ch525.pdf.

[239] *Id*.

[240] Draft Environmental Impact Statement (DEIS). Chapter 4, Section 4.10-13.

[241] Stronghold watersheds are the most important watersheds for the protection of Maryland's freshwater stream biodiversity. These locations are the places where Greatest Conservation Need species of stream-dwelling fish, amphibians, reptiles, or mussels have the highest abundance or diversity. https://dnr.maryland.gov/streams/Pages/streamhealth/Maryland-Stronghold-Watersheds.aspx.

[242] DEIS. Appendix D.7 Natural Environment Technical Report. Page D.7-54.

watersheds, and the degradation of headwater streams, which control the timing of water transported downstream.

The Chesapeake Bay Clean-up Plan Total Maximum Daily Loads (TMDL) is a comprehensive plan to address the years-long decline in the bay's water quality and to restore its waters to meet the federal Clean Water Act "fishable and swimmable" goal, the specific mandate for Cleaning up the Chesapeake Bay in Section 117 of the act "to ensure that management plans are developed and implemented to achieve and maintain the goals and requirements" of the Chesapeake Bay Program.[243] In 2010, the Environmental Protection Agency (EPA), in coordination with six bay states, developed the TMDL as a "pollution diet" encompassing the 64,000 square-mile watershed and identifying required pollution reductions for major sources of nitrogen, phosphorus, and sediments across the District of Columbia, Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia.

The TMDL included detailed Watershed Implementation Plans (WIPs) by each of the seven jurisdictions to meet pollution reduction goals. By 2025, the pollution diet calls for reduction of 25 percent for nitrogen, 24 percent for phosphorus, and 20 percent for sediment. Urban and suburban stormwater pollution is a major source of pollution in the Chesapeake Bay. In 2015, the U.S. Court of Appeals for the Third Circuit upheld the Chesapeake Bay TMDL.[244] Municipal Separate Storm Sewer Permits (MS4) are critical in meeting these goals.[245]

The Patuxent River Watershed would also have severe impacts to high-value Tier II waters. Further, 37,000 linear feet of waterway crossings, increasing up to 43,000 feet, will be impacted, depending on the build alignment selected.[246] As noted in the DEIS, several waterways are "notable for their position as headwater or first order tributaries with significant riparian habitat supported RTE species[247] identified."[248]

BWRR states that these Tier II watershed impacts are "unavoidable."[249] However, Tier II catchment watersheds will be unjustifiably and significantly affected with the loss of forest, the creation of new impervious surfaces, and the loss of stream buffers, as well as having a direct impact on the Chesapeake Bay program goals. Mitigation reforestation and replanting in other locations of the watersheds will not replace the current filtering capacity and the loss of land in the existing habitats.

The DEIS states:

> The Project has the potential to impact groundwater through many of the same direct and indirect ways as it would surface waters, including but not limited to the increase of impervious

[243] 33 U.S.C. 1267 (g) (1).
[244] *American Farm Bureau Federation v. EPA* 792 F.3d. 281 (3rd. Circuit 2015).
[245] Maryland Department of the Environment v. City Commissioners of Carrol County 214 A 3d. 61, 100 (Md 2019).
[246] DEIS. Chapter 4, Section 4.11.3.2.
[247] Rare, Threatened and Endangered species.
[248] *Ibid*. Section 4.10-13.
[249] *Ibid*. Page 7 of 109.

> surfaces and therefore potential decrease in the amount of natural precipitation that can infiltrate the soil and replenish underground aquifers, the potential for dewatering during construction and a potential for greater stormwater runoff contributing to potential groundwater contamination."[250]

The project's impacts on the Chesapeake Bay program goals are not mentioned in Exhibit G, Antidegradation Analysis, except to state that the tunnel spoils could be used in the Chesapeake Bay:

> The Project will generate approximately 25 million cubic yards of spoils, mostly from tunneling excavation. Excess spoils from tunnel boring and land grading will be disposed of in ways that avoid or minimize impacts on wetlands and streams. BWRR is coordinating with Maryland agencies on potential beneficial use of spoils on the Chesapeake Bay shoreline and island enhancement projects. The project will not dispose of any spoils from tunnel excavation within Tier II watersheds.[251]

With no definitive plans having been created for the proper treatment and disposal of the spoils, the certification should not be granted.

The DEIS states that "the effects of the alignments alone may contribute to the overall impairment of nearby waterways as a result of the build alternative but are not expected to affect a designated waterway status . . . [and that] such increases in runoff and/or thermal impacts are not anticipated to be as significant in areas of greater urbanization . . . "[252] Of further note, the DEIS then delayed any real analysis by simply stating that the "Project sponsor will evaluate Environmental Site Design (ESD) measures to 'trap runoff . . . along the alignments" and develop "stormwater and erosion and sediment control Best Management Practices (BMP)s to minimize and mitigate impacts."[253] It also suggests that "it anticipates that MDE would prioritize the Little Patuxent and Anacostia Rivers for TMDL requirements and potential status changes to waterways."[254] This approach completely ignores the importance of conducting a comprehensive analysis up front as part of the National Environmental Policy Act (NEPA) process.

IV. Negative Impacts on Nontidal Wetlands of Special State Concern and Sensitive Species Project Review Areas

Previously, the DEIS detailed serious and pervasive impacts to extremely sensitive wetlands and stream systems from the build alternatives, including wetlands of special state concern (as identified in the

[250] DEIS. Chapter 4, Section 4.10.4.2.
[251] MDE. Water Quality Certification: Baltimore-Washington SCMaglev Project. Maryland High-Quality Water (Tier II) Antidegradation Review Report. Alternatives Analysis – Minimization Alternatives. Section 2.1 Table 3: Tier II Watersheds Avoidance and Minimization Measures. Item #7. Page 7.
[252] DEIS. Chapter 4, Page 4.10-17
[253] *Ibid*. Section 4.10.5.1
[254] *Ibid*. Section 4.10- 19.

Nontidal Wetlands of Special State Concern [NTWSSC]) and state designated Tier II waters entitled to the highest level of protection. Yet, while stating that the Federal Railroad Administration (FRA) "anticipated" that the project's joint application for federal and state permits would be "included" in the DEIS Section 4.1-7, it was notably absent. This failure makes it extremely difficult for the DEIS commenters to provide meaningful comments on these grave impacts. A review of the information in the DEIS on these issues demonstrates how such a failure undermines the NEPA process. In a similar fashion, the project will have deep and lasting negative impacts. See below MDE Comment #6 from the agency's Non-Tidal Wetlands Division (NTWD).

> The proposed TMF options 4 and 5 have major permanent impacts to NTWSSC. TMF option 10A also has major impacts to nontidal wetlands. Please provide a functional assessment of the wetland communities associated with options 4, 5 (BARC Airstrip), and 10A, and provide justification for the impacts to the NTWSSC.[255]

The response from BWRR follows:

> The impacts to NTWSSC resources and non-tidal wetlands of TMF Options 4; 5 and 10A are unavoidable due to the design criteria required for the TMF ramps and TMF facility. These design criteria apply to horizontal and vertical alignments, turnout locations on the mainline for TMF ramps, vertical separation between the TMF ramps and the mainline, as well as location of turnouts and buildings inside the TMF facility. The J alignment is currently designed to fit all three TMF options included in the DEIS (4, 5, and 10A). Once a preferred TMF option is selected (and the other TMF options are eliminated), the mainline alignment will be optimized for the remaining TMF site. Minimization of impacts to natural resources (wetlands and waterways) will be considered during this optimization exercise. TMF Options 4, 5, and 10A have the potential to result in an immediate and permanent removal of habitat, potential hydrologic disconnection, and altered functions and values of the wetland systems within the footprint. An expanded functional assessment of the wetland communities associated with options 4, 5, and 10A is attached to the end of this comment response package. In addition, Section 7 has been added to Exhibit B to incorporate the wetland functional assessment.[256]

The Department of Natural Resources (DNR) Comment #4 states [bold text emphasis added]:

> The area around the Patuxent River on the east side of MD295 is designated as a WSSC and SSPRA.[257] Although the WSSC is indicated on the impact plates, there seems to be different types of impacts within the WSSC. **The permanent wetland habitat conversion and pier impacts are within the LOD[258] on WI-23 and 24. However, only the pier impact contains the color shading for permanent NTWSSC impact? Both seem permanent and are within the**

[255] MDE. Water Quality Certification: Baltimore-Washington SCMaglev Project. Joint Permit Application, Exhibit Q – Comment Response Matrix. Item #6. NTWD-6. Page 4. March 11, 2021.
[256] *Id*.
[257] WSSC – WSSC Water; SSPRA – Sensitive Species Project Review Areas.
[258] LOD – level of design/development/detail.

> **WSSC.** Please note that although the area along the northern shoreline of the Patuxent River is not delineated as a wetland, it is within the SSPRA and DNR will closely review activities within the SSPRA/ WSSC boundaries.[259]

The sponsor answered as follows:

> On plates WI-23 and 24, permanent impacts are shown within the WSSC only where pier foundations are proposed as this is the only permanent wetland loss within the LOD. Forested wetlands, including the referenced WSSC, not impacted by pier foundations but below the proposed viaduct will be converted from PFO to PEM[260] due to tree height restrictions. However, wetland function will be restored and/or maintained in such areas post construction. Therefore, the majority of the WSSC wetland is considered permanently converted.[261]

This concern and the answer above are demonstrative of the lasting changes to the wetlands and sensitive areas by being permanently converted. The EPA defines conversion as follows: "Activities in which most or all of an existing wetland is converted to a different type of wetland. For example, changing an emergent wetland to a pond converts the habitat from one wetland type to something quite different."[262] The cumulative effect of the establishment of this project's infrastructure, which is the direct causality of habitat conversion in these watersheds, will also permanently alter the functional capacity of what is being protected, as outlined in the above DEIS excerpts.

V. Cumulative Impacts from Bureau of Engraving and Printing and Train Maintenance Facility on Beltsville Agricultural Research Center Land

Both the potential impacts of the SCMaglev project and the other environmental and land losses taking place in the same geographic area should be considered. The National Capital Planning Commission (NCPC) approved final site and building plans to locate the Bureau of Engraving and Printing (BEP) Currency Production Facility in Beltsville, Maryland. Plans submitted by the USACE, in coordination with the Department of the Treasury and the BEP, are for a new 920,000-square-foot, 40-to-50-foot-tall facility to be located on a 104-acre site on the BARC grounds. Continued development in these untouched areas will have a cumulative impact that will fragment and end the ecological, environmental, and historical value of these lands.

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[259] *Ibid*. Item #48. DNR-4. Page 15.
[260] PFO – palustrine emergent; PEM – palustrine forested.
[261] *Id*.
[262] U.S. Environmental Protection Agency (EPA). Wetlands Restoration Definitions and Distinctions. Wetlands Restoration Definitions and Distinctions | US EPA. Retrieved September 29, 2023.

VI. Extensive Permanent Damage from Train Maintenance Facilities

Regardless of the TMF location, the loss and damage to the area's environmental functionality is going to be enormous and permanent. A more detailed answer regarding TMFs brings forth the extensive permanent damage to the waters, flora, and fauna of the immediate area, with more widespread damage to Beaverdam Creek. The information below is taken from Exhibit Q: MDE Comment and Response Matrix, with a general answer for all three proposed sites, but with a more detailed description of the problems associated with the preferred (BARC West) site:[263]

Comment Response Attachment
Expanded Responses to MDE Comment 6

MDE Comment 6: *The proposed TMF options 4 and 5 have major permanent impacts to NTWSSC. TMF option 10A also has major impacts to nontidal wetlands. Please provide a functional assessment of the wetland communities associated with options 4, 5, and 10A, and provide justification for the impacts to the NTWSSC.*

Removal or fill within wetlands would result in an immediate and permanent removal of habitat, potential hydrologic disconnection, and alter the functions and values of the systems. The functions and
values that may be altered include:

- A direct removal or change in habitat which may indirectly affect the species relying on the wetland for food, water, protection, and breeding.
- A direct removal or change in hydrologic functions may include a reduction in water storage capacity which may indirectly affect both surface water hydrology downstream and groundwater recharge and supply. This may also affect flooding patterns, and the ability to slow down flow velocities.
- A direct removal or fill within wetlands can directly affect the landscape's capacity to trap and filter sediments and pollutants, which may indirectly affect water quality.

The three TMF options would result in substantial impacts to forest, FIDS habitat, and SSPRAs.

- The BARC Airstrip TMF option would be the least impactful, with just under 100 acres of forest impact and approximately 93 acres of FIDS habitat primarily associated with the access ramps.
- BARC West and MD 198 would each impact over approximately 150 acres of forest and FIDS habitat.
- For SSPRAs, the MD 198 TMF would result in the fewest impacts at 59 acres, and BARC West would result in the greatest impacts at 157 acres.

Preferred BARC West TMF site (Option #5)

• Tier II Watershed

[263] MDE. Water Quality Certification: Baltimore-Washington SCMaglev Project. Joint Permit Application, Exhibit Q – Comment Response Matrix. Pages 33-34. March 11, 2021.

• Largest systems present:
    - WP234 >4ac
    - Direct impact within TMF footprint

• Principal functions and values (in **bold**) identified within these wetlands with dominant functions and values listed below:
    - **Sediment/Toxicant Retention**
    - **Nutrient Removal**
    - **Wildlife Habitat**
    - Existing opportunity for sediment trapping by slow moving water or deepwater habitat, from potential sources of excess sediment and nutrients present in the watershed above the wetland
    - Long duration water retention time; flood control
    - High density and diversity of vegetation and presence of vegetative classes
    - High potential for sediment trapping, water retention, and nutrient utilization and attenuation
    - Wetland systems not fragmented by development and connected with other wetland systems connected by Beaverdam Creek tributaries
    - Upland area immediately surrounding wetlands are largely undeveloped and bordered by upland wildlife habitat, wildlife food sources, and access to nearby wetlands
    - High density and diversity of vegetation, presence of vegetative classes/community structure
    - High population potential for insects, amphibian populations, and avian species
    - High percentage of energy-absorbing emergent and/or shrubs bordering the waterway
    - Suitable functions and values also include flood flow alteration and sediment/shoreline stabilization.

• DEIS Section 4.10.4.2 and NETR Section D.7.4.2:
    - BARC West TMFs would add approximately 187 to 190 acres of new impervious surface and impacts to Beaverdam Creek and tributaries.
    - FRA anticipates that stream relocations and/or creation of large culverts would be required for these streams, including the headwaters. Beaverdam Creek (part of the Anacostia watershed) was the only major waterway identified within the SCMAGLEV Project Affected Environment as having good health indices based on MBSS data.
    - The BARC West TMF would have the least impact to floodplains of the TMF options.

• DEIS Section 4.11.4.2 and NETR Section D.8.4.2:
    - BARC West would result in 10 acres of permanent wetland impact, which includes two to three acres of permanent NTWSSC impacts.

• DEIS Section 4.12.4.2 and NETR Section D.9.4.2:
    - In the area of the BARC West TMF, MDNR has identified two RTE plant species, white fringed orchid (*Platanthera blephariglottis* var. *blephariglottis*) and northern pitcherplant (*Sarracenia purpurea*), both associated with high quality wetlands. This area also supports the American brook lamprey and three RTE odonate species.

- Fill within or adjacent to the North Branch of Beaverdam Creek associated with the BARC West TMF could result in degradation of aquatic and riparian habitat sufficient to disrupt the local occurrence of American brook lamprey.
- Groundwater and surface water changes, sedimentation, and nutrient runoff resulting from project elements may degrade suitable habitat for populations of White Fringed Orchid and acidic seepage fen and swamp communities, which are highly sensitive to these types of disturbances.

VII. Serious Impact to Federal and State Listed Rare, Threatened and Endangered Species and Their Habitats

The ecological resources impacted by the project are extensive and serve as habitat for a number of federal and state listed rare, threatened, and endangered (RTE) species protected under the Federal Endangered Species Act (ESA)[264] and Maryland law.[265] This habitat is also the home of migratory birds protected under the Migratory Bird Treaty Act (MBTA).[266] The FRA and project proponents will have a very heavy burden to overcome to justify negatively affecting or destroying these listed species through both direct and indirect impacts and habitat modification and destruction.

The ecological resources impacted by the project include terrestrial, aquatic, and forested habitat; fields and meadows; scrub shrub areas; and aquatic environments.[267] Forests and forest fragments are common throughout the project's affected environment and provide nesting, foraging, and refuge for wildlife, including birds, fish, mammals, insects, reptiles, and amphibians.[268] The habitats that support RTE
species, most notably in larger natural-forested tracts in Anne Arundel and Prince George's Counties, include the following federal and state listed species and imperiled habitats:[269]

- Northern Long – Eared Bat (F, S)
- American Peregrine Falcon (S)
- White catfish
- Coastal plain acidic seepage fen—globally Imperiled
- Two RTE fish species and One RTE plant species:
  - White fringed orchid and northern pitcher plant—RTE
  - Swamp Pink (F, S)
  - Glassy Darter (S)

[264] U.S. Fish and Wildlife Service (USFWS). Endangered Species Act. 16 U.S.C. 1531-1544. December 28, 1973. https://www.fws.gov/sites/default/files/documents/endangered-species-act-accessible_7.pdf.
[265] See, e.g., Maryland Department of Natural Resources. List of Rare, Threatened, and Endangered Animals of Maryland. November 2021. https://dnr.maryland.gov/wildlife/Documents/rte_Animal_List.pdf.
[266] USFWS. Migratory Bird Act of 1918. https://www.fws.gov/law/migratory-bird-treaty-act-1918.
[267] DEIS. Section 4(f). 4.12.3 and Table 4.12-1. Pages 4-12-3 and 4.
[268] *Id*. 4.12.3.1. Page 4.12-5.
[269] *Id*. Pages 4.12-18 - 4.12.-19.

- Pine barrens pine-oak woodland—globally rare/imperiled. A globally critically imperiled natural community of coastal plan – piedmont acidic seepage swamp
- Ten Odonate (Dragonfly and damselfly) species
- Coastal Plain Oak forest—Globally rare
- Stronghold Watershed of Upper Beaverdam Creek
- American Brook Lamprey (S)
- Yellow Lance (F)
- American Brook Lamprey (S)[270]

In addition, the U.S. Fish and Wildlife Service (USFWS) and DNR staff have notified the FRA of the presence of vernal pools and spring-fed wetland and forest stream complexes containing RTE and other at-risk plant and animal species.[271] The DEIS notes that:

> RTE species are typically associated with high quality, contiguous habitats and are sensitive to habitat disturbance and fragmentation. Therefore, potential RTE species habitat, beyond those areas identified above, may occur within the SCMAGLEV Project Affected Environment in large undeveloped areas and corridors, . . .[272]

The DEIS notes the serious impacts of the project on the habitats supporting RTE species.

> The greatest potential impact would occur in areas where permanent structures would replace habitat in areas of vegetation removal or alteration of habitat (e.g. shading of normally one area or forest fragmentation) and destruction of individual plants or animal habitats during construction . . . Indirect impacts incudes degradation of water quality or hydrologic changes on aquatic organisms.[273]

The DEIS notes that the FRA has examined operational impacts resulting from ongoing, routine, and occasional activities associated with the project and related services. Short-term impacts during construction, such as changes in migratory patterns, and accessibility of habitat, current conditions of natural habitats, and proximity to the project also have been looked at. Further examined is how important habitat characteristics, the type and amount of habitat, and potential impacts by direct removal, filling, hydrological interruption, and the sensitivity of ecological conditions could be changed.[274]

The ESA that protects a number of these species has been described by the Supreme Court as "the most comprehensive legislation for the preservation of endangered species ever enacted by any nation," and is intended "to halt and reverse the trend toward species extinction whatever the cost."[275] The FRA recognizes it must undergo the Section 7 consultation process with the USFWS. Section 7 is often called

[270] *Id*. Chapter 4.12. Page 18. (Also see: DEIS,Appendix D.7.)
[271] *Id*. Page 4.12-9.
[272] *Id*. Page 4.12.10.
[273] *Ibid*.
[274] *Ibid*.
[275] *TVA. V. Hill* 437 U.S. 153, 180 (1978).

the “Heart of the Act” and establishes a process “to ensure that any action authorized, funded or carried out by an agency is not likely to jeopardize the continued existence of any listed species or result in destruction or modification of critical habitat.”[276]

The “effects” analysis is quite broad and covers direct, indirect, and cumulative effects of activities that are interrelated and interdependent[277]—**a particularly significant requirement in this context, given the extent of ecosystem impacts from the build alignments.** This analysis also requires consideration of climate change impacts.[278] In addition, Section 7(a) requires federal agencies to “affirmatively act within the scope of their authority for the conservation of listed species.“[279] “Conservation” is the key goal and means “to use all methods and procedures necessary to bring any endangered or threatened species to the point at which the measures in the Act are not a longer necessary.”[280] Thus, the ESA creates a strong obligation on the FRA to ensure that this project will not jeopardize the federally listed species or adversely modify their critical habitat.

Section 4.4.2 of the EPA’s *Water Quality Standards Handbook* addresses antidegradation of aquatic life and wildlife uses by stating:

> No activity is allowable under the antidegradation policy which would partially or completely eliminate any existing use, whether or not that use is designated in a State's water quality standards. The aquatic protection use is a broad category requiring further explanation. Non-aberrational resident species must be protected, even if not prevalent in number or importance. Water quality should be such that it results in no mortality and no significant growth or reproductive impairment of resident species. Any lowering of water quality below this full level of protection is not allowed.[281]

Request for answers to the following questions:

1. How will offsite mitigation projects protect these areas if permanent damage has been done to the already endangered species and to an area that is widely considered to be unique?
2. How can a deficit of offsite measures account for the acres of permanent **onsite** damage? Offsite plantings will never reinstate the purpose and function of the streams and the areas being destroyed.
3. For these offsite areas that are going to be replanted to meet the restoration requirements:
    a. Do any of these areas already have the same type of natural coverage habitats?
    b. How much acreage of these areas already has the same tree species?
    c. If they do, then how is planting on them replacing the lost acreage?
    d. Is BWRR allowed to plant on land that is currently being used as a mitigation measure for a previous project?

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[276] See: Liebesman, Lawrence, and Rafe Petersen. *The Endangered Species Deskbook* (2d. Ed.) (ELI) Chapter VI. https://www.westacademic.com/Liebesman-and-Petersens-Endangered-Species-Deskbook-2d-9781634591294.
[277] 50 CFR 402.02.
[278] See In re, *Polar Bear Endangered Species List and 4(d) Rule Litigation, 709* F.3d. 1 (D.C. Circuit 2013).
[279] *Sierra Club. v. Glickman*, 156 F.3d. 606 (5th Circuit 1996).
[280] 16 U.S.C. 536 (a) (1).
[281] EPA. *Water Quality Standards Handbook*. Chapter 4. Section 4.4.2 – Aquatic Life/Wildlife Uses. Page 6.

VIII. Violation of the Migratory Bird Treaty Act

The FRA also must comply with the Migratory Bird Treaty Act (MBTA), enacted in 1918, making it unlawful to "pursue, hunt, take, capture, kill, possess . . . Any migratory bird of any product . . . unless permitted by regulations."[282] The MBTA provides civil and criminal penalties. Most recently, the Interior Department withdrew a previous U.S. Department of the Interior's solicitor's opinion and rescinded the previous Administration's January 7, 2021, rule allowing for incidental and unintentional destruction of an MBTA species. This means that a person can be charged for indirect and unintentional conduct that harms a migratory bird species.[283] Given the migratory bird species within the project area that could be impacted by above ground structures, this will require the FRA and the project sponsor to avoid or minimize the taking of these species.

In addition, the Maryland Nongame and Endangered Species Conservation Act (MNESCA) protects any federal and state listed species of wildlife and plants. The MNESCA prohibits a person from exporting, taking, or possessing any endangered species of wildlife and defines "take" as to "harass, harm, pursue, hunt or shoot . . ."[284] The protected endangered or threatened species includes any species of wildlife or plants so determined under federal or state law. The act also prohibits violations of any regulation pertaining to the conservation of the species " . . . unless a person has a permit" and imposes fines or imprisonment for any violations. The DNR administers this act and has established programs including the acquisition of land or aquatic habitat necessary "for the conservation of nongame, threatened or endangered species of wildlife or plants."[285]

The DEIS discussion of minimization and mitigation measures to ensure compliance with these important federal and state statutes was just a "laundry list" of measures such as off-site plantings, wetland mitigation, and onsite reestablishment of forest habitat, where feasible, purchasing forest and wetland complexes for placing perpetual easements and funding ecological research.[286] The FRA then referred to its continued coordination and consultation with the USFWS and DNR. These measures are a far cry from the commitments that the FRA and the project sponsor will need to make to meet the stringent criteria for avoiding and compensating for the taking of these species. Indeed, under the ESA's formal consultation process, the extent of take of listed species from habitat modification will have to be determined based on a USFWS Biological Opinion and Incidental Take Statement (ITS) that specifies the number of listed species actually taken, directly or indirectly, through habitat modification by federal action. The ITS must then implement any "reasonable and prudent measures that the Service considers necessary or appropriate to minimize such impact" with terms and conditions that must be complied

[282] 16 U.S.C. 703- 711.
[283] The Biden Interior Department vacated the Department of the Interior's (DOI) Solicitor Op. M-37050 allowing for incidental take on March 3, 2021. On May 7, 2021, DOI issued a proposed rule that prohibits such take. This action follows on a ruling by the New York Federal Court holding that the Trump interpretation violated the MBTA. *NRDC v. DOI* 478 F. Supp. 3d. 469 (S.D.N.Y.) (8/11/20).
[284] Md Code Ann. Nat. Res. Section 10- 2A- 02(a) (1991).
[285] *Id*. Nat. Res. Section 10- 2A-05.
[286] DEIS. Section 4(f). 4.12.5.1. Pages 4.12-21 - 4.12-26.

with to implement these measures.[287] The FRA and the project sponsor will then have to commit enforceable conservation terms and conditions to compensate for any authorized take of the species.[288]

In short, the likely impacts to federal and state RTEs and their habitat will require the FRA and the project sponsor to commit to much more specific and detailed avoidance, minimization, and mitigation measures than identified in both the DEIS and the BWRR's WQC application.

IX. "Temporary" Structures, Infrastructure, and Their Permanent Impacts

Many may consider the construction of access roads "temporary." However, their impacts are woefully under-documented. "Temporary" does not mean that permanent damage will not be done, or that restoration efforts would halt and reverse environmental degradation. The submitted documents tend to imply that the damage done to the environment comes solely from the path the train follows. However, there will be many instances where large roads will have to be built through woods and wetlands so that BWRR can access the train pathway with trucks delivering cement, construction equipment, and materials needed for the associated built environment, including 100-foot towers. To accommodate such equipment, permanent access roads that can handle extremely heavy vehicles will be built. It is made to appear that there simply will be a little bit of cutting, with cloth gently laid over the ground so the plants will be not harmed.

In reality, vehicles—particularly heavy cement and dump trucks—cannot be brought in without removing the vegetation, removing the topsoil and some subsoil, building up a thick layer of gravel, and flattening the terrain, resulting in permanent damage to the site. Ultimately, the access roads cannot be removed as they must remain for future repairs and inspections of the line. The train line does not have a single access road, rather a network of access roads. Those access roads become corridors for invasive plants, and the roads will fragment the forests. Roads also have a disproportional impact on streams as they can serve as a link between sediment source areas and streams, and often account for most of the sediment problems in a watershed. From a watershed point of view, access roads will:

- Permanently alter the hydrology of the site.
- Destroy springs.
- Block water that formerly simply sank into the earth or flowed across the area.
- Require the deployment of pipes to route discharge under these access roads.
- Increase erosion.
- Cause siltation.

The new hydrology will never heal with time, nor will there be some new "good" hydrology. Instead, an engineering solution will be applied, and stone will be brought in. Great swales and sumps will be

[287] 16 U.S.C. 1536 (b) (4).
[288] 50 CFR 402.14 (i) (5).

created to minimize the runoff. While those engineered solutions may minimize siltation, the ecosystem will be compromised and permanently damaged.

The above can be interpreted as saying that 56 acres of forest within the Tier II watershed of the Patuxent will be destroyed. The reality is that more will be destroyed for the entire project, although only the Tier II portion is herein reviewed. Of the 56 acres of forest, 40 will be destroyed, such that they will never be forest again. Sixteen of the forest acres to be cut down are intended as a "laydown area." A laydown area is where several environmentally unfriendly activities are going to take place: e.g., storage of equipment, setting up staging areas, parking vehicles, building large piles of dirt. To make these laydown areas, BWRR will permanently take away from these 16 acres old, longstanding forest that had never been agricultural land; had deep, rich soils that supported rich communities of plants, animals, and soil microbes; and have soils that allow water to percolate slowly into the watershed. Undisturbed carpets of forest litter purify runoff as it drains through the layers, while the immense canopies absorb large amounts of CO2 and nitrogen. In its place they will bring huge earth-moving machines, push over all the trees, and then burn them in piles. Afterward, fill dirt will be brought in to raise the area and level it out. It will then be compacted so that the raised area will support a thick layer of gravel on which heavy machinery will be run for several years. In the end, this land that no longer has capacity to drain, no longer has any natural soil, and no longer supports life, will be planted with four-foot-tall trees in plastic tubes, and subsequently left unattended by the project developers. With small trees being used to replant, many of which will die in a few years, invasive species will become prevalent, supplanting the native species that have been removed.

It should be noted that the process above was followed to create the Greenbelt Metro Green Line storage and maintenance yard about 20 years ago. The laydown area there, even 20 years later, is still open compacted dirt where all the trees died, leaving only lespedeza, an aggressive, invasive weed. Again, it is likely that most people think the builders of the SCMaglev train will only be disturbing the path of the line by cutting the trees along it, and that the promised forest mitigation signifies replacing those trees. Few will realize *until it is too late* that BWRR will make our forests into dirt landfills that are as impervious as pavement and will **never** be functional forest again.

The Exhibit B Wetland Delineation Data document lists these sites. If an area is shaded orange, the area is now forest that will be permanently destroyed. If it is shown as an *ironic* shade of green, it will be made into landfill and might as well be paved, as it will have **no** ecological value after the incursion of the SCMaglev project.

The conservation areas the train will run through are largely forested. Those forests protect the Tier II watersheds. The surrounding fields and housing areas are the primary contributors to the degradation of these watersheds. The forests remaining in the area still exist primarily because they are on government lands that are too wet to farm or build on. These wet areas are the primary buffer for the water quality of the river/stream. If ever a project were designed with the goal of maximizing damage to a watershed, it would be designed exactly as BWRR has done.

As stated in the DEIS:

> The loss of forest along waterways will directly affect water temperature regimes and dissolved oxygen levels, and in-stream/floodplain vegetation composition. Although the viaduct would provide or replace shading to portions of stream, the full benefit of forest shading would not be achieved. Additional indirect effects of potential changes to water temperature and vegetation changes would affect aquatic organisms and water quality, wildlife habitat and corridors, flood control and reducing the effects of nutrient runoff into waters. Changes to flooding regimes of waterways could affect the forest buffers and could potentially influence the species present that are adapted to life along waterways.[289]

Mitigation via reforestation or conservation of forests is reliant on the willingness of landowners to allow the use of their land (see Section 2.3.4 of Exhibit G). BWRR concedes to having difficulty in getting landowners to agree to do this. BWRR does not intend to execute final agreements with the landowners until "later phases of this project" (see Section 3.5 of Exhibit G). These landowners could back out. Lack of interested landowners and having to go offsite for reforestation opportunities does not present a strong statement for supporting this project. BWRR claims:

> The potential for compensating for unavoidable impacts to water quality for the SCMAGLEV project at a 1:1 Tier II mitigation ratio in the Patuxent River 1 watershed appears to be achievable based on the on- and off-site in-kind reforestation analyses and findings conducted to date and as presented herein."[290]

The only definitive statement in the previous sentence is that there will be "unavoidable impacts to water quality."

BWRR identified three alternatives in addition to a "No Build" option. Being focused on their preferred option in the application materials reveals they were only ever interested in one alternative. It is the only alternative in which they looked at finding reforestation sites for the damages they plan to inflict on conservation areas.

Overall, BWRR proposes to replace what is **not** replaceable. BWRR is talking about, or "intending to" as they so often say, reforesting what amounts to residents' backyards or small slivers of land tucked into odds and ends placed around the suburbs. These sites are likely already growing or will grow back to forests on their own . . . making the net in new forest zero or near zero. Small fragments of land planted with small trees surrounded by cities will **never** function the same as what was destroyed, no matter how many years projected into the future.

Throughout this process, the MCRT has questioned many of the numbers in ridership, finances, and "intended" acreage for reforestation or conservation. The MCRT has diligently worked through large and intricately related documents to identify core information (or the lack of it). Some of the problems detected with the mitigation analysis are listed below:

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[289] *Ibid*.

[290] Exhibit G - MAGLEV Tier II Minimization Alternatives_22.03.01_ForWQC Revised Final. Appendix D. Section 4.0. Page 17.

- Damage is documented only in terms of acreage of land with trees and does not account for losses due to:
    - Large-scale hydrological changes to the soils and watershed.
    - Fragmentation of the remaining forested lands, gutting their biological capacity.
    - The removal of biodiverse, complex old growth forest with intact soils with large carbon stores and water filtration capacity.
- Laydown areas will all be created in existing forest areas.
    - Laydown areas will require removal of all trees and soils and will be leveled, replaced with fill dirt, compacted, and topped with a deep course of gravel to carry the weight of piles of dirt, heavy equipment, parking for vehicles, construction materials, and materials processing centers.
    - Laydown areas cannot be returned to their original state.
    - Laydown areas are industrial and, because of the compaction, need to be considered as an impervious surface.
    - Laydown areas are not considered an impervious surface according to the documentation submitted.
    - BWRR plans to plant trees on these sites and count the many acres as representing "mitigation."
    - As has happened elsewhere, those trees will die, and the area will remain barren except for invasive weeds.
    - Laydown areas impact the hydrology surrounding them, which then impacts streams within the watershed in negative ways, furthering erosion and siltation.

Transportation infrastructure, due to its vast geographic reach, generates more complex and potentially more extensive environmental damage. In addition, cumulative effects of multiple factors are challenging to assess and predict, as these factors may evolve and interact. Consequently, there is no scientifically credible way to mitigate this type of damage.

Not finding the acres needed is a clear sign that the watershed has **no** capacity to support further degradation of the forests and streams. In short, this is a very damaging project to the land through which it will pass, both above and below the ground.[291]

X. Stormwater Management

The project will create many acres of new impervious surface, which will be subject to Stormwater Management Environmental Site Design (SWM ESD). Exhibit G does not go into any detail about how this treatment of impervious surfaces works or will mitigate impacts (see 2.2.1 of Exhibit G). The report should describe these impacts and how they will specifically be mitigated to prevent flooding and other hydrological issues. Also, BWRR treated impervious surfaces as "fully mitigated acres" and does not count the new impervious surfaces in impacted acres (see Section 2.4 of Exhibit G - Table 4).

[291] Many of the comments and observations in the Mitigation section have been generously provided by Sam Droege as a private citizen, an experienced and expert field biologist and scientific researcher.

The WQC decision will be made in February 2024. In a presentation to NASA Goddard staff in November 2022, a BWRR representative mentioned that the current FRA pause in the EIS process would resume in the third or fourth quarter of 2024. Reluctance to provide more in-depth analysis and details until after the WQC process is complete is shown again in Exhibit R, where the USACE states: "Additional detail on stormwater management design and facility specifications will be needed to determine an accurate accounting of impacts and any potential discharges to waterways."[292] BWRR's response was to say:

> More detailed information will be provided as the project advances to the FEIS phase. This project will follow both Environmental Protection Agency (EPA) and Maryland SWM guidelines for Federal Projects. Throughout the project corridor, SWM will be provided to meet current Maryland Department of Environment (MDE) regulations for both regulated SWM quality and quantity treatment. The developer intends to demonstrate the implementation of Environmental Site Design to the Maximum Extent Practicable before proposing traditional structural Best Management Practices for SWM treatment.[293]

How much longer will it be until cogent, detailed answers are provided? Specific questions have been asked multiple times throughout the EIS and WQC processes. Is it prudent and responsible to grant permits without having detailed plans of how the project sponsor will intend to proceed? More importantly, while the effects of stormwater run-off are often recognized and regulated in receiving water bodies at the watershed scale, practices to manage stormwater are generally designed for smaller drainage. Therefore, there is still insufficient evidence of the effectiveness of stormwater management at reducing water pollution at the watershed scale.

As noted in recent comments on MDE proposed permits, Maryland has failed to make necessary reductions in urban stormwater pollution.[294] In fact, stormwater loads have increased: " . . . pollution from urban and suburban stormwater runoff has been increasing – up 5 percent for nitrogen between 2009 and 2019, up 3 percent for phosphorus and sediment over this time period, according to numbers from the EPA-led Chesapeake Bay Program."[295] Not only will this project cause an increase in pollution, it will decrease the ability of the watersheds to support the Chesapeake Bay programs. Not having specific proposed stormwater mitigation plans should terminate this certification process.

Maryland's Phase III WIP revised the 2025 targets—the stormwater loads that Maryland hopes to achieve by 2025. The new targets are 20 to 40 percent higher than the previous Phase II targets, signifying that Maryland is now planning to accept 20 to 40 percent more pollution than they were a few years ago. The following table summarizes the change in target loads between the two WIPs. As a point of comparison, we also provide the same estimates for Virginia, where planning targets have become more stringent.

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[292] MDE. Water Quality Certification: Baltimore-Washington SCMaglev Project. Joint Permit Application, Exhibit R – USACE Comment Response Matrix. Item #18. USACE-IP-2. Page 9.
[293] *Ibid*.
[294] Comments of the Chesapeake Accountability Project on the Tentative Determination for the NPDES MS4 Discharge Permit for Baltimore City. January 21, 2021. Pages 6-7.
[295] Environmental Integrity Project. "Stormwater Backup in the Chesapeake Region." Page 4. https://environmentalintegrity.org/reports/stormwater-backup-in-the-chesapeake-region/.

Stormwater pollution targets for 2025 in Phase II and Phase III WIPs from the "developed" sector.[296]

Measure of	Maryland			Virginia		
	Phase II WIP	Phase III WIP	Change	Phase II WIP	Phase III WIP	change
Nitrogen	7.8	9.3	+19%	10.3	9.7	-6%
Phosphorus	0.48	0.66	+37%	1.24	1.19	-4%
Sediment	289	394	+36%	514	476	-7%

The Phase III WIP targets for nitrogen and sediment are even higher than the TMDL baseline loads from 2009. The TMDL is a groundbreaking pollution reduction program, yet the nitrogen and sediment load from developed land in Maryland will be higher at the end of the TMDL than they were at the beginning. The Phase III WIP clearly shows Maryland backsliding on its stormwater reduction plans and the proposed MS4 relaxing the impervious surface restoration requirements.

Pollution loads created by the additional impervious surfaces will only contribute further to Maryland's Chesapeake Bay problems: " . . . stormwater runoff carries high volumes of pollutants, such as heavy metals, hydrocarbons and bacteria, over impervious surfaces and directly into waterways."[297] Of particular concern is that at the tunnel transition in Greenbelt, much of the area is shown as "laydown areas," with the same areas being marked as a stormwater management facility. This is a forested area and contains perennial streams and wetlands. If used as a laydown area, it cannot be used as a stormwater management facility. During construction, where will the stormwater from the laydown area go? Missing pollutant loads information and the lack of more planning details prior to a WQC decision being made, as well as the promise of addressing these issues in the FEIS *after* a decision is reached, are deeply concerning.

XI. Stormwater Management Related Concerns

"The Maryland Department of the Environment (MDE) Antidegradation Program requires no net negative impact to forests as a result of the proposed activity."[298] The key phrase is "no net negative impact to forests." It does not say "no net loss of acreage with trees," but this is how it is being treated in this and other SCMaglev related documents.

One obvious impact is negative changes to the hydrology of the watershed. BWRR responding that all the runoff will be captured from impervious surfaces (which they define as only those surfaces that are paved) using water control structures is superficial. While this is an engineered solution to one problem of a negative impact, it does nothing for the other impacts and, in fact, creates more.

[296] *Ibid*. Version CAST-2019, scenarios "2025 WIP2" and "WIP 3 Official Version."
[297] DEIS. Section 4.10.3.2. Page 4.10-7.
[298] Exhibit G - MAGLEV Tier II Minimization Alternatives_22.03.01_ForWQC Revised Final. Appendix D. Memorandum: SCMAGLEV Baltimore-Washington High Speed Project Teir II Mitigation Site Search. Page 1.

1. The water control structures they intend to create also seem to be included in their totals of forest restoration acreages. Water control structures are not forest, instead essentially temporary ponds, and should be removed from the "reforestation" numeration and put in the "destruction" accounting.
    a. Water control structures are mainly designed for water infiltration and/or storage and to address intense rainfall events. They do not target or are not effective water quality improvement.
2. As previously discussed, 16 acres (in the Patuxent River Watershed alone) in the laydown areas may have trees planted on them. These are construction sites and will never be forests. Their surfaces need to be treated as impervious, with the runoff from these areas built into the planning as well.
3. Returning to "no net negative" impact to forests, the following additional items are clearly negative impacts beyond the simple loss of acreage, which was not the measure intended by the MDE.
    a. As indicated earlier, laydown areas cannot be reforested in any sense of the word and will create impervious surfaces within forest environments that impact the surrounding forests, as well as the water quality of the streams in the area.
    b. The project will permanently fragment large blocks of forests into small blocks of forest. The remaining forests lose most of their biological functionality due to the incursion of invasive species; the lack of sufficient forest size for many bird, turtle, vertebrate, and insect species; and the loss of hydrological capacity in terms of groundwater movement, runoff, seeps, and springs.
    c. Many of the forests that will be cut down are old forests that have never been in cultivation and contain biodiversity that reflects the continuous presence of forests. In particular, the soils in these areas are complex environments of loose, fragile soil structure housing fungal communities and invertebrates. Because of the nature of these soils, they drain well, act as a natural water filter, and provide oxygen to the roots of the plants and to the creatures in that forest. Bulldozers, clearings, and traffic on these soils destroy them and their hydrology.
    d. There is no documentation of where access roads will be created to bring vehicles into the laydown areas and along the train line. It is mentioned that these are considered "temporary," but this is a misrepresentation. They must remain for safety, emergencies, and repair. The trees on these access roads will be destroyed, as well as the roots and vegetation of the trees on either side of the road. The roads will be at minimum wide enough for a dump truck and possibly wide enough for two dump trucks so they can pass each other. The roads must be built up with fill, culverts lain over streams and wet areas, and gravel, which will permanently alter the hydrology of the sites. These need to be documented, the forest destruction accounted for, and the changes to the hydrology of the forests documented.

XII. Stormwater Pollution Prevention Plan

In the DEIS, BWRR promised to develop a SWPPP: " . . . the Project Sponsor will prepare a Stormwater Pollution Prevention Plan (SWPPP) and identify activities and conditions that could cause water pollution

and detail steps taken to prevent the discharge of any unpermitted pollution."[299] Two years later, the SWPPP has not been developed beyond stating their intentions.

In a WQC application memorandum from BWRR to MDE's Water and Science Administration, there is a section referencing a SWPPP that contains a passage of concern [emphasis added]:

> Operational controls will be implemented according to applicable regulations and standards. The site will include transportation infrastructure and is potentially subject to the NPDES General Permit for Discharges of Stormwater Associated with Industrial Activity (20-SW permit). If subject to the 20-SW, BWRR will need to develop a Stormwater Pollution Prevention Plan (SWPPP) for operational activity, to include procedures for preventing stormwater runoff from interacting with any potential pollutant sources during operational activities. Potential pollution sources would be any chemicals that may be needed for operational activity such as de-icing agents or any chemicals used for maintenance activities, including those that may be stored in the TMF sites. Sediment runoff created by the construction and operation of the SCMaglev would contribute to sediment in the Chesapeake Bay watershed, and sediment is a major pollutant. **BWRR currently does not intend to use de-icing agents for their operations and has not yet identified other potential chemicals that may be stored or used for routine operations**.[300]

There has been no mention of how to prevent erosion and sediment transport into waterways, other than to say that they will adhere to state requirements.

How is it that BWRR has "not yet identified other potential chemicals that may be stored or used for routine operations"? If BWRR is intending to build TMFs of a certain size, functional capacity, and practices, it stands to reason that they would already know what chemicals are going to be used for those purposes. Furthermore, the following should also be known before the granting of any permits:

1. How frequently would the chemicals be used?
2. What is the volume/amount of those chemicals when used?
3. How would they be applied?
4. What are the open-air or sheltered requirements of those chemical applications?
5. How would the chemicals be recovered?
6. How would the unused chemicals be stored?
7. How would the used chemicals be stored?
8. What is the storage life of unused chemicals?
9. What is the storage life of used chemicals that would need to be removed or treated?
10. How would the used chemicals be removed and disposed of?
11. What are the chemical hazard protections, environmental hazard protections, containment, and spill response protocols?

Allowing the project to proceed without knowing the detailed and vetted answers to all these concerning questions should not be allowed and would not be represent good stewardship of environmental and public resources.

[299] DEIS. Section 4.10.3.2. Page 4.10-29.
[300] MDE. Water and Science Administration. MAGLEV_WQC_MEMORANDUM_Finalv05.pdf. Pages 6 – 7 of 13.

XIII. Environmental Summary: Impact, Questions, and Concerns

[***Note***: This section is comprised of article excerpts published in January 2021. Reprinting permission was granted by the author, Dan Woomer.[301]

The biological and ecological damage done to the natural environment is going to forever change the current functional capacity. The dependencies of various habitats on the targeted land, bodies of water, and wetland features will be changed with a destructive and diminished capacities impact.

Impact of the SCMagLev Trainyard on Preserved Lands

A trainyard would normally be built in an industrial zone within a large city where power, housing, and a skilled workforce would be co-located. The trainyard would be sited in a landscape already built to accommodate and minimize the runoff, lighting, pollution, and ecological impacts such intense and industrial land use requires. Siting a trainyard in a preexisting trainyard would properly place it in a landscape that was long-ago compromised ecologically and currently dedicated to human commercial and business needs. In the same fashion, refuges and parks are dedicated to the needs of wildlife, conservation, research, and the human needs for nature, solitude, clean water, clean air, and a place to recharge our own batteries.

However, the SCMagLev plan sites the train emerging from its underground tunnel to slice through, destroy, and disrupt the last large, ecologically intact green space left in the Prince George County region. When the SCMagLev train parasitically emerges aboveground, it would access a planned 200-acre industrial site, currently located on existing conservation lands. Building these train lines and trainyards also requires upgrading the existing small rural roads to industrial standards, as well as the creation of a new, high-powered, electrical system and associated transmission corridors. All this development would be placed into an existing, large intact landscape of protected forests, wetlands, and fields, the last such area in the region.

Permanent, Unrecoverable, Biological Damages from the SCMagLev Trainyard

The bottom line: Building a 200-acre trainyard results in absolute, irreversible ecological damage to the land. The landscapes currently targeted for support and maintenance for the SCMagLev trains have been in forest for millennia. They contain plants, such as the White Fringed Orchid, that are globally rare. The Pitch Pine Barrens ecosystem is at its southern terminus and is also globally rare. This landscape of protected government parklands and research centers is large enough to support and retain almost all the biodiversity that was once, but is no longer, found across the Baltimore-Washington region.

Much of that biodiversity outside this protected area has been lost, or greatly diminished, due to the combinations of housing developments, shopping malls, business centers, roadways and other built-up industrial, transportation, and recreational facilities. That altered landscape can no longer support most

[301] MagLevTruth. Woomer, Dan. SCMaglev – What's the Biological and Ecological Impact? Parts One and Two. January 11, 2021. Part One: 6d0640_efecc0b083614963a73f1b04cebe4cec.pdf (filesusr.com). Part Two: 6d0640_54c8689b28194a99afcd5e4b404efebe.pdf (filesusr.com). Retrieved October 23, 2023.

species that once lived and thrived in this area and, instead, is composed mostly of the weeds and nonnative species that follow development and invade the remnant natural landscapes.

Researcher C. K. Khoury, after reviewing all the public lands in the United States, indicated that the Patuxent Research Refuge (PRR) retains the most biodiversity of the wild relatives of our crop plants, one of many examples of both how rich the biodiversity of the area remains and how important it is to keep this repository. He points out that many of these important wild native plants that could be important for our food security are now rare, un-, or under-represented in genetic repositories.[302]

All three of the proposed trainyards are located at the headwaters of stream systems of both the Potomac and Patuxent Rivers. These stream systems are filled with fragile springs, bogs, fens, and other wetlands. Their loss and the subsequent pollution from the runoff from these trainyards would bring large pulses of silt and industrial-related, chemical-laden water, all pushed downstream. Rain events would punish and degrade all the streams below these sites.

The creation of these industrial sites requires the removal of all trees, plants, creatures, and topsoil on the site to level the area to accommodate these long trains. Several feet of gravel, sand, and concrete would be placed on top of this flattened landscape to stabilize the roadbed so that it would be able to handle the weight of all the trains and attendant heavy equipment. Factories would be built both to create and repair these trains. Parking lots would be created for the sites' employees. Roadways would need to be built and augmented to handle the weight of industrial vehicles and increased commuter traffic. With the creation of these sites, the tunneling, and other construction, how much fuel is being burned and contributing to emissions? Can it be negated by the imagined fuel savings of this train, which itself will use massive amounts of electricity to run? In addition, new transmission lines and substations would need to be located to handle the high-energy needs for the site.

The building of this trainyard in the middle of our protected public lands, as with what has occurred at other industrial sites, would create an invasion portal for non-native species—Tree of Heaven, Asian Bittersweet, Privet, Bush honeysuckle, Norway Rats, House Mice, Kudzu, and many more. These invasive plants and animals would infiltrate the surrounding parklands, seriously disrupting the native wildlife in the area, causing outright destruction of the natural hydrology of the springs, and seeping support of the rare plant and animal communities that filter and preserve our drinking water. This development would inject light, noise, vibration, and pollutants on and into our public parklands, repelling the very animals such refuges are specifically designed to protect and study.

Lost Plant and Animal Communities

The planned site for the SCMagLev trainyard is currently a large protected green space where land, plant, insect, and animal studies have been conducted by public, academic, and private researchers for over 100 years. From this century of work, a long list of species has been scientifically described for the first time and named using specimens found in this area. Literally hundreds of publications have been

[302] Khoury, Colin. K. "Crop wild relatives of the United States require urgent conservation action." 2020. https://www.pnas.org/content/early/2020/12/09/2007029117.

generated from work done on these public lands. (*Note*: Patuxent is the sole research refuge in the entire National Wildlife Refuge system and the U.S. Department of Agriculture's Beltsville Agricultural Research Center [BARC] is the largest agriculture research station in the world). This region is one of the biologically best-documented sites in the world.

The Patuxent Research Refuge has the largest species list of dragonflies and damselflies of any national wildlife refuge or national park in the United States—approximately 112 species. It contains more known species of bees than any other national wildlife refuge in the United States—approximately 221 species, with more new ones found each year. This refuge has what are likely complete, or nearly so, lists of all the plants, mammals, snakes, fish, amphibians, and birds that inhabit the many types of intertwined streams, wetlands, plant communities, and rivers.

Building the SCMagLev trainyard on the proposed site would destroy these species' habitat, effectively destroying the existing diverse nature living therein. Once built, these lands could never be recovered and the losses could never be mitigated or recreated elsewhere. These current protected areas act as a unit, a compete landscape. They function and exist in connection and relationship with each other, allowing plants and animals to migrate and reestablish populations sequentially across the region as local ecological circumstances change. Destruction of this system with the building of the SCMagLev trainyard and maintenance facilities, would kill this system. The trainyard would result in a new biological desert that would jeopardize the remaining neighboring landscape of trees, forests, and fields, and their inhabitants. When large-scale disasters, such as the inevitable hurricanes, tornadoes, floods, and fires occur, the ability of the remaining habitats to recover would be seriously compromised.

Current Public Landowners, Intended Land-use, and SCMaglev Impact

The National Park Service (NPS) owns and manages the land around the Baltimore-Washington Parkway (Parkway) in the project area. The roadway is purposely surrounded by an unbroken swath of woodlands that connect it to the PRR and BARC. The SCMagLev train lines would run parallel to the Parkway and destroy a wide path through these woods, leaving a strip of woodlands isolated between the Parkway and the train line. This would cause them to be ecologically isolated and functionally dead from the lack of connection to the contiguous PRR and BARC woodlands, and open the construction area to the invasion of weeds and non-native plants.

The U.S. Fish and Wildlife Service owns the PRR, which would be substantially impacted by this project in several locations with the building of the trainyard. The research refuge is home to the Patuxent Wildlife Research Center. It is also home to some of the best-known and most-studied groups of animals and plants in the world. The refuge is currently an almost unbroken swath of woodlands, wetlands, headwater streams, and bottomlands bisected by both the Big and Little Patuxent Rivers.

The Beltsville Agricultural Research Center is the world's largest agricultural research center. It was created over 100 years ago and has housed hundreds of research scientists who have used the facility to study all aspects of agriculture. The grounds are a complex of fields, pastures, research areas, study plots, and natural areas.

The National Aeronautics and Space Administration (NASA) Goddard Space Flight Center would be affected by this project. In the BARC-EAST proposed trainyard (primarily to be located on the PRR and

BARC), some of the trainyard would directly impact NASA's optical test site. This site was chosen because the surrounding area was dark, silent, and isolated by the surrounding woodlands and fields. SCMagLev's impacts on the NASA facility would come from adding vibration, light, and sounds that are not compatible with its functioning.

The Greenbelt Forest Preserve is 254.8 acres of forested land owned by the City of Greenbelt and protected and conserved in their existing natural state for the use and enjoyment of present and future generations. The city purchased the parcels that became the preserve in the mid-1990s and passed legislation in 2003 to designate these lands as a protected "Forest Preserve." This designation protects the land from development and retains it in a natural forested state. Several of the largest, most contiguous forested parcels, which comprise approximately 145 acres, are threatened by the proposed SCMagLev's J1 alignment (route) option. Sixty-five acres would be destroyed by that route, including 12 acres of wetlands. In addition, 6.5 of those acres are designated and protected as Wetlands of Special State Concern by the state of Maryland. The 145 acres are part of a larger unbroken patch of forest that runs from the community gardens at Garden Way to Beaverdam Road in the City of Greenbelt.

The Maryland-National Capital Park and Planning Commission owns a woodland covenant on one of the largest parcels of the Greenbelt Forest Preserve, which was purchased using Maryland's Program Open Space (POS) funds.[303] Land purchased using POS funds shall be perpetually protected green space and are federally protected under the Land and Water Conservation Fund Act of 1965. The NPS owns scenic easements on 65 acres of the North Woods Tract of the preserve. These easements establish a federal interest in the green space, such that this land falls within the legal boundaries of the Parkway, although the City of Greenbelt retains ownership of the land itself. Finally, the preserve is protected under Section 4(f) of the 1966 U.S. Department of Transportation Act,[304] which prohibits the construction of transportation projects within protected green space or historical landmarks unless it is shown that no "feasible or prudent" alternative exists. And as we have identified and discussed in other articles, alternative transportation systems already exist, namely Amtrak & MARC.

Anne Arundel County has parklands adjacent to the Parkway south of Maryland City, as well as just north of the North Tract of the refuge. The parcels along the west side of the Parkway include playfields for baseball, football, and soccer, as well as a popular dog park. The parcel north of the North Tract includes baseball playfields and floodplain wetlands, as well as the riparian forest along the Little Patuxent River.

The District of Columbia and the Federal Government owns some of the land. The Oak Hill site where the proposed Route 198 trainyard would be located is an 800+-acre triangular area bounded by Maryland Route 198 on the south, the Parkway on the northwest, and Maryland Route 32 on the northeast. The Little Patuxent River traverses the site. Most of this site is composed of an 827-acre parcel owned by the U.S. government, but it has been managed and operated by the District of Columbia since 1921, pursuant to the Federal Appropriations Act of 1923.[305] Historically, the District operated several facilities on site, including the Forest Haven Asylum which closed in 1991; the Cedar Knoll Youth Center which

[303] See: https://dnr.maryland.gov/land/Pages/ProgramOpenSpace/home.aspx.
[304] See: https://www.environment.fhwa.dot.gov/env_topics/4f_tutorial/overview.aspx?h=e/.
[305] See: https://www.loc.gov/law/help/statutes-at-large/67th-congress/Session%204/c67s4ch148.pdf.

closed in 1993; and the Oak Hill Youth Center which closed in 2009. Currently, the site houses the Maya Angelou Academy at New Beginnings and the Maryland Job Corps' Woodland Job Corps Center. The Maryland Environmental Trust, the Scenic Rivers Land Trust, and the Patuxent Tidewater Land Trust hold a conservation easement on 250 acres of the site. A great majority of the site is undeveloped. Riparian and upland forest dominate the undeveloped areas, coupled with acidic seepage swamps, wet meadows, emergent wetlands, and the river itself.

Other Landowners would be impacted by the proposed trainyard in both the developed and undeveloped areas. It would require the destruction of the Woodland Job Corps Center, impact more than a dozen private landowners, and destroy parts of the historic Forest Haven Asylum. It would destroy approximately 115 acres of upland forest and 25 acres of riparian forest, as well as destroy a 2.5-acre forested, groundwater-fed wetland and a 3-acre wet meadow. The published footprint of the trainyard crosses the Little Patuxent River, which would necessitate moving the course of the river. The published footprint of the trainyard would impinge on the conservation easement by 25 acres. The footprint for Route Option J of the SCMagLev viaduct would impinge on the property on the northeast boundary. It would destroy a large beaver pond and several vernal pools with a documented presence of marbled and spotted salamanders, as well as destroy several acres of riparian wetlands.

SCMagLev Trainyard Size Put into Perspective

The proposed SCMagLev trainyard is approximately one mile long by a quarter-mile wide. As a useful comparison, that measures:

- about one-and-one-fifth times as big as Disneyland.
- about six times as big as the Pentagon.
- about 50 times as big as the Kennedy Center.
- about 150 times as big as a football field.
- more than three times larger than the 12,000 parking spaces at Robert F Kennedy Stadium; the proposed area could fit up to 55,000 parking spaces.

XIV. Environmental Summary

Missing from the applicant's WQC submission materials are detailed mitigation plans, pollution control plans, stormwater management plans, and several other key documents that are critical elements for the public to review and comment upon, as is their right. The MCRT has requested access to these documents that will provide the full description of required mitigation planning. The presence of these plans will not negate extensive damage the project will cause. The loss of the BARC and PRR lands to build the SCMaglev transportation system would be tragic and irreversible. Major research facilities of national and international importance would be destroyed. The habitat for hundreds of rare birds, insects, and fungi would be lost forever. The damage to the watersheds would have everlasting negative effects not only on the surrounding land environments, but also downstream to the Chesapeake Bay. The applicant has admitted that there will be severe and permanent damage that likely cannot be mitigated.

BWRR states in their SEJ that "Travel demand will continue to increase along major roadways and railways, including Interstate 95 (I-95), the Baltimore-Washington Parkway (BWP), MD 295, I-295, US 29, US 1, and the Northeast Corridor (NEC)."[306] BWRR, in this statement, indicate that they fully intend to move through the rest of Maryland, in their pursuit of taking this train beyond Maryland's borders. It is already known that for this segment, the permanent damage to Maryland's waters cannot be fully mitigated in this approximately 35-mile stretch. What other Maryland waters are going to suffer due to damage that cannot be mitigated in the remaining approximately 50 miles to the northern state border? The cumulative damage to the state of Maryland for a project that does not serve the citizens of Maryland cannot move forward. There is no social, financial, or other justification that warrants this socially and environmentally irresponsible project. Suffering such losses to build a redundant, high-cost, and taxpayer-supported transportation system for elite and well-heeled travelers that has little to no benefit for Marylanders would be unconscionable.

[306] BWRR. Maryland High-Quality Waters (Tier II) Social and Economic Justification Report. Page 10.

XV. Purpose and Need

The Chesapeake Bay Foundation's (CBF) comments dated May 24, 2021, about the Superconducting Magnetic Levitation (SCMaglev) Draft Environmental Impact Statement (DEIS) states:

"With respect to the statement of "Purpose and Need," its structure should avoid improperly foreordaining the outcome. An inappropriate and too narrow purpose and need leads to an inappropriately cramped alternatives analysis . . . In this case, the purpose and need statement too directly predicts the outcome, which circumstance should be eschewed. But even if the purpose is stated as "building a high-speed system to reduce travel time to meet the capacity and ridership needs of the Baltimore-Washington region," and even if the agency proposing this solution is given more deference than appropriate as to what the purpose should be, how can the SCMaglev possibly stand up?"[307]

The same can be said about Baltimore-Washington Rapid Rail's (BWRR) Water Quality Certification (WQC) justification application documentation. CBF further commented:

" . . . the SCMaglev as described is not a "system" but a single, two-way, two-destination train from each of the two end-point termini. While its two terminal stations (depending upon their ultimate locations) may be accessible to other transportation modes in those two cities, and while the single additional station at Thurgood Marshall-BWI Airport will provide a modest amount of access to air transport to those who can afford the cost of that access from the terminal stations, the SCMAGLEV does not a "system" make. People who live along the corridor (and who will absorb all the adverse impacts of its location . . .) will be unable to access the train unless they are able to drive to one of the two inner-city termini or the airport."[308]

[MCRT Editor's Note: BWRR's stated preferred Baltimore terminus is in Cherry Hill, which is on the southern border of Baltimore City, and the northern border of Anne Arundel County. Cherry Hill is not in the "inner-city" as Amtrak's and MARC's Penn Station, or as MARC's West Baltimore and Camden Yards stations.]

XVI. What are the Alternatives to the SCMaglev?

The study of "all reasonable alternatives" has been described as the heart or linchpin of an environmental impact statement by reviewing courts since the passage of the National Environmental Policy Act (NEPA). While truly speculative alternatives—ones that cannot possibly fulfill the purpose—need not be considered, all reasonable ones must be.

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[307] Appendix: Submission Reprint: Kurtz, Josh – "Draft Environmental Impact Statement and Draft Section 4(f) Evaluation Baltimore-Washington Superconducting MAGLEV Project Comments Submission." Chesapeake Bay Foundation. May 24, 2021. https://aa247ef8-bd4a-4dd2-890c-8b5ebdf396e2.filesusr.com/ugd/6d0640_dd1783ac780445fcb02619616faca327.pdf. Page 1.

[308] *Id.*

As has been the case in several recent transportation projects in Maryland, both BWRR's WQC justification materials and the FRA DEIS (*referred to as BWRR's documentation in this paper*) present and analyze *no alternative* to the already selected mode and configuration of two termini, with one station in-between, and the use of magnetic levitation technology. It stands to reason that no alternatives would be offered if (as in this case) ultra-high speed is the major criterion for deployment, rather than accommodating, expanding, improving, and even increasing the speed of transit service along the corridor to better provide for the needs of the regional commuting and traveling public. BWRR's documentation's comparison of SCMaglev to ***existing and operating land-based rail transportation systems*** is hobbled by cramped purpose and need statements. What remains is one system, with a couple of alternative alignments in one corridor, alternative locations for terminal stations on either end, and several possibilities for storage yards and maintenance facility sites—along with, of course, the mandated "no build" alternative. The CBF comments below are relevant to the BWRR documentation under discussion:

"This serious defect also relates directly to the purpose and need statement which frames the entire study, noted above as unnecessarily and indeed, inequitably narrow. There is currently no alternative to this technology, in this configuration, if the sole purpose is extremely high-speed access between two termini with one location in between. The National Environmental Policy Act (NEPA) requires a detailed statement on "alternatives to the proposed action." That central requirement was improperly removed from this environmental impact analysis before it even began."[309]

XVII. The FRA's Statement of Purpose and Need and Its Analysis of Alternatives to the SCMaglev Project Violates the NEPA

While separate from the FRA, the MDE must consider "purpose and need" as part of justification for a project, when that project is identified as one that will cause extensive and permanent damage to Tier II waters, as is the case with the SCMaglev.[310] "Under the Council on Environmental Quality (CEQ) regulations, the statement of purpose and need is essential to the NEPA process because it guides the agencies scope of review."[311] An agency is not permitted to "contrive a purpose so slender as to define competing reasonable alternatives out of consideration." *Simmons v Corps* 120 F.3d. 664, 666 (7th Cir. 1997). An agency cannot unreasonably narrow the objective of the proposed action to limit the range of alternatives considered. *Friends of Southwest's Future v. Morrison*, 153 F. #d. 1059, 1066 (9th Cir. 1998). Clearly, the project's definition of purpose and need and analysis of alternatives violates these principles.

The FRA cites the SAFETEA-LU Act (P.L. 109- 59) authorized funding to study magnetic levitation transportation projects. The Baltimore-Washington corridor was identified as the location for its evaluation of the SCMaglev project "due to the area's high level of congestion, economic importance, increased development and the need for connectivity between the two cities."[312] Yet instead of a

[309] *Id,* Page 2.
[310] MDE. TMDL – Water Quality Standards. Tier II FAQ (maryland.gov). Retrieved October 4, 2023.
[311] See 40 CFR 1502. 13.
[312] Draft Environmental Impact Statement (DEIS). Chapter 2, Section 2.2. Page 2.2.

defining purpose and need without favoring any one alternative, the FRA's definition of project purpose presumes that the concerns Congress cited can only be met by a high-speed ground transportation system that meets the optimum operating speed of the SCMaglev. In the FRA's view, the SCMaglev is the only viable alternative to improving existing rail, highway, and public transit to address serious mobility problems for the Baltimore-to-Washington corridor. However, BWRR's documentation's list of transportation challenges does not lead to such a conclusion. Rather, the DEIS and the WQC applicant's justification materials essentially dismisses the fact that the corridor's increased population and employment, growing demands on the existing transportation network, inadequate capacity of the existing transportation network, and increased travel times could be addressed by alternatives other than the maglev technology.

From the beginning, the FRA's alternatives development process focused on screening design options and possible routes for the SCMaglev project and not on whether other transit alternatives might address the corridor's transportation challenges.[313] As a result, the DEIS cites but "downplays" the FRA's ongoing study of less costly and disruptive alternatives while presuming that they will not address the transportation challenges as would the SCMaglev.

The DEIS cites the FRA's Northeast Corridor FUTURE (NEC FUTURE) Tier I Final EIS that documented the increasing demand for improved rail service and identified service and performance objectives to improve rail service on the Northeast Corridor. That record of decision (ROD) recommended numerous improvements covering chokepoint relief projects, new track capacity, signal upgrades, replacement of the Baltimore and Potomac Tunnel, improvements to the Baltimore-Washington International Marshall Airport Rail Station, and the Fourth Track Project. The DEIS also listed a number of improvements in local transit service, including improvements to the MARC Commuter Rail Service and to the AMTRAK intercity rail service on the Northeast Corridor between Boston, Massachusetts, and Washington, D.C.[314] Further, the next generation of Acela trains will travel at speeds of up to 200 miles per hour and Amtrak will continue to replace and upgrade tracks along the Northeast Corridor to safely accommodate these faster trains.

[MCRT Editor's Note: Replacement of the Baltimore and Potomac Tunnel is now underway, and Amtrak spent $4.7 million to replace the original the BWI Train. More about this toward the end of this submission.]

As a result of this *skewed approach* to alternatives, the *conclusion is leapt to* that the *no build alternative* "would not likely fully achieve the capacity needed to keep pace with the region's population and employment growth" as would the SCMaglev. BWRR reflects this same errant position in its WQC justification materials. Yet the FRA concedes that "other planned and funded transportation projects . . . would result in improved capacity of the regional transportation network for existing modes."[315]

The FRA's conclusion is based on inaccurate financial assumptions and outdated traffic data. The traffic and population data do not incorporate the impact of COVID-19 and existing and future traffic patterns, such as remote working, the shrinking population of Baltimore City, and the loss of high-end earners

[313] *Ibid*. Chapter 3, Section 3.2.
[314] *Ibid*. Chapter 3, Section 3.3.1 (No Build Alternative).
[315] *Ibid*. Chapter 3, Section 3.3.1.2. Page 3-11.

from Maryland and Washington, D.C. Most significantly, the ridership demand study provided is heavily redacted and does not reveal the critical data needed to analyze whether riders would even use the SCMaglev as an alternative to other transit modes. Indeed, the DEIS cost-and-service data expressly contradict its conclusion, noting that the $60 one-way cost of the SCMaglev trip is "seven times the cost of the existing MARC commuter fare between Baltimore and Washington D.C." and that such a cost "would be prohibitive for some low-income populations."[316] Additionally, unlike the MARC commuter system, which has 16 intermediate stops, the SCMaglev only stops in Baltimore, at BWI Marshall Airport and in Washington D.C.[317] Thus, it would not be readily usable by commuters living in points between the two cities. However, these commuters do have access to stops much closer to their homes by which they can reach their destinations at a much lower cost. That system is the MARC train service.

Further, the FRA should now take into account the changed infrastructure priorities of the current Administration. The president's recent Infrastructure Jobs Plan for Maryland notes: "Marylanders who take public transportation spend an extra 66.3% of their time commuting and non-white households are 2.7 times more likely to commute via public transportation. 23% of trains and other transit vehicles in the state are past their useful life." Yet, rather than proposing the SCMaglev as a solution, the administration states that it "will modernize public transit with an $85 billion investment."[318] And the administration has backed up their statement with Congress by passing the Infrastructure Investment and Jobs Act, which was signed into law on November 15, 2021.

In short, this *skewed approach* is a classic case of unreasonably narrowing the objective of the proposed action to limit the range of alternatives considered. The FRA's approach violates the NEPA's fundamental rule that the "alternatives section is the heart of the EIS" and "must rigorously explore and objectively evaluate all reasonable alternatives (see 40 CFR 1502. 14., CEQ's Questions and Answers About the NEPA Regulations, Q. 1 a. (CEQ, 1981.)[319]

XVIII. The FRA's Limitation of the Project's Study to the Baltimore-to-Washington Corridor Improperly Segments the Scope of Analysis from the Project Sponsor's Plan to Extend the SCMaglev to the Entire Northeast Corridor

BWRR, the project sponsor, consistently describes the SCMaglev as part of an overall Washington-to-New York business model and their unsubstantiated supporting data appear to be based on this overall system. The Northeast Maglev, LLC (TNEM) project's website notes that the proposed SCMaglev system "ultimately will be extended to New York City."[320] The plan to go proceed New York City and Boston has been repeated many times over several years by TNEM representatives.[321] Thus, the Washington, D.C.-

[316] *Ibid*. Chapter 4, Section 4.5. Page 4.5-18.
[317] *Ibid*. Section 3.3.2.4, Table 3.4-4. Page 3-26.
[318] "American Jobs Plan - The Need for Action in Maryland." The White House. www.whitehouse.gov/wp-content/uploads/2021/04/AJP-State-Fact-Sheet-MD.pdf.
[319] 46 Federal Register 18026. March 23, 1981.
[320] Northeast Maglev Common Questions - General Questions. 2021. https://northeastmaglev.com/faq/#general.
[321] See Appendix - Article Reprint: Diffendal, Theresa. "Maglev Route Deliberations: Decision Due This Summer." May 2, 2019. Greenbelt News Review. https://greenbeltnewsreview.com/issues/GNR20190502.pdf. ; Appendix - Article Reprint.

to-Baltimore route is just one phase of a project ultimately planned to go to New York City and possibly even Boston. In effect, by limiting the scope of analysis to only the Washington-to-Baltimore corridor, BWRR and the FRA have improperly segmented the project and foreclosed the consideration of other transit alternatives if the Washington, D.C.-to-Baltimore segment were to be extended along the length of the Northeast Corridor.

The prohibition on improper segmentation of an overall project is central to the NEPA. Under established case law and guidance, to avoid improper segmentation, a proposed project (1) must have logical termini, (2) must have substantial independent utility, (3) may not foreclose the opportunity to consider alternatives, and (4) does not irretrievably commit funding of closely related projects.[322] As one court stated:

"The purpose of considering connected actions in one EIS is to assure that the decisionmakers, as well as the public, are aware of the environmental impacts of the entire connected project, as an interconnected whole so as to avoid an irretrievable commitment to the entire project on the strength of a segmented analysis of the impacts . . ." [323]

From the beginning of this project, the FRA has treated the Washington, D.C.-to-Baltimore segment as independent and unrelated to the real possibility that approval of this project would incentivize the efforts of the project sponsor to eventually extend the SCMaglev to New York and possibly even Boston. The FRA relies on its decision to identify the Washington, D.C.-to-Baltimore segment for study to implement the Congressional language in Section 1307 of the SAFETEA- LU Act authorizing funding to study magnetic levitation projects. As a result, the FRA's definition of Purpose and Need has focused on the SCMaglev as the only viable alternative to address the serious transportation needs of the corridor and downplayed other viable alternatives as "no action," even though planned major upgrades to Amtrak and MARC service are well underway. Thus, the BWRR documentation focuses on the foreseeable impacts of SCMaglev in the Northeast Corridor as if the project would essentially end in these connected cities. In so doing, the FRA, and now possibly the Maryland Department of the Environment (MDE), are not considering the foreseeable consequence that approving the SCMaglev would inevitably lead to extending that technology to New York and even Boston as federal financial and other resources would be diverted from viable and existing alternative transit improvements, to the SCMaglev. Indeed, it is entirely likely that not considering other transit upgrades as alternatives, would also result in limiting the scope of such consideration once the project was built and operational between Washington, D.C., and Baltimore. This would then detract from continued improvements to existing, affordable, and accessible intra and inter-city commuting options used by the overwhelming majority of the population.

Further, under CEQ's definition, the effects of future extension of the SCMaglev along the length of the Northeast Corridor are not speculative and must be considered under the NEPA. This should be considered by the MDE before issuing a WQC. CEQ defines *effects* as "changes to the human

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Zaleski, Andrew. "Crazy Train: Is the proposed 300-mile-per-hour maglev train Baltimore's future? Or fantasy?" Baltimore Magazine. September 2019. www.baltimoremagazine.com/section/businessdevelopment/proposed-300-mile-per-hour-maglev-train-baltimores-future-or-fantasy-public-transport-technology/.

[322] See One Thousand Friends v. Mineta, 364 F.3d. 890, 894 (8th Cir. 2004). See FHWA Regulations at 23 CFR 771.111 (f).

[323] *Northwest Bypass Group v. Corps,* 552 F. Supp. 2d. 97,122 (D.N.H 2008), see also *Thomas v. Peterson,* 753 F.2d. 754, (9th Cir. 1985).

environment from the proposed actions or alternatives that are reasonably foreseeable and have reasonably close causal connection to the proposed actions or alternatives . . . . and may include effects that are later in time or farther removed in distance from the proposed action or alternatives."[324]

The *effects definition* is very broad and includes:

". . . ecological (such as effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic and cultural, economic (such as effects on employment) social or health effects. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial."[325]

The one major limitation is that "effects should generally not be considered if they are remote, or the product of a lengthy causal chain . . . [and] do not include effects that the agency has no ability to prevent due to limited authority or would occur regardless of the proposed action."[326]

Under this definition, it is entirely foreseeable that extending the SCMaglev beyond the Washington, D.C.-to-Baltimore corridor would have broad effects. Such approval would clearly require FRA authorization—and likely federal funding—so any such impacts would not be remote or beyond the ability of the FRA to address and the MDE to comprehend. That is, such effects would not result from purely private or non-federal actions.

Indeed, the scope of likely effects tied to the future extension of the SCMaglev are likely to cover many factors, such as air and water quality, land use, growth, climate change, and economics, including transit-oriented development. One could easily envision a future extension impacting urban areas, wetlands, streams, water quality, forests, and protected species in Northern Maryland, Pennsylvania, Delaware, New Jersey, and New York (depending on the chosen alignment).

Further, consideration of the cumulative and indirect harm to all these resources from the Northeast Corridor extension would be precluded because of the improper segmentation of the project only to the Washington, D.C.-to-Baltimore corridor. Refer to *Sierra Club v. FERC* (Sabal Trail), 867 F. 3d. 1357 (D.C. Circuit, 2017) regarding the authorization of the construction of a pipeline. The NEPA required the Federal Energy Regulatory Commission (FERC) to consider the downstream effects of greenhouse gas emissions from power plants serviced by the pipeline.

The improper segmentation would also foreclose comprehensive consideration of meeting the clean-up goals of the Chesapeake Bay program that requires cooperation and coordination among federal agencies and six states to meet specific clean goals set by the Bay Total Maximum Daily Load (TMDL) program as upheld by the Third Circuit in *American Farm Bureau Federation v. EPA*, 792 F. 3d. 281 (3rd Circuit 2015).

[324] 40 CFR 1508. 1(g).
[325] *Ibid,* at 1508.1 (g) (1).
[326] *Ibid,* at 1508.1 (g) (2).

Furthermore, even though there is no formal federal plan to extend the SCMaglev beyond the Washington, D.C.-to-Baltimore corridor, a programmatic EIS covering the Northeast Corridor would be very beneficial. CEQ's *Forty Questions Memorandum* guidance under the NEPA states that "preparation of an area-wide or overview EIS may be particularly useful when similar actions, viewed with other reasonably foreseeable or proposed agency actions, where a common timing or geography are in place *or* exist."[327] Agencies have used discretionary programmatic EISs effectively. In particular, the Federal Highway Administration used a programmatic EIS to advance a new 149-mile interstate highway in Indiana.

In the case of the SCMaglev project, the FRA has already prepared the Northeast Corridor EIS (NEC *Future Plan*) and issued an ROD with recommended improvements to grow the role of rail within the transportation system of the Northeast. According to the ROD: "The selected alternative prioritizes a corridor wide commitment to the existing Northeast Corridor, brings it to a state of good repair and provides the additional capacity and service enhancements necessary to address passenger rail needs through 2040 and beyond."[328]

It would be logical, advisable, and reasonable for the MDE to delay any further action on approval of BWRR's SCMaglev WQC application for the Maryland segment, and the FRA to delay the next iteration of an SCMaglev EIS (*whether supplemental or final*). The logical next move being to preparing a programmatic EIS looking at SCMaglev technology in relation to the Northeast Corridor ROD, and laying out transportation improvements for the entire Northeast Corridor to provide the kind of comprehensive analysis that the NEPA requires.

[327] Volume 46 Federal Register 18033 (3/23/81) Q. 24b.
[328] *NEPA Litigation Guide*. Second Edition 2012. The American Bar Association. Pages 87-88.

XIX. Social and Economic Issues: Impact on Residents and Communities

The applicant's WQC justification materials, as the DEIS are woefully inadequate in the presentation of the known and potential negative consequences that building and operating the SCMaglev project will bring to communities, businesses, and residents. BWRR claims that the construction will bring minor inconveniences and that the operation of the SCMaglev system will be hardly noticeable. However, independent assessment and research present a far different picture. These impacts are ignored, or significantly downplayed, in the BWRR documentation. The actual impacts need to be revealed and clearly articulated prior to any decision by the MDE. BWRR's documentation for the SCMaglev fails to provide this information and is therefore deficient. With these glaring deficiencies, the MDE should not issue any WQC for this project.

Japan's SCMaglev is the high-speed, ground-based transportation system the Northeast Maglev (TNEM), the SCMaglev project's promotional entity, proposes to build in the Northeast Corridor of the United States. BWRR, the project developer for the Baltimore to Washington, D.C. segment, and TNEM have the short-term goal of obtaining WQC from the MDE and FRA approval to build a SCMaglev train between Baltimore and Washington, D.C., with the long-term goal of extending the operation to New York City, by way of Philadelphia.

Information about the SCMaglev project and BWRR's plans to build and operate the system have raised many questions and concerns. The study of SCMaglev public documents (and several made public through requests via the federal Freedom of Information Act and Maryland's Public Information Act) by MCRT, and the work of other concerned individuals, communities, and organizations, have identified and discussed many questions with building and operating the SCMaglev. In this section, we will take a deeper dive into the impacts on communities that building and operating the SCMaglev would create.

XX. Environmental Justice Community Impacts[329]

Environmental justice (EJ) is a grave concern of residents and communities potentially being disrupted and enveloped by the proposed SCMaglev project.

What is Environmental Justice?

The U.S. Environmental Protection Agency defines EJ as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."[330]

Environmental Justice Plan 2025 notes the disparities encountered in EJ communities:

[329] Appendix – Reprint: Jackman, Patricia, and McCutchen, Susan. "SCMagLev – Environmental Justice Communities." July 5, 2021.
[330] U.S. Environmental Protection Agency (EPA). "Environmental Justice." www.epa.gov/environmentaljustice.

"Environmental justice is closely tied to health disparities in that low-income, and some communities of color are often differentially burdened by environmental hazards and have high exposure to pollution emissions. Consequently, this leads to an excess burden of illness and disease. . . . racism and discrimination have been closely tied to the social and economic disadvantage experienced by low-income and economically underserved populations. *Furthermore, these communities are often disproportionately used as environmental sinks to host locally unwanted land uses (***LULUs***)*." [Emphasis added.][331]

As stated in the DEIS,[332] the U.S. Department of Transportation (USDOT) Order 5610.2(a), Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (2012), requires that **any activities that will have a disproportionately high and adverse effect on populations** protected by Title VI ("protected populations") will only be carried out if:

1. A substantial need for the activity exists, based on the overall public interest.

2. Build Alternatives that would have less adverse effects on protected populations (and that still satisfy the need identified in item 1 above), either:
   - Would have other adverse social, economic, environmental, or human health impacts that are severe; or
   - Would involve increased costs of extraordinary magnitude.[333]

Request:

The BWRR documentation must present:
1. A detailed, data-based analysis of need for the project based on overall public interest, not simply presenting numbers of people counted using a skewed project sponsored yes/no survey where choosing the option to support is the highly biased choice.
2. Present Build Alternatives that have less adverse effects on protected populations.

This information then needs to be shared with the public and given sufficient time for public review and comment before any consideration on a decision to move the SCMaglev project forward.

USDOT Order 5610.2(a), drawing from the framework established by Title VI and the National Environmental Policy Act (NEPA) of 1969, also establishes principles to ensure nondiscrimination in federally funded activities:

[331] The Program on Community Engagement, Environmental Justice, and Health (CEEJH). "Environmental Justice Plan 2025 Prince George's County, Maryland." CEEJH (Dr. Sacoby Wilson, Director). School of Public Health, the University of Maryland College Park. April 2018. Page 9. www.btbcoalition.org/index%20page%20images/ENVIRONMENTAL%20JUSTICE%20PLAN%202025_PrinceGeorges.pdf.
[332] DEIS. Chapter 4.05. Section 4.5.2.1. Page 4.5-1.
[333] *Id*.

1. Avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects—including social and economic effects—on minority populations and low-income populations.

2. Ensure full and fair participation by all potentially affected communities in transportation decision-making processes.[334]

Further, Morello-Frosch, et al. (2011) note:

> "Racial or ethnic minority groups and low-income communities have poorer health outcomes than others. They are more frequently exposed to multiple environmental hazards and social stressors, including poverty, poor housing quality, and social inequality. We conclude that current environmental policy, which is focused narrowly on pollutants and their sources, should be broadened to take into account the cumulative impact of exposures and vulnerabilities encountered by people who live in neighborhoods consisting largely of racial or ethnic minorities or people of low socioeconomic status."[335]

In announcing its opposition to the Baltimore-Washington DC Maglev Project, the Maryland Chapter of the Sierra Club stated:

> ". . . Those who would bear the burden of the impacts from construction and operation of this project would receive none of the benefits, since there are no stops along the route between D.C. and Baltimore, other than BWI airport. According to the Draft EIS, the communities that the train would cut across are nearly 70 percent communities of color and approximately 13 percent low income. Approximately 80 percent of the land parcels that would be impacted are located within Environmental Justice communities. Moreover, the cost of the ticket on the maglev train - an estimated $60 on average - would be greater than that on the MARC train ($8) or Amtrak ($46), making it an option only for the wealthy and out of reach for most people."[336]

XXI. Is Construction of the SCMaglev Justified Under the Requirements of United States Department of Transportation Order 5610.2(a)?

No, absolutely not. Construction of the SCMaglev is not justified under the requirements of USDOT Order 5610.2(a). BWRR does not address other build alternatives. The SCMaglev does not fulfill the public's need for equitable and efficient mass transit and does not serve the many communities along its route that would suffer disproportionately if this project were built.

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[334] DEIS. Chapter 4.05. Section 4.5.2, Subsection 4.5.2.1. Page 4.5-2.

[335] Morello-Frosch, Rachel; Zuk, Miriam; Jerrett, Michael; Shamasunder, Bhavna; Kyle, Amy D. "Understanding the Cumulative Impacts of Inequalities in Environmental Health: Implications for Policy." Research Article Health Affairs, Volume 30, No. 5. *Environmental Challenges for Health*. May 2011. www.Healthaffairs.Org/Doi/Pdf/10.1377/Hlthaff.2011.0153.

[336] Sierra Club Maryland Chapter. "Sierra Club Statement on the Proposed Baltimore - Washington DC Maglev Project." April 29, 2021. www.sierraclub.org/maryland/blog/2021/04/sierra-club-statement-proposed-baltimore-washington-dc-maglev-project.

The Beacon Heights-Woodlawn Community Groups' comments on the DEIS include the following reasons why they believe the DEIS for the SCMaglev project fails to meet NEPA requirements and the same holds true for the WQC process:

> "The DEIS fails to adequately assess the effects that air emissions, stormwater runoff, noise and vibration, and electric and magnetic fields, from both construction and operation of the train, will have on the surrounding communities. Second, the environmental impacts of the SCMAGLEV Project are not reasonable in light of the purpose and need for the Project. Third, the DEIS pushes the responsibility for assessing these environmental and community impacts to a 'later design phase' or to the permitting process, which largely excludes public participation. Further, the SCMAGLEV Project is an unnecessary addition to the multiple methods of transportation that already service residents from Washington D.C., Baltimore, MD, and Baltimore-Washington International Airport."[337]

In a recent opinion piece, Prince George's County Councilmember Jolene Ivey (District 5) and (former) Councilmember Danielle Glaros (District 3) wrote:

> "As our country confronts our historic — and current — mistreatment of black and brown people . . .we must acknowledge and address the ways that land use, development and transportation projects have affected these exact same communities in a discriminatory way." [338]

Glaros and Ivey continue:

> "Today it is the Northeast Maglev — a superconducting magnetic-levitation train, known as SCMaglev or maglev — that would wreak havoc, eliminate green space, pollute our air, suffocate our businesses and siphon off significant business from MARC commuter rail and Amtrak. Prince George's County would bear the brunt of these negative impacts while realizing no balancing benefits to our community. Again, a project is planned through a majority-minority community where the land is cheap and the homes less expensive." [339]

In another article in the University of Maryland newspaper *The Diamondback*, Janna Parker, a resident from Temple Hills is quoted:

> "It doesn't even stop in the county that it wants to build through. It essentially seems just like another project that is being done at the expense of people of color, in regards to their

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[337] Appendix - Reprint: Farley, Michael and Fells, Ina. "Comments on Baltimore-Washington Superconducting MAGLEV Project Draft Environmental Impact Statement and Draft Section 4(f) Evaluation (EIS No. 20210010). Beacon Heights and Woodlawn Community Groups. April 23, 2021. Pages 1-2. https://aa247ef8-bd4a-4dd2-890c-8b5ebdf396e2.filesusr.com/ugd/6d0640_dac97370e48c47778f9103f9382e31eb.pdf.

[338] Appendix - Reprint: Ivey, Jolene, and Glaros, Dannielle. "Opinion: Prince George's County won't stand for the maglev – another destructive project for our people." *Washington Post*. April 23, 2021. www.washingtonpost.com/opinions/local-opinions/prince-georges-county-maglev-wreak-havoc-minority-communities/2021/04/22/f314b0ae-a1eb-11eb-85fc-06664ff4489d_story.html.

[339] *Id*.

ownership of land and property as well as their ability to make decisions about what happens on the land and property they own, and subsequently should govern." [340]

Ed Anderson's corner townhouse in South Laurel is about 100 feet from the proposed SCMaglev's route. He was quoted in 2019 in another article:

> "'I definitely would never want that eyesore. You think I would've bought this property knowing that?' Some of the strongest opposition to the project continues to come from residents such as Anderson who live near the routes under consideration. The luster of a high-speed maglev train wears off when they consider the impact construction might have on their homes: boring machines chewing earth, trucks hauling off tons of dirt, tunnels beneath their streets, and ever-present viaducts supporting trips north and south every 10 minutes."[341]

In an April 15, 2021, letter, the Prince George's County Board of Education expressed its opposition to the SCMaglev, stating that two possible routes:

> ". . . have the potential for significant impacts on public schools located in Prince George's County . . . The proximity of these schools to what is expected to be approximately seven years of construction could present several challenges to the education provided to countless Prince George's County Public School (PGCPS) students. Over the seven-year time span, children could be subjected to construction noises, ground movements, debris, construction traffic, pollution, and other byproducts of ongoing construction. This would be detrimental to a conducive learning environment."[342]

Prior to Prince George's County School Board announcement, the Anne Arundel County School Board issued a statement of their opposition to building the SCMaglev in 2017, stating in part that it ". . . is disruptive to our schools and surrounding communities."[343] See Exhibit L for BWRR stated depths beneath schools, homes and other features that are of concern.

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[340]Truss-Williams, Anaya. Appendix - Article Reprint: "Community members say MAGLEV train would be overpriced, destroy local environments." *The Diamondback*. April 22, 2021. https://dbknews.com/2021/04/22/community-members-say-maglev-train-would-be-overpriced-destroy-local-environments/.

[341] Zaleski, Andrew. Appendix - Article Reprint: "Crazy Train: Is the proposed 300-mile-per-hour maglev train Baltimore's future? Or fantasy? *Baltimore Magazine*. September 2019. https://www.baltimoremagazine.com/section/businessdevelopment/proposed-300-mile-per-hour-maglev-train-baltimores-future-or-fantasy-public-transport-technology/.

[342] Prince George's County Public Schools. "SCMagLev." April 15, 2021. https://aa247ef8-bd4a-4dd2-890c-8b5ebdf396e2.filesusr.com/ugd/6d0640_5f4e72ffbc3f4df7a70987054c233811.pdf.

[343] Parcella, Rachael. "Anne Arundel school board opposes superconducting maglev train routes." November 1, 2017. *Capital Gazette*. www.capitalgazette.com/education/ac-cn-maglev-aacps-1102-story.html.

Exhibit L - Plan and Profile Drawings 20WL1574 Wetlands Water ways Parts 1-10

Schools, Homes, Other Features Above Tunnels	Depth (feet)	Drawing	Page #
Anacostia River, Bladensburg Waterfront Park	23	PP-45	9 of 98
Bladensburg High School	60	PP-46	10 of 98
Elizabeth Seton High School	73	PP-46	10 of 98
Rogers Heights Elementary School	76	PP-46	10 of 98
Homes along Stanton Road and Greenvale Parkway	45 to 53	PP-47	11 of 98
Beacon Heights Elementary School	74	PP-48	12 of 98
Homes along Riverdale Road	54	PP-48	12 of 98
Homes along Lois Lane and Lory Lane	32 to 52	PP-48	12 of 98
Lamont Elementary School	67	PP-49	13 of 98
Greenbelt: Homes along Greenbrook Drive	58	PP-50	14 of 98
Greenbelt: Eleanor Roosevelt High School	46 to 49	PP-51	15 of 98
Greenbelt: Hanover Pkwy Homes (Greenbriar)	26	PP-51	15 of 98
Amtrak Rail Crossing	37	PP-67	32 of 98
Linthicum Elementary School - Tunnel is offset	70	PP-71	36 of 98
Overlook Elementary School - Tunnel is offset	68	PP-72	37 of 98
Patapsco River Crossing	20	PP-73	38 of 98
Baltimore Highlands Elementary School	42	PP-74	39 of 98

EJ populations, communities of color, and low-income communities are more often exposed to elevated levels of air, water, and noise pollution because hazardous facilities and infrastructure have intentionally been disproportionately located in their communities.[344] Air and noise pollution are more lethal to communities of color due to the cumulative impacts of exposure to higher levels of these pollutants and the chronic stress from racial discrimination.[345]

To complicate this even more, climate change will bring about increased temperatures and extreme weather events like heat waves, leading to even higher rates of air pollution.[346] The SCMaglev's excessive use of electricity,[347] (73 percent of which is derived from nuclear and fossil fuels)[348] and the increased diesel and other traffic-related emissions during the project construction will only add to the already poor air quality along its route.

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[344]Velasco, Gabriella. "How Transportation Planners Can Advance Racial Equity and Environmental Justice." August 18, 2020. www.urban.org/urban-wire/how-transportation-planners-can-advance-racial-equity-and-environmental-justice.

[345] Varanasi, Anaradhi. "Over 14 million people of color in the US live in counties with high air pollution." April 27, 2020. www.forbes.com/sites/anuradhavaranasi/2020/04/27/over-14-million-people-of-color-in-the-us-live-in-counties-with-high-air-pollution/?sh=64985d2c5301.

[346]Fowlie, Meredith, Reed Walker, and David Wooley. "Climate policy, environmental justice, and local air pollution." October 26, 2020. www.brookings.edu/research/climate-policy-environmental-justice-and-local-air-pollution/.

[347] Aoki, Hidekazu, and Kawamiya, Nobuo. "Up to five times as much when compared to high-speed steel-wheeled trains." Cited in: Appendix - Reprint: Harding, Robin. "Japan's new maglev train line runs headlong into critics." *Financial Times*. October 17, 2017. Page 2. www.ft.com/content/5d4e600a-9e12-11e7-8b50-0b9f565a23e1.

[348] U.S. Department of Energy (DOE). "Maryland State Profile and Energy Estimates." Energy Information Administration (EIA). October 15, 2020. www.eia.gov/state/analysis.php?sid=MD.

A recent *Washington Post* article notes that "nearly every source of the nation's most pervasive and deadly air pollutant disproportionately affects Americans of color."[349] The communities along the train route are particularly vulnerable to air pollution. The American Lung Association has given a grade of **F** for ozone to all three of the counties along the route, Anne Arundel, Baltimore, and Prince George's. Of the 14 counties in the state, six received a grade of **D** or **F**, and the nine others are a grade of **C** or higher.[350] This was called out again in video testimony on the SCMaglev by Sonja Wyatt, a member of the Prince George's County NAACP Branch Committee on the Environment and Health member, who emphatically noted that Prince George's County is a dumping ground for the state's polluting infrastructures, and that Prince George's County has already received an **F** for air quality from the American Lung Association. "The SCMaglev is yet another project with overwhelmingly negative effects on health, environmental sustainability and quality of life in Prince George's County." [351]

In summary, BWRR's documentation are deficient in satisfying USDOT Order 5610.2(a), which requires that:

- a substantial need for the activity exists, based on the overall public interest, and
- build alternatives that have less adverse effects on protected populations be examined.

Environmental Justice and the SCMaglev Draft Environmental Impact Statement

In its January 2021 SCMaglev DEIS, the FRA broadly and inadequately addresses EJ issues along the proposed routes of the SCMaglev Project. Many questions are being posed in EJ communities, including about the destruction likely to be wrought by its building, the extensive footprint, the invasiveness of the built environment on completion, the associated hazardous waste, and pollutants released during construction, and in operation, including potentially from the ventilation facilities in EJ communities. Thus, the DEIS statement that "the SC Maglev would positively affect the labor market"[352] is very misleading when viewed in the context of the overall adverse impact of the Project on disadvantaged populations. This should be considered by the MDE in their WQC materials review.

According to the DEIS, "minority populations comprise 69.6 percent of the total population and low-income populations make up 12.7 percent of the SCMaglev Project Affected Environment."[353] See DEIS Table 4.5-2.[354]

[349] Eilperin, Juliet, and Fears, Darryl. "Deadly air pollutant 'disproportionately and systematically' harms Americans of color, study finds." *Washington Post*. April 28, 2021. www.washingtonpost.com/climate-environment/2021/04/28/environmental-justice-pollution/.
[350] American Lung Association. "State of the Air Report Card." Retrieved May 2, 2021. www.lung.org/research/sota/city-rankings/states/maryland.
[351] Wyatt, Sonja. "SCMAGLEV Testimony." April 20221. www.youtube.com/watch?v=A-9seVJUR50.
[352] DEIS. Section 4.5. Environmental Justice. Page 4.5-12.
[353] *Ibid*. Page 4.5-5.
[354] *Ibid*. Page 4.5-6.

Table 4.5-2: EJ Demographics in the SCMAGLEV Project Affected Environment

Environmental Justice Identifier	Total Population	Percent of Total Population
Black or African American	105,072	46.6%
American Indian and Alaska Native	620	0.3%
Asian	15,205	6.7%
Native Hawaiian and Pacific Islander	308	0.1%
Some other race	822	0.4%
Two or more races	5,3877	2.4%
Hispanic or Latino	29,505	13.1%
Non-White Hispanic or Latino	15,376	6.8%
Total Population (EJ and non-EJ)	**225,635**	**100%**
Total Minority Population	**156,919**	**69.6%**
Low-income population	28,165	12.7%

Source: American Community Survey Sample Data (ACS 2018)

The range of impacts includes construction in general, as well as transportation, community facilities, parkland, economic, aesthetics and visual quality, hazardous materials, noise, vibration, and land use, as referred to in the following Table 4.5-3.

Table 4.5-3: Impacts Considered in Disproportionality Analysis

Environmental Resource Areas	Type of Impacts Consideration	DEIS Reference Section
Transportation	Impacts that would decrease the Level of Service (LOS) in residential areas; impacts that would change local access or mobility	Section 4.2
Community Facilities	Includes directly impacted community facilities	Section 4.4
Parkland	Includes directly impacted parklands	Section 4.7
Economic	Includes areas with the potential for changes to local economies	Section 4.6
Aesthetics and Visual Quality	Includes Moderate (M) and Higher (H) Levels of visual changes in residential neighborhoods	Section 4.9
Hazardous Materials	Includes directly affected areas with an existing Risk Ranking of 4 or more (Medium to High)	Section 4.15
Noise	Includes areas that will result in a severe noise impact	Section 4.17
Vibration	Includes areas that will result in frequent vibration impact	Section 4.17
Land Use	Includes properties that would have permanent full parcel acquisitions, permanent partial parcel acquisition, and temporary full parcel acquisition	Section 4.3

The SCMaglev project "hammers" EJ communities along both alternative alignments. These impacts include:

- Eighty (80) percent of the parcels that would be impacted by land use conversion, rezoning, and property acquisitions are in EJ communities.[355]
- Nearly all the project ancillary facilities (those located above ground) are located within the EJ population areas (e.g., stations, viaducts, tunnel portals, power substations, stormwater management facilities, etc).
- Increase in runoff, stormwater, and flooding issues will disproportionately affect the EJ communities.
- Most cultural resources (historic and archaeological resources) impacts occur within EJ groups.[356]
- Construction impacts would occur at varying locations and for varying durations in EJ and surrounding communities during the construction period, 24 hours a day, seven days a week, for one to seven years.[357] Impacts during construction, as well as while the train is running, is not limited to a one-, or even a five-mile buffer around the route. Disruption in transportation, spills, air pollution, or economic impacts on commercial business (e.g., shut down or difficult to access during the construction period) will impact the town or community far beyond the buffer zone. Calculating the amount of these disruptions based on the buffers significantly underestimates the actual impacts.
- A Decreased Level of Service (LOS) in EJ and surrounding residential areas and changes to local access or mobility can be anticipated.[358]
- The chance of vehicle collisions and other operational accidents is elevated in EJ communities because of the disproportionate construction impacts.
- Potential spills of hazardous materials are more likely to occur in EJ communities.[359]
- Most of the frequent and severe noise and vibration impacts will occur in EJ communities.
  - 99 percent of the noise impacts.[360]
  - 100 percent of the severe vibration.[361]
- Air pollution will worsen around stations due to increased traffic and potentially harmful emissions from ventilation facilities. Localized increase to mobile force air emissions around stations due to increased traffic.[362] Mobile source air emissions do not stay local; rather, they disperse into surrounding areas, sometimes at distances.[363] The air emissions could have significant impact throughout the communities near the sites.
- Visual changes in neighborhoods and the elimination of greenspace will occur in and around EJ communities.
- Of the 56 locations identified as moderate- or high-sensitivity aesthetic impacts, 47 would be located in EJ population areas.[364]

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[355] *Ibid*. Page 4.5-15.
[356] *Ibid*. Chapter 4.05. Section 4.5.4.2. Page 4.5-14.
[357] *Ibid*. Chapter 4.05, Section 4.5.4.3. Page 4.5-21.
[358] *Ibid*. Chapter 4.05. Section 4.5.4.2. Page 4.5-9.
[359] *Ibid*. Chapter 4.05. Section 4.5.4.2. Page 4.5-13
[360] *Ibid*. Page 4.5-15.
[361] *Ibid*. Page 4.5-16.
[362] *Ibid*. Page 4.5-19.
[363] European Environment Agency. "Dispersal of Air Pollutants." April 20, 2016. www.eea.europa.eu/publications/2599XXX/page005.html.
[364] DEIS. Chapter 4.05. Section 4.5.4.2. Page 4.5-13.

- Negative impacts to EJ neighborhood cohesiveness and the disruption of interaction between people and groups within a community will be sustained, as have occurred with other transportation construction projects.[365]
- Permanent and unrecoverable impacts to recreational facilities and parklands: 12 of the 14 parks affected are in EJ communities.[366] (Impacts to the Maryland City Park and the Greenbelt Forest Preserve would have the greatest impacts to the nearby EJ populations).

Furthermore, disconcerting questions arise as these impacts are considered by EJ communities that historically have been characterized by inequity and disproportionate impact from major transportation projects.

- Is it appropriate to place more potential pollutants and large disruptive construction footprints where minority, lower-income residents live?
- Will EJ communities enjoy any of the claimed SCMaglev benefits, such as temporary or permanent jobs, community investment, or improved accessibility?
- Is the quality of life of the residents in EJ communities considered less important than those in more upscale communities?
    - Would these more affluent residents and their communities be considered more deserving of careful consideration and appropriate environmental protection?
    - Would major, invasive transportation projects such as the SCMaglev realistically not be built in these more prosperous and potentially more influential areas because of the anticipated hue and outcry?

The Chesapeake Bay Foundation (CBF) produced an excellent detailed research report on the impacts the SCMaglev will bring onto the EJ communities and should be closely studied in reference to the BWRR documentation.[367] The CBF's findings demonstrate BWRR's lack of measurable concern on the part of the project sponsors and in-depth research into how it will affect the quality of life of viable and thriving multiracial, multicultural, and lower-income communities along the Northeast Corridor is troubling.

The following is from the CBF report with minor editing. [368]

I. The adverse environmental impacts of the SCMaglev are to be absorbed, almost exclusively, by minority or low-income communities and neighborhoods, increasing environmental inequities in the Chesapeake Bay region.

Just as examining true alternatives comprises the heart of an EIS process, equity and disproportionate impact are at the heart of evaluating environmental justice impacts. When virtually all of the adverse impacts of a project are to be experienced and absorbed by minority or low-income communities and

[365] *Ibid*. Page 4.5-18.
[366] DEIS. Chapter 4.05. Section 4.5.4.2. Page 4.5-11.
[367] Kurtz, Josh. Appendix - "Draft Environmental Impact Statement and Draft Section 4(f) Evaluation Baltimore-Washington Superconducting MAGLEV Project Comments Submission." Chesapeake Bay Foundation. May 24, 2021. https://aa247ef8-bd4a-4dd2-890c-8b5ebdf396e2.filesusr.com/ugd/6d0640_dd1783ac780445fcb02619616faca327.pdf.
[368] *Id*.

neighborhoods, and when those communities mostly become the victims of its establishment rather than having an equitable share in its benefits, a serious and substantial environmental injustice is identified.

In the case of the SCMaglev that is precisely the case, as shown in the facts uncovered in the DEIS, some of which are demonstrated with the impact information summarized below. It is not only the specific kind of inequity routinely and systemically created by major transportation and other public infrastructure projects which have been imposed upon environmental justice (EJ) communities for decades but is also the kind of disproportionate adverse impact addressed by, and to be avoided in every way possible, in accordance with Presidential Executive Orders 12898[369] and 14088.[370]

102 of 124 (85%) of the block groups within the impact area in some way exceed one or more environmental justice (EJ) thresholds.

Of the block groups within the impact area ("project affected environment"), 59 are minority majority, 10 are low income, and 33 have both characteristics.[371] These communities will bear the brunt of the impacts from this project yet reap few or none of the benefits: "Generally, the majority of the SCMAGLEV project impacts for each Build Alternative . . . would occur within EJ populations, given that the large majority of the Affected Environment consist[s] of EJ populations."[372]

18 of 20 community facilities identified are within EJ population areas, and while impacts differ according to alignments and SCMaglev facility locations, "nearly all property acquisitions and disruptions to community facilities would occur in neighborhoods and areas containing EJ populations."[373] These include, for example, the acquisition of numerous commercial and industrial properties near a possible Cherry Hill station in Baltimore, as detailed in Chapter 4.4; and full or partial acquisition of numerous residential properties along the right-of-way or due to the placement of ancillary facilities. Table 4.4-1 contains a list of potentially impacted neighborhoods and community facilities, with a designation as to what such temporary or permanent impacts might be. These include, for example, the permanent displacement of the Woodlands Job Corps Training Center in the alternative that includes the MD 198 train maintenance facility – objected to by the U.S. Department of Labor since it is the "only one of two of its kind the Washington, D.C., area and relocating it would be extremely costly;"[374] displacement of the Medmark (Addiction) Treatment Center in the alternative which includes the Cherry Hill Station in Baltimore; and both acquisition of the New York Avenue Playground and Park, and permanent displacement of the private family Snowden Cemetery in another set of alternative alignments.[375] Property acquisitions would occur in Summerfield, South Laurel, Maryland City, Severn, Westport, and other neighborhoods.

[369] Executive Order 12898 (February 11, 1994).
[370] Executive Order 14088, §§219-223 (January 27, 2021).
[371] DEIS. 4.5-6.
[372] *Ibid*. 4.5-10.
[373] DEIS. Chapter 4.05. Section 4.5.4.2. Page 4.5-10.
[374] *Ibid*. 4.5-11.
[375] *Ibid*. 4.4-5.

Cultural resources in and among EJ Communities may be adversely impacted.

An extensive list of cultural resources in and among EJ communities may be adversely impacted by the various alternative alignments.[376] Many cultural resources that will be adversely impacted are listed or eligible for listing on the National Register of Historic Places (NRHP), a program largely administered by state-level (and District of Columbia) historic preservation agencies. A SCMaglev station at Camden Yards, for example, would require the permanent destruction of the historic, NRHP-listed Old Otterbein United Methodist Church (1785-1786).[377]

State and local parks within EJ areas would be adversely affected.

12 of 14 state or local parks that would be adversely affected are within EJ areas. The other two impacted parks, Greenbelt Park and Patuxent National Wildlife Refuge and Research Center, are federal. In Alternative J1, Maryland City Park would lose four playing fields and a paved trail, although the communities around it are not well served by recreational facilities because of the existence of Fort Meade and the Patuxent National Wildlife Research Refuge (PNWRR). Greenbelt Forest Preserve, part of nationally historic City of Greenbelt, would experience adverse impacts, as several uses within it would be foreclosed and one set of alternative alignments (J1) would have the viaduct traverse and permanently affect about 40 acres of the Hamilton Woods and North Woods tracts.[378]

47 of 56 areas identified as moderate to high visual impact zones in the SCMaglev DEIS are in EJ-identified block groups or neighborhoods.

With respect to *aesthetics* and *visual quality*, 47 of 56 areas identified as moderate to high visual impact zones were in EJ-identified block groups or neighborhoods. The longer "Alignment J" viaduct produces more impacts, versus a longer deep tunnel that would be a part of alternative J1[379] , but overall, a 150-foot high elevated trainway or viaduct anywhere along the route would become a highly visible neighborhood intrusion when seen from medium distances; when residences, buildings or community gathering places are close to the support structures; when the viewshed is more open than shielded by trees; or when the viewer is in a somewhat elevated location.

[MCRT Editor's Note: At 150 feet, the elevated guideway is 50 feet taller than the tree canopy along the BW Parkway.]

One example is the direct visual intrusion, in the South Laurel neighborhood, upon The Villages at Montpelier Apartments, Applewalk Condominiums, and Laurelwood Condominiums, where the viaduct could be as close as 90 feet away and a forest buffer would be completely removed.[380] The construction and placement of high-tension power lines to serve a new substation would also adversely affect aesthetics visual quality.[381]

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[376] *Ibid*. Chapter 5.
[377] *Ibid*. 4.4-8.
[378] *Ibid*. 4.5-11-12.
[379] *Ibid*. 4.5-13.
[380] *Ibid*. 4.4-11.
[381] *Id*.

Any direct economic development or improvements in adversely affected EJ areas is unlikely based on the DEIS.

The applicant's WQC justification materials, as in the DEIS, states that (one of the only) positive impacts on EJ communities will purportedly come from the construction jobs needed over the construction period. How many jobs? In the DEIS BWRR estimates 8,700-10,560.[382] We have more to say on BWRR job creation claims later. In the applicant's WQC justification materials, the number is 23,000 jobs.[383] It is not made clear that these may not all be continuous nor all full-time equivalent jobs. Further, none of these jobs will be allocated or limited to those living in EJ neighborhoods but rather will be regionally available. Thus, they are just as likely to be filled by a worker from upper Baltimore County, Howard County, Montgomery County, Alexandria or Fairfax in Virginia, or elsewhere in Prince George's or Anne Arundel Counties, as someone from the adversely impacted EJ communities along the line.

It is also unlikely that there would be any direct economic development or improvement in most of the otherwise adversely impacted EJ areas, since there are no station areas to be accessed therein except around the possible Cherry Hill terminal station in Baltimore and certain neighborhoods in Washington, D.C. While positive economic impacts will be unlikely with respect to most EJ areas, there is a very good possibility of gentrification and residential or business displacement impacts occurring in the two terminal cities, due both to station placement and improved access – with the most displacement and gentrification occurring in lower-priced Baltimore.[384]

Environmental health is likely to be adversely impacted during construction.

Spills and perhaps hazardous materials from various construction-related equipment and materials are likely in and around maintenance facilities and activities, such as fuels and oil leaks from trucks, excavators, loaders, and the like, solvents and other liquids from degreasing activity, storage tanks, polluted stormwater from temporary and permanent parking facilities, etc. Construction activities include digging and deep excavation, tunneling, pile driving, stockpiling of materials, and the like; both fugitive dust and noise and vibration, and the potential for exposure to hazardous materials is higher in those locations.[385]

Transportation impacts from trucks and other heavy vehicles working on the extensive project and traveling on local roads are likely; these include regular congestion, detours, or constant noise exceeding healthy levels. More concerning, temporary (i.e., over the course of five or more years of construction activities) small particle (PM 2.5) air pollution from diesel exhaust is likely, which can exacerbate lung

[382] *Ibid*. 4.5-12.
[383] "Baltimore-Washington SCMaglev Project Maryland High-Quality Waters (Tier II) Social and Economic Justification Report." Page 11.
[384] *Ibid*. 4.5-13.
[385] *Ibid*. 4.4-9.

diseases such as COPD and asthma, as well as cardiac effects[386,387,388,389,390]; these are known to affect EJ communities more than the general population as a whole.[391,392,393,394,395] Such effects occur even when the air quality is within air quality standards. Communities such as Adelphi, Hyattsville, Riverdale and numerous EJ neighborhoods along alternative routes will experience adverse health impacts for a period of five years or more.

Noise and vibration impacts could persist during regular SCMAGLEV operation, with impact areas closest to the viaduct almost entirely in EJ communities.

Design features enclosing noise-producing elements with walls and louvres, for example, will be used as mitigation but the applicant's WQC justification materials, as the DEIS, does not offer an estimate of the geographic reach or extent/severity of vibration impacts due ostensibly to the newness of the technology being used (although it is technology now in use in Japan). While some mitigation is possible using dampening techniques, it is not clear how effective that can be.[396] Indeed, no matter how much shielding is employed, there would be vibration impacts on "multiple residential properties" located

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[386] Peters A., Dockery D. W., Muller J. E., Mittleman, M. A. "Increased particulate air pollution and the triggering of myocardial infarction." *Circulation*. June 12, 2001. PMID: 11401937. DOI: 10.1161/01.cir.103.23.2810. https://pubmed.ncbi.nlm.nih.gov/11401937/.

[387] Thurston, G. D., Ahn, J., Cromar, K., Shao, Y., Reynolds, H., Jerrett, M., Lim, C., Shanley, R., Park, Y., Hayes, R. B. "Ambient Particulate Matter Air Pollution Exposure and Mortality in the NIH-AARP Diet and Health Cohort." *Environ Health Perspective*. April 2016. PMID: 26370657 PMCID: PMC4829984 DOI: 10.1289/ehp.1509676. https://pubmed.ncbi.nlm.nih.gov/26370657/.

[388] Zanobetti, Antonella, Schwartz, Joel. "Air pollution and emergency admissions in Boston, MA." September 13, 2006. *Journal of Epidemiology & Community Health*. Volume 60, Issue 10. https://jech.bmj.com/content/60/10/890.

[389] United States Environmental Protection Agency (EPA). "Integrated Science Assessment for Particulate Matter (Final Report, Dec. 2019), U.S." (Final Report, December 2019. EPA/600/R-19/188, 2019, §12.5.4. https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=347534.

[390] Mar, Therese F., Koenig, Jane Q., Primomo, Janet. "Associations between asthma emergency visits and particulate matter sources, including diesel emissions from stationary generators in Tacoma, Washington." 2010. *Inhalation Toxicology*. Vol. 22 (6): 445-8. PMID: 20384437 DOI: 10.3109/08958370903575774. https://pubmed.ncbi.nlm.nih.gov/20384437/.

[391] United States Environmental Protection Agency (EPA). "Integrated Science Assessment for Particulate Matter (Final Report, Dec. 2019), U.S." (Final Report, December 2019. EPA/600/R-19/188, 2019, §12.5.4. https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=347534.

[392] Miranda, Marie Lynn, Edwards, Sharon E., Keating, Martha H., Paul, Christopher J. "Making the environmental justice grade: The relative burden of air pollution exposure in the United States." *International Journal of Environmental Research and Public Health*. 2011. 8: 1755-1771. https://pubmed.ncbi.nlm.nih.gov/21776200/.

[393] O'Lenick, Cassandra R., Winquist. Andrea, Mulholland, James A., Friberg, Mariel D., Chang, Howard H., Kramer, Michael R., Darrow, Lyndsey A, Sarnat, Stefanie Ebelt. "Assessment of neighbourhood-level socioeconomic status as a modifier of air pollution-asthma associations among children in Atlanta." July 15, 2016. *Journal of Epidemiol Community Health*. https://pubmed.ncbi.nlm.nih.gov/27422981/.

[394] Qian Di, M.S., Yan Wang, M.S., Antonella Zanobetti, Ph.D., Yun Wang, Ph.D., Petros Koutrakis, Ph.D., Christine Choirat, Ph.D., Francesca Dominici, Ph.D., and Joel D. Schwartz, Ph.D. "Air Pollution and Mortality in the Medicare Population." June 29, 2017. *The New England Journal of Medicine*. 376:2513-2522. DOI: 10.1056/NEJMoa1702747. www.nejm.org/doi/full/10.1056/nejmoa1702747.

[395] Thurston, GD. "Written Report of George D. Thurston Regarding the Public Health Impacts of Air Emissions From the Wheelabrator Facility." November 20, 2017. Report for the Chesapeake Bay Foundation. www.cbf.org/document-library/cbf-reports/thurston-wheelabrator-health-impacts-2017.pdf.

[396] *Ibid*. 4.5-16.

above the tunnel portions of the J01-J06 alignments in the Woodlawn, New Carrollton, Greenbelt, and South Laurel neighborhoods.[397] Such community facilities as the Tabernacle Church and Learning Center, the New Life Christian Center, Resurrection Church and others would be impacted by noise and vibration due to proximity to the trainway or viaduct in certain alternative alignments.[398] See Sections XXIV and XXV for more information on Noise and Vibration.

SCMAGLEV operations will necessarily create electromagnetic fields.

In addition to noise and vibration, SCMaglev operations will necessarily create electromagnetic fields.[399] While there are safety standards for exposure to non-ionizing radiation for workers in occupational settings, there evidently are none in Maryland for residential exposure.[400] The DEIS states that "there will be a magnetic field generated . . . [and] shielding and other mitigation will be designed to fully comply with International Commission on Non-Ionizing Radiation Protection and World Health Organization (WHO) guidelines and technical specifications."[401] The applicant's WQC justification materials, and the DEIS should reveal what levels of electromagnetic radiation are likely to occur at set distances from trackage and electrical facilities, what the international guidelines and specifications are with respect to those levels, and precisely what will be the mitigation used to shield people, pets, wildlife, and electronic equipment from adverse exposure levels. More on this later.

Temporary and permanent changes from the SCMaglev project may decrease access, mobility, and community cohesion in EJ neighborhood and communities.

Changes to access and mobility, as well as community cohesion, often accompany the construction of large public infrastructure projects adjacent to, across, or within neighborhoods and communities. The DEIS identified a "project affected environment" (PAE) for neighborhoods and community facilities as an area within a 500-foot buffer around the proposed build alternatives alignments and within a quarter mile buffer around stations and maintenance facilities."[402] Both temporary and permanent impacts would occur due to construction (road detours and blockages, noise and vibration, etc.), and permanent changes would occur as properties are acquired and neighborhoods change accordingly, with on-going noise and vibration of the operations or visual quality also impacting both residential areas and community facilities.[403]

In summary, the adverse and sometimes serious social, community, and environmental impacts of this project will almost solely be experienced within EJ neighborhoods along its alternative alignments and near its termini, while these communities will unlikely obtain many of its purported benefits, such as

[397] *Ibid*. 4.4-10.
[398] *Ibid*. 4.4-11; 4.4-6.
[399] *Ibid*. 4.18-1.
[400] This begs the question as to whether such standards exist elsewhere (i.e., in other states) for residential exposure, and how the levels of electromagnetic radiation (EMR) produced through the use of this train technology and equipment may compare with such standards, with respect to nearby homes, schools, yards, and parks. To the extent such standards exist, this information should have been made available in the SCMaglev DEIS and WQC justification materials for comparison purposes.
[401] DEIS. 4.5-18-1.
[402] *Ibid*. 4.4-2.
[403] *Ibid*. Table 4.4-1.

temporary or permanent jobs, beneficial community investment, or improved accessibility. This is precisely the kind of inequity and disproportionate impact that defines environmental injustice, which has characterized hundreds of major transportation projects for decades, and which at least two Presidential Executive Orders aim to reduce or eliminate. It should weigh heavily against the MDE issuing a WQC, and the FRA proceeding with the SCMaglev project.

XXII. More on the Impacts

Construction

The DEIS provides only a general approach to addressing potential construction issues related to transportation, which will have to be determined *after the final engineering design has been approved and the building progresses*:[404]

"Construction will begin after completion of the final engineering design, and subject to Federal, state, and local permits. During this time, localized construction impacts, such as changes in traffic volume and circulation patterns, noise and vibration levels, visual effects have the potential to occur. As the engineering design advances, the Project Sponsor will develop a specific construction plan describing construction sequencing, equipment, methodologies, and safety practices. . . . As part of construction planning, the Project Sponsor will coordinate with affected property owners and stakeholders to ensure that the construction management plan accommodates their needs and concerns to the extent reasonably feasible. They will also develop and implement a variety of mitigation and minimization measures to be applied corridor wide and specific to each site and the local construction activities. Examples of these measures include locating the elevated structure piers outside floodplains and wetlands when possible, locating the piers to avoid roads and prevent sight distance issues, installing cofferdams will be required for in-water pier construction, preparing and implementing a plan to dispose of excavated soils, preparing and implementing a noise and vibration control plan, protecting local building foundations during construction, and implementing traffic management and control plans."

Transportation

In the DEIS, the FRA broadly evaluated current transportation systems and networks accessible to and used by EJ communities and likely to be affected to an unknown degree by the SCMaglev during construction and in operation:[405]

- Commuter Rail Network – Maryland Area Regional Commuter (MARC) commuter rail service between the City of Baltimore, Baltimore-Washington International Thurgood Marshall (BWI

[404] U.S. Department of Transportation (USDOT), Federal Railroad Administration (FRA), and Maryland Department of Transportation (MDOT). "Baltimore-Washington Superconducting Maglev Project: Draft Environmental Impact Statement and Section 4(f) Evaluation." Section 4.1: Introduction, Pages 4.1-4 and 4.1-5. www.baltimorewashingtonscmaglevproject.info/images/document_library/deis/deis_full_download.pdf.
[405] *Ibid.* Section 4.2: Transportation. Page 4.2-2.

Marshall Airport) Station, and Washington, D.C. (the Penn Line between Baltimore Penn Station, BWI Marshall Airport Station and Washington Union Station and the Camden Line between Baltimore Camden Yards Station and Washington Union Station).

- Intercity Passenger Rail (Amtrak) – Amtrak Intercity Passenger Rail service between Baltimore Penn Station, BWI Marshall Airport Station, New Carrollton, and Washington Union Station. Three Amtrak services operate along the corridor between Baltimore and Washington, D.C.: Acela high speed express service, Northeast Regional Service, which makes more stops within the corridor than Acela service, and long-distance intercity rail which operates within the corridor but is destined for cities outside the Northeast corridor.

- Local Transit Systems – In Baltimore this includes MDOT Maryland Transit Administration (MDOT MTA) Citylink local bus routes, commuter bus, Light Rail Link (hereafter Light Rail) and Metro Subway Link heavy rail (hereafter Metro). In Washington, D.C., this includes Washington Metro Area Transit Authority (WMATA) local bus and Metrorail, commuter bus run by multiple agencies, and the DC Streetcar and Washington, D.C. Circulator, both run by the District Department of Transportation. In Prince George's County local transit service includes the locally operated The Bus system, WMATA Metrorail and Metrobus service, and commuter bus service run by MDOT MTA; In Anne Arundel County, local transit service includes Baltimore Light Rail, local bus and commuter bus service run by MDOT MTA.

- Intercity Bus – Throughout the corridor, privately operated intercity bus service is provided by operators Greyhound, Peter Pan Trailways, and Mega Bus, each of whom provide service between Baltimore and Washington, D.C.

- Regional Roadway Network – Regional roadways that span the SCMAGLEV Project Affected Environment.

Community Facilities

The DEIS "considers the potential direct impacts, including permanent effects and short-term construction effects to neighborhoods and community facilities."[406] The concerning direct impacts for EJ communities include:[407]

- Property impact(s) – full (displacement – permanent use of more than 1/3 of the property or removal of structures), partial property acquisition (permanent use of less than 1/3 of the property), or temporary use of property (property only used during construction).

- Community cohesion effects – disruption or enhancement of interactions between people and groups within a community.

- Community facility utilization – displacement of or changes in the utilization of community facilities.

[406] *Ibid*. Section 4.4: Neighborhoods and Community Facilities. Page 4.4-1.
[407] *Ibid*. Pages 4.4-1 and 4.4-2.

- Aesthetics and visual appearance – changes in the visual landscape.

- Noise and vibration – changes in noise and vibration.

- Air quality – changes to air quality including increases or decreases in pollutants and increases in fugitive dust during construction.

- Health and safety – threats to public health and safety

- Changes to access and mobility – disruption in the ingress and egress to a community or community facility.

Parkland

The DEIS states:

> "Nearly 2,000 acres of Federal, state, and local recreational facilities and parklands occur in the SCMAGLEV Project Affected Environment. Within the urbanized areas at either end of the SCMAGLEV Project Affected Environment, parks are generally small and meet local community recreational needs. Parks within the central portion of the SCMAGLEV Project Affected Environment tend to be larger, more regional in focus, and are generally significant for both active passive recreation as well as natural resource conservation."[408]

These parks are used by EJ community residents and are a part of their communities. And yet, the "FRA considers several impacts to public recreational facilities and parklands to be difficult to mitigate due to extensiveness of impact and/or uniqueness of park features."[409]

Economic

See Sections XX and XXXVII for more economic information. Several observations in the DEIS made about economic impact that would affect EJ communities include the following:

- The SCMaglev would have both a positive and negative impact on revenues, potentially impacting the local government services that rely on them. The increased accessibility of some properties would result in an increase in property values and, therefore, property taxes, while property acquisitions and losses of revenues by competing systems would result in a reduction of revenues. The net change in revenues would therefore impact the availability and scale of public services.[410]

- Temporary negative construction impacts to business revenues in the affected areas may be significant, ranging from $18.5 million to $311.3 million (2018 dollars). This decrease in business

[408] *Ibid*. Section 4.7: Recreational Facilities and Parklands. Pages 4.7-5 and 4.7-6.
[409] *Ibid*. Page 4.7-7.
[410] *Ibid*. Section 4.06: Economic Resources. Page 4.6-3.

revenues is due to lane closures, traffic delays, and limited accessibility that would reduce the number of people frequenting the area and supporting businesses.[411]

- While residential relocations are sensitive because they may alter households' school and commute patterns, FRA also anticipates commercial acquisitions … None of the acquisitions along the SCMaglev alignments are sufficiently unique in its commercial activity that the business could not find comparable building, resource, and transportation access elsewhere in the same jurisdiction.[412]

- The SCMaglev's construction will cause travel disruptions as street lanes and sidewalks are closed, as parking space is reduced, as commercial establishments become less visible from the street, and as noise and dust levels in the vicinity of the building activity rise. There are two main types of construction impacts, defined by the groups who are most directly affected—traveler impacts and business community impacts.[413]

Aesthetics and Visual Quality

The DEIS notes many issues associated with aesthetics and visual quality and mitigation, including some of possible particular concern to our EJ communities, including:

- FRA assessed the visual effects of the alignment (viaduct and deep tunnel), stations, and miscellaneous fixed support facilities on adjacent and nearby communities, general public areas, sensitive viewsheds, historic sites, and other special features considered to be visually sensitive.[414]

- The greatest numbers of cultural sites are typically found in municipalities that date from the 18th to early 20th centuries and therefore contain older buildings and structures. Municipalities with many cultural sites include Baltimore City, MD, Washington, D.C., and the central Maryland suburban towns of Bladensburg, Greenbelt, and Linthicum.[415]

- Tunneling efforts, such as cut/ cover work, site clearing for buildings/facilities, grading, staging and work areas. At the end of construction, these elements would be removed and temporarily disturbed areas would be restored to the extent practicable.[416]

- Prior to construction, BWRR or its contractors would present visual impact mitigation strategies to the following neighborhoods (additional neighborhoods may be identified as the SCMAGLEV Project proceeds): Mount Vernon Square District, Ivy City, Langdon, Gateway, Brentwood, Bladensburg, Wildercroft, Woodlawn, West Lanham Hills, Montpelier, South Laurel, Woodbridge Crossing, Montpelier Hills, Evergreens at Laurel Apartments, Maryland City, Sudlersville South, Barbersville,

[411] *Ibid*. Page 4.6-8.
[412] *Ibid*. Page 4.6-11.
[413] *Ibid*. Page 4.6-15.
[414] *Ibid*. Section 4.9: Aesthetics, Visual Quality, and Light Emissions. Page 4.9-2.
[415] *Ibid*. Page 4.9-4.
[416] *Ibid*. Page 4.9-28

Harmons Station, Baltimore Highlands, Lansdowne, Dorchester Heights, Cherry Hill, Westport, Otterbein, Downtown Baltimore Business District.[417]

Hazardous Materials

EJ communities have often been the location for the disposal of and exposure to hazardous materials. According to the DEIS, many sites and operations have a risk for encountering potentially hazardous materials, and construction itself brings its own dangers.

- There have been more than 1, 000 sites identified and ranked within the SCMaglev Project Affected Environment with the potential for hazardous materials site concerns. Most sites identified within the SCMaglev Project Affected Environment are designated a Risk Ranking of 1 or 2, meaning relatively low risk. The FRA focused on sites with Risk Rankings of 3 or higher because they have the greatest potential for the SCMaglev Project to encounter contaminated soil, groundwater, or other hazardous materials during construction.[418]

- The SCMaglev Project will involve the use of hazardous materials for construction and operation and will result in the generation of hazardous waste and other solid waste. This will require management of construction and operating activities to protect human health and the environment.[419]

- Some construction and demolition waste materials and products encountered or generated during construction present a known risk to human health and the environment. These include hazardous wastes (listed, characteristic and universal types identified by the USEPA); asbestos-containing materials (friable); asbestos-containing materials (non-friable); lead-containing materials (including lead-based paint); products containing polychlorinated biphenyls (PCBs); solvents, chemicals, paints, petroleum-derived products; diesel/gasoline; fluorescent and compact fluorescent lamps; electronics; and medical waste. The SCMaglev Project does have the potential to encounter naturally occurring asbestos during tunneling operations through bedrock.[420]

- The operation and maintenance of the SCMAGLEV Project would require the handling, transporting, generating, storing, and disposing of hazardous and solid waste. Hazardous materials including lubricants, hydraulic fluids and cleaning products would be used during the routine maintenance of rail vehicles and stations. Wastes that would require disposal include used oil, used cleaning products, solvents, and paint.[421]

Construction Noise and Vibration

Extended years of construction is a major concern for EJ residents. Their communities and municipalities along the routes, with dense populations and built environment, such as houses, apartment buildings,

[417] *Ibid*. Pages 4.9-28 and 4.9.29.
[418] *Ibid*. Section 4.15: Hazardous Materials Sites and Solid Waste. Page 4.15.4.
[419] *Ibid*. Page. 4-15.5.
[420] *Ibid*. Page 4-15.6.
[421] *Id*.

schools, and businesses, surrounded by roadways in various degrees of repair, already are affected by noise and vibration and would likely be more so with the construction and operation of the SCMaglev. As the DEIS observes to be the case for vibrations, even for a no build option: "Traffic, including heavy trucks and buses, rarely create perceptible vibration unless vehicles are operating very close to buildings or there are irregularities in the road, such as potholes or expansion joints."[422]

During construction, the DEIS noted:

> "In summary, there are no predicted noise impacts from the tunnel boring machine as all activities would be underground. However, the removal of spoils from the tunnel boring machine (TBM) launch areas (which typically occur continuously 24/7 during this phase) could cause impacts at residences in the Maryland City and Fort Meade communities. Localized noise impacts are also expected from station and FA/EE excavation as these will require deep boring, pile driving and possibly blasting.[423] "

The same is stated for vibration."[424]

Noise and Vibration Impact from Tunnelling, FA/EE, Station, Support Facility Construction

The MCRT collected the following information from BWRR documents to better relate the full impact on communities and residents brought on if building the SCMaglev is approved. The number of total estimated daily trips, based on BWRR provided information, will take place largely in EJ communities.

Source: Exhibit I - BWRR-MEM-0021-R0 Construction Plan Rev2 20.05.14. Table 6. Alignment Alternative J FA/EE Shaft Launch/Retrieval Site Construction. Pages 15-16.

Location Description	Work Activity	Est. Duration (Months)	Est. Operating Hours	Est. Min. Truck Trips (per Day)	Est. Max. Truck Trips (per Day)	Est. Worker Vehicle Trips	Est. Total Min. Work-related Trips (per Day)	Est. Total Max. Work-related Trips (per Day)
Station 104+267 – Launch2	FA/EE Shaft Launch/Retrieval Site Construction	**15**	**24 hours per day**	130	130	125	**255**	**255**
Station 108+160 - Retrieve	FA/EE Shaft Launch/Retrieval Site Construction	**12**	**24 hours per day**	35	35	50	**85**	**85**

[422] *Ibid*. Section 4.17: Noise and Vibration. Page 4.17.10.
[423] *Ibid*. Page 4-17.18.
[424] *Id*.

Source: Exhibit I - BWRR-MEM-0021-R0 Construction Plan Rev2 20.05.14. Table 6. Alignment Alternative J FA/EE Shaft Launch/Retrieval Site Construction. Pages 15-16.								
Station 113+102 - Launch	FA/EE Shaft Launch/Retrieval Site Construction	**18**	**24 hours per day**	160	160	125	**285**	**285**
Station 140+281 – Alt. FA/EE Site3	FA/EE Shaft Launch/Retrieval Site Construction	**12**	**24 hours per day**	40	40	50	**90**	**90**
Station 141+601 – Launch	FA/EE Shaft Launch/Retrieval Site Construction	**15**	**24 hours per day**	125	125	125	**250**	**250**
Station 151+097 – Retrieval	FA/EE Shaft Launch/Retrieval Site Construction	**12**	**24 hours per day**	40	40	50	**90**	**90**
Totals				**530**	**530**	**525**	**1,055**	**1,055**

Source: Exhibit I - BWRR-MEM-0021-R0 Construction Plan Rev2 20.05.14. Table 8. Alignment Alternative J Tunnel Boring. Page 18.

Location Description	Work Activity	Est. Duration (Months)	Est. Operating Hours	Est. Min. Truck Trips (per Day)	Est. Max. Truck Trips (per Day)	Est. Worker Vehicle Trips	Est. Total Min Work related Trips (per Day)	Est. Total Max Work related Trips (per Day)
1 - Station 101+100 to Station 104+179	Tunnel Boring	**13.5**	**24 hours per day**	200	265	150	**350**	**415**
2 - Station 104+329 to Station 108+142	Tunnel Boring	**17**	**24 hours per day**	200	265	150	**350**	**415**
3 - Station 113+012 to Station 108+177	Tunnel Boring	**21**	**24 hours per day**	200	265	150	**350**	**415**
4 - Station 113+162 to	Tunnel Boring	**23**	**24 hours per day**	200	265	150	**350**	**415**

Source: Exhibit I - BWRR-MEM-0021-R0 Construction Plan Rev2 20.05.14. Table 8. Alignment Alternative J Tunnel Boring. Page 18.

Station 118+348								
5 - Station 141+517 to Station 135+175	Tunnel Boring	**28**	**24 hours per day**	200	265	150	**350**	**415**
6 - Station 146+395 to Station 141+667	Tunnel Boring	**19**	**24 hours per day**	200	265	150	**350**	**415**
7 - Station 143+603 to Station 146+395	Tunnel Boring	**23**	**24 hours per day**	250	320	150	**400**	**470**
Station 146+626 to Station 152+820	Tunnel Boring	**27**	**24 hours per day**	200	265	150	**350**	**415**
			Totals	**1,650**	**2,175**	**1,200**	**2,850**	**3,375**

Source: Exhibit I – BWRR-MEM-0021-R0 Construction Plan Rev2 20.05.14. Table 13. Alignment Alternative J Viaduct Construction. Page 30.

Location Description	Work Activity	Est. Duration (Months)	Est. Operating hours	Est. Min. Truck Trips (per Day)	Est. Max. Truck Trips (per Day)	Est. Worker Vehicle Trips	Est. Total Min. Work-related Trips (per Day)	Est. Total Max. Work-related Trips (per Day)
Station 120+022– Station 122+522	Viaduct Construction	**34**	**7:00 am - 4:00 pm**	30	30	60	**90**	**90**
Station 122+522– Station 125+022	Viaduct Construction	**34**	**7:00 am - 4:00 pm**	30	30	60	**90**	**90**
Station 125+022– Station 127+522	Viaduct Construction	**34**	**7:00 am - 4:00 pm**	30	30	60	**90**	**90**

Source: Exhibit I – BWRR-MEM-0021-R0 Construction Plan Rev2 20.05.14. Table 13. Alignment Alternative J Viaduct Construction. Page 30.								
Station 127+522– Station 130+022	Viaduct Construction	**34**	**7:00 am - 4:00 pm**	30	30	60	**90**	**90**
Station 130+022– Station 132+522	Viaduct Construction	**34**	**7:00 am - 4:00 pm**	30	30	60	**90**	**90**
Station 132+522– Station 134+230	Viaduct Construction	**28**	**7:00 am - 4:00 pm**	30	30	60	**90**	**90**
Totals				**180**	**180**	**360**	**540**	**540**

Source: Exhibit I - BWRR-MEM-0021-R0 Construction Plan Rev2 20.05.14. Table 15. Alignment Alternative J TMF Ramps Construction. Page 31.								
Location Description	**Work Activity**	**Est. Duration (Months)**	**Est. Operating Hours**	**Est. Min. Truck Trips (per Day)**	**Est. Max. Truck Trips (per Day)**	**Est. Worker Vehicle Trips**	**Est. Total Min. Work-related Trips (per Day)**	**Est. Total Max. Work-related Trips (per Day)**
BARC West	BARC West TMF Ramp NB	**30**	**7:00 am - 4:00 pm**	30	30	30	**60**	**60**
BARC West	BARC West TMF Ramp SB	**26**	**7:00 am - 4:00 pm**	26	26	52	**78**	**78**
Totals				**56**	**56**	**82**	**138**	**138**

Source: Exhibit I - BWRR-MEM-0021-R0 Construction Plan Rev2 20.05.14. Table 28. Alignment Alternative J Substation Construction. Page 48.								
Location Description	**Work Activity**	**Est. Duration (Months)**	**Est. Operating Hours**	**Est. Min. Truck Trips (per Day)**	**Est. Max. Truck Trips (per Day)**	**Est. Worker Vehicle Trips**	**Est. Total Min. Work-related Trips (per Day)**	**Est. Total Max. Work-related Trips (per Day)**
Station 104+500	Substation Construction	**24**	**7:00 am - 4:00 pm**	6	6	100	**106**	**106**

Source: Exhibit I - BWRR-MEM-0021-R0 Construction Plan Rev2 20.05.14. Table 28. Alignment Alternative J Substation Construction. Page 48.								
Station 124+300	Substation Construction	**24**	**7:00 am - 4:00 pm**	6	6	100	**106**	**106**
BARC West TMF Alt. (x2)	Substation Construction	**24**	**7:00 am - 4:00 pm**	6	6	100	**106**	**106**
Station 151+000	Substation Construction	**24**	**7:00 am - 4:00 pm**	6	6	100	**106**	**106**
Station 155+460	Substation Construction	**24**	**7:00 am - 4:00 pm**	6	6	100	**106**	**106**
Totals				**30**	**30**	**500**	**530**	**530**

Source: Exhibit I - BWRR-MEM-0021-R0 Construction Plan Rev2 20.05.14. Table 19. Station Construction. Page 39-40.								
Location Description	**Work Activity**	**Est. Duration (Months)**	**Est. Operating Hours**	**Est. Min. Truck Trips (per Day)**	**Est. Max. Truck Trips (per Day)**	**Est. Worker Vehicle Trips**	**Est. Total Min. Work-related Trips (per Day)**	**Est. Total Max. Work-related Trips (per Day)**
Washington DC - Mt Vernon Square East	Station Construction: Civil	**48**	**7:00 am - 4:00 pm**	250	350	150	**400**	**500**
Washington DC - Mt Vernon Square East	Station Construction: Architectural	**24**	**7:00 am - 4:00 pm**	100	100	100	**200**	**200**
BWI Airport	Station Construction: Civil (Station Box)	**42**	**24 hours per day**	220	220	150	**370**	**370**
BWI Airport	Station Construction: N. Switch Box	**24**	**24 hours per day**	220	220	50	**270**	**270**
BWI Airport	Station Construction: S. Switch Box	**24**	**24 hours per day**	220	220	50	**270**	**270**
BWI Airport	Station Construction: Architectural	**24**	**24 hours per day**	50	50	150	**200**	**200**

Source: Exhibit I - BWRR-MEM-0021-R0 Construction Plan Rev2 20.05.14. Table 19. Station Construction. Page 39-40.								
Baltimore - Cherry Hill	Station Construction: Civil	30	7:00 am - 4:00 pm	150	150	50	**200**	**200**
Baltimore - Cherry Hill	Station Construction: Architectural	24	7:00 am - 4:00 pm	50	50	100	**150**	**150**
Totals				**1,260**	**1,360**	**800**	**2,060**	**2,160**

Source: Exhibit I - BWRR-MEM-0021-R0 Construction Plan Rev2 20.05.14. Table 22. Station Construction. Page 45.								
Location Description	**Work Activity**	**Est. Duration (Months)**	**Est. Operating Hours**	**Est. Min. Truck Trips (per Day)**	**Est. Max. Truck Trips (per Day)**	**Est. Worker Vehicle Trips**	**Est. Total Min. Work-related Trips (per Day)**	**Est. Total Max Work-related Trips (per Day)**
Station 118+348	Portal Construction	27	24 hours per day	145	145	150	**295**	**295**
Station 135+175	Portal Construction	16	24 hours per day	100	100	150	**250**	**250**
Station 152+820	Portal Construction	20	7:00 am - 4:00 pm	100	100	150	**250**	**250**
Totals				**345**	**345**	**450**	**795**	**795**

Source: Exhibit I - BWRR-MEM-0021-R0 Construction Plan Rev2 20.05.14. Table 26. TMF Alternatives Construction. Page 47.								
Location Description	**Work Activity**	**Est. Duration (Months)**	**Est. Operating Hours**	**Est. Min. Truck Trips (per Day)**	**Est. Max. Truck Trips (per Day)**	**Est. Worker Vehicle Trips**	**Est. Total Min. Work-related Trips (per Day)**	**Est. Total Max. Work-related Trips (per Day)**
BARC West	TMF Construction	78	7:00 am - 4:00 pm	100	100	150	**250**	**250**
Totals				**100**	**100**	**150**	**250**	**250**

The data for dump truck movements, show frequency per day and the likely duration of months to years of these activities. There is also shown in these tables is worker vehicle trips. What is not shown are

cement trucks, in numbers likely similar to the dump trucks, and the multitude of other construction equipment, most diesel or gasoline fueled. MCRT asks MDE to think about all the diesel and gasoline engine pollution, from thousands of pieces of construction equipment, released into our environment for the years needed to build the SCMaglev. Is the SCMaglev really worth the cost to EJ communities whose residents will not be able to afford the ticket price, even if it did provide useful, local service?

The impacts presented in the above tables are for BWRR's preferred alternative alignment J, BARC WEST Train Maintenance Facility (TMF).

Other impact findings include the following that may have impact on EJ communities in SCMaglev operation:

- Along tunnel sections, the FRA did not predict any airborne or community noise impacts since all train operations would be underground. Therefore, all predicted operational train noise impacts occur along the viaduct sections of the alignment due to the exposure of the train pass-bys along the elevated guideway.

- The FRA also predicted noise impacts at residences adjacent to the proposed ancillary facilities, which include trainset maintenance facilities, fan plants, and maintenance-of-way facilities and substations.

- Unlike noise, the FRA predicted vibration impacts from train operations along both tunnel and viaduct sections of the guideway.[425]

- Mitigation strategies include the application of design features to minimize or eliminate potential noise and vibration impacts at residential communities within the SCMaglev Project Affected Environment. Features such as taller parapet walls could minimize noise impacts along viaduct sections but would not eliminate them. Similarly, concrete-lined tunnels and concrete viaducts would reduce vibration transmission but not eliminate them. Additional mitigation measures would be required to reduce noise and vibration impacts.[426]

Land Use

As stated in the BWRR documentation, land will be impacted to build the SCMaglev. Again, EJ communities are most affected.

- Linear impacts to land use would be due to the viaduct, its support piers, and new roadways built to supplement access for construction and ongoing maintenance. Large area impacts to land use would be associated with SCMaglev Project related buildings such as substations, fresh air/emergency egress facilities (FA/EEs), TMFs, and systems support buildings; construction laydown areas; and areas for stormwater management. [427]

[425] *Ibid*. Page 4-17.11.
[426] *Ibid*. Page 4-17.18.
[427] *Ibid*. Section 4.3. Land Use and Zoning. Pages 4-3.8 and 4-3.9.

- The construction of some SCMaglev Project features would be in contrast to current and surrounding land uses. The potential sites for the TMFs include large portions of Beltsville Agricultural Research Center (BARC) which currently includes open space, forested areas, and agricultural uses or an area of land off of MD 198 east of the BW Parkway that includes forested land and institutional uses. In other areas, SCMaglev Project facilities would be located in proximity to residential and commercial uses and forested areas. [428]

- The SCMaglev Project would require temporary property acquisitions and permanent partial (less than 1/3 of the property) property acquisitions from numerous residential properties. As the SCMaglev Project design is finalized, these property impacts may be refined.[429] [It should be noted that eminent domain allows for "involuntary acquisition" where the property owner who does not agree to allow the easement has their property taken from them. If this project fails and is discontinued, the homeowner/landowner still have had their homes and property taken from them.]

  [MCRT Editor's Note: The statement, "As the SCMaglev Project design is finalized, these property impacts may be refined" is repeated in the BWRR documentation. For the SCMaglev designs to be "finalized," the project must be approved. So, what in effect the public is being told is – *We'll work these issues out as we encounter them. You can trust us.*]

- The aboveground structures associated with the alignment include the viaducts, power substations, fresh air/emergency egress facilities, extensive stormwater management facilities, and systems buildings (ancillary facilities). The viaduct would run only along the central portion of the SCMAGLEV Project corridor and generally parallels the BW Parkway and would impact the land that abuts it. The ancillary facilities would be dispersed throughout the SCMAGLEV Project corridor and would include larger footprints in comparison to the viaduct. Some ancillary facilities are located within and in close proximity to residential, commercial, open space, and forested land uses. The aboveground structures associated with Build Alternatives using the Build Alternatives J would result in permanent changes to land use of between 629 acres and 643 acres.[430]

Environmental Protection Agency Review of SCMaglev Environmental Justice Issues

The Environmental Protection Agency (EPA) makes several key observations and recommendations in its detailed review of how EJ issues are addressed in the FRA's SCMaglev DEIS.[431]

Environmental Justice Screening and Mapping Tool[432] Reports in Appendix D.3

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[428] *Id*.
[429] *Ibid*. p. 4-3.10.
[430] *Ibid*. p. 4-3.12.
[431] Appendix – Reprint: U.S. Environmental Protection Agency (EPA). "Technical Comments to the Draft Environmental Impact Statement and Draft Section 4(f) Evaluation: Baltimore-Washington Superconducting MAGLEV Project." CEQ# 20210010. May 24, 2021. Pages 2-4. https://aa247ef8-bd4a-4dd2-890c-8b5ebdf396e2.filesusr.com/ugd/6d0640_a82951f511eb408abd4c5010594e447a.pdf.
[432] Environmental Justice Screening and Mapping Tool. www.epa.gov/ejscreen.

The FRA assessed the entire project corridor using the Environmental Justice Screening and Mapping Tool (EJSCREEN); however, the EPA indicates this is insufficient to adequately assess environmental impact on EJ communities: "While this approach may provide demographic and environmental data for the whole corridor, it risks obscuring and understating conditions of individual communities."[433] They recommend the EJSCREEN tool can be used to develop community-level metrics and should be used to review individual communities such as in "those areas identified within Attachment F of Appendix D.3."[434] The MDE should also make use of the EJSCREEN to gain a far better understanding of the potential impacts building and operating the SCMaglev will have on all communities near to and through which the SCMaglev will transit.

Census Bureau Data

The EPA notes the FRA used the outdated 2010 Decennial Census and the 2018 American Community Survey five-year estimates in its identification of minority and low-income populations.[435] The agency "encourages the FEIS to utilize the most recent available respective U.S. Census and ACS data sets to promote accurate and up-to-date analyses regarding minority populations, low-income populations, and other demographics."[436]

Council on Environmental Quality 1997 Environmental Justice Guidance Under the National Environmental Policy Act

In reviewing the applicant's WQC justification materials, the MDE should be aware that the DEIS refers to the Council on Environmental Quality (CEQ) 1997 guidance to identify both minority and low-income populations. They recommend instead using U.S. Census data.[437]

" . . . however, EPA observes that the methods that the DEIS uses to develop both the minority population and low-income population benchmarks is inappropriate. Adding an additional 10 percentage points to percent minority population and percent low-income averages is mathematically inappropriate and inadvisable. This methodology may cause areas of EJ concern to be missed due to unduly high benchmark values being set. EPA notes that the 1997 CEQ Environmental Justice Guidance does not call for the adding of additional percentages to the benchmarks for low-income populations."[438] They recommend instead using U.S. Census data. [439]

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[433] Appendix – Reprint: U.S. Environmental Protection Agency (EPA). "Technical Comments to the Draft Environmental Impact Statement and Draft Section 4(f) Evaluation: Baltimore-Washington Superconducting MAGLEV Project." CEQ# 20210010. May 24, 2021. Pages 2. https://aa247ef8-bd4a-4dd2-890c-8b5ebdf396e2.filesusr.com/ugd/6d0640_a82951f511eb408abd4c5010594e447a.pdf.
[434] *Id*.
[435] DEIS. Section 4.5, Environmental Justice. Page 4.5-3.
[436] Appendix – Reprint: U.S. Environmental Protection Agency (EPA). "Technical Comments to the Draft Environmental Impact Statement and Draft Section 4(f) Evaluation: Baltimore-Washington Superconducting MAGLEV Project." CEQ# 20210010. May 24, 2021. Pages 2. https://aa247ef8-bd4a-4dd2-890c-8b5ebdf396e2.filesusr.com/ugd/6d0640_a82951f511eb408abd4c5010594e447a.pdf.
[437] *Ibid*. Page 3.
[438] *Id*.
[439] *Ibid*. Page 3.

The EPA points out that to help identify minority populations, the 1997 guidance calls for the following tests: (1) "identification of populations that exceed the 50% minority population benchmark established by CEQ" and (2) "the application of the significantly greater benchmark . . . used when local minority population averages are below 50%."[440] The EPA recommends the FRA return to the 1997 guidance and these important clarifications, indicating the agency "remains willing to coordinate with the lead agencies as needed to assist with interpretation and application of appropriate methods."[441]

Most of the SCMaglev Project Affected Environment Qualifies as Environmental Justice

The U.S. Department of Transportation states: ". . . *most of the SCMAGLEV Project Affected Environment qualifies as EJ*."[442] Regarding this statement in the FRA DEIS, the EPA comments:

> "Such a concentration of impacts in the described areas seems unnecessary and avoidable, as many areas that the DEIS characterizes as 'No EJ' do not appear to be subject to potential ancillary construction features (e.g., stations, TMF footprints, etc.) and consequent impacts on the same scale as the impacts that appear in 'EJ' areas. . . . The distribution of these impacts appears to be disproportionate, with a greater burden in areas with relatively higher minority and/or low-income populations."[443]

While recognizing the FRA indicates in the DEIS that it will address disproportionality in the Final Environmental Impact Statement (FEIS), the EPA "recommends that the Project limit and mitigate impacts within areas of potential EJ concern to the maximum extent possible and that it ensures the avoidance of disproportionate impacts to low-income populations and/or minority populations."[444]

Discussion

It is clear from our review of the EJ information in the BWRR documentation and the EPA's review of EJ issues therein, there will be permanent short- and long-term impacts from the SCMaglev Build Alternatives on EJ populations. As seen from Table 4.5-2, Black and African American and Hispanic or Latino minorities and low-income populations are at a higher risk of direct and disproportionate impacts of this project, as extrapolated from the DEIS discussion (see Table 4.5-3) that refers to the sections in which these concerns are at best superficially addressed and at worst ignored, partly because of the broad scope of unknowns associated with the unfocused review of more than one proposed route.[445]

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[440] *Id*.
[441] *Id*.
[442] U.S. Department of Transportation (USDOT), Federal Railroad Administration (FRA), and Maryland Department of Transportation (MDOT). Section 4.5, Environmental Justice. Page 4.5-5.
[443] Appendix – Reprint: U.S. Environmental Protection Agency (EPA) "Technical Comments to the Draft Environmental Impact Statement and Draft Section 4(f) Evaluation: Baltimore-Washington Superconducting MAGLEV Project." CEQ# 20210010. May 24, 2021. Page 3. https://aa247ef8-bd4a-4dd2-890c-8b5ebdf396e2.filesusr.com/ugd/6d0640_a82951f511eb408abd4c5010594e447a.pdf.
[444] *Ibid*. Page 4.
[445] U.S. Department of Transportation (USDOT), Federal Railroad Administration (FRA), and Maryland Department of Transportation (MDOT). Section 4.5, Environmental Justice. Page 4.5-6.

A major concern for the MDE and our communities is that issues will be addressed after the engineering design has already been approved and as the construction progresses, a point at which the already marginalized municipalities and residents will have little or no impact on the planning and may have already suffered damages. It must be remembered that mitigation does not mean that irreparable harm will not be done. The depth and breadth of the environmental impacts is enormous. One can anticipate a situation of a shrug and an apology from developers at a point when it is too late for remediation.

The MCRT, and many other organizations and communities, are concerned about "the industrial levels of pollution released into our watershed and communities" and point out the following: "The DEIS analyses and discussion of the disproportionate impacts on environmental justice (EJ) areas are seriously deficient. The DEIS understate and fail to address the impact on and likely displacement of the residents and communities through which the SCMaglev will travel. The DEIS ignores the potential use of eminent domain to take property, especially in EJ communities."[446] These observations apply to the current BWRR documentation submitted to the MDE.

[MCRT Editor's Note: While BWRR has stated they do not intend to use eminent domain to take homes or businesses, BWRR is currently in Baltimore Circuit Court in a dispute over their use and ability to use eminent domain to take property in Westport, an EJ community in South Baltimore. The current owner of the land is Stonewall Capital, which purchased the 43 undeveloped acres on Kloman Street in 2021. The property, interestingly enough, was purchased from Plank Industries.[447] The founder and executive chairman of Plank Industries is Kevin Plank, also sits on the Advisory Board of the Northeast Maglev company. Stonewall Capital plans to build a 1,300-unit apartment and town house project, which includes parks and greenspace. An overview of the development plan can be found here.[448] BWRR filed a lawsuit to condemn the land to build a maintenance facility. Stonewall Capital and the Westport Capital Development, LLC, countered in Baltimore Circuit Court with a motion to dismiss the suit, arguing that the rail company lacks the authority to acquire private property for public use through eminent domain. "Baltimore City Circuit Court Judge Kendra Ausby granted Stonewall Capital's motion to dismiss, questioning BWRR's authority to acquire the property for public use through eminent domain while noting Maryland law requires the company to get consent from the city to condemn property."[449] On appeal, the Court of Special Appeals of Maryland remanded the case back to the Baltimore Circuit Court. As of October 6, 2023, the two parties are in negotiations. No trial date has been set.]

While on the subject of eminent domain, in reviewing the BWRR documentation, the MCRT found the information on the potential use of eminent domain was lacking or purposely left out. Note, the MCRT did not find any mention of BWRR's plan to take the 43 acres in Westport in the DEIS. To obtain a true evaluation of the effect building and operating the SCMaglev will have on residential and business

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[446] Maryland Coalition for Responsible Transit – Citizens Against the SCMaglev. Mini Press Release #6: E-Bulletin Board Version. SCMagLev DEIS Findings, Conclusions, and Recommendations. May 24, 2021. Page 1.

[447] Stonewall Capital Closes on Westport Waterfront Parcel, Adds Three Development Partners (southbmore.com). Retrieved October 29, 2023.

[448] Lynch, Kevin. "'One Westport' Waterfront Development Gets Subdivision Approval, Hopes to Start Construction In Summer." December 6, 2021. *SOuthBmOre All Things South Baltimore*. Page 1. www.southbmore.com/2021/12/06/one-westport-waterfront-development-gets-subdivision-approval-hopes-to-start-construction-in-summer/.

[449] Lazo, Luz. "Judge tosses lawsuit from high-speed-train developer seeking land for Maryland station." *Washington Post*. August 31, 2021. www.washingtonpost.com/transportation/2021/08/31/dc-baltimore-maglev-train/.

property values, the calculations must be redone to include **ALL** infrastructure including maintenance of ways, tunnel portals, TMFs, Fresh Air/Emergency Egress (FA/EE) facilities, and all portions of the tunnels and viaducts.

The DEIS states that prior to its FEIS, the FRA "will continue public outreach, stakeholder coordination, and mitigation identification efforts" and "will document the outcome of the disproportionality analysis."[450] This does not obviate the more chilling DEIS statement referred to above: "The vast majority of the SCMaglev Project impacts would occur in EJ population areas due to the fact that most of the SCMaglev Project Affected Environment qualifies as EJ."[451]

EJ residents and communities cannot assume this basic premise will change dramatically should this project move forward, as it would reflect unlikely major changes in the proposed route considered and developed after the investment of years of project development and financial and lobbying commitment from BWRR and TNEM to promote the SCMaglev project.

Bladensburg: A Case Study

Each community is different in demographics and environmental variables, but the EJ areas cover most of Prince George's, sections of Baltimore City, while less frequent in Anne Arundel County. Beyond that, communities within each county are different. Bladensburg for example, has across the line one of the highest percentile environmental impacts in the county, as well as one of the lowest per capita income. Yet, the proposed route would have a large impact on this EJ area.

To help focus realities faced by an EJ community that would be directly affected by the building of the proposed SCMaglev project. Besides the Westport community in Baltimore City, Bladensburg is one of the Port Towns, an EJ area of concern at many levels. *Environmental Justice Plan 2025* offers a case study of its demographics and environmental status:

> "Bladensburg is a small town, comprised of 9,608 residents located outside of Washington, DC. This community has an average low median household income of $44,125 and a poverty rate of 20.3% Bladensburg residents are primarily people of color, with 51.9% African American and 31.7% Hispanic. The town has dense, heavy traffic along with numerous industrial sites within the radius of the town. ... The current concrete block plant has been in operation for over 90 years, yet, there have been no on-site assessments of contamination or monitoring of air pollution including diesel particulates at or near the site. This site presents a public health threat to local residents, particularly vulnerable populations such as children, the elderly, and individuals with underlying health issues such as asthma or heart disease."[452]

[450] U.S. Department of Transportation (USDOT), Federal Railroad Administration (FRA), and Maryland Department of Transportation (MDOT). Section 4.5. Environmental Justice. Page. 4.5-5.
[451] *Id*.
[452] School of Public Health, the University of Maryland College Park. "Environmental Justice Plan 2025." The Program on Community Engagement, Environmental Justice, and Health (CEEJH) (Dr. Sacoby Wilson, Director). April 2018. Page 13. www.btbcoalition.org/index%20page%20images/ENVIRONMENTAL%20JUSTICE%20PLAN%202025_PrinceGeorges.pdf.

One view recently attributed to SCMaglev sponsors by an interviewing reporter is that building a ventilation station in the Port Towns near the Bladensburg Waterfront Park is regarded as being of little intrusion because an almost-100-year-old industrial park is sited across from it.[453] One might inquire what this signifies as a justification to build this five-story structure that could likely be the source of dangerous pollutants and emissions into the community. [We'll discuss this more deeply later]. Does this mean that the residents are part and parcel of an industrial park and not a viable and thriving community? EJ communities deserve the same careful consideration as do those in upscale communities.

The Current Administration and EJ Communities

The current Administration has directed its attention to EJ community concerns. According to Climate Executive Order 14008:

> Agencies shall make achieving environmental justice part of their missions by developing programs, policies, and activities to address the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts. It is therefore the policy of my Administration to secure environmental justice and spur economic opportunity for disadvantaged communities that have been historically marginalized and overburdened by pollution and underinvestment in housing, transportation, water and wastewater infrastructure, and health care.[454]

In response to this executive order, the Administration created the "Justice40 Initiative" that underscores its attention to revitalizing and providing resources to EJ communities. The following orders were made to "secure environmental justice and spur economic opportunity": [455]

- The order formalizes President's commitment to make environmental justice a part of the mission of every agency by directing federal agencies to develop programs, policies, and activities to address the disproportionate health, environmental, economic, and climate impacts on disadvantaged communities.

- The order establishes a White House Environmental Justice Interagency Council and a White House Environmental Justice Advisory Council to prioritize environmental justice and ensure a whole-of-government approach to addressing current and historical environmental injustices, including strengthening environmental justice monitoring and enforcement through new or strengthened

[453] McCutchen, Susan. Personal communication during a 2019 interview at the Bladensburg Waterfront Park with WUSA 9 reporter.
[454] The White House. "Executive Order on Tacking the Climate Crisis at Home and Abroad." Section 219. Policy. January 27, 2021. www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/.
[455] The White House. "Fact Sheet: President Biden Takes Executive Actions to Tackle the Climate Crisis at Home and Abroad, Create Jobs, and Restore Scientific Integrity Across Federal Government." January 27, 2021. www.whitehouse.gov/briefing-room/statements-releases/2021/01/27/fact-sheet-president-biden-takes-executive-actions-to-tackle-the-climate-crisis-at-home-and-abroad-create-jobs-and-restore-scientific-integrity-across-federal-government/.

offices at the Environmental Protection Agency, Department of Justice, and Department of Health and Human Services. The new bodies are also tasked with advising on ways to update Executive Order 12898 of February 11, 1994.

- The order creates a government-wide "Justice40 Initiative" with the goal of delivering 40 percent of the overall benefits of relevant federal investments to disadvantaged communities and tracks performance toward that goal through the establishment of an Environmental Justice Scorecard

- The order initiates the development of a Climate and Environmental Justice Screening Tool, building off EPA's EJSCREEN, to identify disadvantaged communities, support the Justice40 Initiative, and inform equitable decision making across the federal government.

These actions acknowledge and underscore concerns expressed by EJ residents as proposed transportation projects compete to establish themselves along the densely populated Northeast Corridor, undoubtedly affecting EJ communities that are its mainstay.

At what point will the benefits to the wealthy stop intruding on the basic rights (or what *should be the rights*) of those living in the EJ areas?

The applicant's WQC justification materials are deficient as they fail to provide a reasonable answer to the following questions:

- How are any of these impacts cited above acceptable, given that most of the residents of these areas are most likely to NEVER use the SCMaglev because it does not provide localized regional commuter services?
- How are any of these above listed items beneficial to these residents, who will NOT be recipients of any of the very highly-suspect, but "promoted" and unproven, economic benefits?

XXIII. The Building and Operation of the SCMaglev Will Have Significant and Potentially Health Harming Impacts on Humans and Wildlife and Property

1. Tunnel Ventilation - Potential Toxins, Carcinogens, and Radioactive Gas Release

BWRR planning calls for the building of ground-level FA/EE structures. The BWRR has stated the ventilation facilities are needed to:

(1) Allow workers into the tunnel for maintenance.
(2) Provide a way for passengers to leave in case of an emergency, and allow emergency personnel to enter.
(3) In case of fire, ventilation facilities will exhaust the smoke out of the tunnel.

The BWRR plans to build one of these surface facilities every three to four miles along the tunnel segments. With FA/EEs located every three to four miles along the tunneled section of the SCMaglev, in

case of an emergency passengers and emergency personnel would have to walk up to two miles. They would also need to descend or ascend 80 to 150 feet to reach the surface.

The BWRR documentation is deficient as it does not answer the following questions:

- How is this going to work for a firefighter carrying 50 to 70 pounds of gear?
- How will a disabled passenger exit?

At the October 17, 2017, BWRR-Maryland Transit Administration (MTA) Open House, Ms. Cosema Crawford, PE, Senior Vice President representing Louis Berger (the engineering firm hired to study the building of a superconducting maglev train between Washington, D.C., and New York), provided the following information:

The ventilation facilities' primary purpose is to clear smoke in case there is a fire in the tunnel. The ventilation units will force air into the tunnel on one side of the tunnel section with smoke, and the next ventilation facility will exhaust the smoke-filled air from the tunnel. In other words, one ventilation facility will pressurize the tunnel ahead of the section of the tunnel with smoke and the alternate ventilation facility will depressurize the tunnel to exhaust the smoke to the atmosphere.

What Kind of Fire Could Occur in a SCMaglev Tunnel Section?

If the fire resulted from a train accident or some type of electrical event, the fuel for the fire would likely be lubricants, plastics, and electrical wire insulation. A Massachusetts Institute of Technology School of Engineering article states: "When plastic is burned, it releases dangerous chemicals such as hydrochloric acid, sulfur dioxide, dioxins, furans and heavy metals, as well as particulates." [456,] As noted on the American Cancer Society website, many of the compounds that would be generated by such an electrical fire ". . . are known to cause respiratory ailments and stress human immune systems, and they're potentially carcinogenic.".[457]

The applicant's WQC justification materials, as the DEIS, is deficient as it does not answer the following questions:

- How will the smoke, containing known toxins and carcinogenic compounds, exhausting into the atmosphere be mitigated to protect people and wildlife near the FA/EE?
- Will the residents and anyone near the FA/EE exhausting smoke be alerted that smoke from an SCMaglev fire is venting into their community? How will they be alerted?
- What are the potential and likely health risks to humans and wildlife exposed to and breathing in the smoke being vented out of the tunneled section and into the atmosphere?
- Property near the FA/EEs will lose value because of the undesirability of living near a structure that at any time could spew out smoke filled with toxic and carcinogenic compounds. What is the likely property value loss, and will the affected property owners be compensated by TNEM?

[456] Biemiller, A. "Can we safely burn used plastic objects in a domestic fireplace? No, you can't. Don't even think about it…" School of Engineering, Massachusetts Institute of Technology. Posted March 12, 2013. https://engineering.mit.edu/engage/ask-an-engineer/can-we-safely-burn-used-plastic-objects-in-a-domestic-fireplace/.
[457] To see the current list of known and probable carcinogenic substances from the American Cancer Society, go to: www.cancer.org/cancer/cancer-causes/general-info/known-and-probable-human-carcinogens.html.

- On what determinants will compensation be based, and will property owners be compensated?
- What is the likely property tax loss? How will this be calculated? Will the affected jurisdiction be compensated by TNEM for the loss in property taxes resulting from the devalued property?

What About Radon Gas?

The proposed tunneling route from Baltimore to BWI and onto southern Anne Arundel County, and under Prince George's County into Washington, D.C., includes areas with known radon gas levels of .02 pCi/L to 4.0 pCi/L. [458,459]

Maryland is a radon gas "hot spot." Average measurements across the state range for 0.2 pCi/l to 61 pCi/L.[460] Radon (symbol Rn, atomic weight 86) is a radioactive gas released from the normal decay of the elements uranium, thorium, and radium in rocks and soil. It is an invisible, odorless, and tasteless gas that seeps up through the ground and diffuses into the air. In a few areas, depending on local geology, radon dissolves into ground water and can be released into the air when the water is used. Radon gas usually exists at very low-levels outdoors. However, in areas without adequate ventilation, such as underground mines, radon can accumulate to levels that substantially increase the risk of lung cancer."[461] The same would likely be true for the SCMaglev tunnel. According to the Environmental Protection Agency (EPA), "Radon in air is ubiquitous (existing or being everywhere at the same time). Radon is found in outdoor air and in the indoor air of buildings of all kinds. EPA recommends homes be fixed if the radon level is 4 pCi/L or more. Because there is no known safe level of exposure to radon, EPA also recommends that Americans consider fixing their home for radon levels between 2 pCi/L and 4 pCi/L."[462]

Consider the miles-long, 43-foot diameter tunnel, 80 to 150 feet below ground level, starting in Baltimore and ending in southern Anne Arundel County, as well as the miles-long tunneled section starting in Prince George's County and running under Washington, D.C., to the Mount Vernon station, and the potential collection of radon gas. As high-speed trains run through the tunnel, the air pressure wave at the front of the train will build, forcing air displacement to the sides and over the top of the train, as will other lower air pressure areas, including ventilation shaft openings to the surface. If this radioactive radon gas is present, it will be pushed out into the community through the ground-level ventilation facilities, exposing anyone in nearby homes, businesses, and schools, as well as people living, playing, and working in the area. While the level of radioactive gas will likely be low, the impact on the property values near these facilities will be negatively affected.

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[458] "About Radon Levels in Anne Arundel County." www.county-radon.info/MD/Anne_Arundel.html - Radon levels in Anne Arundel County average 3.3 pCi/L, with a range from under 2 pCi/L to 61 pCi/L. (Note: pCi/L stands for Picocuries Per Liter.)
[459] "About Radon Levels in Prince Georges County." www.county-radon.info/MD/Prince_Georges.html - Radon Levels for Prince George's County also range from 2 pCi/L to over pCi/L. (Note: pCi/L stands for Picocuries Per Liter.)
[460] "Radon Levels Across Maryland." phpa.health.maryland.gov/OEHFP/EH/Pages/Radon.aspx.
[461] "Radon and Cancer." American Cancer Society. Last reviewed December 6, 2011. www.cancer.gov/about-cancer/causes-prevention/risk/substances/radon/radon-fact-sheet.
[462] U.S. Environmental Protection Agency (EPA). "What is EPA's Action Level for Radon and What Does it Mean? 2021. www.epa.gov/radon/what-epas-action-level-radon-and-what-does-it-mean.

The applicant's WQC justification materials, as the DEIS, is deficient as it does not answer the following questions:

- Will the exhausted air displaced by the running of the SCMaglev in the tunnel be tested for radon gas?
- Will radon gas be continuously monitored or periodically tested? If periodically, how frequently?
- Who will conduct the tests? What is their relationship with TNEM, the BWRR, and anyone associated with the SCMaglev?
- If radon or other dangerous gases are found at the ventilation stations, what is the mitigation plan?
- If found, will residents near the facility be notified of the presence and concentration of the radon gas? How will residents be notified?
- What is the plan if the exhaust show unsafe levels of gases are present?
- What are the potential and likely short- and long-term health risks to humans and wildlife exposed to and breathing the radon gas present at the FA/EEs?
- Property near the FA/EEs will lose value because it is undesirable to live near a structure that at any time could spew radioactive gas. What is the likely property value loss, and will the affected property owners be compensated by TNEM?
- On what determinants will compensation be based, and will property owners be compensated?
- What is the likely property tax loss? How will this be calculated? Will the affected jurisdiction be compensated by TNEM for the loss in property taxes resulting from the devalued property?

2. Electromagnetic Fields Exposure and Human-Wildlife Health

Electromagnetic fields (EMFs) surround us. Some EMFs occur naturally and some are man-made. While the medical and scientific communities take the general position that the evidence is inconclusive, the effects of increased exposure to man-made non-ionizing EMFs on human health is a growing concern. Current research is finding connections between EMF exposure and disease. A growing body of recent studies have found that long-term exposure to man-made EMFs negatively affects human health. Considering the increasing level of electromagnetic energy to which people are exposed, concerns about the additional exposure to the high-level of electromagnetic energy generated by the SCMaglev system needed to lift and propel the multi-ton train and its potential to impact our health need to be well researched and quantified before any consideration of building and operating the SCMaglev is considered.

Over the last century, there has been increasing exposure to higher levels of man-made sources of non-ionizing EMFs. Recent technological developments have made the electromagnetic environment more prominent in our lives. Present both in occupational environments and daily life, these EMF-generating technologies include, but are not limited to, industry equipment (e.g., welding machines, induction heaters), telecommunications (e.g., television, radio broadcast stations), medical diagnostic tests, and in daily life (e.g., microwaves, mobile phones and mobile phone base stations, Wi-Fi, Bluetooth, etc.).

The adverse health effects of exposure to EMFs are a growing source of great concern within governmental and non-governmental organizations responsible for public health. Ongoing studies include an explanation of non-thermal effects of radiofrequency electromagnetic fields (RF EMFs) on human health.

Questions and Concerns

(1) What are electromagnetic radiation and electromagnetic fields?

The EPA defines electromagnetic radiation (EMR) and EMFs:[463]

- Electromagnetic Radiation (EMR) consists of waves of electric and magnetic energy moving together through space. An example of electromagnetic radiation is visible light. Electromagnetic radiation can range from low to high frequency, which is measured in hertz, and can range from low to high energy, which is measured in electron volts. Wavelength, another term associated with electromagnetic radiation, is the distance from the peak of one wave to the next.

- There are two general kinds of electromagnetic radiation: ionizing radiation and non-ionizing radiation. Ionizing radiation is powerful enough to knock electrons out of their orbit around an atom. This process is called ionization and can be damaging to a body's cells. Non-ionizing radiation has enough energy to move atoms in a molecule around and cause them to vibrate, which makes the atom heat up, but not enough to remove the electrons from the atoms.

- Electromagnetic fields (EMF) associated with electricity are a type of low frequency, non-ionizing radiation, and they can come from both natural and man-made sources. For example, lightning during a thunderstorm creates electromagnetic radiation because it creates a current between the sky and the ground. Surrounding that current is an electromagnetic field. One example is the Earth's magnetic field. We are always in the Earth's magnetic field, which is generated at the Earth's core. This magnetic field makes compasses work and is also used by pigeons and fish to navigate.

(2) What is the best way to assess the effects of EMFs on human health and why should we be concerned

Recent epidemiological studies provide evidence of the possible health effects of EMF exposure:

- In 2020, research studies reported the association between maternal exposure to magnetic field non ionizing radiation during pregnancy and the risk of Attention-Deficit/Hyperactivity Disorder (ADHD) in their offspring. The study was conducted at Kaiser Permanente Northern California with 1,482 mother-child pairs participating and EMF exposures captured during pregnancy in two studies conducted from October 1, 1996, to October 31, 1998, and from May 1, 2006 to February 29, 2012. The offspring were followed from May 1, 1997 to December 21, 2017. The main outcomes from the two studies showed physician-diagnosed ADHD and immune-related comorbidities (having multiple medical conditions) of asthma or atopic dermatitis up to 20 years of age in the offspring. These findings reveal probable new risk factors now prevalent in our modern-day life and should necessitate more scrutiny, possible restrictions, and at least more research on EMF.[464]

[463] U.S. Environmental Protection Agency (EPA). "Electromagnetic Radiation (EMR)" and "Electromagnetic Fields (EMF)." www.epa.gov/radtown/electric-and-magnetic-fields-power-lines.

[464] De-Kun Li, MD, PhD; Hong Chen, MPH; Jeannette R. Ferber, MPH; Andrew K. Hirst, MS; Roxana Odouli, MSPH. "Association Between Maternal Exposure to Magnetic Field Nonionizing Radiation During Pregnancy and Risk of Attention-

- Another study evaluated Electromagnetic Hypersensitivity Syndrome (EHS), characterized by a variety of nonspecific symptoms that can vary with individuals. The symptoms are real and vary in severity. EHS can be disabling for affected individuals. It is classified as a functional impairment in Sweden. Spain has recognized EHS as a permanent disability. (Note: The U.S. government has not recognized EHS as a disability as of the date of this submission.) Below are the reported symptoms from individuals exposed to EMF:[465]

Abdominal pain	Headache	Numb limbs
Anxiety	Head pressure	Phosphenes
Appetite loss	Heart eat irregularity	Rash
Arousal decreased	Heart palpitation	Restlessness
Blood pressure increase	Hormonal disorder	Skin burning
Breathlessness	Hypersensitivity to medication	Skin redness
Chest pain	Hypersensitivity to noise	Skin tingling
Concentration difficulties	Intestinal trouble	Sleep disturbance
Crankiness	Irregular bowel movement	Stress
Daytime sleepiness	Irritation	Sweating
Digestive problems	Itching skin	Swollen eyes
Dizziness	Limb pain	Swollen joints
Dry skin	Metabolic disorder	Tachycardia
Exhaustion	Mood changes	Tenseness
Faintness	Mood depression	Tiredness
Fatigue	Muscle cramps	Toothache
Fear	Muscle pain	Trembling
Feebleness	Nausea	Unfeelingness
Feeling hot	Neck pain	Vision blurring
Forgetfulness	Neuralgia	Vomiting
Hair loss	Neurasthenia	Weariness

(3) What other medical studies have been reported to support the negative impact of EMFs on human health?

Studies have been done worldwide on the effects of EMF exposure on human health. A key finding of these studies is that the closer the proximity to the source of the EMF, including a broadcast transmitter or a single phone base transmitter, the more symptoms were reported, including sleep disorders. Also, the type of EMF and its strength and duration can diminish or intensify with the variability of the RF EMFs. Some of these studies are described in the bullets below.

Deficit/Hyperactivity Disorder in Offspring in a Longitudinal Birth Cohort." *Journal of the American Medical Association*. March 24, 2020. https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2763232.

[465] Leitgeb, N. "Chapter 5: Electromagnetic hypersensitivity. In: *Advances in Electromagnetic Fields in Living Systems*." Volume 5. Health Effects of Cell Phone Radiation. J.C. Lin, ed. New York, New York. Springer. 2009. http://gnusha.org/~nmz787/biological%20radio%20research/Electromagnetic%20Hypersensitivity.pdf.

- As reported in 2019, the International Agency for Research on Cancer classified RF EMFs as a possibly carcinogenic to humans (group 2B) in May 2011.[466]

- In 2015, the Scientific Committee on Emerging and Newly Identified Health Risks reported on the effects of EMF exposure in frequencies already used by mobile telephone companies. In this report, epidemiological studies were completed on RF EMF exposure. Researchers found an increased risk of glioma (tumor in the brain or spine) and acoustic neuroma (a benign tumor that develops on the balance (vestibular) and hearing, or auditory (cochlear), nerves leading from your inner ear to the brain), in heavy users of mobile phones.[467]

- A 2017 study by Yang, et al., indicated long-term (over ten years) use (exposure) of the mobile phone increases the risk of intracranial tumors, mostly gliomas, particularly in the case of the same-side exposure. This means if the user has the phone to the right ear predominantly (not necessarily all the time), then the glioma occurs on the right side of the brain.[468] Additional 2017 research studies regarding the risk of mobile phone use and health impacts include Bortkiewicz et al., Carlberg and Hardell, Momli et al., and Prasad et al. (See the Sources section at the end of this section for the references.)

- In 2019, an advisory committee of the International Agency for Research on Cancer (IARC) recommended the agency reassess the cancer risks involved with RF EMFs and recommended this research should be "high priority." "The group, with 29 members from 18 countries, suggests that the new evaluation take place between 2022 and 2024. In May 2011, an IARC expert committee classified RF radiation as possible human carcinogen [Group 2B]. Since then, the evidence has grown stronger."[469]

(4) What other medical issues are related to EMF exposure and human health?

Within the modalities of medical diagnostic testing, specifically magnetic resonance imaging (MRI), patients with cardiac pacemakers, as well as those with implantable cardioverter-defibrillators (ICDs), are cautioned before having an MRI. The electromagnetic field generated by the MRI can interfere with the functioning of these devices and can alter or stop the functioning of the apparatus while exposed to

[466] Moskowitz, J.M. "Electromagnetic Radiation Safety: International Agency for Research on Cancer (WHO) Position on Radiofrequency Radiation." November 4, 2019. www.saferemr.com/2019/11/IARC-RFR-cancerrisk.html. Röösli, M. "Radiofrequency electromagnetic field exposure and non-specific symptoms of ill health: A systematic review." Pages 277-287 in *Environmental Research* 107. 2008. https://media.ellinikahoaxes.gr/uploads/2017/04/rsli2008.pdf.
[467] Scientific Committee on Emerging and Newly Identified Health Risks. "SCENIHR (Scientific Committee on Emerging and Newly Identified Health Risks), Potential health effects of exposure to electromagnetic fields (EMF)." January 27, 2015. www.researchgate.net/publication/291329105_SCENIHR_Scientific_Committee_on_Emerging_and_Newly_Identified_Health_Risks_Potential_health_effects_of_exposure_to_electromagnetic_fields_EMF_27_January_2015.
[468] Yang, M., W. Guo, C. Yang, J. Tang, Q. Huang, S. Feng, A. Jiang, X. Xu, and G. Jiang. "Mobile phone use and glioma risk: A systematic review and meta-analysis." *PLoS One* 12, e0175136. May 4, 2017. https://pubmed.ncbi.nlm.nih.gov/28472042/.
[469] Microwave News. "IARC Urged to Revisit RF Risk: Animal Studies Prompt Calls to Upgrade Classification to 'Probably Carcinogenic' or Higher." Last updated October 30, 2019. https://microwavenews.com/short-takes-archive/iarc-urgedreassess-rf.

the electromagnetic field. The current information from the Mayo Clinic[470] and Johns Hopkins[471] states that even with the newer models of pacemakers, the MRI electromagnetic field strength should not exceed 1.5 Tesla, along with other considerations, including the type of pacemaker and manufacturer, what type of leads are being used, the duration of the scan, and the type of scan. Type of scans are functional MRI, breast MRI, magnetic resonance angiography, magnetic resonance venography, and cardiac MRI. These same criteria apply to patients with embedded ICDs. Exposure to the electromagnetic field during an MRI can heat up leads on the older models of pacemakers. If not carefully controlled, the MRI can interfere with the functioning of the embedded devices, including altering or stopping their functioning.

(5) How do EMF exposure and health issues relate to the SCMaglev?

The same concerns of the malfunctioning of cardiac pacemakers and ICDs could potentially arise with exposure to the far stronger 15 Tesla-strength electromagnetic field needed to lift and propel the SCMaglev. (Remember 1.0 Tesla to 1.5 Tesla is the maximum for an MRI EMF strength to safeguard the patient with a pacemaker or ICD.) People with pacemakers and ICDs should be wary of riding the SCMaglev. The U.S. Department of Transportation (USDOT), Federal Railroad Administration (FRA), and Maryland Department of Transportation (MDOT) Draft Environmental Impact Study (DEIS), states:

> "The electric fields associated with the SCMAGLEV may be of sufficient magnitude to impact operation of a few older-model pacemakers; in such cases, the older-model pacemakers may revert to an asynchronous pacing while in the presence of the SCMAGLEV Project. Cardiovascular specialists do not consider prolonged asynchronous pacing to be a problem. Cardiovascular specialists commonly use asynchronous pacing to check pacemaker operation; therefore, while the SCMAGLEV project's electric field may impact operation of some older-model pacemakers while in the presence of the SCMAGLEV, the result of the interference would be of short duration and not considered harmful. Pacemakers revert to their normal mode of operation once out of the immediate area of the SCMAGLEV Project."[472]

The applicant's WQC justification materials, as the DEIS, is deficient as it does not answer the following questions:

- Who are these cardiovascular specialists and where are their reports?
- How independent were they in conducting their research?
- The DEIS has references dating back to 1996 to support their statements. Much research and a better understanding about the relationships between EMF exposure and human health have been found over the past two and a half decades. What current research references can TNEM and the FRA present to support their position?

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[470] Mayo Clinic. "New protocols allow for MRI in selected patients with pacemakers." September 5, 2013. www.mayoclinic.org/medical-professionals/cardiovascular-diseases/news/new-protocols-allow-for-mri-in-selectedpacemaker-patients/mac-20430571.

[471] Johns Hopkins Medicine. "Living with a Pacemaker or Implantable Cardioverter Defibrillator ICD." www.hopkinsmedicine.org/health/wellness-and-prevention/living-with-a-pacemaker-or-implantable-cardioverter-defibrillator-icd.

[472] DEIS. Chapter 4(f), Section 18. Table 4.18-3. Page 9.

A study coming out of China in 2023, researchers completed a series of analyses and modeling simulations to assess the strength of the electromagnetic fields surrounding and radiating out from high-temperature superconducting magnetic levitation trains. They concluded the electromagnetic field strength within the train car and surrounding area was well within "relevant electromagnetic environmental standard limits."[473] But it is very important to note:

(a) The conclusions and findings are based on simulations of the Chinese maglev. As Japan's JP Central's SCMaglev exists and does occasionally run, actual, independent measurements and findings should be available for the system TNEM proposes to build in Maryland. MCRT asks, "Why doesn't BWRR share the actual data and reports?"

(b) The Chinese Communist Party has decided to build their maglev system. It is unlikely any Chinese sponsored research would find any issue with their maglev system.

As stated in the DEIS: "Unlike high voltage transmission lines, EMF exposure from the SCMaglev project would not be constant. EMF exposure would only occur as the train passes by. Additionally, the exposure level would be lower than a high-voltage transmission line, as the Shinkansen website states that the train **reportedly complies** [*bold emphasis added*] with the International Commission on Non-Ionizing Radiation Protection standards. As previously stated, the EMF inside the train and along the tracks is approximately one third of the International Commission on Non-Ionizing Radiation Protection guidelines and is safe for persons with medical pacemakers."[474]

The applicant's WQC justification materials, as the DEIS, is deficient as it does not answer the following questions:

- Note the phrase "reportedly complies." When was this research done? There are no references provided to back up these statements.
- Again, who are the authors, when was this research conducted, and where are the reports?

(6) Are the EMFs generated by the SCMaglev a potential health issue?

With the implications of current research on EMF exposure and disease and the increasing impact on human health, adding exposure to the far stronger EMFs generated by the high-powered electromagnets used to operate the SCMaglev, there is the potential for increased, additional, and more severe health issues.

The USDOT-FRA-MDOT *Final Alternatives Report* states: ". . . superconducting maglev (SCMAGLEV) technology, which differs from other maglev systems (such as the German Transrapid system) in that SCMAGLEV accelerates and decelerates through an electromagnetic force generated between

[473] Zhang, Hu; Zhang, Jianqiong; Deng, Zigang; Wang, Qingfeng; Li, Xiangqiang; Tang, Xianfeng; and Zhang, Weihua. "Study on Electromagnetic Radiation Characteristics Based on HTS Maglev Levitation Test Line." *MDPI Journals. Electronics*. Volume 12. Issue 8. 10.3390/electronics12081776. www.mdpi.com/2079-9292/12/8/1776.
[474] *Ibid*. Appendix D.11-15.

superconducting magnets on the vehicle and reaction coils on the guideway sidewalls. The superconducting magnetism is much stronger than ordinary normal conducting electromagnets."[475]

Depending on the proximity of the person to the guideway and the number of exposures, the symptoms, conditions, and/or diseases discussed here have the potential to become intensified due to the strength of the electromagnets used to levitate, propel, and brake the SCMaglev train.

Note: The *Final Alternatives Report* states that people must maintain a minimum distance of 20 feet from the guideway because of the electromagnetic field strength.[476] DEIS Appendix D.11 indicates: "The American Conference of Governmental Industrial Hygienists also recommends that workers with pacemakers should not exceed 1 Gauss (1,000 mG or 0.1 µT)."[477] Note that they refer to the safety of the workers, but what about the safety of the passengers? How is this distance going to be assured, especially if there is an emergency and passengers are exiting the train, and emergency personnel are at the scene to provide emergency services? Also, as we indicated earlier, the DEIS itself notes the detrimental effect of being in proximity to the SCMaglev if one has a cardiac pacemaker or cardioverter-defibrillator.

(7) Besides passengers and maintenance employees, should anyone else be concerned with the SCMaglev EMF exposure?

Although the personnel representing the SCMaglev recommend that people (passengers and maintenance workers) do not come within 20 feet of the guideway during operation of the SCMaglev, there is a concern for the residents and businesses near the SCMaglev system. Besides the potential danger coming from the ventilation structures (exposure to toxins, cancer-causing compounds, and radioactive gas released into the atmosphere and surrounding areas; see the 2021 MCRT-CATS report about the impact of the SCMaglev on communities[478]), the EMFs generated by the SCMaglev, in addition to the increasing amount of the man-made EMFs continuously injected into our environment, have the potential to increase the negative health consequences of those living and working in proximity to the SCMaglev system.

While the BWRR cites the Japanese report that states the SCMaglev's generated EMFs are safe[479], we have not seen the research to corroborate this statement. Further, with such potential adverse health effects from SCMaglev EMF exposure, safety claims should be independently assessed applying U.S. standards of rigor, and not be accepted from a source with a significant financial stake bringing the SCMaglev to the United States. If one accepts the statements that the EMF exposure from the SCMaglev

[475] U.S. Department of Transportation (USDOT), Federal Railroad Administration (FRA), and Maryland Department of Transportation (MDOT). "Final Alternatives Report." November 2018. Page 42. www.bwmaglev.info/images/document_library/reports/alternatives_report/SCMAGLEV_Alts_Report_Body-Append-A-BC_Nov2018.pdf.
[476] *Ibid*. Chapter 1. Page 1. Footnote 1.
[477] DEIS. Section 4(f). Appendix D.11.1.4. Page 10.
[478] Appendix – Reprint: Woomer, Dan. "What Impact Would the SCMagLev Have on Our Communities?" CATS-MCRT White Paper. January 11, 2021.
[479] JP Central. "Superconducting Maglev's magnetic field has no health impact." https://scmaglev.jr-centralglobal.com/about/magnetic/.

operation would be at an acceptable level, the addition of the SCMaglev EMF to an environment increasingly saturated with man-made EMFs may well act as a multiplier of the negative human health effects already identified by ongoing international research, findings, and issued precautions.

Many questions that have arisen require sufficient and replicated independent research to assure that exposure to the EMFs required for the SCMaglev to operate is safe.

The applicant's WQC justification materials, as the DEIS, is deficient as it does not address the following questions:

- How will the maintenance workers for the train system who are constantly exposed be protected? Note, in stand-by mode, the superconducting magnets maintain enough charge to generate 1 Tesla. This is further discussed in Section 3.
- What kind of exposure will SCMaglev riders have and what are the long-term or cumulative health effects?
- What is the exposure for the workers constructing the train system (over years)? What is the cumulative effect on their health? How will their safety be maintained? What happens if the system is powered up and workers are present?
- What is a safe distance from electromagnets for homes and businesses along the train's route?
- Is there research to define and substantiate the "safe" distance?
- The FRA should conduct or assemble independent research to address these questions, and share this information with the public and given sufficient time for public review and comment before any consideration on a decision to move the SCMaglev Project forward.

Aside from questions about the safety and crashworthiness of the train itself (see Part 2 of the MCRT-CATS report on SCMaglev safety)[480], statements and assessments about EMF safety from the SCMaglev builder and operator—JR Central and the BWRR, respectively—do not constitute independent, unbiased reviews. If the FRA approves building the system, the BWRR, JR Central, and the Japanese government stand to make a profit as the builders and operators. Passengers, maintenance workers, humans and wildlife in proximity to the system will then become the test subjects to determine if the system has little to no effect on human or wildlife health.

Forthcoming research studies will probe further into EMF exposure and its negative effects on the human body, particularly as EMF-producing technologies continue to be developed and expand into the future. The additional electromagnetic radiation introduced with the operation of the SCMaglev could be a multiplier of the impact on human health from the increasing levels of man-made EMFs. As shown in the recent studies cited above, exposure to more EMFs will likely put more people at risk of experiencing the symptoms previously stated, including the possibility of experiencing more intense symptoms, conditions, and disease. Furthermore, we have not yet considered the effects of continuous exposure to the SCMaglev's high-level EMF impact on the health of wildlife.

It is anticipated that additional studies will provide stronger evidence of the correlation between our EMF-rich environment, human exposure, and human health problems. Our already non-ionized, radiation-rich environment is replete with man-made and naturally occurring EMFs.

[480] Appendix – Reprint: Woomer, Dan. "Is the SCMagLev Safe? (Part 2)." CATS-MCRT White Paper. January 11, 2021.

Question:

- What kind of additional or increased instances of human and wildlife health issues will likely manifest with the addition of the SCMaglev's high level of EMFs into our environment and communities?

This section highlights concerns about impacts on human and wildlife health from the addition of high-level electromagnetic fields needed to operate the SCMaglev train system. It should give the reader pause when considering that only a small number of people will use this transportation system, one that does not provide services to our communities. The reader may ask whether, along with the destruction of irreplaceable natural research areas and lands, unanswered questions about the safety of the train system and structures, and the potential of impacts on human and wildlife health, is it worth building a transportation system only the more affluent can afford to ride?

XXIV. Noise and Vibration Issues and Impacts

Research has found that exposure to noise can lead to cardiometabolic diseases, which further increase the adverse health effects of classical risk factors that disproportionately affect EJ populations, such as hypertension, diabetes, hypercholesterolemia, and others.[481] "Whole-body **vibration** can cause fatigue, stomach problems, headache, loss of balance and 'shakiness' shortly after or during exposure."[482] "Alterations of sleep rhythm and sleep depth are reported for amplitudes of vibration as low as 0.4 mm/s (this is a frequency weighted route mean square (rms) value). Cardiovascular reactions are reported for amplitudes from .3 millimeters per second."[483]

The BWRR asserts that there is no issue with noise and vibration with the operation of the SCMaglev. However, actual data, observations, and experiences with the SCMaglev train in Japan directly challenge these misrepresentations.

The applicant's WQC justification materials, as the DEIS, is deficient as it does not provide actual SCMaglev noise and vibration data and measurements.

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[481] Münzel, Thomas; Sørensen, Mette; Schmidt, Frank; Schmidt, Irwin; Steven, Sebastian; Kröller-Schön, Swenja; and Daiber, Andreas. "The Adverse Effects of Environmental Noise Exposure on Oxidative Stress and Cardiovascular Risk." U.S. National Library of Medicine, National Institutes of Health. March 20, 2018. www.ncbi.nlm.nih.gov/pmc/articles/PMC5898791/.

[482] Canadian Centre for Occupational Health and Safety. "Vibration and Health Effects." Retrieved May 2, 2021. www.ccohs.ca/oshanswers/phys_agents/vibration/vibration_effects.html#:~:text=Whole%2Dbody%20vibration%20can%20cause,long%20car%20or%20boat%20trip.

[483] Waddington, David; Woodcock, James; Jansson, Sabine; Smith, Michael G.; Persson Waye, Kerstin. "CargoVibes: human response to vibration due to freight rail traffic Railway Induced Vibration-Human perception of vibration." The National Academies of Sciences, Engineering, and Medicine. October 2015. Page 233-248. www.researchgate.net/publication/281063022_Cargovibes_Human_response_to_vibration_due_to_freight_rail_traffic. Also see: Peris, E., Woodcock, J., Sica, G. and Waddington, D. "Effect of situational, attitudinal and demographic factors on railway vibration annoyance in residential areas." November 2017. *The Journal of the Acoustical Society of America*. 135. 2014. https://uic.org/IMG/pdf/uic-railway-induced-vibration-report-2017.pdf.

Request:

- The MCRT Review Team requests the MDE, FRA, MDOT and BWRR, through an independent source, provide actual data, as well as sound and vibration measurements, using the SCMaglev operating in Japan as the source. Data and research originating from the Japanese government, JR Central, and/or TNEM is inherently subject to bias because of the large financial investment and benefits to be accrued should they be successful in bringing the SCMaglev to the United States.
- To provide some degree of confidence, the MCRT Review Team requests the SCMaglev proposal be assessed following the guidance found in the FRA's September 2012 publication *High-Speed Ground Transportation Noise and Vibration Impact Assessment* (DOT/FRA/ORD-12/15).

1. Noise and Vibration Impacts and Disproportionality Analysis Missing from BWRR Documentation

The applicant's WQC justification materials, as the DEIS, indicates that the vast majority of the impacts would occur in environmental justice (EJ) population areas. However, the applicant's WQC justification materials, nor the FRA, has not shown a substantial need for the project or described the necessary steps to avoid these impacts. For example, over 99 percent of the impacted noise receptors and 100 percent of the severe vibration impacts would be located in EJ population areas.[484] The DEIS says the FRA will continue to refine its EJ analysis, complete a disproportionality analysis, and develop mitigation in the final EIS (FEIS). These steps should already have been completed to allow for public comment.

Waiting until the FEIS denies the opportunity for public comment and full FRA consideration of all comments before making any decision to move forward toward a build decision. The same holds true for the applicant's WQC justification materials. The applicant's WQC justification materials, as the DEIS, is deficient in that it does not contain the disproportionality analysis and information required to make a fully-informed decision that would allow a review of all relevant information to develop comments on the full range of costs versus benefits.

Request:

- The MDE needs to complete an independent assessment of the SCMaglev's impact on EJ Communities during the construction phase and during operation of the system before and WQC is issued. The FRA must issue a completed disproportionality analysis prior to the FEIS and before the Record of Decision (ROD).

The public should be given adequate time to review and provide comments before considering issuing the WQC.

[484] DEIS. Chapter 4.05. Section 4.5.4.2. Pages 4.5-15 to 16.

2. Missing Noise and Vibration Measures

Vibration control measures are not as well understood as other mitigation measures, due to the uniqueness of the magnetic levitation technology for transportation projects.[485]

The BWRR documentation is deficient in that noise and vibration data are missing. These data are readily available from the system operating in Japan.

- Why were actual sound and noise measurements not included in the DEIS?
- Using the SCMaglev in Japan, why were sound and noise levels, as well as assessments of results of sound and vibration mitigation attempts, not included in the DEIS?
- What are the lessons learned about noise and vibration mitigation by JR Central? If JR Central has developed techniques to address the unique nature of the SCMaglev's generation of noise and vibration, these should be included in the DEIS, if they wish to sell the SCMaglev to the United States.
- Have the results of noise and vibration mitigation efforts been independently verified?
- How do the noise and vibration measurements stack up against U.S. standards?

The impact of the "hurtling trains" is further substantiated by the once Baltimore Sun reporter, Kevin Rector, who noted in his lengthy article "'It can be done': Futuristic Japanese maglev train could revolutionize travel from DC to Baltimore, and beyond" the impact of vibration as the SCMaglev whizzed by homes near the guideway. As Mr. Kevin Rector noted: "The 91-year-old Suzuki said when the first tests began in 1997, the train caused such a massive boom each time it emerged from its tunnel that homes shook violently. He said JR Central officials listened, and made good on promises to diminish the local impact — including by developing a hood to go over the track at the tunnel exit to reduce noise and vibration."[486]

[MCRT Editor's Note: But there yet remains noise and vibration as the SCMaglev passes. As the SCMaglev passed by, Mr. Rector noted the vibration of Mr. Suzuki's home.[487] Masonry structures subjected to ongoing vibration will eventually crack.]

As stated in this article" "One of the great things about taking technology that is actually in existence, and has been tested for years and years and actually has people riding on it, is we don't have to speculate about impacts," Rogers said.

"Are you going to have noise? We can actually measure the noise of a real train. Or, are you going to have vibration if you're in a tunnel? We can actually measure the vibration that's in a tunnel and come back with real numbers."

[MCRT Editor's Note: If you can measure the noise, where's the analyses and report(s)?]

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[485] *Id*.

[486] Appendix – Reprint: Rector, Kevin. "'It can be done': Futuristic Japanese maglev train could revolutionize travel from DC to Baltimore, and beyond." October 27, 2018. *The Baltimore Sun*. www.baltimoresun.com/maryland/bs-md-japan-maglev-20180531-htmlstory.html.

[487] *Id*.

Noise and vibration from both temporary construction activities and long-term operations exceed the FRA criteria at several receptors in the Project Study Area. Although the FRA identifies noise and vibration control measures that could reduce potential impacts, the DEIS's general statements do not explain if and where these will be implemented and what would be their effects. Yet, the DEIS states that "vibration impacts are concentrated along the viaduct. As such, 100 percent of the severe vibration impacts would be located in EJ population areas."[488] The MDE, as well as the FRA, should evaluate these control measures as part of the WQC justification, as well as the DEIS, and should not have used the unique nature of the SCMaglev technology as an excuse. The data and information exist and should be verified by independent testing and provided to the public by MDE and the FRA. The applicant's WQC justification materials, as does the DEIS, appears to leave consideration and implementation of these controls up to the project sponsor (BWRR).

The BWRR documentation is deficient as it does not assess the noise and vibration impact of the SCMaglev construction and operation on nearby communities in a meaningful, data driven manner.

Request:

- The BWRR, MDE, and MTA must include analyses of the noise and vibration impacts, following the guidance found in the previously cited September 2012 FRA publication. Furthermore, they must make public all UNREDACTED data modeling inputs, parameters, outputs, and reports.

3. Sounds of Distant Thunder

Repeated claims have been made by the project sponsor that the SCMaglev does not make noise as do steel-wheel trains, and that it would be "creating no more noise than that already produced by the highway," referring to the BW Parkway.[489] Others would disagree and would also comment on the how many times an hour the noise was heard. "The sound when the linear Shinkansen comes out of the tunnel is considerably great though the tunnel is made so big and the car body is made small. Although it is a slightly distant thunder (sound), it is heard more than 10 times an hour (if it is a commercial operation). Since the train is pushing the air, the pressure increases at the beginning when entering the tunnel. Because it travels faster than the train, the maximum sound is sounded as a 'Rumble' when the train leaves the tunnel.

This phenomenon is called 'microbaric wave.' The wave plane gradient of the compressed wave due to tunnel entry is proportional to almost three times the train speed."[490] Again as reported by Rector: "The 91-year-old Suzuki said when the first tests began in 1997, the train caused such a massive boom each

[488] *Id*.

[489] "Sounds of Distant Thunder." Footnote: TNEM. Presentation to Greenbelt City Council. "SCMaglev Project Update." PowerPoint Presentation, Slide 16. April 3, 2018.

[490] Joe & Santaro. Linear Forcible Near #5: Tunnels and Noise, Withers, Evacuations. 2019-02-06. Retrieved May 10, 2021. https://joe3taro.com/?p=2333&fbclid=IwAR2ciF_AhZpw_U_JPkG6lSThwN6MehRstQ1NdTrBDRcvYVJPhLaibfWFVI4. Page 2.

time it emerged from its tunnel that homes shook violently."[491] JR Central developed and installed "hoods" to go over the track at the tunnel exit to reduce noise and vibration. However, as Rector observed, even after the "hoods" were installed as the SCMaglev passes by "it shakes the cinderblock walls of 91-year-old Moriyoshi Suzuki's tidy family home." [492] This is clear evidence that the SCMaglev is not noise and vibration-free system the BWRR claims.

4. Masonry and Concrete Structures

With the evidence that disproves statements from the BWRR that the SCMaglev is noise and vibration free, what will be the effect on structures (e.g., homes and businesses) near the SCMaglev during building and operation? Masonry and concrete structures (e.g., foundations and foundation walls, as well as drywall, masonry or poured concrete walls) do not respond well to vibrations; that is, such structures tend to crack as they do not uniformly vibrate. Cracks in foundation walls result where the vibration energy finds a weak point. Such cracks weaken the support for the structure above and lead to water infiltration. In other words, ground and/or surface water (rain and downspout runoff) seeps into the basement. Wet basements bring additional damage to the structure and anything located in the basement (such as furnaces, washers and dryers, and furniture). The increased moisture creates dangerous mold and other serious health and safety problems for people who live in single-family homes and apartment complexes, as well as for those who work or play in commercial or other types of buildings (e.g., schools, churches).[493]

The BWRR documentation, is deficient in failing to provide independently verified data and analyses on the vibration levels and dispersion area of the SCMaglev. Again, the data are readily available as they can be assessed using the existing SCMaglev in Japan.

5. Operation Phase Noise Impacts

Background noise was measured at the locations of 20 receptor locations involving 4,000 receptor sites within an 800-foot screening distance.[494] The DEIS is missing "count" units in the discussion in section D.10.4.2.1, and in the counts in Table D.10-6 the units are not given.[495]

The applicant's WQC justification materials, as the DEIS, deficient in that the provided information is incomplete and, as such, does not allow independent assessment of the potential impact. The question is:

- Are the data presented as counts per day or some other unit of time?

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[491] Appendix – Reprint: Rector, Kevin "'It can be done': Futuristic Japanese maglev train could revolutionize travel from DC to Baltimore, and beyond." October 27, 2018. *The Baltimore Sun*. www.baltimoresun.com/maryland/bs-md-japan-maglev-20180531-htmlstory.html.

[492] *Id*.

[493] Appendix – Reprint: Woomer, Dan. "What Impact Would the SCMagLev Have on Our Communities?" CATS-MCRT White Paper. January 11, 2021.

[494] DEIS. Appendix D.10. Table D.10-6. Page 10-14.

[495] DEIS. Appendix D.10. Section D.10.4.2.1. Pages 10-16 -17.

The DEIS contains incomplete "counts" for receptor locations. It appears that the results given in Table D.10-6 above are the predicted total counts (moderate/severe) summed over all receptors, thus for the alignments. If so, then the predicted counts at each receptor location should be given.

The DEIS is deficient as it does not provide the noise information from the receptors in a manner that allows for a proper review of noise impacts on the various areas and communities along the SCMaglev's path.

- What are the counts for each receptor location?

The DEIS contains discrepancies in train passage counts, which has a direct noise impact implication. There are 104 train passages each day in both directions for a total of 208.[496] There are nine (9) receptor locations (N3-N9) in the viaduct region (disregarding N20 at the MD198 train maintenance facility), all at locations where the SCMaglev is moving at maximum speed. One would expect a total of 9x208 = 1,872 counts daily (moderate + severe). Yet the totals over the alignment are in the approximate range 500-660.[497]

The applicant's WQC justification materials, as the DEIS, is deficient as it does not answer the following questions:

- Is there a range of noise output for every train passage?
- What is the range?
- How do these noise data compare with aircraft noise data as measured by the FAA using DNL[498] standards?
- Will the noise generated by the SCMaglev be held to a different standard than that of aircraft noise? If so, why? If not, how will USDOT (FRA's sister agency) apply noise measures?
- As noted above, why are there discrepancies in the measurement of noise in the DEIS?
- Will the noise generated by the SCMaglev be held to a different standard that of aircraft noise? If so, why? If not, how will FRA sister USDOT agency's noise measures be applied?
- As noted above, why does the discrepancies in the DEIS of train, and resulting incidents of noise, exist in the DEIS?
- Will BWRR and MDOT apply the revised FAA noise measures to better quantify and assess the SCMaglev noise fields and their impact on both human and wildlife?

[496] DEIS. Appendix D.10. Section D.10.6. Table A1. Pages 10.6-27 to 28.

[497] Appendix – Reprint: Kowalski, M. "SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0." 2021. Page 25.

[498] *DNL* is the current standard noise metric used for all FAA studies of aviation noise exposure in airport communities. Note, the FAA is currently collecting information to review the continued use of DNL, or replace/supplement this metric with a combination of additional noise measures to better determine the level of disturbance of aircraft noise from annoying to having a health impacts.

Airborne Noise

The FRA predicted airborne noise up to 2,100 ft from the guideway.[499] This impact distance is due to a combination of the aerodynamic effects of high-speed train operations, the elevated guideway, and the low background noise level." In footnote #7 of App-D.10. Noise and Vibration (ref 7) states: "The FRA impact criteria are based on a sliding scale whereby low background noise level result in more stringent thresholds." The net effect is that most if not all in the South Laurel communities will likely be able to hear the train passages 208 times every weekday of the year (somewhat less on weekends) regardless of whether the noise levels exceed the formal definition of moderate or severe. Note that this is a periodic noise source, which is much more annoying than a random source.[500]

Sound Attenuation Walls

Proposed mitigation measures include track design, tunnel portal design, augmented parapet walls, and sound attenuation walls. The first three of these are probably more effective but more costly. Some of them would be difficult or impossible to implement once the line is built and in operation. The last measure, sound attenuation walls, is the most common, but would effectively destroy the scenic view that defines the BW Parkway. Moreover, the train's minimum elevation of 10 meters over grade might render such barriers ineffective. In summary, the applicant's WQC justification materials, nor the DEIS, does not address the noise problem sufficiently. Sound attenuation barriers and non-impulsive equipment must be mandatory.[501]

6. Operation Phase Vibration Impacts

Ground Water Wells, Sceptic Systems, Geothermal Heat Pumps Sensitivity Not Assessed

The methodology is based on the FRA's *High-Speed Ground Transportation Noise and Vibration Impact Assessment* guidelines.[502] These guidelines do not assess the sensitivity of ground water wells, septic systems, or geothermal heat pumps. As such the impacts on those systems are missing from the applicant's WQC justification materials, as the DEIS.

At least four properties in the Montpelier Woods community in South Laurel have geothermal heat pumps at distances in the range of 2,300 to 2,800 feet from the guideway. More are planned, and it is possible they exist in the other South Laurel communities or elsewhere along the alignments. All implemented systems use vertical ground loops of depths in the range 300 to 600 feet. Geothermal heat pumps represent considerable financial investment by the property owners.

[499] DEIS. Appendix D.10, D.10.4.2.2. Pages 10-18.
[500] Appendix – Reprint: Kowalski, M. "SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0." 2021. Pages 25 - 26.
[501] *Ibid*. Page 26.
[502] Federal Railroad Administration (FRA). "2012: *High-speed Ground Transportation Noise and Vibration Impact Assessment*, Final Report." September 2012. U.S. Department of Transportation, DOT/FRA/ORD-12/15. www.fra.dot.gov/eLib/details/L04090.

The full extent of well usage and septic systems near the SCMaglev alignments is not known to the reviewers of the applicant's WQC justification materials, and the DEIS.

The applicant's WQC justification materials, as the DEIS, is seriously deficient as it does not provide thorough analyses of the groundwater impacts building and operating the SCMaglev will potentially bring.

Requests:

- As with the WQC, the needed surveys must be completed before the FEIS and released to the public for review and comment, prior to the FEIS and ROD.
- It is mandatory that a survey of properties along the entire alignment be made, especially in tunnel areas, to ensure that no geothermal heat pump loops, wells, or septic systems are damaged.
- Many residents get their water from wells. The potential for damaging the wells and the damage caused to the aquifer by the building and operating of the SCMaglev. need to be assessed.
- In addition, the water usage during the building phase needs to be assessed to determine if SCMaglev water usage will remove sufficient groundwater as to cause subsidence issues in the aquifer and damage to the water flow needed for proper well operation.
- This information should be made available for public review, with sufficient time to comment, before any decision to move forward with issuing the WQC and before the building of the SCMaglev is considered.

Geologic Conditions Not Well Documented

The analysis is based on "typical" soils.[503] The FRA guideline states: "It is well known that there are situations in which ground-borne vibration propagates much more efficiently than normal. The result is unacceptable vibration levels at two to three times the normal distance. Unfortunately, the geologic conditions that promote efficient propagation have not been well documented and are not fully understood. Shallow bedrock or clay soils are often involved. One possibility is that shallow bedrock acts to keep the vibration energy near the surface. Much of the energy that would normally radiate down is directed back toward the surface by the rock layer, with the result that the ground surface vibration is higher than normal."[504]

Appendix G13 of the DEIS gives extensive geotechnical profiles along both alignments but it is not clear how far these profiles extend in directions toward communities near the alignments.

Other geological databases might be used if they cover the affected communities with sufficient spatial resolution.

[503] DEIS. Appendix D.10. Section D.10.2.2.2. Pages 10-12.

[504] Federal Railroad Administration (FRA). "2012: High-speed Ground Transportation Noise and Vibration Impact Assessment, Final Report." September 2012. U.S. Department of Transportation, DOT/FRA/ORD-12/15. www.fra.dot.gov/eLib/details/L04090. Page 8-5.

In summary, the vibration analysis should be redone for communities near the alignments, assuming "efficient" soil propagation if no other data are available. Lacking guidelines, calculations should be based on first principles and/or on analogous systems.[505]

The MDE and the FRA need to determine the answers to the following questions and make this information available to the public for review and comment:

- At what distance from the SCMaglev is it safe to use wells and geothermal heat pumps?
- When will this information be made available, not only to the public, but also to county permitting offices to inform those members of the public who are applying for permits to install such systems?

7. Operation Phase Noise-Induced Vibration Impacts

One of the potentially serious impacts, unlikely to be mitigated, is the impact of sound and vibration from the SCMaglev building and operation on NASA's Goddard Geophysical and Astronomical Observatory's (GGAO) ability to continue its operations.

The GGAO is "one of the few sites in the world to have all four geodetic techniques co-located at a single location: Satellite Laser Ranging (SLR), Very Long Baseline Interferometry (VLBI), Global Navigation Satellite Systems (GNSS) and Doppler Orbitography and Radiopositioning Integrated by Satellite (DORIS). Sites like GGAO provide scientists a unique opportunity to assess system performance and perform multi-technique analysis. Co-located techniques are an integral part to the maintenance of the International Terrestrial Reference Frame (ITRF), a set of points with their 3-dimensional cartesian coordinates which realize an ideal reference system."[506]

Proximity of these systems allows for calibration of mobile systems, "repeated measurements on a marker with mobile systems . . . changes in antenna location for GNSS or DORIS . . . and co-locations between instruments . . . "[507] This supports "one-way laser ranging experiments to the Lunar Reconnaissance Orbiter, neutron spectroscopy experiments, search for optical sources of gamma ray bursts, the X-Ray beam-line," to name a few. "NASA's satellite missions and field experiments, Global Modeling and Assimilation Office (GMAO) generates near-real time atmospheric products using Goddard Earth Observing System (GEOS) and distributes them to a broad community of users. While these products emphasize the traditional aspects of weather analysis and forecasting, they have a broader scope that includes aerosols and trace gases. To enhance the quality of these near-real-time products, GMAO conducts research and development activities into atmospheric data assimilation and forecast model development."[508]

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[505] Appendix – Reprint: Kowalski, M. "SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0." 2021. Pages 26-27.
[506] National Aeronautics and Space Administration (NASA). "Goddard Geophysical and Astronomical Observatory (GGAO)." SGP: Space Geodesy Project. March 2, 2021. https://space-geodesy.nasa.gov/NSGN/sites/GGAO/GGAO.html#:~:text=The%20Goddard%20Geophysical%20and%20Astronomical,VLBI%2C%20GNSS%2C%20and%20DORIS.
[507] National Aeronautics and Space Administration (NASA). "Goddard Geophysical and Astronomical Observatory (GGAO)." SGP: Space Geodesy Project. Retrieved May 8, 2021. Space Geodesy Project. https://space-geodesy.nasa.gov/NSGN/sites/GGAO/GGAO.html.
[508] National Aeronautics and Space Administration (NASA). "Goddard Geophysical and Astronomical Observatory." https://space-geodesy.nasa.gov/NSGN/sites/GGAO/GGAO.html. Retrieved May 4, 2021.

The applicant's WQC justification materials, as the DEIS, is deficient because the likely impacts on the continuation of NASA's research facility operation is not included. Questions such as the following need to be answered before any consideration of moving forward with building the SCMaglev is considered.

- How will the SCMaglev affect NASA's weather and prediction analysis?
- Will the GGAO be able to operate as it does at present when subjected to the light, noise, and vibrations generated by the SCMaglev and its support and maintenance facilities operations?

Effects on Seasonal-Decadal Analysis and Prediction?

Reanalysis - "Long-term, model-based analyses of multiple datasets using a fixed assimilation system are a major focus in the GMAO. Building on the success of the atmospheric reanalysis conducted with GEOS, current research and development activities are directed at producing a major Earth System Reanalysis, including atmosphere, land, ocean, and ice."[509] As well as Mesocale - "Current computing capacity enables GMAO to simulate the entire globe at spatial resolutions previously only possible with regional models.

These "global mesoscale model" simulations serve as forefront evaluations of model performance and form the basis for Observing System Simulation Experiments."[510]

Finally, as we are dealing with foretelling our future climate: "GMAO's mission to provide modeling support for NASA's satellite observations encompasses the need to examine the impacts of different observation types in weather and climate prediction. It also requires the ability to simulate potential new observation types, in order to assess their cost benefit, based on their likely impacts on prediction."[511]

Well NASA Goddard believes the building and operating the SCMaglev will have significant impact on their ongoing GGAO facility operations. As stated in the "SCMaglev – NASA Comment" letter[512],

"NASA is concerned about SCMAGLEV impacts on operations at NASA's Goddard Geophysical and Astronomical Observatory (GGAO) facility on BARC property. A Trainset Maintenance Facility (TMF) located at the BARC Airstrip would have devastating impacts on the GGAO operations and the science data collected. The GGAO site was specifically selected because of its remoteness and isolation from human activity. Part of the site's current importance is that the data collected at this very stable site has a 50+ year history. Specific impacts are listed below [emphasis added].

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[509] National Aeronautics and Space Administration (NASA). "Reanalysis." Goddard Space Flight Center. https://gmao.gsfc.nasa.gov/reanalysis/. Retrieved May 4, 2021.
[510] National Aeronautics and Space Administration (NASA). "Global Mesoscale Modeling." Goddard Space Flight Center. https://gmao.gsfc.nasa.gov/global_mesoscale/. Retrieved May 4, 2021.
[511] National Aeronautics and Space Administration (NASA). "Observing System Science." Goddard Space Flight Center. https://gmao.gsfc.nasa.gov/observing_sys_science/. Retrieved May 4, 2021.
[512] National Aeronautics and Space Administration (NASA). "SCMaglev – NASA Comments" letter to the FRA. June 14, 2021. https://aa247ef8-bd4a-4dd2-890c-8b5ebdf396e2.filesusr.com/ugd/6d0640_ea8412d3507e412082ca26e6f7795043.pdf.

- Impacts from vibration, lighting, radio frequency (RF) interference, EMF, and traffic ***would jeopardize*** the quality of the measurements that all satellite missions and other applications rely on.

- The long-term geodetic measurements made at GGAO require a stable environment, with a requirement for accuracy of the geodetic coordinates at 1 mm and a stability of 0.1 mm/yr. The construction and operation of a major facility adjacent to the GGAO, such as a TMF, could disturb the stability of the GGAO site through ground deformation due to dewatering or other activities. This ***would render the data from this site difficult, if not impossible to use, disrupting the essential contribution made to the national and global reference frame used for all civil and scientific applications***.

- Artificial lighting from a TMF would ***negatively impact the optical systems*** at GGAO. Many of these operations can only be performed at night and any nearby artificial lighting would severely limit or eliminate these capabilities. These include regular satellite laser ranging to Earth orbiting satellites including Global Navigation Satellite System (GNSS) satellites, as well as on occasion interplanetary laser ranging experiments.

- RF Interference from Wi-Fi and any other transmitting device (in the 2-14GHz range) would ***interfere with highly sensitive operations and in some situations may damage the equipment***, which would compromise the ability of the Very Long Baseline Interferometry radio telescope to routinely participate in sessions to determine Earth Orientation Parameters, including UT1, the change in the rotation angle of the Earth. UT1 is an essential input to all GNSS positioning (civil, military, and scientific).

- Significant EMF could negatively impact the sensitive equipment used for many of the systems at GGAO.

- Traffic/Roads: Rerouted roads could ***negatively impact nearly all the systems operating at GGAO due to increased light pollution and vibratio***n from changes in the traffic patterns.

NASA believes that adequately resolving impacts to operations at GGAO through mitigation measures would not be possible."

Building an uncommercially proven, non-integrated, ground-based high-speed transportation system that only the wealthier among us can afford to use and that has a high potential to disrupt ongoing vital science and research at NASA, PRR, and BARC facilities makes no sense. A lower-cost, commercially proven, well-integrated high-speed train system already exists, is in operation, and is being enhanced, and it would have far less impact on our environment and the ongoing operation of these vital facilities. The MDE should not issue any WQCs, and the FRA should choose the No Build option before the SCMaglev irreversibly damages our state's prized and valued assets.

XXV. Noise and Vibration – Disturbance and Nuisance – Research, Observations, and Commentary

This section provides a deeper scientific look at disturbances and nuisances associated with noise and vibration. It is comprised of extensive excerpts taken, with generous permission, from Dr Owen Kelley's research paper titled "Mapping the Noise and Vibration Nuisance of the Proposed Baltimore-Washington Superconducting Maglev Train" and presented in January of 2018. Other sources are noted individually within this section.

Noise and Vibration Nuisance Distances

It is difficult for the public and for elected officials to form opinions about the impacts of these (proposed alignments) alternatives when they lack information about how far from the track a noise nuisance or a ground-vibration nuisance may be generated by the passage of maglev trains. Maglev-generated noise may disrupt sleep, ground vibration may rattle homes and places of business, and the rapid onset of the maglev noise is a safety hazard because it can startle. All three of these kinds of nuisance may hamper business activities, reduce residents' quality of life, and lower property values along the track.[513]

The criteria used in evaluating noise impacts from high-speed ground transportation are based on maintaining a noise environment considered acceptable for land uses where noise may have an effect. These criteria take into account the unusual noise characteristics of high-speed rail operations, including the effects of startle on humans, livestock, and wildlife to the extent that these effects are known.[514] …Some characteristics of high-speed train noise are similar to low overflights of aircraft, and researchers generally agree that high noise levels from aircraft overflights can have a disturbing effect on both domestic livestock and wildlife. Some animals get used to noise exposure while some do not. Documented effects range from simply taking notice and changing body position to taking flight in panic. Whether these responses represent a threat to survival of animals remains unclear, although panic flight may result in injuries to animals in rough terrain or in predation of unprotected eggs of birds. A limited amount of quantitative noise data relating actual levels to effects provides enough information to develop a screening procedure to identify areas where noise from high-speed train operations could affect domestic and wild animals.[515]These criteria are adapted from criteria developed by FTA for rail noise sources operating on fixed guideways or at fixed facilities.[516]

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[513] Kelley, Dr. Owen. "Mapping the Noise and Vibration Nuisance of the Proposed Baltimore-Washington Superconducting Maglev Train." January 2018. Page 3.

[514] Federal Railroad Administration (FRA), 2012: *High-speed Ground Transportation Noise and Vibration Impact Assessment*, final report, September 2012. U.S. Department of Transportation, DOT/FRA/ORD-12/15, page 35 of 248. Available online at High-Speed Ground Transportation Noise and Vibration Impact Assessment | FRA (dot.gov).

[515] Federal Railroad Administration (FRA), 2012: *High-speed Ground Transportation Noise and Vibration Impact Assessment*, final report, September 2012. U.S. Department of Transportation, DOT/FRA/ORD-12/15, page 35 of 248. Available online at High-Speed Ground Transportation Noise and Vibration Impact Assessment | FRA (dot.gov).

[516] U.S. DOT, FTA. *Transit Noise and Vibration Impact Assessment, Final Report*, FTA-VA-90-1003-06, May 2006.

Thresholds for Disturbance

Most studies have focused on identifying a noise level associated with disturbance effects, even if the type of noise event varied considerably from study to study. In the well-documented study that recommended Sound Exposure Level (SEL) as the preferred descriptor, a threshold of response for disturbance ("100 percent rate of crowding") of domestic turkeys was identified as SEL = 100 dB (ref. 21). Even if the descriptors are not the same, many studies report levels in the vicinity of 100 dB as associated with an observable effect, as shown in Table A-1. The information in this table is taken from an extensive survey on aircraft noise effects.88 Until more definitive information on thresholds can be developed, an interim criterion of SEL = 100 dB will be used for disturbance by high-speed rail operations.[517]

Table A-1 Summary of Noise Levels Associated with Effects on Animals and Birds

Animal Category	Species	Noise Level and Type (if known) Associated with Effect	Effect
Domestic Mammals	Dairy Cow	105 dB	Reduction in milk production
		97 dB	Changes in blood composition
		110 dB, 1 kHz	Changes in blood composition
	Swine	108 – 120 dB	Hormonal changes
		93 dB	Hormonal changes
		120 – 135 dB	Increased heart rate
	Sheep	100 dB "white noise"	Increased heart rate, respiration
		90 dB "white noise"	Decreased thyroid activity
		100 dB	Increase in number of lambs per ewe
Wild Mammals	Reindeer	Sonic booms	Startle
	Caribou	Aircraft	Starte, panic running
	Pronghorn antelope	77 dBA, helicopter	Running
Domestic Birds	Chicken	100 dB	Blood composition
		115 dB	Interrupt Brooding
Wild Birds	Quail	80 dB	Accelerated hatching
	Canary	95 – 100 dB	Hearing loss
	Seabirds (general)	Sonic boom	Startle, flush from nest
	Tern	Sonic boom, frequent	Reduces reproduction
	California condor	Blasting drilling, etc.	Flush from nest, abandon area
	Raptors	Sonic booms	Alarm

Overview of Nuisances

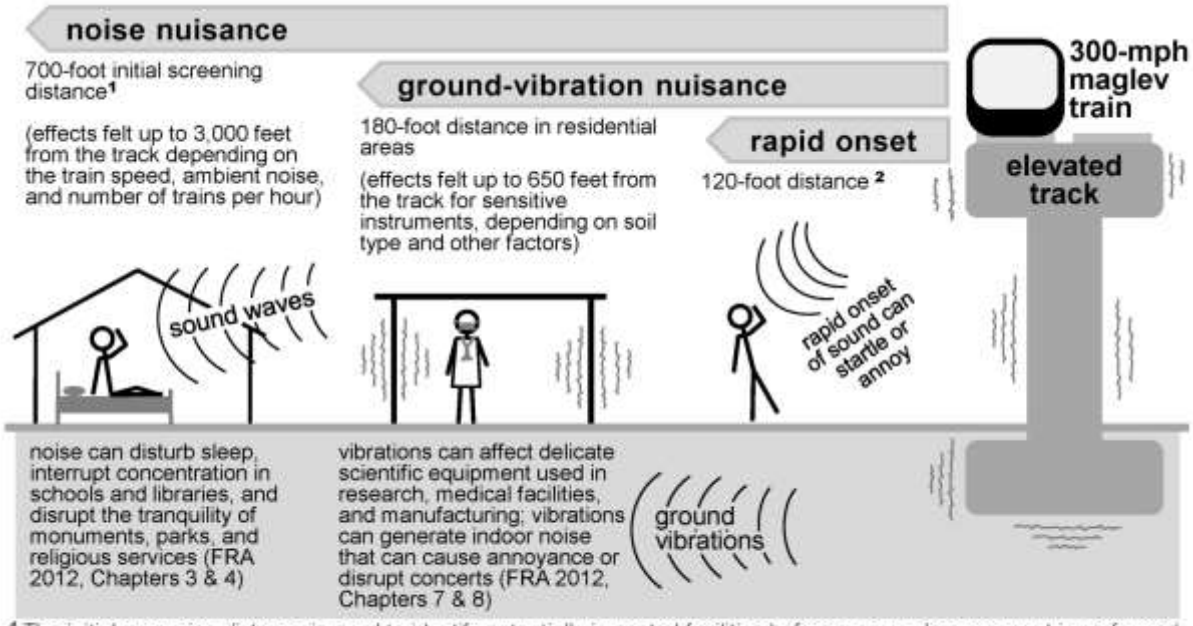
The nuisance distances stated in the following tables go from track to observer, meaning that the total width of the nuisance zone would be twice as great as the nuisance distance stated in the table. In other words, the nuisance extends beyond the centerline of the track for an equal distance on each side of the track. The noise and rapid-onset nuisances are associated only with the aboveground portion of the

[517] Federal Railroad Administration (FRA), 2012: *High-speed Ground Transportation Noise and Vibration Impact Assessment*, final report, September 2012. U.S. Department of Transportation, DOT/FRA/ORD-12/15, Appendix A: page 202 of 248. Available online at High-Speed Ground Transportation Noise and Vibration Impact Assessment | FRA (dot.gov).

track. In contrast, the ground-vibration nuisance extends an equal horizontal distance on either side of the track regardless of whether the track is aboveground or underground according to FRA (2012).

Throughout, 300 mph is used as the top speed of the maglev train even though a slightly higher speed is stated by the environmental impact study (311 mph). Using a round number for the train speed (i.e., 300 mph instead of 311 mph) in the present document avoids giving a false impression that these rough estimates are more accurate than they are. Another reason to use 300 instead of 311 mph as the top speed in the calculations of the present document is that it reduces the chance of overestimating the nuisance distances. At speeds of 300 mph, the distance to which a nuisance extends from the track increases rapidly with train speed.

Figure 1 is a schematic depiction of the three kinds of maglev nuisances that are described in FRA (2012) and subsequently in the present document, and represents the potential response of those subjected to the associated noise and vibration on their property, in their homes, and in the parks, libraries, schools, places of worship, concert halls, theaters, monuments, hotels, and businesses that they frequent.



Note: The location of the FRA has changed to: Available online at H..h-Speed Ground Transportation Noise and Vibration Impact Assessment | FRA (dot.gov).

Figure 1. A schematic representation of three nuisances associated with a maglev train: noise nuisance, ground-vibration nuisance, and rapid-onset nuisance.

Noise Nuisance

Initial screening for noise nuisance

There are three methodologies for identifying nuisances according to FRA (2012, pg. 4-2): Initial Screening, Detailed Analysis, and General Assessment. Initial screening is a useful technique because it can be applied when only a few parameters are known about the proposed rail project and the impacted communities. The purpose of initial screening is to generate a list of properties that are near enough to a proposed track alignment that these properties should be examined more carefully by a subsequent "detailed analysis" (FRA 2012, pg. 5-1). A list of the kinds of noise-sensitive features that one should look for during the initial screening is found in FRA (2012, pg. 3-7). There is also a third method, whose complexity and accuracy lies somewhere between initial screening and detailed analysis. This middle method is called a "general assessment" (FRA 2012, pg. 4-4).

For a noise nuisance, one can read an initial-screening distance from FRA (2012) Table 4-1. To choose a value from this table, one needs an estimate of the pre-existing noise conditions and the speed of the train. The quieter the pre-existing conditions, the further from the tracks that the new maglev noise will be experienced as a nuisance. Aerodynamic noise dramatically increases with train speed; therefor the noise of the maglev train's passage is a nuisance further from the track when the train is traveling faster.

For the purpose of determining a noise-nuisance initial-screening distance, many residential areas, parks, forests, and farmland might reasonably be treated as "quiet suburban." Table 4-6 and page 4-12 of FRA (2012) suggest that "loud suburban" conditions are likely to occur within 400 feet of a superhighway, within 200 feet of a major road with at least 300 trucks passing per hour, or where the population density is high (≥10,000 persons per square mile).

Table 4-1 of FRA (2012) provides three variations on both quiet and loud suburban conditions. From noisiest to most quiet, these three variants are that the new maglev track is being built next to an existing highway, next to an existing train track, or in a location with no such transportation infrastructure. Table 1 (below) of the present document was created by extracting values from FRA (2012) Table 4-1 that correspond to the middle of these three variants (i.e., existing rail corridor). The distances quoted in Table 1 of the present document would vary by no more than ±100 feet if one of the other variants were chosen from FRA (2012) Table 4-1.

To use Table 1 of the present document, one needs an estimate of where along the proposed aboveground track alignments the maglev train will be traveling at least 200 mph. Section 8.4 of the present document provides such an estimate under the route alignments proposed in October 2017 for the Baltimore-Washington superconducting maglev rail project. In brief, section 8.4 estimates that the maglev train would likely be traveling ≥200 mph at least from Bladensburg to Fort Meade. The ≥200 mph portion of the track would include the entire aboveground track of the October 2017 proposed routes. The aboveground portion of the track goes from Greenbelt to Fort Meade under alternatives J and J1.

Table 1. Initial-screening distance for noise nuisance for an Above ground maglev track, based on FRA (2012) Table 4-1.[a]

Setting	Maglev train speed	
	<200 mph	**≥200 mph** [b]
Noisy suburban	50 feet	400 feet
Quiet suburban	50 feet	700 feet

[a] The initial-screening distance would vary from the values stated here by no more than ±100 feet if different variants of noisy and quiet suburban environments were selected from FRA (2012) Table 4-1.

[b] Under all route alignments proposed in October 2017 for the Baltimore-Washington superconducting maglev rail project, the maglev would likely be traveling at least 200 mph along all of the aboveground portions of the track between Bladensburg and Fort Meade.

General assessment of noise nuisance

The FRA (2012) general-assessment method for noise nuisance involves more steps than the just-described initial-screening technique for noise nuisance. Table 2 of the present document is calculated using a simplified form of the FRA (2012) general-assessment method, as described in detail in section 8.1 of the present document.

Comparing the initial screening (Table 1, above) with the general assessment (Table 2, below), one sees that the general-assessment distance for 200 mph trains is generally consistent with the initial-screening distance. For example, for quiet pre-existing conditions, the initial-screening distance is 50 or 700 feet for trains traveling under or over 200 mph, while the general-assessment distance is 366–498 feet for trains traveling at 200 mph depending on whether the track is elevated or at ground level.

In contrast, the general-assessment distance for a maglev train traveling specifically at 300 mph is considerably greater than the initial-screening distance for the broad category of all trains traveling at least 200 mph. For example, under quiet pre-existing conditions and for 4 trains per hour that travel 300 mph along an elevated track, the general-assessment noise nuisance would extend 1,933 feet from the track. In comparison, the closest category in the initial screening would be the noise nuisance extending 700 feet from the track if the trains were traveling at ≥200 mph in quiet pre-existing conditions. A plausible explanation for the difference between general assessment and initial screening for a 300-mph train is that FRA (2012) may have optimized its initial-screening "≥200-mph category" for trains that are traveling merely 200–250 mph, not 300 mph. Using the FRA formulas and inserting the 300-mph parameter, the distances specific to a maglev train traveling at 300-mph can be extrapolated, as shown in Table2.

Table 2. The distance from the track that the noise nuisance (airborne noise) extends when the track is aboveground, based on FRA (2012, Chapter 4).

Background sound level	Quiet, suburban (50 dBA)			Loud, suburban (60 dBA)	
Train speed [a]	300 mph	200 mph		300 mph	200 mph
4 trains per hour					
Elevated track	1,933 ft	498 ft		895 ft	231 ft
Track at ground level	1,421 ft	366 ft		658 ft	169 ft
8 trains per hour					
Elevated track	3,074 ft	792 ft		1,423 ft	366 ft
Track at ground level	2,259 ft	582 ft		1,046 ft	269 ft

[a] As described in section 5d of the present document, a reasonable assumption of 0.05*g* acceleration results in the proposed Baltimore-Washington maglev train traveling ≥200 mph from Bladensburg to Fort Meade. Under the same assumption, the train would be traveling at 300 mph between Greenbelt and the Patuxent Wildlife Research Refuge on alternative routes J and J1.

Ground-vibration Nuisance

To estimate the distance from a maglev train at which a ground-vibration nuisance exists, one must use the FRA (2012) general-assessment method rather than an initial screening. This is necessary because FRA (2012, Table 8-1) only provides an initial-screening distance for the ground-vibration nuisance of steel-wheeled trains, not maglev trains.

In Chapters 7 and 8, FRA (2012)'s general-assessment method provides a ground-vibration nuisance distance that depends on three factors. One factor is the speed of the train, such as 200 mph or 300 mph. As described in section 8.4 of the present document, the alternative routes proposed in October 2017 for the Baltimore-Washington superconductive maglev train would likely have the train traveling ≥200 mph at least from Bladensburg to Fort Meade. The train is likely to travel at 300 mph from Greenbelt to the Patuxent Wildlife Research Refuge under alternative routes J and J1.

A second factor is that the ground-vibration nuisance extends a different distance from the track depending on the use of the building. Given at least 70 train passbys per day, FRA (2012) deems that a train-induced vibrational level of 65 VdB is acceptable for concert halls, recording studios, and most buildings that contain moderately-sensitive laboratory or manufacturing equipment. FRA (2012) deems that a higher vibrational level of 72 VdB is acceptable for residences, operating rooms, auditoriums, and theaters (pg. 7-3 and Table 7-2). These vibrational levels can occur at the distances from the track that are specified in Table 3 of the present document. Section 8.2 of the present document shows how the values in Table 3 can be traced to the guidelines in FRA (2012).

Table 3. Distance that the ground-vibration nuisance would extend from either an aboveground or belowground maglev track, based on FRA (2012) Tables 7-1, 7-2, and 8-2 and Figure 8-1.

	Maglev train speed	
Building type (acceptable vibration threshold)	200 mph	300 mph
Normal soil propagation (the default assumption)		
Residential area, operating room (72 VdB)	60 feet	180 feet
Research, manufacturing, or medical facilities with vibration-sensitive equipment; concert halls (65 VdB)	130 feet	300 feet
Efficient soil propagation (only where indicated by seismic tests)		
Residential area, operating room (72 VdB)	180 feet	400 feet
Research, manufacturing, or medical facility with vibration-sensitive equipment; concert halls (65 VdB)	300 feet	650 feet

Rapid-onset Nuisance

When a high-speed train approaches, the rapid crescendo of noise can be an annoyance independent of the loudness of the noise itself. Near to the track, the sound's rapid onset is able to surprise and startle, not merely annoy. The sound of a high-speed train's passage is mostly confined to a period of about 5 to 10 seconds (depending on how fast the train is moving), which includes about two seconds of rapid increase in the sound level followed by several seconds of decreasing volume (FRA 2012, Fig. 2-3). The faster the train moves, the more extreme the crescendo.

For various train speeds, FRA (2012, Fig. 2-5) can be used to estimate the distance at which rapid onset is an annoyance. Interpolating or extrapolating along the straight line shown in FRA (2012, Fig. 4-2), one can estimate the distance at which rapid onset can surprise or startle. Table 4 below summarizes these values. Section 8.3 of the present document provides details of how Table 4 below is consistent with FRA (2012).

Table 4. Distance from the track that a nuisance may extend due to the rapid onset of the noise of the maglev train's passage, based on FRA (2012) Figures 2-5 and 4-2.

Impact (sound-onset rate)	Maglev train speed	
	200 mph	300 mph
Annoyance (15 dBA s^{-1})	80 feet	120 feet
Surprise or startle (30 dBA s^{-1})	42 feet	63 feet

XXVI. Construction Issues and Impact

Incomplete Construction Impact Assessments

The DEIS Section D.4D.2[518] discusses short term impacts on business during the construction phase.[519] (Note that in Section 4.6.3.2, page 4.6-20, there appears to be an omission because there is no discussion of the business impacts at the Route 197/BW Parkway interchange, despite nearby Crystal Plaza.)

The applicant's WQC justification materials, as the DEIS, again is incomplete because it does not provide a discussion on the impact on businesses located at and around the Route 197/BW Parkway interchange.

Question:

- Why is the interchange not included in the business impact discussion?

Regarding business losses, it is stated on page D-27 that: "There is limited literature and no standard methodology that focuses on quantifying the social costs associated with the impacts that results from construction."[520] References are cited. The results in Table D.4-6 (pages D-17 to D-18) show a wide range of uncertainty for every choice of Build Alternative (e.g., $18.5 to $233.5 million for the preferred J-03 alternative).[521]

The applicant's WQC justification materials, as is the DEIS, statements appear to obfuscate the information needed to make an informed decision about the impacts

[518] and DEIS. Appendix D.4. Page D-17.
[519] *Id*.
[520] DEIS. Appendix D.04. Page D-27.
[521] DEIS. Appendix D.04. Table D.4-6. Page D-17.

Questions:

- Is this wide range a result of the methodology or does it reflect uncertainty in the input values?
- What methodology or methodologies were used?
- What data were used?
- How valid and accurate are the data?
- Why are these results not broken down into separate geographical areas along the alignment where local impacts can be more easily seen?[522]

Negative Monetary Impact on Travelers During Construction Ignored

More importantly, despite the extremely detailed discussions on the significant value of monetized time saved by SCMaglev users, there is only one qualitative paragraph in the DEIS[523] and no quantification of the monetized time lost during construction by travelers not associated with the project during construction (a large portion of whom are likely to be nearby residents).

During the construction phase, road congestion will not only impact vehicles and travel time, but also public transportation on which a substantial part of the Prince George's community relies. The statement that reduced travel times in 2030 would make up the disruptive impacts for the five to eight years of disruption is not tenable.

Public transportation is important not only for work and school commutes, but for many it is the only mode of transportation for accessing grocery stores, doctors, and other basic needs. Disruption of bus service and routes over a period of several years will have a significant impact on health and job security. “Commuting is often a key consideration for individuals’ employment choices. Helping people to understand their options for a new job or mode of transportation can have a very meaningful impact in someone’s life. The connections between transportation, health/wellbeing, and environment really inspired me to get into this field and help people adopt new transportation habits.”[524]

Public transportation includes movement across the communities and is especially important in EJ communities. Bus routes in Central Maryland show similar ridership demographics; ridership is predominately Black, used by full-time employees, ages 25-49, incomes $25,000 or less, with no car ownership.[525]

It is neither sufficient nor reasonable to evaluate time benefits quantitatively without also evaluating time costs.

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[522] Appendix – Reprint: Kowalski, M. “SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0.” 2021. Pages 15-16.
[523] DEIS. Appendix D.04. Page D-24.
[524] King, Stacey. “Commuter’s Choice.” Maryland Department of Transportation. Retrieved May 2, 2021. www.mdot.maryland.gov/OPCP/RSC_Spotlight_PG.pdf.
[525] Maryland Department of Transportation (MDOT). “Maryland Transit Administration. Central Maryland Transit Development Plan Final Report.” January 2018. https://rtp.mta.maryland.gov/docs/Connecting_Our_Future_RTP_CentralMD.pdf.

The applicant's WQC justification materials, as the DEIS, is deficient because it fails to provide these analyses.

Question:

- Where are these analyses?

The BWRR, MDE and the FRA must provide this information along with the studies and data that support the provided answer(s)[526] to present a balanced picture of the impacts and not just the purported benefits of the SCMaglev.

Loss of Revenue for Businesses Impacted by Construction Incomplete

Regarding losses for businesses (e.g., food and entertainment) during construction, the applicant's WQC justification materials, or the DEIS, contains a few statements that provide a strong contrast in attitude with the numerous mitigations promised throughout: "These industries are believed to be most impacted because the ability to make comparable transactions - purchase groceries or a coffee for example - elsewhere in the community is greatest. By contrast, professional services transactions are less likely to be tempered as people are less willing to change dentists, lawyers or hair stylists once they have found a professional with whom they are comfortable. They are more willing to accept the travel inconvenience to visit the dentist that makes them comfortable and knows them."[527] The first sentence is Darwinian, and the second leaves affected residents with the realization of the grim choices forced upon them. Together they introduce considerable doubt about the sincerity of promises for community involvement.[528]

BWRR Grossly Underestimates Construction Phase Impacts

We believe BWRR has grossly underestimated construction phase impacts. The discussion is confined largely to the 500-foot Limit of Disturbance (LOD). All communities south of the BW Parkway/MD197 interchange will be severely impacted during the construction phase.

1. South Laurel Communities South of the BW Parkway/MD197 interchange:[529]

- Townhouse/Single Family: Pheasant Run (north side of MD197)
- Single Family: Montpelier Woods (north side of MD197), Snowden Pond (south side)
- Condominiums/Apartments: Applewalk, Laurelwood, The Villages at Montpelier (south side of MD197)
- Other: Halltown, and approximately a dozen homes along Snowden Road and MD197 apparently unaffiliated with homeowners' associations.
- Population (July 2020)[530]

[526] Appendix – Reprint: Kowalski, M. "SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0." 2021. Pages 14-15.
[527] DEIS. Appendix D.04. D.4D.2.2.1. Page D-28.
[528] Appendix – Reprint: Kowalski, M. "SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0." 2021. Page 16.
[529] *Ibid*. Page 19.
[530] *Maryland Gazetter*. "HomeTownLocator." https://maryland.hometownlocator.com.

- 1,544 north side of MD197
- 2,439 south side of MD197
- Total: 3,983 residents

Construction Traffic

The traffic impact on the BW Parkway/MD197 worksite is shown in Table D.2-33 of the DEIS.[531] A total of 51 trucks per day and 190 worker vehicles will be arriving and leaving for viaduct and electrical substation construction.[532] This is an enormous amount of traffic concentrated in a very small region, amounting to 1 truck every 11 minutes, in the unlikely event that truck arrivals are evenly spaced throughout the day. Workers will arrive at 7:00 a.m. and the construction area will be active from 7:00 a.m. to 4:00 p.m. daily. Viaduct construction is scheduled to last 34 months over years two through four and substation construction for 24 months over years two through six. For the J alignment there will also be a 200 x 90-meter laydown at the present Harley Davidson site. The laydown for the J1 alignment will be at the Suburban Airport site accessed by Brock Bridge Road. Both alignments will have a laydown at Powder Mill with 45 trucks and 90 workers arriving daily. An additional 44 to 56 trucks and 90 to 112 workers will arrive at Beaver Dam Road if either the BARC West or BARC East site is selected, along with 145 trucks and 150 workers for the South Portal Construction site. Greenbelt and Soil Conservation Roads will provide access to this site.[533]

The DEIS quotes daily traffic counts on MD197 of 28,700, but with the following description: "MD 197 is two lanes in each direction, with the two directions separated by a grass median."[534] It should be clarified that the grassy medium disappears within about 100 meters north and south of the interchange. Also, as the laydown is on the south side of MD197, vehicles must cross MD197 to bring these materials to work sites north of MD197. Moreover, for the J alignment there are construction activities for Support Facilities SCM SVS 07 (adjacent to the northbound BW Parkway/MD197 exit lane) and SCM SVS 08 (west of southbound MD197 and between the northbound flyover exit lane and northbound BW Parkway). **Together with the laydown activities, there will be severe traffic impacts during the construction phase on the northbound MD197 exit lane from the BW Parkway.[535]**

A traffic count of 28,700 vehicles daily for MD197 is not trivial. Moreover, MD197 narrows to a single lane each direction just south of the South Laurel Drive intersection, which is well within the LOD. All six South Laurel communities listed above access areas outside their neighborhoods only through MD197. Those on the north side have three minor roads accessing MD197, only one of which has traffic signals (Snowden Road). Those on the south side have only two access roads, also only one of which has signals (South Laurel Drive). All but two access points to MD197 for these six communities are essentially within the 500-foot LOD, and the two exceptions (Basswood Drive, Snowden Pond Road) do not have signals, despite repeated appeals by residents to install them. Residents leaving their homes will encounter huge delays just accessing MD197. These delays will introduce uncertainties in all travel, whether, for commuting to work, basic trips for shopping, or medical appointments, for example.[536]

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[531] DEIS. Appendix D.2. Section D.2A.15.2. Page A.15-86.
[532] DEIS. Appendix D.2. Table D.2-33. Section D.2A.15.2. Page A.15-86.
[533] Appendix – Reprint: Kowalski, M. "SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0." 2021. Pages 19-20.
[534] DEIS. Appendix D.2. D.2A.15. Page A-56.
[535] *Id*.
[536] *Id*.

Their travel problems will not end even after escaping the local BW Parkway/MD197 tangle, for in almost all directions they will encounter additional construction traffic and activity at other construction sites and more delays—at Powder Mill Road and Brock Bridge Road (for the J-1 alignment), and at Contee Road, MD198, and construction-related congestion on the BW Parkway in both directions. Even the only escape route to the nearest alternate grocery stores in Bowie (at a distance of less than six miles) along MD197 will share the construction traffic up to Powder Mill Road. Weekends will not be exempt, as roadblocks are scheduled to be set up on four weekend days, closing ***both*** MD197 and the BW Parkway at the alignment, something that was never done during the 1999-2003 refurbishment of this interchange. There are also a host of road closures scheduled at or near the BW Parkway and Powder Mill Road, as well as the BW Parkway and MD198 interchanges, and other roads.[537] **In summary, the approximately 4,000 residents of South Laurel will be effectively cut off from the outside world during the construction phase for an estimated 34 months.[538]**

Finally, much of the Washington Suburban Sanitary Commission (WSSC) facility at Canadian Way in South Laurel is well within the 500-foot LOD for Alignment J viaduct construction and the additional six meters of work area appears to abut the WSSC boundary.[539] Support facility SCM SVS10 sits just west of the viaduct. Appendix G7 of the DEIS states: "Discussions have been initiated with the Washington Suburban Sanitary Commission (WSSC) about the potential use of a parking lot for one of its administrative facilities as a TBM (tunnel boring machine) retrieval shaft and future FA/EE location. **No major WSSC infrastructure is expected to be impacted.**"[540] The second sentence, bolded here for emphasis, strains believability. Also, Canadian Way, which will be heavily used for access to the worksite, is the sole access for WSSC workers. There is no other discussion about the South Laurel WSSC facility in the DEIS.[541]

Traffic Impacts During Operations

Even after construction, viaduct crossovers on the entrance/exit lanes of the BW Parkway/MD197 interchange will continue to have great adverse impacts on car traffic flow, thus contributing to accidents on both roads and degraded Line of Sight (LOS).

J Alignment[542]

The northbound BW Parkway exit ramp at MD197 serves northbound MD197 by way of a flyover ramp and bridge over MD197 southbound. Approximately 334 meters of that is under the viaduct. Thus, the viaduct elevation at STA124+400 is planned to be approximately 14 meters above the flyover ramp grade and approximately 28 meters above the southbound MD197 grade.[543] The flyover ramp is at a slight angle to the viaduct and emerges from under it for another approximately 222 meters (although

[537] DEIS. Appendix G8. Part K. Table 23. Page 35.
[538] Appendix – Reprint: Kowalski, M. "SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0." 2021. Pages 20-21.
[539] DEIS. Appendix G. Part B. Attachment 2. J1. Page 36.
[540] DEIS. Appendix G7. Section 17.3. Page 79.
[541] Appendix – Reprint: Kowalski, M. "SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0." 2021. Page 21.
[542] Distances measured from DEIS Appendix G. Part A. Pages 34-35.
[543] DEIS. Appendix G. Part E. Page 56.

displaced eastward no more than 18 meters) before finally curving to the left to merge with the MD197 northbound. The merge comes right at the location where the flyover ramp again ducks under the viaduct for a distance of approximately 53 meters.[544] Thus, the right-hand merge with the northbound MD197 traffic comes at highway velocity in permanent shadow from the viaduct. **Under these conditions there is an extremely high probability for accidents.**

The northbound BW Parkway also serves MD197 southbound by an additional lane that splits to the right (east). There is approximately 230 meters of travel under the viaduct before the additional lane curves to the right, around what is planned to be the laydown area, until it reaches a point perpendicular to MD197 at a traffic signal, allowing traffic to turn left or right. A left turn at this light allows residents of Pheasant Run to turn right on Mallard Drive to access their community. Going straight along Snowden Road allows access to Montpelier Woods. Turning right and traveling short distances allows subsequent right turns at South Laurel Drive (for Applewalk, Laurelwood, and The Village at Montpelier), at Snowden Pond Road (for Snowden Pond), or to continue on towards Powder Mill or points further south on MD197 (Bowie).

- The entrance lane from northbound MD197 to the northbound BWP would have a similar length of 90 meters directly underneath the viaduct beginning right at the split from northbound MD197 thru traffic.

J-1 Alignment[545]

The southbound exit from the BW Parkway to MD197 will go under the viaduct for a distance of approximately 58 meters before emerging several hundred meters before the signaled intersection with MD197, now reunified into two-lanes in both directions.

The loop entrance from northbound MD197 to southbound BW Parkway will have an approximate 61-meter section under the viaduct.

The viaduct is within 10 meters of the southbound BW Parkway travel lanes for approximately 590 meters starting just north of the MD 197 southbound exit until the viaduct crosses over southbound MD197.

The entrance ramp to the southbound BW Parkway from southbound MD197 is long and will be directly under the viaduct for approximately 459 meters.

Common to Both Alignments

The long stretches of roadway more than 38 or even up to 50 meters directly underneath the viaduct do not permit the use of single hammerhead column supports for the guideway as shown in the DEIS drawings TY01 and -02.[546] Rather, straddle bent mountings (TY-04) will be required. In the constricted geometry around the interchange, it is not clear whether even these mountings will fit. However, any modifications of the exit/entrance roadways to snake around viaduct mountings would defeat the careful engineering of the BW Parkway interchange refurbishment, introduce dangerous conditions that

[544] DEIS. Appendix G. Part A. Attachment 2. Pages 34-35.
[545] Distances measured from DEIS Appendix G. Part B. Pages 35-36.
[546] DEIS. Appendix G. Part D. Drawings TY-01 – TY-02.

lead to accidents, and likely result in slowing exit traffic from the BW Parkway to the point where backups would occur onto the BW Parkway.[547]

Similar analyses to the above for the BW Parkway/MD 197 interchange can be done for the Powder Mill, MD198, and MD 32 interchanges. The latter two, along with the MD197 interchange, were part of the BW Parkway refurbishment (1999-2002) and were designed to minimize accidents and improve traffic flow. Traffic impacts might be marginally less severe for the MD32 (full cloverleaf) and MD198 (half-cloverleaf) interchanges because of the design of their on/off ramps and because the BW Parkway crosses them at an angle closer to perpendicular.

However, in summary, the overall picture is that the proximity of the SCMaglev viaduct to the BW Parkway introduces complicated challenges to motorists at the interchanges, leading to the considerable potential for accidents and significantly degraded LOS flow on the BW Parkway and on all four roads that have interchanges with it (Powder Mill Road, MD197, MD198, and MD32). Moreover, the viaduct mountings will essentially lock in the proposed modified design of the interchanges, making it virtually impossible to correct any flaws or even to modify them in the future.[548]

Aesthetic Community and Property Impact

Aesthetic impacts were evaluated along both alignments, including the entire viaduct and the TMF locations.

High Common Aesthetic Area (CAA) #5 - #13 Evaluations
There are nine Common Aesthetic Areas (CAA) (#5 - #13) used in Appendix D.06 of the DEIS to evaluate aesthetic impacts along the viaduct and the TMF locations.[549] Figures D.6-6 through D.6-14 map the locations. Regardless of the chosen alignment, Tables D.6-7 through D.6-9 show H (high) impacts for over half the locations evaluated, with the remaining locations split approximately evenly between M (moderate), L (low), and RI (relatively imperceptible). The H locations are split about evenly between the alignments. As might be expected, resources on the north side of the BW Parkway show visual impacts for the J-1 alignment and resources on the south side show higher values for the J alignment.[550]

Moderate to High CAA #7 Evaluation
CAA #7 South Laurel residential areas show generally H visual impact with moderate to high sensitivity for the J alignment.[551]

Snow Hill Manor and Montpelier Mansion
Members of the Snowden family were early colonists of Maryland arriving in the 17th century. The family owned much of the land through which the SCMaglev would traverse. They were friends of George and Martha Washington (who really did lodge there on his trips north). Some of their iron

[547] Appendix – Reprint: Kowalski, M. "SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0." 2021. Pages 21-23.
[548] *Id*.
[549] DEIS. Appendix D.6. Figure D.6-1. Section D.6.1.1.2. Page 6-7.
[550] *Ibid*. Page 6-6 to 6-7.
[551] DEIS. Appendix D.6. Figure D.6-8: CAA #7. Page 6-22.

mining operations, among the first in America, were located near where Brock Bridge Road crosses the Patuxent River. Active historic homes still dot the landscape and are on the National Register of Historic Places. These homes are operated by the Maryland-National Capital Parks and Planning Commission (M-NCPPC).

- Snow Hill Manor at Contee Road and MD197 is 4,000 feet from the BW Parkway, but the view is blocked by trees.

- Montpelier Mansion, located at Muirkirk Road and MD197, is the historical and cultural centerpiece, with a full, yearly program of events, many of which are located on the east lawn toward the BW Parkway. The mansion sits on a small hill approximately a half-mile from the BW Parkway, and thus has a direct view of the SCMaglev J-1 alignment from across Montpelier Park. While this distance is formally just outside the 2,000-foot criteria, the lawn area is not.

Request: The MCRT Review Team believe that the mansion's historical significance warrants an exception and request that it be included in the noise and vibration analysis.

Incomplete and Deceptive Viaduct Illustrative Renderings
In DEIS Section D.6.1.3.3 of Appendix D.06 the illustrative renderings along the viaduct are incomplete and deceptive.

- While the airplane views are useful in understanding the relationships between the guideway and its facilities to the existing environment, aesthetics are evaluated on ground views. There are only three ground views along the viaduct, all of which are located from the perspective of a traveler on the BW Parkway, not from a resident. This perspective reduces the incongruity of the SCMaglev by putting it in the context of another transportation artery, thus giving a favorable but unfair picture. Given the high visual impacts determined for residential neighborhoods additional renderings (before/after) are needed for both alignments:

    - J: Parking lot of New Life Christian Center (Pheasant Run) looking directly west toward the MD197 flyover ramp; alternate location is parking lot of nearby 7-Eleven; a 3- or 5-photo mosaic would give a true picture of the immensity of the viaduct compared with its surroundings.

    - J: Just at the east edge of the cul-de-sac on Pheasant Run Court looking directly west toward MD197.

    - J: Northbound MD197 100 yards south of Canadian Way looking toward the split between northbound MD197 and the northbound entrance ramp to the BW Parkway.

    - J: Southern parking bay for 11742 S. Laurel Drive apartments, looking west-southwest (260 degrees east of north) toward 11746 S. Laurel Drive apartments.

    - J: North side of the gymnasium building belonging to Tabernacle Church on S. Laurel Drive (south side of power right of way) looking west-northwest (280 degrees east of north) toward BW Parkway.

- J-1: Corner of Apache Tears Court/Ispahan Loop looking east-northeast (20 degrees north of east) toward Montpelier Hills townhomes at Ivory Fashion Court.

- J-1: Corner of Muirkirk Road/Hermosa Drive looking southeast (120 degrees east of north) toward Montpelier Hills Recreation area.

- Two of the three renderings—Figure D.6-33 (on page 6-41) and Figure D.6-39 (on page 6-44)—show the base of the mounting piers, which is open and free.[552] Exact fencing locations are not provided in the DEIS but, given safety and security concerns, it is unlikely that viaduct piers such as those in Figures D.6-33 and D.6-44 can remain unfenced because of their close proximity to the viaduct (an easy baseball throw) and the potential for vandalism. Figure D.6-33 and perhaps one more of the existing or additional renderings should show fencing. Finally, fencing degrades with time. Without regular trimming, it will become an eyesore with growth of invasive vines and weeds and trash (see the photos below), seriously detracting from the natural landscape for which the BW Parkway was built. Proper maintenance of fences and surrounding grounds is often reduced or eliminated when budgets become restricted.

    - It is disingenuous to use renderings in summer months when tree leaves partially provide camouflage. Deciduous trees are leafless approximately five months of the year. To be fair, worst-case impacts (winter months) should be shown throughout. (The burden of proof should be on the proposers.)[553, 554]

SCMaglev promotors provide aesthetically pleasing imagery of the elevated sections as seen from the BW Parkway.

View from BW Parkway onto Powder Mill Road.

DEIS artist image of an aesthetically pleasing viaduct.

[552] DEIS. Appendix D.6. Figure D.6-33: CAA #5. Page 6-41.

[553] Appendix – Reprint: Kowalski, M. "SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0." 2021. Pages 27-29.

[554] DEIS. Artist image of an aesthetically pleasing viaduct see: DEIS Appendix D.06. Figure D.06-33 t0 33. Page 4.19-14.

What follows are the "Real World" photos of the fenced in areas under the SCMaglev elevated section in Japan.

Reality - SCMagLev viaduct fencing in Japan - photo 1.

Reality - SCMagLev viaduct fencing in Japan - photo 2.

The BARC West Train Maintenance Facility Option was Added Without Public Notification

The West Train Maintenance Facility Option was added to the planned SCMaglev build options without public notification. The DEIS states the following reason for this unannounced addition: "Added a BARC West TMF; the large land area of BARC enables the standardized TMF size and configuration to be accommodated on a single parcel of land without the constraints of existing development, public, roadways, **waterways**, and other existing infrastructure."[555]

[MCRT Editor's Note: ". . . without the constraints of existing . . . **waterways** . . . Really?]

The applicant's WQC justification materials, as the DEIS, again is misleading and missing important information:

- Why was the public not notified of the change prior to the release of the DEIS?
- While the location may not have the "constraints of existing development, public, roadways, **waterways**, and other existing infrastructure," nothing is said about the impacts to BARC, the ongoing research, and so forth. Why are the actual destruction and disruptions to the surrounding areas not included?

Viaduct Rights-of-Way Broadened Without Public Notification

Again, without public notification, the ROW for the viaduct were broadened by another 20 feet and a permanent road was added in that new right of way for permanent access to the trainline.[556]

The applicant's WQC justification materials, as the DEIS, again is misleading and missing important information:

- Why was the public not notified of the change prior to the release of the DEIS?

[555] DEIS. Appendix C. Page C-28.
[556] *Ibid*. Page C-29.

No Impact Study of Electrical Transmission Line Changes
The DEIS mentions that the BWRR is planning to move transmission lines below ground or increase elevation where they cross the trainline, but there is no information on the impacts of these actions.[557]

The applicant's WQC justification materials, as the DEIS, again is misleading and missing important information:

- Why is this impact study not in the DEIS?
- When will it be made available for public review and comment?

XXVII. Tunnel Boring Machine Launch/Retrieval Sites

The applicant's WQC justification materials, as the DEIS, fails to describe the full impact to the sites chosen for FA/EE construction that also will be used as Tunnel Boring Machine (TBM) launch retrieval sites. In Section 4.4.5.1, the DEIS states that examples of design minimization techniques are consolidating temporary TBM launch sites, storage, and staging areas with permanent FA/EE facilities or substations.[558] Yet, what the DEIS describes as a design minimization technique constitutes added and disproportionate impacts to those who reside in the EJ neighborhoods and roads impacted by tunnel construction.

The BWRR documentation should clearly identify, separate from the discussion of the FA/EEs, a written narrative of the nature of the TBM launch/retrieval sites, listing the specific sites that are to be used as TBM Launch Sites. It is presumed that these sites' locations and sizes include:

- New York Avenue NW at Montana Avenue NW, Washington, D.C.: 3 acres
- Kenilworth Avenue near Lloyd Street, Hyattsville, MD: 3 acres
- Riverdale Road near Auburn Avenue, Riverdale, MD: 3 acres
- North of Connector Road, Fort Meade, MD: 3 acres
- Railroad Avenue at MD 176, Harmans, MD: 7 acres
- Harman's Road at MD 100, Hanover, MD (new site): 3 acres
- Mathison Way, BWI Marshall Airport, MD (new site): 3 acres
- MD 170 at South Camp Meade Driver, BWI Marshall Airport, MD: 3 acres
- I-895 near Annapolis Road, Halethorpe, MD: 6 acres (from DEIS, Section 3.3.2)559

Nowhere is it confirmed in a written narrative that all these sites also will be used for TBM launch/retrieval. The additional amount of acreage required at each site for tunnel boring launch/retrieval is not listed, nor is the total acreage required for the combined functions.

[557] DEIS. Appendix C. Section C.3.8. Page C-36.
[558] DEIS. Chapter 4.04. Section 4.4.5.1. Page 4.4.20.
[559] DEIS. Chapter 3. Section 3.3.2.5. Page 3-32.

Request:

- Before considering any decision by the MDE to approve WQCs, or for the FRA to allow the SCMaglev Project to move forward, the FRA needs to provide a fully detailed listing and explanation of any, and all construction activity for all FA/EE sites, and identify the sites that will include any TBM activity. The MDE, as well as the public, needs to know the impacts to Tier II waters, the environment, and EJ Communities.

  This information needs to be provided to the public with sufficient time to review and provide comments. This includes the MDE required documentation of BWRR as identified in the MDE letter of September 8, 2023, and due to MDE at the close of the public comment period, November 16, 2023.

- Before considering any decision to move the SCMaglev project forward, the MDE needs to know, and the FRA must provide a fully-detailed listing and explanation of all construction activity for all FA/EE sites, and identify the sites that will include any TBM activity.

  This information needs to be provided to the public with sufficient time to review and provide comments.

Lert's look at one example - A TBM launch retrieval site is planned for the Martin's Woods neighborhood in Lanham, MD. The BWRR documentation does not adequately describe the extreme stress to which this neighborhood, as well as the other neighborhoods, will be exposed during construction that will last at least one to five (or more) years. The stress will result from the following:

- 24-hour onslaught of noise and vibration from drilling.
- Transport of truckloads of dirt and muck continuously throughout the neighborhoods.
- Transport of truckloads of cement continuously throughout the neighborhoods.
- Damage to home interiors, especially drywall cracks (interior walls and ceilings,) developing from the constant movement of heavy vehicles such as dump trucks and concrete trucks running throughout the neighborhoods.
- Environmental impact from runoff into tributaries.
- Dirt and dust kicked up and thrown into the air.
- Impacts to the area from the industrial layout of the type of facility necessary to accommodate a drill of up to 50 feet in diameter and all related construction equipment.

The applicant's WQC justification materials, as the DEIS, is deficient because it does not address the following questions:

- Is TNEM liable for the interior damage to homes as a result of this continuous running of heavy trucks and the related vibration to homes and businesses?
- Neighborhood roads are not designed for the continuous heavy vehicle traffic the SCMaglev construction would bring. Is TNEM liable to repair/replace damaged roads, or are we the taxpayers stuck with cleaning up the mess?
- What are the potential health risks to nearby residents exposed to the additional airborne dust and dirt?

- What are the potential health impacts on residents exposed to 24-hour-a-day, seven-days-a-week noise and vibration?
- What is the anticipated polluted runoff into the local streams and waterways? What process will be used to mitigate these impacts? How effective are these mitigation processes?

The applicant's WQC justification materials, as the DEIS, also does not discuss reclamation and rehabilitation of land beyond what is necessary to support the FA/EEs once construction is complete. This would be 10 to 12 acres for the TBM launch/retrieval site versus approximately three acres once construction is complete.

Request:

- The supplementary applicant mitigation plans required of BWRR by MDE, in full detail, should describe what will be done to recover and restore the acreage destroyed with the TBM sites before and during tunnel boring, and what will have to be done to return it to normal use on construction completion. This information then needs to be shared with the public, and the public given sufficient time for review and comment before any consideration on a decision to move the SCMaglev project forward.

Some of the impacts mentioned in the applicant's WQC justification materials should be described in further detail along with meaningful mitigation efforts to minimize these impacts on the communities. The DEIS states that "at the height of construction activity there will be 560 to 690 daily truck departures/arrivals at this work site, which will be active 24 hours per day. In addition, there will an estimated 425 autos carrying workers arriving and departing over the 24-hour period."[560] The DEIS states the construction will also contribute diesel emissions from the temporary standby generation facilities powering the tunnel boring machines, which the DEIS contends will use 4.9 trillion MMBtus of energy.[561,562]

The applicant's WQC justification materials, as the DEIS, is deficient because:

- It does not provide the required analysis of how this amount of additional traffic will affect local traffic or tie up major roadways such as Riverdale Road, Kenilworth Avenue/Route 201, or Veterans Highway.
- It does not discuss meaningful mitigation efforts that might include modification of 24 hours-a-day, seven days a week operations or curtailment of construction traffic during rush hours.
- It does not discuss the concentrated number of apartment complexes within the affected section of Martin's Woods. There are at least three major complexes in the immediate vicinity of this construction with several more east and west of the TBM launch and retrieval site along Riverdale Road. These apartment complexes contribute to traffic along that road; their residents also will be severely impacted by the massive increase in traffic due to construction.

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[560] DEIS. Appendix D.02. Section D.2A.15.2. Page A-65.

[561] DEIS. Chapter 4.19. Section 4.19.3.3. Page 4.19-14.

[562] Appendix - Reprint: Beacon Heights Civic Association; Woodlawn Community Association. "Comments on Baltimore-Washington Superconducting MAGLEV Project Draft Environmental Impact Statement and Draft Section 4(f) Evaluation (EIS No. 20210010)." April 23, 2021. Page 6. https://aa247ef8-bd4a-4dd2-890c-8b5ebdf396e2.filesusr.com/ugd/6d0640_dac97370e48c47778f9103f9382e31eb.pdf.

These neighborhoods also will be exposed to "deep boring, pile driving, and possibly blasting."[563] This type of continuous construction activity will cause increased vibrations in the area and possible structural impacts.

Because the applicant's WQC justification materials, as the DEIS, fails to discuss in necessary details the severe conditions EJ and other communities will experience with tunnel boring and construction, the full impacts should be described in a supplementary DEIS, so that the impacted communities and the community at large have a chance to comment and modify these plans. A conceptual layout illustration similar to the one included for the TMF in Figure 3.4-5, page 3-21 should be provided for each TBM launch and retrieval site, as well as conceptual illustrations and photos that show the full extent of the planned TBM launch retrieval area along with the access roads. In other words, the TBM launch and retrieval sites should be documented in the same manner as the TMF with the following:

- total acreage requirements.
- total amount of impervious surfaces created at each site.
- amount of natural clearance.
- nature of run-off and effects on surrounding environment.
- mitigation efforts necessary for muck and soil handling procedures.
- disposal arrangements of muck and other potential hazards to the immediate community.[564]

Two of the planned sites are located close to rivers, Kenilworth Hyattsville on the Anacostia River and I-895 near Annapolis Road, Halethorpe on the Patuxent River.

Request:

- The BWRR needs to provide a description of the effects on the Anacostia and Patuxent Rivers from constant runoff and tunneling over a three-year or more period, and any mitigation plans.

This information then needs to be shared with the MDE and the public and given sufficient time for public review and comment before any consideration on a decision to move the SCMaglev project forward.

Finally, this type of facility seems entirely inappropriate for the almost exclusively residential setting of Martin's Woods and other primarily residential settings. Serious consideration should be given to finding more suitable locations.

The full environmental and community impact to the TBM Launch Retrieval Sites should be documented in a supplementary DEIS so those communities and public officials can comment and respond to the entire scope of impacts the combined functions these sites will present to the surrounding environment and the community.

[563] DEIS. App-D.10. Section D.10.4.3.2. Page 10.4-23.
[564] DEIS. Chapter 3. Section 3.3.2.2. Figure 3.4-5. Page 3-21.

XXVIII. Soil from Tunneling and Soil Hauling

The DEIS states that, overall, 75 percent of the alignments are underground, and the tunnel will be approximately 50 feet in diameter.[565,566] Tunneling will begin at a point north of Greenbelt and go south to Washington, D.C., as well as at a point south of Linthicum/BWI Airport, going north to Baltimore. Assuming a wall thickness of 18 inches, the amount of soil removed would be approximately 11,000,000 cubic yards. For an average dump truck capacity between 10 to 14 cubic yards per load, 790,000 to 1.1 million dump truck trips, respectively, will be required.

Requests:

- As part of a supplemental DEIS, the MTA and BWRR must provide a thorough, unredacted cost and engineering analyses of how to run both current route alternatives entirely in tunnels versus, as currently, using above-ground guideways. These analyses must be at a level of detail appropriate to this phase of the DEIS, subject to FRA guidance, to inform communities and residents mere feet outside the above-ground LODs (such as in South Laurel) what will be the full cost and impact on their communities, homes, businesses, and environment.

- A detailed list of all sites approved or awaiting approval or recommended in name as a disposal site for any soils, spoils, muck, dirt, or sediments of any kind that have been excavated must be provided.

- As part of the supplemental DEIS, the MTA and BWRR provide a thorough cost and engineering analysis of how to avoid or processes to be employed to treat and neutralize all pollution from tunneling and other removed dirt and soil before disposal.

This information then needs to be shared with the public and given sufficient time for public review and comment before any consideration on a decision to move the SCMaglev project forward.

XXIX. Haul Routes

Haul Routes are needed to remove soil and other debris and for materials and move in precast structures (as much as 10.5 ft in width) to staging areas (e.g., Konterra), to worksites, and laydown areas. The haul routes are discussed qualitatively in Section D.2A.15567 and mapped in Figures 17-19 and Tables 13-15 in Appendix G.7.568

They show that both Greater Laurel and Greater Greenbelt will be flooded with several hundred trucks daily traversing all or portions of every major artery including MD193, MD197, MD198, MD201, and Route 1. Even smaller roads, some single lane each direction, will be pressed into service including Riverdale, Powder Mill, Contee, Muirkirk, Odell, Springfield, Soil Conservation, Beaver Dam, and Brock

[565] DEIS. Appendix G.13. Part L. Section 2.1. Page 3 (86 of 215).
[566] DEIS. Appendix G. Part K. Section 6.3. Page 17.
[567] DEIS. Appendix D.02. Sections D.2A.15.1 and D.2A.15.2. Pages A-62 to A.15-91.
[568] DEIS. Appendix G. Park K. Section 7.4. Pages 24 to 31.

Bridge. Some of these roads are inadequate in size and load bearing capability (e.g., Beaver Dam, and Brock Bridge) and will have to be upgraded.

In Appendix 11, the Alternatives Comparison Matrix (page 10), for the sponsor's preferred alternative (J3) would require 2.25 million truck trips[569], an unfathomable number. As most construction is complete by the end of year six, this would amount to 1,500 trucks per day, although during peak years (two to four) the daily rate might be much higher. Moreover, these trucks would not be spread out evenly along the alignment, but concentrated along haul routes, at laydown locations, and at work sites.

Traffic control maps in Appendix G.2 Part I (TCP 13 to TCP 41) show how traffic control restrictions will affect both NASA GSFC and NSA.[570] Road closures will require long detours. Depending on the selected alignment and location of the TMF, not all these roads will be used. However, most of the proposed haul routes are common to both alignment choices and any choice of the TMF. Several mitigation measures (e.g., truck lanes, truck turning lanes, retiming signaled intersections, traffic studies, dedicated contact number) are proposed, but there is a high likelihood that extensive backups will be created daily starting with the morning rush hour as workers arrive and, because of the truck traffic, would not dissipate during the day, thus extending to after the traditional evening rush hour. Note that many haul routes from staging to laydown areas have turns at narrow intersections, thus making the transportation process both difficult and slow.

In summary, the synergism produced by so much construction traffic (workers and trucks) will likely produce extensive gridlock in major parts of Greater Laurel, Greater Greenbelt, and Greater Hyattsville and Riverdale, thus drastically reducing quality of life for many of their combined 172,080 residents and lasting at least 34 months.

Requests:

- A detailed impact survey and plan must be provided, that details the disruption caused by roadway improvements to accommodate both the physical load (weight) and the increased traffic.
- A part of a supplemental DEIS, the MTA and BWRR must provide a thorough cost and engineering analysis of how to avoid all such pollution from fill dirt and soil removal, and a milestone chart/project schedule for formulating a tunnel soil disposal plan.

This information then needs to be shared with the public and given sufficient time for public review and comment before any consideration on a decision to move the SCMaglev project forward.

XXX. Tunnel Evacuation

Question:

- Does the SCMaglev tunnel evacuation design meet federal standards, as well as applicable local standards?

[569] DEIS. Appendix G. Section 7.4. Page 10.
[570] DEIS. Appendix G. Part D.2. Drawing 1.

The SCMaglev has a similar evacuation design to that of the previously proposed Hyperloop. FA/EEs are three to four miles apart. The Gotthard Base Tunnel (longest rail tunnel in the world) has escape passageways spaced about every 1,000 feet. The Hyperloop call for access and passages no farther than 10,500 feet between emergency exits. SCMaglev emergency access and exits would be between 3.1 to 3.7 miles apart.[571]

The facilities for passengers to escape during an emergency, whether from a breakdown, fire, flooding, or terrorism, leave much to be desired. There will be riders ranging from newborns to senior citizens and individuals with disabilities on the SCMaglev train; therefore, what BWRR is proposing would not pass muster.

Should a fire break out at the worst possible place, passengers could face upward of a two-mile walk, if the SCMaglev is half-way between two FA/EEs exits and then up several stories to reach surface and the ventilation shaft exit. The worst-case scenario could occur if an accident or some other event blocked the tunnel right after passing an exit, preventing people from reversing course to the closer exit. This would result in up to a four-mile walk. A power failure or other catastrophic incidents could also render the elevator useless.

To comply with NFPA standards for rail tunnels, the SCMaglev would need at least 74 exits in each tunnel between Baltimore and D.C. Even this standard of 1,000 feet between exits is weak. Smoke from fire in an enclosed, below-grade area has a high propensity to kill people and create numerous problems for anyone trying to exit and emergency personnel trying to enter and assist. When passengers eventually reach the ventilation shafts, their challenges may not be over. The tunnel floor will be 44 to 104 feet (or more) below the surface. One or more means of vertical access (e.g., elevator, man basket, stairs, or ladder) would be needed for ingress and egress.

At the top of each shaft will be either a shed housing ventilation equipment or a flat steel grate. This will not work for a 70-year-old person who has just traveled thousands of feet and then has to climb a ladder to exit.

Such long and inconvenient escape routes would also hamper incoming firefighters, who typically have only a 30-minute supply of air, at most, for their breathing apparatus. According to Edenbaum, “ingress becomes a concern with very long tunnels . . .” a tunnel fire and ventilation engineering consultant based in Toronto, Canada. “Long tunnels are rare in the United States, a country that has more experience with fires in tall buildings than deep underground. All of our research in terms of stairwells has been done with downward motion. What’s not been well studied are situations where people might have to walk a significant amount.”[572]

[571] DEIS. Chapter 3. Section 3.1.2. Page 3-4.

[572] Edembaum, Justin. Found in “Review of Elon Musk’s DC-to-Baltimore ‘Loop’ system reveals safety concerns - From insufficient emergency exits to problematic escape ladders.” https://techcrunch.com/2019/05/22/review-of-elon-musks-dc-to-baltimore-loop-system-reveals-safety-concerns/. Also see NFPA 101®: Life Safety Code®. National Fire Protection Association. www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=101.

XXXI. Other Tunnel Issues

There are numerous properties along the proposed routes that rely on well and septic system or have a geothermal system installed.

The applicant's WQC justification materials, as the DEIS, are deficient in that it does not provide the information for the following question:

- How are these properties being identified, and the owners notified?
- What are the proposed mitigation measures for each property?
- If damage to the well or the water flow occurs with the building and operation of the SCMaglev, what level of compensation will TNEM provide to the affected homes and businesses?

This information then needs to be shared with the public and given sufficient time for public review and comment before any consideration on a decision to move the SCMaglev project forward.

Ground water removal (pumping) entering the tunnels is a concern in terms of contaminants in the water being pumped into the environment.

The BWRR documentation is deficient in that it does not provide the information for the following questions:

- What type of water removal systems will be implemented in the tunnels?
- Where will water that infiltrates the tunnel going to be disposed of?
- What decontamination systems and processes will the BWRR build into this system?
- How effective are these systems and processes in removing containments?
- How will the extracted containments be treated to neutralize the containments identified?
- Where and how will the resulting decontaminated materials be disposed of?

XXXII. Viaduct Issues and Impact

There are numerous residential properties along the proposed route Alternatives which will be impacted by extremely close proximity to the proposed SCMaglev Limit of Disturbance (LOD) in the DEIS, and in 4(f) and DEIS maps cited below. The following comments address representative impacts from the J1 (west) viaduct along the northern extent of Alternate J1 (west). But the already once-extended DEIS review period still did not allow time for a more complete analysis of the J1 and J viaducts' impact on communities end-to-end by residential volunteers.

To obtain a true evaluation of the effect building and operating the SCMaglev will have on residential and business property values, the calculations must include:

- **MOW, Tunnel Portals, FA/EE facilities**.
  - **Risk Analysis Radius for Tunnel Portions.** With a radius of one-quarter mile is appropriate to tunnel portions since the primary risk to residents is the effect of vibration on building foundations and basements, manifesting in cracks, shifting, and settling, as well as storm and groundwater leakage and the resulting deterioration of the foundation and basement wall structures.

○ **Risk Analysis Radius for Viaduct Portions:** Along the viaduct that radius should be increased, as suburban residential areas have less density and generally larger properties. Real estate agents use radii up to 1 to 3 miles in calculating residential property value "comparables"; a radius of 1.5 miles is a fair compromise. It is well known that properties near train rails are not as highly valued: ". . . not every study of transit and property values has found a positive correlation. For example, a 1995 study by John Landis found that values for single family homes within 900 feet of light rail stations in Santa Clara County was 10.8 percent lower than comparable homes located farther from light rail stations. The same study found that there was no value premium for office and retail property located within one-half mile of BART stations in the East Bay."[573]

Building and operating the SCMaglev will generate noise, vibration, and visual impacts. The DEIS includes a long list for both J and J-1 alignments of community regions in Prince George's and Anne Arundel Counties with adverse aesthetic impacts, many evaluated as H (High) to M (Moderate). [574] These will change the nature and feel of whole communities, from suburban to urban/industrial, with a consequential and permanent negative impact on property values.

Many of the impacts are permanent and will be more than "moderate." The codes for the table and the types of impact dealt to these communities will be:

- PA = Property Acquisition
- D = Displacement
- N = Noise
- V = Vibration
- VQ = Aesthetics/Visual Quality
- AM = Access and Mobility
- CC = Community Cohesion[575]

While only a relatively small number of residents may be displaced, it is ironic that those who remain will be the unlucky ones because of their proximity to the SCMaglev. Along the viaduct, a radius of 1.5 miles will capture losses in entire communities, including Greenbelt, Greenbriar, Applewalk, Laurelwood, Pheasant Run, Montpelier Woods, Montpelier Hills, Montpelier, Snowhill Estates, Briarwood, Maryland City, and Russett. Results from all added regions (MOWs, portals, FA/EE, tunnel and viaduct) should be included in Tables D.4-51 and D.4-52 (Appendix D.04, Section D.4D.2.5.1, pages D-64 to D-65) and in the discussion. Moreover, results in those tables should be separated into business and residential losses. This will give a complete, accurate, and fair picture of all tax revenue and property value changes.[576]

[573] Landis, J. et al. "Rail Transit Investments, Real Estate Values, and Land Use Change: A Comparative Analysis of Five California Rail Systems." Institute of Urban and Regional Development. UC Berkeley. 1995. https://escholarship.org/uc/item/4hh7f652.
[574] DEIS. Chapter 4.04, Table 4.4-1. Pages 4.4-5 to 4.4-7.
[575] *Ibid*. Page 4.4-7
[576] Appendix – Reprint: Kowalski, M. "SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0." 2021. Pages 14-15.

Request:

- Rework the impacts on residential and commercial structures and communities to break out the potential losses for residences from businesses, to provide better insight in tot the full impact cost of build and operating the SCMaglev.

This information then needs to be shared with the public and given sufficient time for public review and comment before any consideration on a decision to move the SCMaglev project forward.

Property Value Loss

Property value losses are unusual in that they are incurred as early as the date that the SCMaglev is approved, as realtors are obligated to inform potential buyers of potential adverse impacts. This certainly applies to the SCMaglev in Anne Arundel and Prince George's Counties, given both the SCMaglev's short- and long-term impacts. However, losses are not accrued until the owner sells the house. It is even possible that losses could put some property mortgages "underwater." Indeed, adverse traffic consequences during the construction phases will be apparent to buyers; many will not care to wait years until construction ends and will buy elsewhere, the losses to the seller then becoming obvious.

Owners who then reluctantly decide to sell, that is "to get out" while they can, at a loss, will also pay an additional penalty (as do renters) for moving expenses, as well as the challenges of uprooting a family and finding suitable housing that fits their job (commute) and personal situation.

Owners who wait longer hoping for property values to recover might not be rewarded because the nature and feel of the community has changed irretrievably. Of course, owners also pay less in property tax, but simple calculations reveal that this offset comes nowhere near compensating for the loss in home value, even after decades. Sadly, long-term owners may not even realize they have suffered a loss in property value unless they have carefully tracked home value and tax assessments year by year.

In summary, residential homeowners along the entire length of either SCMaglev alignment will likely suffer a real monetary loss from SCMaglev proximity. To be fair, these losses should be calculated and booked against claimed benefits. Just as important, these losses are not shared evenly in their county (or city) but suffered only by those who had the great misfortune to have bought a home without foresight that its location would one day be near or above the SCMaglev.[577]

The applicant's WQC justification materials, as the DEIS, mentions potential increases in property values near stations but fails to discuss potential decreases in property values from noise, vibration, and adverse visual impacts. First, as the SCMaglev passes, it vibrates structures next to the viaducts. This shaking was felt, experienced, and reported in Rector's article.[578] Second, besides vibration of an amplitude that shakes local homes, the SCMaglev also is emitting EMF radiation from the guideways as it passes. Further, at any time there is the possibility of the SCMaglev system releasing toxins,

[577] *Id*.
[578] Appendix – Reprint: Rector, Kevin. "'It can be done': Futuristic Japanese maglev train could revolutionize travel from DC to Baltimore, and beyond." *The Baltimore Sun*. October 27, 2018. www.baltimoresun.com/maryland/bs-md-japan-maglev-20180531-htmlstory.html.

known cancer causing compounds, and radon gas from the FA/EEs (ventilation systems) into the atmosphere and exposing people and wildlife to the emissions. These conditions compromise the quality of life for residents.

The environmental impacts discussed in this submission will further devalue property. All to build a "shiny" train system that only the wealthier among us can afford to ride. The irony is that the very owners who will see their properties devalued and potentially suffer negative health effects will likely not use the SCMaglev.

The SCMaglev tunneling in Linthicum under Camp Meade Road in Anne Arundel County could have detrimental effects on the historic Holy Cross Church, the Veterans Memorial, and the historic houses along Camp Meade Road. Many of the homes under which the tunnel will be bored were built starting in 1900 and into the 1920s, a few later into the 1950s. The foundations of these homes would originally be poured concrete, with the walls made from cinder block. Between the boring and tunnel construction process, and then with the operation of the SCMaglev, the cumulative effect of the vibrations will likely crack these 100-year-old structures and those built later, as well as topographically lower structures (therefore situating them closer to the top of the tunnel) such as the Veterans Memorial and the historic church.

As Amtrak is an already existing high-speed rail system and is being updated as of the writing of these comments, there is no viable research to justify bringing in a commercially unproven, high-speed ground and underground-based transportation system and risking the structural integrity of these homes and businesses. The better alternatives to the SCMaglev are discussed in Better Alternatives section of this submission.

Tunnel Easement Under Property – Negotiation versus Eminent Domain

If the No Build option is not selected, one of the two routes (J or J1) that fall on either side of the BW Parkway would be selected. Property owners in the state of Maryland own their property to the core, meaning to the core of the earth. If the BWRR train tunnel passes underneath the owner's property and the ROW for the tunnel intersects any of the property lines, the BWRR or a company working for them will contact the property owner for the purpose of establishing an easement to tunnel, either by negotiation or by "taking."

The 2018 *Final Alternatives Report* provides some idea of the number of homes within the LOD, stating: [579]

Alternative J1 (West)

- Number of residential property parcels in the LOD tunnel: 1,204
- Number of residential property parcels in the LOD surface: 12
- Number of commercial property parcels in the LOD tunnel: 101

[579] SCMagLev Final Alternatives Report." November 2018. www.bwmaglev.info/images/document_library/reports/alternatives_report/SCMAGLEV_Alts_Report_Append_D-E-F-G_Nov2018.pdf.

- Number of residential property parcels in the LOD surface: 21

Alternative J (East)

- Number of residential property parcels in the LOD tunnel: 1,117
- Number of residential property parcels in the LOD surface: 5
- Number of commercial property parcels in the LOD tunnel: 78
- Number of residential property parcels in the LOD surface: 20

When asked, the BWRR states they will not use eminent domain, but rather "negotiate" with property owners.[580] However, that is not a complete answer. The unaddressed other option is that the BWRR, being granted the Washington Baltimore & Annapolis (WB&A) franchise, [581] can exercise the power of eminent domain, as stated in the documents from the railroad franchise hearing, testimony, and orders conducted by the Maryland Public Service Commission (PSC) in 2015.[582] While BWRR stated they will not use this power on residential areas, as noted before BWRR is currently attempting to make use of eminent domain in the EJ community of Westport.

The owner will be told that the intended tunnel intersects and crosses some portion of their property. Then, the owner will be asked for an easement that would allow the tunnel to be built underneath the owner's property. If agreed to, the owner would probably receive a nominal one-time payment for granting the easement to TNEM/BWRR to tunnel underneath the property. Paperwork would also have to be completed to that effect and would become a part of the property record along with filing the easement paperwork with the state of Maryland, the county and city where the owner resides, and the holder of the mortgage if the home is not paid off. The easement would then convey with any sale of the property. It would become a permanent fixture to the property.[583]

If the homeowner refuses to grant the easement, the BWRR, using the eminent domain authority conveyed with the WB&A franchise, can exercise eminent domain to take that portion of the property needed for the tunnel or take all of the property. The homeowner would be paid what would be considered fair market value and would have to vacate the property in the event all the property was taken. And as discussed, what was the 'Fair Market Value' of the property prior to the SCMaglev was likely to be greater than the value post SCMaglev.

When the BWRR says they will not take any "homes," they mean they will not have to take any structures *if people agree to the easement*. The property owners are left with two very unappealing choices: (1) comply or (2) lose their property. Allowing the BWRR to exercise eminent domain also establishes the acquisition of the property to be used in conflict and direct competition with existing local transportation services.

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[580] Appendix – Articles. Reprint: Giese, James. "Maglev Group May Prefer the Greenbelt Alignment. "December 28, 2017. Greenbelt News Review.
[581] Washington, Baltimore and Annapolis Electric Railway.
[582] Maryland Public Service Commission. Case No: 9363. "In The Matter of the Application of Baltimore Washington Rapid Rail, LLC for Transfer of Abandoned Railroad Franchise." CSNDirectJune19PubVers.pdf. Page 6.
[583] Maryland Code, Real Property § 4-105. Retrieved April 28, 2021. https://codes.findlaw.com/md/real-property/md-code-real-prop-sect-4-105.html.

Among the many questions contained in this submission, the FRA should answer the following:

- Why should our government allow eminent domain power to be used for a private project that will undermine an existing public investment in Amtrak?

Example of Impacts Compiled by the Montpelier Hills Homeowners Association and Recreation Association

The impacts described here are by example in Montpelier Hills Homeowners Association (MHHA) and Recreation Association (MHRA), 501(c)3, zip code 20708. MHHA consists of 365 32-year-old town homes and 211 final phase townhouse lots to be built (M-NCPPC Specific Design Plan SDP-0510) approved in 2006 by Maryland-National Capital Park and Planning Commission - Prince George's County Planning Board. The eastern boundaries of the MHHA, including homes and common grounds owned by MHHA/MHRA, run very close, within a few yards along the west boundary of the BW Parkway, with which the proposed SCMaglev viaduct alternative J1 (west) is in conflict. MHHA/MHRA are served by U.S. Congressional District 5 and District 4; Maryland Assembly District 23; Prince George's County Council District 1, and Prince George's County Police District VI.

- After our review of the SCMaglev DEIS and 4(f) we (MCRT/CATS) support the "No Build" alternative and have serious concerns about the impacts to homeowners of the J1 (west) and J (east) "Build" alternatives. The proposed J1 (west) viaduct and J (east) viaducts both are totally unacceptable, and J1 (west) and J (east) tunneling would be only slightly less onerous than a viaduct, for reasons of construction, operations, potential failure, and eventual decommissioning of the SCMaglev.

Section 4(f) 4.4-12 (below) lists residential properties that would experience acquisition. The DEIS states "The viaduct would require the removal of a forested buffer between these communities and the BWP and would present a stark change from current views. The viaduct would be as close as 65-feet to residences and would impact residents due to increased noise, vibration, and changes to aesthetics. For Build Alternatives J1-02, J1-03, J1-05, and J1-06, the LOD extends into residential property on Elmshorm Way, Frensham Court, and Ivory Fashion Court and would eliminate parking; alter access to residences from Hermosa Drive and Muirkirk Road; and eliminate open space and picnic tables. Residents in these areas would experience property acquisition, changes to access, and impacts to community cohesion. The Villages at Montpelier Apartments and Evergreens at Laurel Apartments east of the BWP would also experience impacts due to increased noise."[584] Yet, the companies wanting to build the SCMaglev continue to say that property takings are not required, as they did in April 2021 in a letter to the Anne Arundel County Council: ". . . all SCMAGLEV Build alternatives under review will require ***zero residential displacements***."[585]

While many impacted residential homeowners may escape forced "displacement," per se, many will be forced to consider "**self-displacement**," because, according to the SCMaglev DEIS, they will find themselves within mere feet of the SCMaglev Limit of Disturbance (LOD), just beyond even the relief of eminent domain.

[584] DEIS. Chapter 4.04. Section 4.4.4.2. Page 4.4-12.

[585] Appendix – Letter Reprint: Rogers, Wayne. "BWRR Letter to Anne Arundel County Council." April 16, 2021.

If your home is 65 feet from a viaduct (see below) but outside the LOD, it is cold comfort to be told in the DEIS Executive Summary that: "Build Alternatives J-01 to J-06 [east] include 25 percent viaduct and 75 percent tunnel, whereas Build Alternatives J1-01 to J1-06 [west] include 14 percent viaduct and 86 percent tunnel."[586] And similarly for residents along the extent of J1 (west) and J (east). The roughly 60-foot-high J1 concrete viaduct would loom permanently over even three-story townhomes. When SCMaglev trains do come, the passengers will be able to glimpse through windows, onto decks, and down into backyards; an unquantifiable loss of privacy and quality-of-life expected to significantly reduce home market values. Homeowners who invested in their now-impacted homes decades ago will now be living under the shadow of a SCMaglev viaduct, akin to the elevated "L-train" tracks in Chicago.

We are also concerned that SCMaglev trains on viaduct through communities like Montpelier Hills will not only induce vibrations directly into our proximate home foundations and underlying soil (at the same ground level, not in deep tunnels), but also sympathetically reverberate with vibration-sensitive, wood-frame, dry-wall-finished town homes, windows, and walls and increase potentially persistent noise risk of sensitive car alarms and home security sensors triggering with each passing SCMaglev train. Proposed noise/sound mitigations seem to be prospective in the nearer field proximity between homes like in Montpelier Hills, and viaducts, along J1 (west), and by extension J (east).

The SCMaglev *Final Alternatives Report* states: "BWRR did not develop a fully tunneled alternative concept as the alignments were refined to minimize environmental impacts to the extent practicable. The additional billions of cost from tunneling to go beyond minimization of impact to complete avoidance of impact along the BW Parkway is a substantial amount of capital expenditure that would severely jeopardize the financial viability of the project. In addition, some extent of above-ground operation is needed to demonstrate the feasibility of Maglev technology to the public [*emphasis added*], other than riders, consistent with the Maglev Deployment Program as authorized in TEA-21 [Transportation Equity Act] and to provide riders the experience of above-ground travel. With the BWP already being in transportation use, the section along the BWP is the logical location to provide the above-ground demonstration of Maglev (above ground running in any other section of J or J1 would result in substantial residential or business impacts). In addition to being not prudent or feasible, placing the entire project in tunnel would be unreasonable. The Section 4(f) Evaluation of the recent Baltimore & Potomac (B&P) Tunnel Project in Baltimore, that was extensively in tunnel, concluded it was not prudent or feasible to avoid the use of nine Section 4(f) properties. The DEIS will expand further on the Section 4(f) analysis for this SCMAGLEV project, including a full tunnel option for comparison."[587]

Not unreasonably, we are not convinced by the above rationale for not providing a full tunnel option in Section 4(f) of the DEIS.

[586] DEIS. Section 4(f). Page ES-13.
[587] BWRR. Final Alternatives Report. Section D. November 2018. Page 63.

Request:
The SCMaglev DEIS and Section 4(f) must provide supplemental analysis of a fully-tunneled, end-to-end Alternate Route J1 (west) and J (east), with no viaducts, and with budget estimates for comparison with all other alternates.

If full end-to-end tunnel Alternatives J (east) and (J1 west) would have "billions of cost from tunneling" and "severely jeopardize" SCMaglev "financial viability," there would still not seem to be any systems engineering reason to not perform a supplemental full-tunnel, end-to-end analysis for equally thorough "comparison" with the other alternatives, including a further analysis of costs, to more fully inform the FEIS and the FRA ROD. Any full-tunnel alternative would only be approved by the FRA if it were in fact the best, most cost-effective alternative, rather than an undocumented prejudgment.

Further, per the BWRR (see above): "In addition, some extent of above-ground operation is needed to demonstrate the feasibility of Maglev technology to the public, other than riders, consistent with the Maglev Deployment Program as authorized in TEA-21 [Transportation Equity Act] and to provide riders the experience of above-ground travel."

The MCRT Review Team believes that being "consistent with **the Maglev Deployment Program as authorized in TEA-21" [Transportation Equity Act] is not an overarching mandate** for a problematic viaduct through communities like MHHA/MHRA, at the cost of hurtful impacts on homeowners and residents along the full length of Route J and Route J1, especially for underserved people in Transportation Equity Act designated areas who cannot even board the SCMaglev train in their own community or anywhere in Prince George's and Anne Arundel Counties (other than at the SCMaglev's BWI airport station).[588]

For each community, the categories below of multiple, overlapping impacts and concerns are within the fiduciary responsibility of impacted homeowners' associations (condominiums, etc.) for their member homeowners, during construction and operation, and ultimate decommissioning, or potential failure of SCMaglev.

Representative concerns, exemplified in Montpelier Hills (Community comments submitted separately):

- MHHA 576 fee-simple townhouse lots (just over 1,500 residents based on a 2.63 average persons per household in 2018:[589] MHHA enforces outward maintenance, noise, nuisance).
- MHHA common grounds: landscaping, parking, sidewalks, paths, equipment, amenities, tot lots.
- MHRA property and facilities (e.g., pavilions and tennis courts).
- Nearby non-Montpelier Hills properties and facilities, such as:
  - Proposed SCMaglev system elements: e.g., Support Facilities, Interconnection Switch Yard (power)
  - Montpelier Elementary School

[588] U.S. Department of Transportation (DOT). "TEA-21 The Transportation Equity Act for the 21st Century." May 29, 1998. Federal Highway Administration (FHWA). www.fhwa.dot.gov/tea21/summary.html. Retrieved May 5, 2021.
[589] Fry, Richard. "The number of people in the average U.S. household is going up for the first time in over 160 years." Pew Research Center - Factank News in Numbers. October 1, 2019. www.pewresearch.org/fact-tank/2019/10/01/the-number-of-people-in-the-average-u-s-household-is-going-up-for-the-first-time-in-over-160-years/.

- County roads' sole ingress and egress to Montpelier Hills
- Other entities and services in and near MHHA, such as:
  - Three Prince George's County stormwater management facilities are within MHHA.
  - Nearby Crystal Plaza shopping center

Viaduct Impact Examples in Montpelier Hills

- **12101 Ivory Fashion Court, Laurel, MD 20708**

Lat: 39.055738 Lng: -76.841045
Elevation: 215.59 feet Above Sea Level (from latlongdata.com/elevation).[590]
Note the newly-added, 20-foot wide "temporary" (7-years?)" construction phase access road touching residential property. All seven other residential properties in that town home row are also a mere few feet from that construction road and the LOD. Consider also the surrounding Home Owner Association (HOA)-owned common grounds here and elsewhere in Montpelier Hills, which is where the construction road and LOD would "transect."

On-site video interview of homeowner on Ivory Fashion Court, Montpelier Hills, MD 20708; (See: bit.ly/MagLevIvoryFashionVideo) shows properties to be impacted by J1 (west) viaduct.

Viaduct Impact Examples on Elmshorn Way

- **11414 Elmshorn Way, Laurel, MD 20708**

Lat: 39.047403 Lng: -76.845701
Elevation: 163.85 feet; from latlongdata.com/elevation[591]
All eight of the town homes on Elmshorn Way are similarly impacted by the new, SCMaglev "temporary" extended 20-foot-wide construction access road, subsuming common grounds up to the parking lot, taking away the HOA's amenities for residents, like the permanent community picnic table, which the SCMaglev LOD subsumes, leaving that table in the middle of the access road when the construction access road is eventually decommissioned. Then Elmshorn Way homeowners will be only 20 feet farther from the viaduct.

- On-site video interview of homeowner on Elmshorn Way, Montpelier Hills, MD 20708; (See: http://bit.ly/MagLevElmshornVideo) shows properties to be impacted by J1 (west) viaduct.

- On-site Video interview of homeowner on Frensham Court., Montpelier Hills, MD 20708; (See: http://bit.ly/MagLevFrenshamVideo) shows properties to be impacted by J1 (west) viaduct.

- On-site Video interview of homeowner on Oregold Court., Montpelier Hills, MD 20708; (See: http://bit.ly/MagLevOregoldVideo) shows properties to be impacted by J1 (west) viaduct.

Likewise on Sea Pearl Court and Blue Moon Court, in Montpelier Hills, MD 20708, along the J1 (west) viaduct at the BW Parkway's western boundary.

[590] DEIS. Appendix G. Part D. Page 30.
[591] DEIS. Appendix G. Part D. Page 29.

The SCMaglev seemingly could not have wedged its proposed J1 (west) viaduct into any narrower passage than between Montpelier Hills east boundary and the near-contiguous BW Parkway west boundary.

Given that the DEIS puts the J1 (west) viaduct so close to homes, as noted above, the MCRT Review Team are concerned that Section 4(f), page F-F-7, asserts: "SCMAGLEV trains levitate between the walls of a unique U-shaped concrete structure that guides the trains along the alignment, which has walls surrounding the trains on both sides, making the system free [sic] from derailment." We disagree that the viaduct is "free from derailment." See the MCRT's safety white papers found in the appendices of this submission.

Questions based on the lack of needed information in the applicant's WQC justification materials, and the DEIS, include:

I. Is there any "safe" distance from SCMaglev-sourced EMFs/EMR for homes with adults and children, and common grounds amenities (walkways, tot lots, etc.), mere feet beyond the LOD of the proposed viaducts?
II. On Alternative Routes J (east) and J1 (west) what are the safe distances? (See the MCRT/CATS DEIS Comments Section in this submission concerning Community Impact.)
III. Can cellphones or other electronic devices be reliably operated on SCMaglev; that is, will there be WiFi in deep underground tunnels, on viaducts, and at grade?
IV. Will cellphone use be prohibited in any circumstance? Cellphone use is obviously imperative for riders and may affect ridership.
V. Are these forms of communication not viable because of the EMF field needed to levitate and propel the SCMaglev? If so, what is the affected range of SCMaglev EMF interference to communications and transmissions?
VI. This information then needs to be shared with the public and given sufficient time for public review and comment before any consideration on a decision to move the SCMaglev project forward.

MCRT abhors all 4(f) community impacts along the entire length of J1 (west) and J (east), as exemplified by these impacts in Montpelier Hills.

See: Section 4(f) 4.4-7 through 4.4-13, extracts below.

- The Build Alternatives could cause community disruption in the following areas due to adverse permanent impacts further described in this section: Elmshorn Way, Hermosa Drive, and Frensham Court in the Montpelier Hills community, as well as Ivory Fashion Court, Blue Moon Court, and Sea Pearl Court (Build Alternatives J1-01 thru J1-06).[592]

- Residences west of the BW Parkway on Elmshorn Way, Hermosa Drive, Fairlane Place, and Frensham Court in the Montpelier Hills community in South Laurel would experience impacts due to increased noise from train pass-by along the viaduct, as would residences on Ivory Fashion Court, Blue Moon Court, and Sea Pearl Court.[593]

[592] DEIS. Chapter 4.04. Section 4.4.4.2. Page 4.4-7.
[593] *Ibid*. Page 4.4-11.

- Residents along Frensham, Dortmund, and Vanfleet Courts would be within 500 feet of the buildings and would experience increased noise.[594]

- The viaduct and a system building would be located between the BW Parkway and the Crystal Plaza Shopping Center (north of the BW Parkway/MD 197 interchange). The Crystal Plaza Shopping Center includes multiple retail stores, restaurants, two gas stations, and a hotel. The systems building and viaduct would be as close as 100 feet to a hotel and shopping center stores. The Montpelier Post Office and the businesses within the shopping center would experience increased noise and changes in visual quality.[595]

XXXIII. BWRR Understates the Impact on Historic Sites and Cultural Resources

The introduction to Chapter 4.08 of the DEIS does not clearly state how the National Historic Preservation Act (NHPA) defines "historic properties."

- The first paragraph of the introduction provides the definition of "cultural resources" under NEPA; that is, "any prehistoric or historic structures, buildings, objects, sites, districts (a collection of related structures, building, objects, and/or sites), landscapes, natural features, traditional cultural properties (TCPs) and cemeteries."

- The second paragraph then states that "cultural resources that meet the National Register of Historic Places (NRHP) significance criteria qualify for consideration under the National Historic Preservation Act (NHPA) (54 U.S.C. § 300101 et seq.) and its implementing regulations (36 C.F.R. Part 800)."

- The third paragraph then states that "both cultural resources, as defined above, and historic properties, as defined by NHPA, are addressed in this section."[596]

However, it should be stated in the second paragraph that "cultural resources that meet the National Register of Historic Places (NRHP) significance criteria" are defined as "historic properties" under NHPA. This is important to understand how this chapter coordinates both NEPA and NHPA requirements.

Overall, the DEIS does not provide enough information to evaluate which of the build alternatives would have the least impact on cultural resources. Several problems have created this situation:

1. Ideally, the cultural resources component of an EIS is coordinated with NHPA Section 106 review such that the NHPA Section 106 review is completed prior to the agency's ROD.[597] As noted in DEIS Section 4.8.2.1 (Regulatory Context), the steps of Section 106 review are: (1) identifying and evaluating historic properties, (2) assessing effects to those properties, and (3) resolving any adverse

[594] *Ibid*. Page 4.4-12.
[595] *Ibid*. Page 4.4-13.
[596] DEIS. Chapter 4.08. Section 4.8.1. Page 4.8-1
[597] NEPA and NHPA. "A Handbook for Integrating NEPA and Section 106." www.achp.gov/digital-library-section-106-landing/nepa-and-nhpa-handbook-integrating-nepa-and-section-106.

effects. However, the cultural resources studies for this project have not even completed the identification and evaluation of historic properties prior to the preparation of the DEIS.

The DEIS states that further cultural resources studies will be accomplished after the ROD through a Programmatic Agreement (PA) that is being developed for this project. **This planned phasing of fieldwork forecloses the option of avoiding impacts to significant historic properties rather than mitigation.** The DEIS states that this phasing is authorized under the published regulations of the Advisory Council on Historic Preservation (ACHP) that guide federal agencies and other participants in the Section 106 process (36 CFR Part 800). Specifically, section 4.8.2.2 of the DEIS cites 36 CFR § 800.14(b) as allowing a PA "when the effects on historic properties cannot be fully determined before a Federal agency approves an undertaking."[598] However, the DEIS fails to explain how this specific project qualifies as a "complex undertaking" in which "the effects on historic properties cannot be fully determined before a Federal agency approves an undertaking." An explanation is needed.

Request:
We call on the FRA to provide the information to evaluate which of the build alternatives would have the least impact on cultural resources prior to any decision moving forward with building the SCMaglev.

2. Large portions of the project are excluded from cultural resources studies based on faulty assumptions. The areas covered by cultural resource studies are called the "affected environment" under NEPA and the "area of potential effect" (APE) under NHPA. This DEIS defined separate APEs for above-ground resources (such as historic structures, buildings, objects, districts, landscapes, natural features, TCPs, cemeteries, and local government-designated landmarks and historic districts) and archaeological resources (such as prehistoric or historic sites, TCPs, cemeteries, and local government-designated sites). There are issues with how each APE is delineated for this DEIS.

   A. Tunnel sections of the alignments are not included in either APE.
   i. The above-ground APE does not include the tunnel portions of the project because the DEIS (pages 4.8-4 to 4.8-5) asserts that "the potential for construction of the deep tunnel portions of the SCMAGLEV system to result in impacts on above-ground resources is low based on the extremely low probability of collapse of a deep tunnel to such an extent that the ground surface is breached, or that vibration or noise from the deep tunnel reaches the surface."[599] However, in Appendix D.10 (Section D.10.4.2.3 Ground-borne Vibration and Ground-borne Noise Effects) the FRA predicts vibration impacts up to 225 feet from tunnel guideways and ground-borne noise impacts up to 250 feet from tunnel guideways.[600] Chapter 4.13 of the DEIS (Topography and Geology) raises additional concerns that "groundwater pumping could result in topographic subsidence and ground compaction" (page 4.13-6) and the possibility that construction of the tunnels could result in micro-seismic activity (page 4.13-7).[601] The exclusion of the tunnel portions of the project from the above-ground APE needs to be reconsidered in light of the information cited here from Appendix D.10 and Chapter 4.13, because vibrations,

[598] DEIS. Chapter 4.08. Section 4.8.2.2. Pages 4.8-2 to 3.
[599] DEIS. Chapter 4.08. Section 4.8.4. Pages 4.8-4 - 5.
[600] DEIS. Appendix D.10. Section D.10.4.2.3. Page 10.4-20.
[601] DEIS. Chapter 4.13. Section 4.13.4. Pages 4.13-6 – 7.

subsidence, and/or micro-seismic activity could negatively impact historic properties. The tunnel portions of the project would run directly under numerous known historic properties, including (but not limited to):

a. Twin Oaks/Linthicum House (AA-113), a NRHP-eligible property in northern Anne Arundel County that is not discussed in the DEIS.
b. Linthicum Heights Historic District (AA-990), a NRHP-listed district in northern Anne Arundel County that is not discussed in the DEIS.
c. Martin's Woods (PG:72-68), a NRHP-eligible property in Prince George's County.
d. Cherry Hill Cemetery (PG:69-21), a potentially-NRHP-eligible property in Prince George's County that is not discussed in the DEIS.
e. Fort Lincoln Cemetery (PG:68-15), a NRHP-eligible property in Prince George's County that is not discussed in the DEIS.

Request:
All APEs, along the alignments that are subsurface and elevated must be identified and assessed to determine the potential and likely impacts building the SCMaglev would have on the structures. This information must be made available for public review and comment before any consideration is given to moving the building of the SCMaglev forward.

ii. The archaeological APE does not include the tunnel portions of the project because the DEIS (page 4.8-5) asserts that there is an "extremely low probability of collapse of a deep tunnel to such an extent that the ground surface is breached."[602] The exclusion of the tunnel portions of the project from the archaeological APE needs to be reconsidered in light of the information cited above from Appendix D.10 and Chapter 4.13, because vibrations, subsidence, and/or micro-seismic activity could negatively impact archaeological resources. There are undoubtedly known archaeological sites and many acres with medium/high sensitivity for archaeological resources above the tunnel portions of the project.

(a) The above-ground APE along the viaduct portions of the project in Maryland is delineated in the DEIS at 150 feet of the LOD. This narrow APE needs to be reconsidered to account for the visual impact of the proposed tall viaduct structures.

XXXIV. BWRR Fails to Identify Potentially Significant Cultural Resources

Lack of sufficient consultation with the public has resulted in the applicant's WQC justification materials, as with the DEIS, not identifying potentially significant cultural resources. Local community residents have knowledge of prehistoric and historic artifacts and features in the Greenbelt Forest Preserve, some of which appear to be within the proposed SCMaglev LOD. These potential historic properties are not listed on MHT's MEDUSA database, but consultation with these residents would have yielded this information. It is highly likely that residents in other communities along the proposed alignments have similar knowledge and information that has not been recorded on MHT's MEDUSA database.

[602] DEIS. Chapter 4.08. Section 4.8.2.3. Page 4.8-5.

XXXV. BWRR Fails to Identify Other Significant Cultural Resources

Lack of consultation with county offices has resulted in the DEIS not identifying significant cultural resources. The comments from the M-NCPPC discuss the historic properties not identified in the Phase IA archaeology report and the DEIS: the Hamilton Family Cemetery (PG:67-003-03c) and the Pleasant Grove Methodist Church Site and Cemetery (PG:64-016). Consultation with the M-NCPPC and other local jurisdictions is needed to obtain information on historic properties not yet listed on the Maryland Historical Trust's (MHT) Medusa database.[603]

The applicant's WQC justification materials, as the DEIS, is deficient as it does not identify and discuss the impacts to all significant cultural resources and historic properties. The FRA should not consider any decision to move forward with the building of the SCMaglev until these historic and cultural assets are fully identified, the impacts on building and operating the SCMaglev are assessed and reported, and the public is allowed sufficient time to review and make comments.

XXXVI. BWRR Fails to Provide Completed Maryland and Washington, D.C., State Historic Preservation Office Information

The applicant's WQC justification materials, as the DEIS, was issued for public review before the Maryland and Washington, D.C., State Historic Preservation Offices (SHPOs) had completed their reviews of the Phase IA archaeology reports. As a result, the DEIS relies on information that has not yet been validated by SHPO review.

MDE is premature in reviewing the applicant's WQC justification materials because the necessary information from the SHPOs is not included, which further reduces the information needed to identify, quantify, and assess the full extent of the negative impacts building and operating the SCMaglev will have on our communities and residents. This missing information, along with other missing information noted in this submission, makes the assessment of benefits versus costs increasingly difficult, artificially biasing the reviewer toward viewing them favorably because they are not openly informed of the full costs and impacts.

XXXVII. BWRR Lacks Clear and Accurate Description of Greenbelt National Historic Landmark

The applicant's WQC justification materials, as the DEIS, is deficient as it lacks a clear and accurate description of the Greenbelt Historic District National Historic Landmark (NHL). This leads the DEIS to

[603] Medusa. "Maryland Historical Trust's online database of architectural and archaeological sites and standing structures." https://mht.maryland.gov/secure/medusa/.

ignore impacts to defining features of the NHL. This must be corrected for the NHL to be appropriately considered in the alternative selection process.

The Greenbelt Historic District is the only NHL in the alignments under consideration. Most of the description of the Greenbelt Historic District NHL is in the Section 4 (f) evaluation in Appendix F, where it is split between discussion of the NHL (pages F-81 and F-82) and the Forest Preserve (pages F-36 to F-39).[604] Although Appendix F states that the Forest Preserve is part of the NHL, this division makes it seem that the Forest Preserve is not part of the NHL. These sections need to be combined and the importance of the Forest Preserve as an integral part of the NHL needs to be recognized. In addition, the following corrections are needed:

- On page F-36, the DEIS states that "The Greenbelt Forest Preserve consists of 200 acres of woodland owned and administered by the City of Greenbelt within four tracts – the Boxwood, North Woods, Hamilton Woods, and Belle Point Tracts." This is not correct, as the Greenbelt Forest Preserve consists of 254.8 acres of woodland with five tracts including the four listed by the DEIS and the Sunrise Tract.[605]

- Page F-82 of the DEIS states that ". . . the Greenbelt Forest Preserve (North Woods and Hamilton Tracts), . . . includes the Northway Fields . . ." This is not correct, as the ballfields are in a parcel that is not part of the Greenbelt Forest Preserve.[606] However, the ballfield parcel qualifies separately as a Section 4(f) park property.

- Section F.9 (References; pages F-123 to F-125) includes no references to the Greenbelt Historic District NHL. Citations of both the NRHP nomination[607] and the NHL nomination document[608] should be included in Section F.9.

- The descriptions of the NHL in the main text of the DEIS (Chapter 4.8) and in Appendix D.5 are more muddled:

    - The main text of the DEIS provides an incorrect description of the NHL; Tables 4.8-4 and 4.8-5 (on pages 4.8-21 and 4.8-26) state that "only a sliver of the historic district is within the APE." This appears to be ignoring the inclusion of the North Woods and Hamilton Woods tracts of the Greenbelt Forest Preserve in the NHL. This is also minimizing the proposed impacts within the Forest Preserve; maps in the DEIS indicate that approximately 65 acres of the Forest Preserve

[604] DEIS. Chapter 4.23. Pages F-81 to 82 and Pages F-36 to 39.
[605] "Forest Preserve Stewardship Guidelines." City of Greenbelt, Maryland. 2019. Appendix A. Greenbelt City Code, Chapter 12 Parks and Recreation, Article IX. Forest Preserve. Page 1. www.greenbeltmd.gov/home/showdocument?id=16685.
[606] Maryland State Archives. "Prince George's County Circuit Court Plat Book." NLP 129. Northway Fields Park, Parcel A; Greenbelt City Code, Chapter 12 Parks and Recreation, Article IX. Forest Preserve. Page 55. www.greenbeltmd.gov/Home/ShowDocument?id=7734.
[607] Hauenstein, Thomas. "Greenbelt Historic District, National Register of Historic Places Inventory -Nomination Form." November 25, 1980. https://mht.maryland.gov/secure/medusa/PDF/PrinceGeorges/PG;67-4.pdf.
[608] Lampl, Elizabeth Jo. "Greenbelt Historic District, National Historic Landmark Nomination." December 2, 1996. https://npgallery.nps.gov/pdfhost/docs/NHLS/Text/80004331.pdf.

would be impacted by the proposed Maglev J1 alignment, which represents approximately 25 percent of the entire Forest Preserve. Hardly a "sliver." **These proposed impacts to the Greenbelt NHL could not be mitigated.**

- The Greenbelt Historic District NHL encompasses 756.8 acres, so the proposed SCMaglev LOD with the NHL is about 8 percent of the total NHL. Also, hardly a "sliver."

- Appendix D.5 provides a muddled description of the NHL due to its reliance on the NRHP nomination form and its ignoring of the NHL nomination document. The NHL nomination document supersedes the NRHP form. For example, the period of significance was expanded to 1935-1946 in the NHL nomination document.

Request:
Considering these errors, misstatements, and apparent obfuscations in the current WQC justification materials, as the DEIS, the BWRR and the FRA should identify, assess, and report on the full impact building and operating the SCMaglev would have on all historic districts along all proposed SCMaglev alignments. This information should be made available for public review, with sufficient time to comment, before any decision to move forward with the building of the SCMaglev is considered.

- The main text and appendices ignore the potential impact of noise and vibration on the Greenbelt Historic District and ignores the district's contributing elements in and/or near the proposed LOD, including:

  - The Hamilton Cemetery and the associated Hamilton Farmstead site, which are located extremely close to the proposed LOD (and within the Affected Environment as defined in Chapter 4.4). These historic properties are not listed on MHT's MEDUSA database, but consultation with the Maryland-National Capital Park and Planning Commission's (M-NCPPC's) staff archaeologist and/or the City's Department of Planning and Community Development would have yielded this information.

  - The original allotment gardens, which are contributing elements of the NHL, are located extremely close to the proposed LOD. The Hamilton Gardens section of the allotment gardens are within the Affected Environment as defined in Chapter 4.4.

  - Local community residents have knowledge of prehistoric and historic artifacts and features in the Forest Preserve, some of which appear to be within the proposed SCMaglev LOD. These potential historic properties are not listed on MHT's MEDUSA database, but consultation with these residents and the M-NCPPC's staff archaeologist would have yielded this information.

Request:
When all the issues with the current WQC justification materials, as the DEIS, are identified, assessed, and reported by the BWRR and the FRA, make the information available so the public has sufficient time to review and provide comments before any decision to move forward with WQC and the building of the SCMaglev is considered.

XXXVIII. Programmatic Agreement Needs to Consult with More Stakeholders Regarding Greenbelt National Historic Landmark

The proposed Programmatic Agreement (PA) needs to bring more stakeholders into the consultation about impacts to the Greenbelt NHL. Page 4.8-1 of the DEIS cites the requirement "that prior to the approval of any Federal undertaking which may directly and adversely affect an NHL, the Federal agency shall, to the maximum extent possible, undertake such planning and actions necessary to minimize harm to the NHL" and consult with both the ACHP and the Secretary of the Interior (36 CFR § 800.10(c)).[609] The DEIS goes on to state that the "FRA is coordinating with the MD SHPO, NPS, and the Department of the Interior regarding SCMAGLEV Project effects to the Greenbelt Historic District in the context of Section 106 and Section 4(f) (Section F.8)" and that "the Final Section 4(f) Evaluation will report the outcome of coordination with MD SHPO and NPS regarding the Build Alternatives and the Greenbelt Historic District."[610] Public and city perspectives should be part of this consultation.

The DEIS (on page 4.4-13 and in Appendix D.3) states that "two cemeteries would be impacted by the elevated viaduct."[611, 612] Discussion of the impacts to and possible mitigation measures for these cemeteries is hampered by a lack of necessary information.

- Pages 4.4-13 and D-98 go on to state that "the Snowden Cemetery, within the PRR, would be acquired and displaced. The cemetery and the remains of those buried there would be relocated outside of the LOD. All state and local laws and applicable USFWS regulations regarding burial transfer would need to be followed." However, Page D-110 (in Appendix D.3) states that this impact and relocation is not certain: "The Project Sponsor will coordinate with federal (PRR/US Fish and Wildlife), state (Maryland Historical Trust) and local (Anne Arundel County) agencies if impacts to Snowden Cemetery cannot be avoided and graves would need to be relocated. All applicable laws and regulations, including Maryland Burial Law, would be followed."[613] Review of the Phase IA archaeological report and information from the Maryland Historical Trust's MEDUSA online database indicates that the Snowden Cemetery is not within the LOD for this project. This assumes that the area of currently existing fence encloses the entire cemetery, while it is possible that unmarked graves may be present outside the current fence. The lack of field investigations leaves uncertainty about the project's possible impact to this cemetery.

Request:
Before any decision to move forward with the WQC and building of the SCMaglev is considered, the BWRR and the FRA should independently verify the existence (or lack thereof) of unmarked or marked grave sites outside of any currently existing fence line (or lack thereof) and their inclusion in the current

[609] DEIS. Chapter 4.08. Section 4.8.1. Page 4.8-1. Also see: eCFR. "Title 36. 800.10 Special requirements for protecting National Historic Landmarks." https://ecfr.io/Title-36/Section-800.10.
[610] DEIS. Appendix F. Page F-82.
[611] DEIS. Chapter 4.04. Section 4.4.4.2. Page 4.4-13.
[612] DEIS. Appendix D.03. Section D.3D.3.2.1. Page D-98.
[613] DEIS. Appendix D.03. Section D.3D.3.4.1. Page D-110.

DEIS, and provide the public with the appropriate NEPA analysis and sufficient time to provide comments.

- Pages 4.4-13 and D-98 go on to state that "the Training School Cemetery, within the Maryland City neighborhood, is immediately adjacent to the viaduct. The viaduct would impact cemetery visitors due to increased noise and changes to aesthetics." This cemetery is a contributing element to the NRHP-eligible D.C. Children's Center-Forest Haven District (AA-2364).[614] However, the only mention of the cemetery in the main DEIS is in Tables 4.8-1 (Resources in the Above-ground APE by Build Alternative) and 4.8-15 (Potential Adverse Effects on Above-Ground Historic Properties by Build Alternative) where this historic property is listed as a "hospital campus with cemetery."[615] The discussion of the D.C. Children's Center-Forest Haven District in Appendix F (Draft 4(f) Evaluation) fails to mention the cemetery. The Determination of Eligibility Form on file at MHT includes a detailed description of this cemetery, concluding that it is NRHP-eligible under Criterion A.[616] This document describes the Training School Cemetery as "an unmarked cemetery of approximately half an acre, used from 1927-1982" with a single large monument stone that "was added to the cemetery after the fact as a memorial erected by families of former residents at the DC Children's Center" and states that "there is no plan of interment locations in the cemetery available, nor is there any permanent marking of the cemetery boundaries." The lack of documentation of the boundaries of this cemetery leaves uncertainty about the project's possible impact to this cemetery. Both archival and archaeological investigations are needed to define the cemetery's boundaries.

Request:
Before any decision to move forward with the WQC or building of the SCMaglev is considered, the BWRR and the FRA should independently plot, identify subsurface remains and artifacts, and then develop a full description of the cemetery, according to NEPA regulatory requirements.

[614] Maryland Historical Trust. "D.C. Children's Center-Forest Haven District (AA-2364)." September 8, 2011. https://mht.maryland.gov/secure/medusa/PDF/AnneArundel/AA-2364.pdf.
[615] DEIS. Chapter 4.08. Section 4.8.3. Page 4.8-10 to 15 and 4.8-15.
[616] Maryland Historical Trust. "D.C. Children's Center-Forest Haven District (AA-2364)." September 8, 2011. https://mht.maryland.gov/secure/medusa/PDF/AnneArundel/AA-2364.pdf. Page 348 of 355.

XXXIX. Financial Sustainability and Ridership

The following section analyzes the claim that operational and maintenance costs are projected to be completely offset by revenues from passenger ticket sales.[617]

To date, Baltimore-Washington Rapid Rail (BWRR) and the Northeast Maglev (TNEM) have not provided any analyses or unredacted data to validate that the Superconducting Magnetic Levitation (SCMaglev) project is financially feasible and able to generate sufficient revenue to be self-sustainable and to cover the costs of the system's operation, maintenance, and loan servicing.

Neither the Water Quality Certification (WQC) justification materials nor the initial Draft Environmental Impact Statement (DEIS) (BWRR documentation) support BWRR's claim that the system will generate sufficient revenues to pay for the operation and maintenance of the system. Even if the data were available, one must ask if those projections can still be accurate given the global pandemic and the move to telecommuting by a significant portion of the workforce, as well as the continuing loss of population in Baltimore,[618] and the loss of high-earners in both Baltimore and Washington, D.C.[619] It is difficult, if not impossible, to disentangle the financial shortfalls of the project from the lack of ridership data.

Ridership data are critical to understanding the financial sustainability of the project. To date, meaningful ridership data have not been provided. On March 21, 2021, the Maryland Coalition for Responsible Transit (MCRT) filed a Freedom of Information Act request for ridership and other data. In response, on August 26, 2021, the MCRT received a heavily-redacted version of the report that turned out to be virtually useless because of its redactions. The Federal Railroad Administration (FRA) claimed the redactions were to protect "trade secrets and commercial or financial information obtained from a person [that is] privileged or confidential [Exemption 4],"[620] and "personnel and medical and similar files, the disclosure of which would constitute a clearly unwarranted invasion of personal privacy [Exemption 6]."[621] On November 21, 2021, the MCRT legal counsel filed an appeal challenging their withholding of ridership information under exceptions 4 and 6. Subsequently, on August 17, 2022, the FRA responded to the MCRT's challenge and provided a less-redacted version of the ridership information. From the reports and other publicly available data sets, Owen Kelley[622] completed a deep dive into SCMaglev ridership projections and, using multiple analyses to validate his finds, concluded that BWRR's ridership projections were a factor of ten too high. More on these analyses will be presented later in this section.

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[617] Baltimore-Washington Rapid Rail. "Common Questions - Economics." Northeast Maglev. 2021. https://northeastmaglev.com/faq/#Economics.

[618] United States Census (USC). Baltimore population data for 2010 through 2021 source: USA Facts. https://usafacts.org/data/topics/people-society/population-and-demographics/our-changing-population/state/maryland/county/baltimore-city/. Baltimore City population data for 2022 source: United States Census. "Quick Facts." www.census.gov/quickfacts/fact/table/baltimorecitymaryland/INC110221.

[619] Villanova, Patrick. "Where High Earners Are Moving – 2023 Study." July 26, 2023. https://smartasset.com/data-studies/where-high-earners-moving-2023.

[620] FOIA Exemption 4, 5 U.S.C. 552 (b)(4).

[621] Exemption 6, 5 U.S.C. § 552(b)(6).

[622] Kelley, Owen. "Ridership Revisited: The Official Ridership Forecast for the Proposed Baltimore-Washington Maglev is a Factor of Ten Too High." August 2021. www.greenbeltonline.org/wp-content/uploads/2021/08/kelley202108.magrider.pdf.

Much of the BWRR documentation provides little data on the topic of ridership information. These "data" are unsubstantiated empty "shell" documents with the important numerical values deleted and the input assumptions obfuscated or missing entirely. The same is true of any analysis contained therein that should include intermediate and detailed final results. For a person intending to use the BWRR documents to evaluate a true ridership study, The Louis Berger Group,[623] or the FRA, BWRR documentation appears to contain zero percent of the data values and information that would be needed to evaluate the plausibility of the official ridership forecast.

Without sufficient ridership and revenue, the project is destined to be financially unsustainable. Without substantiated ridership data and analysis information, the DEIS does a disservice to the public by its obfuscation, which constitutes a failure to share ridership information specific to the Washington, D.C., and Baltimore segment being used to justify issuing the WQC.

The BWRR documentation is deficient, as it fails to address the following questions:

- How is input data and information, such as the number of people from a specific area, named proprietary? The assumptions, input parameters, models, specific methodology or methodologies, and results should be made public to determine (and to prove) that this information is valid and specific to the segment between Washington, D.C., and Baltimore.
- While some information may be algorithmically proprietary and specific to the modeling software used, the input data, methodology, and output should not be withheld. Assumptions and conclusions must be able to be independently validated. Withholding and obfuscating this information gives a very strong, deeply concerning, and distinct impression of fundamental impropriety and bias.

BWRR indicates that the SCMaglev project is not in competition with Amtrak or MARC. Nonetheless, BWRR repeatedly asserts that the price of tickets will be on par with Amtrak's Acela train. Further, BWRR continually talks about serving the Northeast Corridor, which Amtrak currently serves. Other terminology employed by BWRR includes that they are providing "options," while still claiming they are not taking away riders from Amtrak.

Requests:

- BWRR and the Maryland Transit Administration (MTA) must provide the ridership information they assert validates their claim(s) that the SCMaglev ridership will not be drawn from current and future Amtrak or MARC ridership. These analyses must include community-by-community ridership onboard and offboard data and projections. Such information should demonstrate that SCMaglev ridership would not be taken from Amtrak or MARC and should support their claim(s) of "non-competition" with Amtrak and MARC.

[623] The Louis Berger Group is providing planning, engineering, environmental and financial analysis services for the SCMaglev project. For more information see: "Developer Working Towards 2020 Decision on $10-Billion Maglev Train." December 17, 2018. Maryland Society of Professional Engineers. www.mdspe.org/page/Maglev.

This information then must be shared with the public, with sufficient time given for public review and comment before any consideration on a decision to move the SCMaglev project forward by the MDE granting WQC.

contrary to BWRR's claims of non-competition, Appendix D.4 of the DEIS does show diversion of passengers from Amtrak and MARC.[624] Passengers from MARC and Amtrak would decrease the economic vitality and viability of these more affordable services on which a far larger portion Marylanders depend. Table D.4-47 of the DEIS displays the ridership and revenue for the three rail systems in 2030 and the forecasted rail systems' revenue loss resulting from passenger diversions to the SCMaglev.[625] Such losses would need to be made up with larger taxpayer-funded subsidies; in effect, the SCMaglev indirectly would be taking taxpayer dollars far better used on higher-priority transportation projects.

The DEIS ridership estimates premised on the SCMaglev in operation in 2030 is based on a 57.3 percent diversion of riders from each of the three rail lines to the SCMaglev; that is, if the Cherry Hill Station is selected (currently favored) and if the 61.3 percent diversion of riders from each of the three rail lines to the SCMaglev if the Camden Yards Station is selected. In 2030, Amtrak Acela, Amtrak regional rail, and the MARC commuter rail system are expected to accumulate a revenue loss of $23.2 million annually at full buildout if the Cherry Hill Station is selected, as well as a revenue loss of $24.8 million annually at full buildout if the Camden Yards Station is selected. MARC's one-ticket cost is $9. The SCMaglev's one-way ticket cost is between $30 and $80. It is doubtful that between 57 to 61 percent of current daily MARC commuters are going to pay over three to eight times the cost of a MARC ticket to get to Washington, D.C. 26 minutes sooner than would the MARC express. How many commuters from North Baltimore are going to travel past Penn Station to go to the BWRR Cherry Hill station, pay more, and have a longer total transit time to work?

The DEIS shows that 44.6 percent of the ridership would come from the non-business segment, which is not defined.[626] However, we know it excludes commuters, business, and airport travel. The inability to unpack the assumptions behind this number and the consequences of an overestimate will have serious consequences for the economic and commercial viability of the system. Given the size of this segment and its vagueness, one must question whether the project will be able to generate revenues sufficient to cover the costs of running the operation, maintaining the system, servicing loan debt, and paying required taxes.

In DEIS Section 4.2.4.4, the predicted diversion of MARC ridership to the SCMaglev is 32 percent of the annual MARC ridership on the Penn and Camden lines.[627] In DEIS Section 4.2.5.4, the predicted diversion of Amtrak ridership to the SCMaglev is 94 percent of Amtrak ridership at the three stations.[628] For MARC and Amtrak, these reductions may prove catastrophic. Bus systems also suffer losses, but these can adapt more readily by changing routes.

[624] DEIS. Appendix D-4. Page D-54.
[625] *Ibid*. Table D.4-47. Page D-55.
[626] DEIS. App-D.04_DEIS_Economics Impact Analysis Technical Report. Table D.4-19. Page D-35.
[627] *Ibid*. Chapter 4.02, Section 4.2.4.4. Page 4.2-10.
[628] *Ibid*. Page 4.2-12.

The consequences described above are wholly inconsistent with the current Administration's stated goal of moving "Amtrak into the 21st Century with Sustained Investment."[629]

The BWRR documentation is critically deficient in that it compares the theoretical SCMaglev of the future to the current Amtrak and Acela services. The appropriate comparison should be the SCMaglev to the Amtrak and Amtrak Acela of 2028 to 2030 and beyond, when the SCMaglev is projected to be operational and by which time Amtrak and Acela will have undergone many phased-in improvements. Amtrak is operation and moving forward with many system enhancements and renewal projects. The next generation of Acela currently is undergoing test runs on the Northeast Corridor and is planned to be placed in service as soon as 2023 to 2024.

XL. Cost to Use

BWRR states that there are three types of travelers: those traveling for business, those traveling for non-business activities, and those commuting to work. According to the DEIS, only 15.45 percent of the estimated ridership would be business travelers.[630] By reporting this small percentage, TNEM is admitting that only a small segment of the population demographic would have sufficient income to afford the high price of tickets as a frequent passenger riding the SCMaglev.

In the DEIS, BWRR further states: "The net extra cost associated with SCMAGLEV use for travelers that divert is estimated to be between $432.3 million and $478.8 million in 2030, and $555.2 million and $614.6 million in 2045. Those travelers that divert are willing to pay more for the time savings, reliability, and amenities of the new mode."[631] Reliability and amenities touted by BWRR of the SCMaglev significantly shrink when compared with the next-generation Acela scheduled to start operation in 2023 to 2024. While BWRR claims ticket costs will be similar to Amtrak and Amtrak's Acela, station access strongly favors Amtrak and Amtrak's Acela with stations in downtown Baltimore, instead of a 15-minute or more trip from downtown Baltimore to Cherry Hill. Taking into account the travel time to Cherry Hill, Amtrak and Amtrak Acela stations in Baltimore reduce the "total time spent in transit," again increasing the favorability to make use of Amtrak and Amtrak Acela.

In other words, travelling on the SCMaglev is expensive. Riders must be able to afford this proposed system. Further, they must be willing to spend the additional travel time to get to the planned stations' locations, as well as to expend the additional cost to travel from the destination station to the rider's final destination. The economics of taking the SCMaglev over the alternatives simply do not compute in most situations. Yet, BWRR claims in the DEIS that business travelers, those who may be the least concerned about the cost because they are able to afford it, represent only 15.45 percent of the projected ridership. And this percentage is now even less, given the increase in the successful use of remote working opportunities during the COVID-19 lockdowns, decreasing population of Baltimore City, exodus of high-earners from both cities, and continuing population shrinkage in Baltimore City.

[629] "Passenger Trains > Biden's Proposed 2022 Budget for Amtrak." Moves Amtrak into the 21st Century with Sustained Investment. https://www.trainorders.com/discussion/read.php?4,5232094.
[630] DEIS. Appendix D.4. Table D.4-19. Page D-35.
[631] *Ibid*. Page D-43.

[MCRT Editor's Note: We'll take a deeper dive into ridership later.]

Except for the terminuses, SCMaglev, unlike other transit systems, would not serve other common transportation needs, such as school, shopping, or medical appointments, because of the lack of local stops and high-priced tickets. Riders might use it for leisure activities or cultural events, but the ticket prices make it cost-prohibitive for the majority of families living in and around Baltimore City, leaving MARC, the bus system, or driving and parking a much more affordable option for a multi-occupant vehicle.

To simplify the math, if the average round-trip ticket cost were $100, a commuter would pay $24,000 a year to ride the SCMaglev. This would be $12,900 more than the annual cost of commuting by car between Baltimore and Washington, D.C., based on the Internal Revenue Service's estimate of the per-mile cost of driving.[632] Most American families have trouble saving for the future, so would they really choose to spend an extra $12,900 a year to upgrade from car to SCMaglev commuting?[633]

For most families, the SCMaglev would be an unattractive option on a family outing. A D.C.-area family of four going to a downtown Baltimore attraction would expect to pay $60 to $140 for the entire family to take the trip using conventional transit. It is very unlikely this same family would be willing to pay an additional $60 to $280 for the whole family to make the same trip via the SCMaglev.[634]

Washington, D.C., attracts tourists, but for most of these families, a side trip to Baltimore would not seem more attractive should the SCMaglev be built. Studies, such as the one cited in the *Business Insider*, estimate that the average American family spends $2,000 on its annual vacation.[635] If an out-of-state family visited Washington, D.C. for their vacation, would they be willing to spend an extra $560 on transportation if they decided to make a side trip to Baltimore? In contrast, the existing bus and commuter-rail service cost $10 one way and renting a car for an entire week can cost under $500.[636]

XLI. Where's the Ridership?

Much of the analysis appears to depend on ridership data requests, with multiple reports referenced for over several years. The BWRR documentation does not appear to include these reports or the data, nor can they be found on the BWRR or TNEM websites. However, like the origin and destination (O/D) pairs chosen, without their inclusion it is impossible for the public to understand the basis on which the economic arguments have been made to support building and operating the SCMaglev. For such a large project as the SCMaglev, full transparency should be required, and the ridership data should be included for public review and comment.

[632] Internal Revenue Service (IRS). Standard Mileage Rates. Standard Mileage Rates | Internal Revenue Service (irs.gov). Retrieved April 26, 2021. www.irs.gov/tax-professionals/standard-mileage-rates.
[633] In 2020, the cost of commuting by car was $0.58 per mile according to the IRS, and one might assume an 80-mile round trip, Washington, D.C., to Baltimore. A 48-week work-year is 240 days. By car, $0.58/mile x 80 miles/day x 240 day/year. By SCMaglev, $100/day x 240 day/year.
[634] At Fort McHenry National Monument, Port Discovery Children's Museum, Maryland Science Center, and National Aquarium, admission for 2 adults and 2 children is approximately $30-$60, $72, $96, and $140, respectively.
[635] McDowell, Erin. "People spend an average of $1,979 annually on summer vacations — here are 4 ways to save money on your next trip." *Business Insider*. August 9, 2019. www.businessinsider.com/average-american-spending-on-vacations-2019-8.
[636] *Id*.

As stated earlier, the FRA responded to two MCRT FOIA requests to receive the ridership data used by TNEM to project their ridership and ridership revenue, a critical component in the assessment of the validity of TNEM claims that the SCMaglev will generate the revenues needed to offset operational, loan payment, loan servicing, and taxes. The MCRT review found the "reports" and "data tables" so heavily redacted that they were rendered useless. BWRR then posted the same document on its website with a public announcement. ***As a source of information to substantiate the ridership claims made by BWRR and TNEM, both the heavily- and less-redacted ridership data documents are substantially useless.***

The BWRR documentation are critically deficient because they:

- Do not include the ridership data or analyses. Nor does the DEIS identify the specific methodologies and assumptions used to generate the ridership projection. Further, the applicant's WQC justification materials do not present information to substantiate and validate the data sources or the appropriateness of the applied methodologies, nor do they provide information on the accuracy and tolerances of the ridership projections.

This information must be shared with the public and given sufficient time for public review and comment before any consideration on a decision to move the SCMaglev project forward.

XLII. Deep Dive into BWRR Ridership Projections

As noted by Carol Park of the Maryland Public Policy Institute, regarding BWRR's inflated ridership projection, it is doubtful the SCMaglev will

> ". . . attract sufficient ridership to make it economically viable. According to Maglev officials, the service would target the 'elite business travelers' and charge higher prices than Amtrak, which already provides regular rail service between the two cities. Just as with the [no longer running] Seoul-Incheon line, there are also numerous bus companies that provide affordable trips along the Baltimore-D.C. route."[637]

What happened with the train in South Korea? The South Korean government "built the Seoul-Incheon line despite consistent warnings of inadequate demand. The project was politically, rather than commercially, driven, in that the Korean officials wanted to present a futuristic version of Korea to the international community as part of the 2018 Pyeongchang Winter Olympics."[638] However, following the Olympics, with the system continuously operating with 75 percent of the seats empty and requiring large government subsidies to maintain operation, South Korea pulled the plug.

What realities are supporters of the SCMaglev ignoring and glossing over? Park observes:

[637] Appendix – Reprint: Park, Carol. "Lessons from Asia for the Northeast Maglev." Maryland Public Policy Institute. December 7, 2018. www.mdpolicy.org/research/detail/lessons-from-asia-for-the-northeast-maglev.
[638] *Id*.

"SCMagLev supporters in Maryland have similar non-business motives for backing the project. Baltimore has been experiencing a steady population decline over the years, and many supporters believe that connecting the city to economically vibrant D.C. could reverse that trend. This vision has blinded the advocates to serious concerns about the project."[639]

Further, Park noted in 2018 that:

". . . the project purports to be a private effort. . . . high-speed train projects are generally magnets of questionable government subsidies . . ."[640] This fact is clearly demonstrated by California's bullet train. The Maglev website currently predicts that the project would cost $10 billion to $15 billion without cost overrun. California's bullet train, which was estimated to cost $6 billion originally, has surged to a price-tag of $10.6 billion. If we apply this rate of cost overrun to Maglev, we can realistically expect the project to cost $17.6 billion to $26.5 billion.[641] Even at its current price tag, Maglev would still be one of the most expensive rail lines ever built on a per-mile basis, at an estimated cost of $250 million per mile."[642]

[MCRT Editor's Note: The 2018 $15 billion estimate to build the SCMaglev system increased to a $16 billion estimated cost in 2021.

The numbers for California's high-speed train may vary across information sources, the one constant is they are ballooning rapidly. In 2009, according to "Construction Dive" the project price was estimated to be $40 billion, but as of February 15, 2023, California's high-speed train cost is now estimated to be $105 billion.[643] On August 30, 2023 the "Washington Post" reported "California is building a 500-mile system between Los Angeles and San Francisco that has been marred by delays and cost overruns. Its price tag, at $128 billion, is nearly quadruple the $33 billion project voters approved in 2008. A 119-mile section is under construction, and projections call for a 171-mile segment connecting Merced, Fresno and Bakersfield to open between 2030 and 2033. [644]"

So, applying the same cost escalation factor to the

SCMaglev, the cost would now be $40 to $64 billion.]]

Park also notes:

"Given the immense cost estimate of Maglev and no private partners that seem excited to step in, the Maglev project is doomed to become an expensive failure. In addition, using general

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[639] *Id*.
[640] *Id*.
[641] Note these estimates were made in 2018. Today, the costs would be higher.
[642] Appendix – Reprint: Park, Carol. "Maglev: A high speed train to higher taxes." The Maryland Public Policy Institute. February 7, 2018. www.mdpolicy.org/policyblog/detail/maglev-a-high-speed-train-to-higher-taxes.
[643] Obando, Sebastian. "California's high-speed rail cost rises to $105B, more than double original price." February 15, 2023. Construction Dive. www.constructiondive.com/news/california-high-speed-rail-costs-rise-to-105-billion/618877/.
[644] Lazo, Luz. "Faster trains to begin carrying passengers as Amtrak's monopoly falls." Washington Post. August 30, 2023. www.washingtonpost.com/transportation/2023/08/30/amtrak-brightline-high-speed-rail/.

taxpayers' money to build a high-speed rail system that will be mainly used by high-income residents will only exacerbate Maryland's inequality."[645]

"Supporters of the SCMagLev dismiss concerns about insufficient ridership. They argue that the success of bullet trains in Japan demonstrate these hurdles can be overcome. That's exactly what officials in China, Taiwan and South Korea thought, only to discover that the situation in Japan is unique. . . . Most of Japan's 128 million inhabitants live in a few densely populated cities. Many of those residents are rich enough to afford the expensive train tickets. . . . Compared to Japan, the situation is the polar opposite in Baltimore, where many of the residents who depend on public transit are low-income workers. If these residents are to commute between Baltimore and D.C., they would need an option that is affordable and easily accessible from their homes. MagLev is neither."[646]

[MCRT Editor's Note: Japan's Shinkansen Nozomi "Bullet" train, is a steel wheel on steel track system. Whereas the SCMaglev is a magnetically levitated and propelled train. These are two very different technologies, thereby making inferences from one to the other questionable.]

The city bus service links to MARC, which provides reliable and cost-effective transportation. It annually moves (Pre COVID-19) over 9 million passengers into and outside of D.C.[647] There is also low-cost bus service between the two cities.

XLIII. Deeper Dive into BWRR Ridership Projections

BWRR's inflated ridership discussed by Park is further and more deeply investigated and reported on by Owen Kelley, PhD.[648] He took a deep dive into the BWRR's DEIS ridership projections. A high-level review of Kelley's research and findings, organized into five chapters, are delineated below.[649]

[MCRT Editor's Note: MCRT strongly encourages the Maryland Department of the Environment (MDE) to read and consider Dr. Kelley's research which is based on several open sources of data unlike BWRR's ridership projections. The methodologies and analyses are well defined and can be replicated.]

1. The proposed Baltimore-Washington maglev's official ridership forecast is more than a factor of ten higher than reference data can support. The official estimate is 25 million one-way maglev trips per year, but reference data suggest that under 1 million maglev trips per year is more likely.[650]

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[645] Park, Carol. "Maglev: A high speed train to higher taxes." The Maryland Public Policy Institute. February 7, 2018. www.mdpolicy.org/policyblog/detail/maglev-a-high-speed-train-to-higher-taxes.
[646] *Id*.
[647] "MDOT MTA Performance Improvement - Ridership. Data through 12/31/2020." Maryland Department of Transportation - Maryland Transit Administration. www.mta.maryland.gov/performance-improvement.
[648] Kelley, Owen, Ph.D. "The Federal Railroad Administration falls for an excessively high forecast of how many trips would be made on the maglev." May 21, 2021. www.greenbeltonline.org/maglev-ridership/.
[649] Kelley, Owen. "Ridership Revisited: The Official Ridership Forecast for the Proposed Baltimore-Washington Maglev is a Factor of Ten Too High." August 2021. www.greenbeltonline.org/wp-content/uploads/2021/08/kelley202108.magrider.pdf.
[650] For 2045, the Federal Railroad Administration (FRA) forecasts 24.938 million one-way maglev trips per year if the Baltimore maglev station were built at Camden Yards: draft environmental impact statement (DEIS), Chapter 4.2, Table 4.2-3,

2. Maglev riders would be predominantly wealthy, not a cross section of society. Given the maglev ticket price and limited travel-time savings relative to car travel, only the wealthiest 2% of the region's population would likely ride the maglev.

3. Kelley lays out a strong and clear argument that the SCMaglev would serve areas close to the SCMaglev stations, or within easy access, which results in a smaller geographic area than BWRR's 25-mile diameter radius around each of the three (3) proposed stations. SCMaglev would not serve the entire Baltimore-Washington region. The travel-time savings that matter are based on total travel time, door to door. Total travel time includes both the time to travel from the trip origin to a maglev station and from the final maglev station to the actual destination. The maglev would save travelers a significant amount of time within only a small area near each of the three maglev stations. The stations would be located in downtown Washington, BWI airport, and downtown Baltimore. For this reason, most counties in the Baltimore-Washington region would have few if any maglev customers start or end their trips there.

   [MCRT Editor's Note: MDE must consider the population income demographics of the areas immediately surrounding the three proposed SCMaglev stations. Some of these communities have low annual income levels that would make riding the SCMaglev very unlikely.]

4. Kelley's research report dives into the BWRR claims that operating the SCMaglev will reduce greenhouse gases. His, and others research, including the FRA, raises serious doubts that the SCMaglev will have much impact on greenhouse gases. In fact the construction, operation and maintenance of the SCMaglev will more likely will increase greenhouse gases in the SCMaglev's operational and immediate surrounding areas, thereby thwart efforts to combat climate change. The SCMaglev operation would take few cars off the road, and add to this the source of the SCMaglev's greenhouse emissions is the generation of electricity to run the system. The draft environmental impact statement says as much, but the information is buried in an appendix. Furthermore, the statement does not even attempt to estimate greenhouse emissions from constructing the SCMaglev.

5. In the last part of his research report, Kelley looks at BWRR's claims to reducing road congestion. Again, BWRR's statements don't jive with the data. Kelley finds the maglev would do very little to reduce regional road congestion. Even if the maglev's official ridership forecast were accurate, the amount of car travel that would be avoided once the SCMaglev starts operating would be small. After less than a year, the natural, gradual increase in regional road traffic would erase the forecasted road-traffic reduction from maglev operation. "These statistics on SCMaglev travel and regional road traffic were published in the SCMaglev's draft environmental impact statement, but the statement failed to put these two statistics together and draw the logical conclusion."[651]

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page 4.2-7. Of this total, the DEIS forecasts that 20.6 million maglev trips would be diverted from other modes of transportation. The present document estimate that 1 million diverted trips is a more likely forecast, as stated in Chapter 1.

[651] Kelley, Owen. "Ridership Revisited: The Official Ridership Forecast for the Proposed Baltimore-Washington Maglev is a Factor of Ten Too High." August 2021. Pages 4 – 5. www.greenbeltonline.org/wp-content/uploads/2021/08/kelley202108.magrider.pdf.

As the current discussion is on BWRR's inflated ridership projections, the following is taken from Part 1 of Kelley's research.

Why Are the Ridership Numbers Important?

BWRR states in the DEIS that ticket sales to ride the SCMaglev will generate the revenue needed to maintain and operate the system. So, as Kelley states:

"The accuracy of the official ridership forecast matters because the maglev's draft environmental impact statement relies on this forecast to quantify the various benefits of operating the maglev. The number of people riding the maglev determines the revenue from ticket sales, the financial solvency of the maglev operator, the amount of road congestion prevented, the reduction in car generated air pollution, and the number of jobs created."[652]

A principal problem with the ridership projection is noted by Kelley:

"In the draft environmental impact statement, there is no evidence that the Federal Railroad Administration commissioned an independent review of the Louis Berger ridership report or had its staff perform an internal review. The draft environmental impact statement does mention one review of the Louis Berger ridership report, but that review suffers from a conflict of interest. That review was conducted by the company that wants to build the maglev, i.e., Baltimore Washington Rapid Rail (BWRR)."[653] By republishing Louis Berger's numbers in the draft environmental impact statement, the Federal Railroad Administration has transformed these numbers into the project's official ridership forecast."

One of the first problems Kelley finds with the ridership projection from BWRR is that:

" . . . the draft impact statement says that most maglev trips would be "diverted" not "induced." A diverted maglev trip is a maglev trip that the customer would make by another form of transportation if the maglev were not built. In contrast, an induced maglev trip is a trip that would only occur if the

[652] Kelley, Owen. "Ridership Revisited: The Official Ridership Forecast for the Proposed Baltimore-Washington Maglev is a Factor of Ten Too High." August 2021. www.greenbeltonline.org/wp-content/uploads/2021/08/kelley202108.magrider.pdf. "Revenue from maglev ticket sales in "SCMAGLEV annual fare cost" row of Appendix D4, Table D4-28, pg. D-44. Road congestion: . . . Air pollution: Appendix D4, Table D4-40, pg. D-51, . . . 390–440 jobs created by maglev operations: Chapter 4.6, Pages 4.6-8."

[653] Dr. Kelley notes: "The maglev DEIS cites the 2018 Louis Berger "Baltimore-Washington SCMAGLEV Project Final Ridership Report" in Appendix D4 (footnote to Table D4-19, pg. D-36) and in Chapter 4.6 (pg. 4.6-3, footnote 9). The DEIS describes three steps that the "project sponsor" took to check the ridership forecast (Appendix D2, pg. B-104), but no steps that the Federal Railroad Administration took. The Federal Railroad Administration is a regulatory agency, so one of its essential functions is to double-check statements made by project sponsors, i.e., by the industry that the agency is supposed to be regulating. From the page following the title page of the draft environmental impact statement: "The Project Sponsor, Baltimore Washington Rapid Rail, LLC proposes to construct and operate an SCMAGLEV system between Baltimore, MD and Washington, D.C." See the discussion in Voulgaris (2019) on how a forecast can be affected by the biases of the forecaster.

maglev were built. As a practice, transportation planners divide total ridership into diverted and induced travel."[654]

Kelley focused on diverted trips because the numbers are easier to estimate than induced trips. Another issue is that BWRR makes use of the population in a 25-mile radius around each station as the potential pool for ridership. This includes a very large number of people that do not have the income level to make travel via SCMaglev a viable option. A more likely scenario is total travel time, and the time to travel to the station. Kelley lays out the argument for choosing the savings between 8 to 27 minutes if the SCMaglev is used. He also notes that roughly two percent of the population in the areas surrounding the stations would have the income level to make using the SCMaglev a viable option.

Using data from the Metropolitan Washington Council of Governments' (MWCOG) 2020 Travel Survey of the Washington, D.C., region, the number of trips in the SCMaglev service area is 18,956 one-way trips per day, "where the maglev would save a customer approximately 8 to 27 minutes relative to the amount of time the customer would otherwise have spent driving directly to the destination"[655] as compared with the 25-miles-radius around each SCMaglev station used by BWRR.

Using time saved as the measure for determining the potential SCMaglev population pool, Kelley identifies jurisdictions residents could save time using the SCMaglev as opposed to driving between Baltimore and Washington, D.C. At the southern end of the line, the SCMaglev ridership population pool would likely be the District of Columbia, the City of Alexandria, and Arlington County. On the northern end, the population pool would likely be the City of Baltimore and Baltimore County.

To project out to the ridership out to 2045, Kelley uses the 0.93 percent increase in travel per year as proposed in the SCMaglev's DEIS.[656] Now, considering the fraction of the population that has sufficient income and views saving time worth the higher cost of a ticket to ride the SCMaglev as the potential population pool. That pool size is likely around 2 percent of the population in the likely ridership population in the served jurisdiction identified earlier.

In Figure 3, Kelley shows how these factors are combined to arrive at an unofficial forecast of 178,000 one-way trips diverted to the maglev in 2045. He also states:

"Figure 1 also shows the official forecast for this portion of the maglev ridership: 17.6 million one-way maglev trips. To be clear, both the official forecast and the just-derived unofficial forecast are both forecasts for diverted maglev trips in 2045, excluding BWI airport customers. The official forecast is

[654] Kelley, Owen, Ph.D. "The Federal Railroad Administration falls for an excessively high forecast of how many trips would be made on the maglev." May 21, 2021. www.greenbeltonline.org/maglev-ridership/.
[655] Kelley, Owen, Ph.D. "Ridership Revisited: The Official Ridership Forecast for the Proposed Baltimore-Washington Maglev is a Factor of Ten Too High." August 2021. www.greenbeltonline.org/wp-content/uploads/2021/08/kelley202108.magrider.pdf. Page 41.
[656] 0.93% annual growth: Appendix D2. Page C-106.

approximately one hundred times greater than the independent, unofficial forecast (100 ≈ 17.6 ÷ 0.178).”[657]

Looking at travel to and from BWI-Marshall Airport, as with the travel between Baltimore and Washington, D.C., the official ridership forecast in the SCMaglev DEIS is much higher than the unofficial forecast derived by Kelley. [658,659]

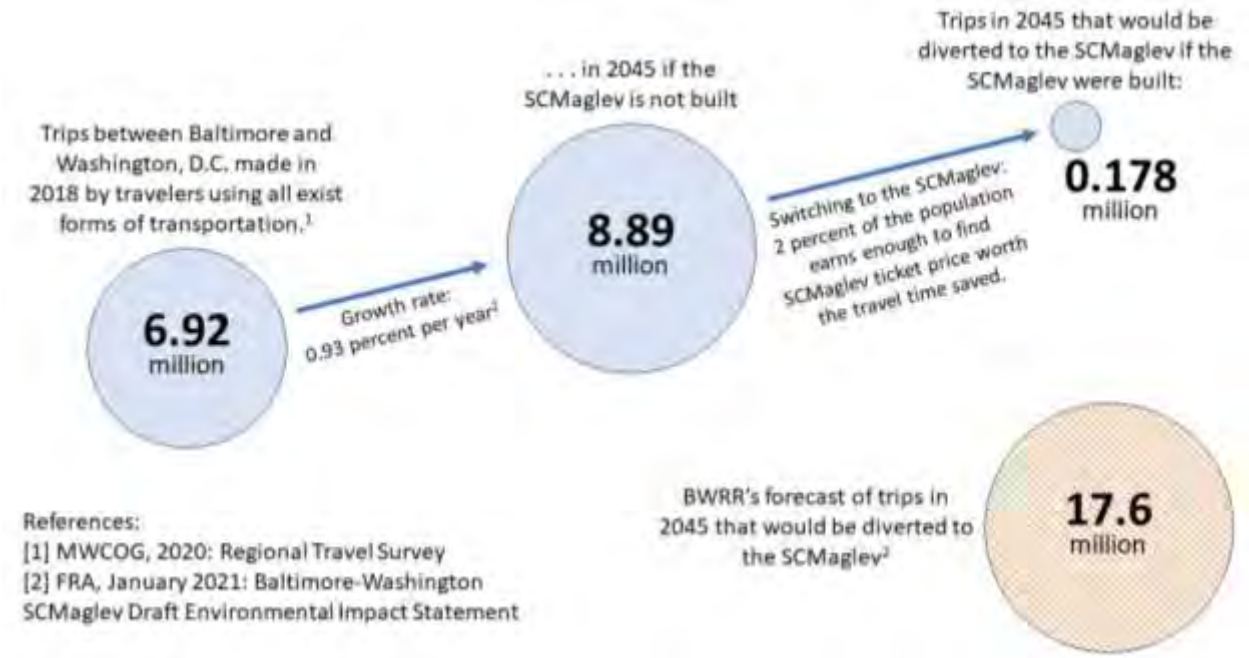

Figure 3. A schematic diagram showing how the present chapter calculates an unofficial forecast for the number of maglev trips in 2045 that would be made by “diverted” travelers. A diverted traveler is someone who would make the trip by another form of transportation if the maglev were not built. The 17.6-million-trip official forecast is much larger than the 178,000-trip unofficial forecast. Both forecasts exclude BWI airport passengers.

[MCRT Editor Note: Given the drop in passengers for 2020 and 2021, Kelley’s projection is actually higher than the past two years of passenger served at BWI Marshall would have resulted in.]

Kelley notes the first task is to determine what portion of BWI customers would save time if they used the SCMaglev to travel to or from the BWI Marshall. As noted earlier, Washington, D.C., area residents who would save time riding the SCMaglev to or from BWI Marshall are those who live in the District,

[657] The official ridership forecast for diverted non-airport travelers is the product of 20.579 million trips by diverted travelers (Chapter 4.2, Table 4.2-3, pg. 4.2-7) multiplied by 85.5%, the percent of maglev trips that would be made by people other than BWI airport customers (Appendix D4, Table D4-19, pg. D-35). 17.6 million = 20.579 million X 0.855.
[658] “Facts & Figures BWI Marshall Airport Facts & Figures – General Passenger Statistics.” Baltimore/Washington International Thurgood Marshall Airport. www.bwiairport.com/flying-with-us/about-bwi/facts-figures.
[659] The Maryland Aviation Administration reported that BWI airport had 26.99 million arrivals and departures in 2019. This number significantly dropped during the pandemic to 11.20 million for 2020, and for 2021 the number has increase to 18.87 million or 69 percent of the number of passengers arriving and departing as compared to the 2019 number of 26.99 million on which Kelley based his ridership projections.

Arlington, and Alexandria. Most of Baltimore City residents, but not most Baltimore County residents, could save time by riding the SCMaglev to BWI.

Approximately 21% of the region's population lives in the four above-mentioned jurisdictions. See Table 1.[660]

Table 1. The population of counties and cities in the planning areas of the Metropolitan Washington Council of Governments (MWCOG) and the Baltimore Metropolitan Council (BMC).

Location	**Population**[a]
Washington-area jurisdictions served by the proposed SCMaglev[b]	1,102,019
District of Columbia	705,749
Arlington County, VA	236,842
City of Alexandria, VA	159,428
Baltimore-area jurisdictions served by the proposed SCMaglev[b]	1,420,860
City of Baltimore, MD	593,490
Baltimore County, MD	827,370
Population served by the proposed SCMaglev for travel between Baltimore and Washington	2,522,879
Population served by the proposed SCMaglev for travel to BWI Marshall[b]	1,695,509[c]
Total population in the Baltimore-Washington region	8,102,628

[a] As of 2019 according to the US Census. Data in *.csv format: https://www2.census.gov/programssurveys/popest/datasets/2010-2019/counties/totals/co-est2019-alldata.csv. Description: https://www.census.gov/data/datasets/time-series/demo/popest/2010s-counties-total.html.

[b] A jurisdiction is served by the SCMaglev if the majority of its residents would save time riding the SCMaglev rather than making the trip by car. Baltimore County is included in the area served by the SCMaglev for travel between Baltimore and Washington largely because many Baltimore County residents would save time if they used the SCMaglev station at BWI. However, when the destination is BWI, then only the downtown Baltimore SCMaglev station can serve as a starting point, which is too far out of their way for most Baltimore County residents to find useful.

[c] This population is 20.93% of the Baltimore-Washington region's population.

Employing the same calculations used to determine the non-BWI Marshall trips, the first factor extrapolates the 2019 measured trips to 2045, the year of the official SCMaglev ridership forecast. The second factor is 0.02, the portion of the population wealthy enough to find the SCMaglev travel-time savings worth the SCMaglev ticket price. After combining these factors, the result is an unofficial forecast of 143,000 one-way SCMaglev trips in 2045 by BWI Marshall customers traveling to or from the airport on the proposed SCMaglev.

[660] Kelley, Owen. "Ridership Revisited: The Official Ridership Forecast for the Proposed Baltimore-Washington Maglev is a Factor of Ten Too High." August 2021. www.greenbeltonline.org/wp-content/uploads/2021/08/kelley202108.magrider.pdf. Extracted from Table 4. Page 25.

Add the 143,000 BWI Marshall trips to the 178,000 non-BWI Marshall trips the sum is 321,000 trips, which is far less than the BWRR's forecast of 20.6 million diverted trips. To be clear, the official (BWRR's) and unofficial (this analyses) forecasts are both estimates of the number of diverted SCMaglev trips that would be made in 2045. BWRR's forecast is a factor of **64 times greater than the independent, unofficial forecast** [Emphasis added]. (64 ≈ 20.6 ÷ 0.321).[661]

Dr. Kelley takes another publicly available data set to confirm the analyses presented to this point.

Table 2. Number of people commuting between Baltimore and Washington as estimated by the Census Bureau's American Community Survey (ACS) in 2015[a]

Job Location						
	Baltimore		Washington			
Location of Home	Baltimore City	Baltimore County	District of Columbia	Arlington	Alexandria	Total
Baltimore City			4,765	392	182	5,339
Baltimore County			5,120	369	247	5,736
District of Columbia	1,234	403				
Arlington	115	16				
Alexandria	231	436				
					Number of Commuters:	13,091
					Number of one-way trips per year:[b]	5.577 million

[a] Data from the US Census Bureau, 2015: Table 4, Residence MCD/County to Workplace MCD/County Commuting Flows for the United States and Puerto Rico Sorted by Workplace Geography: 5-Year ACS, 2011–2015. An Excel spreadsheet for the entire country with over 594,000 rows. On the web page titled "2011–2015 5-year ACS commuting flows." www.census.gov/data/tables/2015/demo/metro-micro/commuting-flows-2015.html.

[b] The total number of trips is the number of commuters times 426 one-way trips per year. The number of one-way trips per year is two (2) one-way trips per day of traveling to the office: 426 = 2 · 0.903 · 236. The factor of 0.903 comes from the fact that Washington-region workers spend, on average, 9.7% of their days teleworking rather than traveling to their office. The 236 figure is the number of weekdays in the year minus 10 federal holidays and minus 3 weeks of paid vacation (15 days): 236 = 365.25 (5/7) - (10 + 15) = 261 - 25.

If you multiplying the number of commuters by two trips per workday and by the average number of workdays in a year, the annual number of one-way commuting trips can be estimated. Using the same two factors noted earlier, the 0.93%-per-year increase in travel between the year that the data was collected (2015) and the SCMaglev forecast year of 2045. And as noted earlier, since only 2 percent of the population is wealthy enough to pay for the time saved with riding the SCMaglev as opposed to driving, multiply by 0.02. The result is this analysis forecasts that 147,000 one-way SCMaglev trips would be made in 2045 by diverted commuters, that is commuters who switch from other forms of transportation to ride the SCMaglev. In contrast, BWRR's forecast is that diverted commuters would

[661] DEIS. Official forecast of 20.579 million trips by diverted travelers. Chapter 4.2. Table 4.2-3. Page 4.2-7.

make 5.2 million one-way maglev trips per year. That makes BWRR's forecast is 35 times higher than the unofficial forecast (35 ≈ 5.2 ÷ 0.147).[662] All three of Dr. Kelley's analyses come to the same conclusion the ridership forecast in BWRR's DEIS is more than ten times higher than the referenced publicly available federal, state, and MWCOG datasets can support.

Elected officials at the local, county, and state levels have expressed concerns and stated that the SCMaglev would not be worth constructing because it would likely attract so few riders. The City of Greenbelt stated: "Of particular concern, the DEIS relies on undisclosed methodologies to predict wildly inflated ridership figures and savings in travel time. Based on reasonable ridership assumptions, it is unlikely the SCMAGLEV would be profitable."[663] The city also asserts the implausibly high ridership forecast is one reason why the SCMaglev's draft environmental impact statement appears to violate National Environmental Policy Act (NEPA) regulations.[664]

In 2021, the Prince George's County Council stated that it opposed the construction of the maglev because of a "lack of usage access"; that is, few county residents would ride it.[665] Also in 2018, the District 22 delegation to the Maryland state legislature expressed its concerns about SCMaglev ridership in the following way: "We are writing to express our strong opposition to the proposed SCMAGLEV Project. To date, we are far from convinced that the SCMAGLEV Project is necessary, environmentally sound, financially sustainable or that a market exists outside of deep-pocketed corporate executives." The co-signers were three members of the Maryland House of Delegates and a member of the Maryland Senate.[666] Numerous environmental organizations support public transit and strongly oppose the proposed Baltimore-Washington SCMaglev. For example, the Chesapeake Bay Foundation wrote in 2021: ". . . despite the overly generous ridership figures developed, we sincerely find it hard to fathom how the train can 'meet the capacity and ridership needs' in the region and the generalized corridor if it will only make one stop between its two terminal stations, and if a one-way ticket average fare was projected in this study to cost at least $60 (in 2020).[667]" In addition, 52 environmental organizations cosigned a letter in 2021 opposing the proposed Baltimore-Washington maglev for similar reasons.[668]

Both politically-aligned and non-partisan organizations and individuals have expressed concern that the proposed SCMaglev would not attract sufficient ridership to make it worth building. The CATO Institute, a libertarian think tank, published the following comments by transportation analyst Randal O'Toole:

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[662] The BWRR's forecast for diverted commuters is the product of 20.579 million trips by diverted travelers (Chapter 4.2, Table 4.2-3, pg. 4.2-7) multiplied by 25.4%, the percentage of SCMaglev trips that would be made by commuters (Appendix D4, Table D4-19, pg. D-35). 5.2 million = 20.579 million X 0.254.

[663] "Comments by the City of Greenbelt Comments also adopted by the City of College Park and the Town of Landover Hills." May 24, 2021. Page 4. https://aa247ef8-bd4a-4dd2-890c-8b5ebdf396e2.filesusr.com/ugd/6d0640_fb37e3e82cab4ff88183b565c09b406d.pdf.

[664] *Ibid*. Pages 22–25.

[665] "Council Says 'No' to Baltimore-Washington Superconducting Maglev Project." Prince George's County Council, Resolution CR-26-2021. https://pgccouncil.us/CivicAlerts.aspx?AID=1022&ARC=1553.

[666] District 22 delegation (2018).

[667] Kurtz, Josh – "Draft Environmental Impact Statement and Draft Section 4(f) Evaluation Baltimore-Washington Superconducting MAGLEV Project Comments Submission." Chesapeake Bay Foundation. May 24, 2021. Page 2. https://aa247ef8-bd4a-4dd2-890c-8b5ebdf396e2.filesusr.com/ugd/6d0640_dd1783ac780445fcb02619616faca327.pdf.

[668] See: Appendix: Environmental Organizations Opposing SCMaglev Sign on Letter to the Maryland Transit Administration. May 24, 2021.

"Clearly, the main users of the maglev line will be bureaucrats and lobbyists who will have someone else (mainly taxpayers) pay their way. What is less clear is why ordinary taxpayers should pay to build a line that they won't ever use."[669] On the other side of the political spectrum, Martin Mitchell, the president of the Prince George's County Young Democrats, stated: "It's obviously not going to be affordable to a lot of people so I don't understand how you expect to take a lot of cars off the road and be an alternative to driving.[670]"

XLIV. SCMaglev's Potential Ridership is Evaporating

COVID-19 Impact on Ridership

MARC ridership in 2019 was 9,030,928, with an annual average of 9,149,350 for years 2017 – 2019. With the impact of shutdowns brought on by COVID-19, ridership dropped 96 percent in 2020.[671] In 2022, the system had a ridership of 2,815,900, or about 11,800 ***less*** per weekday as of the first quarter of 2023, than pre-COVID-19 pandemic weekday ridership of 40,000.[672] As of July 2022, ridership increased to about 63 percent of its pre-pandemic levels and is expected to continue rebounding throughout 2023 as pandemic-related restrictions are lifted and more residents return to in-person work.[673] However, more pre-COVID-19 commuters are now leaving the area because they can work from home and are choosing to move to states with lower taxes.

Resulting from the pandemic and the implemented "lock downs," many knowledge-based workers teleworked from home, and as stated earlier, many still are. During the pandemic "lock downs" there was a massive expansion in the use of virtual meeting apps and, with the explosion in their use, these apps—Zoom, Skype, GoToMeeting, and others—have made significant improvements in reliability and access. The forced experience resulting from the pandemic "lock downs" has clearly shown employers and employees, especially knowledge-workers, that work can be performed at required levels of performance from home or other remote locations.

This sizable increase in telework is further supported by the Metropolitan Washington Council of Governments (MWCOG). Their survey of Washington, D.C. regional commuters found that the pandemic has caused a major shift in travel mode trend, including:

- Fivefold increase in telework.
- Threefold decrease in transit.

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[669] O'Toole, Randal. "Maglev to Destroy Habitat, Climate." April 6, 2001. Cato Institute. www.cato.org/blog/meglev-destroy-habitat-climate.
[670] Kelley, Owen A. "Ridership Revisited: The Official Ridership Forecast for the Proposed Baltimore-Washington Maglev is a Factor of Ten Too High." August 2021. www.greenbeltonline.org/wp-content/uploads/2021/08/kelley202108.magrider.pdf. Page 16.
[671] Maryland Department of Transportation (MDOT). MDOT MTA to Further Adjust Service as Ridership Declines Amid Covid-19 Emergency. April 10, 2020. Maryland Department of Transportation. www.mta.maryland.gov/articles/284.
[672] Wikipedia. "MARC Train." https://en.wikipedia.org/wiki/MARC_Train.
[673] MDOT. "Fall 2022 Service Changes." www.mta.maryland.gov/servicechanges/fall2022.

- Largest drop in drive alone trips since 2010. [674]

The article went on to say:

"Two-thirds (66 percent) of survey participants reported teleworking at least occasionally, up from 35 percent in 2019. Teleworking replaced nearly half (48 percent) of all weekly commute trips in 2022, up from 10 percent in 2019. Drive alone commuting accounted for 41 percent of weekly commute trips—the lowest share of these trips recorded since the survey began. However, for those traveling to work and not teleworking, driving alone continued to be the primary mode of transportation for commuters. 78 percent of trips to outside work locations were by driving alone, an increase of 14 percent from 2019."[675]

Transit experienced a threefold decrease in weekly commute trips since the last survey, accounting for 8 percent of trips in 2022 versus 24 percent in 2019 with commuters citing pandemic-related health concerns with shared travel modes."[676]

'Our 2022 State of the Commute survey is a comprehensive source of data illustrating how the COVID pandemic upended commuting in the metropolitan Washington region, most notably by accelerating an explosion in telework,' said Nicholas Ramfos, Commuter Connections Director."

Even before the pandemic, the advent of telework had already begun to reduce office space requirements, improve employee work life balance, and reduce funds expended for rent. Telework has now come to the fore. Coupled with future office planning incorporating "hot seating," open space, common work areas, and the next generation of workers who are comfortable with virtual meetings and the related technologies, employees will only come into "the office" on a weekly, bi-weekly, or monthly basis. Covid-19 has accelerated this evolution, which will allow agencies and their support contractors to reduce their office space, furnishings, and utility costs requirements, and plow the savings back into mission-related work. This development, coupled with federal agencies located in Washington, D.C., moving portions of their operations to other parts of the country, has and will continue to impact projected daily ridership of all forms of commuting in and out of our nation's capital.

[MCRT Editor's Note: As federal agencies and their support contractors are moving out of Washington D.C., the pool of potential SCMaglev riders is further shrinking.]

These changes will have significant impact on projected ridership of all existing transportation systems. As such, it raises more questions as to the need to build the SCMaglev.

[674] Metropolitan Washington Council of Governments (MWCOG). "Survey highlights 'telework explosion' and other regional commuting trends since pandemic onset." September 8, 2022. www.mwcog.org/newsroom/2022/09/08/survey-highlights-telework-explosion-and-other-regional-commuting-trends-since-pandemic-onset/.
[675] *Id*.
[676] *Id*.

High-end Earners are Leaving

And, as reported in *The Daily Record* on August 7, 2023:

> "As the number of Americans filing tax returns with earnings over $200,000 grows, these earnings are coupled with migration trends that are influencing states' finances, according to a new report from SmartAsset[677]. High earners are leaving states such as California and New York, instead choosing to move to states such as Florida and Texas."[678]
>
> "JP Krahel, professor of accounting at Loyola University Maryland's Sellinger School of Business, said the primary cause of migration of high earners has always been the variation in tax rates among states, and that many of the states with the highest increase in high earners have lower or no income tax, attracting households from states with higher tax rates."[679]
>
> "Maryland was the state with the **sixth-largest net outflows of high-earning households**, [emphasis added] trailing California, New York, Illinois, Massachusetts, New Jersey and Virginia, according to the report. Washington, D.C., would follow, and high earners left D.C. at a **faster rate than any state** [*bold emphasis added*]."[680]
>
> "High earners are leaving Washington D.C. The nation's capital lost a net total of 2,009 high-earning households between 2020 and 2021. As a percentage of all filers, high earners left D.C. at a faster rate than any state."[681] As reported by WTOP News on September 21, 2023, "High earners left Washington, D.C., costing the District in "$3 billion in taxable personal income."[682]

Another factor further reducing the SCMaglev's potential ridership pool is Baltimore City's continued population decline. Since 2010, when TNEM started talking about building and operating the SCMaglev, Baltimore City's population has ***declined*** by 8.2%, as seen in Table 3.[683]

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[677] Villanova, Patrick. "Where High Earners Are Moving – 2023 Study." July 26, 2023. https://smartasset.com/data-studies/where-high-earners-moving-2023.
[678] Kales, Eli. "Report: Maryland among states with highest loss of high-earning residents." *The Daily Record*. August 7, 2023. https://thedailyrecord.com/2023/08/07/report-maryland-among-states-with-highest-loss-of-high-earning-residents/.
[679] *Id*.
[680] *Id*.
[681] Villanova, Patrick. "Where High Earners Are Moving – 2023 Study." July 26, 2023. https://smartasset.com/data-studies/where-high-earners-moving-2023.
[682] Cooper, Kyle. "High earners who left DC during pandemic cost city $3 billion in tax revenue, data reveals." September 21, 2023. WTOP News. https://wtop.com/dc/2023/09/high-earners-who-left-dc-during-pandemic-cost-city-3-billion-in-tax-revenue-data-reveals/.
[683] United States Census (USC). Baltimore population data for 2010 through 2021 source: USA Facts. https://usafacts.org/data/topics/people-society/population-and-demographics/our-changing-population/state/maryland/county/baltimore-city/. Baltimore City population data for 2022 source: United States Census. "Quick Facts." www.census.gov/quickfacts/fact/table/baltimorecitymaryland/INC110221.

Year	Population	Year	Population
2010	620,942	2016	616,542
2011	620,493	2017	610,853
2012	623,035	2018	603,241
2013	622,591	2019	594,601
2014	623,833	2020	583,132
2015	622,831	2021	576,498
2016	616,542	2022	569,931

Table 3 Baltimore City's Population by Year for 2010 through 2022 (estimate as of July 1, 2022)

The BWRR documentation is deficient because it fails to provide the information that leads to the following questions:

- What are the ridership projections considering the impact of the increasing use of teleworking?
- How have the ridership projects changed as a result of agencies and support contractor experiences with maintaining ongoing operations during COVID-19 "lock downs"?
- How much have the ridership projections decreased as a result of the increasing use of telework and the pool of potential riders leaving Baltimore and Washington, D.C.?
- What level of taxpayer subsidy will now be needed to operate the SCMaglev? What is the projected increase in subsidies?
- What is the projected impact on Amtrak and MARC ridership and their respective subsidy requirements?
- SCMaglev's funding is reportedly a loan from a Japanese bank; how has COVID-19 loss of potential ridership affected that pledge? With loss of the population pool of potential riders, is Japan as willing to make a $5 billion loan? If the SCMaglev operation fails, will the United States and we as its taxpayers become accountable for the loan repayments?

This information must be made available for public review, with sufficient time to comment, before any decision to move forward with the building of the SCMaglev is considered.

XLV. Infrastructure Capacity Accommodation

The operations plan developed in Appendix G4 of the DEIS assumes 16-car trains (each approximately 1,300 feet long), which is what station platforms can accommodate.[684] (Note that the Baltimore-Washington International [BWI] airport station is somewhat shorter, which implies that passengers to and from this SCMaglev station will be segregated into designated cars.) The service plan in Table 5.1 of this appendix calls for eight trains per hour during peak periods. Given dwell times for boarding at the BWI airport station and for the desired turnaround time of 20 minutes or less at the end stations, it appears that eight trains per hour is at or near maximum capacity.

The BWRR documentation is deficient because it fails to address the following questions:

- How many total trains will the proposed SCMaglev need to function at peak periods?

[684] DEIS. Appendix G. Part K. Table 4.1. Page 4.

- What is the maximum number of trains the system can accommodate?
- How many trains can the Train Maintenance Facility (TMF) accommodate?
- How many trains will normally be stored in the TMF overnight?
- How many trains are stored overnight at the end stations?
- How many reserve trains and cars are kept on hand?
- Are any reserve trains kept at the end stations during daytime operations?
- This information must be made available for public review, with sufficient time to comment, before any decision to move forward with granting WQC, permitting, and the building of the SCMaglev is considered.

Summing over rows of DEIS Appendix D.2 Table D.2-1, the system capacity is 79,248 passengers per day in both directions, for a total of 158,496.[685] The forecasted ridership in Table D.2-2 is 70,069 or 77,764, depending on the Baltimore station location chosen, respectively. Hence the forecasted ridership is either 44 or 49 percent of this capacity.

Capacity can only be increased by adding cars, which may not be possible for the given station lengths or by increasing the rate of trains. If the system is eventually extended to points north (Wilmington, Delaware; Philadelphia, Pennsylvania; New York City, New York; Boston, Massachusetts) as advertised, how much of the original designed capacity is needed to accommodate passengers boarding in Washington, D.C., for these destinations?

To create additional capacity, trains could certainly be added during off-peak times, but the system is advertised as making regular commuting to these locations possible, so off-peak times may not be popular. However, reducing the allocation of tickets to local (Washington, D.C., to Baltimore) commuters would violate the basis on which the original system was approved. The operators would therefore have to sequester tickets for local commuters at the level prior to any line extensions. It should be noted that if FRA's reported analysis in the DEIS is correct, local commuters would suffer a loss in access to other transit systems after the SCMaglev would cause ridership and financial losses by pulling ridership from them. Express trains are considered in Appendix G4; however, outside these stations, there is only a single "track" in each direction in the Baltimore-Washington, D.C., corridor. The SCMaglev system might not be expandable, as currently designed, to meet the new requirements. Horizontal expansion of the alignment in both the tunnel and viaduct sections would be both prohibitively expensive and come with further adverse environmental and social impacts, surpassing the original construction. Moreover, additional trains might require expansion of the TMF and/or the addition of other TMFs further north.[686]

Another deficiency of the DEIS is TNEM's plan to build a second set of guideways from New York to Washington, D.C. At its February 27, 2019, BWI Business Partnership meeting, BWRR representative David Henley presented alignment diagrams showing another set of guideways between New York City and Washington, D.C., with no stops in Maryland - in effect, an express from New York to Washington, D.C. Building such a second set of tunnels and elevated guideways would multiply the costs to residents, communities, and our state environment, as presented and discussed throughout this submission. Further, without any stops in Maryland, we again would be exposed to myriad pollution and

[685] *Id*. Appendix D.2. Table D.2-1. Page A-2.
[686] Appendix – Reprint: Kowalski, M. "SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0." 2021. Page 35.

environmental impacts (e.g., more electricity generation, noise and vibration) with few receiving any benefits.

XLVI. Economic

An article reported that TNEM was formed in 2010 and is "being run with about $120 million that [TNEM CEO Wayne] Rogers has raised so far in startup capital, all from Individuals—all of whom wish to remain anonymous."[687]

Requests:

- For transparency and openness for the project, the FRA should identify the TNEM financial backers so the public can be assured that no undue or improper political pressures are being brought into play in the proposal review and decision process.
- For transparency and openness for the project, the investors should be identified so our residents can determine whether there are foreign government or agencies that wield undue influence in our state and country.
- This information must be shared with the public and given sufficient time for public review and comment before any consideration on a decision grant WQC to move the SCMaglev project forward.

Rogers, Chairman and Chief Executive Officer of TNEM (Northeast Maglev LLC), said: "Yes, we'll go raise private investment but it can't all be private investment. We can't rebuild our infrastructure 100 percent privately."[688] While the article listed the $5 billion loan from the state-owned Japan Bank for International Cooperation, he added: "The rest would need to come from a mix of private and public sources."[689] This opens the door for significant state and federal subsidies, and the burden will fall on taxpayers, the majority of whom will likely never use the system but will subsidize a train for the benefit of the elite.

The BWRR documentation is deficient because it fails to address the following questions:

- Without solid ridership and revenue studies that show the potential financial success of this venture, what private investors will be willing to participate?
- To qualify for a U.S. Department of Transportation (USDOT) loan, these private investors will need an investment grade rating from two nationally recognized rating agencies. Does TNEM have such a credit rating? If so, where is the documentation for justify the loan(s)?
- TNEM and BWRR are expecting funding from the federal government (public/private partnership) and a very substantial, minimum $5 billion loan from the Japanese. How does this project make the United States a technological leader in transportation infrastructure, as has been suggested, when it

[687] Terry, Robert J. "Do high-speed rail plans in the Baltimore-Washington region stand a chance?" *Washington Business Journal*. January 19, 2018. www.bizjournals.com/washington/news/2018/01/19/3-plans-for-high-speed-rail-aim-to-connect.html.
[688] Appendix - Articles Reprint: Park, Carol. "Maglev: A high speed train to higher taxes." February 7, 2018. The Maryland Public Policy Institute.
[689] Roberts, Terry. "Do high-speed rail plans in the Baltimore-Washington region stand a chance?" January 19, 2018. *Washington Business Journal*. www.bizjournals.com/washington/news/2018/01/19/3-plans-for-high-speed-rail-aim-to-connect.html.

is satisfying the Japanese desire to create a U.S. market for Japanese technology and their manufacturers and labor force?

- How is this proposal in keeping with the spirit and intent of Executive Order 13788, "Presidential Executive Order on Buy American and Hire American" (April 18, 2017)? The requirements of the executive order should apply. No exemption for a high-price train system for the elite should be granted, especially when doing so would further disadvantage the majority of middle- and lower-income communities, residents, and commuters.

Over the past century, several technological innovations were transformational but were not viable in the long term. The Zeppelin airship, the Concorde Supersonic Transport (SST), and the Shuttle are just a few. It is interesting that, while it was viewed as "transformational" by those who wanted to establish it, the SST was never profitable. It proved to be an unsuccessful venture from a profitability and ridership aspect. With many similarities in claims and promises with the SCMaglev proponents, the SST is a valid comparison to the current proposal, having failed financially for lack of ridership, just as South Korea's maglev train.

SCMaglev technology is one type of high-speed, ground-based transportation system technology. There are many steel-wheeled on steel track systems in commercial operation today. Where steel-wheeled on steel track has a long and proven record, the SCMaglev has not been proven viable as a fully commercially operational system anywhere in the world. Japan opened a test and development track in 1997, but its first commercial-scale SCMaglev train operations were not expected to begin until 2027, and this date has slipped. In a *Kyodo News* article dated July 3, 2020, the system builder and operator, J.P. Central, gave up on starting commercial service in 2027.[690] According to Chūō Shinkansen article on Wikipedia, as of September 7, 2023, the start date for commercial operations is now unknown.[691]

[MCRT Editor's Note: For the SCMaglev promoters to continue to say the SCMaglev is a proven, commercially viable system is false and misleading.]

A plan for upgrading and expanding rail infrastructure in the Northeast Corridor is already underway, financed in part with a $2.5 billion Railroad Rehabilitation and Improvement Financing (RRIF) loan. The NEC plan does not include building an SCMaglev system. In fact, the SCMaglev project would directly compete with its recommendations. The FRA, through the NEC Future Plan program has already developed a long-term vision and investment program for the NEC with regional stakeholders. Billions of dollars have already been committed and major upgrades to the existing Acela equipment are expected to be in place and operational between 2023 and 2024, with the Airo set to debut in 2026.[692]

[690] "JR Central gives up on opening new maglev train service in 2027." July 3, 2020. https://english.kyodonews.net/news/2020/07/a97dfd2524f6-shizuoka-says-no-to-construction-for-new-maglev-train-service.html.
[691] Wikipedia. "Chūō Shinkansen." September 7, 2023. https://en.wikipedia.org/wiki/Ch%C5%AB%C5%8D_Shinkansen.
[692] Airoidi, Donna M. "Flush With Infrastructure Funding, Amtrak Readies New Trains." January 23, 2023. *Business Travel News*. www.businesstravelnews.com/Interviews/Flush-With-Infrastructure-Funding-Amtrak-Readies-New-Trains.

As noted on the FRA's website:

> "TIER 1 RECORD OF DECISION. Selected Alternative. The FRA has selected a corridor-wide vision for the NEC that encompasses improvements to grow the role of rail within the transportation system of the Northeast. The Selected Alternative prioritizes a corridor-wide commitment to the existing NEC and brings it to a state of good repair as well as provides the additional capacity and service enhancements necessary **to address passenger rail needs through 2040 and beyond** [bold emphasis added]."[693]

Harper writes:

> "The $1.2 trillion infrastructure bill Congress passed includes much of the federal funding needed to pay for upgrades to the busy Northeast Corridor, including the Portal North Bridge and Hudson Tunnel projects, officials say. According to U.S. Rep. Mikie Sherrill, D-New Jersey, the bill includes $66 billion for passenger rail expansion and improvements. Of that money, $22 billion is for Amtrak, while $24 billion is in Northeast Corridor Modernization Grants. The $46 billion can be used to finance the completion of the Gateway Program on the Northeast Corridor, including the Hudson River Tunnel."[694]

Also note that during the long and costly FRA study that led to the approval of Amtrak's NEC Future Plan, building an additional rail alignment was considered, but it was found to be too expensive and unnecessary when plans for the existing systems upgrades and enhancements were considered.

The BWRR documentation is deficient because it fails to address the following question:

- Does it make sense for the USDOT approving (or the MDE to consider permitting) a new project that would undermine the success of another project it has already funded and will be completed very soon?
- This information should be made available for public review, with sufficient time to comment, before any decision to move forward with the building of the SCMaglev is considered.

In sum, the SCMaglev would have a negative impact on Amtrak's ability to repay the RRIF loan. As discussed previously, the DEIS states: "In 2030, Amtrak Acela, Amtrak regional rail, and the MARC commuter rail system are expected to accumulate a revenue loss of $23.2 million annually at full build out if Cherry Hill Station is selected, and a revenue loss of $24.8 million annually at full build out if Camden Yards Station is selected."[695] Table D.4-47 in the DEIS displays the ridership and revenue for the three rail systems in 2030 and the forecasted revenue loss resulting from passenger diversions to SCMaglev. The ridership estimates for SCMaglev in 2030 is based upon a 57.3 percent diversion of riders from each of the three rail lines to SCMaglev if the Cherry Hill Station is selected, and 61.3 percent diversion of riders from each of the three rail lines to SCMaglev if the Camden Yards Station is

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[693] Federal Railroad Administration (FRA). "NEC Future – A Rail Investment Plan for the Northeast Corridor." Record of Decision (ROD) for NEC FUTURE in July 2017. www.fra.dot.gov/necfuture/.

[694] Harper, Casey. "Bipartisan infrastructure bill passes, leaving larger Dem bill in limbo." *The Center Square*. November 7, 2021. www.thecentersquare.com/national/bipartisan-infrastructure-bill-passes-leaving-larger-dem-bill-in-limbo/article_e4a62e7e-3f81-11ec-93ba-8f88078e4f8c.html.

[695] DEIS. Appendix D.04. Section D.4D.2.4.9. Table D.4-47. Page D-54.

selected."[696] It should be noted that BWRR has more recently indicated they prefer building out the Baltimore station in Cherry Hill.

The MCRT SCMaglev DEIS Review Working Group finds it very interesting that the DEIS provides forecasts on ridership losses for Amtrak and MARC if the SCMaglev is built, but says nothing about the SCMaglev's ridership projections and the associated revenue. Why are the SCMaglev's ridership and financials not provided? What is in this information that TNEM does not want the public to know? What validation has the MDE undertaken to substantiate the projected SCMaglev ridership?

The BWRR documentation is deficient because it fails to address the following questions:

- Does it make sense for the MDE to approve the WQC for, or for the FRA to consider approving, a new ground-based transportation project that would undermine the success of another project it has already funded and is well underway??
- Has the MDE or the FRA considered how SCMaglev's diversion of Amtrak ridership would be contradictory to the current Administration's budget proposal that seeks to move . . . "Amtrak into the 21st Century with Sustained Investment? The discretionary request provides $2.7 billion for Amtrak, a 35-percent increase, to provide improvements and expansion on the Northeast Corridor and throughout the Nation's passenger rail network."[697]

This information must be made available for public review, with sufficient time to comment, before any decision to move forward with the building of the SCMaglev is considered.

Japanese researchers Anki and Kawamiya state that the SCMaglev "constitutes not only an extraordinarily costly but also an abnormally energy-wasting project, consuming in operation between four and five times as much power as the Tokaido Shinkansen (the Japanese wheel-rail high-speed train)."[698]

The BWRR documentation is deficient because it fails to address the following questions:

- From the operation of the Japanese experimental SCMaglev, these questions should be easy to answer:
  - What is the annual cost of electricity per mile to operate the train?
  - How does this electricity usage compare with Amtrak and MARC? What is the likely mix of generation sources (e.g., nuclear, natural gas, renewable) to be used to produce the electricity needed?
  - Where is the electricity coming from? As noted earlier, Maryland receives a majority of its electricity it uses from out of state sources.

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[696] *Ibid*. Page D-55.
[697] Young, Shalanda D. Letter: to The Honorable Patrick Leahy, Chairman Committee on Appropriations, United States Senate. "President's request for fiscal year (FY) 2022 discretionary funding." Executive Office of the President - Office of Management and Budget. April 9, 2021. www.whitehouse.gov/wp-content/uploads/2021/04/FY2022-Discretionary-Request.pdf. Page 27. Also see: "Passenger Trains > Biden's Proposed 2022 Budget for Amtrak." Moves Amtrak into the 21st Century with Sustained Investment. www.trainorders.com/discussion/read.php?4,5232094.
[698] Appendix – Reprint: Aoki, Hidekazu, and Kawamiya, Nobuo. Cited in Harding, Robin. "Japan's new maglev train line runs headlong into critics." Financial Times. October 17, 2017. Page 2.

This information must be made available for public review, with sufficient time to comment, before any decision to move forward with the building of the SCMaglev is considered.

The economic arguments contained in the BWRR documentation seriously underestimates adverse long-term (recurring) market responses on communities in Prince George's and Anne Arundel Counties, particularly along the viaduct portion.[699] Calculations are done only for regions around the three choices for the TMF and around the Washington, D.C., and Baltimore stations. The region around the BWI station is ignored because of the prevalence of airport functions. The impact radius chosen for calculations is only one-quarter (1/4) to one-half (1/2) mile. Together these choices produce: (a) increases in property values around the stations, as people are willing to pay more for housing within walking distance of transit, and (b) negligible losses in property value at both the Beltsville Agricultural Research Center site TMFs and minor losses at the MD 198 TMF. Further, the discussion emphasizes effects on the tax base, mostly ignoring losses in residential property values.[700]

A passage in the DEIS Appendix D.4 (Economics Impact Analysis) states:

> "Parcel record shapefiles obtained from Washington, D.C. and Maryland provide assessments of property values for parcels within a ¼-mile and ½-mile radius of the proposed transit stations. A property premium based on empirical research on property value outcomes in other locations is applied to the base parcel values. Studies have shown that an increase in property values near transit lines can range from 2 percent to over 167 percent, depending on the property type, transit mode, and proximity."[701, 702]

In the "Capturing the Value of Transit" report, notes ". . . that not every study of transit and property values has found a positive correlation (see Tables 2.2 and 2.3). For example, a 1995 study by John Landis found that values for single family homes within 900 feet of light rail stations in Santa Clara County was 10.8 percent lower than comparable homes located farther from light rail stations. The same study found that there was no value premium for office and retail property located within one-half mile of BART stations in the East Bay."[703]

The BWRR documentation appears to ignore that the underlying driver for property value increase is not only access to the transportation system. The affordability to make use of the transportation by most of the surrounding population must be considered as well. This is where the cost to ride the SCMaglev negates the proximity of the system, which also drives up property values. Also, with the proximity of the far-lower-cost MARC option at the newly rebuilt $4.7 million BWI Rail Station, there are few travelers in the BWI area who can or would select the SCMaglev over using MARC's comfortable, convenient, much less expensive, and covered-parking option.

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[699] DEIS. Appendix D.04. Section D.4D.2.5. Page D-58.
[700] Appendix – Reprint: Kowalski, M. "SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0." 2021. Page 13.
[701] DEIS. Appendix D.04. Section D.4D.2.5.1. Page D-58.
[702] "Capturing the Value of Transit." Center for Transit-Oriented Development. November 2008. Page 10. www.reconnectingamerica.org/assets/Uploads/ctodvalcapture110508v2.pdf.
[703] Landis, J., et al. "Rail Transit Investments, Real Estate Values, and Land Use Change: A Comparative Analysis of Five California Rail Systems," Institute of Urban and Regional Development, UC Berkeley. 1995. https://escholarship.org/uc/item/4hh7f652.

The Purple Line debacle was an object lesson in how inscrutable giant contracts with private corporations can leave the public held responsible for the cost. The state budget cannot tolerate the risk of another Purple Line. And, in addition, potential state budget cuts are looming due to ending federal financial support to state governments as the COVID-19 pandemic winds down.

For a current example of overpromising and underperforming, refer to California's experience with its high-speed rail system, which has become a financial nightmare. It has a record of massive overruns, building delays, and homes, businesses, and private properties taken, with still no working system as of this date.

Park states:

> "Finally, building the Northeast Maglev will inevitably disrupt the communities along the line because of noise and electromagnetic fields, not to mention the hurtling trains. As the Maglev will only make three stops, the affected residents are unlikely to experience any commercial or economic development in their neighborhood."[704]

The impact of the "hurtling trains" is further substantiated by the former *Baltimore Sun* reporter, Kevin Rector, who noted the following about the impact of vibration as the SCMaglev whizzed by homes near the guideway:

> "The 91-year-old Suzuki said when the first tests began in 1997, the train caused such a massive boom each time it emerged from its tunnel that homes shook violently. He said JR Central officials listened, and made good on promises to diminish the local impact — including by developing a hood to go over the track at the tunnel exit to reduce noise and vibration."[705]

[MCRT Editor's Note: There yet remains noise and vibration as the SCMaglev passes. Masonry structures subjected to ongoing vibration will eventually crack.]

Rector also reported:

> "One of the great things about taking technology that is actually in existence, and has been tested for years and years and actually has people riding on it, is we don't have to speculate about impacts," Rogers said. 'Are you going to have noise? We can actually measure the noise of a real train. Or, are you going to have vibration if you're in a tunnel? We can actually measure the vibration that's in a tunnel and come back with real numbers.'"[706]

[MCRT note: If you can measure the noise, where are the analyses and report(s)?]

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[704] Appendix – Reprint: Park, Carol. "Lessons from Asia for the Northeast Maglev." The Daily Record. Maryland Public Policy Institute. December 7, 2018. www.mdpolicy.org/research/detail/lessons-from-asia-for-the-northeast-maglev.
[705] Appendix – Reprint: Rector, Kevin. "It can be done': Futuristic Japanese maglev train could revolutionize travel from DC to Baltimore, and beyond." *The Baltimore Sun*. October 25, 2018. www.baltimoresun.com/maryland/bs-md-japan-maglev-20180531-htmlstory.html.
[706] *Id*.

XLVII. Ticketing

There appears to be no discussion about the ticketing process, which may affect passenger processing and, therefore, system operations.[707]

The BWRR documentation is deficient because it fails to provide the information that could answer these questions:

- Do riders buy a reserved ticket for a destination and a given train time or do they just buy a ticket and pick the next available train?
- In the former case, what do passengers do if their assigned departure train is unavailable because of a service disruption?[708]

This information must be made available for public review, with sufficient time to comment, before any decision to move forward with the building of the SCMaglev is considered.

XLVIII. Incomplete Modeling Results

DEIS Tables D.2-15 and D.2-16 do not give a complete picture of the modeling results.[709] They should both be split into two tables that show ante meridiem (AM) and post meridiem (PM) hours that include the peak periods (rush hour). Given its proximity to the SCMaglev, it is surprising that more entries along the Baltimore-Washington Parkway (BW Parkway) were not included in these tables. Motorists mitigate backups by choosing suitable alternate routes, which may require a decision at each and every interchange along a freeway, depending on their final destination ("bailout traffic"). Without higher fidelity in the presented data, it is difficult to obtain a complete picture. The following links along major North-South roads should be included: BW Parkway[710]@MD197 BW Parkway@I95, BW Parkway@MD410, BW Parkway@New York Avenue (Kenilworth-MD50 split), I95@MD32, I95@MD198, I95@MD200, MD29@MD32, MD29@MD198, MD29@ MD200. Finally, a summation row should be included at the bottom of each table.

Nevertheless, the current results presented in these tables do NOT support the claim that the SCMaglev reduces regional roadway traffic volumes in the 2045 Horizon Year compared with the No Build option. Indeed, for the BW Parkway@MD198 entry, the predicted volume increases compared with the No Build by 1.79 and 0.24 percent for the Cherry Hill and Camden station alternatives, respectively. There are few negative values in the percent change column between No Build and Build for the Cherry Hill option, and all the negative values for the Camden option are less than 1 percent. Thus, SCMaglev operations do nothing to decrease traffic congestion problem on the BW Parkway and, in fact, the data presented in the DEIS suggest building and operating the SCMaglev may make traffic matters slightly worse.

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[707] *Ibid*. Page 35.
[708] *Ibid*. Pages 11-12.
[709] DEIS. Appendix D.2. Pages A.5-25 to -26.
[710] "BWP" as used in the DEIS stands for the Baltimore-Washington Parkway. The MCRT uses the term "BW Parkway" to clarify references to the Baltimore-Washington Parkway.

Finally, it is difficult to reconcile the results in Table 4.2-3[711] for the row "Diverted from Auto" with the results in Tables D.2-15 and -16. The results in Table 4.2-3 for 2045 are 14,877,281 and 16,480,393, depending on the Baltimore station location. This is a daily average of 40,759 and 45,152, lumping weekday and weekends together. The net daily changes in Tables D.2-15 total show a few thousand.

One of the many questions the BWRR documentation fails to answer is:

- What are the origin points of the riders who diverted from automobiles and other vehicles (e.g., trucks and motorcycles)?
- This information must be made available for public review, with sufficient time to comment, before any decision to move forward with the building of the SCMaglev is considered.

It appears to be somewhere other than the regions reported in Tables D.2-15 and -16, which samples primarily the intercity corridor and not the Baltimore and Washington, D.C., city cores.[712]

The SCMaglev does not provide a commuter transportation system that supports a need in terms of real travel time, while touting a dubious travel time of 15 minutes from "DC to Baltimore" (sic) generically. For purposes of proper comparison of SCMaglev travel time with existing passenger rail between Washington, D.C., and Baltimore, the time purported by the SCMaglev as overall travel time should be measured as a trip between Mt. Vernon Square (D.C.) to Cherry Hill (Baltimore). There are several additional time periods left out of BWRR's specious 15-minute claim for the SCMaglev travel time:

- Time to travel (car, taxi, Metro, bus ride, walk) in congested traffic from home or work to the station/parking where the Mt. Vernon Square station is not co-terminus with the NEC.
- Time to enter the Mount Vernon Square station.
- Time to get in line to pass through security.
- Time to walk from security to the train platform.
- Waiting for the train to arrive to onboard.
- Waiting for the train to leave.
- Once at the destination (Cherry Hill, which is not in downtown Baltimore and not co-terminus with the NEC), offboarding the train.
- Time to walk to the outside of the station to obtain transportation (car, bus, light rail). Walking is not considered a viable option due to the distance to the downtown Baltimore area from the Cherry Hill station.
- All these "left-out" time segments add many minutes to the supposed "15-minute" trip from Washington, D.C., to Baltimore, not to mention any additional costs of parking or public transportation needed to get to and from stations in relation to the starting point and ultimate destination.

Any reference in the DEIS that promotes the inaccurate and misleading "15-minute" SCMaglev travel time between Washington, D.C., and Baltimore should be removed. This misinformation incorrectly conflates high-train speed with short passenger travel time, both in project analysis and public promotion. In order to protect the integrity of the NEPA process, particularly accurately informed public

[711] DEIS. Section 4.2.3.4. Page 4.2-7.
[712] Appendix – Reprint: Kowalski, M. "SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0." 2021. Pages 11-12.

comments on the DEIS and decisions made by public representatives and officials, this misinformation needs to be corrected.

XLIX. Traffic Analysis

Do the Metropolitan Washington Council of Governments (MWCOG) and Baltimore Metropolitan Council (BMC) regional traffic models accurately reproduce the present traffic count rates and reliability indices? In Section D.2E.2, the project sponsor adapted these models for the SCMaglev traffic analysis.[713] To determine potential ridership, the project sponsor identified travel volumes between key O/D pairs.[714] The choice of O/D pairs might influence ridership results and many pairs spanning the entire Baltimore-Washington corridor are necessary to understand traffic flow sufficiently.

The DEIS is deficient because it does not answer the following questions:

- What O/D pairs is the project sponsor using in projecting ridership?
- What methodologies are employed?
- How accurate is the modeling data?
- What are the validity assessments for the data and the modeling systems employed?
- This information must be made available for public review, with sufficient time to comment, before any decision to move forward with the building of the SCMaglev is considered.

The ridership results in Table D.2-2 are 70,069 for the Cherry Hill station choice and 77,764 for the Camden Yards station choice. [715] These are critical values of ridership to ascertain the financial viability and economics sustainability of the SCMaglev.

The BWRR documentation is deficient because it does not answer the following question:

- What is the sensitivity of those results to the input parameters (e.g., O/D pairs, ticket cost)?

This sensitivity might be expressed by putting an uncertainty range on the values, based on an accuracy measure of the input data and an assessment of the validity on the modeled results.[716]

L. Ground Truth Validation[717]

SCMaglev alignments are parallel to the BW Parkway throughout the entire viaduct and much of the tunnel sections. Therefore, for commuter car traffic between Baltimore and Washington, D.C., the SCMaglev will have its greatest effect, for better or worse, on this major artery. Model analysis is often validated using direct experience (ground truth) and the application of common sense. The observations and conclusions summarized below come from the principal reviewer of this document (Michael Kowalski, PhD), who commuted for 32+ years (1985-2017) from South Laurel (BW Parkway/Rt197 or BW

[713] DEIS. Appendix D.2. Pages E-115 to -118.
[714] *Ibid*. Page B-104.
[715] *Ibid*. Section D.2A.2.1. Page A-3.
[716] Appendix – Reprint: Kowalski, M. "SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0" 2021. Page 8.
[717] *Id*.

Parkway/Powder Mill interchange) to the U.S. Naval Research Laboratory in southeast Washington, D.C., along the BW Parkway to the "split" and then on Kenilworth Avenue (DC 295), a distance of 21 miles. Note also that this reviewer habitually listened to WTOP traffic reports every 10 minutes for the duration of the commute, which is factored into the observations:

- From the MD197 southward, the bulk of traffic is going south in the AM rush hour and north in the PM rush hour.

- Local centers of employment (e.g., Fort Meade/NSA and NASA/Goddard) and local commuting within Prince George's and Anne Arundel Counties account for a smaller but significant stream of traffic that may be opposite to the rush hour bulk directions.

- Overall, there has been a steady and even increase in traffic density and decline in reliability. Commuters have shifted travel times to accommodate so that "rush hour" is longer than an hour. In 1985, the typical commute was 30 minutes going south and 35 minutes going north. In 2017, that commute had increased about 10 minutes in both directions. (Note that about half of this commute time was on Kenilworth Avenue/DC295, which itself has gone through various phases of upgrade and repair.)

- Significant traffic backups and reduced reliability are generally caused not by high-traffic density alone, but by accidents, which may occur more frequently with high-traffic density. Accidents mostly occur at or near interchanges, where turbulence to the traffic flow is introduced by merging vehicles.

- The accident rate decreased markedly after BW Parkway refurbishments of the federal portion (18 miles south of MD175) were completed, the first major repair campaign to be done since the roadway was opened in 1954.

    - Repair, reconstruction, or replacement of all bridges, except for the I-95 bridge over the BW Parkway (which is owned by the State of Maryland) and the NASA exit bridge (which is owned by the National Aeronautics and Space Administration).

    - Reconfiguration or reconstruction of six interchanges (MD32, MD197, MD410, MD193, MD202/450, US/MD201), excluding the I95 and NASA interchanges.

    - Repair of underlying concrete slabs and joints, as well as recoating with asphalt, and widening shoulders on both sides of travel lanes.

    - While a third travel lane was not added, a long northbound exit lane from Powder Mill Road to MD 197 was added. The exit lane is critical in drawing off significant amounts of northbound PM rush hour traffic headed for points in Greater Laurel.

    - The work was completed over a three-year period (1999-2002) in phases, which successfully minimized traffic flow impacts.

- Overall, the BW Parkway refurbishments reduced accidents, particularly because of improved (longer) merge lanes. Traffic flow greatly improved as compared with the level of service in 1985.

- Note the presence of a third traffic lane on the state portion nearer to I695 and on southbound of MD202 to the "split," which also improves traffic flow in those portions.

- The present level of service on the BW Parkway has slipped from the level in 2002 to that shown for the PM rush hour reliability index in the DEIS,[718] which is about the same as that just prior to the 1999-2000 refurbishments. This figure chosen for the DEIS, taken from the 2019 Maryland State Highway Mobility report, is something of a worst-case scenario. The AM case is less severe, and this report has many informative figures and tables. There are several causes for this loss in level of service, among them:

    - A relatively higher accident rate at the Powder Mill and Route 197 interchanges, especially southbound during peak AM, primarily because of the large number of vehicles entering the highway from the Greater Laurel area. The Powder Mill interchange was not included in the 1997-2002 refurbishment.

    - The failure to regularly maintain the BW Parkway surface. At one point in March 2019, speed limits between MD197 and MD198 were dropped to 40 mph because a plethora of potholes had disabled many vehicles. This situation persisted for several months until emergency funds were found to resurface the road.

    - Growth in traffic volume.

The principal reviewer's experience is not unique. Along the SCMaglev viaduct section, two regional entities can be defined (data taken from United States Zip Codes.org[719]):

- Greater Laurel, including the incorporated City of Laurel, all zip codes that touch the BW Parkway, and/or zip codes for those regions often referred to as satellites of the City of Laurel.
    - ZIP codes: 20707, 20708, 20723, 20734, 20705, 20763, 20755
    - Population: 140,303

- Housing units (non-rental): 54,469
    - Greater Greenbelt, including the incorporated City of Greenbelt and one other zip code north of the BW Parkway/I95 interchange that touches the BW Parkway.
    - Zip Codes: 20770, 20769
    - Population: 31,777
    - Housing units (non-rental): 13,557

- A good fraction of the residents in these regions use the BW Parkway in commuting in the AM to points southward and entering at MD32, MD198, MD197, Powder Mill Road, and MD193. It goes

[718] DEIS. Appendix D.4. Section D.4D.2.4.2. Page D-39.
[719] United States Zip Codes.org. 2021 . www.unitedstateszipcodes.org/.

against common sense to expect any of them to drive north to the SCMaglev stations in Baltimore or at BWI to then go south to Washington, D.C. A similar argument holds for the reverse direction.

In summary, obvious conclusions can be drawn from these observations:

- Refurbishing BW Parkway interchanges (and those of other north-south arteries: I95, MD29) can increase level of service.
- Adding a third lane to the BW Parkway throughout its entire length would produce a high level of service without the SCMaglev.
- All roads require regularly scheduled maintenance to perform at design parameters.
- Commonsense arguments belie any hope that residents of Greater Laurel or Greater Greenbelt will use the SCMaglev for daily commuting.

Finally, in DEIS Section D.2A.15.2, the mitigation discussion for every single work site subsection requires regional roads to be maintained in good repair.[720] Funding for road maintenance is traditionally done using fuel taxes on trucks, but there is no guarantee that such taxes are obligated to any project. With the SCMaglev, massive construction will be going on more or less simultaneously along the whole alignment for at least three years. Thus, road degradation will exceed the available resources to keep impacted roads in good repair.[721]

LI. Synopsis of Problems in Japan with SCMaglev

SCMaglev technology under consideration in the DEIS in all alternatives except the No Build option has numerous limitations that make it a questionable choice for an expensive, impactful megaproject that will take at least seven years to implement. Multiple problems have come to light with the ongoing construction of the Linear Chuo-Shinkansen in Japan that could impact the implementation of the SCMaglev technology in the United States and lead to a very expensive and wasteful boondoggle. Chief among these issues is that the sole implementation of this technology is on a test "track" configuration in Japan. This only implementation of SCMaglev technology is not commercially operational and will not be until at least 2037, and likely later, long after the current planned release of the SCMaglev Final EIS and Record of Decision (ROD) by the U.S. FRA. Current total ridership on the test track in Japan is approximately 300,000,[722] which is about the number of riders on MARC in a week (Pre COVID-19). The test track opens to the public for free rides once every several weeks.

Another risky characteristic of the SCMaglev technology is that it is proprietary, unique to one provider, with only one incomplete system in prototype. Its choice for implementation of any alternative other than No Build will result in a transit system that is highly vulnerable. As Philepsen points out:

[720] DEIS. Appendix D.2, Section D.2A.15.2. Pages A-62 - A-83.
[721] Appendix – Reprint: Kowalski, M. "SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0." 2021. Pages 8-11.
[722] Patterson, Torkel. "High Speed Rail: Supporting Sustainable Development and Economic Growth." *Global Railway Review*. April 6, 2020. Retrieved from High-speed rail: Supporting sustainable development and economic growth on May 1, 2021. www.globalrailwayreview.com/article/99036/high-speed-rail-sustainable-economic-development/.

"In a time when there is a lot of talk about resilience, vulnerable systems are questionable. High-speed systems of any kind are far more vulnerable than traditional trains but Maglev poses its own set of vulnerability. Dependence on one single manufacturer and its patent is a huge vulnerability. The fact that Maglev trains can't derail, can't collide with each other (at least not on the same track) and may be thus safer than conventional trains doesn't eliminate its vulnerability as a monopoly."[723]

Not only is the Japanese implementation of SCMaglev Linear Chuo-Shinkansen proprietary, but on analysis, it is infeasible according to several other key aspects. "In his intensive analysis on the feasibility of the Linear Shinkansen plan, Hashiyama Rejiro considered three aspects; economic feasibility, technological reliability, and environmental appropriateness. He concluded that it was deficient in all three."[724] The build alternatives set forth in the DEIS, all involving the SCMaglev technology, should be independently evaluated against these three criteria to determine the feasibility of this technology as a better alternative to the No Build option.

Another development in the construction of the Linear Chuo-Shinkansen that could impact the implementation of SCMaglev technology in the United States is the refusal of the governor of the Shizuoka prefecture to allow construction because of environmental concerns. These concerns include "the construction's potential impact on 290 species of local flora and fauna as water levels at the local Oi River are expected to become lower due to earth moving work to build a tunnel, as well as the effects of water pollution on the environment."[725] The concerns raised by the citizens of Shizuoka prefecture highlight the need for further analysis of the environmental impact of the tunneling used with the SCMaglev before any consideration is given to move forward with the project.

Finally, as in the United States, transit patterns have changed due to the precautions adopted in response to the COVID-19 pandemic that may impact the availability of funding and support for the completion of the Linear Chuo-Shinkansen SCMaglev project in Japan, which is so expensive it will have to be subsidized with revenue from the high-speed rail service.

> ". . . commuting and travel patterns shaped by the rise of the Shinkansen are in flux, thanks to the growth of remote work during the pandemic. That's delivering a jolt to Japan's hidebound office culture, and potentially transforming the role and purpose of the rail network that serves it. In particular, major shifts in demographics and national travel patterns might complicate the arrival of the long-awaited next generation of the rail network: the $84 billion Linear Chuo Shinkansen, which could travel at more than 300 mph."[726]

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[723] Philepsen, Klaus. "Can Maglev trains make the US a leader in high speed rail?" *Community Architect Daily*. October 29, 2018. http://archplanbaltimore.blogspot.com/2018/10/can-maglev-trains-make-us-leader-in.html.
[724] Hidekazu, Aoki & Nobuo, Kawamiya. "End Game for Japan's Construction State - The Linear (Maglev) Shinkansen and Abenomics." *The Asia-Pacific Journal*. June 15 2017. https://apjjf.org/2017/12/Aoki.html.
[725] Yamada, Hideyuki. "Maglev train tunnel construction could affect habitat for 290 species: central Japan pref." *The Mainichi*. July 7, 2020. https://mainichi.jp/english/articles/20200707/p2a/00m/0na/011000c.
[726] Sieloff, Sarah. "Japan's Bullet Trains Are Hitting a Speed Bump." *Bloomberg*. October 14, 2020. www.bloomberg.com/news/features/2020-10-07/can-japan-s-bullet-trains-get-back-up-to-speed.

> "The scale of the current ridership crash is indeed huge. For the quarter ending June 30, 2020, Central Japan Railway Company (JR Central), which operates the Tokaido Shinkansen, the oldest and most profitable bullet train service, reported a revenue drop of almost 73% compared to 2019. Ridership on the Tokaido Shinkansen for the period of August 7 through 17 — typically one of the busiest travel periods of the year — was down 76%. Another company, JR East, posted its first-ever loss in the first quarter of 2020 and cut Shinkansen services by 40% starting in May; the company also slashed fares by 50% through March 2021. The company is projecting its largest net loss since Japan's railways were privatized in 1987, with estimated losses for FY2020 coming in at $3.96 billion (its FY2019 profit was $1.9 billion)."[727]

On April 17, 2020, JR Central President Shin Kaneko reported:

> "The number of passengers riding bullet trains on the Tokaido Shinkansen Line between April 1 and 15 has seen a decrease to just 15% of total passengers recorded in the same period of the previous year, announced Central Japan Railway Co. (JR Central) President Shin Kaneko at a regular press conference on April 16."[728]

The lack of a fully operational SCMaglev in Japan could cause severe impacts in the United States if the technology is implemented prematurely. Many property owners wonder if they even could obtain homeowner's insurance if an immature, partially developed technology runs under or close to their homes, or if premiums would be raised to cover unforeseen problems. The final EIS should address the problems surfacing in Japan as reflected in the credible sources cited and described within this comment. It also should consider the level of risk the alternatives using SCMaglev technology pose in light of these problems when making a final decision. The No Build option should be favored over any alternative using SCMaglev technology thus far presented.

LII. Demand, Costs and Impacts

In response to the questions posed at the outset of this section, below are our summary findings:

1. What is the problem the SCMaglev will solve?

The BWRR lays out the argument that with the projected population growth in the Northeast Corridor the need for a high-speed, ground-based transportation system like the SCMaglev is warranted. But BWRR's claims analyses, the applicant's WQC justification materials, and the DEIS are deficient in establishing what percentage of this population would likely use the SCMaglev. The analyses needed is an independent assessment of BWRR's claims which is not included in the applicant's WQC justification materials, or in the DEIS.

Conclusion:

[727] *Id*.

[728] Yamamoto, Yoshitaka. 'Tokaido Shinkansen bullet train passenger numbers plunge to 15% of same period in 2019." *The Mainichi*. April 17, 2020. https://mainichi.jp/english/articles/20200417/p2a/00m/0bu/010000c.

While the regional population growth will likely occur, there is insufficient information to assess if the increase in population will translate into substantial numbers of potential riders for the SCMaglev to generate the revenue needed to cover its expenses. Looking at worldwide experiences with such systems, there is a high likelihood that the SCMaglev will require tax dollars in the form of subsidies to meet operating and maintenance costs, as well as all loan servicing obligations, and meet tax obligations. To repeat, FRA has already stated that the planned expansion and upgrades to the existing Northeast Corridor Amtrak rail system will meet the needs of the region to 2040 and beyond.

2. Is there sufficient demand to generate the revenue needed to maintain and operate the SCMaglev?

As discussed earlier, analyses from the Maryland Public Policy Institute,[729] and Kelley's deep analysis,[730] the continued population loss of Baltimore, and the high-earners leaving both Baltimore and Washington, D.C., the raises serious questions about who and the numbers of people within the demographics of Baltimore residents would have the level of income to use the SCMaglev, instead of the MARC or bus services. And who lives in the immediate surrounding neighborhoods, that is the geographic areas from which SCMaglev use is an option. The results are clear, given the lower income level of the population within the potential ridership service zone, the likelihood is low to very low. To state this another way: SCMaglev is unlikely to be used by the majority of the existing Baltimore population. Add this limiting factor to the potential ridership population, and the significant rise in the use of telework by knowledge-based workers (from the remaining population pool who might use SCMaglev) as the result of COVID-19 lockdowns, and again the Baltimore population continues to shrink, as does the flight of higher end earners from both Baltimore and Washington, D.C. Given these ongoing population factors, the potential number of riders for the SCMaglev is crumbling.

Conclusion:

It is unlikely that in this scenario the SCMaglev will have (if they ever did have) the numbers of riders needed to maintain the financial stability of the operation.

3. What is the total cost to build this SCMaglev?

The total cost to build the SCMaglev can only be derived from investigating not only the financial costs, but also the costs to communities, businesses, alternative systems, and the environment. An assessment of the costs to residents, communities, and our environment to build the SCMaglev is not adequately provided in the applicant's WQC justification materials, nor the DEIS. Much more detailed, independently verified information and analyses needs to be provided. This submission by the MCRT attempts to identify and discuss the full costs of building and operating the SCMaglev. From the results of our research and investigations, and the research of others, and from what information we have been able to assemble, the findings are clear:

The cost residents, communities, and environment to build and operate the SCMaglev is extreme.

[729] Appendix - Article Reprint: Park, Carol. "Transportation Lessons from Asia for the Northeast Maglev." The Maryland Public Policy Institute. December 7, 2018.

[730] "Kelley, Owen. "Ridership Revisited: The Official Ridership Forecast for the Proposed Baltimore-Washington Maglev is a Factor of Ten Too High." August 2021. www.greenbeltonline.org/wp-content/uploads/2021/08/kelley202108.magrider.pdf.

With all the missing and obfuscated information, the lack of transparency about the real and total costs to build and operate the SCMaglev, and the presence of real, operational, affordable, and superior rail systems like Amtrak and MARC, the MDE and the FRA should no longer waste resources on considering building the SCMaglev and instead MDE reject the WQC request, and the FRA choose the No Build Option.

Wayne Rogers has stated: "Infrastructure is fundamentally a government responsibility, which has failed."[731] MCRT agrees. Many governments in other countries have failed by partnering with private companies to build trains that turned out to be costly, dangerous, and increasingly reliant on government; that is, on taxpayer support. We do not need to spend tax dollars to subsidize a train system for the wealthy when there are far more important transportation projects in need of funding, projects that serve and are used regularly both by D.C. residents and Marylanders.

"The most common argument levelled against maglev has always been to do with money, given that projects are required to start from scratch and cannot be integrated into a standard rail infrastructure. Floating trains don't appear to generate much profit, either – a case in point, the line in Shanghai is said to lose around $85m-$100m a year, according to some reports."[732]

So, in the final equation for the SCMaglev:

Baltimore income demographics limit potential ridership **+ PLUS +** Geographic area surrounding the SCMaglev stations limit on potential ridership **+ PLUS +** Costs to ride the SCMaglev versus alternative bus or the MARC system **+ PLUS +** Expansion of teleworking use and capabilities **+ PLUS +** The coming generation of workers comfortable with telework and virtual meetings **+ PLUS +** Population of Baltimore continues to decline **+ PLUS +** High-end earners leaving Baltimore and Washington, D.C. **+ PLUS +** The high cost to build and operate the SCMaglev **+ PLUS +** Safety and crashworthiness concerns with the SCMaglev **+PLUS +** The environmental destruction the SCMaglev will bring to Maryland **+ PLUS +** Better alternatives using existing Amtrak and MARC = **EQUALS** =

SCMaglev is too unproven, has safety and crashworthiness issues,
and is far too costly financially and environmentally,
compared with existing systems and their planned improvements.
The only SOLUTION is No WQC and choosing the No Build Option.

[731] *Id*.

[732] Davies, Ross. "Magnetic pull: China and Japan battle it out for maglev train supremacy." July 14, 2020. *Railway Technology*. www.railway-technology.com/features/maglev-train/.

LIII. Employment Projection Issues (Jobs)

See: https://northeastmaglev.com.

According to the 2021 DEIS, the construction of the SCMAGLEV project (Alternative J-03) is expected to create 161,000 job-years in the Washington-Baltimore-Arlington Combined Statistical Area over seven years, including 123,000 construction and 38,000 professional services job-years. For a few years, BWRR has been showing a slide claiming that building the SCMaglev will create 74,000 jobs in Maryland. However, the total jobs created nationwide has grown to the current number of 205,000, as shown on BWRR's SCMaglev website (see image above), and repeated in its WQC justification materials. The key observations to be made are that the jobs numbers have increased over the years, yet the estimated cost to build has only increased by $1 billion, and that illusory and incorrect terminology has been widely used by BWRR, as seen in the image above.

BWRR stated in 2015 testimony to the Maryland Public Service Commission: "BWRR estimates that the construction phase would lead to the creation of 74,000 'job-years' in Maryland."[733],[734] Footnote 17 in the BWRR written testimony gave the definition of "job-years":

"A job year is equivalent to a year of full time employment; a worker employed half time for 5 years is enjoying 2.5 job-years, and a full time worker working for ten years represents ten job-years. Data are from pages 4-5 of Exhibit B of the Direct Testimony of Witness Racciatti."[735]

What this means is that if it takes eight years to build the SCMaglev, then the number of full-time jobs will be 9,250, that is: 74,000 job-years divided by 8 years equals 9,250 jobs. BWRR and the Northeast Maglev (TNEM) in claiming 74,000 jobs or 205,000 jobs (as seen in the image above) have continued to use this inaccurate, misleading terminology in project analysis, public promotion, and the applicant's WQC justification materials, including the DEIS (BWRR documentation). Correct, accurate, and consistent terminology must be used in order to protect the integrity of the WQC and the National Environmental Policy Act (NEPA) process, especially considering the necessary outreach for public comments specific to what is represented in the BWRR documentation. Anything less has the clear appearance of an attempt to obfuscate the truth.

With the release of the DEIS in 2021, employment projections climbed to a potential 195,000 job-years, with only a small increase of the projected total costs of the SCMaglev. Again, the current number cited is 205,000. There have been numerous occurrences of using that number as "jobs" versus "job-years," which is misleading. It is also repeated by supporters of the project who clearly do not go deeper into the accuracy of what they have been told. In an article from the *Southern Maryland Chronicle*, TNEM

[733] The Louis Berger Group. "Ord87248, pp 7/31." Maryland Public Service Commission Testimony. October 14, 2015.
[734] Maryland Public Service Commission Testimony. Case No. 9355. Direct Testimony of C. Shelley Norman, PhD. October 14, 2015. Page 11.
[735] *Ibid*.

indicates up to 195,000 jobs, which is not what the DEIS states.[736] The DEIS clearly states "job-years" and not "jobs,"[737] yet TNEM and BWRR continue to misrepresent the benefits of the project.

The lack of transparency and the marketing of the "job opportunities" is misleading in other ways. These figures give the impression that they reflect new, full-time employment opportunities. In project management, the level of effort that is represented by "job-years," in addition to new jobs, includes existing jobs that "touch" the project:

- ALL of the current BWRR and TNEM employees including executives, administrative staff, support staff, technical, and engineering staff.
- Currently employed full-time staff at consulting technical companies.
- Currently employed manufacturing line employees, such as those in Japan who work for Central Japan Railway Company (JR Central), the maker and manufacturer of the trains and the technology that support the train.
- Currently employed JR Central executives, administrative staff, support staff, and technical and engineering staff.
- Currently employed support and service industry employees, e.g., those who work for food, delivery, cleaning, printing, and advertising services.

If not employed by the SCMaglev project, unions would have other jobs lined up to support the Amtrak infrastructure improvements, as well as MARC and other transportation infrastructure improvements. This SCMaglev project would not have the impact touted by its proponents, and it is not going to have any measurable impact on reducing unemployment.

In other DEIS job creation estimate inconsistencies (Section ES.4.3.1[738]), the number of permanent jobs created by the SCMaglev project is given as 390 to 440. In Appendix G15,[739] the employment range is given as 1,350 to 2,080. Again, even within their own documents, the job number vary.

The applicant's WQC justification materials and the DEIS are deficient because they fail to provide the following information, which leads to the following questions:

- Why are these discrepancies present in the various job estimates?
- What is the source of these apparent discrepancies?[740]
- What are the actual number of jobs, temporary and permanent?
- What methodologies are employed to generate these estimates?
- What are the sources of these data?
- How are the data for these models validated?

[736] Cox, Jeremy. "High-Speed Train Could Go Through 'Irreplaceable' Land In Maryland." *The Southern Maryland Chronicle*. March 3, 2021. https://southernmarylandchronicle.com/2021/03/03/high-speed-train-could-go-through-irreplaceable-land-in-maryland/.
[737] DEIS. Appendix-D.04. Table D.4-6. Page D-18.
[738] *Ibid*. Section ES.4.3.1. Page ES-15.
[739] *Ibid*. Appendix G15. Table 1. Page 2.
[740] Appendix – Reprint: Kowalski, M. "SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0." 3031. Page 13.

This information must be made available for public review, with sufficient time to comment, before any decision to move forward with the permitting of, or the building of the SCMaglev is considered.

Request:

- The FRA must independently produce or validate the jobs projections and provide the methodologies and data sources used to produce them. Providing a certification based on unverified claims compromises the very integrity of that certification.

This information must be shared with the public and given sufficient time for public review and comment before any consideration on a decision to move the SCMaglev project forward.

While neither MARC nor Amtrak have made service plans to mitigate the ridership losses predicted in the transportation analysis, it is apparent that jobs will be lost. However, without specific plans these losses cannot be quantified. In fairness, they also should not be ignored.

BWRR should state that if Amtrak and MARC lose jobs resulting from the ridership losses to the SCMaglev operations, their estimated positive jobs economic impact of 390 to 440 permanent jobs produced would thereby be reduced by job losses suffered by Amtrak and MARC, and possibly others. The potential job losses and the actual net job impact of the SCMaglev has yet to be quantified.[741] Without precise job categories, it is not yet possible to determine whether workers at MARC and Amtrak can transfer their job skills to the SCMaglev, or even if the SCMaglev jobs at the displaced skill level will be filled by American workers. Thus, it is possible that there may be no net gain in transportation jobs produced by the SCMaglev; in fact, as Japanese workers are part of the labor mix, it is possible the net impact could be job losses for American workers. With the information available, it looks more likely there will be a net loss. Moreover, the $24.3 to $27.4 million in earnings from the SCMaglev[742] is approximately offset by competing transportation systems losses of $23.2 to $24.8 million (year 2030), as shown in DEIS Table 4.6-2.[743] Similar calculations might offset gains predicted for the SCMaglev in other parameters such as emissions. In effect, the SCMaglev may be approximately neutral, providing no significant gain in the transportation sector other than the time saved, for which SCMaglev users would pay a premium.[744]

[741] DEIS. Section ES.4.3.1. Page ES-15 and elsewhere.
[742] *Ibid*. Chapter 0. Section ES.4.3.1. Page ES-15.
[743] *Ibid*. Section 4.6.3.2. Page 4.6-1.
[744] Appendix – Reprint: Kowalski, M. "SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0." 2021. Page 16.

LIV. BWRR Lacks Transparency in Operations and Maintenance Costs

Appendix G15 in the Superconducting Magnetic Levitation (SCMaglev) Draft Environmental Impact Statement (DEIS) states that operation and maintenance (O&M) cost information is proprietary; therefore, the Federal Railroad Administration (FRA) has agreed to accept an O&M staffing analysis. Specifically: "Based on a call with FRA on January 28, 2020, FRA agreed to accept an O&M staffing analysis in lieu of proprietary O&M cost information."[745] Given that a significant amount of taxpayer funds likely will be solicited, financial viability is a major concern and important details (such as debt service costs) need to be disclosed.[746]

The Baltimore-Washington Rapid Rail (BWRR) Water Quality Certification (WQC) justification materials and the DEIS (BWRR documentation) are deficient because both fail to address the following questions:

- What are the detailed projected O&M costs?
- How were these costs identified and how was the level of cost determined?
- What measure(s) of accuracy and validity are employed to assure the accuracy of these projections?
- Why is this information critical for assessment of the financial viability of the SCMaglev proposal not provided?
- When will the FRA make this information available, in a clear, complete, and unredacted form?

This information must be made available for public review, with sufficient time to comment, before any decision to move forward with the building of the SCMaglev is considered.

LV. Capital and Construction Costs

In Appendix G.9 (Capital and Construction Costs), items 50-100 are blank.[747] The elements are:

- Systems
- Row, Land, Existing Improvements
- Vehicles
- Professional Services
- Unallocated Contingency
- Finance Charges

These elements book the costs of rolling stock, presumably including their superconducting magnet bogies eElectromagnets). None of the sub-elements of element 10 Guideway and Track seem to book (power down) their superconducting magnets. Yet the grand totals (after including escalation costs) are in rough agreement with the $10 to $12 billion total costs shown for top-level project construction costs

[745] DEIS, Appendix G. Part L Page 213.
[746] Kowalski, M. Appendix – Reprint: “SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0.” 2021. Page 18.
[747] DEIS. Appendix G-9. Page 199.

in the bottom row of Table ES4.3-2.[748] It strains credulity to expect that the SCMaglev critical components and the rolling stock together are negligible costs.[749]

The applicant's WQC justification materials, and the DEIS, are deficient because both fail to address the following questions:

- Where are the costs of these critical components costs accounted for?
- Are these component part of the $5 billion loan from the Bank of Japan?

This information must be made available for public review, with sufficient time to comment, before any decision to move forward with the building of the SCMaglev is considered.

LVI. Project Risk Management, Risk Buy Down, Failure, and Decommissioning

There are serious concerns regarding a number of project management issues. The lack of transparency and substantiation of realistic project cost estimates, timelines, and employment claims is not acceptable. That BWRR and the Northeast Maglev (TNEM) can be allowed to hide ALL meaningful information behind claims of "proprietary" is simply not believable. Further, the range of estimates presented vary so widely that the project management qualifications should be questioned.

For example, BWRR stated in 2015 testimony to the Maryland Public Service Commission: "BWRR estimates that the construction phase would lead to the creation of 74,000 'job-years' in Maryland."[750] Since the release of the DEIS, however, this employment "claim" has risen from 74,000[751] to currently between 161,000 and 195,000 job-years (now 205,000 job years),[752] while the projected cost has barely changed with the addition of approximately 120,000 jobs. How is this possible?

While some may be encouraged by the increase in the number of jobs, it is indicative of a deeply concerning and serious issue: The estimate changes demonstrate quite clearly that there is a serious lack of project management knowledge in terms of the level of effort required to build this system. This has a direct impact on the cost of the project that will cost billions of dollars. According to the Bureau of Labor Statistics, the mean average wage in the construction and extraction industries is $53,940 per year.[753] The range of project cost for salaries and wages alone would be incredibly significant, from $4.69 to $6.53 billion dollars as calculated in 2021. With significant inflation and wage growth since 2021, the projected salary and wages totals have increased, while BWRR is sticking to a maximum cost to build of $16 billion.

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[748] *Id*. Chapter 0. Table ES4.3-2. Page ES-20.
[749] Appendix – Reprint: Kowalski, M. "SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD v4.0." 2021. Pages 4-5.
[750] The Louis Berger Group. "Ord87248, pp 7/31." Maryland Public Service Commission Testimony. October 14, 2015.
[751] Appendix - Article Reprint: Smith, Mark. "Will Maglev be rolling soon?" *The Business Monthly*. November 11, 2020.
[752] DEIS. Chapter 4.06. Section 4.6.3. Page 4.6-8.
[753] U.S. Bureau of Labor Statistics (BLS). Occupational Employment and Wage Statistics. May 2020. Construction and Extraction Occupations. Retrieved April 27, 2021. www.bls.gov/oes/current/oes470000.htm#(2).

See relevant job-years calculations below:

Low end of the range: 161,000 job-years – 74,000 job-years = 87,000 job-years.
87,000 job-years X $53,940 per year = $4,692,780,000.

High end of the range: 195,000 job-years – 74,000 job-years = 121,000 job-years.
121,000 job-years X $53,940 per year = $6,526,740,000.

These calculations use the very low-dollar figure of $53,940 for ALL employees. The average salary would increase considerably were the executive, technical, and consulting wages to be factored in. As it stands, the job description classification information and associated hours per task have not been made available for independent assessment and evaluation. This lack of information is a serious deficiency in the DEIS and it denies public review and comment on this critical aspect of the SCMaglev proposal. Without this critical information, the number of jobs purported by the SCMaglev appears to be in support of their marketing effort rather than the need to provide honest, accurate, and valid data.

Also missing from the BWRR documentation are those project management documents that provide any substantiation to these job-years claims. Notwithstanding that work breakdown structures and schedules are not available, or in proof of existence, the range of miscalculation in the level of effort increases the cost of the project by an almost additional 50 percent. And the project has not even been approved. What will be the amount of the next level of effort estimation? Those who receive government funding should be good stewards of the government's money (our taxpayer dollars). Included in that is transparency in all stages of a project.

The risk management portion of this project is lacking. In a supplemental SCMaglev DEIS, or otherwise in the final EIS, this information needs to be available prior to the record of decision (ROD). MDE should also have this information prior to any consideration of granting a WQC to BWRR.

Request:
The FRA must direct BWRR to develop, implement, and publish an ongoing risk management assessment throughout all phases of the SCMaglev project's life—planning, construction, operations, maintenance, upgrade, decommissioning, and possible failure of the SCMaglev system. The MDE should review this documentation prior to any consideration of granting a WQC to BWRR.

- This assessment must be transparent to stakeholders, including the public, and proactively address internal and external risks to the project itself. This is distinct from SCMaglev project-sourced risks to the community: Health & Safety, Section 4(f), and so forth, which are addressed elsewhere in the DEIS. This ongoing risk management assessment must provide:
  - ISO 31000.[754]
  - Initial and annual itemized risk buy-down budget (regardless of funding source).

[754] "IWA 31:2020 Risk management — Guidelines on using ISO 31000 in management systems." TC > ISO/TC 262. July 2020. www.iso.org/standard/75812.html?browse=tc.

- The FRA must provide an independent assessment of the work breakdown analyses and estimated labor hours and associated number of jobs, over the construction and operation phases. Further, this information must be provided to the MDE.
- The FRA must direct BWRR to publish and implement an SCMaglev Decommissioning Plan and itemized decommissioning budget (regardless of funding source). Further, this information must be provided to the MDE.

This information must be shared with the public, with sufficient time for public review and comment, before any consideration on WQC decisions, or to move the SCMaglev project forward.

It is not clear that another company would or could take over sponsorship and operation of the SCMaglev should the system fail or go bankrupt. The SCMaglev uses proprietary, exotic, sole-source, and foreign-sourced technology, as well as potentially toxic, difficult, and costly-to-dispose-of materials and excavations.

A decommissioning plan needs to be developed and shared with the public that addresses how impacted communities will be fully restored to their pre-construction status. This would include environmentally safe removal of all above-ground, at-grade, and underground structures and facilities, and RODs, to name a few. It would also include restoring pre-construction status to impacted residents and community facilities within or outside the limits of disturbance. This goes beyond usual construction and performance bonds.

Decommissioning costs would be included with total SCMaglev lifecycle costs (regardless of funding source), for comparison with the total lifecycle costs of other relevant transportation systems and their decommissioning costs, as well as their likelihood and difficulty of decommissioning. This would also include a plan and budget and the identification of funding sources for:
- Removal of all SCMaglev equipment and facilities.
- Restoration of all SCMaglev rights-of-way to pre-construction status quo.

To date, there has not been a comprehensive cost versus benefit analysis provided. This analysis is a standard for any project management team, but has yet to be presented to the public for the SCMaglev project. Only snippets of unsubstantiated claims of success and impact have been presented. BWRR has failed to present “how” any of this is going to be achieved. As the MDE knows, the National Environmental Policy Act process demands that such a high-dollar and high-negative impact project be presented with plans and documentation from a much-higher-caliber project management team.

LVII. Better Alternatives for Maryland

There are far better, less costly alternatives for Maryland than building and operating the SCMaglev, with far fewer environmental impacts. They are Amtrak, the Maryland Area Regional Commuter (MARC), and the Virginia Railway Express (VRE).

LVIII. The Applicant's WQC Justification Materials are Deficient as it Fails to Compare the SCMaglev With Similar Ground-based, High-speed Systems, Existing and Planned.

Baltimore-Washington Rapid Rail (BWRR)'s Water Quality Criteria (WQC) justification materials and the Federal Railroad Administration's (FRA) Draft Environmental Impact Statement (DEIS) (BWRR documentation) ignore identifying and discussing the Superconducting Magnetic Levitation (SCMaglev) benefits compared with other rail transportation systems currently in operation. With the SCMaglev plan to provide service along the Northeast Corridor—from Washington, D.C., to New York, and onto Boston—their system is in direct competition with Amtrak. For the initial segment between Washington, D.C., and Baltimore, the SCMaglev is in direct competition with Amtrak and the Maryland Area Rail Commuter (MARC) rail systems. As discussed in "Purpose and Need," the lack of these analyses of the alternatives to the SCMaglev project violates the National Environmental Policy Act (NEPA). NEPA requirements are clear, requiring that any proposed system of the size and impact the SCMaglev would bring ***must*** be compared with alternate and existing systems to clearly show that the superiority of the proposed system warrants the economic, social, and environmental impacts on the affected communities. The BWRR documentation has so skewed the applicant's WQC justification materials and has in effect ". . . contrive[d] a purpose so slender as to define competing 'reasonable alternatives' out of consideration,"[755] which the court ruled in Simmons v Corps 120 F.3d. 664, 666 (7th Cir. 1997) that an agency is not permitted to do. Because the SCMaglev DEIS fails to provide this required comparison to existing and competing systems, it is seriously deficient in justifying this project. With these glaring deficiencies, the MDE should deny the WQC, even as should the FRA should choose the "no build" option.

There are two clearly comparable systems to the SCMaglev already in existence and operating: Amtrak (including Amtrak's Acela) and the MARC.

LIX. What is the SCMaglev?

The SCMaglev train is a high-speed, ground-based passenger transportation system currently being developed and tested in Japan. Its technology is based on research first conducted by James Powell and Gordon Danby at the U.S. Department of Energy's Brookhaven National Laboratory in 1960.[756] Their

[755] See "Purpose and Need, Concerns and Question" Section 4.
[756] Appendix – Reprint: Woomer, Dan. "SCMagLev – A Short History of MagLev Development and its Potential Future." November 8, 2017.

designs and patents include superconductive levitation, with superconductive magnets in the vehicle, electromagnetic levitation of the vehicle from the guideway, the Null Flux Loop design, and the Linear Synchronous Motor. In place of steel wheels running on steel rails, the system employs a magnetic field to levitate the train above the guideway and a magnetic alternating current manipulated frequency field, known as a linear synchronous motor, to propel the train along the guideway.

LX. What Value Does the SCMaglev Bring?

The increasing population, growing impacts of climate change, and need to protect green space and water from pollution drive the need for improvements in our transportation systems. As Vuan and Casello note, we are facing:

". . . two serious transportation problems in urbanized regions and in major intercity corridors. First, highway and street congestion have become a chronic problem, causing longer travel times, economic inefficiencies, and deterioration of the environment and quality of life. Second, congestion problems are occurring at airports, with similar high user and social costs."[757]

While the BWRR promotion of the SCMaglev technology hypes it as the "best" solution for the current and future needs of commuters along the Northeast Corridor, real-world experiences with maglev compared with high-speed rail paints a different picture. As noted by Vujan and Casello, when the three most important system characteristics of maglev and high-speed rail are compared side-by-side, the practical choice is in favor of high-speed rail:

(1) Developments in high-speed rail technology have reduced the advantage of maglev in higher speeds, so the differences in travel times on typical interstation spacings are minimal.

(2) High-speed rail has a large advantage over the maglev due to its compatibility with existing rail networks.

(3) High-speed rail involves a lower investment cost, while operating costs of the maglev (specifically the SCMaglev) are still uncertain, although the evidence in the Vujan and Casello report shows the operating costs for the maglev (which includes the SCMaglev) are higher in several areas. In one key cost area, energy consumption is estimated to be lower for high-speed rail. This is reinforced with research from Japan that found the SCMaglev can use up to *five times* the energy compared with high-speed rail.[758,759]

[757] Appendix – Reprint: Vujan, Vukan, and Casello, Jeffrey M. "An Evaluation of Maglev Technology and Its Comparison with High-Speed Rail." *Transportation Quarterly*. March 2002. https://repository.upenn.edu/entities/publication/c6fa9c12-d045-49a7-9477-86343e7fabcb.
[758] Aoki, Hidekazu, and Kawamiya, Nobuo. Cited in Harding, Robin. "Japan's new maglev train line runs headlong into critics." *Financial Times*. October 17, 2017. www.ft.com/content/5d4e600a-9e12-11e7-8b50-0b9f565a23e1.
[759] Aoki, Hidekazu, and Kawamiya, Nobuo. Cited in Davies, Ross. "Magnetic pull: China and Japan battle it out for maglev train supremacy." *Railway Technology*. Last Updated May 29, 2020. www.railway-technology.com/features/maglev-train/.

As U.S. and international maglev system promoters have done previously, BWRR promoters " . . . claim that their system can achieve higher speeds, have lower energy consumption and life cycle costs, attract more passengers, and produce less noise and vibration than high speed rail."[760]

The travel time difference between high-speed rail and maglev is small for short distances. While SCMaglev promoters talk about its speed, this does not necessarily connote a faster trip. Station location(s), access to the stations, and the distance of the rider from the trip's start and ending stations play an important role in determining the total transit time to the rider's desired destination, as does the cost of a ticket.

Energy and CO_2

As noted earlier, Aoki and Nobuo reported that the SCMaglev can use up to five times the energy compared with high-speed rail. In the DEIS, BWRR states that the SCMaglev should be built because it would reduce CO_2 emission by two million short tons. In the applicant's WQC justification materials, BWRR states it would reduce CO emissions by 2,199,369 metric tons over a 30-year period.[761] However, no details or information to substantiate this claim have been provided. Independent analysis finds constructing the SCMaglev track between Baltimore and Washington, D.C., would likely release 0.5 to 0.9 million short tons of CO_2.[762] Further, this does not include the regional loss of CO_2 absorption with the destruction of over 200 acres of current intact greenspace and forested areas.

The DEIS states that the SCMaglev operations between Baltimore and Washington, D.C., will NOT be carbon neutral. Specifically, the DEIS states: "the SCMAGLEV system and ancillary facilities will increase net transportation energy consumption by approximately 3.0 trillion Btus. For context, this would be enough energy to power around 88,900 average homes for one year."[763]

Currently, according to the Energy Information Administration's (EIA's) 2022 data, about 73 percent of Maryland's electricity is generated from nuclear and natural gas, while coal-fired plants generate about 14 percent (data as of 2021).[764] Generating the electricity needed to operate the SCMaglev would increase CO_2 emission (Akoi and Kawamiya, 2017[765]). As noted in the EIA's Maryland [Energy] Profile Analysis, Maryland consumes about five times more energy than it produces. Maryland purchases about 80 percent of its energy from surrounding states, as well as fuel from foreign countries. As the cost of electricity is increasing, the door is opened to higher energy costs.

Question:

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[760] Appendix – Reprint: Vujan, Vukan, and Casello, Jeffrey M. "An Evaluation of Maglev Technology and Its Comparison With High-Speed Rail." *Transportation Quarterly*. March 2002.
[761] BWRR Social and Economic Justification 2021. Section 2.3.1 Improved Air Quality. Table 12. Page 19.
[762] Appendix – Reprint: Kelley, Owen. "Would the Proposed Baltimore-Washington Maglev Increase Greenhouse Gas Emission?" Issues Forum, Prince George's Group, Sierra Club Maryland Chapter. December 13, 2020. www.sierraclub.org/maryland/prince-georges/blog/2020/12/would-proposed-baltimore-washington-maglev-increase-greenhouse.
[763] DEIS. Chapter 4, Section 19 "Energy." Page 4.19-11.
[764] U.S. Department of Energy (DOE). "Maryland State Profile and Energy Estimates." Energy Information Administration (EIA). October 15, 2020. www.eia.gov/state/analysis.php?sid=MD.
[765] Aoki, Hidekazu, and Nobuo Kawamiya. Cited in Davies, Ross. "Magnetic pull: China and Japan battle it out for maglev train supremacy." *Railway Technology*. Last Updated May 29, 2020. www.railway-technology.com/features/maglev-train/.

- How has BWRR specifically incorporated the rising cost of electricity in their operation and maintenance costs?

The DEIS ignores the one technology that exists and is evolving to address these mounting pressures on our transportation infrastructure. This is high-speed rail, which has a proven history of efficiently moving large numbers of passengers reliably, safely, and comfortably, and at lower cost.

In a comparison of transit times between the maglev and high-speed rail, at a non-stop travel distance of 150 miles:

- At 100 mph, the travel time is 1.5 hours (both Amtrak and the MARC can travel at speeds in the 100+ mph range).
- At 200 mph (the speed at which the next generation of the Acela—currently in final, pre-commercial operation testing—can run), the travel time is 45 minutes.
- At 300 mph (the SCMaglev), the travel time is 30 minutes, only a 15-minute difference from running at 200 mph, for the 150-mile trip.

As the distances between trip starts and their final destinations decrease, the travel time differences shrink considerably. Thus, on shorter distances, as between stations in the Northeast Corridor, the savings in travel time between the SCMaglev and high-speed rail are so insignificant as to not justify the high cost to build and operate anything other than high-speed rail. Again, (1) the proximity of the rider to the starting and ending stations and (2) the time and means used to access these stations contribute to the total time in transit.

Station Locations Difference

The Baltimore City train stations—Penn Station (serviced by both Amtrak and MARC) and West Baltimore and Camden Yards (serviced by the MARC)—are located near residential and business districts. The SCMaglev station in Cherry Hill is located on the southern outskirt of Baltimore City, five minutes or more from the heart of the Baltimore business district, in a poorer residential area, with a median household income of $27.4K.[766]

Travel Time Difference

With the current track configuration, Amtrak's Acela runs between Baltimore's Penn Station and Washington. D.C., with a stop at the Baltimore-Washington International (BWI) Rail Station, a trip of between 33 to 38 minutes. There is an option to express the MARC trainsets between Union Station and BWI (23 minutes) to West Baltimore (29 minutes) and to Penn Station (39 minutes), using existing equipment and railways. With the planned upgrades to the Penn Line, these transit times will be reduced. Developments associated with the West Baltimore Plan and a MARC Express should also be noted. The West Baltimore Plan (part of the HUB West Baltimore Community Development Corporation [HWB]) includes running a MARC Express from Baltimore to Washington, D.C., with a stop at the BWI

[766] Statistical Atlas. "Household Income in Cherry Hill, Baltimore, Maryland." https://statisticalatlas.com/neighborhood/Maryland/Baltimore/Cherry-Hill/Household-Income. Note data from the 2010 Census and the 2012-2016 American Community Survey.

Marshall Airport station. Using the current MARC equipment, rail, and train management system, a MARC Express could complete the trip in 29 minutes.[767]

On August 20, 2021, following a few test runs, MARC started an express train from Baltimore Penn Station to Washington D.C.'s Union Station, with a stop at BWI Marshall. ***The total travel time was 30 minutes.*** BWRR claims the SCMaglev can complete the run in 15 minutes, but at a far higher cost per ticket. HWB lays out why the SCMaglev "makes no sense:"[768]

	Maglev	MARC Express
Construction	$14 – 16 billion	$0
West Baltimore-Washington Travel Time	15 minutes	29 minutes
Ticket Price	$26 - $80*	$9**

* Various BWRR sources and presentations have stated a ticket price as high as $80.
** See 2021 MARC Fare schedule.[769]

[MCRT Editor's Note: As discussed in the Financial Stability, Economic Impacts, and Ridership section of this submission, construction estimates of $40 to $64 billion may be closer to the actual cost if building the SCMaglev segment between Baltimore and Washington, D.C., is approved.]

Again, if the goal is to shorten the travel time between Baltimore and Washington, D.C. with the least environmental impact, and for the betterment of ALL communities neighboring the rail alignments, the West Baltimore Project of running a MARC Express in the morning and evening is by far the better alternative,[770] and establishing the MARC Express has the significant benefit of " . . . equitable, transformational revitalization in the three neighborhood clusters around the West Baltimore MARC Station."[771]

Ticket Cost Difference

Between Union Station and West Baltimore, the SCMaglev claims to be able to run 15-minute trips at the cost of $30-$80 one way not from downtown Baltimore, but deep south Baltimore from the Cheery Hill station. This is between three to more than eight times more expensive than a one-way MARC ticket price of $9.00 from downtown's Baltimore Penn Station and Washington, D.C.'s Union Station, which the MARC Express can complete in 30 minutes.[772]

[767] Sacks, Jonathan. "HUB West Baltimore." Baltimore-Washington Transportation Research Group. 2023. www.hubwestbaltimore.org/introduction.
[768] Baltimore-Washington Transportation Research Group. "3 Reasons Maglev Makes No Sense." 2023. www.bwtrg.org/marc-vs-maglev.
[769] "MARC Fares." Maryland Department of Transportation - Maryland Transit Administration. https://s3.amazonaws.com/mta-website-staging/mta-website-staging/files/Fares/Penn-Line-Fare-Chart-2021.pdf.
[770] Baltimore-Washington Transportation Research Group. "West Baltimore Project." 2022. www.bwtrg.org/west-baltimore-project.
[771] *Id.*
[772] "MARC Fares." Maryland Department of Transportation - Maryland Transit Administration. https://s3.amazonaws.com/mta-website-staging/mta-website-staging/files/Fares/Penn-Line-Fare-Chart-2021.pdf.

[MCRT Editor Note: Depending on the train taken, the Amtrak one-way coach ticket price for Baltimore to Washington, D.C., is as low as $5.00.[773] It is unlikely that the SCMaglev can match this ticket price.]

The BWRR documents are deficient as they are missing the analyses of "total transit time" and comparison with existing transportation infrastructure comparable with "total transit time." Without these data and analyses, the BWRR documents do not provide the information needed to make an informed decision on the cost and benefits of the SCMaglev, when compared with the existing Amtrak, Amtrak Acela, or MARC systems.

Real-world experience comes into the picture at this juncture. As Vujan and Casello (2002) state:

"Maximum operating speed is the speed for which the system has been designed for regular, daily operation under normal conditions. The entire system - its infrastructure, vehicles, controls, reliability, etc., must be designed so that this speed can be operated on a daily basis, withstanding the handling of passengers, reasonable weather variations, and operated by qualified personnel (but not an entire team of specialists supervising and intervening in every minute of system operation)."[774]

Another important point is that there can be a major difference between maximum speed and maximum *operational* speed of a system. Again, the real-world operational speed is usually lower than the experimental test and development speed, making the differences between travel speeds and travel time of the maglev versus high-speed rail even less. So, as the comparable travel times differences narrow in real-world operation, the huge cost difference to build and operate the two systems increasingly favors high-speed rail.

The SCMaglev is currently operating on a 26.6-mile test and development guideway during the day. Amtrak operates passenger rail services with over 21,000 miles of track, across 46 states, including Washington, D.C., and Canada. Amtrak also offers an array of services and serves a far broader spectrum of travelers and commuters than the SCMaglev will serve.

Northeast Maglev (TNEM) has stated that once the SCMaglev is built to New York, it will pull ridership from airlines; thus, according to TNEM, the SCMaglev is in competition with airlines. It is unlikely the segment under consideration between Baltimore and Washington, D.C., will pull ridership from airlines. It will most likely divert ridership from Acela. And, if built to New York, it may pull some passengers from airlines, but will continue to garner passengers from Amtrak and Amtrak's Acela. Both are ground-based transportation systems that would run parallel to each other. However, the DEIS ignores SCMaglev comparisons with existing high-speed rail systems, such as Amtrak and Amtrak's Acela and, from the perspective of local transit needs, the MARC. It is precisely because the SCMaglev is a track-following, high-speed, ground-based passenger transportation system that the MDE and the FRA are tasked with its review instead of the Federal Aviation Administration.

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[773] Amtrak. "Ways to Save on Northeast Travel." www.amtrak.com/save-on-northeast-travel.

[774] Appendix – Reprint: Vujan, Vukan, and Casello, Jeffrey M. "An Evaluation of Maglev Technology and Its Comparison with High Speed Rail." March 2002. Transportation Quarterly, Vol. 56, No. 2, Spring 2002 (33–49). ©2002 Eno Transportation Foundation, Inc., Washington, DC. http://www.researchgate.net/publication/297471032_An_Evaluation_of_Maglev_Technology_and_Its_Comparison_With_High_Speed_Rail.

LXI. SCMaglev Proponents and Risk

Park (2018) noted: "SCMagLev enthusiasts have been pushing the project despite warnings of significant risks, just like the supporters of the bullet train did in Asia. For instance, the South Korean government built the Seoul-Incheon line despite consistent warnings of inadequate demand [underscoring added]. The project was politically, rather than commercially, driven: Korean officials wanted to present a futuristic version of Korea to the international community as part of the 2018 Pyeongchang Winter Olympics."[775]

She goes on to say: "SCMagLev supporters in Maryland have similar non-business motives for backing the project. Baltimore has been experiencing a steady population decline over the years, and many supporters believe that connecting the city to economically vibrant D.C. could reverse that trend. This vision has blinded the advocates to serious concerns about the project."[776]

Understand, it is the Japanese government and the Central Japan Railway Company (JRC) will stand to make significant financial gains by bringing their system to the United States. If successful, it will mean a large profit for both entities and jobs for Japan. TNEM and BWRR have a huge financial stake in seeing the SCMaglev built and placed in operation for the benefit of TNEM's investors.

LXII. Amtrak, the MARC, and the VRE - The Better Alternatives

Continuing to upgrade and enhance Amtrak, the MARC, and the VRE systems is the far superior choice over building the SCMaglev and better for the region's rail commuting future. Amtrak and its predecessors have over 150 years of experience. As noted earlier, Amtrak operates passenger rail services with over 21,000 miles of track, covering a network of 500 destinations across 46 states (including Washington, D.C., and Canada), running more than 300 trains each day in 2019,[777,778] and carrying 32.54 million passengers.[779] Amtrak has a long history of freight, commuter, and higher-speed rail experience. As noted in their *FY 2022 Company Profile Amtrak Company Profile for the Period of October 1, 2021 – September 30, 2022*, Amtrak is the only railroad in North America to maintain right-of-way for service at speeds in excess of 125 mph (201 kph), and its engineering forces maintain

[775] Appendix – Reprint: Park, Carol. "Transportation Lessons from Asia for the Northeast Maglev." The Maryland Public Policy Institute. December 7, 2018. www.mdpolicy.org/research/detail/lessons-from-asia-for-the-northeast-maglev.
[776] *Id.*
[777] Amtrak. "How Much Do Amtrak Tickets Cost?" Howmuchisit.org. August 10, 2018. www.howmuchisit.org/amtrak-tickets-cost/#:~:text=Amtrak%20is%20a%20government-owned%20passenger%20rail%20corporation%20in,46%20states%20as%20well%20as%20select%20Canadian%20cities.
[778] Amtrak. "Amtrak Facts." www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/nationalfactsheets/Amtrak-Company-Profile-FY2022-072523.pdf.
[779] Amtrak. "FY 2019 Company Profile for the Period of October 1, 2018 - September 30, 2019." https://media.amtrak.com/wp-content/uploads/2020/06/Amtrak-Corporate-Profile_FY2019_-FINAL-033120.pdf.

approximately 375 route miles of track for 100+ mph (160+ kph) service.[780] TNEM and the BWRR have little-to-no experience building and operating a large, complex, ground-based transportation system.

Amtrak offers an array of services and serves a far broader spectrum of travelers and commuters than the SCMaglev would serve. Amtrak also coordinates and integrates their services with several local commuter train systems, such as the MARC and VRE, as well as heavy-rail freight operators. The SCMaglev would be far less integrated into the ground-based transportation systems of the region.

MCRT Editor's Note: Amtrak's Union Station in Washington, D.C., the second busiest station in the United States for FY 2022, handled 3,631,677 passengers.[781]

The FRA has already completed a long and costly review of rail service needs in our region. The agency accepted and approved Amtrak's EIS and their Northeast Corridor (NEC) *Future Plan*.

During this long and costly study, building an additional rail alignment was considered, but found to be too expensive and not needed when the plans for the existing systems upgrades and enhancements were considered.

BWRR repeatedly says the existing 150-year-old rail system is obsolete. **This is not true.** If the existing rail systems are obsolete, why would the FRA approve Amtrak's NEC *Future Plan*?

With the FRA's approval of Amtrak's NEC *Future Plan*, Amtrak secured a $2.5 billion loan to start the updates and enhancements. Amtrak and the MARC employ modern equipment. Both are purchasing and implementing new, proven, state-of-the-art equipment. For anyone who has commuted on Amtrak or the MARC for any length of time, they can tell you that all rails, ties, and railroad beds used by Amtrak and MARC have been rebuilt. All high-speed continuous rail has been installed. The MARC trains running from Union Station to Baltimore that express to Odenton can and run over 100 mph. The MARC is the fastest commuter rail systems in the world.[782] As noted by Van Hattem (2006): "MARC operates the fastest commuter trains in North America, using electric locomotives that race along the Penn Line at speeds of up to 125 mph – the maximum allowable track speed on the Northeast Corridor."[783] Another example of Amtrak upgrades is the new $4.7 million BWI Rail Station completed in 2020 that services

[780] Amtrak. "FY 2022 Company Profile for the Period of October 1, 2021 – September 30, 2022. www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/nationalfactsheets/Amtrak-Company-Profile-FY2022-072523.pdf.

[781] *Id.*

[782] Wikipedia. "MARC Train." https://en.wikipedia.org/wiki/MARC_Train.

[783] Appendix – Reprint: Van Hattem, Matt. "Maryland Rail Commuter (MARC) - The commuter railroad serving Baltimore and Washington, D.C." *Trains*. June 30, 2006. www.trains.com/trn/railroads/maryland-rail-commuter-marc/#:~:text=MARC%20operates%20the%20fastest%20commuter%20trains%20in%20North,EMD%2FASEA%2C%20and%20HHP-8%E2%80%99s%20built%20in%202001-2002%20by%20Bombardier-Alstom.

both Amtrak and the MARC. The concrete structure built in the 1960s has been replaced with a new, more comfortable station, seen pictured here.

In Baltimore:

> "Amtrak and master developer Penn Station Partners broke ground in October 2021 on the redevelopment and expansion of Baltimore Penn Station. The redevelopment will rehabilitate, modernize and expand the historic landmark to better accommodate passenger growth, improve the customer experience and create a revitalized civic space. Construction will be a catalyst to transform surrounding vacant Amtrak-owned land into a mixed-use, transit-oriented development with up to one million square feet of new office, retail and residential space."[784]

New BWI Rail Station. Photo by B. Taylor

MCRT Editor's Note: Amtrak's Union Station in Washington, D.C., was the second busiest station in the United States for FY 2022, handling 3,631,677 passengers. Baltimore's Penn Station handled 838,591 passengers the same year.[785]

As of 2022, Amtrak has invested $2.3 billion in capital projects, including advancing new fleets of trains to operate in the Northeast and other areas of the United States; major infrastructure programs, such as the Portal North Bridge in Kearny, N.J., and the Baltimore & Potomac (B&P) Tunnel Replacement Program in Baltimore, Maryland; and other station and facility improvements.[786]

With the roughly $6 billion replacement, these issues will persist, and the risk to Northeast Corridor operations will grow. A tunnel replacement program has already completed its NEPA review, and preliminary work is beginning in 2023. Pre-award authority has been given by the FRA for major construction contracts to be awarded. Funding will be a combination of Infrastructure Investment and Jobs Act (ILJA) funding and Maryland and internal program revenue.[787]

[784] Amtrak. "FY 2022 Company Profile for the Period of October 1, 2021 – September 30, 2022. www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/nationalfactsheets/Amtrak-Company-Profile-FY2022-072523.pdf.

[785] The Great American Stations. "Baltimore, MD - Penn Station (BAL)." https://www.greatamericanstations.com/stations/baltimore-penn-station-md-bal/.

[786] Amtrak. "FY 2022 Company Profile for the Period of October 1, 2021 – September 30, 2022. www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/nationalfactsheets/Amtrak-Company-Profile-FY2022-072523.pdf.

[787] Amtrak. Frederick Douglass Tunnel Program." www.amtrak.com/about-amtrak/new-era/infrastructure-projects/baltimore-potomac-tunnel-replacement.html.

Nearly 150 years old, Baltimore & Potomac (B&P) dates from the Civil War era. It is the oldest Amtrak tunnel and a single point of failure for the 9 million MARC and Amtrak customers who rely on it. It is also the largest bottleneck on the Northeast Corridor between Washington and New Jersey.

Amtrak is currently testing the new Acela on the Northeast Corridor.

"The 1.4-mile tunnel, connecting Baltimore's Penn Station to Washington and Virginia, suffers from a variety of age-related issues such as excessive water infiltration, a deteriorating structure, and a sinking floor. The tunnel lacks adequate fire and life safety systems to help keep passengers safe in the event of an emergency, and excessive costly maintenance is required. The tunnel is at capacity, and the tunnel's tight curvature requires trains to reduce speeds to 30 mph. These issues create chronic delays — more than 10% of weekday trains are delayed, and delays occur on 99% of weekdays."[788]

With a combination of ILJA funding and Maryland and internal program revenue, $6 billion has been set aside. The tunnel replacement program has already completed its NEPA review, and preliminary work is beginning in 2023. Pre-award authority has been given by the FRA for major construction contracts to be awarded.[789] Partnering in this project are the FRA, Maryland Department of Transportation (MDOT), Amtrak, and Baltimore City.

The two new Frederick Douglass Tunnel tubes being built will primarily serve electrified MARC and Amtrak trains. MDOT's Maryland Transportation Administration (MTA) will electrify its MARC Penn Line trains, and diesel freight trains will only be allowed in the two new tunnel tubes under temporary or emergency operations.

The new tunnel will allow increased speed of trains, resulting in an increased capacity of the rail system.

The program will also include solar power generation at multiple locations, making the Northeast Corridor even greener.

Amtrak is currently building the next generation of Acela, capable of a speed of over 200 mph. The new Acela is being designed and built in the United States by American workers, not overseas and imported into the United States, as would be the case with the SCMaglev. In 2016, Amtrak reported it was contracting with Alstom to produce 28 state-of-the-art, fifth-generation, high-speed trainsets to replace the equipment used to provide Acela service. The new trains are scheduled to enter into service on the Northeast Corridor in 2023 -2024. The new trainsets will accommodate nearly 25 percent more

[788] *Id.*
[789] *Id.*

customers, while continuing the spacious, high-end comfort of the current Acela service. Alstom is using parts manufactured by nearly 250 suppliers in 27 states with 95 percent of the components produced domestically.[790] Manufacture of the trainsets has generated 1,300 new jobs in 35 communities across the United States.[791]

In FY 2022, the first 18 units of a total order of 125 new Tier 4 ALC-42 diesel locomotives from Siemens Mobility went into revenue service. Cleaner, faster, and more fuel efficient than their predecessors, the ALC-42s will form the new backbone of the National Network fleet. Amtrak also has contracted with Siemens Mobility to manufacture a new fleet of up to 83 multi-powered Amtrak Airo™ trainsets that will be leveraged for State Supported and Northeast Corridor services, with further options for up to 130 additional trains to support growth plans. Most of these trainsets will provide both electric and diesel power, and some will have cutting-edge battery power.[792]

If approved, the building and operating of the SCMaglev would be in direct competition with Amtrak. Subsidies to Amtrak will likely increase. If it follows international experience with such systems, the project will likely require subsidies, resulting in taxpayers paying the costs associated with subsidizing two competing systems. And the irony of this is while subsidizing the SCMaglev, the majority of taxpayers could not or would not afford to use this land-based transportation system. Thus, the BWRR documents again should explain why the SCMaglev is superior to existing rail systems, but they do not.

There are additional questions that should be addressed.

- How does the SCMaglev fit in with the current Administration's "Made in America" directive?
- Why are we considering bringing in a train system from Japan?
- Why would we not support the system designed and built in the United States, supporting long-term American jobs, and currently in operation?
- Who would pay for the security of the SCMaglev system?
- What is the level of state, city, and county resources needed to maintain the security envelope of the SCMaglev system?
- What are the costs to our residents?
- This information should be made available for public review, with sufficient time to comment, before any decision to move forward with the building of the SCMaglev is considered.

[790] Amtrak. "FY 2019 Company Profile for the Period of October 1, 2018 - September 30, 2019." https://media.amtrak.com/wp-content/uploads/2020/06/Amtrak-Corporate-Profile_FY2019_-FINAL-033120.pdf.
[791] Amtrak. "FY 2022 Company Profile for the Period of October 1, 2021 – September 30, 2022." www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/nationalfactsheets/Amtrak-Company-Profile-FY2022-072523.pdf.
[792] *Id.*

LXIII. Amtrak - Reality Check[793]

Financial Strength
Amtrak delivered its best operating performance in company history in FY 2019 (pre-Covid-19). It posted a Generally Accepted Accounting Principles revenue record of $3.5 billion, an increase of 3.4 percent over FY 2018. Amtrak's adjusted operating earnings (of $29.4 million) were the best to date and an 82.8 percent improvement over the prior year. Amtrak's capital investment of $1.6 billion in FY 2019 was 10.2 percent higher than in FY 2018.

"The Acela, Amtrak's premium service, is the fastest train in the Western Hemisphere, with a maximum speed of 150 mph (241 kph) on sections of its route between Boston and New Haven, Conn. Its top speed between New York City and Washington is 135 mph (217 kph) . . . More than 60.7 million passengers have traveled on the fleet of up to 20 Acela trainsets since revenue service began on Dec. 11, 2000. In FY 2022, customers took more than 2.1 million Acela trips and generated more than $338.9 million in ticket revenue."[794]

"This year, Amtrak received a credit upgrade to 'A' from S&P and an affirmation of an 'A1' credit rating by Moody's, reflecting significantly reduced operating losses and a stronger balance sheet, with **no net debt** [bold emphasis added]."[795]

In FY 2022, as a direct result of the COVID-9 pandemic, ridership on all forms of public transportation plummeted. Amtrak earned approximately $3.0 billion in revenue and incurred approximately $6.0 billion in capital and operating expenses. No country in the world operates a passenger rail system without some form of public support for capital costs and/or operating expenses.[796] But in 2019, Amtrak was getting close to match revenues and costs.

MARC ridership also plummeted, from a high of over 9-million passengers and commuters for 2019 to a low of 2,815,900, due to COVID-19 lockdowns.[797]

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[793] Amtrak. "FY 2019 Company Profile for the Period of October 1, 2019 - September 30, 2019." https://media.amtrak.com/wp-content/uploads/2020/06/Amtrak-Corporate-Profile_FY2019_-FINAL-033120.pdf.
[794] Amtrak. "FY 2022 Company Profile for the Period of October 1, 2021 – September 30, 2022." www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/nationalfactsheets/Amtrak-Company-Profile-FY2022-072523.pdf.
[795] Amtrak. "Testimony by Richard Anderson President & Chief Executive Officer National Railroad Passenger Corporation." Before the United States House of Representatives Committee on Transportation & Infrastructure Subcommittee on Railroads, Pipelines, and Hazardous Material. www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/testimony/2019/Amtrak-CEO-Anderson-House-Railroads-Testimony-Amtrak-Now-Future-111319.pdf.
[796] Amtrak. "FY 2022 Company Profile for the Period of October 1, 2021 – September 30, 2022." www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/nationalfactsheets/Amtrak-Company-Profile-FY2022-072523.pdf.
[797] Wikipedia. "MARC Train." https://en.wikipedia.org/wiki/MARC_Train.

These Amtrak and MARC data raise an interesting question. BWRR states that revenues from ridership will cover the operations and maintenance of the SCMaglev.[798] As discussed previously, research reviewed and cited strongly contests BWRR's ridership projections. Work by the Maryland Public Policy Institute, CATO, and in-depth study by Owen Kelley, PhD, BWRR's projections appear to be inflated by an order of magnitude, or ten times the more likely ridership. It must be pointed out that BWRR ridership projections were based on a pre-COVID-19 population. In 2022, both Amtrak's and the MARC's ridership numbers increased as both have recovered about 60 percent of their pre-pandemic ridership.

As noted earlier, Baltimore's Penn Station handled 838,591 passengers in FY 2022. At its peak 2019 (pre-COVID-19) period, the MARC moved just over 9 million commuters and passengers on all three lines. As a comparison, according to BWRR: "Based on the SCMAGLEV ridership forecast, during the first year of operation, 2030, between 11.38 and 12.61 million annual passengers are expected to divert from cars to SCMAGLEV (DEIS 4.2-7)."[799] As discussed earlier, where are the BWRR projected 11.4 to 12.6 million passengers coming from?

Questions:

- Following the pandemic, with far more people working from home, and the continued shrinking of Baltimore City's population, what is the current SCMaglev ridership projection?
- Will the current ridership projections generate the revenue to cover the operations and maintenance of the SCMaglev?

MCRT Editor's Note: If the SCMaglev is allowed to be built and operated, it will not only pull passengers from Amtrak, but will likely require government subsidies to cover maintenance and operating costs and loan service fees. The net effects would be (1) negatively impacting the revenue improvement efforts of Amtrak (following years of improved balance sheets), likely resulting in the need for increased subsidies for Amtrak, and (2) taxpayers funding one system for use by most riders and another only for the more affluent who can afford to ride.

Customer Service Rating

Nearly nine out of ten customers surveyed expressed overall satisfaction with their Amtrak experience. The company achieved a year-over-year increase in customer satisfaction scores in many categories, including clean train interiors, restroom cleanliness, and information about delays.

Safety Updates

Amtrak was the first major U.S.-based railroad to implement a Safety Management System, a proactive approach to managing safety, resulting in improvements in a broad range of safety metrics. It also completed implementation of Positive Train Control, a safety technology designed to match train speed to track conditions for improved safety, on all Amtrak-owned and controlled tracks, except for less than one mile of slow-speed track in the complex Chicago terminal area.

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[798] Baltimore-Washington Rapid Rail. "Baltimore-Washington SCMaglev Project Maryland High-Quality Waters (Tier II) Social and Economic Justification Report." Revision: 2. March 1, 2021. Page 15. https://mde.maryland.gov/programs/water/WetlandsandWaterways/SiteAssets/Lists/SCMAGLEV/NewForm/SCMAGLEV_Tier_II_SEJ_MDE_R2_22.03.01.pdf.

[799] *Ibid.* Page 14.

Infrastructure Upgrades
Amtrak improved the reliability and performance of infrastructure by investing $713 million in state-of-good-repair projects, including the repair or replacement of 24,080 feet of catenary hardware; 79,985 concrete ties; 1,784 bridge ties; and 283 miles of high-speed surfacing.

Amtrak invested a record $78 million on ADA-related design and construction improvement projects at more than 40 locations, advancing efforts to make stations universally accessible.

Amtrak invested more than $110 million in technology, including an updated customer mobile app to make bookings and travel management faster and easier.

Reducing Environmental Impact
Amtrak met or exceeded all annual energy, fuel, recycling, and greenhouse gas emissions targets. Efforts such as lighting upgrades, reduced idling, and a focused recycling program helped Amtrak meet these targets and save money.

Operating and Improving
Amtrak operates a nationwide rail network, serving more than 500 destinations in 46 states, the District of Columbia and three Canadian provinces, on more than 21,400 miles of routes. It is the nation's only high-speed intercity passenger rail provider, operating at speeds up to 150 mph (241 kph). Nearly half of all trains operate at top speeds of 100 mph (160 kph) or greater.[800]

When included among U.S. airlines, Amtrak ranked eighth in domestic passengers carried (Oct. 2019 - Sept. 2020). In the Northeast Corridor, Amtrak has a strong position in many markets that were previously dominated by air carriers.[801]

The Northeast Corridor is the busiest railroad in North America, with approximately 2,200 Amtrak, commuter, and freight trains operating over some portion of the Washington-Boston route each day (Pre COVID-19). 18.8 million trips were made by Amtrak customers on the corridor in FY 2019. This included all Amtrak trains that traveled over some portion of the corridor's spine (Washington-New York-Boston) and connecting corridors to Harrisburg, Pennsylvania; Springfield, Massachusetts; Albany, New York; and Richmond, Virginia. Skilled employees maintain, rebuild, and overhaul a wide variety of cars. Amtrak owns and operates 363 route-miles of the 457 route locomotives at facilities across the country. **Trains regularly reach speeds of 125-150 mph** (201-241 kph). "Continued outreach on Amtrak Connects US, a vision to advance the development of more frequent, reliable and sustainable

[800] FY 2022 Company Profile for the Period of October 1, 2021 – September 30, 2022. www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/nationalfactsheets/Amtrak-Company-Profile-FY2022-072523.pdf.
[801] *Ibid*. Page 4.

intercity passenger rail service to over 160 more communities and 20 million more passengers annually by 2035 . . .”[802,803]

The Acela, Amtrak’s premium service, is the fastest train in the Western Hemisphere, with a maximum speed of 150 mph (241 kph) on sections of its route between Boston, Massachusetts, and New Haven, Connecticut. Its top speed between New York City and Washington, D.C., is 135 mph (217 kph). During FY 2019, Amtrak launched Acela Nonstop (New York to Washington), expanded weekend Acela frequencies, and completed a $4 million refresh of train interiors on the entire Acela fleet. [804]

Interesting Fact: The name “Acela” is a combination of the words “acceleration” and “excellence.”

More than 56.1 million passengers have traveled on the fleet of 20 Acela trainsets since revenue service began on December 11, 2000. In FY 2019, customers took nearly 3.6 million Acela trips and generated nearly $642 million in ticket revenue.

While SCMaglev has yet to build anything, Amtrak continues to upgrade and modernize. Active Amtrak-owned or -leased passenger equipment includes 20 Acela® high-speed trainsets (40 power cars and 120 passenger cars); 1,374 passenger cars, including Amfleet®, Superliner®, Viewliner®, Horizon, Talgo, and other types; 80 Auto Train® vehicle carriers; 21 non-powered control units; 230 road diesel locomotives; and 66 ACS-64 electric locomotives.


Amtrak has ordered 75 new Tier 4 diesel locomotives from Siemens. Rendering courtesy of Siemens Mobility.

In FY 2019, Amtrak had 28 new high-speed trainsets from Alstom and 75 new Tier 4 diesel locomotives from Siemens on order. It also continued receipt of Viewliner II rail cars from CAF as part of an ongoing 130-car order and issued a request for proposal for at least 75 new intercity trainsets or rail car equivalents to replace existing Amfleet I and Talgo fleets.

Amtrak improved customer experience at stations throughout the network by investing $143 million in them. Projects included installation of a state-of-the-art digital board at Gray 30th Street Station in Philadelphia; enhancement of Metropolitan Lounges in Washington Union Station, Boston South Station, and Gray 30th Street Station; restoration of the Great Hall at Chicago Union Station; and upgrades that ranged from new paint to seating to platforms at various locations through the Customer Now program.

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[802] *Ibid*. Page 2.
[803] Amtrak. “Amtrak Facts.” www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/nationalfactsheets/Amtrak-Company-Profile-FY2022-072523.pdf.
[804] Amtrak. “FY 2022 Company Profile for the Period of October 1, 2021 – September 30, 2022. www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/nationalfactsheets/Amtrak-Company-Profile-FY2022-072523.pdf. Page 6.

Amtrak Near-Future Further Reduces the Differences between High-Cost SCMaglev and High-Speed Rail

"Amtrak is redefining the future of rail by investing in the customer experience on the Northeast Corridor, both in station and on board" their trains.[805] As opposed to the dreams and claims of the SCMaglev, Amtrak plans to introduce new high-speed trainsets along the Northeast Corridor starting in 2021. These will be the next generation of Acela, built and now being assessed by American safety and performance standards.

"This new service will provide customers with world-class accommodations and amenities, along with a smoother and more comfortable ride. Amtrak is also upgrading our infrastructure with significant station expansion and modernization efforts in New York and Washington, DC, and improved track capacity and ride quality along the Northeast Corridor. All of this is being done in an effort to make Amtrak the smarter way to travel."[806]


Interior of the latest generation of Acela.

Amtrak's CEO Bill Flynn stated on May 6, 2021,before House Transportation and Infrastructure Committee's Subcommittee on Railroads, Pipelines and Hazardous Materials, sums up the reasons to dump the SCMaglev and put the resources into high-speed rail. He said the SCMaglev " . . . would be environmentally disruptive, require public spending that would primarily benefit the rich and provide marginal time savings for passengers while being substantially more expensive. . . . While new technologies like maglev and hyperloop may capture the public imagination, they are not a substitute for high-speed and intercity passenger rail. . . . They would serve only a small niche of the intercity travel market at a much higher cost, both financially and environmentally."[807]

Specifically on the environment, Amtrak set its most ambitious sustainability target yet in FY 2022: achieve net-zero greenhouse gas emissions across all operations and the Amtrak network by 2045, as part of an overall Climate Commitment. This commitment also includes the following four key actions: establish a company-wide climate resilience program, reduce fuel usage, integrate climate considerations into business operations and achieve 100% carbon-free electricity by 2030.[808]

[805] Profounnd-Tip. "What is the future of Amtrak?" August 13, 2022. https://profound-tip.com/what-is-the-future-of-amtrak/.
[806] Amtrak. "The Future of Amtrak Travel Starts Today." 2021. www.amtrak.com/about-amtrak/future-of-rail.html.
[807] Wilen, Holden. "Amtrak CEO bashes proposed Baltimore-Washington maglev project." *Washington Business Journal*. May 6, 2021. www.bizjournals.com/washington/news/2021/05/06/amtrak-ceo-bashes-maglev-project.html?s=print.
[808] Amtrak. "FY 2022 Company Profile for the Period of October 1, 2021 – September 30, 2022. www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/nationalfactsheets/Amtrak-Company-Profile-FY2022-072523.pdf.

LXIV. A Deeper Look: Far-Lower Cost Alternative for Baltimore to Washington, D.C. - The West Baltimore MARC Express Proposal

The Baltimore-Washington Transportation Research Group (BWTRG) lays out a strong and coherent plan that makes use of **EXISTING** (bold emphasis added) MARC resources to start running the MARC Express trains between Baltimore and Washington, D.C. [809]

Why is the MARC Express a Far Better Idea Than the SCMaglev?

- The MARC Express takes only 15 minutes longer than the hypothetical travel time of the SCMaglev.
- The MARC Express costs tens of billions of dollars less to implement compared with building the SCMaglev.
- The MARC Express riders pay one-fourth to one-eighth less for a ticket compared with the projected ticket cost to ride the SCMaglev.
- The MARC Express runs into the heart of Baltimore City, making stops at West Baltimore and Penn Station, while the SCMaglev would be on the outskirts of Baltimore, which would increase the commute time traveling to and from its station.
- The MARC Express would bring a market-driven economic revitalization to historic environmental communities and neighborhoods.
- The MARC Express would provide a strong economic tie with Washington, D.C., by providing a major stock of affordable housing for the city's workforce that would be only 30 minutes away from the commuter train.

As noted by BWTRG: "So it's being a part of Washington's economy that really matters. And just in the smaller region around Washington (stopping northward at the Montgomery and Prince Georges County Lines), the Metropolitan Washington Council of Governments (MWCOG) sees a huge need for housing. In a report released in September 2019, they declared that an additional 320,000 housing units are going to be needed in the Washington Metropolitan Area by 2030 - with 75% of those housing units needing to be 'near high-capacity transit' and 'affordable to low- and middle-income households."[810] This is an economic growth for Baltimore that the SCMaglev cannot serve.

What's the Market Driver for this Economic Growth?

West Baltimore is the quintessential inner-urban, townhouse-centric, late 19th - early 20th century environment currently sought by homebuyers all over Europe and in New York, Boston, and Washington, D.C. The problem for workers who live in Washington, D.C., however, is that their city's similar neighborhoods are so attractive to buyers that they have become unaffordable for typical low- and middle-income workers.

An attractive alternative is a train ride 30 minutes north to West Baltimore: "Rather than pay $2.5 million for a townhouse in Logan Circle in Washington, one can pay $250,000, or even $25,000 for the same house in West Baltimore - or $1,000 for a shell that can be made your own. It's a kind of cheap not

[809] Sacks, Jonathan. "West Baltimore Rising: A Roadmap for Inclusive Transformational Change in One of the City's Most Challenged Yet Most Economically-Promising Neighborhood Clusters." Baltimore-Washington Transportation Research Group. October 1, 2020. https://westbaltimoreproject.org/.
[810] *Ibid.* Page 13.

available anywhere else in the Washington-Baltimore Metropolitan area, certainly not for any community with similar attributes."[811]

Can the MARC Express Work? The Short Answer is Yes!

Starting from Baltimore's Penn Station, Amtrak is currently running between Baltimore and Washington, D.C., in 30 minutes, with a 2-to-3-minute stop at the BWI Rail Station. Between Baltimore and Washington, D.C., the current MARC equipment is capable of running at the same speed as the Amtrak equipment. If the MARC expresses from West Baltimore, the travel time from this mixed residential and business community is shorter and the trip would take less time to complete.

The Math Works

From the West Baltimore Station to Union Station is approximately 34 miles. To travel that distance in a half-hour would require an average speed of 70 mph. This 30-minute travel time includes the time required to initially speed up leaving Penn Station, slow down for a 2-to 3-minute stop at the BWI Rail Station, speed up when leaving the BWI Rail Station, and slow down to stop at Washington, D.C.'s, Union Station. To accomplish this trip in 30 minutes, the MARC trains would need to travel at approximately 85 mph on the faster sections of the trip. Reviewing the specifications for the MARC's existing equipment confirms that both the existing engines and coaches are capable of achieving and sustaining these speeds, as the existing train sets can travel at 125 mph. Thirty minutes from West Baltimore to Washington, D.C., with a stop at BWI in 30 minutes is not theoretical.[812] It was tested and achieved on August 20, 2021.

[MCRT Editor's Note: MARC Express started operating on August 30, 2021.[813] On August 26, 2023, Holly Arnold, Acting MTA Administrator, announced: "I am pleased to inform you that effective this Monday, August 30, with our return to full service, Penn Line Train #536 will operate between Union Station and Penn Station with a single stop at BWI Marshall Airport. The train is scheduled for a 41-minute downtown-to-downtown run time -- including the BWI stop . . . it is a good first step towards a non-stop train. MARC Train Operations managers will soon begin working with Amtrak on the next schedule change, planned for mid-November. One of the goals of this change will be to modify an existing morning and afternoon southbound train to introduce a one or two stop Baltimore-Washington southbound service to complement Train 536 and morning northbound non-stop Train 408."

This is a 45-percent savings in time over the "local" train (which follows directly after the express.) As a reference, the trip from Union Station to BWI Station takes 23 minutes.]

[811] *Id.*
[812] HUB West Baltimore. "MARC Express to Washington." www.hubwestbaltimore.org/marc-express-to-washington.
[813] The Elm. "New MARC Train Service from D.C. to Baltimore." September 15, 2021. https://elm.umaryland.edu/announcements/Announcements-Content/New-MARC-Train-Service--.php.

With Amtrak's operational oversight,[814] MARC currently owns the trainsets and the locomotives that can be used to initiate the proposed MARC Express between Baltimore and Washington, D.C.[815]

[MCRT Editor's Note: **SCMagLev proponents falsely state the existing rail system is obsolete**. The MARC, as well as Amtrak equipment, are modern, efficient, and powerful, as seen here.]

The MARC's new Siemens SC-44 Chargers, eight of which were delivered in 2017. They have a top speed of 125 mph and are able to pull six or even eight coach trains on this line at the speed needed.

The State of Maryland purchased 63 MARC IV multi-level coaches in 2014, 49 coaches and 14 cab cars. They have a top speed of 125 mph, and a maximum service speed of 100 mph.

The recently refurbished MARC III multi-level coaches are rated for a maximum speed of 125 mph, with a service speed of 100 mph. In 2023, 39 coaches and 15 cab cars are in service.

[814] Amtrak. "FY 2022 Company Profile for the Period of October 1, 2021 – September 30, 2022. www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/nationalfactsheets/Amtrak-Company-Profile-FY2022-072523.pdf.

[815] Sacks, Jonathan. "West Baltimore Rising: A Roadmap for Inclusive Transformational Change in One of the City's Most Challenged Yet Most Economically-Promising Neighborhood Clusters." Baltimore-Washington Transportation Research Group. October 1, 2020. https://westbaltimoreproject.org/.

[MCRT Editor's Note: The MARC does not own any of the rail lines (with one small exception). The entire line is run by Amtrak, which is paid by the State of Maryland for the use of the tracks (again, owned by Amtrak), the staffing (contracted by Amtrak), and the maintenance of some equipment.]

Is There Capacity in the Current Train Schedules? Again, the Short Answer is Yes.
Additional workweek MARC Express Service running two rush hour morning and evening northbound and southbound train sets are possible.

BWI Rail Station
The BWI Rail Station is the second busiest station in Maryland (after Baltimore Penn), and the 13th-busiest in the Amtrak system.

As currently configured, three tracks run through the BWI Rail Station. However, only two have access to a platform. So only two tracks are typically used for stops at BWI Airport. If there is a problem or track work is underway, the third center track is used. However, using this center track delays the loading and unloading of passengers.

Most Amtrak and MARC trains (115 out of 138) stop at the airport station. So, essentially, the current boarding platform configuration at the BWI station constrains the boarding access and operational flexibility of the Penn Line, reducing it almost exclusively to two lines for nine miles of the line's length. As noted in the MARC Express proposal, "if the 3rd track at the BWI Rail Station could be brought into full use with a reconfigured platform, that could potentially increase capacity by 30% on the entire line, [allowing] another 40-50 trips a day."[816]

From an Anne Arundel County perspective, such a capacity change coupled with the MARC Express Service would provide an opportunity for a significant job and economic boon in the BWI area. The potential of additional 27-minute express commuter service to Washington, D.C., and a 17-minute express trip to Baltimore would provide the means to increase air traveler accessibility and commuter accessibility to Washington, D.C., and Baltimore.[817] As with West Baltimore, such a short and easy trip between Washington, D.C., and BWI Airport would bring BWI into the "neighborhood" sphere of Washington, D.C.

"And with that classification secured, the possibilities for transit-oriented development, and office development along the lines of Northern Virginia's great satellite cities (Courthouse, for instance), becomes not just a real possibility, but an almost irresistibly compelling prospect, since land in Maryland is cheaper, and the value of the proposition is therefore greater".[818]

Building the SCMaglev brings none of these benefits to Baltimore, Anne Arundel County, or Washington, D.C. However, the running of the MARC Express would bring to Baltimore and Anne Arundel County businesses, communities, and neighborhoods, as well as the Washington, D.C. workforce. Again, on August 30, 2021, MARC started the MARC Express from Baltimore's Penn Station, to Washington D.C.'s Union Station, with a stop at BWI-Marshall Airport.

[816] *Ibid.* Page 32.
[817] *Ibid.* Page 37.
[818] *Ibid.* Page 40.

LXV. Boosting the Economies of Both Baltimore and Washington, D.C.

According to Johns Hopkins researchers Hartman and McComas: "There are few pairs of neighboring cities in the United States such that one city is booming while the nearby city is struggling. Just 40 miles to the north of economically booming Washington D.C. lies economically struggling Baltimore City. Affordable housing has been hard to come by in the Washington, D.C. real estate market in recent years with housing sale prices up over 50 percent in the last decade. Just 40 miles north, Baltimore struggles with a seemingly intractable problem of addressing a vacant housing stock of over 16,000 units. The close physical proximity between these cities offers the possibility that an effective investment in cross-city transit could help residents of both cities to gain improvements in quality of life and economic vitality."[819]

The principal driving reason for MARC Express is affordable housing in Baltimore as compared with Washington, D.C., as noted by Hartman and McComas: "There is a dramatic difference between the cost of housing in Baltimore and D.C., particularly with respect to sales prices. In 2019, the average sales price of a home in D.C. is $628,900 compared to $148,700 in Baltimore, while the average rent in D.C. is $2,700 a month compared to $1,300 a month in Baltimore.6 With these estimates, the average annual savings could be about $16,000 for renters, easily outweighing the commute cost of around $5,400 a year. The vacancy rate for homes for sale in the District of Columbia was 1.4% compared to 4% for Baltimore City in 2018.7 The comparable vacancy rates for rental housing was 7.5% in Washington and 13.5% in Baltimore. These rates hold for housing that is available for move-in."[820]

Conclusion

The better choice for Maryland is to continue to invest in Amtrak and MARC upgrades and expansion. The BWRR documents fail to compare the SCMaglev with the existing and planned improvements to Amtrak, Amtrak's Acela, and the MARC, a requirement of the NEPA process. Therefore, both the applicant's WQC justification materials and the DEIS are fatally flawed. **The MDE should NOT approve the WQC for the SCMaglev, and the FRA should choose the No Build option.**

[819] Hartman, Ronald J., and McComas, Mac. "Investing in High-Speed Rail to Washington, D.C. to Boost Baltimore's Economy." February, 2021. Johns Hopkins 21st Century Cities Initiative. https://21cc.jhu.edu/research/current-baltimore-research/investing-in-high-speed-rail-to-washington-d-c-to-boost-baltimores-economy/.

[820] *Id.*

Appendices

LXVI. Appendix: MDE WQC Comments Team Bios

William Boone – Retired. Has a B.A. in Environmental Geography with a minor in Urban Planning, and a M.A. in Emergency Management and Disaster Planning. He consulted with FEMA, DHS, Federal law enforcement agencies, and the U.S. Army.

Louis Cerny – has been involved with maglev proposals since the late 1980s, when he served as the executive director of the American Railway Engineering Association. He has continued to study maglev technology as a private consultant and has commented on many maglev proposals. Mr. Cerny was a voting member of FRA committees that developed safety standards for high-speed rail.

Richard Dolesh – has worked with parks, resource conservation and natural resources for nearly all of his professional life. Most of his experience in these areas has been on the Patuxent River. He is currently a Senior Policy Associate with the National Recreation and Park Association, previously was Director of Forest, Wildlife, and Heritage Service for Maryland Department of Natural Resources (DNR) and before that, was Chief of Natural and Historical Resources for Maryland National Capital Parks and Planning Commission (MNCPPC). He is the author of a number of articles in the Parks and Recreation Magazine and other publications relating to parks and conservation.

Sam Droege – grew up in Prince George's County and has worked as a biologist for the past 40 years, specializing in the survey and monitoring of plants and animals.

Ben Fischler – Archaeologist with experience preparing NEPA studies.

Kyle Hart – serves as the Mid-Atlantic Field Representative for the National Parks Conservation Association (NPCA). Since graduating college in 2016, he has worked for four different environmental nonprofits in Virginia and D.C. to protect the region’s air, land, and water from harmful developments like the SCMagLev.

Patricia Jackman – served as the National Equal Opportunity Program Manager and held various civil rights positions for the US Forest Service before retiring. An environmentalist and community activist, she is a co-founder and is currently treasurer of the Maryland Coalition for Responsible Transit. Pat is a resident of New Carrollton in Prince George’s County.

Michael Kowalski, PhD – Retired after a long career as an Astrophysicist (federal employee) at the U.S. Naval Research Laboratory (NRL), Washington, D.C. His bibliography includes 49 publications as Principal- or Co-author in refereed scientific journals and 76 meeting presentations. He has vast experience in the analysis and scientific interpretation of ground- and space-based astronomical data, R&D of technologies for ground and space applications, and management and proposal preparation for both R&D and space-flight programs. He is a world-renowned expert in R&D of multilayer diffraction gratings and has expertise with X-ray detectors and superconducting instrumentation. He participated in seven (7) national or international orbital space-flight missions and served as Project Scientist and/or Principal Investigator on three (3) NASA sounding rocket missions. His also has extensive experience as a Contracting Officer Representative.

Rhonda Kranz – is an ecologist and independent consultant delivering strategic and tactical services to organizations that support environmental concerns. She has thirty years of experience in research, conservation, and program management.

Beth LeaMond – has a BS in Geology from the University of Cincinnati, and an MS in Environmental Science from Indiana University. Beth worked as a Hydrologist for the US Geological Survey-Water Resources Division in New York State from 1987 - 2000, and in the Water Quality Standards Program at the US EPA from 2002 - 2015.

Lawrence Liebesman – "Larry," is a nationally recognized environmental lawyer and litigator with more than 40 years of experience. His practice emphasizes wetlands, climate change, water pollution, coastal issues, environmental impact assessment and endangered species law. Larry represents a range of clients in the public, private and nonprofit sectors on a broad range of environmental issues at the federal and state levels and has testified as an expert witness in litigation and before Congress. He has negotiated Clean Water Act (CWA) and Endangered Species Act (ESA) permits and approvals for commercial, residential, public works and environmental restoration projects. Larry is involved in Chesapeake Bay cleanup issues. He advises clients on storm water issues and served on the Maryland State Water Quality Advisory Committee which provides advice to the Maryland Secretaries of Environment, Natural Resources and Agriculture on Bay water quality issues. He also served as counsel for an innovative public private partnership storm water wetland restoration project that will significantly reduce pollution impacting Bay while creating high value wetland habitat. The project received the National Wetlands Award for Landowner Stewardship from the Environmental Law Institute. Larry has also participated as amicus in landmark Clean Water Act and Endangered Species Act cases before the United States Supreme Court including the Rapanos case on the definition of Waters of the United States. Larry is a Phi Beta Kappa graduate of Rutgers University and received his law degree with honors from GW Law School. He is a member of the District of Columbia and Maryland Bars along with the bars of several federal courts including the U.S. Supreme Court.

Susan McCutchen – – Retired as a senior research associate and project manager from the National Academies of Sciences, Engineering, and Medicine. She assisted in the production of more than 50 publications on policy issues, including science and technology for international development, technology transfer, aeronautics and the U.S. space program, natural disaster mitigation, U.S. education policy and science curricula, needle exchange, the scientific merit of the polygraph, human factors/engineering, research ethics, Social Security and Veterans Affairs disability compensation programs, health hazard evaluation, and medical and public health preparedness for catastrophic events, including nuclear detonations. Ms. McCutchen is a community advocate on many issues, including the SCMaglev.

Suzzie Schuyler – Is a retired Pet/Ct, nuclear medicine, mammographer, and radiologic technologist, having worked 38 years in conjunction with CT and MRI units. Ms. Schuyler holds a bachelor's of science degree in professional health. With her long career, she has expertise with ionizing and non-ionizing radiation and the acute precautions taken to protect employees and the public. She also taught courses in radiologic technology, which included procedural processes, safety, and radiation protection. Ms. Schuyler is an active member of community organizations, including the Linthicum-Shipley

Improvement Association, where she has served as a voting Board member and held elected officer positions, including president. She has investigated the SCMagLev plans, proposals, and other information for several years, and has engaged with the Anne Arundel County Council and the Maryland state legislature, and met with Maryland Congressional leaders to express the community's opposition to building the SCMagLev.

University of Maryland Francis King Carey Environmental Law Clinic

Marcia Watson, PhD – Has a doctoral degree in biological sciences from the University of Delaware; her specialization is in environmental physiology. She served on the faculty and as an academic administrator at University of Delaware and at University of Maryland University College (now University of Maryland Global Campus). Now retired, she lives in Bowie, Prince George's County, Maryland. She is the President of the Patuxent Bird Club and serves on the Board of Directors of the Maryland Ornithological Society and also on the Board of the Friends of Patuxent Research Refuge/Patuxent Wildlife Research Center. Dr. Watson is the editor of the Birder's Guide to Maryland and D.C., a project of the Maryland Ornithological Society and formerly served on the Maryland-DC Bird Records Review Committee.

Daniel Woomer, PhD (ABD) – Is a community activist and technical expert. He retired after a long career including positions with Westinghouse Defense Center, Johns Hopkins University's Applied Physics Laboratory, and the U.S. Department of Energy (DOE). During his career with the DOE, he worked in various positions with the Energy Information Administration and the Office of Congressional and Intergovernmental Affairs, and he helped set up the Office of Technology Transitions. He also served as an adjunct faculty member with the University of Maryland University College, where he developed and taught mathematics, supervisory and leadership classes for over a decade. He is active with community and national organizations including Linthicum-Shipley Improvement Association (LSIA) and National Association of Retired Federal Employees (NARFE), having served in leadership roles and elected positions. Dan is also serving as a Maryland Senator appointee and voting member of the DC Metroplex BWI Community Roundtable. Dan's full bio can be found at: www.linkedin.com/in/daniel-e-woomer-11829613.

LXVII. Appendix: Acronyms

- AA County – Anne Arundel County
- AACPS - Anne Arundel County Public School
- ABS – Anti-lock Braking System
- ACHP – Advisory Council on Historic Preservation
- APE – Area of Potential Effect
- BARC – Beltsville Agricultural Research Center
- BMP – Best Management Practices
- BWI – Baltimore-Washington International Airport
- BWRR – Baltimore-Washington Rapid Rail
- BWP – Baltimore-Washington Parkway (also BW Pkwy)
- BWTRG – Baltimore-Washington Transit Group.
- CAA – Common Aesthetic Area
- CAST – Chesapeake Assessment Scenario.
- CATS – Citizens Against the SCMagLev
- CEQ – Council on Environmental Quality
- CERN – European Council for Nuclear Research.
- CO_2 – Carbon Dioxide - a colorless gas with a density about 53% higher than that of dry air. Carbon dioxide molecules consist of a carbon atom covalently double bonded to two oxygen atoms.
- Corps – Army Corps of Engineers
- CPCN – Certificate of Public Convenience and Necessity
- D.C. – Washington District of Columbia
- DCDOT – District of Columbia Department of Transportation
- ^{o}C – degrees Celsius - a temperature scale originally known as the centigrade scale - the scale was named after the Swedish astronomer Anders Celsius (1701–1744), who developed a similar temperature scale. Before being renamed to honor Anders Celsius in 1948, the unit was called centigrade, from the Latin centum, which means 100, and gradus, which means steps - since 1743 the Celsius scale has been based on 0 °C for the freezing point of water and 100 °C for the boiling point of water at 1 atm pressure. Prior to 1743 the values were reversed (i.e., the boiling point was 0 degrees and the freezing point was 100 degrees). The 1743 scale reversal was proposed by Jean-Pierre Christin.
- ^{o}F – degrees Fahrenheit - is a temperature scale based on one proposed in 1724 by the physicist Daniel Gabriel Fahrenheit - the Fahrenheit scale is now usually defined by two fixed points: the temperature at which pure water ice melts is defined as 32 °F and the boiling point of water is defined to be 212 °F, both at sea level and under standard atmospheric pressure (a 180 °F separation).
- DEIS – Draft Environmental Impact Statement
- DNL – Day-Night Average Sound Level - represents the total accumulation of all sound energy, but spread out uniformly over a 24-hour period.
- DNR – Department of Natural Resources
- DOD – United States Department of Defense
- DOI - Department of Interior

- DORIS – Doppler Orbitography and Radiopositioning Integrated by Satellite
- EIS – Environmental Impact Statement
- EMF – Electromagnetic Field
- ESA – [Federal] Endangered Species Act
- ESD – Environmental Site Design
- FA/EE – Fresh Air and Emergency Egress - Surface ventilation facilities above SCMagLev tunneled sections.
- FERC – Federal Energy Regulatory Commission
- FHWA – Federal Highway Administration
- FPAB – Forest Preserve Advisory Board
- FRA – Federal Railroad Administration
- GEOS – Goddard Earth Observing System
- GGAO – Goddard Geophysical and Astronomical Observatory
- GMAO – Global Modeling and Assimilation Office
- GNSS – Global Navigation Satellite Systems
- JRC – aka JR Central - Central Japan Railway Company Design and builder of the SCMagLev and support systems.
- *He* – Helium - atomic number 2 - a colorless, odorless, tasteless, non-toxic, inert, monatomic gas, the first in the noble gas group in the periodic table, with a boiling point the lowest among all the elements.
- *LHe* – Liquid Helium
- LN_2 – Liquid Nitrogen
- LOD – Limits of Disturbance
- LOS - Level of Service
- LSIA – Linthicum-Shipley Improvement Association
- LWCF – Land and Water Conservation Fund
- MARC – Maryland Area Rail Commuter – Maryland's commuter rail system
- MCRT – Maryland Coalition for Responsible Transit email: MCRTaction@gmail.com, website: www.mcrt-action.org.
- MBTA – Migratory Bird Treaty Act.
- MDE – Maryland Department of the Environment
- mG – milliGauss - measure of magnetic field strength can be expressed in units of Tesla (T) or microtesla (μT) or Gauss (G) or milligauss (mG), where 1 G is equivalent to 10^{-4} T (or 1 mG = 0.1μT).
- MHHA – Montpelier Hills Homeowners Association
- MHRA – Montpelier Hills Recreation Association
- MHT - Maryland Historical Trust
- MJ – The joule (symbol: J) is a derived unit of energy in the International System of Units. It is equal to the energy transferred to (or work done on) an object when a force of one newton acts on that object in the direction of the force's motion through a distance of one meter (1 newton-meter or N·m) - Megajoule (MJ) is equal to one million (10^6) joules, or approximately the kinetic energy of a one megagram (metric ton) vehicle moving at 161 km/h (100 mph).
- M-NCPPC - The Maryland-National Capital Park and Planning Commission
- MS4 – Municipal Separate Storm Sewer Permits

- MSDS – Material Data Safety Sheet
- MTA – Maryland Transit Authority
- MWCOG – Metropolitan Washington Council of Governments
- MOW – Maintenance of Way
- NABTU – North American Building Trades Union
- NASA – National Aeronautics and Space Administration
- NEC – Northeast Corridor
- NEC Future – Amtrak's FRA reviewed and approved plan to upgrade passenger rail equipment, facilities and services along the northeast corridor.
- NEPA – National Environmental Protection Act - The National Environmental Policy Act - was signed into law on January 1, 1970 and requires federal agencies to assess the environmental effects of their proposed actions prior to making decisions. The range of actions covered by NEPA is broad and includes: (1) making decisions on permit applications, (2) adopting federal land management actions, (3) constructing highways and other publicly-owned facilities.
- NHL – National Historic Landmark
- NHPA – National Historic Preservation Act
- N – Nitrogen - atomic number 7 - is the lightest member of group 15 of the periodic table, often called the pnictogens - it is a common element in the universe, estimated at about seventh in total abundance in the Milky Way and the Solar System - at standard temperature and pressure, two atoms of the element bind to form dinitrogen, a colorless and odorless diatomic gas with the formula N_2. Dinitrogen forms about 78% of Earth's atmosphere, making it the most abundant uncombined element.
- NPS – National Park Service
- NRHP – National Register of Historic Places
- NTWSSC – Nontidal Wetlands of Special State Concern
- NWRS – National Wildlife Refuge System
- NWVC – National Wildlife Visitor Center
- OSTI – Office of Scientific and Technical Information - U.S. Department of Energy www.osti.gov.
- PA – Programmatic Agreement
- pCi/L – Picocuries Per Liter - a measure used to express the results of radioactivity tests in air and water. For radon gas, one picocurie per liter is the amount of radon in the air so that 2.2 atoms of radon decay during one minute in one liter of air.[821]
- PG County – Prince George's County
- PGCPS – Prince George's County Public School
- PJM – Pennsylvania-New Jersey-Maryland Interconnection
- PWRC – Patuxent Wildlife Research Center
- PRR – Patuxent Research Refuge
- RPA – Rules of Particular Applicability – U.S. Rail Safety Standards.

[821] Picocuries - A pCi is a measure of the rate of radioactive decay of radon. One pCi is one trillionth of a Curie, 0.037 disintegrations per second, or 2.22 disintegrations per minute. Therefore, at the EPA's recommended action level of 4 pCi/L (picocuries per liter), there will be approximately 12,672 radioactive disintegrations in one liter of air during a 24-hour period. Source: https://branchinvestigations.com/avada_faq/what-is-a-picocurie-pci/. Also see the US EPA's official position at the EPA's Radon Health Risks Frequently Asked Questions. Source: www.radon.com/radon_faq/.

- ROD – Record of Decision.
- RRIF – Railroad Rehabilitation and Improvement Financing
- RSAC – Rail Safety Advisory Committee.
- RSD – Rolling Stock Depot.
- RTE species – Rare, Threatened and Endangered species.
- SCC – Social Cost of Carbon - Now set with the current Administration at $52/metric ton.
- SCM – Superconducting Magnetic
- SCMagLev – Superconducting Magnetic Levitation
- Short Ton – In the United States and Canada, a ton is defined to be 2,000 pounds (907.18474 kg). A short ton is equal to 2,000 pounds avoirdupois (907.19 kg). It is also a measure of gross internal capacity, equal to 100 cubic feet (2.83 cu. m). Where confusion is possible, the 2,240-pound ton is called a "Long Ton."
- SHPO – State Historic Preservation Office
- SLR – Satellite Laser Ranging
- TBM – Tunnel Boring Machine
- TCP – Traditional Cultural Properties
- TEA – Transportation Equity Act
- TFS –Transmission Feasibility Study.
- TMDL – Total Maximum Daily Load
- TMF – Train Maintenance Facility
- TNEM – The Northeast Maglev company
- TTC – Transportation Technology Center - located in Pueblo, Colorado.
- USDOE - United States Department of Energy
- USDOT – United States Department of Transportation
- USFWS – United States Fish and Wildlife Service
- USGS – United States Geologic Survey
- VLBI – Very Long Baseline Interferometry
- VMT – Vehicle Miles Travelled
- VRE – Virginia Rail Express – Virginia's commuter rail system
- WB&A - Washington, Baltimore and Annapolis Electric Railway[822]
- WHEJIC - White House Environmental Justice Interagency Council
- WIP – Watershed Implementation Plan

[822] The Washington, Baltimore and Annapolis Electric Railway (WB&A) was an American railroad of central Maryland and Washington, D.C., built in the 19th and 20th century. The WB&A absorbed two older railroads, the Annapolis and Elk Ridge Railroad and the Baltimore & Annapolis Short Line, and added its own electric streetcar line between Baltimore and Washington. It was built by a group of Cleveland, Ohio, electric railway entrepreneurs to serve as a high-speed, showpiece line using the most advanced technology of the time. It served Washington, Baltimore, and Annapolis, Maryland, for 27 years before the "Great Depression" and the rise of the automobile forced an end to passenger service during the economic pressures of the 1930s "Depression" southwest to Washington from Baltimore and west from Annapolis in 1935. Only the Baltimore & Annapolis portion between the state's largest city and its state capital continued to operate electric rail cars for another two decades, replaced by a bus service during the late 1950s into 1968. Today, parts of the right-of-way are used for the light rail line (from Cromwell Station / north Glen Burnie going north to downtown Baltimore and further north through city to Hunt Valley in Baltimore County), rail trail for hiking - biking trails, and roads through Anne Arundel County. For additional information see: https://en.wikipedia.org/wiki/Washington,_Baltimore_and_Annapolis_Electric_Railway.

- WLA – Waster Load Allocations
- WMATA – Washington Metropolitan Area Transit Authority
- WSSC – Washington Suburban Sanitary Commission
- WQC – Water Quality Certification

LXVIII. Appendix: Article & Letter Reprints

LXIX. Appendix: Article Reprint: Boehm, Eric. "Proposed Baltimore-to-D.C. Maglev Train Would Cost as Much as Building 1,500 Miles of Highway." *Ingram Publishing/Newscom*. October 18, 2017. Posted on *Reason Free Minds and Free Markets*.

[The] Proposed Baltimore-to-D.C. Maglev Train Would Cost as Much as Building 1,500 Miles of Highway
The $15 billion project would connect two cities that are only 35 miles apart. That's $420 million per mile-if it stays on-budget.

High-speed rail boondoggles aren't just for California anymore.

A proposal to build a high-speed maglev [MCRT note: SCMaglev] train between Baltimore, Maryland, and Washington, D.C., took a step toward enaction this week with the announcement of three potential routes for the rail line, *UrbanTurf* reports. The Federal Railroad Administration, the Maryland Department of Transportation, and other agencies involved in the project are planning a series of public meetings to gather citizens' input on the project.

Here's my input: I can't believe this is something that's seriously under consideration.

For now, there is no official estimate of how much the train will cost, but the website for the Baltimore-Washington Superconducting Maglev Project includes a projected cost of between $10 billion and $15 billion. Even if you give them the benefit of the doubt about the final price tag—something you probably shouldn't do, given how much other high-speed rail projects have ended up costing—that still raises some serious questions about the fiscal sanity of building this thing.

$15 billion is an amount so astronomically large that it is difficult to comprehend. So let's consider the relative costs of building this train versus, say, a new four-lane highway between D.C. and Baltimore.

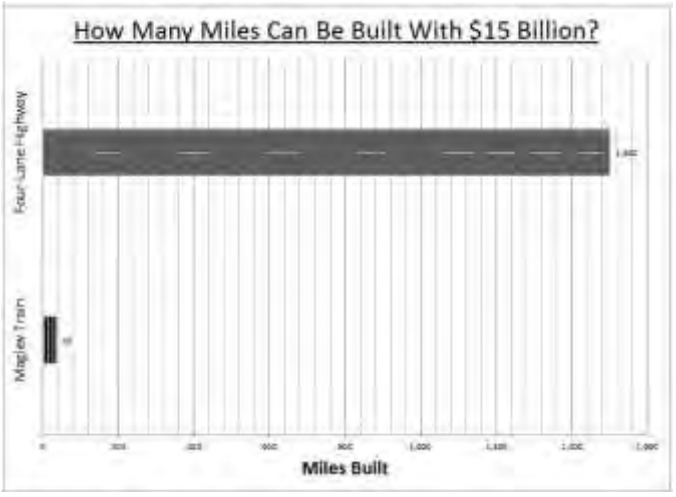
[MCRT note: BWRR now states the cost will now be $16 billion]

Eric Boehm; Sources: www.baltimorewashingtonscmaglevproject.com/index.php/faqs; www.artba.org/about/faq

The proposed maglev train doesn't have a precise route yet, but the routes under consideration are all in the neighborhood of 35 miles long. That means the maglev would cost about $420 million per mile.

According to the American Road & Transportation Builders Association, a national trade group, it costs about $10 million per mile to build a four-lane highway through a suburban or urban area, which is how most of the land between Washington and Baltimore would be classified.[823]

Here's an alternative visualization. In this graphic, we are comparing how many miles of Maglev train can be built with $15 billion versus how many miles of four-lane highway could be built with an equal amount of funding.



Eric Boehm; Sources: www.baltimorewashingtonscmaglevproject.com/index.php/faqs; www.artba.org/about/faq

This is insanity.

Also worth considering: Resurfacing an existing four-lane highway costs about $1.25 million per mile, meaning that the maglev's $15 billion price tag could be used instead to resurface about 12,000 miles of roadway. That's more than a third of all roads in the state of Maryland.

One more way to visualize this fiscal craziness: The WMTA, which runs buses and subways in Washington, has an expected total operating budget of $1.7 billion next year. The Maryland Transit Administration, which runs the Baltimore subway, various light-rail lines around the city, and the MARC train between Baltimore and D.C., has a total operating budget of $787 million this year.

For the cost of building this train—not operating and maintaining, but merely *building* it—you could fund both the WTMA and the MTA through 2024 without asking taxpayers or riders to pay a single dime toward either system.

That probably sounds pretty good to commuters in D.C., who have been squeezed by the WMATA with fare increases and service cuts in the past two years. A functional subway system in the nation's capital would certainly serve more people than a super-expensive train between downtown D.C. and downtown Baltimore.

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[823] Source: Baltimore-Washington Superconducting Maglev Project. Environmental Study. Frequently Asked Questions. www.baltimorewashingtonscmaglevproject.com/index.php/faqs and American Road and Transportation Builders Association. Frequently Asked Questions. www.artba.org/about/faq.

[MCRT note: The planned station will be located in the southern part of the city in Cherry Hill, not downtown as are Penn, West Baltimore, and Camden Yards stations.]

After all, exactly how useful would a train like this be? Most of the (admittedly horrific) traffic in the D.C. metro area is the result of commuters going back and forth between the city itself and the suburbs. Another train between D.C. and Baltimore — did I mention there already is a non-maglev train between the cities? — would be of limited utility for most residents of the greater Baltimore - D.C. metro area, even with a stop at the airport. It would likely do little to get cars off the road. Anyone needing to travel farther up the East Coast would still have to drive, or use Amtrak, or fly.

[MCRT note: ". . . did I mention there already is a non-maglev train between the cities?" They would be Amtrak, Amtrak Acela, and MARC.]

The planners behind the maglev project say this would be the first leg in a train line that would eventually connect Washington to New York City or even Boston. But those other parts of the project won't be built until the 2040s, according to the project's website (and holy moly, can you imagine how expensive the rest of the line would be?). Until then, this would be — sorry in advance, Baltimore — a train to nowhere.

Some money has already been flushed away on this idea: The federal government issued a $27.8 million grant in 2015 for the project's planning and preliminary engineering. The project is soaking taxpayers in foreign countries too, thanks to the Japanese government's decision to put up $5 billion in support. Maglev trains are already used in Japan and Japanese companies would be well positioned to bid on this project, if it gets that far.

[MCRT note: as of October 2023, Japan's SCMaglev is still not in daily commercial operation and is still running on the test and development guideway. Building the existing system to Tokyo and onto Osaka have been delayed as costs and technical issues plague the building schedule.]

That's a lot of money, but it's nothing compared to how much could end up being spent on this boondoggle.

This piece was updated to correct the number of highway miles able to be built with $15 billion.

[MCRT note: The update was in October 2017]

ERIC BOEHM is a reporter at *Reason*.

LXX. Appendix – Article Reprint: Park, Carol. "Maglev: A high speed train to higher taxes." February 7, 2018. The Maryland Public Policy Institute.

On Sunday February 4th, an Amtrak passenger train accidentally diverted to a side track and crashed in South Carolina, killing two and injuring 116 people. For Maryland, yet another Amtrak accident, the 26th major accident since 2014, is a wake-up call: Should we be drooling over the futuristic concept of Maglev, when America's existing railways are suffering from inadequate maintenance and mismanagement?

The Maglev is a superconducting "magnetic levitation" train that would connect Baltimore to Washington D.C. in 15 minutes at 311 mph. As currently envisioned, the project would be a public–private partnership, funded by a mix of public and private dollars. Earlier this month, Wayne Rogers, the CEO of Northeast Maglev, announced that construction could begin in 2020 once states involved approve the project.

The Maglev project has been backed by Gov. Larry Hogan since 2015. While Hogan's attempt to innovate Maryland's transit system deserve credit, high speed rail projects are a magnet for questionable subsidies, as demonstrated by California's bullet train. The Maglev website currently predicts that the project would cost $10 billion to $15 billion without cost overrun. California's bullet train, which was estimated to cost $6 billion originally, has surged to a price-tag of $10.6 billion. If we apply this rate of cost overrun to Maglev, we can realistically expect the project to cost $17.6 billion to $26.5 billion. Even at its current price tag, Maglev would still be one of the most expensive rail lines ever built on a per-mile basis, at an estimated cost of $250 million per mile.

The problems begin here. So far, only $5 billion has been pledged by the Bank of Japan toward construction. This means up to $10 billion more will be needed under the current price-tag, and up to $21.5 billion with the likely cost overrun. That money will be taxpayers' dollars, a large portion of that likely having to come out of Maryland residents' pockets. Rogers did not hesitate in asking for government subsidy: "Yes, we'll go raise private investment but it can't all be private investment. We can't rebuild our infrastructure 100 percent privately."

Unfortunately, the private sector is unlikely to invest in a project that has no evidence for profitability. After all, Maglev would target the elite business travelers and be out of reach of most residents of Maryland or D.C., due to its high-ticket prices. In addition to Amtrak, a variety of private bus companies already provide affordable trips between D.C. and Baltimore. With such narrow ridership prediction, it seems reasonable to be pessimistic about Maglev's revenue stream and profitability.

In fact, the discussion of Maglev for Baltimore and D.C. goes back at least two decades. After a comprehensive study by the Federal Railroad Administration of the maglev technology in 2002,

former Governor Robert Ehrlich opposed Maglev, saying it would be "the most technically and organizationally complex infrastructure project undertaken in Maryland in many decades." Governor Ehrlich's opposition clearly stemmed from more than just costs concerns, and it is needless to say that there were various reasons why the project failed to pass the first time.

Given the immense cost estimate of Maglev and no private partners that seem excited to step in, the Maglev project is doomed to become an expensive failure. In addition, using general taxpayers' money to build a high-speed rail system that will be mainly used by high-income residents will only exacerbate Maryland's inequality.

Instead of wasting energy experimenting with dangerous projects like Maglev, Maryland government should redirect its energy to finding more efficient ways to allocate taxpayers' money to improve the safety of the existing transit system in Maryland. Making maximal use out of minimal taxpayers' dollar to improve Maryland's transit network should be the priority. Focusing on maintenance and safety will be a key to preventing a South Carolina–type of tragedy for the Maryland residents, which is far more important than building another train.

Some of taxpayers' money has already been handed out for Maglev—the federal government issued a $27.8 million grant in 2015 for its planning. However, $27.8 million is nothing in comparison to the multi-billion-dollar figures that are currently being discussed. Luckily, it is not too late for Maryland officials to stop supporting Maglev, a high-speed train to higher taxes.

LXXI. Appendix - Submission Reprint: Coalition for Smarter Growth. "Baltimore-Washington Superconducting Magnetic Levitation Draft Environmental Impact Statement and Draft Section 4(f) Evaluation." May 2021.

Submitted via email to info@BWMaglev.info

May 24, 2021

SCMAGLEV Project
% Lauren Molesworth
Maryland Transit Administration
6 Saint Paul Street
Baltimore, MD 21202

Re: Baltimore-Washington Superconducting Magnetic Levitation Draft Environmental Impact Statement and Draft Section 4(f) Evaluation

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The Coalition for Smarter Growth submits the following comments in response to the Notice of

Availability of the Baltimore-Washington Superconducting Magnetic Levitation (SCMAGLEV) Draft Environmental Impact Statement (DEIS) and Draft Section 4(f) Evaluation. We oppose the Baltimore-Washington SCMAGLEV (henceforth referred to as "the project") and support the No Build alternative for reasons detailed below.

Extremely narrow and biased purpose and need

> *"To evaluate, and ultimately construct and operate, a safe, revenue-producing, high-speed ground transportation system that achieves the optimum operating speed of the SCMAGLEV technology to significantly reduce travel time to meet the capacity and ridership needs of the Baltimore-Washington region."*[824]

The above purpose statement from the DEIS is extremely narrow and explicitly biased toward the Baltimore-Washington SCMAGLEV project. Rather than comprehensively study transportation options to reduce travel times, improve connectivity, and increase transit ridership between Baltimore and Washington, the DEIS only considers alternatives using SCMAGLEV technology. This approach artificially starts with the solution rather than giving a menu of options due attention. Among the alternatives that should have been studied is a combination of MARC and Amtrak improvements, along with transit-oriented station development (TOD). Given that the SCMAGLEV would have major impacts on parkland it would violate Section 4(f) of the Federal Highway Act. The MARC, Amtrak, TOD alternative along existing rail alignments is a prudent and feasible alternative to the SCMAGLEV that cannot legally be ignored.

Lack of independent utility

Project advocates, such as Northeast Maglev, have indicated an intention and desire for the Baltimore-Washington corridor to only be the first segment of a SCMAGLEV line covering the full Northeast Corridor (NEC). Future project segments could connect as far north as Boston, Massachusetts or south to Charlotte, North Carolina. However, given the higher densities along much of the corridor and resulting right-of-way design and cost challenges, approval and ultimate construction of the full SCMAGLEV is unlikely.

There are diminishing returns on short-distance Maglev service. The Acela Express between DC and Baltimore currently takes 30 minutes. While Maglev would cut time spent on the train in half, this doesn't account for total trip time, including time spent getting to the station. The average total trip would go from 90 minutes to 75 minutes, which is not worth the risk, nor the costs to equity and environmental quality.[825] The 15-minute Maglev trip would only be six

[824] U.S. Department of Transportation (DOT), Federal Railroad Administration (FRA); Maryland Department of Transportation (MDOT). 2021. "Draft Environmental Impact Statement and Draft Section 4(f) Evaluation: Baltimore-Washington Superconducting Maglev Project." ES-6.
[825] Levy, Alon. 2018. *Is maglev right for D.C.?* March 22. D.C. Policy Center. https://www.dcpolicycenter.org/publications/is-maglev-right-for-d-c/.

minutes faster than the expected Acela trip time following replacement of the B&P Tunnel and other investments that are already moving forward.[826]

Many of the high-speed travel benefits would only come from extending the SCMAGLEV beyond the Washington, DC and Baltimore regions. Therefore, this particular segment simply does not provide independent utility, but if built could very well become a "white elephant" — an isolated short-distance segment with few benefits beyond what could be achieved by upgrading existing technologies.

3. Negative racial and social equity impacts

The project would have a negative impact on racial and social equity. Construction would plow through majority-Black Prince George's County, but the residents of Prince George's County would not be able to take advantage of the project, since there will only be stops in DC, at BWI Airport, and at Penn Station in Baltimore. Environmental Justice (EJ) communities would be disproportionately impacted, with 80 percent of impacted parcels located in EJ communities, and vent systems and viaduct/viaduct ramps located completely in EJ communities.[4]

Furthermore, the high projected cost of a one-way ticket sends a signal that this project is for the wealthiest white-collar commuters, not those who will suffer from the environmental destruction wrought by the project or those who need more accessible, frequent, and affordable transit. An average $60 ticket for the Baltimore-Washington SCMAGLEV would be about seven times more than an existing MARC ticket for the same trip ($8), four times more than an Amtrak NE Regional coach ticket ($15), and 30% more than an existing Amtrak Acela ticket ($46).[827]

4. Harm to taxpayer investments in existing transit

The Baltimore-Washington SCMAGLEV is already diverting millions of dollars and attention from repairing and improving our existing MARC and Amtrak infrastructure, and could divert billions more. The Federal Railroad Administration (FRA) has already awarded a $27.8 million grant to MDOT MTA for preliminary engineering and environmental review.[828] Given that Maglev is a multi-billion-dollar technology yet to be implemented anywhere in the U.S., it could require significant public funding. The DEIS says repeatedly that the project might receive

[826] Flynn, William J. 2021. "Testimony of William J. Flynn, Chief Executive Officer, National Railroad Passenger Corporation Before the United States Houses of Representatives House Committee on Transportation & Infrastructure Subcommittee on Railroads, Pipelines, and Hazardous Materials, When Unlimited Potential Meets Limited Resources: The Benefits and Challenges of High-Speed Rail and Emerging Rail Technologies" May 6. https://transportation.house.gov/imo/media/doc/Flynn%20Testimony2.pdf.
[4] *Ibid*, 4.5-16, 4.5-20.
[827] *Ibid*, 4.6-13.
[828] *Ibid*, ES-1.

federal funding.[829] We believe that there is a real likelihood that the proponents will seek substantial public funding. At a recent hearing before the United States House of Representatives' Committee on Transportation & Infrastructure Subcommittee on Railroads, Pipelines, and Hazardous Materials, BRWW explicitly asked for $300 million in contract authority.[8] This indicates an intention to continue to seek ever-greater federal and state taxpayer dollars for this project.

In addition to diverting federal funding, the project would negatively impact ridership on existing MARC and Amtrak rail systems. As the DEIS states, "the large majority of forecasted trips on SCMAGLEV Project are diverted from other modes rather than induced new trips."[830] The DEIS shows the project diverting 32 percent of MARC riders from MARC and 94 percent of annual Amtrak riders between Penn Station and Union Station.[831] This substantial decrease in ridership on both systems would be accompanied by a substantial decrease in Amtrak and MARC fare revenue, potentially leading to poorer service for those unable to afford the ticket cost of the Baltimore-Washington SCMAGLEV. This disparity would further entrench transportation inequities.

Investing in the MARC and Amtrak Northeast Corridor (NEC) expansion plans would more effectively serve the transit needs of our region. In fact, Amtrak and the Federal Railroad Administration already analyzed "the mobility challenges of the Baltimore-Washington, DC travel corridor with a focus on the role of passenger rail in meeting those challenges" and determined that a new passenger rail alignment was not necessary, as a part of the NEC FUTURE program.[832] Instead, their programmatic environmental impact statement (EIS) identified improvement of the existing rail alignment as the preferred alternative.

For $6.8 billion, the region could fund the entire program of improvements in the Greater Washington Partnership Capital Region Rail Vision for the DC to Baltimore travel corridor, with tangible benefits to residents and travelers throughout Prince George's County, Howard County, Anne Arundel County, the City of Baltimore, and the District of Columbia, compared to the $10-$15 billion cost of the SCMAGLEV project.[833] For the Penn and Camden MARC lines, this would provide:

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[829] *Ibid*, 4.4-4, 4.4-20, 4.6-9, and 4.21-6. 8 Rogers, Wayne L. 2021. "Testimony of Wayne L. Rogers, Chairman & CEO The Northeast Maglev, LLC before the United States Houses of Representatives House Committee on Transportation & Infrastructure Subcommittee on Railroads, Pipelines, and Hazardous Materials, When Unlimited Potential Meets Limited Resources: The Benefits and Challenges of High-Speed Rail and Emerging Rail Technologies" May 6. https://transportation.house.gov/imo/media/doc/Rogers%20Testimony.pdf.
[830] *Ibid*, 4.2-6.
[831] *Ibid*, 4.2-10 and 4.2-12.
[832] Campbell-Lorenc, AICP, Janet. Letter to Mr. Bradley M. Smith, Director of the Office of Freight and Multimodalism, Maryland Department of Transportation. Amtrak, Corporate Planning. January 31, 2017.
[833] Greater Washington Partnership. 2020. "Capital Region Rail Vision: From Baltimore to Richmond, Creating a More Unified, Competitive, Modern Rail Network." December 20220. https://greaterwashingtonpartnership.com/wp-content/uploads/2020/12/Capital-Region-Rail-Vision-Report_Final.pdf.

- Faster, more reliable travel times.
- Improved stations and amenities.
- Seamless rail integration from Baltimore to DC, and set the stage for integration via through-running service into Northern Virginia.
- Facilities to support all-day, frequent service, enabling the system to serve more than weekday, 9-5 commuters.

Wash-Balt. Corridor Improvements in Capital Region Rail Vision	
Penn Line Improvements	Millions $
3-main tracks, New York Ave to New Carrollton	271
Additional 4th track, New Carrollton to Grove	584
B&P Tunnel replacement —4 tubes	4,520
Baltimore Penn Station interlocking improvements	67
Union Tunnel expansion— additional 4th track	151
Bayview track realignment	15
Station modifications to support one additional main track: Odenton, Bowie State, Seabrook, New Carrollton	90
New Carrollton Station -- 4th track with platform	53
Baltimore Penn Station improvements	140
New Bayview Station	100
Overnight Storage Facility	40
Penn Line Storage and Maintenance Facility	294
Subtotal	6,325
Camden Line Improvements	Millions $
Montana siding extension	12
Third track: Brentwood- Hyattsville	31
Third track: Hyattsville-Greenbelt	23
Third track, Savage-Jessup	22
Double-tracking: Alexandria Branch across Anacostia River	11
Additional 3rd track	200
Signal system improvements	22
Station upgrades	54
Station parking and access improvements	105
Camden Line storage and maintenance facility improvements	37
Subtotal	517
Total (millions $)	**6,842**
Washington Union Station Near-Term Improvements and Full Expansion	
Washington Union Station Near-Term VRE Improvements	55
Washington Union Station Full Expansion	5,560
Total (millions $)	**5,615**

The investments needed to provide higher quality Amtrak NEC service are already underway, such as the replacement of the Baltimore & Potomac Tunnels, additional right-of-way and track

segments, and modernization and expansion of Washington Union Station.[834] "Amtrak has taken out a $2.5 billion loan with the Federal Railroad Administration to purchase new high speed trains and construct infrastructure needed to optimize high speed rail service between Baltimore and Washington, DC."[14] Any public or private dollars spent on SCMAGLEV would undercut these existing taxpayer investments in the Amtrak NEC.

There are also many questions about how the project's DC station would impact the District and whether it would benefit or harm the city's transportation network. It is unclear how the currently proposed station location in Mount Vernon East would impact New York Avenue, a major transportation corridor, and the District's goals to minimize parking and single-occupancy vehicle trips. BWRR plans to add 1,000 underground parking spaces which would induce more traffic on DC streets. Additionally, the proposed Mount Vernon East Station would offer no direct underground connections to Metrorail, leaving Maglev riders disconnected from the District's subway system and from the Amtrak hub at Union Station when disembarking. This contradicts one of the project's stated objectives: "Connectivity to existing transportation modes in the region." Other alternatives to Mount Vernon East were eliminated, so it is impossible to fully evaluate the relative costs and benefits of those options.

Upgrades to the existing rail system could also more easily be extended to other destinations in the northeast than the SCMAGLEV. Existing rail stations are located in more central and well-established transit hubs, like DC's Union Station. In short, a much more cost-effective solution would be to invest in improving our existing infrastructure and eventually upgrade to high-speed rail standards.

5. Questions about ridership estimates

Our arguments so far assume that the project's ridership estimates included in the DEIS are correct. However, this may not be the case. The ridership forecast copies from a contractor's report, which is not available to the public to review without heavy redactions. Furthermore, the "ridership demand forecasts were developed by the Project Sponsor" and it does not seem that they were reviewed independently by the Federal Railroad Administration or any other federal agencies.[835] Analysis from a private citizen finds that "the official forecast is approximately one hundred times greater than the independent, unofficial forecast."[836] A faulty ridership forecast calls into question the purported benefits of the project.

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[834] Campbell-Lorenc, AICP, Janet. Letter to Mr. Bradley M. Smith, Director of the Office of Freight and Multimodalism, Maryland Department of Transportation. Amtrak, Corporate Planning. January 31, 2017.

[835] U.S. Department of Transportation (DOT) Federal Railroad Administration (FRA); Maryland Department of Transportation (MDOT). 2021. "Draft Environmental Impact Statement and Draft Section 4(f) Evaluation: Baltimore-Washington Superconducting Maglev Project, Appendix D.2 Transportation Technical Report." B-104. https://www.bwmaglev.info/index.php/component/jdownloads/?task=download.send&id=38&catid=4&m=0&Itemid= 101.

[836] Kelley, Owen A. 2021. "The Federal Railroad Administration falls for an excessively high forecast of how many trips would be made on the maglev." May 21. https://www.greenbeltonline.org/maglev-ridership/.

6. Existing alternatives avoid negative environmental impacts

Creating a new right of way for this project, rather than investing in existing rail right of way, will bring about numerous negative environmental impacts, as documented in the DEIS. Not only does the project require above-ground viaducts for 14 to 25 percent of the route, with a right-of-way of 72 feet or more, but the project also requires a Trainset Maintenance Facility, nine Fresh Air/Emergency Egress buildings, two maintenance of way facilities, seven power substations, an operations and control center, small support buildings, access roads, parking lots, and "lay-down" lots for storage, maintenance, and staging.
These assorted facilities will negatively impact up to 328 acres of federal lands, such as the Patuxent Research Refuge, Beltsville Agricultural Research Center, and federal parklands along the Baltimore-Washington Parkway. The impacted areas include some of the last large blocks of undeveloped land in the region, serving as an important area for biodiversity, rare ecosystems, and flora and fauna. We have also signed onto comments submitted by the National Parks Conservation Association that further detail the environmental concerns.

Additionally, the Baltimore-Washington SCMAGLEV will require twice the energy per passenger mile as Amtrak, increasing energy usage by approximately 3.0 trillion additional BTUs per year — enough energy to power around 88,900 homes per year.[837] It is not ensured that this electricity will come from clean, renewable sources, and the reductions in trips on other modes will not offset this increase in energy consumption. Overall, the project could lead to increased net carbon emissions by 286 to 336 million kilograms per year, further deteriorating air and water quality.[838] Bus and current passenger rail technologies are 20 to 37 percent more efficient than the proposed project.[839]

Conclusion

In closing, the Baltimore-Washington SCMAGLEV project provides more harm than benefit. The project's harms include its fundamental inequity and disproportionate impacts to low-income communities and communities of color, detrimental effects to ridership and funding for existing MARC and Amtrak systems, and irreversible damage to key environmental resources. These costs would be incurred without significant overall travel time savings for those who could afford to ride Maglev. The Coalition for Smarter Growth wholly endorses the No Build

[837] U.S. Department of Transportation (DOT) Federal Railroad Administration (FRA); Maryland Department of Transportation (MDOT). 2021. "Draft Environmental Impact Statement and Draft Section 4(f) Evaluation: Baltimore-Washington Superconducting Maglev Project." 4.19-7.
[838] Kelley, Owen A. 2021. "Operating the maglev would increase greenhouse gas emissions, Federal Railroad Administration finds." April 13. https://www.greenbeltonline.org/operating-the-maglev-would-increase-greenhouse-gas-emissions-federal-railroadadministration-finds/.
[839] U.S. Department of Transportation (DOT) Federal Railroad Administration (FRA); Maryland Department of Transportation (MDOT). 2021. "Draft Environmental Impact Statement and Draft Section 4(f) Evaluation: Baltimore-Washington Superconducting Maglev Project." 4.19-10.

alternative and supports regional efforts to implement proposed MARC and Amtrak improvements.

LXXII. Appendix - Article Reprint: Davies, Ross. "Magnetic pull: China and Japan Battle it Out for Maglev Train Supremacy." July 14, 2020. *Railway Technology*.

Notwithstanding the coronavirus crisis, Japan has revealed it will conduct tests of a new prototype train as part of its ambitious maglev line, while China looks set to double down on further floating projects. Elsewhere though, the maglev concept shows little sign of ever taking off.

A test run takes place with Mount Fuji in the backdrop. Credit: Central Japan Railway Company.

Ever since it was launched in time for the 1964 Olympic Games in Tokyo, the Shinkansen has remained a source of national pride in Japan.

The story of the bullet train is also one of progress. When it first linked Tokyo to Osaka over half a century ago, it was at a speed of 210km/h; today, trains hurtle along at a clip of up to 320km/h, transporting over a million passengers a day.

But as the Shinkansen has developed into something of an institution – and emblem of the country's technological spirit – the next chapter of high-speed train travel in Japan has proven much harder to write. This sticking point has a name: maglev.

While Japan is already in possession of rail network based on magnetic levitation – the Linimo Line in the Aichi Prefecture, close to the city of Nagoya – it is considerably overshadowed by China's commercial maglev service, which shuttles travelers between Shanghai and Pudong International airport at 268mph (the Linimo runs at 62mph).

It has been over 17 years since the Shanghai Transrapid (its official name) commenced operations, yet it remains the world's fastest electric train. Tokyo – which first began exploring the merits of the technology in the late 1960s – is keen to steal a march on its longtime rival and unveil an even more ambitious maglev system of its own.

Japan is betting big on the Chuo Shinkansen maglev line, which will cover the 178-mile distance between Tokyo and Nagoya at speeds of 500km/h, slashing the journey time to just 40 minutes. Scheduled to open commercially in 2027, Japan's network is based around superconducting magnets that are able to levitate the train by up to 10cm with minimal friction.

"Japan's network is based around superconducting magnets that are able to levitate the train."

High hopes: the Chuo Shinkansen line

In 2015, a test run of the maglev train conducted by its operator Central Japan Railway Company (JR Central) saw it reach speeds of over 600km/h, shattering previous world speed records. Since then, JR Central has busied itself with constructing the line, which will predominantly run through tunnels.

The outbreak of the coronavirus pandemic, however, has brought construction work in Tokyo and Kanagawa Prefecture to a halt, after Prime Minister Shinzo Abe declared a national state of emergency in April. JR Central will be champing at the bit to get back to the ¥5.5tn ($49bn) project. It had been scheduled in May to a test a new version of the maglev train before the government issued its shutdown notice.

More efficient: Hitachi unveils new maglev train prototype

Unveiled by Hitachi, the new LO prototype includes two end cars and an intermediate coach (the previous prototype had only one end car). According to JR Central, the latest design offers 13% less air resistance than the previous prototype, creating a significant reduction in noise and power consumption.

The operator is therefore keen to see what the new train – consisting of 12 cars and stretching a total length of 300m – can do on the Yamanashi test line as soon as possible.

This might be easier said than done. With Japan already bracing itself for a post-pandemic recession, JR Central's purse strings are likely to be tightened. Regardless of the economic disruption caused by Covid-19, there are some, however, that believe the maglev project is well in danger of losing money hand over a fist.

"**The maglev constitutes not only an extraordinarily costly but also an abnormally energy-wasting project, consuming in operation between four and five times as much power as the**

Tokaido Shinkansen [emphasis added]," wrote Japanese researchers Hidekazu Aoki and Nobuo Kawamiya in a 2018 paper denouncing the project.

Full speed ahead: China continues to prioritize maglev

Across the East China Sea, Beijing has plans to retain its global position as maglev's leading exponent – in addition to its ever-growing high-speed rail network. A Communist Party-approved whitepaper published in September 2019, "Outline for Building China's Strength in Transport", included an entire chapter on the development of new maglev lines between its key urban hubs.

In October, Changjiang Daily, the official newspaper of Wuhan, reported that tracks would be laid across the central province of Hubei in 2020 to test trains with speeds of up to 1,000km/h, based around a high-temperature, superconducting maglev theory. China Railway Group, a state-owned company, is purported to have already carried out a feasibility study for a new maglev network extending from Guangzhou to Beijing.

While the project appears to have been temporarily put on ice due to the coronavirus pandemic, China's emergence from the crisis has seen the resumption of new infrastructure projects.

In late April, Tong Laisheng, director of CRRC's Maglev Research Institute, revealed tests had been carried out on a new version of a train on the Changsha Maglev Express Line, which links the city in Hunan with Huanghua International Airport. In a statement, Tong said the new rolling stock had successfully hit speeds of 160km/h on the 18.5km line, compared to the 100km/h capacity of the old train.

Forever an outlier: Maglev's uncertain destiny elsewhere

Outside China, Japan and South Korea – whose first Maglev line, linking Incheon International Airport to Seoul, opened in 2016 – magnetic levitation technology continues to evade mainstream consideration, in spite of its European beginnings.

The UK holds the distinction of operating the first commercial maglev train – the Birmingham Airlink shuttle that ran from 1984 to 1995. Germany looked on course to develop something similar with the Transrapid maglev monorail in Munich, until an accident in 2006 at its test facility, which killed 23, brought progress to a tragic halt.

The most common argument levelled against maglev has always been to do with money, given that projects are required to start from scratch and cannot be integrated into a standard rail infrastructure. Floating trains don't appear to generate much profit, either – a case in point, the line in Shanghai is said to lose around $85m-$100m a year, according to some reports.

As fears mount of a global recession, governments are unlikely to countenance the idea of floating trains for a long time to come, leaving China – and Japan – as maglev's only true champions.

LXXIII. Appendix: Submission Reprint: DePuyt, Bruce – "Baltimore Officials' Rejection of Maglev is the Latest Blow for the Proposed High-Speed Rail." *Maryland Matters*. June 25, 2021.

A train similar to the Maglev train that would connect Baltimore and Washington, D.C. Baltimore-Washington Rapid Rail photo.

Backers of a proposed high-speed train between Baltimore and Washington, D.C. tout the project as a boon for both cities — and the Maryland economy.

Baltimore Mayor Brandon M. Scott's administration doesn't see it that way.

The proposed "super-conducting magnetic levitation" — or "Maglev"— train, modeled after an existing system that opened in Japan in the 1980s, is capable of traveling at 311 miles per hour,

enough to get people between the two cities in 15 minutes. It is backed by Japan Central Railroad and is currently undergoing environmental review.

In a May 14 letter to the Maryland Department of Planning, two senior members of Scott's team urged state and federal transportation officials to reject the project.

The letter laid out a host of reasons why the project should not move forward.

Among them:

- Proposed stations — in Cherry Hill and Camden Yards — would be incompatible with existing and planned structures.
- Jurisdictions in the project's path "would not be served by the SCMAGLEV" but they "would be subjected to the construction impacts."
- Fear that home- and business-owners in Baltimore would suffer "property devaluation and the use of eminent domain."
- Concern that only upper-income travelers would be able to afford the estimated $60 one-way fare.
- Northeast Maglev, the company behind the venture, hopes to eventually have a system that travels between D.C. and New York in about an hour. Because future segments have yet to be designed, Baltimore officials said, it is impossible to "evaluate the full extent of the environmental, historical, land use, and transportation impacts on the City of Baltimore."
- City officials also expressed concern that maglev would undercut existing Amtrak and MARC service, and they noted that Amtrak has just landed $2.4 billion in federal funds toward ambitious improvements along the Northeast Corridor.

"These are fully functioning and existing passenger train services along the United States' Northeast Corridor that we fully support for future funding, transportation efficiency, safety, access, and development," Baltimore's planning director Chris D. Ryer and transportation chief Steve Sharkey wrote.

Their filing with the state was first reported by The Baltimore Sun.

Baltimore-Washington Rapid Rail, a sister company working in tandem with Northeast Maglev, has sought for years to build support among local, state and federal officials. (Their top lobbyist, Gerard Evans, is a seasoned Annapolis hand who is consistently among the state's top-grossing government relations specialists.)

The Scott administration's apparent rejection of the proposed multi-billion-dollar line follows similar actions in Prince George's. Members of the state's congressional delegation have also been cool to the project.

In an interview, former Maryland Governor Parris N. Glendening (D), a “smart growth” advocate who advises local leaders around the world on transit-oriented development, said Maglev backers have made a number of mistakes in their efforts to build public and political support.

A former Prince George’s County Executive, Glendening called it “a personal insult” that the line would not stop in the county, even though residents would be forced to endure years of construction.

“You can’t have the second-largest county, with the largest minority population, and basically use it as a storage yard,” he said.

Glendening also called it “outrageous” that the new train would cut through federal parkland, something that has riled residents and municipal officials in northern Prince George’s.

“I don’t know who came up with that idea,” the former governor said, “but it just does not make any sense. …The whole approach makes no sense at all. The average citizen, I think, is understanding this.”

BWRR: ‘Don’t count this as dead’

Wayne Rogers, Baltimore-Washington Rapid Rail’s CEO, pushed back against the criticisms lobbed by Baltimore officials and Glendening.

He provided 60 letters that state and federal officeholders, business leaders, labor representatives, religious and civic leaders, and others have submitted to U.S. Transportation Secretary Pete Buttigieg in support of the project.

Rogers also said that the project has consistently polled well in surveys the company has commissioned. And he noted that Baltimore’s last three mayors supported Maglev.

“We believe that Baltimore does support the project,” he said in an interview.

BWRR has a meeting with Ryer scheduled for mid-July. “We think the majority of the issues they brought up can be answered directly,” Rogers said.

He also hopes to meet with Scott (D) but has yet to get on the mayor’s calendar.

A Scott spokeswoman told Maryland Matters late Thursday that he is “intrigued by the Maglev project but primarily focused on solutions to Baltimore’s acute transportation challenges. The Mayor remains committed to transit equity and ensuring residents can access reliable transportation options within city limits and across the region.”

Rogers, the former head of the Maryland Democratic Party, cautioned against reading too much into the city's letter.

"We have a single letter from the planning department," he said. "Don't count this as dead yet, because it is absolutely not."

As for concerns expressed by Prince George's County leaders and Glendening, Rogers noted that the county's strategic vision, Blueprint 2035, calls for "innovation, new technology and jobs."

"So what about this [proposal] doesn't match that?" he asked.

He also rejected the suggestion that running a train along the Baltimore-Washington Parkway constitutes an invasion of "parkland."

"It's probably the most deadly national park in America," he said, a reference to the 547 accidents that occur along the road on average each year.

Former D.C. Council Member Jack Evans (no relation to lobbyist Gerard Evans) traveled on Japan's "Maglev" system when he chaired the board that oversees bus and rail service in the capital region.

"I have enormous familiarity with how it works, how it gets done and the benefits it can bring — and it can," Evans said.

He acknowledged that Baltimore's decision to reject the proposal is yet another blow for a project that has struggled to overcome opposition.

"It's hurting," he said. "They really do need a champion who's going to take this and run with it."

But he said many high-profile proposals — like DC's convention center, Nationals Park, and Metro —were unpopular. "If you ever got it done, there'd be enormous support behind it," he said.

Like Rogers, Jack Evans said that, where rail travel is concerned, the U.S. has been surpassed by countries in Asia and Europe, where "people are looking to the future of transportation… to move people quickly and safely, from one place to another, without driving cars."

"The East Coast transportation [network] cries out for something like this."

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About the author: Bruce DePuyt is a contributor to Maryland Matters, where he was a full-time reporter until December 2022. Previously, DePuyt spent nearly three decades on local television, including 14 years as producer and host of "NewsTalk" on NewsChannel 8 in the Washington, D.C., region. He was a reporter and anchor on "News 21" in Montgomery, where he also served as producer and host of "21 This Week." He then became a reporter and anchor at NBC affiliate WVIR in Charlottesville, Va. He appears occasionally on WTOP (103.5 FM), WAMU (88.5 FM) and MPT. All posts by Bruce DePuyt. Contact: bruce@marylandmatters.org.

LXXIV. Appendix: Submission Reprint: Diffendal, Theresa. – "Maglev Route Deliberations: Decision Due This Summer." *Greenbelt News Review*. May 2, 2019.

Greenbelt convened a special town meeting last Thursday to discuss updates to the magnetic-levitation train whose planned path will run under part of the city. While significant changes have been made to potential routes since the project managers began garnering public comments, some Greenbelt residents still view it as lacking in benefits to the city.

Baltimore-Washington Rapid Rail Project Director David Henley gave a project presentation at the meeting to an audience of about 20, including Mayor Emmett Jordan and Councilmembers Judith Davis, Leta Mach, Edward Putens and Rodney Roberts.

Of the 14 original route options, three remain: a west route, an east route or no train at all. The routes are named for the side of the Baltimore-Washington Parkway they hug.

The Federal Railroad Administration is currently in "deliberation" about the two alignments and will make their decision public around July or August, according to Henley.

Henley told the audience that he and his company, "in the interest of being frank," preferred the east route. The west alternative has longer tunnel segments, which could require additional vent plants.

Both routes have the Maglev passing near Eleanor Roosevelt High School and running underground for the entirety of its path through Greenbelt. The difference, however, is that while the western version would run underneath the Forest Preserve, the eastern route would bypass it completely.

Neither route would have the train emerging above ground until about two miles north of Greenbelt.

Various maps of the two Washington to Baltimore routes were provided with overlays of potential stations, emergency exits, vehicle maintenance and repair sites and ventilation shafts. Approximately 75 percent of the planned route will be underground.

Multiple slides included diagrams of the tunnel boring machines which will cut through dirt at a rate of 40 feet per day while simultaneously laying concrete panels in their wake to form the tube. Seven or eight will operate at once during construction, Henley explained, and despite their size, "you will not hear it, even when it's digging," he said.

Noise and vibration limits are specified in the project's contract. To alleviate residents' concerns, Henley added, sensors could be installed to monitor noise level and vibrations.

To reach depths of 80 feet – which Henley said is the minimum depth when the Maglev is underground – three-story tall vents will be dug into the earth. In addition, anywhere from five to seven acres is required around each vent for security purposes.

Jordan described the vents as physically "striking" in terms of scale and mass.
Dirt from the boring machines will exit through these shafts, enough to fill 200 trucks each day per site. Vents are planned along Route 410 and a Washington Suburban Sanitary Commission parking lot in Bladensburg, among others.

Barbara Benfield, who is not a Greenbelt resident but was present at the meeting, voiced concerns about where the dirt-filled trucks will go and the amount of traffic they could add to already full roads.

One vent site is located near Route 197, but according to Benfield there are few roads nearby, necessitating the paving of additional paths.

The vents could double as emergency exits when the Maglev is operating, though currently the designs consist of stairwells, presenting issues for those unable to walk up steps.

Greenbelt resident Bob Snyder, however, spoke in favor of Maglev. With an aging Baltimore-Washington Parkway and growing D.C., Maryland and Virginia population, he said, "I think it's a good idea to have another choice of transportation."

When in operation, the Maglev would run from 6 a.m. to 11 p.m. There would be around 12 cars per train capable of holding 500 people altogether. A ticket will be a dollar per mile, or $40 for a 15-minute one-way trip from Washington to Baltimore.

Resident Ruth Haynes quickly called out the cost, saying sarcastically, "we can really afford that on our pensions."

Henley mentioned a few times, however, that a Maglev route from Washington to Baltimore is not the final plan. While the path could work as a standalone, Henley told the audience the "momentum after this segment will be to go north."

Ultimately, he said, the route would extend first to Wilmington, then Philadelphia with an endpoint in New York City. Due to the envisioned scale of the project, Henley contended, the Maglev would not conflict with MARC or Amtrak business.

In fact, by 2050 Henley estimated the Maglev will capture only about 16 percent of the traffic between Washington and Baltimore, fueling residents' sentiments that while the Maglev runs through Greenbelt, the new transportation is not for them.

Brian Almquist, from the Greenbelt Advocates for Environmental and Social Justice, delivered a fiery statement. He went so far as to call the project – whose target, he posited, is wealthy business people rather than interregional traffic – a "boondoggle," which he defined as a useless or wasteful activity.

"Bottom line is to me we're not really benefiting," Susan McCutcheon from Bladensburg said in agreement. Instead, she continued, the route would benefit those passing through Maryland while taking advantage of those who "don't have anyone to speak (for us) except ourselves."

Henley was quick to challenge McCutcheon's statement, though, saying "community voices helped shaped this outcome."

He cited multiple differences between the current versions of the routes and the initial alternatives. He continued, "I would just not underestimate your power."

After the FRA selects a preferred route in the next few months, five corridor-wide public hearings will be held, including in Anne Arundel and Prince George's counties and Baltimore. The draft Environmental Impact Statement is slated to be completed at the end of the year.

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About the author: Theresa Diffendal is a University of Maryland graduate student in journalism reporting for the News Review.

LXXV. Appendix: Environmental Organizations Opposing SCMaglev Sign on Letter to the Maryland Transit Administration. May 24, 2021.

May 24, 2021

SCMAGLEV Project c/o Lauren Molesworth
Maryland Transit Administration
6 Saint Paul St, Baltimore, MD 21202

Via email to info@bwmaglev.info

We, the undersigned organizations, are writing to express our opposition to the proposed Baltimore-Washington Maglev project and urge the Federal Railway Administration (FRA) to adopt the No-Build Alternative. The Maglev project would have numerous environmental impacts along its 40-mile route and within the surrounding area, both temporary impacts during construction and permanent impacts that cannot be mitigated. In many locations, the resulting destruction of critical habitat would be irreversible and would have substantial impacts on wildlife, public welfare, human health, and human recreational resources.

Clean Air and Climate Change

Project developers have publicly claimed that the Maglev is an environmentally-responsible project that will result in cleaner air through the removal of passenger vehicles from the roadways. This claim is not substantiated by the DEIS, which demonstrates that the project would increase annual net transportation energy consumption by up to 39% by the year 2045 compared to the No-Build option (Table 4.19-7). This is an increase in 3.07 Trillion BTUs, enough energy to power 88,900 homes (Page 4.19-11).

The DEIS further states that the Maglev would be "37 and 20 percent less efficient than existing bus and passenger rail, respectively" (Page 4.19-10). Thus, the Maglev cannot be touted as an energy efficient means of mass transportation. An analysis by Dr. Owen Kelley, a private citizen with a background in atmospheric sciences, found that the Maglev operation would increase net CO_2 emissions by up to 336 million kilograms per year relative to the No-Build option (Greenbelt Online, greenbeltonline.org, April 13, 2021).

At the same time that the operation of the Maglev would result in increased greenhouse gases, the removal of vegetation to accommodate the Maglev infrastructure would result in a loss of ecosystem services and a concomitant lessened ability to remove carbon and carbon dioxide, as well as other pollutants, from the environment. The more than 9 million people who live in the

Baltimore-Washington region depend on the ecosystem services performed by the existing green spaces for clean, breathable air. The late Senator Paul Sarbanes recognized this fact when he referred to the Patuxent Research Refuge as the “lungs of the Baltimore-Washington Region.” With the increase in greenhouse gases, people who live in the area would bear the burden of an increased risk of respiratory diseases associated with air pollution.

The increase in power consumption caused by the Maglev operations and the destruction of carbon-storing forests are in direct opposition to the urgent need for actions to reduce greenhouse gas production in order to abate ongoing climate change. A new report from the EPA, released on May 12, 2021, indicates that the climate change crisis is more dire than previously thought, and the inescapable conclusion is that we cannot allow such a massive scale infrastructure project that move us further from bringing climate change under control.

Public Lands and Green Space

The Maglev project would permanently impact up to 328 acres of federal property, including portions of the Beltsville Agricultural Research Center, owned by USDA; the Baltimore-Washington Parkway, owned by the National Park Service; the Patuxent Research Refuge, owned by the U.S. Fish and Wildlife Service as part of the National Wildlife Refuge System; the NASA Goddard Space Flight Center; Fort Meade, owned by the US Army; and other properties administered by the National Security Agency and the U.S. Secret Service. The project would destroy up to 451 acres of forests, including up to 42 acres of the Greenbelt Forest Preserve, owned by the City of Greenbelt. Local parks such as Maryland City Park and Springfield Road Park would also be taken to accommodate the SC Maglev infrastructure. In total, up to 140.5 acres of recreational facilities and parklands would be impacted.

The destruction of forests, wetlands, and other habitats would result in extensive impacts to the 20,000+ acre green oasis that is the largest tract of undeveloped land in the Baltimore-Washington corridor. The impacts would include not only the direct loss of habitat, but also disruption of ongoing research and human recreational use of the area.

The natural lands lost to Maglev infrastructure cannot be mitigated through re-creation elsewhere, as they are dependent upon specific geological formations and soil types. The lands at Beltsville Agricultural Research Center and Patuxent Research Refuge have been documented as some of the most biologically diverse and well-studied landscapes in the world. The destruction of habitat on these properties will impact the continuity of over a century of environmental research at the Patuxent Research Refuge and the Beltsville Agricultural Research Center.

There will also be significant impacts to outdoor recreational facilities, with the loss of public park space at Maryland City Park, Springfield Road Park, Greenbelt Forest Preserve, and Greenbelt’s Northway Fields Park, among others along the proposed route.

Recreational use of the Patuxent Research Refuge will also be impacted. The Refuge serves over 215,000 visitors annually, on average, including hikers, runners, dog-walkers, hunters, naturalists such as birders, and families. As part of the U.S. Fish and Wildlife Service's Urban Refuge Program, the Refuge serves a diverse population and sponsors programs that bring inner-city youths and their families to the Refuge, perhaps for their first-ever experience in a natural setting. Maglev infrastructure would impinge on the Refuge's public hunting areas, public hiking trail system, and at least one fishing pond. The proposed Train Maintenance Facility, with its round-the-clock operations, will bring a heavy-industry environment of noise and light pollution. The proposed viaduct would be tall enough to tower above the tree canopy and would be visible from the Refuge's National Wildlife Visitor Center. The viaduct, which would flank the Baltimore-Washington Parkway for several miles, would forever negate the ability of the Parkway to fulfill its purpose of serving as a scenic entryway to the nation's capital. Park service staff have called the impacts to the Parkway more substantial than anything they have seen in their entire career.

Rare, Threatened and Endangered Species

The construction of the Maglev infrastructure would result in loss of or damage to sensitive habitats and plant communities that harbor rare, threatened and endangered flora and fauna. Many of the habitats that would be impacted along the Maglev alignment and its associated infrastructure support plant communities that are rare within the State of Maryland, and that depend for their existence on the underlying geological structures and soil substrates. These communities are irreplaceable and cannot be recreated elsewhere.

In destroying sensitive habitats, the Maglev project would imperil specific Rare, Threatened and Endangered Species, as identified by the U.S. Fish and Wildlife Service (USFWS) and the State of Maryland, including nine species of mammals; twelve species of birds; two species of reptiles; three species of fish; eleven species of odonates (dragonflies & damselflies); eighteen species of lepidoptera (butterflies, skippers, moths); two species of freshwater mussels (one federally endangered); and at least seven species of plants (DEIS Chapter 4, Section 4.12.3.3 and DEIS Appendix D.7, Attachments A, B, C and F). Although the DEIS states that the Project Sponsor will mitigate impacts to rare, threatened and endangered species, the DEIS fails to provide detailed mitigation plans.

There is no analysis of Rare, Threatened and Endangered species at the Greenbelt Forest Preserve, Maryland City Park, Springfield Road Park, Fort Meade, or Goddard Space Flight Center, or in outlying areas that will be impacted by the Maglev, such as Konterra, the site of a proposed large Lay-Down Area. There is also no evaluation for impacts along the tunneled portion of the proposed route. In other words, the project sponsor is seeking to move forward with the project before conducting a full analysis of Rare, Threatened and Endangered Species within the entire project impact area. This is an unacceptable oversight.

Waterways and the Chesapeake Bay

The Maglev would have negative impacts on eight sub-watersheds of the Chesapeake Bay Watershed: the Anacostia River, the Upper Patuxent River, the Little Patuxent River, the Severn River, the Lower North Branch of the Patapsco River, Baltimore Harbor, Gwynns Falls, and Jones Falls. The DEIS does not demonstrate that the tunneling process will adequately protect underground aquifers and wetlands from potential disruption and damage.

Of special watershed concern is the proposed Trainset Maintenance Facility (TMF), which would add approximately 200 acres of new impervious surface to the region. The DEIS states that the placement of the TMF in either the Anacostia or the Little Patuxent Watershed would cause "a change in watershed function" such as the "ability to filter and store water in the soil" (Page 4.10-15). In total, up to 76 acres of floodplain, 51 acres of wetlands, 124 acres of Chesapeake Bay Critical Area, and 12,896 linear feet of waterways would all be negatively impacted (Table ES4.3-1).

The cumulative effect of the changes to the waterways, wetlands, and sub-watersheds in terms of stormwater management, increased runoff, and potential chemical pollutants would impair the ability of the State of Maryland to meet the mandates of the Chesapeake Bay Watershed Agreement.

Environmental Justice

There are significant environmental justice concerns surrounding the Baltimore-Washington Maglev project. Minority populations comprise 69.6% and low-income populations make up 12.7% of the total population in the Maglev Project Affected Environment. There will be both permanent or long-term impacts as well as shorter term impacts to communities of color and low-income populations. Low-income populations and Black and Latinx minorities are at a higher risk of direct and disproportionate impacts of the construction of this project. The construction staging and laydown areas and haul routes would predominately occur within environmental justice population areas. According to the DEIS, 80% of the parcels that would be impacted by land use conversion, rezoning, and property acquisitions are in communities of color. Furthermore, 100% of the above ground viaduct portion of the Maglev, where construction and perpetual community impacts would be the greatest, are within or directly adjacent to environmental justice communities.

Worse yet, these communities would not directly benefit from the Maglev. The proposed project has three stations; one in Mount Vernon East Washington D.C., a stop at the BWI Airport, and finally a terminus station in Baltimore at either Camden Yards or Cherry Hill. The communities of Prince George's and Anne Arundel Counties would feel the brunt of construction and long-term impacts, while receiving no public transportation benefits in return.

The extremely high-ticket price, projected to be an average of $60 for a one-way trip, would exclude all but the wealthiest of commuters from riding on Maglev. This is eight times higher than a corresponding ticket on the MARC train.

Conclusion

For these reasons, we are opposed to the construction of the Baltimore-Washington Maglev, and request that the No-Build alternative be adopted. We call on Congress, the FRA, and MTA to continue to invest in Amtrak and other regional transit options that better serve our communities while safeguarding our parks and the environment.

Signed,

Steve Holmer
American Bird Conservancy

Trey Sherard
Anacostia Riverkeeper

Erin Castelli
Anacostia Watershed Society

David Curson
Audubon Mid-Atlantic

Alice Volpitta
Blue Water Baltimore

CJ McAuliffe
Carroll County Bird Club

Susan Barnett
Celebrate the Greenbelt Forest Preserve

Bonnie Bick
Chapman Forest Foundation

Reed Perry
Chesapeake Conservancy

Evan Isaacson
Chesapeake Legal Alliance

Denisse Guitarra
Audubon Naturalist Society

Julie Dunlap
Audubon Society of Central Maryland

Carol Schreter
Baltimore Bird Club

Tom Taylor
Beaverdam Creek Watershed Watch Group

Lore Rosenthal
Greenbelt Climate Action Network

Mary Maxey
Howard County Bird Club

Jil Swearingen
In the Weeds Consulting

Frederick Paras
Maryland Entomological Society

Christopher F. Puttock
Maryland Native Plant Society

Kurt Schwarz
Maryland Ornithological Society

Lutz Rastaetter
Citizens to Conserve and Restore Indian Creek

Anne Lewis
City Wildlife

Emily Ranson
Clean Water Action

Jane Lyons
Coalition for Smarter Growth

Adam Kron and Joel Merriman
DC Audubon Society

Theodore Weber
Defenders of Wildlife

Abel Olivo
Defensores de la Cuenca

Bonnie Borsa
Frederick Bird Club

Richard Dolesh
Friends of Patuxent Research Refuge

Marian Dombroski
Friends of Quincy Run Watershed

Joan Maloof
Old-Growth Forest Network

Frank Allen*
Patuxent Tidewater Land Trust

Kenneth Cohen
Prince George's Audubon Society

Marcia Watson

Josh Tulkin
Maryland Sierra Club

Bonnie Winter
Mattawoman Watershed Society

Diana Younts
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Gail Mackiernan
Montgomery Bird Club

Evelyn Ralston
Montgomery Bird Club

Elizabeth Hobbins
Montpelier Woods Homeowners Association

Kyle Hart
National Parks Conservation Association

Janith Taylor
National Wildlife Refuge Association

Barbara Hopkins
Neighbor Space of Baltimore County

Mark Southerland
Safe Skies Maryland

Bob Lukinic
Southern Maryland Audubon Society

Laurie McGilvray
Takoma Park Mobilization Environment Committee

Bettye Maki
Talbot County Bird Club

Michael Walsh

Patuxent Bird Club

Tri-county Bird Club

Frederick Tutman
Patuxent Riverkeeper

Robin Broder
Waterkeepers Chesapeake

Nancy Meyer
Port Towns Environmental Action

Robert K. Musil
Rachel Carson Council

* Not included on letter submitted to FRA on 5/24/21 due to timing issues

LXXVI. Appendix - Reprint: Kelley, Owen A. "Economic Impact and Financial Viability of the Proposed Baltimore Washington Maglev." *Greenbelt Online*. September 6, 2020.

A maglev train in Japan. The proposed Baltimore Washington maglev would use Japanese "superconducting maglev" technology, the kind shown here on the Japanese test track.

It is clear from emails flying around, Facebook posts, and items in the News Review that many Greenbelters are concerned about the impact on Greenbelt of the magnetically levitated

(maglev) train that has been proposed between Baltimore and Washington. To explore the question of whether the maglev would bring economic benefits that would outweigh harm to Greenbelt, this blog post examines some of the financial and economic numbers published by Baltimore Washington Rapid Rail (BWRR), the company seeking to build and operate this maglev.

Background

As of this summer, one of the two possible track alignments for the Baltimore Washington maglev would come out of a tunnel near the community gardens by the GHI office and then, heading north aboveground, devastate the Greenbelt Forest Preserve along Goddard Branch. The other proposed alignment would be aboveground and parallel to the Baltimore Washington Parkway, just east of the parkway. Maglev trains passing along that second route could generate enough noise to reduce our ability to enjoy the extensive forest between the parkway and Ridge Road. (In planning documents, these two options are called alignments J1 and J.)

This forest is close to many of our homes, it is an important part of many people's lives, and it helps to bind our community together–think about annual Pumpkin Walk. This forest was part of the plan since Greenbelt was founded as a New Deal experiment in town planning. Central to this experiment was placing large tracts of green space next to neighborhoods of modest homes to promote quality of life. In other words, this forest is a living remnant of Greenbelt's New Deal era "belt of green." It is what's called a "contributing element" to the Greenbelt National Historical Landmark on the National Registry of Historic Places.

It can be difficult to figure out what the maglev is all about. It's not you. When it comes to the maglev, it actually is hard to ferret out the relevant facts and see how they fit together.

Just the Facts Ma'am

One reason that it is difficult to evaluate the merits of the maglev is because Baltimore Washington Rapid Rail (BWRR) has not published in one place all of the relevant financial figures or the details of how these figures were calculated. A compilation of this information would make it easier to evaluate economic benefit and financial viability.

To partially address the information deficit, this blog post collects some of the financial and economic figures that can be found scattered, here and there, in some of BWRR's presentations and affiliated websites. Performing some simple arithmetic on these published values, one finds inconsistencies (item #4, below).

Further doubts about economic benefit and financial viability come from comparing BWRR's figures with information on corporate or government websites (item #2) or in peer-reviewed

journals. In one case, BWRR fails to provide an essential high-level data value, but independent sources make it possible to estimate a range for this value (item #1).

It is tempting to rely on whatever cost-benefit analyses will be published within the maglev's upcoming Environmental Impact Statement (EIS). The cost estimates in EISs, however, are unreliable (item #5), so it is vital that elected officials and the public engage in their own fact-finding and analysis.

1. For most people, the maglev would be slower than driving

BWRR advertises that the maglev would take 15 minutes station-to-station to go from Baltimore to Washington, but BWRR never mentions a vastly more important number, the average travel time door-to-door for real destinations in the maglev's target market. Using various sources that are independent of BWRR, one finds that despite the speed of the maglev train itself, most people would find it faster to drive rather than ride the maglev.

As we know from our train or planes trips, it takes time to travel from home to either train station or airport and then more time to travel from the final station or airport to our real destination.

The table below suggests that the total duration of a trip via maglev would be about 80 minutes starting from various locations 2 to 4 miles from the Baltimore maglev station and ending at one of several locations within the DC beltway. In contrast, driving between these locations would take only 50 or 65 minutes during midday or rush hour, respectively, according to Google Maps. [1]

Approximate Duration in Minutes: Baltimore-to-Washington Maglev Trip

Trip segment	Rush hour	Midday
2-to-4-mile drive to downtown Baltimore maglev station	14	7
Wait for maglev train	4	15
Ride on a maglev train that skips the BWI station	15	15
5-minute walk to Union Station Metro platform + wait for train	5+4	5+6
Ride on DC Metro train	26	26
Walk or drive from Metro station to inside-the-Beltway destination	8	8
Total travel time	**76**	**82**

Anyone could repeat or expand this simple analysis using the online resources provided in the footnote. There is no evidence that the maglev's upcoming Environmental Impact Statement will analyze average trip duration and describe the analysis method in sufficient detail that the public can check the math. The average trip duration for likely riders of the Baltimore Washington maglev would, ideally, be analyzed in a peer-reviewed journal.

2. The maglev ticket price would limit ridership

After years of promoting the idea of a malgev between Baltimore and Washington, BWRR has not yet identified in public documents who exactly would be willing to pay $80-$160 round trip to travel between these two city centers, which are separated by only 40 miles. Common sense suggests that the ticket price is too high to be attractive to many commuters, for family outings, or for the typical tourist. [2]

Were the average round-trip ticket to cost $100, a commuter would pay $24,000 a year to ride the maglev. This would be $12,900 more than the annual cost of commuting by car between Baltimore and Washington based on the IRS's estimate of the per-mile cost of driving. Most American families have trouble saving for the future, so would they really choose to spend an extra $12,900 a year to upgrade from car commuting to maglev commuting? [3]

For most families, the maglev would be an unattractive option on a family outing. A DC-area family of four going to a downtown Baltimore attraction would expect to pay $60-$140 for the entire family to get in. They would probably not want to pay an extra $100 per person or $400 for the whole family to make the trip via maglev. [4]

Washington DC attracts tourists, but for most of these families, a side trip to Baltimore would not seem more attractive were the maglev built. Some studies estimate that the average American family spends $2,000 on its annual vacation. If an out-of-state family visited DC for their vacation, would the family be willing to spend an extra $400 on transportation if they decided to make a side trip to Baltimore? In contrast, the existing bus and commuter-rail service costs under $10 one-way, and renting a car for a whole week can cost under $500. [5]

3. The maglev is unlikely to create thousands of jobs, post-construction

Everyone is sympathetic with Baltimore's desire to attract people to its downtown, to revive its economy, and to create jobs, but the chances are slim that operating a maglev line from DC will do the trick.

As discussed in items #1 and #2 above, the maglev would be slower and more expensive than driving, leading to the conclusion that the maglev is unlikely to greatly increase travel between Baltimore and Washington. If travel does not increase, then operating the maglev would fail to create thousands of jobs the way that BWRR advertises it would.

In 2015, in a filing before the Maryland Public Services Commission, BWRR claimed that the maglev would generate "economic activity previously not conceivable." They claimed that maglev operation would create 6,800 to 8,300 jobs in the Baltimore Washington region contingent on the maglev line being extended to New York City. [6]

More optimistically in 2020, the BWRR website claims that, post-construction, the maglev would create 14,600 jobs per year. The BWRR website provides no market analysis to back up this job-creation claim. [7]

4. Maglev ticket sales could not pay back the construction cost

Despite the high ticket price, BWRR could not recoup the construction cost for a Baltimore-to-Washington maglev line with ticket sales, even over a 30-year period. The following paragraph does the math. BWRR has not announced private financing for the construction, so it looks like tax dollars would have to fund most of the maglev construction cost, which means that this money could not be spent on more effective solutions.

BWRR's inability to pay for maglev construction with ticket revenue is clear from its own estimates of construction cost, ridership, and ticket price. BWRR estimates a $15 billion construction cost, and that may be an underestimate as discussed in item #5 below [8]. Assuming a fairly low interest rate of 3.25%, then the principal and interest on a $15-billion 30-year loan would total $23.5 billion [9]. Ticket sales would gross only $15 to $22.5 billion in 30 years based on BWRR's expectation of 10-15 million one-way trips per year and an average ticket price of $50 one-way [10].

In recent years, WMATA, the organization that runs the DC subway, has had a multi-billion dollar backlog of "state of good repair" projects, and completing these projects promptly would be a better use for tax dollars than building a maglev that we don't really need. Instead of investing in the maglev, there may be less expensive ways to reducing car emissions and rush-hour traffic, such as to find ways to make teleworking sustainable and convenient.

In 2020, a maglev train at the decommissioned test track for the Munich maglev line. In 2006, 23 people were killed by a maglev on this test track, damping public enthusiasm for the technology. Spiraling costs canceled the Munich maglev line in 2008.

German maglev photo credit.

5. The cost-benefit analysis in an Environmental Impact Statement is unreliable

If the cost of constructing a maglev between Baltimore and Washington exceeds BWRR's current $15-billion estimate, it would decrease the chance that maglev would avoid bankruptcy, let alone create an economic boom.

A number of studies find that construction costs for rail projects end up, on average, about 50% higher than estimated prior to construction beginning. Various theories have been advanced to explain why cost estimates continue to have a low bias in Environmental Impact Statements even after researchers have published evidence that the bias exists. [11]

Projects similar to the proposed Baltimore Washington maglev tend to have higher-than-average cost overruns, more than double the initial estimate in one case.

Before construction began, the California high-speed rail from Anaheim to San Francisco was expected to cost $33.6 billion in 2008, but today, with the track partially built, the estimate has more than doubled to $80 billion. The maglev planned in Munich was initially expected to cost 1.85 billion euros but it was canceled in 2008 as construction was about to begin because the cost estimate had risen to 3 billion euros. The Tokyo-Osaka maglev was expected to cost 5.1 trillion yen in 2007, but as construction proceeded, estimates rose to 9.1 trillion yen. [12]

Conclusion

Baltimore Washington Rapid Rail (BWRR) predicts that job growth and other economic benefits will flow from operating a maglev between Baltimore and Washington. Based on these predictions, BWRR asserts that the benefits outweigh any harm that the maglev might cause to the environment, to historical resources, or to the quality of life of residents along the track. It is in the public's interest to determine if BWRR's financial numbers are plausible and to avoid the trap of focusing exclusively on potential hazards and nuisances from building or operating the maglev. Each of us can make a contribution, but none of us have the time to do all of the necessary detective work ourselves. We will have to work together.

Notes

[1] In 2020, O. Kelley estimated trip duration by considering Bal----timore locations 2-4 miles from the maglev station: John Hopkins Homewood campus, Canton, Riverside, and Locust Point. The inside-the-DC-Beltway locations considered were College Park, Bethesda, and Crystal City. Downtown Baltimore driving times from https://maps.google.com. Estimated wait for the

maglev assumes rush-hour and midday service every 8 or 30 minutes in each direction. Average wait time is half of the time between trains. DC subway-ride duration and wait time from Union Station, https://www.wmata.com/ schedules/trip-planner/. The 8-minutes post-DC-Metro represents either a half-mile walk or driving conditions and distances similar to those of the midday downtown Baltimore trip segment.

[2] one-way $40-80 ticket price stated by Wayne Rogers on 9 July 2015 before the MD Public Service Commission, as cited on pg. 5 of Judge T. Romine's Proposed Order for case #9363 on 14 Oct 2015.

[3] In 2020, the cost of commuting by car is 58 cents per mile according to the IRS, and one might assume an 80-mile round trip, DC to Baltimore. A 48-week work-year is 240 days. By car, $0.58/mile x 80 mile/day x 240 day/year. By maglev, $100/day x 240 day/year.

[4] At Fort McHenry National Monument, Port Discovery Children's Museum, Maryland Science Center, and National Aquarium admission for 2 adults and 2 children is approximately $30-$60, $72, $96, and $140, respectively.

[5] $2,000 annual vacation: Business Insider 9 August 2019, https://www.businessinsider.in/people-spend-an-average-of-1979-annually-on-summer-vacations-here-are-4-ways-to-save-money-on-your-next-trip/articleshow/70609385.cms.

[6] "previously not conceivable" quote and jobs created: Rogers, W., 2015, testimony, MD Public Service Commission, case #9363, pg. 17-18, 13.

[7] 14.6k jobs/year: https://bwrapidrail.com/project/benefits/.

[8] "Rough construction estimates developed by BWRR at this early stage are $10 billion to $15 billion depending on the construction methodology, e.g. the proportion of higher-cost tunneling versus elevated structure.": FAQ on https://bwmaglev.info, 1 Sept 2020.

[9] The interest and principal on a $15-billion 3.25%-interest 30-year loan from npr / (1-(1+r)-n) where n = 30 x 12, p = $15e6, and r = 0.0325/12, or use an online mortgage calculator.

[10] 10.2 to 15.4 million one-way trips annually (Rogers, W., 2015: testimony, Public Service Commission of MD, pg. 17, line 9). bwrapidrail.com and northeastmaglev.com say that the ticket price will be competitive with existing express-rail service. One might take this to mean a price similar to a 1-way Amtrak Acela ticket in 2020: $35-$80, DC to Baltimore. See footnote #2 of the present document for a $40-$80 ticket price.

[11] 50% cost overrun for rail projects: https://americandreamcoalition.org/?page_id=3813. 45% average cost overrun in rail projects: Prieumus et al. (Eds), 2008: Decision-Making on Mega-Projects, pg. 7. Persistence of low bias in EIS cost estimates: Sturm, J., et al., 2011,

Analysis of cost estimation disclosure in EIS for surface transportation projects, Transportation, 38, 525-544.

[12] California high-speed rail estimate of $33 then $80 billion: Editorial, Los Angeles Times, 17 June 2020. Munich Link Transrapid maglev cost overrun: https://en.wikipedia.org/wiki/Transrapid. The Tokyo-Osaka line is a superconducting maglev and is called the Chuo Shinkansen. Wikipedia.org states the 5.1 to 9.1 trillion yen cost estimate.

LXXVII. Appendix – Article Reprint: Farley, Michael and Fells, Ina. "Beacon Heights and Woodlawn Community Groups Comments on Baltimore-Washington Superconducting MAGLEV Project Draft Environmental Impact Statement and Draft Section 4(f) Evaluation (EIS No. 20210010)." April 23, 2021.

April 23, 2021

Submitted via email to: info@bwmaglev.info, brandon.bratcher@dot.gov.
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Re: Comments on Baltimore-Washington Superconducting MAGLEV Project Draft Environmental Impact Statement and Draft Section 4(f) Evaluation (EIS No. 20210010)

On behalf of the Beacon Heights and Woodlawn Community Groups, we submit the following comments in response to the Notice of Availability of the Baltimore-Washington Superconducting MAGLEV Project Draft Environmental Impact Statement (hereinafter "DEIS") and Draft Section 4(f) Evaluation[840] prepared by the Lead Agency for the matter, U.S. Department of Transportation Federal Railroad Administration[841] (hereinafter "Agency"), as well as Maryland Department of Transportation (hereinafter "MDOT") and the Project Sponsor, Baltimore-Washington Rapid Rail (hereinafter "BWRR").

[840] 86 Fed. Reg. 6643; See also 86 Fed. Reg. 14908 ("Extending the Comment Period from 04/22/2021 to 05/24/2021.").
[841] U.S. Department of Transportation's Federal Railroad Administration will be abbreviated hereinafter as "FRA."

The Beacon Heights and Woodlawn Communities oppose the construction and operation of the SCMAGLEV from Baltimore, MD to Washington, D.C. and therefore support the No Build Alternative. The Baltimore-Washington SCMAGLEV Project (hereinafter "SCMAGLEV Project") disproportionately harms environmental justice communities, including Beacon Heights and Woodlawn, for predominantly three reasons. First, the SCMAGLEV Project's route goes directly through minority and low-income communities without providing service to these communities. Second, although the SCMAGLEV Project is purported to be a cleaner, alternative form of transportation, the SCMAGLEV Project is likely to increase air and water pollution, adversely affecting the health of communities surrounding the route. Finally, the construction and operation of the SCMAGLEV Project will likely bring adverse physical changes to the surrounding communities, such as loss of habitat and historic sites, to make way for the SCMAGLEV Project route.

The DEIS for the SCMAGLEV Project fails to meet the requirements of the National Environmental Policy Act (hereinafter "NEPA") for several reasons. First, the DEIS fails to adequately assess the effects that air emissions, stormwater runoff, noise and vibration, and electric and magnetic fields (hereinafter "EMF"), from both construction and operation of the train, will have on the surrounding communities. Second, the environmental impacts of the SCMAGLEV Project are not reasonable in light of the purpose and need for the Project. Third, the DEIS pushes the responsibility for assessing these environmental and community impacts to a "later design phase" or to the permitting process, which largely excludes public participation. Further, the SCMAGLEV Project is an unnecessary addition to the multiple methods of transportation that already service residents from Washington D.C., Baltimore, MD, and Baltimore-Washington International Airport (hereinafter "BWI").

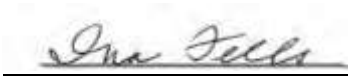
In light of these reasons, and the reasons listed below, the No Build alternative must be selected. The DEIS and procurement process should be stopped and the purpose and need for the SCMAGLEV Project should be reassessed utilizing updated traffic statistics reflecting the changes since the onset of the COVID-19 pandemic. A better analysis of whether the SCMAGLEV Project will meet certain permitting requirements should be conducted at this stage and not passed down to the agency permitting processes where there is limited ability for public participation. Further, a new DEIS should be prepared that adequately assesses the impacts of the proposed SCMAGLEV Project and alternatives on both the environment and the surrounding communities. For these reasons, Beacon Heights and Woodlawn support the No Build Alternative.

Sincerely,
Beacon Heights and Woodlawn[842]
FOR BEACON HEIGHTS CIVIC ASSOCIATION:

[842] The Communities would like to acknowledge the University of Maryland Francis King Carey School of Law Environmental Law Clinic for assisting in drafting these comments. Specifically, the Communities would like to acknowledge Zoe Rydzewski and Johanna Adashek, student attorneys with the Maryland Environmental Law Clinic under the supervision of Seema Kakade, for their contributions to the comment.

Michael Farley
Vice President of Beacon Heights Civic Association

FOR WOODLAWN COMMUNITY ASSOCIATION:



Ina Fells
President of Woodlawn Community Association

COMMENTS ON THE BALTIMORE-WASHINGTON SCMAGLEV DEIS

I. Background

A. Background on Beacon Heights and Woodlawn, Maryland

i. Beacon Heights[843]

The Beacon Heights neighborhood dates back to 1948. It started with cozy little starter homes built for soldiers returning home from WWII. Beacon Heights is located at the intersection of Riverdale Road and 67th Avenue in Prince Georges County, Maryland. The citizens formally incorporated the subdivision of Beacon Heights in 1953.

Beacon Heights has gone through many demographic changes through the years but has handled it well. In fact, there is an old historic African American burial ground, the Cherry Hill Cemetery[5], located on Ingraham St. within Beacon Heights. Predominantly Caucasian in the 1950's through the 1980's, Beacon Heights is now a diverse community of young Hispanic, African American, and Asian families. Beacon Heights is in the 86th percentile in Maryland for people of color and in the 81st percentile in Maryland for low-income populations.[844]

As a community on the rise, there will be a brand-new school, Glenridge Middle School, for grades seven through nine, completed in the next couple years. Located fifteen minutes from downtown Washington, D.C. and still inside the beltway, Beacon Heights is a great place to live.

ii. Woodlawn[845]

Homes in Woodlawn date back to the early 1940s, with predominately White homeowners living in the community for an exceptionally long time. In the late 1970s, there was a huge demographic change in Woodlawn when African Americans began buying homes in the area. Woodlawn has always been a welcoming community, where neighbors became friends. Most of the residents that live in the community, have seen each other's children grow up and become adults themselves. The residents have worked hard and paid off mortgages, retired and started to live comfortably.

Within the last 8-10 years, Woodlawn began to attract younger Latin and African American families. Currently, Woodlawn is in the 87th percentile in Maryland for people of color and in the 77th percentile for low-income populations.[846] Woodlawn's hope for these new homeowners is that they become active in a community that will thrive and grow.

iii. The SCMAGLEV Project's Impact on Beacon Heights and Woodlawn

[843] Testimony provided by a resident of Beacon Heights, MD.
[844] *See infra* Appendix A.
[845] Testimony provided by a resident of Woodlawn, MD.
[846] *See infra* Appendix A.

Beacon Heights and Woodlawn are Environmental Justice (hereinafter "EJ")[847] communities who already experience significant adverse environmental hazards that the SCMAGLEV Project will only further exacerbate.[10] The majority of Beacon Heights' and Woodlawn's EJ indices for pollutants and environmental harms are in and around the 90th percentile for Maryland.[848] For example, Beacon Heights and Woodlawn are already in the 95th percentile for PM2.5 in Maryland,[849] 94/93rd percentile for diesel in Maryland,[850] and 94/93rd percentile for respiratory hazard in Maryland.[851] The DEIS estimates that "[a]t the height of construction activity there will be 560 to 690 daily truck departures/arrivals at this work site, which will be active 24 hours per day. In addition, there will be an estimated 425 autos carrying workers arriving and departing over the 24-hour period."[852] The DEIS states the construction will also contribute diesel emissions from the temporary standby generation facilities powering the tunnel boring machines, which the DEIS contend will use 4.9 trillion MMBtus of energy.[853] Such vehicles and machines are likely to emit additional amounts of PM2.5 adding to the already high levels of PM2.5 which Beacon Heights and Woodlawn currently face.

Moreover, tunneling for the SCMAGLEV Project could exacerbate the severe flooding and sinkholes already plaguing the residents of Beacon Heights, Woodlawn, and Prince George's County at large.[854] For each build alternative described in the DEIS, except for the No Build Alternative, the SCMAGLEV Project requires tunneling for 75 percent of the route for the J Build Alternatives and 83 percent of the route for the J1 Build Alternatives.[855] To

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[847] The EPA defines environmental justice as the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies." EPA, *Learn About Environmental Justice*, https://www.epa.gov/environmentaljustice/learn-about-environmental-justice (last visited Feb. 4, 2021).

[848] *Id*.

[849] *Id*.

[850] *Id.* (94th for Beacon Heights and 93rd for Woodlawn).

[851] *Id.* (94th for Beacon Heights and 93rd for Woodlawn).

[852] Baltimore-Washington Superconducting MAGLEV Project DEIS, App-D.2-65

[853] *Id.* at 4.19-14.

[854] For some examples of sinkholes in and around Prince George's County in recent years, see Matt Ackland, Md. Homeowner at Odds on Who is Responsible for Fixing Growing Sinkhole in Backyard, FOX 5 WASHINGTON DC (May 11, 2016), https://www.fox5dc.com/news/md-homeowner-at-odds-on-who-is-responsible-for-fixing-growingsinkhole-in-backyard (describing a sink hole, caused by a broken water drainage pipe, which only enlarges with additional rain); Sydney Wu, PG Sinkhole Swallows Car after Water Main Break, PATCH (Jan. 27, 2015), https://patch.com/maryland/uppermarlboro/pg-sinkhole-swallows-car-after-water-main-break ("The 90-year-old pipe broke at about 3:30 a.m., causing a large sinkhole that filled with water. . . The large sinkhole swallowed one car and left another one teetering on the edge."); Matthew Stabley, Sinkhole Swallows Car in Prince George's County, NCB WASHINGTON (November 28, 2013), https://www.nbcwashington.com/news/local/sinkhole-swallowscar-in-prince-georges-county/2041200/ (describing a sink hole resulting from a broken water main); Dan Taylor, Huge Sinkhole Opens Up Under Clinton Home: Report, PATCH (Feb. 12, 2018), https://patch.com/maryland/bowie/huge-sinkhole-opens-under-clinton-home-report (unknown cause of a sink home under a resident's home).

[855] Baltimore-Washington Superconducting MAGLEV Project DEIS, at 3-18. "Each Build Alternative follows the same common alignment in deep tunnel from the Washington, D.C. Station to just west of the Anacostia River. The

support the underground portion of the system, the Agency intends to build surface facilities to house ventilation plants and emergency exits spaced every three (3) to four (4) miles along the tunnel segments that can be as large as 1.5 acres.[856] One of these facilities will be located at MD Highway 410, which is adjacent to the Beacon Heights and Woodlawn communities.[857] The SCMAGLEV Project's DEIS expects construction at the MD 410 Fresh Air Emergency Egress site (hereinafter "FA/EE") to be 24 hours-per-day for an estimated 1-5 years.[858] In order to build the FA/EE sites, the DEIS states that the construction process will "require deep boring, pile driving and possibly blasting."[859]

The general tunnel boring practices and the building of the FA/EE site adjacent to Beacon Heights and Woodlawn is likely to cause a number of adverse impacts to the communities. First, the tunnel boring for the SCMAGLEV train under the Beacon Heights and Woodlawn communities and the potential pile driving and blasting for the FA/EE site adjacent to Beacon Heights and Woodlawn will cause increased vibrations in the area which may cause structural damage to above ground structures, like homes, in the Beacon Heights and Woodlawn communities.[860] Subsequently, once the SCMAGLEV Project is complete, the operation of the train underground may also cause increased vibrations in both communities as well.[86124] Second, the additional roads needed for the construction of the FA/EE site adjacent to Beacon Heights and Woodlawn will increase the surface area of impervious surfaces which will only exacerbate the already prevalent issue of flooding in the area.[862] Third, the deep tunneling for the SCMAGLEV Project and the construction of the FA/EE site

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alignments then split and follow along either the east or west side of the BWP in a combination of deep tunnel and elevated viaduct. The alignments re-converge just north of MD 175 near Fort George G. Meade. The alignments then continue in deep tunnel north through the BWI Marshall Airport tunnel and ultimately terminate at the Cherry Hill Station or Camden Yards Station. Each Build Alternative includes one of two alignments - Build Alternatives J or J1, each with six variations that incorporate station and TMF options, as noted below. Both Build Alternatives generally follow a common route (described above) and the BWP; Build Alternatives J are on the east side of the BWP and Build Alternatives J1 are on the west side of the BWP." Baltimore-Washington Superconducting MAGLEV Project DEIS, 3.3.2-11. The Agency's current plan for tunneling is to bore a tunnel 80 to 150 feet below ground level (as measured from the top of the guideway) under more than half of any of the proposed routes. BALTIMORE-WASHINGTON SUPERCONDUCTING MAGLEV PROJECT, Preliminary Alternatives Screening Report, MDOT 20 (Jan. 2018), https://www.bwmaglev.info/images/document_library/reports/pasr/SCMAGLEV_PASR_January_2018_FullVersion_v2.pdf. The inside diameter of the proposed tunnel is 43 feet. *Id*. The goal is to maintain at least 14 meters (about 46 feet) of soil between the top of the tunnel and the foundations of any structure above the tunnel. *Id*.

[856] BALTIMORE-WASHINGTON SUPERCONDUCTING MAGLEV PROJECT, *Preliminary Alternatives Screening Report*, MDOT (Jan, 2018), https://www.bwmaglev.info/images/document_library/reports/pasr/SCMAGLEV_PASR_January_2018_FullVersion_v2.pdf.

[857] *See infra* Appendix C.

[858] Baltimore-Washington Superconducting MAGLEV Project DEIS, App-D.2-85.

[859] *Id.* at 4.17-18.

[860] *See supra* Section III.A.2.

[861] *Id.*

[862] *See supra* Section III.D.1.

are likely to cause the acidic soils in the area around Beacon Heights and Woodlawn to be dislodged to the point where the soils "produce enough acidity to degrade concrete and steel structures to the point of failure."[863] The degradation of concrete and steel structures, such as underground pipes, can lead to sinkholes.[864]

B. Legal Background

NEPA requires an environmental review process for proposed federal projects. The environmental review process under NEPA has two major purposes: to ensure that "agencies consider the significant environmental consequences of their proposed actions and informing the public about their decision making."[865] NEPA has a number of requirements to ensure that agencies adequately consider significant environmental consequences of a proposed project. The Council on Environmental Quality's (hereinafter "CEQ") regulations mandate than an agency discuss a project's environmental consequences in an EIS.[86629] In relevant part, this discussion must consider: "the environmental impacts of the proposed action and reasonable alternatives to the proposed action and the significance of those impacts"; unavoidable adverse effects, including both direct and indirect effects; "energy requirements and conservation potential of various alternatives and mitigation measures"; "urban quality, historic and cultural resources, and the design of the built environment, including the reuse and conservation potential of various alternatives and mitigation measures"; the "means to mitigate adverse environmental impacts"; and "where applicable, economic and technical considerations, including the economic benefits of the proposed action."[867868]

NEPA also requires as part of an EIS's analysis of environmental consequences, that the Agency analyze the reasonably foreseeable effects or impacts of a project. Under 40 C.F.R. § 1508.1(g), the effects or impacts of a project include "changes to the human environment from the proposed action or alternatives that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action or alternatives, including those effects that occur at the same time and place as the proposed action or alternatives and may include effects that are later in time or farther removed in distance from the proposed action or alternatives."[869] Under 40 C.F.R. § 1508.1(aa), reasonably foreseeable is defined as "means sufficiently likely to occur such that a person of ordinary prudence would take it into account in reaching a decision."[870]

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[863] *See supra* Section III.A.2; *See also* Baltimore-Washington Superconducting MAGLEV Project DEIS, 4.13-7.
[864] *See infra* note 16.
[865] *A Citizen's Guide to NEPA: Having Your Voice Heard*, COUNCIL ON ENVIRONMENTAL QUALITY EXECUTIVE OFFICE OF THE PRESIDENT (Jan. 2021), https://ceq.doe.gov/docs/get-involved/citizens-guide-to-nepa-2021.pdf.
[866] 42 U.S.C. §§ 4443(c)(i), (ii).
[867] *Id.*
[868] C.F.R. § 1508.1(g).
[869] 40 C.F.R. § 1508.1(g).
[870] *Id.* at 1508.1(aa).

Not only does NEPA require that an agency evaluate environmental consequences of a project, but it also requires agencies to analyze and propose possible measures to mitigate those consequences. As stated in 42 U.S.C. § 4321, the purposes of NEPA include promoting efforts that will prevent or eliminate damage to the environment.[871] Accordingly, under 40 C.F.R. § 1500.2(f), federal agencies shall, to the fullest extent possible, "use all practicable means consistent with the requirements of the Act and other essential considerations of nation policy, to restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of their actions on the quality of the human environment."[872] The purpose of proposed mitigation measures issued in an EIS is to avoid or minimize the impact of the project on the surrounding environment.[873]

The second purpose of the environmental review process is to inform the public about an agency's decision making.[874] CEQ offered guidance in January of 2021 on how the public can be involved in the NEPA process. One way that the public can participate is through commenting on the DEIS. Additionally, CEQ proposes that the public also comment throughout the permitting process since statutes and regulations also often provide opportunities for public comment.[875] Important for this comment, CEQ recommends that "the permitting and NEPA processes [] be integrated or run concurrently in order to have an effective and efficient decision-making process."[876]

Further, the Department of Transportation's (hereinafter "DOT") has its own EJ Order, setting forth how the DOT is supposed to incorporate EJ principles into its decision making.[877] Under such order, DOT Order 5610.2(a), DOT must ensure that its programs that have a disproportionately high and adverse effect on protected populations will only be carried out if certain requirements are met.[878] Importantly, a substantial need for the program based on the overall public interest must exist.[879] Further, alternatives that would have less adverse

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[871] 42 U.S.C. § 4321.

[872] *See* 40 C.F.R. § 1500.2(f). *See also Forty Most Asked Questions and Answers on the CEQ Regulations: Number 19a*, DEPT. OF ENERGY, OFFICE OF NEPA POLICY & COMPLIANCE, https://www.energy.gov/sites/default/files/2018/06/f53/G-CEQ-40Questions.pdf {MCRT Editor's note: URL updated.] (last visited April 23, 2021) (The mitigation of impacts should be considered regardless of whether the impacts are significant).

[873] See 40 C.F.R. § 1508.20 (stating that mitigation includes: Mitigation includes: (a) Avoiding the impact altogether by not taking a certain action or parts of an action; (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation; (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; (e) Compensating for the impact by replacing or providing substitute resources or environments.).

[874] *A Citizen's Guide to NEPA: Having Your Voice Heard*, COUNCIL ON ENVIRONMENTAL QUALITY EXECUTIVE OFFICE OF THE PRESIDENT (Jan. 2021), https://ceq.doe.gov/docs/get-involved/citizens-guide-to-nepa-2021.pdf.

[875] *Id.*

[876] *Id*.

[877] U.S. DEP'T OF TRANSP., *Dep't of Transp. Order 5610.2(a)*, (May 2, 2012), https://www.fhwa.dot.gov/environment/environmental_justice/ej_at_dot/orders/order_56102a/index.cfm.

[878] *Id.*

[879] *Id.*

effects on protected populations would either have adverse and severe social, economic, environmental, or human health impacts or would extraordinarily increase costs.[880]

II. Inadequacies in Meeting NEPA Requirements

A. Inadequacies in Meeting Requirements under U.S. DOT Order 5610.2(a)

The Agency has not ensured that the SCMAGLEV Project, with its disproportionate impacts upon EJ communities, is substantially needed according to public interest, as necessitated under U.S. DOT Order 5610.2(a).[881] Section I.A.1 below demonstrates the disproportionate impacts to Beacon Heights Woodlawn, and EJ communities at large. Section I.A.2 below illustrates that the disproportionate burden on EJ communities is not justified because there is no substantial need for the SCMAGLEV Project, especially in light of the public interests and existence of other reasonable alternatives.

1. The impacts of construction and the lasting impacts from the train disproportionately burden Beacon Heights and Woodlawn

U.S. DOT Order 5610.2(a) explicitly requires that DOT consider the project's disproportionate impacts.[882] Yet, the extent of this burden was not calculated in the DEIS and the DEIS, by its own words, relies on an incomplete or under-detailed traffic data study. In particular, the DEIS states that a detailed traffic study will be completed at a later design phase.[883] The DEIS also states that the information relied upon for the DEIS is not adequate enough to understand the implications of truck arrivals and departures."[884] As a result, the true impact of construction traffic cannot be measured and DOT is unable to calculate the full breadth of emissions and pollution impacts attributable to construction at this site.[885] These unknown and unstudied emissions will exacerbate the pollution in Beacon Heights and Woodlawn, communities already heavily burdened by PM 2.5, diesel, and respiratory hazards.[886]

The SCMAGLEV Project's DEIS expects construction at the MD 410 FA/EE to be 24 hours-per-day for an estimated 1-5 years, with potentially 560-690 trucks per day. [887] The impact of this was not calculated in the DEIS but pushed off to a later design phase.[888] Tunneling under Beacon Heights and Woodlawn could take years. Many of the residents'

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[880] *Id.*

[881] *Id*.

[882] U.S. DEP'T OF TRANSP., *Dep't of Transp. Order 5610.2(a)*, (May 2, 2012), https://www.fhwa.dot.gov/environment/environmental_justice/ej_at_dot/orders/order_56102a/index.cfm.

[883] Baltimore-Washington Superconducting MAGLEV Project DEIS, App-D.2-66.

[884] *Id.*

[885] *Id.*

[886] *See supra* Section I.A.iii.

[887] Baltimore-Washington Superconducting MAGLEV Project DEIS, App-D.2-65, 85.

[888] *Id.*

work from home and often need to speak with clients and, therefore, the continuous construction will hurt their businesses and interrupt their lives. Other community members are recently retired and would like to spend their retirement in a quiet area, free from years of construction and the worry of ground instability. Yet, they will likely be burdened with noise and vibration, worsening air quality, interrupted transit service, and community disruption for years.

Moreover, the residents will also see no benefits because there is no station or stop in or near their communities that would allow the residents of Beacon Heights and Woodlawn to access the train. Residents will have to first drive almost fifteen miles into Washington, D.C. or twenty-five miles to BWI to access a stop on the train. The train will serve neither Beacon Heights nor Woodlawn. The DEIS merely points out that the SCMAGLEV Project is more efficient with less stops.[889] Thus, to the communities of Beacon Heights and Woodlawn, it feels as though the intent of the DEIS is to purposively trade equity for efficiency in contradiction to the principles of environmental justice.[890]

In sum, the following are the disproportionate impacts on Beacon Heights, Woodlawn, and EJ communities at large that will likely occur as a result of the SCMAGLEV Project.

- "The vast majority of the SCMAGLEV Project impacts would occur in EJ population areas due to the fact that most of the SCMAGLEV Project Affected Environment qualifies as EJ;"[891]
- "Due to the prevalence of EJ population areas, impacts to resources along the corridor will predominately be located in EJ population areas;"[892]
- "Collectively, the Build Alternatives would impact 14 parks, 12 of which are located in EJ population areas. The other two parks are large federal properties that do not have an EJ designation;"[893]
- Ninety percent of the community facilities impacted or displaced by the SCMAGLEV Project are located in EJ communities.[894] The project will displace three community facilities that are not only located in EJ communities but also serve EJ communities.[895] The Adams Place Emergency Shelter, Woodlands Job Corp., and Medmark Treatment Center are essential facilities that provide shelter, job assistance, and addiction treatment to Maryland's most vulnerable populations.[896]

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[889] *Id.* at 4.19-7, 9, n.11.
[890] Under Title VI DOT is expressly required to provide service on a non-discriminatory basis. U.S. DEP'T OF TRANSP., *Dep't of Transp. Order 5610.2(a)*, (May 2, 2012), https://www.fhwa.dot.gov/environment/environmental_justice/ej_at_dot/orders/order_56102a/index.cfm.
[891] Baltimore-Washington Superconducting MAGLEV Project DEIS, 4.5-6.
[892] *Id.* at 4.5-9.
[893] *Id.* at 4.5-12.
[894] *Id.* at 4.5-10.
[895] *Id.*
[896] Baltimore-Washington Superconducting MAGLEV Project DEIS, 4.5-10,11.

- "The entire length of the viaduct is located within and adjacent to EJ population areas, and the new aboveground elevated guideway would be visible to those EJ populations"[897]
- "Long-term operational effects of the SCMAGLEV Project for either Build Alternatives can include potential spills of hazardous substances or accidents. . . These spills are more likely to occur in EJ communities, as nearly all of the viaduct, ancillary facilities, MOW, and TMFs (*sic*) are in EJ population areas;"[898]
- "Over 99 percent of the impacted noise receptors are located with EJ population areas;"[899]
- "100 percent of the severe vibration impacts would be located in EJ population areas;"[900]
- "Approximately 80 percent of the parcels that would be impacted are located within EJ population areas;"[901]
- "The construction of and the associated construction staging and laydown areas and haul routes for the SCMAGLEV Project would predominately occur within Environmental
  Justice population areas;"[902]
- "The majority of the underground stations (MVS East Station and Camden Yards Station) and FA/EE facilities would be located in areas with EJ populations so these populations would experience increased noise and vibration due to construction;"[903]
- "Construction laydown areas would be required in multiple locations throughout the SCMAGLEV Project corridor. All identified construction laydown areas would be located within areas with EJ populations;"[904] and "Construction of the SCMAGLEV Project would result in short-term adverse impacts to EJ populations due to temporary use of property, increased noise and vibration, air quality/emissions, changes in aesthetics and visual quality, changes to access and mobility, changes in current transit service, and the use of community facilities. EJ populations subject to these impacts may also experience community disruption (a population's ability to navigate their way around their community) and adverse effects to community cohesion (disruption of interaction between people and groups within a community).[905]

2. No substantial need for the SCMAGLEV Project exists to justify the SCMAGLEV Project's disproportionate impacts

[897] *Id.* at 4.5-14.
[898] *Id.* at 4.5-15.
[899] *Id.* at 4.5-15,16.
[900] *Id.* at 4.5-17.
[901] Baltimore-Washington Superconducting MAGLEV Project DEIS, 4.5-17.
[902] *Id.* at 4.5-20.
[903] *Id.* at 4.5-21.
[904] *Id*.
[905] *Id.* at 4.5-22.

U.S. DOT Order 5610.2(a) also states that a project with high and adverse effects on EJ populations, will only be carried out in certain circumstances, including if there is substantial need for the program, and limited alternative options. As demonstrated below, no substantial need for the SCMAGLEV Project exists, especially based on the overall public interest. The train will cost too much for the residents of Beacon Heights, Woodlawn, and most citizens to ride, and will only cater to the wealthy.[906] Moreover, the DEIS neither considers nor demonstrates that alternatives with less adverse effects would have other adverse social, economic, environmental or human health impacts that are severe or would involve increased costs of extraordinary magnitude, as dictated by U.S. DOT Order 5601.2(a)(2). The DEIS did not consider non-SCMAGLEV alternatives at all, such as upgrading existing transportation methods within the northeast corridor. Section I.2.i-iv examines the purported reasoning behind each of the SCMAGEV Project's stated needs and demonstrates that they are inadequate to justify the disproportionate impacts borne by the SCMAGLEV Project.

i. Increasing population and employment

The DEIS relies upon inadequate population statistics and data. The DEIS used population statistics from the "Baltimore-Washington region," however, the whole region will not use the train, rather, it is likely that only those in Baltimore and D.C. will use it. The population growth rates in Baltimore and D.C. have decreased for decades. From 1980 to 2000, Baltimore saw a population growth rate of –17.2% and D.C. –10.4%.[907] Early census data for 2020 affirmed showing that Baltimore city lost 9,000 residents, and is now below 600,000 people.[908] Similarly, in 2019, D.C. saw its lowest population growth since 2005.[909] Neither population nor employment trends justify a new transportation system among the many others in the Northeast Corridor.

Moreover, the COVID-19 Pandemic has changed everything: populations, employment statistics, and future population and employment trends, making the data and statistics relied upon in the DEIS outmoded and inadequate. In order to save lives and stop the spread of COVID-19, many employers ordered employees to work remotely. One study

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[906] LSIA, *SC MagLev – Not Good for Linthicum & not the Solution* (Feb. 17, 2021), http://www.lsia.net/scmaglevbwrr; CITY OF GREENBELT, *Special Meeting – City Council Agenda: Proposed MAGLEV Project* (Sept. 8, 2020), https://d3n9y02raazwpg.cloudfront.net/greenbeltmd/cdb3857a-e873-11ea-94190050569183fa-2e149c49-c4d9-4b27-bcb0-3291927b3078-1599241136.pdf.

[907] City of Baltimore Comprehensive Master Plan 49 [available at: http://planning.baltimorecity.gov/sites/default/files/Key%20Trends_0.pdf.

[908] Jayne Miller, *Early Census Count Shows Baltimore Lost 9,000 Residents*, WBAL TV (Mar. 26, 2020), https://www.wbaltv.com/article/census-early-count-shows-loss-of-around-9000-citizens-in-baltimore/31942490.

[909] Sunaina Kathpalia, *The District's Population Grows for the 14th Year in a Row, but at a Weaker Rate*, D.C. POLICY CENTER (Apr. 15, 2020), https://www.dcpolicycenter.org/publications/districts-population-grows-14th-yearrow-weakerrate/#:~:text=According%20to%20the%20latest%20population,minus%20the%20number%20of%20deaths.

found that chief information officers expect that the number of employees permanently working remotely to double from pre-COVID levels.[91072] Another study of business leaders found that seventy-four percent of chief financial officers will move at least five percent of their workforce to permanently remote after the COVID-19 pandemic.[911] A study produced by Upwork estimates just 12.3% of the workforce worked remotely before the COVID-19 Pandemic, while in 2021, 26.7% of the workforce worked remotely, and over 1,000 company managers expect 22.9% of workers to remain in a remote capacity for the next five years.[912]

Further, employees working from home are more efficient and on average work more hours than they would commuting to an office or workspace.[913] For example, REI decided to sell its new, eight-acre corporate campus in D.C. and embrace a more remote and hybrid-remote model.[914] With more companies transitioning to remote or hybrid work, less will need or utilize office spaces, meaning less people commuting. So even if employment does increase as the DEIS states, the current employment trends are based on inadequate data and do not take into account the new and poignant trends of remote work.

ii. Growing demands on the existing transportation network and inadequate capacity of the existing transportation network

The SCMAGLEV will not significantly reduce the congested roadways from Baltimore to Washington D.C. The DEIS projections claim the train will divert the majority of ridership from automobiles.[915] However, the diversions are only a small percentage of the annual automobile trips within the SCMAGLEV Project area.[916] The difference between the SCMAGLEV Build Alternatives and the No Build Alternative results in, at most, 1.3% of

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[910] Gertrude Chavez-Dreyfuss, *Permanently [sic] remote workers seen doubling in 2021 due to pandemic productivity: survey*, REUTERS (Oct. 22. 2020), https://www.reuters.com/article/us-health-coronavirus-technology/permanentlyremote-workers-seen-doubling-in-2021-due-to-pandemic-productivity-survey-idUSKBN2772P0.

[911] GARTNER, Gartner CFO Survey Reveals 74% Intend to Shift Some Employees to Remote Work Permanently [sic] (Apr. 3. 2020) https://www.gartner.com/en/newsroom/press-releases/2020-04-03-gartner-cfo-surey-reveals-74percent-of-organizations-to-shift-some-employees-to-remote-work-permanently2.

[912] Dr. Adam Ozimek, *Economist Report: Future Workforce*¸ UPWORK (Dec. 2020), Economist Report: Future Workforce | Upwork. www.upwork.com/press/releases/economist-report-future-workforce.

[913] Gertrude Chavez-Dreyfuss, *Permanently [sic] remote workers seen doubling in 2021 due to pandemic productivity: survey*, REUTERS (Oct. 22. 2020), https://www.reuters.com/article/us-health-coronavirus-technology/permanentlyremote-workers-seen-doubling-in-2021-due-to-pandemic-productivity-survey-idUSKBN2772P0 .

[914] Caroline Castrillon, *This is the Future of Remote Work in 2021*, FORBES (Dec. 27, 2020), https://www.forbes.com/sites/carolinecastrillon/2021/12/27/this-is-the-future-of-remote-work-in2021/?sh=2d621c701e1d.

[915] Baltimore-Washington Superconducting MAGLEV Project DEIS, 4.2-20.

[916] *Id.* ("Results showed small changes in volumes between the No Build and Build Alternatives, which reflects the fact that although there will be annual diversions to the SCMAGLEV Project from automobiles . . . these diversions are a small percentage of the total annual automobile trips made within the SCMAGLEV Project Affected Environment and are for a small set of distinct origin/destination (O/D) pairs that are part of a much larger set of O/D pairs that are not conveniently served by the SCMAGLEV Project").

automobile trips diverted.[917] Further, while only small changes are expected on a daily basis, even smaller changes are expected during peak hours, when congestion is at its highest.[918] Thus, the SCMAGLEV Project will not sufficiently address congestion and delay problems on roadways to and from Baltimore and D.C. and does not resolve the inadequate capacity of roadways.

The SCMAGLEV Project also does not solve the congestion problem in the Northeast Corridor and only exacerbates the problem by adding one ***more*** method of transportation to the multiple transportation methods utilized in the corridor. The SCMAGLEV ridership forecast predicts it will divert 2,000,000 passengers per year from rail and 200,000-300,000 passengers per year from bus. The SCMAGLEV Project is not needed to help with alleged growing demand and inadequate capacity because the MARC and Amtrak trains, discussed below, are currently undergoing improvements to bolster their speeds and capacity.

The MARC train is the most affordable and equitable transportation option in the corridor. A trip from Baltimore to Washington D.C. costs $12 or less given the significant discounts for students, children, groups, the elderly, and people with disabilities.[919] The MARC train runs from Baltimore to Washington D.C., with more than ten stops in between, including BWI. Juxtaposing the accessibility of the MARC train, the SCMAGLEV will only accommodate commuters traveling between the two already accessible cities and the BWI Airport.[920] To meet growing demand and capacity problems, MARC has long range plans for physical improvements to the MARC rail lines that will allow for more frequent trips with additional capacity and "more attractive and convenient service to potential riders."[921] The SCMAGLEV Project forecasts that it will divert approximately 32% of annual MARC ridership on the Penn and Camden Lines, causing a decline in fare revenue.[922] Diverting revenue from a governmental organization means that public transportation quality and service frequency will decline. The MARC train provides the lowest cost options to people in need of transportation and reducing MARC profit will only worsen the transportation situation in the Northeast Corridor. The SCMAGLEV train is not a proper solution for issues with the MARC train because the SCMAGLEV train will not be capable of making the frequent stops that makes the MARC train so accessible and equitable.

Amtrak's Acela provides high-end and fast paced travel between Washington D.C. and Baltimore. The DEIS incorrectly states that Acela "stops only at Baltimore Penn Station and Washington Union Station."[923] Acela will make nearly the identical trip that the proposed

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[917] *Id.*

[918] *Id*.

[919] MDOT, *MARC Fares*, https://www.mta.maryland.gov/marc-fares (last visited Dec. 30, 2020).

[920] MDOT, *Route MARC – Penn – Washington*, https://www.mta.maryland.gov/schedule/timetable/marc-penn (last visited Dec. 30, 2020).

[921] Baltimore-Washington Superconducting MAGLEV Project DEIS, 4.2-9.

[922] *Id.* 4.2-10.

[923] *Id*. 4.2-11.

SCMAGLEV Project will, traveling between Baltimore and Washington, D.C., and stopping at BWI.[924] Acela offers food service, complimentary WIFI, charging ports, restrooms, takes less than forty minutes to travel from Baltimore to D.C., and can cost less than $20, which is far less than the SCMAGLEV Project purports to charge.[925] Acela currently travels at 150 miles per hour and is dealing with the "aging infrastructure" by upgrading their trains and increasing train speeds to 160 mph this coming year.[926] Yet, these improvements that are already underway may be made inconsequential as the SCMAGLEV Project forecasts that it will divert 94% of annual Amtrak trips traveling between the three major Amtrak stations within the SCMAGLEV Project."[927] This is egregious not only because it will divert most of Amtrak's ridership, pulling funds from the government, but especially because the DEIS recognizes that bus and rail are more energy efficient than the SCMAGLEV Project.[928] Thus, the SCMAGLEV Project will divert ridership from more efficient transportation methods and divert funds supporting government transportation into private entitles.

The SCMAGLEV Project Purpose and Need Statement claims its primary objective was to "[i]mprove redundancy and mobility options for transportation between the metropolitan areas of Baltimore and Washington, D.C."[929] The SCMAGLEV Project will only increase the redundancy of the current transportation options while deflecting funding from existing transportation options. The Agency already has other projects and improvements currently, or soon-to-be, underway, including "MDOT MTA Bus Expansion Program, Bus Rapid Transit to BWI Marshall Airport – from Dorsey MARC Station to BWI Marshall Light Rail Station, U.S. 29 Bus Rapid Transit service, DC Streetcar Expansion, and MDOT MTA Purple Line."[930] Overall, the SCMAGLEV Project is not needed to meet the growing demand for transportation or any alleged inadequacies in the bus or rail systems as there are already current projects underway that fulfill the same needs. In addition, due to COVID-19 disruptions, Amtrak experienced nearly a 50% passenger ridership decline in the 2020 fiscal year as compared to 2019.[931] With policy recommendations like social distancing, two-week quarantines, and travel restrictions in place, public transit ridership has declined precipitously across bus, and rail, and will likely continue to do so.[932]

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[924] AMTRAK, *Acela*, https://www.amtrak.com/routes/acela-train.html (last visited Feb. 18, 2021).
[925] AMTRAK, *Train Options and Accommodations*, https://www.amtrak.com/tickets/departure.html (last visited Dec 26, 2020); AMTRAK, *Acela*, https://www.amtrak.com/routes/acela-train.html (last visited Feb. 18, 2021).
[926] CBS NEWS, *Amtrak's new Acela gets speed testing ahead of 2021 rollout: "It's going to be a game changer"*, (Oct. 9, 2020), https://www.cbsnews.com/news/amtrak-acela-speed-testing-rollout/. *See also* DEIS Chapter 4.2 page 12.
[927] Baltimore-Washington Superconducting MAGLEV Project DEIS, 4.2-12.
[928] *Id.* at 4.19-8.
[929] BALTIMORE-WASHINGTON SUPERCONDUCTING MAGLEV PROJECT, *Purpose and Need Statement* (Oct. 12, 2017), https://www.bwmaglev.info/images/document_library/reports/purpose_and_need_2017_10_12.pdf.
[930] Baltimore-Washington Superconducting MAGLEV Project DEIS, 4.2-16.
[931] AMTRAK, *Amtrak Route Ridership FY20 v. FY19*, at 1 (last visited Feb. 28, 2021), FY20-Year-End-Ridership.pdf (amtrak.com). http://media.amtrak.com/wp-content/uploads/2020/12/FY20-Year-End-Ridership.pdf. [MCRT Editor note: URL updated].
[932] Christina Ianzito, *Guide to State Quarantine Rules for Travelers*, AARP (Feb. 24, 2021), COVID-19 Travel

iii. Increasing travel times and decreasing mobility

The DEIS fails to show that the SCMAGLEV Project will decrease travel times or increase mobility. While the DEIS projections claim the majority of ridership will be diverted from automobiles the difference between the SCMAGLEV Project's Build Alternatives and the No Build Alternative results in, at most, 1.3% of automobile trips diverted.[933] And, as explained in Section I.2.ii, upgrades to the MARC and Acela trains will upgrade infrastructure and speed up trains.[934] Acela's new fleet will go faster and accommodate twenty-five (25%) more passengers.[935] As the SCMAGLEV Project will not divert substantial amounts of automobile trips, it will not decrease travel times or increase mobility, especially with the upgrades already started within the corridor.

Additionally, the SCMAGLEV Project Purpose and Need Statement is based on traffic assumptions assessed prior to the COVID-19 pandemic, before working from home became the new normal. The COVID-19 pandemic has shown that people can work from home, and are even more productive doing so, thus drastically reducing the number of cars on the highway.[936] Many companies have said they plan to move at least some of their workers permanently remote after COVID-19, and many more are planning hybrid work schedules.[937] With more companies transitioning to remote or hybrid work, less will need or utilize office spaces, meaning less people will commute. Moreover, the DEIS uses data that is over five years old instead of the MDOT's most recent annual report that became available in 2019.[938] In fact, the 2019 annual report produced new data with the 15 most congested roads, and segmented the roads less, which can be seen in the side-by-side comparison of the reports in Appendix B.[939] Instead of nearly half of the "most congested roads" located between

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Advisory: Quarantine Guide By State (aarp.org); CDC, *Social Distancing*, (Nov. 2020), Social Distancing (cdc.gov); USA FACTS, *Monthly public transit ridership is 65% lower than before the pandemic*, (Oct., 2020), Monthly public transit ridership is 65% lower than before the pandemic - USAFacts.

[933] Baltimore-Washington Superconducting MAGLEV Project DEIS, 4.2-20 ("Results showed small changes in volumes between the No Build and Build Alternatives, which reflects the fact that although there will be annual diversions to the SCMAGLEV Project from automobiles . . . these diversions are a small percentage of the total annual automobile trips made within the SCMAGLEV Project Affected Environment and are for a small set of distinct origin/destination (O/D) pairs that are part of a much larger set of O/D pairs that are not conveniently served by the SCMAGLEV Project").

[934] *See supra* Section D.3, D.4.

[935] *New Amtrak Acela Trains Stimulate Nationwide Economy*, AMTRAK (Dec. 4, 2019), https://media.amtrak.com/2019/12/new-amtrak-acela-trains-stimulate-nationwide-economy/.

[936] Gertrude Chavez-Dreyfuss, *Permanently [sic] remote workers seen doubling in 2021 due to pandemic productivity: survey*, REUTERS (Oct. 22. 2020), https://www.reuters.com/article/us-health-coronavirus-technology/permanentlyremote-workers-seen-doubling-in-2021-due-to-pandemic-productivity-survey-idUSKBN2772P0.

[937] *Id.*; *See also supra* Section II(b)(i).

[938] MARYLAND DEPARTMENT OF TRANSPORTATION, *Mobility and Reliability*, https://roads.maryland.gov/mdotsha/pages/Index.aspx?PageId=711 (last visited Feb. 18, 2021).

[939] *See infra* Appendix B.

Baltimore and Washington, D.C., as the DEIS states, only two portions of road are actually on direct paths between Baltimore and Washington D.C.[940] Therefore, the current trends utilized by the DEIS are based on inadequate data and do not take into account the new trends of remote work. Further, the SCMAGLEV Project will not substantially reduce drivers from the Northeast Corridor, thus not solving any congestion problems.

iv. Maintaining economic viability

The DEIS loftily states that the SCMAGLEV Project will be "a transportation system that provides options for reliable, efficient, and cost-effective movement of passengers and goods [] needed to support continued economic growth, including the retention of, and an increase in jobs in the region."[941] The Acela upgrades are projected to do exactly that. The Acela upgrades created an estimated 1300 jobs and sourced parts from all over the country.[942] The DEIS also shows how the SCMAGLEV Project is cost-ineffective. By its calculations, the DEIS estimates that expected SCMAGLEV Project riders will save $462.3 million in 2030 and $617.7 million in 2045 with the Cherry Hill Station or $519.7 million in 2030 and $696.6 million in 2045 with the Camden Yards Station.[943] These savings are based on saved travel time.[944] However, these savings are traded off against costs of travel estimated at $552.6 million in 2030 and $704.2 million in 2045 with the Cherry Hill Station or $607.5 million in 2030 and $773.7 in 2045 with the Camden Yards Station.[945] Overall, the time saved by using the SCMAGLEV Project is heavily outweighed by the high costs of usage. The SCMAGLEV Project relies on outmoded and outdated data and, further, will not fulfill any of the project's stated purposes and needs.

B. The Agency Did Not Conduct Sufficient Outreach During the Scoping Process

The Agency did not adequately conduct the scoping process because it failed to properly engage with residents living along the planned route in areas where stops would not be located.[946] The notice of intent to draft an DEIS for the SCMAGLEV Project was published in the Federal Register on November 25, 2016.[947] Two Agency scoping meetings were held in

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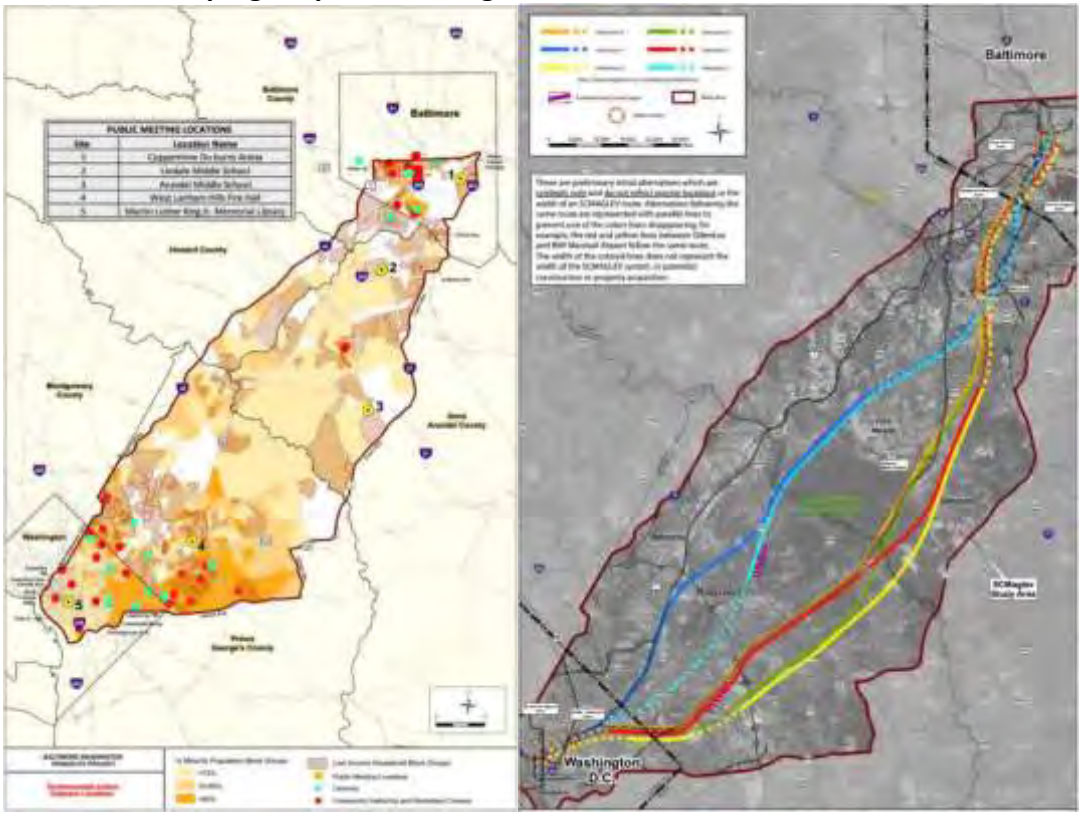
[940] For a side-by-side comparison of 2015 and 2019 congestion reports, *See Appendix B*.
[941] Baltimore-Washington Superconducting MAGLEV Project DEIS, at 2-15.
[942] *New Amtrak Acela Trains Stimulate Nationwide Economy*, AMTRAK (Dec. 4, 2019), https://media.amtrak.com/2019/12/new-amtrak-acela-trains-stimulate-nationwide-economy/.
[943] Baltimore-Washington Superconducting MAGLEV Project DEIS, at 4.6-2.
[944] *Id.* at 4.6-3.
[945] *Id.* at 4.6-3.
[946] As stipulated under 43 C.F.R. § 46.235 ("bureaus must use scoping to engage State, local and tribal governments and the public in the early identification of concerns, potential impacts, relevant effects of past actions and possible alternative actions. Scoping is an opportunity to introduce and explain the interdisciplinary approach and solicit information as to additional disciplines that should be included") and 40 C.F.R. § 1501.9 (Agencies must hold scoping meetings, publish scoping information, "or use other means to communicate with those persons or agencies who may be interest").
[947] Baltimore-Washington Superconducting MAGLEV Project, *Final Scoping Report*, MDOT (May, 2017), https://www.bwmaglev.info/images/document_library/reports/Maglev_Scoping-Report_051717RE.pdf.

2017 for participating agencies. Five scoping meetings, as seen in Figure II.C.1, were held open to the public.[948] However, only 152 people attended these open houses and 57 people submitted comments at the open houses.[949] A total of 669 postcard mailings were sent out to selected community groups, chambers of commerce, and neighborhood associations in early December 2016.[950] The mailing list was determined by the project team based upon proximity to proposed alternative alignments and area of potential effects.[951]

[948] Baltimore-Washington Superconducting MAGLEV Project DEIS, 5-11.
[949] Baltimore-Washington Superconducting MAGLEV Project, *Final Scoping Report*, MDOT (May, 2017), https://www.bwmaglev.info/images/document_library/reports/Maglev_Scoping-Report_051717RE.pdf. *See also* Baltimore-Washington Superconducting MAGLEV Project DEIS, 5-11.
[950] Baltimore-Washington Superconducting MAGLEV Project DEIS, 5-8.
[951] *Id.*

Figure II.C.1: Final Scoping Map[952] **Figure II.C.2: Initial MAGLEV Routes Alternatives**[953]



The Agency did not adequately conduct the scoping process because it failed to properly engage with residents living along the planned route in areas where stops would not be located. The majority of flyers were placed in and around Baltimore and D.C., neglecting the entirety of the central portion of the SCMAGLEV Project route of Figure II.C.1. Unfortunately, it is those areas with less ability to participate and less notice that will have to endure construction for years–and SCMAGLEV Project operation for decades–without being serviced by it, as seen in Figure II.C.2. Further, the fact that the Agency only had 150 people in total at their five public open houses, which is barely a fraction of the entire population that will be affected by this SCMAGLEV Project, evidences the lack of public knowledge and participation in the early stages of the SCMAGLEV Project. The Agency overlooked a key portion of the population that will be adversely affected by this SCMAGLEV Project.

The Agency should have sent out more mailings, placed more flyers, and conducted additional public meetings along the route of the SCMAGLEV Project in order to garner more public participation. The Agency should have also conducted additional public meetings once

[952] Baltimore-Washington Superconducting MAGLEV Project, *Final Scoping Report*, MDOT (May, 2017), https://www.bwmaglev.info/images/document_library/reports/Maglev_Scoping-Report_051717RE.pdf (Figure 2-2).

[953] Baltimore-Washington Superconducting MAGLEV Project, Draft Purpose and Need, and Screening Maps, MDOT (April, 2017), https://www.bwmaglev.info/index.php/april-2017-draft-purpose-and-need-and-screeningmeetings-maps.

they received little turn out in their initial public meetings. For comparison, in order to engage the public to assist with determining how to best update transportation needs along Utah's 1800 North Corridor, the agencies held a single scoping meeting, which garnered over 150 people.[954] A road widening/reconstruction project with one scoping meeting at one location generated a larger audience than five scoping meetings along the 40-mile path of the Proposed SCMAGLEV Project.[955] The I-64 Hampton Roads Bridge Tunnel held two public meetings and also had 152 citizens attend. They then held further meetings to obtain more input.[956] After very little public participation, the Agency should have restructured their outreach and readdressed scoping to do more to reach additional people along the proposed routes, especially since the purpose of NEPA is public involvement.

C. The FRA Should Issue an RPA for the Project

The FRA should issue a Rule of Particular Applicability (hereinafter "RPA")[957] for this SCMAGLEV Project, just as it has for other projects utilizing high-speed rail technology,[958] since it is based off of foreign, newly introduced technology not yet in use in the United States.[959] The DEIS for this SCMAGLEV Project merely states that the FRA *may* issue an RPA but currently does not require the publication of an RPA.[960] Given the unique nature of this SCMAGLEV technology and the precedent set forth by the Texas Central Railroad Project (hereinafter "TCRR") in particular, the FRA should issue an RPA for this SCMAGLEV Project.

For the TCRR, which is a high-speed rail system, the FRA is proposing an RPA.[961] The FRA explained that it "continues to believe that addressing proposals for standalone high-speed rail systems on a case-by-case basis and comprehensively (such as through an RPA or

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[954] 1800 North (SR-37) Transportation Improvement, EPA, https://cdxnodengn.epa.gov/cdx-enepaII/public/action/eis/details?eisId=88431 (last visited Mar. 4, 2021) (DEIS Volume 1 at 64).
[955] *Id.*
[956] *I-64 Hampton Roads Bridge Tunnel from I-664 in the City of Hampton to I-564 in the City of Norfolk VA*, EPA, https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=80039 (last visited Mar. 4, 2021) (DEIS at S-4).
[957] *See Dallas to Houston High-Speed Rail- Passenger Service from Houston to Dallas*, U.S. DEPARTMENT OF TRANSPORTATION: FEDERAL RAILROAD ADMINISTRATION, https://railroads.dot.gov/environmental-reviews/dallashouston-high-speed-rail/dallas-houston-high-speed-rail-passenger (last visited April 21, 2021) (stating an RPA is "a set of minimum Federal safety standards to enable effective safety oversight of the operation" of a high-speed rail system in the United States.)
[958] *See* FEDERAL RAILROAD ADMINISTRATION*, Passenger Equipment Safety Standards, Standards for Alternative Compliance and High-Speed Trainsets*, 83 Fed. Reg. 59182 (stating that the "final rule amends FRA's passenger equipment safety standards using a performance-based approach to adopt new and modified requirements governing the construction of conventional- and high-speed passenger rail equipment.").
[959] Baltimore-Washington Superconducting MAGLEV Project DEIS, 4.22-1 ("The SCMAGLEV Project introduces technology that does not currently operate in the United States.")
[960] *Id.* (stating "…FRA may issue a Rule of Particular Applicability (regulations that apply to a specific railroad or a specific type of operation (RPA)) or a Rule of General Applicability, to impose requirements or conditions by order(s) or waiver(s), or take other regulatory action(s) to ensure that the SCMAGLEV Project is operated safely.").
[961] FEDERAL RAILROAD ADMINISTRATION*, Passenger Equipment Safety Standards, Standards for Alternative Compliance and High-Speed Trainsets*, 83 Fed. Reg. 59182.

other specific regulatory action(s)) is prudent because of the small number of potential operations, and the potential for significant and unique differences in their design."[962] The TCRR is using "technological and operational aspects of the JRC Tokaido Shinkansen system," but is also choosing to do an RPA because there are "significant operational and equipment differences [that] exist between the system proposed for Texas and existing passenger operations in the United States."[963] Additionally, "[i]n many of the railroad safety disciplines, FRA's existing regulations do not address the safety concerns and operational peculiarities of the proposed TCRR system. Therefore, in order to allow TCRR to operate with effective safety oversight, an alternative regulatory approach is required."[964] Using this reasoning, the FRA should issue an RPA for the SCMAGLEV system since it is a standalone high-speed rail system relying on international technology yet to be operated in the United States.[965][966]

III. The DEIS Inadequately Discusses Adverse Environmental Impacts

When evaluating a project's environmental impacts, agencies are obligated to consider the environmental impacts of their actions to the "fullest extent possible."[967] Specifically, NEPA requires agencies to discuss not only the project's environmental impact, but "*any* adverse environmental effects which cannot be avoided should the proposal be implemented."[968] Here, the DEIS's consideration of environmental consequences insufficiently addresses structural impacts from the SCMAGLEV Project,[969] fails to analyze the effects of electromagnetic fields,[970] insufficiently analyzes the SCMAGLEV Project's air emissions,[971] and inadequately analyzes impacts on water quality.[972]

A. The DEIS Inadequately Discusses the Potential Structural Consequences of the Project on Residents' Homes

1. The DEIS fails to adequately assess the impacts that construction of the underground portion of the SCMAGLEV Project will have on above ground structures such as residents' homes and other aging infrastructure

[962] *Id.*
[963] *Id.*
[964] *Id*.
[965] Baltimore-Washington Superconducting MAGLEV Project DEIS, 4.22-5 (stating that the current safety and security requirements are based off "observations of international operation of SCMAGLEV technology and an analysis of proposed design specifications and safety controls.").
[966] U.S.C. § 4332.
[967] 42 U.S.C. § 4332.
[968] *See infra* Section I.B.
[969] *See supra* Section III.A.
[970] *See supra* Section III.B.
[971] *See supra* Section III.C.
[972] *See supra* Section III.D.

The DEIS fails to adequately analyze the impacts tunneling will have on above ground structures. Each build alternative described in the DEIS requires deep tunneling through the majority of the SCMAGLEV Project route.[973] Although the Agency alludes to the fact that these construction efforts may lead to above ground structural problems, the Agency fails to adequately assess how these construction efforts may impact above ground structures and to what extent.

Structural impacts are not adequately studied in the DEIS, especially because the DEIS states outright that the Agency did not look at specific information for Maryland and Washington, D.C. where the Agency plans to construct this SCMGALEV Project. For example, the DEIS states, that "future geotechnical investigations would determine whether accounting for rockslides in the project design is recommended."[974] Moreover, the DEIS explicitly acknowledges the likely presence of acid producing soils in the region, but simply states, that the "FRA did not identify published Maryland- and Washington, D.C.- specific information." [975] The Agency should not have glossed over the issue of acidic soils because, as they go on to state in the DEIS, "acid producing soil hazards are also present and certain unconsolidated soils and sediments in the Atlantic Coastal Plain could contain minerals that produce enough acidity to degrade concrete and steel structures to the point of failure."[976] The Agency's solution to these problems is to conduct further "subsurface geotechnical testing"[977] in "subsequent phases of SCMAGLEV Project Development."[978] Pushing this type of analysis to later in the SCMAGLEV Project's development strips the public of their right to comment on these impact analyses and is directly contradictory to the spirit and purpose of NEPA.

Additionally, the DEIS states that during the construction of the tunnel, the Agency will have to pump groundwater out of aquifers in a process known as "dewatering" in order to adequately and safely use the tunnel boring machines. Although this is a proper and commonly used construction method, the Agency admits that "[g]roundwater pumping could result in topographic subsidence and ground compaction..."[979] The DEIS provides no other information as to how this subsidence and ground compaction may affect above ground structures. Additionally, the DEIS does not go on to state the extent to which this impact may affect communities along the SCMAGLEV Project route, specifically communities like Beacon Heights and Woodlawn who are directly above an underground portion of the route.

Buildings are not totally static structures and are subject to movements caused by a number of external factors. Therefore, it is essential to carry out a condition survey of all

[973] *See infra* Section I.A.
[974] Baltimore-Washington Superconducting MAGLEV Project DEIS, 4.13-7.
[975] *Id.* at 4.13-4.
[976] *Id.* at 4.13-7.
[977] *Id.* at 4.13-7.
[978] *Id*.
[979] *Id.* at 4.13-6.

structures within the area of disturbance of the tunnel. A condition survey should record all visible defects both superficial and structural. A condition survey should also be used to identify what current structural issues the infrastructure along the SCMAGLEV Project route already faces. This survey can guide the construction accordingly by mitigating the construction damage in areas with already high levels of infrastructure damage.

2. The DEIS fails to adequately consider the impacts of vibration from both the construction of the underground portion of the SCMAGLEV Project and the operation of the train through the tunnels, on above ground structures

The DEIS fails to adequately consider what vibration impacts, from both construction and operation of the SCMAGLEV Project, will have on above ground structures. Although the DEIS generally assess the impacts of vibration, the Agency did not adjust their calculations for building foundations along the route.[980] The Agency states in the DEIS that "[a]djustments for individual building foundation effects will be applied during final design where impacts are predicted."[981] However, assessing the impacts to individual building foundations along the route in a later design phase will not give the public the opportunity to comment on such analysis.

Beyond Beacon Height's and Woodlawn's susceptibility to general vibration from tunnel boring during construction, Beacon Heights and Woodlawn are adjacent to a FA/EE location. The DEIS states that "[l]ocalized vibration impacts are also expected from station and FA/EE excavation as these will require deep boring, pile driving and possibly blasting."[982] Although the Agency makes this statement in the DEIS, it does not further state what these "localized vibration impacts" are or to what extent they may do damage to above ground structures.

The Agency also has not done enough research and analysis into how the vibration impacts may be mitigated. The DEIS states that "[b]ased on the limited information available on the use of maglev or SCMAGLEV train service around the world, experience with sourcespecific vibration control measures is very limited."[983] Although the SCMAGLEV technology is relatively new, this does not excuse the Agency from taking reasonable measures to analyze vibration impacts and mitigation of those impacts to surrounding communities. Vibration impacts could do damage to residential homes and put communities of people at a significant safety risk. Pushing this analysis to a later design phase of the SCMAGLEV Project or using other studies from different projects is not adequate when it comes to ensuring the safety of the public.

[980] *See id.* at 4.17-8.
[981] *Id.*
[982] *Id.* at 4.17-18.
[983] *Id.* at 4.17-19.

B. The DEIS Fails to Adequately Analyze the Effects and Safety of Electric Magnetic Fields (EMF)

The SCMAGLEV Project creates a plethora of safety concerns, many of which the Agency has not examined fully enough to allow for meaningful public participation. Some of these major health hazards and concerns include exposure to hazardous materials from the disruption of contaminated sites or accidental spills.[984] This may result in hazardous materials becoming airborne, leaching into soil and groundwater, and directly exposing humans to these particulates.[985] Further, runoff from SCMAGLEV Project facilities, exacerbated by the new impervious surfaces and vegetation clearing for the SCMAGLEV Project, could carry heavy metals and bacteria into the local watershed and groundwater.[986] This will be worse in Prince George's County, where Beacon Heights and Woodlawn reside, as there will be heavy tunnel construction.[987] Noise pollution and vibration are projected to cause hearing loss and interrupted sleep, worsened by the 24-hour construction near the Beacon Heights and Woodlawn neighborhoods that will exceed the nighttime noise limit.[988] In addition to all of these health and safety concerns, the DEIS claims that the electromagnetic fields and interference (hereinafter "EMF/EMI") from the SCMAGLEV Project will be safe.[989] However, the Agency did not conduct EMF/EMI studies for the SCMAGLEV Project that will travel between Baltimore and Washington D.C.[990] This prohibits meaningful public participation on the effects and potential hazards resulting from EMF/EMI.

The SCMAGLEV system radiates electromagnetic radiation above the level proscribed by the International Commission on Non-Ionizing Radiation Protection (hereinafter "ICNIRP") and uses "shielding" to lower EMF/EMI levels below ICNIRP maximum allowed levels.[991] The DEIS does not discuss shielding in-depth when discussing EMF/EMI or what occurs when shielding malfunctions. High levels of non-ionizing radiation can damage bodily tissue, especially in the eyes and testes.[992] This violates NEPA's requirement that the Agency consider the degree to which the proposed action affects public health and safety.[993] Thus, the Agency should conduct studies on SCMAGLEV technology that include long-term exposure and malfunctions in shielding.

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[984] *Id.* at 4.21-3.
[985] *Id.*
[986] *Id.*
[987] *Id.*
[988] *Id.* at 5.
[989] *Id.* at App-D.11-3.
[990] *Id.* at 4.18-2.
[991] *Id*. at 4.18-9.
[992] Zawn Villines, *Are EMFs Dangerous?*, MEDICAL NEWS TODAY (Feb. 4, 2020), https://www.medicalnewstoday.com/articles/emf#_noHeaderPrefixedContent.
[993] 40 C.F.R. § 1508.27(2).

The Agency states that there would be a "need to maintain a minimum distance of 20 feet between the magnets along the guideway and people traversing below."[994] This is clearly a negative environmental effect on the area below elevated guideways and, therefore, needs to be discussed in the DEIS and as part of the RPA. The DEIS does not provide evidence that the 20 feet "avoidance zone" is sufficient. The DEIS also did not state or explain how people would be protected in the case of an emergency egress, just that "protocols will be established."[995] The DEIS again neglects to sufficiently analyze imperative aspects of the SCMAGLEV Project and passes it off to be decided at a later design phase.

The Agency also neglects to conduct thorough safety studies on the effects of SCMAGLEV technology on electronics, including cell phones and pacemakers. The DEIS recognizes that even low levels of EMF/EMI can affect pacemakers and cause asynchronous pacing in the presence of the SCMAGLEV train.[996] The DEIS did not study nor mention the effects on pacemakers from long exposure to EMF or if the shielding malfunctions. The EMF likely effects other electronics including cellphones and can limit their range.[997] Interrupting cellphones can be very dangerous, especially in the situation where 911 needs to be called.

C. The DEIS Does Not Adequately Analyze Air Emissions

1. Although the DEIS purports that the SCMAGLEV Project will reduce the number of cars on the road and therefore reduce emissions, mobile source emissions will actually increase as a result of the SCMAGLEV Project due to the increase in traffic around stations

The DEIS presents contradictory conclusions as it states that the SCMAGLEV Project is purported to be a cleaner, alternative means of transportation, yet the Agency's own analysis of air emissions from mobile vehicles shows air emissions increasing over time. This is predominantly due to a rise in traffic from mobile vehicles around the SCMAGLEV stations that people will drive to in order to access the SCMAGLEV train. See the following tables from the DEIS:

[994] BALTIMORE-WASHINGTON SUPERCONDUCTING MAGLEV PROJECT, *Final Scoping Report* (Nov. 2018), https://www.bwmaglev.info/images/document_library/reports/alternatives_report/SCMAGLEV_Alts_Report_BodyAppend-A-B-C_Nov2018.pdf.

[995] Baltimore-Washington Superconducting SCMAGLEV Project DEIS, App. G.3-9.

[996] *Id.* at App-D.11-3.

[997] *Id.* at 4.18-9.

Table III.C.1.1: Mesoscale Daily Emissions (tons per day)- Cherry Hill Station Option for 2027 and 2045[998]

Table D.9-10: Mesoscale Daily Emissions (tons per day) – Cherry Hill Station Option

Year 2027

Pollutant	BMC		MWCOG		BMC + MWGOC		Net Difference	% Change
	2027		2027		2027		No-Build to Build	No-Build to Build
	No-Build	Build	No-Build	Build	No-Build	Build		
VOC	0.37	0.38	0.37	0.37	0.74	0.75	0.0049	0.66%
NOx	3.76	3.84	2.95	2.93	6.71	6.77	0.0509	0.76%
CO	12.94	13.20	9.24	9.16	22.18	22.36	0.1808	0.82%
PM2.5	0.12	0.12	0.08	0.08	0.20	0.20	0.0018	0.89%
PM10	0.44	0.45	0.29	0.29	0.73	0.73	0.0074	1.02%
SO2	0.01	0.01	0.01	0.01	0.02	0.02	0.0002	0.90%
CO2	4012.64	4095.07	2663.38	2640.42	6676.01	6735.49	59.4853	0.89%

Year 2045

Pollutant	BMC		MWCOG		BMC + MWCOG		Net Difference	% Change
	2045		2045		2045		No-Build to Build	No-Build to Build
	No-Build	Build	No-Build	Build	No-Build	Build		
VOC	0.31	0.32	0.20	0.21	0.52	0.52	0.0087	1.69%
NOx	3.30	3.37	1.98	1.99	5.28	5.36	0.0802	1.52%
CO	11.09	11.32	6.88	6.92	17.97	18.24	0.2697	1.50%
PM2.5	0.09	0.09	0.05	0.05	0.14	0.14	0.0025	1.77%
PM10	0.44	0.45	0.26	0.27	0.70	0.72	0.0131	1.86%
SO2	0.01	0.01	0.01	0.01	0.02	0.02	0.0003	1.59%
CO2	4130.35	4220.23	2524.82	2538.04	6655.17	6758.28	103.1077	1.55%

Source: AECOM, July 2020

[998] *Id.* at D.9-50,51.

[160] *Id.* at D.9-51.

Table III.C.1.2: Mesoscale Daily Emissions (tons per day)- Camden Yards Station Option for 2027 and 2045[999]

Table D.9-11:4 Mesoscale Daily Emissions (tons per day) – Camden Yards Station Option

Year 2027

Pollutant	BMC		MWCOG		BMC + MWGOC		Net Difference	% Change
	2027		2027		2027		No-Build to Build	No-Build to Build
	No-Build	Build	No-Build	Build	No-Build	Build		
VOC	0.37	0.38	0.37	0.36	0.74	0.74	0.0015	0.20%
NOx	3.76	3.83	2.95	2.91	6.71	6.74	0.0258	0.38%
CO	12.94	13.16	9.24	9.12	22.18	22.28	0.0982	0.44%
PM2.5	0.12	0.12	0.08	0.08	0.20	0.20	0.0009	0.46%
PM10	0.44	0.45	0.29	0.28	0.73	0.73	0.0039	0.53%
SO2	0.01	0.01	0.01	0.01	0.02	0.02	0.0001	0.52%
CO2	4012.64	4082.84	2663.36	2627.47	6676.01	6710.31	34.3013	0.51%

Year 2045

Pollutant	BMC		MWCOG		BMC + MWCOG		Net Difference	% Change
	2045		2045		2045		No-Build to Build	No-Build to Build
	No-Build	Build	No-Build	Build	No-Build	Build		
VOC	0.31	0.32	0.20	0.20	0.52	0.52	0.0033	0.64%
NOx	3.30	3.33	1.98	1.98	5.28	5.32	0.0326	0.62%
CO	11.09	11.21	6.86	6.87	17.97	18.08	0.1069	0.59%
PM2.5	0.09	0.09	0.05	0.05	0.14	0.14	0.0010	0.68%
PM10	0.44	0.44	0.26	0.26	0.70	0.71	0.0050	0.71%
SO2	0.01	0.01	0.01	0.01	0.02	0.02	0.0001	0.64%
CO2	4130.35	4174.95	2524.82	2521.73	6655.17	6696.69	41.5163	0.62%

Source: AECOM, July 2020

2. The DEIS fails to take into account the reasonably foreseeable emissions and harm to human health which are likely a result of the SCMAGLEV Project construction being delayed for even an additional short amount of time

The DEIS fails to account for the reasonably foreseeable scenario where the predicted construction time of the SCMAGLEV Project is delayed or extended, and construction takes longer than five years. If construction of the SCMAGLEV Project at individual sites along the route was predicted to take five years or more, a hot spot analysis would be required to adequately assess air emissions at those construction site locations. Under 40 C.F.R. § 1508.1(g), an agency must take into account the effects or impacts of the project.[1000] It is reasonably foreseeable that air emissions will occur from construction over five years and therefore the Agency should have conducted a hot spot analysis for air emissions around these sites in order to assess the health impacts on communities surrounding these construction areas.

According to the DEIS, the Agency proposes that "no site-specific construction element or section will last more than five years with the exceptions of overall construction schedule for stations and trainset maintenance facilities ([hereinafter "TMF"]) lasting six years. However, according to the Construction Planning Memorandum (BWRR, May 14,

[999] *Id*. at D.9-51.
[1000] *See infra* Section I.B.

2020), given the number of stations to be constructed, at a specific station, the construction will not last more than five years."[1001] Although the Agency's Construction Schedule does not propose that construction in any one location will take more than five years, many of the facilities listed on the Construction Schedule propose that construction will take up to four years. Thus, any delay in construction at a particular site will cause construction to take more than five years.

A reasonable person familiar with construction projects, particularly a reasonable person in the business of construction, knows that projects rarely go according to plan. For example, the Purple Line Light Rail Project in Maryland was anticipated to be finished in 2022 after the partnership agreement was signed between the state and the project sponsor in 2016.[1002] However, because of delays, the project is now anticipated to be finished in 2024.[1003] One of the delays of the construction of the Purple Line Light Rail Project was due to Washington's Suburban Sanitary Commission's (hereinafter "WSSC") cease and desist letter requesting a halt in the project because the project was "perilously close to a major pipe that provides drinking water to Prince George's County and would explode if broken."[1004] This pipe is located along Veterans Parkway (Route 410) where the Glenridge facility is to be located, which is close to where the FA/EE adjacent to Beacon Heights and Woodlawn will be located.[1005] A delay in this SCMAGLEV Project, such as the cease and desist for construction of an SCMAGLEV facility, could be enough to cause construction to last more than five years, triggering a hot spot analysis.

Beacon Heights and Woodlawn residents want, and deserve, to live in a clean and safe environment. Not only will Beacon Heights and Woodlawn be facing the effects from the emissions of the construction of the FA/EE adjacent to their communities, but also, they have already been suffering from the construction impacts and emissions from the Purple Line Project's construction of the Glenridge Facility adjacent to their communities. The compounded impacts from these construction emissions will have a detrimental impact on the air quality and health of these communities.[167] As the pandemic has brought to light, poor air quality and underlying conditions of asthma, and other respiratory problems, can

[1001] Baltimore-Washington Superconducting MAGLEV Project DEIS, 4.16-5. As per 40 C.F.R. § 93.123(c)(5), "CO, PM10, and PM2.5 hot spot analyses are not required to consider construction-related activities which cause temporary increases in emissions. Each site which is affected by construction-related activities shall be considered separately, using established 'Guideline' methods. Temporary increases are defined as those which occur only during the construction phase and last five years or less at any individual site." *Id.* at D.9-29.
[1002] Katherine Shaver, Purple Line project delays, cost overruns reveal long-brewing problems, WASH.POST (July 18, 2020 at 8:00am), https://www.washingtonpost.com/local/trafficandcommuting/purple-line-project-delays-costoverruns-reveal-long-brewing-problems/2020/07/18/d3bda6ae-c620-11ea-b037-f9711f89ee46_story.html.
[1003] *Id.*
[1004] *Id*.
[1005] *Id*.

increase the mortality and morbidity rates of these communities who are disproportionately impacted by poor air quality.[1006]

3. The DEIS fails to adequately assess possible mitigation strategies to reduce air pollution, both for the construction phase and operational phase

The DEIS does not adequately assess all relevant and reasonable possible mitigation measures to reduce air emissions, either for the construction phase or the operational phase, of the SCMAGLEV Project.[1007] Under 40 C.F.R. § 1500.2(f), federal agencies shall to the fullest extent possible consider mitigation measures for a proposed project.[1008] For this SCMAGLEV Project, the DEIS includes a fifteen-page chapter on air emissions and a seventy-page technical report on air emissions. The Agency's analysis of mitigation measures for air pollution consists of a one-page bulleted list of only four proposed mitigation measures to reduce air emissions for the entire SCMAGLEV Project.

Compared to other DEISs and Final Environmental Impact Statements (hereinafter "FEISs"), this is a poor assessment of mitigation measures. For example, the Dallas to Houston High Speed Rail Project DEIS offered three pages of discussion of mitigation measures for air emissions and supplied six mitigation measures that could be adopted.[1009] The FEIS for the California High Speed Rail Project from Fresno to Burbank had a four-page analysis of mitigation measures and offered eight mitigation strategies the project could adopt to reduce

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[1006] *See* Yan Cui et al., Air Pollution and Case Fatality of SARS in the People's Republic of China: An Ecologic Study, NCBI: Environmental Health (Nov. 2003) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC293432/. (stating that globally, air pollution is estimated to be responsible for nearly 40% of lower respiratory tract infections and around 20% of coronary heart disease and diabetes diagnoses); Southwest Pennsylvania Environmental Health Project, Air Pollution and Respiratory Infections, Reviewing the Science, www.environmentalhealthproject.com, https://www.environmentalhealthproject.org/sites/default/files/assets/resources/air-pollution-and-respiratoryinfections-reviewing-the-science_0.pdf (last visited Nov. 29, 2020) (finding that with an increase in air pollution, more people go to the hospital within a week of the spike where they are subsequently treated for respiratory infections, like pneumonia or bronchitis); Anoop J. Chauhan & Sebastian L. Johnston, Air Pollution and Infection in Respiratory Illness, 68 BRITISH MEDICAL BULLETIN 1, 95 (Dec. 2003) https://academic.oup.com/bmb/article/68/1/95/421216 (stating that "acute lower respiratory infections were attributed to have caused up to 4 million deaths worldwide from 1997 to 1999."). See also Southwest Pennsylvania

[1007] Under 40 C.F.R. § 1508.20, "agencies are required to identify and include in the action all relevant and reasonable mitigation measures that could improve the action." 40 C.F.R. § 1508.20 (Mitigation measures include: avoiding the impact altogether by not taking a certain action or parts of an action; minimizing impacts by limiting the degree or magnitude of the action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; compensating for the impact by replacing or providing substitute resources or environments).

[1008] *See infra* Section I.B.

[1009] Dallas to Houston High Speed Rail Project DEIS, 3.2-34,36, https://railroads.dot.gov/environmental-reviews/dallas-houston-high-speed-rail/dallas-houston-high-speed-rail-draft. [MCRT Editor note: URL updated].

air emissions.[1010] In the DEIS for the Washington Union Station Expansion Project, FRA considered seven different mitigation measures for air emissions during the operation and construction phase of the project and an additional ten mitigation measures to combat greenhouse gas emissions.[1011] Additionally, for the Washington, D.C. to Baltimore Loop Project, which proposes building an underground hyperloop from D.C. to Baltimore, the Environmental Assessment (hereinafter "EA") for the project proposed six mitigation measures to reduce air emissions.[1012] Notably, an EA is not required to be as detailed as a DEIS[1013], but even the EA for the Washington, D.C. to Baltimore Loop Project proposed more mitigation measures for air emissions than the SCMAGLEV Project DEIS. These examples illuminate the insufficiencies in the mitigation discussion present in the SCMAGLEV Project DEIS.

D. The DEIS Does Not Adequately Address the Water Quality Impacts from the Project

1. The DEIS fails to adequately examine how increased stormwater runoff, due to an increase in the surface area of impermeable surfaces from the SCMAGLEV Project, will affect receiving waterways

The DEIS fails to adequately calculate the increase in impervious surfaces likely to result from the SCMAGLEV Project, and therefore, does not adequately analyze the increase in stormwater runoff as a result of the increase of impervious surfaces.[1014] Of particular import to this comment, the surface area of impervious surfaces will increase in the Beacon Heights and Woodlawn Communities. Adjacent to the Beacon Heights and Woodlawn neighborhoods, an FA/EE site will be constructed that includes Permanent Access Driveways, which are additional impervious surfaces adjacent to Beacon Heights and Woodlawn.[1015]

The DEIS expects an increase in the surface area of impervious surfaces both during the construction phase and the operation phase. During the construction of the SCMAGLEV Project, trucks and work vehicles will need to access the SCMAGLEV Project route on a daily basis for a two-to-seven-year construction period.[1016] In order for these trucks and work

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[1010] California High Speed Rail Project- Fresno to Burbank FEIS, 3.3-86-90, https://railroads.dot.gov/environmental-reviews/california-hsr-fresno-bakersfield/final-environmental-impact-statement-fresno. [MCRT Editor note: URL updated].

[1011] Washington Union Station Expansion DEIS, Ch.7-7,8, https://railroads.dot.gov/sites/fra.dot.gov/files/202006/07_Chapter%207_Mitigation%20Measures_WUSDEIS_pdfa.pdf.

[1012] Washington, D.C. to Baltimore Loop Project EA, 3.9.4-222. https://www.dcbaltimoreloop.com/DraftLoopEA.pdf.

[1013] See EPA, National Environmental Policy Act Review Process, https://www.epa.gov/nepa/nationalenvironmental-policy-act-review-process (last visited April 23, 2021) ("The regulatory requirements for an EIS are more detailed and rigorous than the requirements for an EA.").

[1014] *See infra* Section I.B.

[1015] *See supra* Appendix C.

[1016] Baltimore-Washington Superconducting MAGLEV Project DEIS, D.2 A.15-84-91.

vehicles to access points along the SCMAGLEV Project route, additional roads, and the expansion of existing roads, will be required.[1017] Specifically, for the FA/EE that will be built adjacent to Beacon Heights and Woodlawn, there will be approximately 560 to 690 trucks, at the height of construction, arriving and departing daily with access 24 hours a day.[1018] Additionally, there will be 425 automobiles carrying workers arriving and departing at the site 24 hours a day.[1019]

Table D.1.1: New Impervious Surface per Build Alternatives[1020]

Table D.7-10: New Impervious Surface per Build Alternatives

Acres of New Impervious Surface by Alignment, Station, and TMF								
Build Alternative	Alignment	Stations			TMF			Build Alternatives Total Permanent Acres of Impact
		BWI Marshall Airport	Cherry Hill	Camden Yards	BARC Airstrip	BARC West	MD 198	
J-01	554	2	74	-	-	-	177	808
J-02	557	2	74	-	193	-	-	826
J-03	558	2	74	-	-	187	-	822
J-04	552	2	-	14	-	-	177	745
J-05	555	2	-	14	193	-	-	764
J-06	556	2	-	14	-	187	-	760
J1-01	505	2	74	-	-	-	198	780
J1-02	511	2	74	-	188	-	-	776
J1-03	507	2	74	-	-	190	-	774
J1-04	503	2	-	14	-	-	198	718
J1-05	510	2	-	14	188	-	-	714
J1-06	506	2	-	14	-	190	-	712

The Agency fails to accurately calculate the addition of impervious surfaces as a result of the SCMAGLEV Project. The Agency plans to re-calculate the additional acres of impervious surfaces during the final design stage, but at that subsequent stage in the SCMAGLEV Project, the public will be excluded from commenting on such an analysis. The Agency also fails to explain why areas of proposed permanent stormwater management facilities associated with each Build Alternative would not contribute to impervious surfaces but rather the Agency just makes a blanket statement without justification. The Agency should calculate the additional acres of impervious surfaces before the final design stage and assess the impacts those acres will have on the environment and communities surrounding the SCMAGLEV Project. The Agency also fails to evaluate whether the increase in impervious surfaces along the SCMAGLEV Project route will directly hinder the efforts and goals of the Chesapeake TMDL.[1021] The Agency states in the DEIS that in order to mitigate an increase in surface area

[1017] *Id.*

[1018] *Id.* at D.2.A-65.

[1019] *Id*.

[1020] *Id.* at D.7-55.

[1021] The Clean Water Act (CWA) prohibits discharges of pollutants to waters of the United States without a permit. 33 U.S.C. §§1311, 1342. Under NEPA, the lead agency must coordinate with "permitting and resource

of impervious surfaces, the SCMAGLEV Project will increase the percentage of the route that will be located underground in deep tunnels.[1022] This is an inadequate mitigation measure as deep tunnelling could adversely impact communities including from, but not limited to, local water contamination from tunneling through acidic soils. The purpose of mitigation is to avoid or minimize the project's impacts on the surrounding environment,[1023] therefore, offering mitigation measures that potentially increase adverse impacts of the SCMAGLEV Project on the surrounding environment and communities, is an inadequate analysis of potential mitigation measures.

2. The DEIS fails to adequately assess the impacts the SCMAGLEV Project will have on groundwater quality

The DEIS fails to adequately analyze the effects of tunneling on aquifers.[1024] Beacon Heights and Woodlawn are located in an area designated for deep tunneling and Beacon Heights and Woodlawn sit above the Patapsco Aquifer.[1025] The Agency was notified of which issues to assess in the DEIS by the EPA in 2017 during the Agency's scoping process.[1026] Even

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agencies that may have jurisdiction, authority, expertise, and/or relevant information with respect to the Project as well as with the public." 23 U.S.C. § 139. This SCMAGLEV Project is located within the Chesapeake Bay Watershed and, therefore, the Agency must comply with the Chesapeake Bay Total Maximum Daily Load (TMDL) as well as Maryland's General Permit No. 12-SWA. In order to adequately comply with these requirements, the Agency must consult with Maryland Department of Environment (hereinafter "MDE") and the District of Columbia Energy and Environment (hereinafter "DOEE"). Although the Agency states in the DEIS they will meet all required permitting standards, they fail to adequately address how receiving waterways in the Chesapeake Bay Watershed will meet established effluent limitations given the increase in pollutant loads from construction and operation of the SCMAGLEV Project. *See id.* § 1362(11) (defining an effluent limitation as "any restriction established by a State or the Administrator on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters, the waters of the contiguous zone, or the ocean, including schedules of compliance"), physical, biological, and other constituents which are discharged from point sources into navigable waters, the waters of the contiguous zone, or the ocean, including schedules of compliance").

[1022] Baltimore-Washington Superconducting MAGLEV Project DEIS, at 4.10-29.

[1023] See infra Section I.B.

[1024] See Baltimore-Washington Superconducting MAGLEV Project DEIS, 4.10.3.3-8 (describing aquifers as geologic formations, "which are distinct rock units consisting of either single or interrelated rock layers.").

[1025] Baltimore-Washington Superconducting MAGLEV Project DEIS, at D.7-43.

[1026] BALTIMORE-WASHINGTON SUPERCONDUCTING MAGLEV PROJECT DEIS, Final Scoping Report- EPA Re: Scoping comments for Proposed Environmental Impact Statement for the Baltimore-Washington Superconducting Magnetic Levitation Project (May, 2017), https://www.bwmaglev.info/images/document_library/reports/Maglev_Scoping-Report_051717RE.pdf. EPA Comment states:

> EPA recommends the Draft EIS address proposed action-related activities in or near wellhead (drinking water) protection areas, upstream of drinking-water supply intakes, springs—including karst areas, and karst terrain. For areas characterized by springs and karst, address the potential for contaminants to be introduced into existing or future sources of public water supplies, including aquifers, down-gradient springs, wells, and surface waterbodies. It would be beneficial to identify and map the location of known public drinking water supplies and their sources, surface and ground waters, aquifers, recharge zones, natural springs, etc. within the project area. It is recommended to identify construction and/or operational activities that could potentially impact known source water areas, as well as identify potential contaminants that may impact activities to protect known source water

with the requirements given to the Agency, the Agency fails to adequately assess the impacts to groundwater. The DEIS states that the Patapsco aquifer ranges between 250 to 350 feet in depth and "[t]he depth of SCMAGLEV tunnel is proposed to reach an optimum depth of approximately 320 feet, therefore it is possible that the aquifers would experience direct impacts such as disruption within the aquifer and therefore changes in recharge and/or groundwater levels, and indirect impacts such as a change in the water supply or increased risk of contamination."[1027] The DEIS specifically mentions "[a] few of these locations include the vicinity of the Washington, D.C. and Prince George's County line; the area just south of the Veterans Parkway FA/EE; and just south of MD 198."[1028]

i. Water Quality of Aquifers

The DEIS provides an insufficient analysis of the potential effects to the water quality of aquifers located along the SCMAGLEV Project. The DEIS only describes effects to groundwater and aquifers generally while failing to discuss the aquifers that will specifically be affected by the SCMAGLEV Project except for three pages in Appendix D.7. In the Washington Union Station Expansion Project DEIS, the FRA not only discussed the potentially impacted aquifers, but they also discussed the current groundwater levels in the aquifer and the concentrations of pollutants within the aquifer.[1029] The FRA in the Washington Union Station Expansion DEIS adequately considered the site-specific aspects of the potentially affected aquifers, whereas in the SCMAGLEV Project DEIS, the Agency inadequately discussed the potentially affected aquifers and provided no site-specific data.

Additionally, the Agency in the DEIS breezes over the issue of radon gas being released into groundwater through sediment that is disturbed during the tunnel boring phase of the SCMAGLEV Project. The DEIS states that "[a]dditional evaluation of radon content of sediments and groundwater will [] be conducted at later design phase."[1030] Given the potential hazardous effects of radon,[1031] looking at the radon content of sediments and groundwater at a later date is not sufficient or adequate and poses a risk to human health.

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areas is important. The principal aquifers in the region should be identified and described. All wells, both public and private, that could potentially be affected by the project must be identified. Areas of groundwater recharge in the vicinity should also be identified and any potential impacts from the proposed action examined. *Id*.

[1027] Baltimore-Washington Superconducting MAGLEV Project DEIS, D.7-59.

[1028] *Id.*

[1029] Washington Union Station Expansion DEIS, Ch.7-2, https://railroads.dot.gov/sites/fra.dot.gov/files/202006/07_Chapter%207_Mitigation%20Measures_WUSDEIS_pdfa.pdf.

[1030] *Id.*

[1031] *See* EPA, *Radon in Drinking Water*, https://archive.epa.gov/water/archive/web/html/index-9.html#:~:text=Radon%20is%20a%20naturally-occurring,their%20lifetime%2C%20especially%20lung%20cancer (last visited Apr. 19, 2021) ("Radon is a naturally-occurring radioactive gas that may cause cancer, and may be found in drinking water and indoor air. Some people who are exposed to radon in drinking water may have increased risk of getting cancer over the course of their lifetime, especially lung cancer").

Both Build Alternatives have the potential to contaminate the water quality of groundwater in the Beacon Heights and Woodlawn areas. The DEIS inadequately examine the potential site-specific contamination to surface and/or groundwater that could affect the Patapsco aquifer, which Beacon Heights and Woodlawn rely on for drinking water. In *Friends of Santa Clara River v. U.S. Army Corps of Engineers*, the court ruled that the agency did not act arbitrarily or capriciously in its analysis of the water quality impacts from dissolved copper as a result of the project construction because the agency considered methods for determining *site-specific* dissolved copper quantities and *project-specific* modeling in determining whether the Section 404 Permit would have no effect on the downstream ecosystem.[1032] Unlike in *Friends of Santa Clara River*, in this case, the Agency *does not consider site-specific criteria* for calculating the potential water quality impacts of groundwater. The DEIS simply states that the Agency will calculate the water quality effects at a later date. The agency in *Friends of Santa Clara River* prevailed in their case because they took into account relevant scientific data and project-specific modeling,[1033] but in this case, the Agency fails to take into account or propose any type of specific analysis for determining groundwater quality at SCMAGLEV Project specific sites. The DEIS does not adequately assess the potential risk to human health of such water contamination. It is vital that the DEIS considers the potential groundwater contamination, specifically in the aquifers relied upon by Maryland residents for drinking water, and the potential health risks associated with such contamination.

Although the DEIS points out locations as potential sites for groundwater contamination, the DEIS fails to assess what type of impacts there will be to groundwater quality. The DEIS states that the Agency plans to conduct such assessments at a "later design phase."[1034] Pushing this analysis of groundwater quality to a later design phase eliminates the public's ability to provide comments on the analysis, which violates the purpose and spirit of NEPA.

ii. Dewatering

The DEIS fails to address any requirements for treatment of the water that is collected from the aquifers during the dewatering process at the construction stage. During the construction phase of the SCMAGLEV Project, the Agency will have to dewater[1035] areas

[1032] See EPA, Radon in Drinking Water, https://archive.epa.gov/water/archive/web/html/index9.html#:~:text=Radon%20is%20a%20naturally-occurring,their%20lifetime%2C%20especially%20lung%20cancer (last visited Apr. 19, 2021) ("Radon is a naturally-occurring radioactive gas that may cause cancer, and may be found in drinking water and indoor air. Some people who are exposed to radon in drinking water may have increased risk of getting cancer over the course of their lifetime, especially lung cancer").
[1033] *Id.*
[1034] Baltimore-Washington Superconducting MAGLEV Project DEIS, D.7-19.
[1035] Amanda Wilson, *Dewatering and Discharge Challenges in Construction Projects and Solutions*, WASTE ADVANTAGE MAGAZINE (Dec. 29, 2020), https://wasteadvantagemag.com/dewatering-and-discharge-challenges-

during the construction of subsurface features, "to remove any accumulated water within areas of excavation."[1036] Again, the construction phase most impacts local communities like Beacon Heights and Woodlawn.

Moreover, the DEIS fails to adequately assess mitigation measures for dewatering, particularly in comparison to other DEISs. In order to mitigate the risks of the dewatering, the DEIS proposes that "[t]he Agency should determine the most appropriate means of dewatering, either excluding the groundwater from reaching the work area or pumping it out. The length of time that dewatering would require may dictate proposed measures to mitigate for potential impacts."[1037] Dewatering requires assessing the water to determine which contaminants it can contain and which sediments will need to be separated, applying for the required permits, and treating the water by filtering, removing silt, impurities, and sediments, and discharging it at the proper location.[1038] If dewatering is not done properly, it has the potential to cause erosion, surface flooding, adverse effects on building structures due to variations caused by soil conditions, damage to adjacent properties due to flooding, dampness and associated unhealthy conditions.[1039] Some potential mitigation measures to prevent adverse effects of dewatering, include, but are not limited to:

> "water should not be pumped directly into slopes; dewatering activities should be directed to a wooded buffer, if available; it is important to pay special attention and discontinue dewatering if the area shows signs of instability or erosion; channels used for dewatering must be stable and better if they have been protected with grass or vegetation; you should avoid dewatering under heavy rains because the infiltration rate is at a minimum and water will move slower or just the dewatering process will not function; never discharge water that has been contaminated with oil, grease, or chemical products directly."[1040]

Not only should the DEIS have considered these mitigation measures, but other DEISs prepared by the Agency have considered dewatering mitigation measures. The DEIS for the Washington Union Station Expansion Project provided a number of mitigation efforts for the dewatering process during construction. The mitigation measures include:

> "Construction contractor to be required to provide on-site treatment of pumped groundwater and discharge through the District's MS4 instead of through the

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inconstruction-projects-and-solutions/ (dewatering removes surface water or groundwater from a site before construction commences).

[1036] Baltimore-Washington Superconducting MAGLEV Project DEIS, D.7-100.

[1037] *Id.*

[1038] Amanda Wilson, *Dewatering and Discharge Challenges in Construction Projects and Solutions*, WASTE ADVANTAGE MAGAZINE (Dec. 29, 2020), https://wasteadvantagemag.com/dewatering-and-discharge-challenges-inconstruction-projects-and-solutions/.

[1039] *Id.*

[1040] Juan Rodriguez, *Dewatering Techniques and Solutions for Construction Projects*, THE BALANCE: SMALL BUSINESS, https://www.thebalancesmb.com/what-is-dewatering-844520 (last updated Dec. 6, 2019).

combined sewer system to Blue Plains. Prior to the beginning of construction, Project Proponents to conduct additional groundwater studies, including: Performing additional borings to depths of 120 to 150 feet inside and along the perimeter of the Project Area to better characterize the lower aquifer's composition and extents and any discontinuities of the Potomac Clay layer separating the aquifers; Performing research of adjacent properties to understand the local impacts of ongoing or periodic dewatering systems acting around the Project Area; Performing additional pump testing that target zones of clay discontinuity in the lower aquifer; and, If warranted by the above, performing further modeling to map the areas that have high potential to experience ground subsidence from drawdown; If warranted by the studies listed above, construction contractor to monitor and control the amount of active dewatering on the site so dewatering does not create subsidence in and around adjacent properties."[1041]

It is wholly inadequate that the Agency fails to take into account these mitigation measures in the SCMAGLEV Project's DEIS, when they have considered these mitigation measures in past projects.

IV. Passing Responsibility for Environmental Analysis to the Permitting Stage

The DEIS fails to adequately take into account the permitting requirements for dewatering and the potential contamination of drinking water as the SCMAGLEV Project will be built directly through aquifers that communities depend on. As per CEQ guidance,[1042] the Agency should integrate the requirements for necessary permits that will be required for construction and operation of the SCMAGLEV Project throughout the NEPA process. Simply stating in the DEIS which permits are required for the SCMAGLEV Project in the future, is not adequately integrating the NEPA process with the permitting process.

In Appendix D.1, Permits and Authorizations, the Agency notes that the SCMAGLEV Project will need to receive a Water Appropriations Permit pursuant to COMAR 26.17.06 and COMAR 26.17.07 but fails to analyze whether the SCMAGLEV Project would likely be granted this permit. In order for the SCMAGLEV Project to secure a Maryland Water Appropriations Permit, the Agency must apply for the permit with the Maryland Department of the Environment (hereinafter "MDE").[1043] In addition to applying for the Water Appropriations Permit, the Agency may have to acquire well construction, waterway construction, or wetland permits and get county planning and zoning approval as well as county water and

[1041] Washington Union Station Expansion DEIS, Ch.7-2, https://railroads.dot.gov/sites/fra.dot.gov/files/2020-06/07_Chapter%207_Mitigation%20Measures_WUSDEIS_pdfa.pdf.
[1042] *See infra* Section I.B.
[1043] COMAR 26.17.06.05.

sewer plan approval.[1044] Although the DEIS states that the Agency must acquire a Water Appropriations Permit, the DEIS does not include any of the other additional approvals that the Agency must secure before getting the Water Appropriations Permit.

Additionally, although the Water Appropriations Permit requires a public commenting period coordinated by MDE, the public commenting period for the permit is not conducive to community engagement.[1045] In order to find the most recent Maryland Water Appropriation Permits for March 2021, one must access MDE's website and scroll through the "What's New" page in order to find a link to a pdf with the current month's Water Appropriations Permits. Then, in order to receive notice of the public hearings for said permits, one must call the Water Supply Program and asked to be placed on the interested persons list. There was no information available as to whether a written comment could be submitted or if a member of the public only has the opportunity to submit oral comments at the public hearing. Additionally, there is no information as to whether there is a list where a member of the public can subscribe to updates on new notices of Water Appropriation Permits. Therefore, a member of the public would need to check the Water Appropriation Permits notices every month in order to find the permit they were looking for. This is another added burden to members of the public who are trying to exercise their right to public participation. Therefore, the Agency should not pass the responsibilities off to other agencies during the permitting process to assess the impacts of the SCMAGLEV Project or required mitigation measures.

IV. Inadequate Consideration of Historic Sites Under § 4(f) and the National Historic Preservation Act

The DEIS does not adequately comply with Section 4(f) and Section 106 of the National Historic Preservation Act (hereinafter "NHPA"). The federal government implemented Section 4(f) of the U.S. DOT Act of 1966 and the NHPA in order to preserve publicly owned parks, recreational areas, wildlife and waterfowl refuges, and public and private historical sites.[1046] Section 4(f) of the U.S. DOT Act states that the agencies may only use parks, recreation areas, or wildlife refuges if no feasible and prudent avoidance alternative exists. Unlike NEPA, Section 4(f) imposes substantive restraints on an agency's

[1044] *3.15 Water Appropriation and Use Permit*, MARYLAND DEPARTMENT OF ENVIRONMENT, https://mde.maryland.gov/programs/Permits/Documents/2008permitguide/WMA/3.15.pdf (last visited April 19, 2021).

[1045] COMAR 26.01.07.03 & .04 ("The Department shall provide notice and opportunity to submit comments and to request a public informational hearing"); COMAR 26.01.07.06 ("The Department shall conduct public informational hearings").

[1046] Environmental Review Toolkit, U.S. DEP'T OF TRANSP.:FEDERAL HIGHWAY ADMINISTRATION, https://www.environment.fhwa.dot.gov/legislation/section4f.aspx (last visited April 19, 2021).

action."[1047] Section 106 of the NHPA requires agencies to account for and consider a project's impacts to historic sites or cultural properties.[1048]

A. Inadequate Analysis of the Effect to the Cherry Hill Cemetery under Section 106

The significance of a proposed action affecting the quality of the environment concerns both the action's context and integrity. [1049] Integrity includes "the degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources."[1050] Section 106 of the NHPA requires a lead Agency to "take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register." [1051]

The Cherry Hill Cemetery is of the utmost cultural and historical value to the Beacon Heights Community.[1052] The Cherry Hill Cemetery is designated on the Maryland Inventory of Historic Properties.[1053] It was established by Josiah Adams, a free African American farmer in 1884. The cemetery served the free and formerly enslaved African American communities in the area. It is the only remaining cemetery to what was a thriving African American community following the Civil War. The only other similar cemetery of such cultural and historical significance was destroyed by development. According to the DEIS, the SCMAGLEV

[1047] Defenders of Wildlife v. N. Carolina Dept. of Transportation, 762 F.3d 374, 398–99 (4th Cir. 2014).
[1048] 54 U.S.C. § 306108.
[1049] 42 U.S.C. § 4332.
[1050] 40 C.F.R. § 1508.27(b)(8).
[1051] 16 U.S.C. § 470f (§ 106).
[1052] As told by a member of the Beacon Heights Community Group:
"The history of a community contributes to its personality. Preserving the Cemetery in Beacon Heights, gives the community its unique character. Historic preservation provides a link to the roots of the community and its people. The history is important because it connects us to specific times, places, and events that were significant milestones in our collective past. The ability to revisit this cemetery from time to time, provides us with a sense of place, and maintains continuity between our past and our present by preserving a trail of how we arrived at where, and who we are today.
Culturally a community is richer for having the tangible presence of past eras and historic styles. Economically a community benefits from increased property values and tax revenues when historic sites are protected and made the focal point of revitalization and when the community is attractive to visitors seeking heritage. Socially the community benefits when citizens take pride in its history and mutual concerns of the historic cemetery. Educationally a community benefits through teaching local heritage and the understanding of the past, to the community and students. Historic preservation has been shown to be a key ingredient in stabilizing older communities and bringing citizens together. There are many instances in which the value of historic preservation should be seriously considered, because every project brings with it a unique set of conditions and circumstances that must be weighted and evaluated on their own merits and challenges. The community feels that the MAGLEV train should not be allowed to interfere with the historic site in Beacon Heights. Whether large or small, well maintained or neglected, historic cemeteries are an important part of our cultural landscape."
[1053] *Cherry Hill Cemetery*, MARYLAND INVENTORY OF HISTORIC PROPERTIES, https://mht.maryland.gov/mihp/MIHP.aspx?Search=Property&Property=Cherry%20Hill%20Cemetery/ (last visited April 19, 2021).

Project is projected to run directly underneath the cemetery and construction or vibrations from the SCMAGLEV Project have the potential to destroy this only lasting piece of history.

Given that the Cherry Hill Cemetery is designated on the Maryland Inventory of Historic Properties it means that it could be eligible for the National Register of Historical Properties. The Agency should work with the Maryland Historical Trust in determining whether the property is eligible for the National Register. Beacon Heights and Woodlawn request that the Cherry Hill Cemetery be considered for eligibility by the Maryland Historical Trust and ask the Agency to consider the Cherry Hill Cemetery in the SCMAGLEV Project's Section 106 process.

B. The DEIS did not Adequately Comply with § 4(f)

The SCAMAGLEV [sic] Project does not fulfill Section 4(f) requirements because there is a feasible and prudent alternative for avoiding the publicly owned parks and parkland and the current plan does not include all possible planning to minimize harm to these properties. When identifying land that would fall under Section 4(f) protection, the DEIS only considered public recreational facilities and parklands within 800 feet of the centerline of the alignments and ancillary facilities.[1054] The Agency chose this based, not on construction impacts, but on noise-screening distance.[1055]

Setting the area to identify public recreational facilities and parklands that may be impacted by the SCMAGLEV Project at 800 feet improperly limits the area of disturbance. Even within this narrow area, the SCMAGLEV Project does not adequately comply with Section 4(f) because "nearly 2,000 acres of Federal, state, and local recreational facilities and parklands occur in the SCMAGLEV Project Affected Environment" and there is a feasible and prudent alternative, the no build option.218 The parklands affected serves important functions both for the communities in which they are located and for the animals for which they provide necessary habitat.

The DEIS recognizes that some of the impacts are in parks that are already "generally small" and used to "meet local community recreational needs."[1056] This means that any impacts to these already small parks may severely impact the utility of parks as places for people to reconnect with nature. The Agency considers several impacts to public recreational facilities and parklands to be difficult to mitigate due to the extensiveness of impact and/or uniqueness of the park features.[1057] Despite mentioning the difficulty in mitigating damage to parkland, the Agency does not discuss how they intend to face the challenge of mitigating the damage. They mention developing plans later on to mitigate damages,[1058] but this is not

[1054] Baltimore-Washington Superconducting MAGLEV Project DEIS, 4.7-4,5.
[1055] *Id.*
[1056] *Id.*
[1057] *Id.* at 4.7-7.
[1058] *Id.* at 4.7-22.

enough. Because the Agency makes no attempt to mitigate damages to public recreational facilities and parklands and the No Build alternative represents a reasonable and prudent means of avoiding impacts to public recreational facilities and parklands, the Agency should choose the No Build Alternative.

V. Conclusion

The Beacon Heights and Woodlawn Communities oppose the construction and operation of the SCMAGLEV Project and ask that the No Build Alternative be selected. Beacon Heights and Woodlawn recommend that the Agency reexamine the SCMAGLEV Project's disproportionate impacts on the environment and surrounding communities in four ways. First, the Agency should reexamine and take an actual "hard look" at the SCMAGLEV Project's impacts on environmental justice communities. The Agency should reevaluate how the SCMAGLEV Project's adverse impacts, siting of SCMAGLEV Project facilities, and sources of pollution, are almost solely concentrated in environmental justice communities. The benefits of the project, including station access and price of ridership, cater to higher income communities.

Second, the Agency should reevaluate the impacts of the SCMAGLEV Project on the surrounding communities and environment using updated statistics and studies. The Agency should revisit the SCMAGLEV Project's Purpose and Need Statement after conducting a new traffic survey that reflects the changes in transportation since the COVID-19 pandemic and assess whether there is a need for the SCMAGLEV Project, especially in light of the nearly completed upgrades to MARC and Acela. The Agency should reassess the SCMAGLEV Project's effects of air emissions, stormwater runoff, noise and vibration, and EMF, from both construction and operation of the train, will have on the surrounding communities using updated site-specific studies. Third, the Agency, after reevaluating the SCMAGLEV Project's community and environmental impacts, should go back and reassess and update the proposed mitigation measures that the Agency proposed in the DEIS.

Finally, the Agency should better integrate the public in the environmental review process by going back and evaluating the impacts that they pushed to a "later design phase" or to the potential permitting process. There is an extreme disconnect between the NEPA process and the permitting processes to the detriment of the public. In order for a project to succeed, it not only needs to pass a sufficient NEPA process, but it also must secure the appropriate permits before construction and operation. Therefore, the NEPA process should better reflect the project's need for required permits. If the NEPA process is for the purposes of assessing impacts of a project on the environment and community as well as engaging public participation, then the NEPA process should include permit requirements and analysis as well in order to provide a comprehensive understanding of a project's impacts. When agencies fail to adequately examine environmental and community impacts at the DEIS phase, it excludes the public from participating since there is no commenting process at the FEIS stage and the commenting process at the permitting stage is difficult to navigate at best.

On behalf of the communities of Beacon Heights and Woodlawn, we ask that the No Build Alternative be selected.

I. Appendix A – EJ Screen Reports

EPA

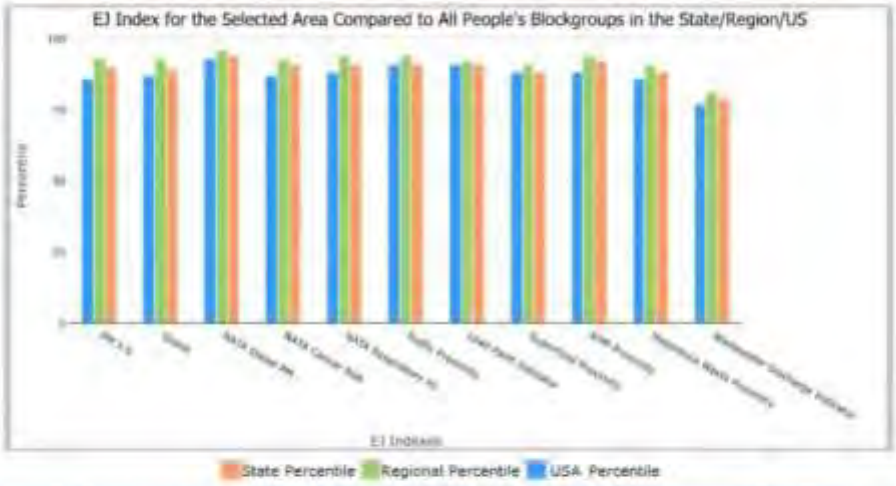
EJSCREEN Report (Version 2020)

1 mile Ring Centered at 38.951116,-76.890264, MARYLAND, EPA Region 3

Approximate Population: 22,605

Input Area (sq. miles): 3.14

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	90	93	86
EJ Index for Ozone	89	93	87
EJ Index for NATA* Diesel PM	94	96	93
EJ Index for NATA* Air Toxics Cancer Risk	91	93	87
EJ Index for NATA* Respiratory Hazard Index	91	94	88
EJ Index for Traffic Proximity and Volume	91	94	91
EJ Index for Lead Paint Indicator	91	92	91
EJ Index for Superfund Proximity	88	91	88
EJ Index for RMP Proximity	92	94	88
EJ Index for Hazardous Waste Proximity	88	91	88
EJ Index for Wastewater Discharge Indicator	79	81	77



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, and it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

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II. Appendix A – EJ Screen Reports
Woodlawn, MD, USA (Prince George's County)[1059]

EPA United States Environmental Protection Agency

EJSCREEN Report (Version 2020)

1 mile Ring Centered at 38.951116,-76.890264, MARYLAND, EPA Region 3

Approximate Population: 22,605

Input Area (sq. miles): 3.14

Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

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[1059] EPA, *EJ Screen*, https://ejscreen.epa.gov/mapper/ (last visited Feb. 5, 2021) (Search "Woodlawn, MD, USA (Prince George's County)" in the map search tool and then click "Get Printable Standard Report...").

EJSCREEN Report (Version 2020)

1 mile Ring Centered at 38.951116,-76.890264, MARYLAND, EPA Region 3

Approximate Population: 22,605

Input Area (sq. miles): 3.14

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m³)	8.89	8.43	95	8.63	65	8.55	61
Ozone (ppb)	43.9	44.6	16	43.2	58	42.9	60
NATA* Diesel PM (µg/m³)	1.02	0.633	94	0.477	95-100th	0.478	90-95th
NATA* Cancer Risk (lifetime risk per million)	37	32	92	31	80-90th	32	70-80th
NATA* Respiratory Hazard Index	0.54	0.44	94	0.4	95-100th	0.44	70-80th
Traffic Proximity and Volume (daily traffic count/distance to road)	1200	730	80	650	86	750	84
Lead Paint Indicator (% Pre-1960 Housing)	0.43	0.29	74	0.36	65	0.28	72
Superfund Proximity (site count/km distance)	0.12	0.13	67	0.15	64	0.13	71
RMP Proximity (facility count/km distance)	1.1	0.66	81	0.62	82	0.74	78
Hazardous Waste Proximity (facility count/km distance)	2.4	2.1	68	2	75	5	69
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	2.5E-06	4.4	52	34	31	9.4	42
Demographic Indicators							
Demographic Index	64%	35%	89	30%	91	36%	85
People of Color Population	94%	49%	87	33%	94	39%	92
Low Income Population	34%	22%	77	27%	68	33%	58
Linguistically Isolated Population	9%	3%	89	3%	91	4%	83
Population With Less Than High School Education	26%	10%	93	10%	93	13%	87
Population Under 5 years of age	9%	6%	78	6%	81	6%	78
Population over 64 years of age	9%	15%	27	16%	21	15%	25

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or facilities. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJSCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

February 05, 2021

Beacon Heights Elementary School[1060]

EPA

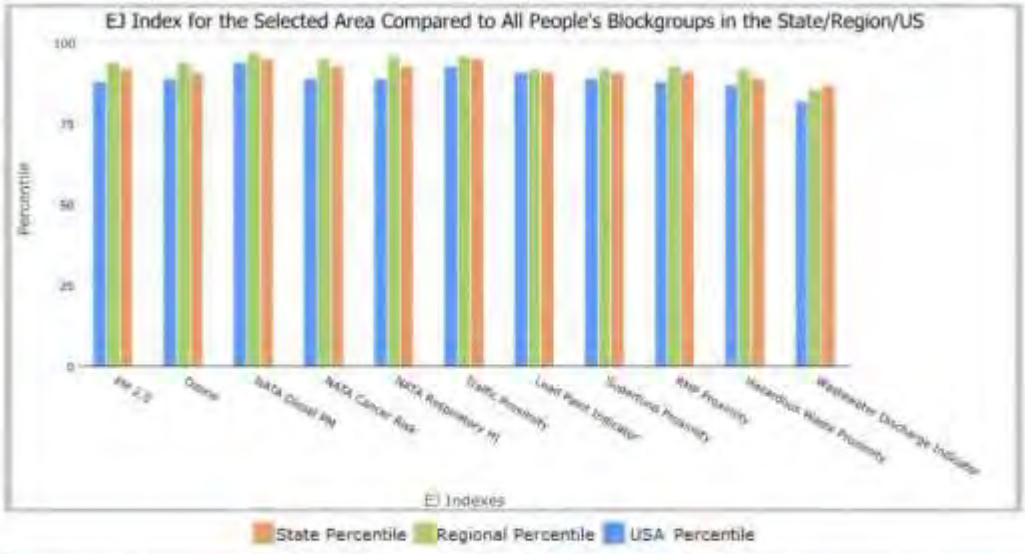
EJSCREEN Report (Version 2020)

1 mile Ring Centered at 38.957640,-76.898160, MARYLAND, EPA Region 3

Approximate Population: 23,409

Input Area (sq. miles): 3.14

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	92	94	88
EJ Index for Ozone	91	94	89
EJ Index for NATA* Diesel PM	95	97	94
EJ Index for NATA* Air Toxics Cancer Risk	93	95	89
EJ Index for NATA* Respiratory Hazard Index	93	96	89
EJ Index for Traffic Proximity and Volume	95	96	93
EJ Index for Lead Paint Indicator	91	92	91
EJ Index for Superfund Proximity	91	92	89
EJ Index for RMP Proximity	91	93	88
EJ Index for Hazardous Waste Proximity	89	92	87
EJ Index for Wastewater Discharge Indicator	87	86	82



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

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[1060] EPA, *EJ Screen*, https://ejscreen.epa.gov/mapper/ (last visited Feb. 5, 2021) (Search "Beacon Heights Elementary School" in the map search tool and then click "Get Printable Standard Report...").

EJSCREEN Report (Version 2020)

1 mile Ring Centered at 38.957640,-76.898160, MARYLAND, EPA Region 3

Approximate Population: 23,409

Input Area (sq. miles): 3.14

Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EJSCREEN Report (Version 2020)

1 mile Ring Centered at 38.957640,-76.898160, MARYLAND, EPA Region 3

Approximate Population: 23,409

Input Area (sq. miles): 3.14

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m³)	8.89	8.43	95	8.63	65	8.55	61
Ozone (ppb)	43.9	44.6	16	43.2	57	42.9	60
NATA* Diesel PM (µg/m³)	1	0.633	93	0.477	95-100th	0.478	90-95th
NATA* Cancer Risk (lifetime risk per million)	37	32	90	31	80-90th	32	70-80th
NATA* Respiratory Hazard Index	0.53	0.44	93	0.4	90-95th	0.44	70-80th
Traffic Proximity and Volume (daily traffic count/distance to road)	1500	730	85	650	89	750	87
Lead Paint Indicator (% Pre-1960 Housing)	0.4	0.29	72	0.36	63	0.28	70
Superfund Proximity (site count/km distance)	0.12	0.13	70	0.15	67	0.13	73
RMP Proximity (facility count/km distance)	0.82	0.66	77	0.62	78	0.74	71
Hazardous Waste Proximity (facility count/km distance)	2.4	2.1	68	2	75	5	70
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	0.00015	4.4	71	34	50	9.4	56
Demographic Indicators							
Demographic Index	65%	35%	90	30%	91	36%	86
People of Color Population	93%	49%	86	33%	93	39%	92
Low Income Population	37%	22%	81	27%	73	33%	64
Linguistically Isolated Population	12%	3%	93	3%	94	4%	86
Population With Less Than High School Education	29%	10%	95	10%	95	13%	89
Population Under 5 years of age	9%	6%	80	6%	82	6%	79
Population over 64 years of age	10%	15%	34	16%	26	15%	31

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJSCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

February 05, 2021

I. Appendix B - Traffic Congestion Comparison

Congestion report from 2015[1061]

Congestion report from 2019[1062]

[1061] MARYLAND DEPARTMENT OF TRANSPORTATION, *Maryland State Highway Report 2015*, I.B.12 https://www.roads.maryland.gov/OPPEN/2015%20mobility%20report%20draft_highres_for%20website1.pdf (last visited Feb. 18, 2021).

[1062] MARYLAND DEPARTMENT OF TRANSPORTATION, *Maryland State Highway Report 2019*, 27 https://roads.maryland.gov/OPPEN/2019_mobility_report.pdf (last visited Feb. 18, 2021).

I. Appendix B - Traffic Congestion Comparison (continued)

Congestion report from 2015[1063]

Congestion report from 2019[1064]

[1063] MARYLAND DEPARTMENT OF TRANSPORTATION, *Maryland State Highway Report 2015*, I.B.14 https://www.roads.maryland.gov/OPPEN/2015%20mobility%20report%20draft_highres_for%20website1.pdf (last visited Feb. 18, 2021).

[1064] MARYLAND DEPARTMENT OF TRANSPORTATION, *Maryland State Highway Report 2019*, 29 https://roads.maryland.gov/OPPEN/2019_mobility_report.pdf (last visited Feb. 18, 2021).

III. Appendix C – Map of FA/EE Adjacent to Beacon Heights and Woodlawn

Appendix C: Map of Beacon Heights and Woodlawn Communities from Google Maps with Depiction of where FA/EE will be Located Adjacent to Communities

LXXVIII. Appendix - Article Reprint: Ivey, Jolene & Glaros, Dannielle. "Opinion: Prince George's County won't stand for the maglev – another destructive project for our people." *Washington Post*. April 23, 2021.

In 2021 Jolene Ivey, a Democrat, represented District 5 on the Prince George's County Council. Dannielle Glaros, a Democrat, represented District 3 on the Prince George's County Council.

We must acknowledge and address the ways that land use, development and transportation projects have affected the EJ communities in a discriminatory way. There's a long list of projects that have been built with wanton disregard for minority communities. Locally and across the country, we can name highways that plowed through homes, divided communities or bypassed them altogether, cutting off their economic oxygen.

An interstate in Montgomery, Ala., originally was planned to run through the home of the Rev. Martin Luther King Jr.'s deputy, Ralph Abernathy, as well as to obliterate the two churches that helped organize the Montgomery bus boycott. Eatonville, Fla., is the nation's oldest Black township north of Orlando and has no exit or access ramp to Interstate 4. In the 1960s, Interstate 65 was run through the center of the Black middle-class community in Indianapolis.

Barbara A. Mikulski launched her political career fighting a plan to run Interstate 95 through Baltimore's Fells Point and Canton neighborhoods. Her reputation as a fighter saw her through to the U.S. Senate, and on to become one of the most revered politicians in Maryland.

Today it is the Northeast Maglev — a superconducting magnetic-levitation train, known as scmaglev or maglev — that would wreak havoc, eliminate green space, pollute our air, suffocate our businesses and siphon off significant business from MARC commuter rail and Amtrak. Prince George's County would bear the brunt of these negative impacts while realizing no balancing benefits to our community. Again, a project is planned through a majority-minority community where the land is cheap and the homes less expensive.

Just as when Mikulski fought — and stopped — the highway that would have split a community, local community leaders are fighting the maglev. The debate so far is mainly about public land. However, the Maryland Department of Transportation's draft environmental impact statement is clear who gets the benefits:

"The SCMAGLEV Project could spur development and commercial investment in neighborhoods near station locations."

However, with no station in Prince George's County, we get only the noise, pollution, disruption to businesses, homes torn down, loss of riders on Amtrak and MARC, loss of economic prosperity and more as the trains speed by us — figuratively and literally. This isn't our opinion. The statement describes what will happen in Prince George's County:

"Could change the community feel and atmosphere." "Impact community cohesion." "Increased noise." "Vibrations." "Changes to aesthetics." Sound familiar?

Northeast Maglev has mounted a campaign to smooth over community opposition, but the people are fighting back. Rep. Steny H. Hoyer (D-Md.) is listening. He has said our county council's and county executive's opposition will "weigh very heavily, not only with me, but I'm sure with [Rep. Anthony G. Brown] and with the congressional delegation."

The Purple Line, on the other hand, has gotten our full support. With 21 stations along this route, 11 in Prince George's and 10 in Montgomery County, we know that the real, lasting economic development will be transformative by spurring development and commercial investment while fulfilling the transportation needs of everyday people every day. We know that the negative impacts are also real, and the Maryland General Assembly has created a $2 million fund to start taking some of the economic sting out of it for impacted businesses. The delays from the fight between the state and the contractor have lengthened the pain that these businesses are trying to endure, and we're hopeful that construction will be fully underway again soon and that the project's benefits will quickly be realized.

The proponents of the maglev indicate they will seek federal funds and will not rule out state funds (they opposed a state bill that would limit their access to funds). One does truly wonder why this proposal is being entertained at all. Why would we support a project that could take as much as 94 percent of Amtrak and 32 percent of MARC riders between Baltimore and Washington? The maglev project's current price tag is no less than the cost of expanding regional commuter rail. Regional commuter rail expansion, as promoted by the Greater Washington Partnership, would generate the same short-term construction jobs but would provide more permanent jobs and support local economies.

Black communities matter. A transportation network that serves communities matters. It is time to shelve the maglev project.

I. Appendix – Article Reprint: Kales, Eli. "Report: Maryland among states with highest loss of high-earning residents." *The Daily Record*. August 7, 2023.

Despite a national increase in high-earning American households, Maryland is one of the leading states experiencing a loss of these residents, who are choosing to migrate to states with lower income taxes and a cheaper cost of living.

As the number of Americans filing tax returns with earnings over $200,000 grows, these earnings are coupled with migration trends that are influencing states' finances, according to a new report from SmartAsset[1065]. High earners are leaving states such as California and New York, instead choosing to move to states such as Florida and Texas.

JP Krahel, professor of accounting at Loyola University Maryland's Sellinger School of Business, said the primary cause of migration of high earners has always been the variation in tax rates among states, and that many of the states with the highest increase in high earners have lower or no income tax, attracting households from states with higher tax rates.

Maryland was the state with the sixth-largest net outflows of high-earning households, trailing California, New York, Illinois, Massachusetts, New Jersey and Virginia, according to the report. Washington, D.C., would follow, and high earners left D.C. at a faster rate than any state.

The report examined tax filers with an adjusted gross income of $200,000 and above using aggregated IRS data, and then compared the inflow and outflow of these filers to determine the state's net inflow of high-earning households.

[1065] Villanova, Patrick. "Where High Earners Are Moving – 2023 Study." July 26, 2023. https://smartasset.com/data-studies/where-high-earners-moving-2023.

Despite the migration of high-earning individuals, these states nonetheless maintain some of the highest percentages of high-earning households.

Texas and Florida, the two states with the highest gains in high-earning households, do not have a state income tax, while Maryland has a tax rate above 5.5% for the same individuals. Krahel also noted that Maryland has a piggyback county tax, which in some cases further exacerbates the difference between this state and others.

Krahel said that while the tax rates have always contributed to this kind of migration, the growth in remote work has made moving to a low-tax state more feasible.

States with higher tax rates, such as Maryland, tend to have more urban centers that people have long been drawn to for their high earning potential. As in-person work is becoming less necessary, many people are choosing to live elsewhere, according to Krahel.

Krahel said that as office buildings' occupancy rates decrease, much of these spaces may be converted to residences, which might lead to more available housing and lower property values — both of which could lessen the migration trends.

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About the Author: (July 14, 2023) *Eli Kales is a rising senior at Georgetown University, majoring in Psychology with a journalism minor. Eli interned with The Daily Record, under the supervision of Patrick Brannan. He has balanced his journalism course load with writing and editing the student newspaper, The Hoya. His editor at The Hoya writes, "As the City Desk Editor, Eli worked to produce four to five pieces per week about local news outside of Georgetown University's front gates; his work was especially important because city stories serve to connect the Georgetown community to local current events." Eli was supported in his internship by Steven Overly as a mentor and Rick Hutzell as writing coach.*

LXXIX. Appendix – Article Reprint: Kelley, Owen A. "Economic Impact and Financial Viability of the Proposed Baltimore Washington Maglev." posted in: *Greenbelt Online*. September 6, 2020.

A maglev train in Japan. The proposed Baltimore Washington maglev would use Japanese "superconducting maglev" technology, the kind shown here on the Japanese test track.

It is clear from emails flying around, Facebook posts, and items in the News Review that many Greenbelters are concerned about the impact on Greenbelt of the magnetically levitated (maglev) train that has been proposed between Baltimore and Washington. To explore the question of whether the maglev would bring economic benefits that would outweigh harm to Greenbelt, this blog post examines some of the financial and economic numbers published by Baltimore Washington Rapid Rail (BWRR), the company seeking to build and operate this maglev.

Background

As of this summer, one of the two possible track alignments for the Baltimore Washington maglev would come out of a tunnel near the community gardens by the GHI office and then, heading north aboveground, devastate the Greenbelt Forest Preserve along Goddard Branch. The other proposed alignment would be aboveground and parallel to the Baltimore Washington Parkway, just east of the parkway. Maglev trains passing along that second route could generate enough noise to reduce our ability to enjoy the extensive forest between the

parkway and Ridge Road. (In planning documents, these two options are called alignments J1 and J.)

This forest is close to many of our homes, it is an important part of many people's lives, and it helps to bind our community together–think about annual Pumpkin Walk. This forest was part of the plan since Greenbelt was founded as a New Deal experiment in town planning. Central to this experiment was placing large tracts of green space next to neighborhoods of modest homes to promote quality of life. In other words, this forest is a living remnant of Greenbelt's New Deal era "belt of green." It is what's called a "contributing element" to the Greenbelt National Historical Landmark on the National Registry of Historic Places.

It can be difficult to figure out what the maglev is all about. It's not you. When it comes to the maglev, it actually is hard to ferret out the relevant facts and see how they fit together.

Just the Facts Ma'am

One reason that it is difficult to evaluate th--e merits of the maglev is because Baltimore Washington Rapid Rail (BWRR) has not published in one place all of the relevant financial figures or the details of how these figures were calculated. A compilation of this information would make it easier to evaluate economic benefit and financial viability.

To partially address the information deficit, this blog post collects some of the financial and economic figures that can be found scattered, here and there, in some of BWRR's presentations and affiliated websites. Performing some simple arithmetic on these published values, one finds inconsistencies (item #4, below).

Further doubts about economic benefit and financial viability come from comparing BWRR's figures with information on corporate or government websites (item #2) or in peer-reviewed journals. In one case, BWRR fails to provide an essential high-level data value, but independent sources make it possible to estimate a range for this value (item #1).

It is tempting to rely on whatever cost-benefit analyses will be published within the maglev's upcoming Environmental Impact Statement (EIS). The cost estimates in EISs, however, are unreliable (item #5), so it is vital that elected officials and the public engage in their own fact-finding and analysis.

1. For most people, the maglev would be slower than driving

BWRR advertises that the maglev would take 15 minutes station-to-station to go from Baltimore to Washington, but BWRR never mentions a vastly more important number, the average travel time door-to-door for real destinations in the maglev's target market. Using various sources that are independent of BWRR, one finds that despite the speed of the maglev train itself, most people would find it faster to drive rather than ride the maglev.

As we know from our train or planes trips, it takes time to travel from home to either train station or airport and then more time to travel from the final station or airport to our real destination.

The table below suggests that the total duration of a trip via maglev would be about 80 minutes starting from various locations 2 to 4 miles from the Baltimore maglev station and ending at one of several locations within the DC beltway. In contrast, driving between these locations would take only 50- or 65-minutes during midday or rush hour, respectively, according to Google Maps.[1066]

Approximate Duration in Minutes: Baltimore-to-Washington Maglev Trip

Trip segment	Rush hour	Midday
2-to-4-mile drive to downtown Baltimore maglev station	14	7
Wait for maglev train	4	15
Ride on a maglev train that skips the BWI station	15	15
5-minute walk to Union Station Metro platform + wait for train	5+4	5+6
Ride on DC Metro train	26	26
Walk or drive from Metro station to inside-the-Beltway destination	8	8
Total travel time	**76**	**82**

Anyone could repeat or expand this simple analysis using the online resources provided in the footnote. There is no evidence that the maglev's upcoming Environmental Impact Statement will analyze average trip duration and describe the analysis method in sufficient detail that the public can check the math. The average trip duration for likely riders of the Baltimore Washington maglev would, ideally, be analyzed in a peer-reviewed journal.

2. The maglev ticket price would limit ridership

After years of promoting the idea of a malgev between Baltimore and Washington, BWRR has not yet identified in public documents who exactly would be willing to pay $80-$160 round trip to travel between these two city centers, which are separated by only 40 miles. Common sense

[1066] In 2020, O. Kelley estimated trip duration by considering Bal----timore locations 2-4 miles from the maglev station: John Hopkins Homewood campus, Canton, Riverside, and Locust Point. The inside-the-DC-Beltway locations considered were College Park, Bethesda, and Crystal City. Downtown Baltimore driving times from https://maps.google.com. Estimated wait for the maglev assumes rush-hour and midday service every 8 or 30 minutes in each direction. Average wait time is half of the time between trains. DC subway-ride duration and wait time from Union Station, https://www.wmata.com/schedules/trip-planner/. The 8-minutes post-DC-Metro represents either a half-mile walk or driving conditions and distances similar to those of the midday downtown Baltimore trip segment.

suggests that the ticket price is too high to be attractive to many commuters, for family outings, or for the typical tourist. [1067]

Were the average round-trip ticket to cost $100, a commuter would pay $24,000 a year to ride the maglev. This would be $12,900 more than the annual cost of commuting by car between Baltimore and Washington based on the IRS's estimate of the per-mile cost of driving. Most American families have trouble saving for the future, so would they really choose to spend an extra $12,900 a year to upgrade from car commuting to maglev commuting?[1068]

For most families, the maglev would be an unattractive option on a family outing. A DC-area family of four going to a downtown Baltimore attraction would expect to pay $60-$140 for the entire family to get in. They would probably not want to pay an extra $100 per person or $400 for the whole family to make the trip via maglev.[1069]

Washington DC attracts tourists, but for most of these families, a side trip to Baltimore would not seem more attractive were the maglev built. Some studies estimate that the average American family spends $2,000 on its annual vacation. If an out-of-state family visited DC for their vacation, would the family be willing to spend an extra $400 on transportation if they decided to make a side trip to Baltimore? In contrast, the existing bus and commuter-rail service costs under $10 one-way, and renting a car for a whole week can cost under $500.[1070]

3. The maglev is unlikely to create thousands of jobs, post-construction

Everyone is sympathetic with Baltimore's desire to attract people to its downtown, to revive its economy, and to create jobs, but the chances are slim that operating a maglev line from DC will do the trick.

As discussed in items #1 and #2 above, the maglev would be slower and more expensive than driving, leading to the conclusion that the maglev is unlikely to greatly increase travel between Baltimore and Washington. If travel does not increase, then operating the maglev would fail to create thousands of jobs the way that BWRR advertises it would.

[1067] one-way $40-80 ticket price stated by Wayne Rogers on 9 July 2015 before the MD Public Service Commission, as cited on pg. 5 of Judge T. Romine's Proposed Order for case #9363 on 14 Oct 2015.

[1068] In 2020, the cost of commuting by car is 58 cents per mile according to the IRS, and one might assume an 80-mile round trip, DC to Baltimore. A 48-week work-year is 240 days. By car, $0.58/mile x 80 mile/day x 240 day/year. By maglev, $100/day x 240 day/year.

[1069] At Fort McHenry National Monument, Port Discovery Children's Museum, Maryland Science Center, and National Aquarium admission for 2 adults and 2 children is approximately $30-$60, $72, $96, and $140, respectively.

[1070] $2,000 annual vacation: Business Insider 9 August 2019, https://www.businessinsider.in/miscellaneous/people-spend-an-average-of-1979-annually-on-summer-vacations-here-are-4-ways-to-save-money-on-your-next-trip/slidelist/70609380.cms.

In 2015, in a filing before the Maryland Public Services Commission, BWRR claimed that the maglev would generate "economic activity previously not conceivable." They claimed that maglev operation would create 6,800 to 8,300 jobs in the Baltimore Washington region contingent on the maglev line being extended to New York City.[1071]

More optimistically in 2020, the BWRR website claims that, post-construction, the maglev would create 14,600 jobs per year. The BWRR website provides no market analysis to back up this job-creation claim.[1072]

[MCRT Editor's note: Since 2020, BWRR number of jobs projected continue to increase. As of September 14, 2023, BWRR now states 205,000 jobs nationwide from construction, and 14,600 annually after opening. See: https://bwrapidrail.com/project/benefits/ Again, the BWRR website provides no market analysis to back up this job-creation claim.]

4. Maglev ticket sales could not pay back the construction cost

Despite the high ticket price, BWRR could not recoup the construction cost for a Baltimore-to-Washington maglev line with ticket sales, even over a 30-year period. The following paragraph does the math. BWRR has not announced private financing for the construction, so it looks like tax dollars would have to fund most of the maglev construction cost, which means that this money could not be spent on more effective solutions.

BWRR's inability to pay for maglev construction with ticket revenue is clear from its own estimates of construction cost, ridership, and ticket price. BWRR estimates a $15 billion construction cost, and that may be an underestimate as discussed in item #5 below[1073]. Assuming a fairly low interest rate of 3.25%, then the principal and interest on a $15-billion 30-year loan would total $23.5 billion[1074]. Ticket sales would gross only $15 to $22.5 billion in 30 years based on BWRR's expectation of 10-15 million one-way trips per year and an average ticket price of $50 one-way[1075].

In recent years, WMATA, the organization that runs the DC subway, has had a multi-billion dollar backlog of "state of good repair" projects, and completing these projects promptly would

[1071] "previously not conceivable" quote and jobs created: Rogers, W., 2015, testimony, MD Public Service Commission, case #9363, pg. 17-18, 13.
[1072] 14.6k jobs/year: https://bwrapidrail.com/project/benefits/.
[1073] "Rough construction estimates developed by BWRR at this early stage are $10 billion to $15 billion depending on the construction methodology, e.g. the proportion of higher-cost tunneling versus elevated structure.": FAQ on https://bwmaglev.info, 1 Sept 2020.
[1074] The interest and principal on a $15-billion 3.25%-interest 30-year loan from npr / (1-(1+r)-n) where n = 30 x 12, p = $15e6, and r = 0.0325/12, or use an online mortgage calculator.
[1075] 10.2 to 15.4 million one-way trips annually (Rogers, W., 2015: testimony, Public Service Commission of MD, pg. 17, line 9). bwrapidrail.com and northeastmaglev.com say that the ticket price will be competitive with existing express-rail service. One might take this to mean a price similar to a 1-way Amtrak Acela ticket in 2020: $35-$80, DC to Baltimore. See footnote #2 of the present document for a $40-$80 ticket price.

be a better use for tax dollars than building a maglev that we don't really need. Instead of investing in the maglev, there may be less expensive ways to reducing car emissions and rush-hour traffic, such as to find ways to make teleworking sustainable and convenient.

In 2020, a maglev train at the decommissioned test track for the Munich maglev line. In 2006, 23 people were killed by a maglev on this test track, damping public enthusiasm for the technology. Spiraling costs canceled the Munich maglev line in 2008.

German maglev photo credit.

5. The cost-benefit analysis in an Environmental Impact Statement is unreliable

If the cost of constructing a maglev between Baltimore and Washington exceeds BWRR's current $15-billion estimate, it would decrease the chance that maglev would avoid bankruptcy, let alone create an economic boom.

[MCRT Editor's note: As of September 14, 2023, the cost has increased to $16.8 billion.][1076]

A number of studies find that construction costs for rail projects end up, on average, about 50% higher than estimated prior to construction beginning. Various theories have been advanced to explain why cost estimates continue to have a low bias in Environmental Impact Statements even after researchers have published evidence that the bias exists.[1077]

[1076] Lazo, Luz. "Federal review of Baltimore-Washington high-speed maglev project moves ahead." *The Washington Post*. January 15, 2021. https://www.washingtonpost.com/local/trafficandcommuting/dc-baltimore-maglev/2021/01/15/6a5c7e00-5735-11eb-a931-5b162d0d033d_story.html.

[1077] 50% cost overrun for rail projects: http://americandreamcoalition.org/ page id=3813. 45% average cost overrun in rail projects: Prieumus et al. (Eds), 2008: Decision-Making on Mega-Projects, pg. 7. Persistence of low bias in EIS cost estimates: Sturm, J., et al., 2011, Analysis of cost estimation disclosure in EIS for surface transportation projects, Transportation, 38, 525-544.

Projects similar to the proposed Baltimore Washington maglev tend to have higher-than-average cost overruns, more than double the initial estimate in one case.

Before construction began, the California high-speed rail from Anaheim to San Francisco was expected to cost $33.6 billion in 2008, but today, with the track partially built, the estimate has more than doubled to $80 billion.

[MCRT Editor's note: As of September 14, 2023 the cost has escalated to $99.9 billion to build from San Francisco to Los Angeles/Anaheim via the Central Valley][1078]

The maglev planned in Munich was initially expected to cost 1.85 billion euros but it was canceled in 2008 as construction was about to begin because the cost estimate had risen to 3 billion euros. The Tokyo-Osaka maglev was expected to cost 5.1 trillion yen in 2007, but as construction proceeded, estimates rose to 9.1 trillion yen.[1079]

[MCRT Editor's note: As of September 14, 2023 the cost is now 9.437 trillion yen.][1080]

Conclusion

Baltimore Washington Rapid Rail (BWRR) predicts that job growth and other economic benefits will flow from operating a maglev between Baltimore and Washington. Based on these predictions, BWRR asserts that the benefits outweigh any harm that the maglev might cause to the environment, to historical resources, or to the quality of life of residents along the track. It is in the public's interest to determine if BWRR's financial numbers are plausible and to avoid the trap of focusing exclusively on potential hazards and nuisances from building or operating the maglev. Each of us can make a contribution, but none of us have the time to do all of the necessary detective work ourselves. We will have to work together.

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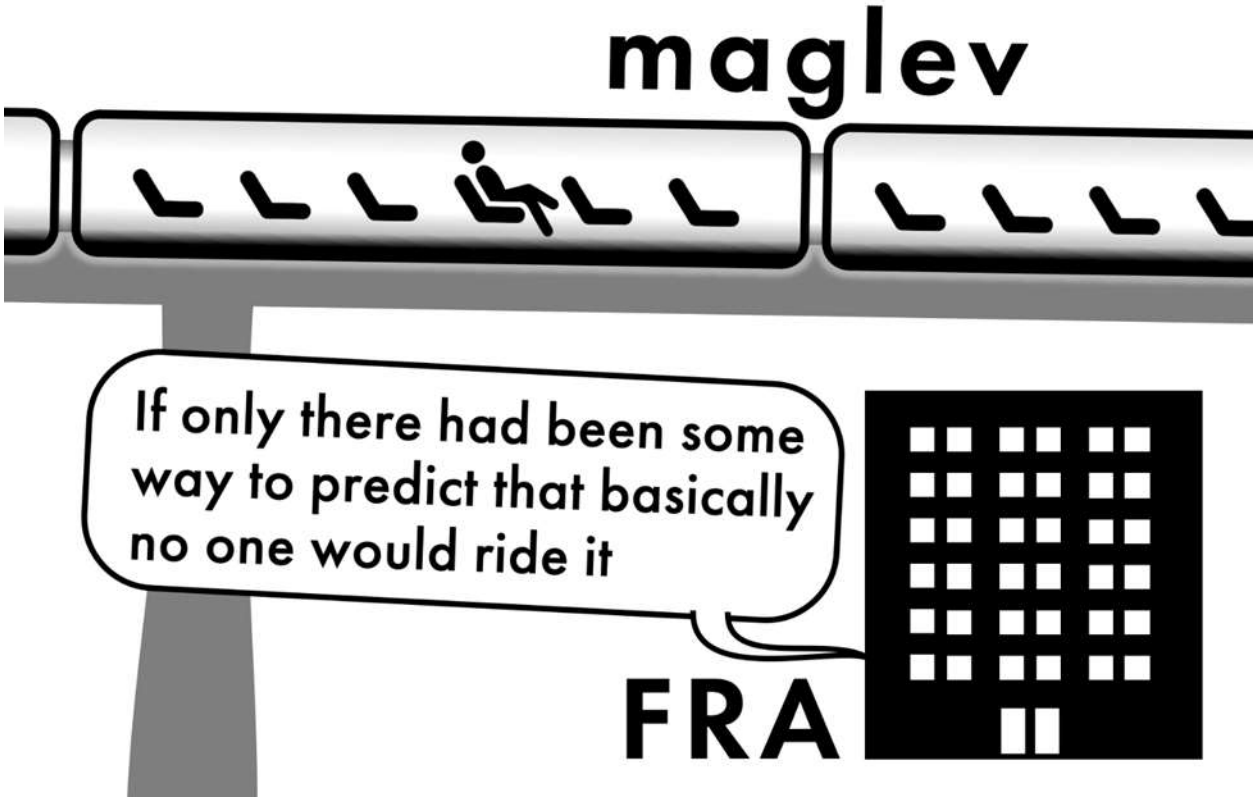
About the Author: *Owen Kelley has a science background, and in his free time, he enjoys exploring and writing about the forests around Greenbelt. In recent years, he has written several articles about the proposed Baltimore Washington maglev.*

[1078] California High-Speed Rail Authority. Capital Costs & Funding. https://hsr.ca.gov/about/capital-costs-funding/#:~:text=The%20current%20cost%20estimate%20to,from%20%2469.01%20to%20%2499.9%20billion.
[1079] California high-speed rail estimate of $33 then $80 billion: Editorial, *Los Angeles Times*, 17 June 2020. Munich Link Transrapid maglev cost overrun: https://en.wikipedia.org/wiki /Transrapid. The Tokyo-Osaka line is a superconducting maglev and is called the Chuo Shinkansen. Wikipedia.org states the 5.1 to 9.1 trillion-yen cost estimate.
[1080] Global Construction Review. "Central Japan Railway: cost of Nagoya maglev line has risen $14bn." On 09/14/2023 $1.00 = 147.47 yen. https://www.globalconstructionreview.com/central-japan-railway-cost-nagoya-maglev-line-has/#:~:text=Central%20Japan%20Railway%20(JR%20Central,on%20the%20original%20cost%20estimate.

Disclaimer: *Kelley is writing in his capacity as a individual citizen examining a non-partisan issue of interest to the public. If errors are suspected, please contact him at okelley@gmu.edu.*

LXXX. Appendix – Appendix – Article Reprint: Kelley, Owen A. "The Federal Railroad Administration falls for an excessively high forecast of how many trips would be made on the maglev." posted in: *Greenbelt Online*. May 21, 2021.



A cartoon depicting the question: Is the maglev's official ridership forecast accurate?

With the maglev public-comment period drawing to a close, many residents in the area are rushing to submit their comments in time. Greenbelt Online offers this last blog post about the maglev before the comment period ends. Instructions for submitting your comments are available here. This blog post discusses the official forecast of the maglev's ridership. Prior articles in this series covered what fraction of Washington-area residents would find the maglev ticket price worth the travel time saved and the climate-change impact of building and operating the maglev. The entire analysis is contained in the following PDF file: kelley202108.magRider.

Introduction

It would be a scandal to spend 17 billion dollars to build a new rail line if one could predict that the train would run mostly empty. There are hints that this disaster might unfold if a magnetic-levitation rail line were built between Baltimore and Washington, DC. Most people call this train, the “maglev.” [1]

The official ridership forecast for the Baltimore-Washington maglev is stated in the project’s draft environmental impact statement. The draft impact statement, however, merely copies its ridership forecast from a contractor’s report, a report that the public is not allowed to read. This secrecy makes it more difficult to double-check the official ridership forecast but it does not make it impossible. If an approximate answer is sufficient, then only a few mathematical steps are needed to derive a ridership forecast that is independent of the official forecast. The accuracy of the official ridership forecast matters because the maglev’s draft impact statement relies on the ridership forecast in order to quantify the various benefits of operating the maglev. The number of people riding the maglev determines the revenue from ticket sales, the financial solvency of the maglev operator, the amount of road-congestion prevented, the reduction in car-generated air pollution, and the number of jobs created because of maglev operations.[2]

It is unclear how low ridership would have to be to make the maglev worthless. The draft impact statement ignores this question. Would this threshold be crossed if the official ridership forecast were, say, twice as high as would be reasonable? The analysis below suggests that the official ridership forecast is more than ten times greater than can be supported by several datasets that describe the region’s travel patterns.[3]

Background

In January 2021, the Federal Railroad Administration published the maglev’s draft environmental impact statement. The document describes ridership as a “key metric” for determining impacts of operating the proposed maglev. Bizarrely, the document uses only 6 out of its 3,000 pages to describe its ridership forecasting method. Such a brief discussion of such an important topic is odd. The draft impact statement provides so little detail that the official ridership forecast is not reproducible.[4]

Worse yet, it appears that the Federal Railroad Administration merely copied its ridership numbers from a contractor’s report. The contracting company is named Louis Berger. In the draft impact statement, there is no evidence that the Federal Railroad Administration commissioned an independent review of the Louis Berger ridership report or had its own staff perform an internal review of it. The draft impact statement does mention one review of the Louis Berger ridership report, but that review suffers from at least the appearance of a conflict of interest. That review was conducted by the company that wants to built the maglev, i.e., Baltimore Washington Rapid Rail (BWRR).[5]

By republishing Louis Berger's numbers in the draft impact statement, the Federal Railroad Administration has transformed Louis Berger's numbers into the project's official ridership forecast.

During most of the public-comment period for the maglev's draft impact statement, the Louis Berger ridership report was completely hidden from the public. The company that wants to build the maglev, BWRR, was allowed to see the Louis Berger report, but not the public or elected officials. Toward the end of the comment period, the Federal Railroad Administration made public a heavily redacted copy of the Louis Berger report. The information relevant to the present article, for example, was completed blanked out in this redacted copy.[6]

Downtown to Downtown

The proposed maglev would have only three stops: downtown Washington, downtown Baltimore, and the Baltimore/Washington International (BWI) airport. The present paper examines travel between the two urban centers first and subsequently examines travel from urban center to BWI airport.

The maglev's draft impact statement says that most of the maglev's ridership would be people traveling between the two cities rather than people who are flying out of or in to BWI airport.

In addition, the draft impact statement says that most maglev trips would be "diverted" not "induced." A diverted maglev trip is a maglev trip that the customer would make by another form of transportation if the maglev were not built. In contrast, an induced maglev trip is a trip that would only occur if the maglev were built. As a practice, transportation planners divide total ridership into diverted and induced travel. The present article examines only diverted trips because they are easier to estimate than induced trips.

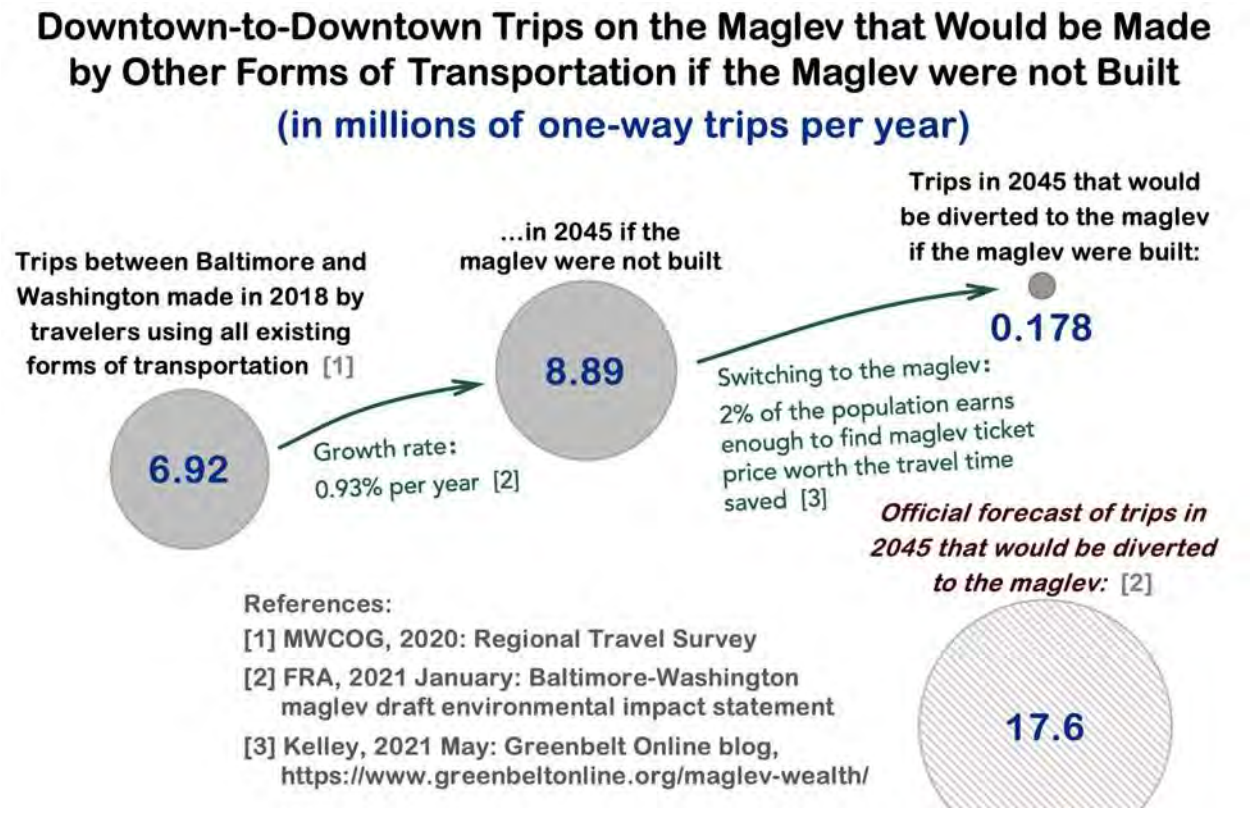
The calculation of diverted trips starts with a recent travel survey. The travel survey states how many trips are made between Washington and Baltimore, and the survey was published in 2020 by the Metropolitan Washington Council of Governments.[7]

The relevant number to extract from the travel survey is the number of trips within the maglev service area: 18,956 one-way trips per day. As discussed in the Appendix of the present article, this number depends on which jurisdictions are determined to be within the maglev's ridership area. These jurisdictions are listed in an article that the present author wrote titled "The Maglev would serve a small geographic area." In these jurisdictions, most residents could save time by riding the maglev rather than driving between Baltimore and Washington. In this way, the maglev would serve three jurisdictions at the southern end of the maglev line: the District of Columbia, the City of Alexandria, and Arlington County. The maglev would serve two jurisdictions at northern end of the line: the City of Baltimore and Baltimore County.[8]

The 18,956-trip estimate is based on data collected in 2018, but this number can be extrapolated to 2045, the year for which the maglev's official ridership forecast is intended to apply. To extrapolate from 2018 to 2045 one may use a 0.93% increase in travel per year between Baltimore and Washington as proposed in the maglev's draft impact statement.[9]

The next step is to multiply by the fraction of the population that makes enough money that the travel time saved on the maglev would seem worth the maglev ticket price. In an earlier article titled "Maglev riders would come from the wealthiest 2% of the Baltimore-Washington population," the author showed that about 2% of the population earns this much.[10]

The schematic diagram below shows how these factors are combined to arrive at an unofficial forecast that 178,000 one-way trips would be diverted to the maglev in 2045. The diagram also shows the official forecast for this portion of the maglev ridership: 17.6 million one-way maglev trips. To be clear, both the official forecast and the just-derived unofficial forecast are both forecasts for diverted maglev trips in 2045, excluding BWI airport customers. The official forecast is approximately one hundred times greater than the independent, unofficial forecast (100 ≈ 17.6 ÷ 0.178).[11]



A schematic diagram showing how the unofficial forecast is calculated for the number of diverted travelers is calculated.

Downtown to Airport

The preceding section considered non-airport travel and this section considers airport travel. In both cases, the official ridership forecast in the draft impact statement is much higher than the unofficial forecast derived in the present article.

At the Baltimore/Washington International (BWI) airport, a maglev station is proposed immediately adjacent to the airport's main terminal where the hourly parking garage now stands. The Maryland Aviation Administration reported that BWI airport had 26.933 million arrivals and departures in 2019.[12]

The first task is to determine what portion of BWI customers would save time if they used the maglev to travel to or from the airport. Those Washington area residents who would save time riding the maglev to or from BWI are those who live in DC, Arlington, or Alexandra. Most City of Baltimore residents, but not most Baltimore County residents, could save time by riding the maglev to BWI. Approximately 21% of the region's population lives in the four above-mentioned jurisdictions.[13]

Next, apply to the airport trips the same two factors that were applied in the previous section to non-airport trips. The first factor extrapolates the 2019 measured trips to 2045, the year of the official maglev ridership forecast. The second factor is 0.02, the portion of the population that is wealthy enough to find the maglev travel-time savings worth the maglev ticket price.

After combining these factors, the result is an unofficial forecast of 143,000 one-way maglev trips in 2045 by BWI customers traveling to or from the airport on the proposed maglev. Add these 143,000 airport trips to the 178,000 non-airport trips derived in the previous section to arrive at the total number of maglev trips that represent travel diverted from other forms of transportation in 2045. The sum of these two numbers is 321,000 trips, which is far less than the official forecast of 20.6 million trips.

To be clear, the official and unofficial forecasts are both estimates of the number of diverted maglev trips that would be made in 2045. The official forecast is a factor of 64 times greater than the independent, unofficial forecast that the present article derives ($64 \approx 20.6 \div 0.321$).[14]

Commuters

The official ridership forecast is far too high based on the analysis presented so far that uses publicly available reference datasets. Because it is a serious charge to claim that the Federal Railroad Administration has been fooled into republishing a grossly implausible ridership forecast, this section examines yet another reference dataset. This third dataset confirms the pattern seen so far, as explained below.

Data from the Census Bureau show that 13,091 people commuted between Baltimore and Washington in 2015, the most recent year for which these data are available. This number is

the sum of the people who live in Baltimore and work in Washington and the people who live in Washington and work in Baltimore. As discussed in Kelley (2021 March 25), these commuters have the District of Columbia, Arlington, or Alexandria at the southern end of their commute and Baltimore County or the City of Baltimore at the northern end of their commute.[15]

The annual number of one-way commuting trips can be estimated by multiplying the number of commuters by two trips per workday and by the average number of workdays in a year.[16]

Multiply this number of trips by the same two factors used in the previous sections of the present article. First, use a 0.93%-per-year increase in travel between the year that the data was collected, 2015, and the maglev forecast year, which is 2045. Second, multiply by 0.02 because only about 2% of the population is wealthy enough that the travel-time saved on the maglev would be worth the maglev ticket price. The result is an unofficial forecast that 147,000 one-way maglev trips would be made in 2045 by diverted commuters, commuters who switched from some other form of transportation to ride the maglev.
In contrast, the official forecast is that diverted commuters would make 5.2 million one-way maglev trips per year. The official forecast is 35 times higher than the unofficial forecast (35 ≈ 5.2 ÷ 0.147).[17]

To review, the present article has examined three reference datasets. All three of them provide evidence that the official ridership forecast for the proposed maglev is implausibly high. The official forecast in the draft impact statement is more than ten times higher than the reference datasets can support.

Prior Studies Suggest Low Ridership

There is nothing surprising about the present article finding that only a few travelers would prefer the proposed Baltimore-Washington maglev over other forms of transportation.
A high-speed rail line that is shorter than 100 miles cannot compete with car travel according to a National Academies report in 1991 and Federal Railroad Administration reports in 1993 and 2005. This result applies to all types of high-speed rail lines whether or not they use maglev technology. The proposed Baltimore-Washington maglev would be only 36 miles long, which is much shorter than the 100-mile cutoff.[18]

It is surprising that the Federal Railroad Administration chose not to mention the findings of these earlier studies in the January 2021 draft impact statement for the proposed Baltimore-Washington maglev. The regulations that implement the National Environmental Policy Act (NEPA) require that an impact statement evaluate all relevant points of view.[19]

The most natural interpretation of these earlier studies is that a maglev shorter than 100 miles would not be economically viable. For this reason, a short-run maglev line would be an invalid subject for an environmental impact statement. To quote NEPA regulations, the subject of an environmental impact statement must:

have independent utility or independent significance, i.e., be usable and be a reasonable expenditure even if no additional transportation improvements in the area are made [20] Based on the analysis in the present article, a maglev between Baltimore and Washington would have so few riders that it would lack the "independent utility" that is required in the above-quoted regulation.

Conclusion

T
he present article has examined the official forecast for the number of trips that would be made on the proposed Baltimore-Washington maglev. The official forecast is stated in the draft environmental impact statement that the Federal Railroad Administration published in January 2021.

The analysis in the present article finds that the official ridership forecast is implausibly high. The official forecast is more than an order of magnitude higher than what reference datasets can support.

The official forecast is 20.6 million one-way maglev trips that would be made each year by travelers diverted from other forms of transportation. In contrast, various reference datasets examined in the present article suggest that a much smaller number of diverted travelers is more likely: 0.32 million one-way maglev trips per year. A diverted traveler is someone who would make the trip by another form of transportation if the maglev were not built. The draft impact statement reports that the great majority of maglev travelers would be diverted from other forms of transportation.

If the official ridership forecast is higher than warranted, then it would prevent the draft impact statement from helping the public and elected officials evaluate the harm and benefits associated with the proposed maglev. The draft impact statement relies on the ridership forecast to derive its estimate for, among other things, the maglev's revenue, the solvency of the maglev operator, the air-pollution reduction, the road-congestion improvement, and the jobs created by maglev operations.

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Notes

[1] $15–17 billion: Appendix D4, Table D4-8, pg. D-21.

[2] Revenue from maglev ticket sales in "SCMAGLEV annual fare cost" row of Appendix D4, Table D4-28, pg. D-44. Road congestion: Kelley 2021 Feb 10. Air pollution: Appendix D4, Table D4-40, pg. D-51, and Kelley 2021 April 11. 390–440 jobs created by maglev operations: Chapter 4.6, pg. 4.6-8.

[3] Many ridership forecasts off ±30%: Hartgen (2013). A factor of 10 error would be unusually large.

[4] Six-page-long ridership-model description citing zero references: Appendix D2, pg. B-104 to D-109. Key metric: Chapter 4.2, pg. 4.2-6. 654 pages in main text and 2399 pages in the appendices, so the total page count is 3,053. To count pages, use the mdls command in the MacOS terminal: mdls -n kMDItemNumberOfPages *.pdf | awk '{print $3; sum += $3} END {print sum}'.

[5] The maglev DEIS cites the 2018 Louis Berger "Baltimore-Washington SCMAGLEV Project Final Ridership Report" in Appendix D4 (footnote to Table D4-19, pg. D-36) and in Chapter 4.6 (pg. 4.6-3, footnotes 9). The DEIS describes 3 steps that the "project sponsor" took to check the ridership forecast (Appendix D2, pg. B-104), but no steps that the Federal Railroad Administration took. The Federal Railroad Administration is a regulatory agency, so one of its essential functions is to double-check statements made by project sponsors, i.e., by the industry that the agency is supposed to be regulating. From the page following the title page of the draft impact statement: "The Project Sponsor, Baltimore Washington Rapid Rail, LLC proposes to construct and operate an SCMAGLEV system between Baltimore, MD and Washington, D.C." See the discussion in Voulgaris (2019) on how a forecast can be affected by the biases of the forecaster.

[6] The maglev DEIS public comment period was January 23 through May 24, 2021: Maryland Transit Administration (MTA) 17 March 2021, press release, https://www.mta.maryland.gov/articles/304. Redacted copy of the 2018 Louis Berger

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[7] See the Appendix of the present article for details about the Regional Travel Survey.

[8] Ridership area article: 25 March 2021: https://www.greenbeltonline.org/the-maglev-would-serve-a-small-geographic-area/.

[9] 0.93% annual growth: Appendix D2, pg. C-106.

[10] 2% article: 2 May 2021: https://www.greenbeltonline.org/maglev-wealth/.

[11] Official ridership forecast for diverted non-airport travelers calculated as diverted travelers contributing 20.579 million trips (Chapter 4.2, Table 4.2-3, pg. 4.2-7) multiplied by 85.5% of maglev trips would be by people other than BWI airport customers (Appendix D4, Table D4-19, pg. D-35). 17.6 million = 20.579 million · 0.855.

[12] MD Aviation Administration December 2020.

[13] 21%: see the Census Bureau data described in the Appendix of the present article.

[14] Official forecast of 20.579 million trips by diverted travelers: Chapter 4.2, Table 4.2-3, pg. 4.2-7.

[15] 13,091 commuters: See the American Commuter Survey data in the Appendix of the present article.

[16] How many trips the average commuter would make in a year: Appendix of present article.

[17] Official forecast for diverted commuters calculated as 20.579 million trips by diverted travelers (Chapter 4.2, Table 4.2-3, pg. 4.2-7) multiplied by 25.4% of maglev trips being made by commuters (Appendix D4, Table D4-19, pg. D-35). 5.2 million = 20.579 million · 0.254.

[18] 33–36-mile length stated in maglev DEIS: FRA 2021, Chapter 3, pg. 3-18 and 3-19. National Academies (1991), Figure ES-1, pg. 7. Car's advantages over rail: FRA 1997, pg. 7-4; FRA 2008, pg. 6-7; and FRA 2005, pg. ES-3.

[19] Eccleston 2014, pg. 258–259. NEPA regulation 2005 Section 1502.9(a) states, "the [lead author] agency shall make every effort to disclose and discuss at appropriate points in the draft statement all major points of view on the environmental impacts."

[20] 23 CFR § 771.111, https://www.law.cornell.edu/cfr/text/23/771.111.

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LXXXI. Appendix – Article Reprint: Kelley, Owen A. "Operating the maglev would increase greenhouse gas emissions, Federal Railroad Administration finds." posted in: *Greenbelt Online*. April 13, 2021.

According to the project's draft environmental impact statement, operating the proposed Baltimore-Washington maglev would increase annual carbon dioxide emissions by more than 200 million kilograms, contradicting the claims of maglev promoters.

A cartoon depicting how operating the proposed maglev

would increase greenhouse gas emissions.

Many Greenbelters are concerned that a magnetic-levitation train between Baltimore and Washington would not serve the region's transportation needs or reduce the region's road congestion. It appears that that the proposed "maglev" would be expensive to ride and harm the environment. Some community organizations warn that the maglev would increase greenhouse gas emissions while maglev promoters claim otherwise. To explore the greenhouse-gas issue, this article takes a deep dive into the maglev's 600-plus-page draft environmental impact statement. In the end, it becomes clear that the draft impact statement really does state that operating the maglev would increase greenhouse gas emissions. The deeper mystery is why did the Federal Railroad Administration bury this information in an appendix and not mention it in the Executive Summary. This article is the third in a series, with the earlier articles discussing the maglev's minimal impact on road congestion and the region's transportation needs.

Introduction

The plot has thickened with regard to the climate-change impact of the "maglev"—the magnetic-levitation rail line that has been proposed to connect Baltimore and Washington, DC. Last year, the present author estimated that constructing the maglev would release hundreds of millions of kilograms of carbon dioxide. This earlier analysis was published in the Issues Forum of the Prince George's County group of the Sierra Club and on Greenbelt Online.

Since then, a regulatory agency has published an analysis that covers the other side of the question: how much would operating the maglev increase annual carbon-dioxide emissions. The regulatory agency's findings, however, are being ignored by some companies and news organizations. This unfortunate situation will be discussed and clarified in the present article.

It was in January 2021 that the regulatory agency—the Federal Railroad Administration—published the draft environmental impact statement for the proposed maglev. This document indicated that operating a maglev between Baltimore and Washington would increase annual carbon-dioxide emissions by more than a hundred million kilograms because of the large amount of electricity that the maglev would consume. This part of the impact statement directly contradicted claims that had been broadcast for years by the company that wanted to and still wants to build the maglev, a company called Baltimore Washington Rapid Rail (BWRR).[1081]

Apparently ignoring the draft environmental impact statement, BWRR and its parent company, The Northeast Maglev, continue to repeat their claims that the maglev would reduce greenhouse gas emissions. Several newspapers mentioned later in this article have echoed the

[1081] Emission increase due to maglev operation in the DEIS (FRA 2021), Appendix D4, as described in the present article; statements by BWRR and TNEM at https://bwrapidrail.com and https://northeastmaglev.com.

companies' claims. Such reporting serves to more completely hide from public view the greenhouse-gas findings of the Federal Railroad Administration.

The Federal Railroad Administration bears some responsibility for this situation because of several editorial choices that were made in the draft environmental impact statement that the agency managed, reviewed, approved, and published. Specifically, the impact statement buries greenhouse-gas findings in an appendix and makes no mention of greenhouse gas emissions in the document's Executive Summary.

What We Knew Before This Year

To understand the draft environmental impact statement that was published this year, it helps to review prior years' statements about the proposed maglev's greenhouse gas impact.

In 2015, Wayne L. Rogers, the chairman of Baltimore Washington Rapid Rail, testified before the Maryland Public Service Commission that the maglev would reduce greenhouse gas emissions by 2 million short tons (1,814 million kilograms). Rogers stated that this figure came from a report authored by Louis Berger, a consulting company.[1082]

A summary of the Louis Berger report was also submitted as evidence in this 2015 case, and the 2 million short tons that were quoted by Rogers turn out to be an estimate for the entire lifetime of the project, not the per-year emission savings. The Louis Berger report summary states an estimate of carbon dioxide emissions from operating the maglev over the project's lifetime with no mention of the emissions that would result from constructing the maglev in the first place. Louis Berger started with an estimate of the CO_2 emissions to generate the electricity to run the Baltimore-Washington maglev. From this value, the company subtracted its estimate of the CO_2 emissions that would be avoided because of a reduction in car travel. The reasoning is that some travelers would switch from driving to using the maglev.[1083]

On an annual basis, the Louis Berger estimate of CO_2 savings is rather small. One can convert project-lifetime emissions to annual emissions by dividing by 60 years, a value found in the literature. The result is a rather small savings of only 33 million kilograms of CO_2 per year.

In comparison, the Maryland Department of Energy estimates that a much more significant reduction in annual CO_2 emissions could be achieved, at much lower cost, by expanding telework opportunities in Maryland: a 300-to-790-million-kilogram reduction each year. This impact would be about ten times greater than above-mentioned Louis Berger estimate for the proposed Baltimore-Washington maglev. An even more significant reduction could be achieved in Maryland, again at low cost, by increasing the fuel-economy standard for gasoline-powered

[1082] Rogers 2015, pg. 19; 1 short ton is about 907.2 kilograms, and 1 metric ton is exactly 1,000 kilograms.
[1083] 2.185 million short tons (1,982 million kilograms): Louis Berger 2015, pg. 7.

cars: a 3,680-million-kilogram reduction per year. This impact would be about a hundred times greater than the impact from the proposed maglev.[1084]

Even if the Louis Berger CO_2 emission estimate were accurate, it would still take the maglev about a decade or two to cancel out the CO_2 emissions from constructing the maglev. In December 2020, the present author published his estimate that constructing the maglev track and tunnel between Baltimore and Washington would release between 316 and 815 million kilograms of carbon dioxide. It appears that no organization or other individual has published an estimate for the amount of CO_2 that would be emitted to construct a maglev between Baltimore and Washington.

New In 2021

In terms of maglev developments, 2021 has already been an eventful year.

Contradicting the 2015 Louis Berger report, the draft environmental impact statement published in January 2021 asserted that maglev operation would significantly increase greenhouse gas emissions. Specifics are provided in the next section of the present article.

On February 9, 2021, the editorial board of the Baltimore Sun published an opinion that mentioned in passing that the maglev would reduce greenhouse gas emissions. The Baltimore Sun presented no data to support its opinion.

On April 2, 2021, the Washington Post published an article claiming that the maglev would "help cut greenhouse gas emissions" because the maglev would take "about 16 million car trips off the road annually." The Post's argument is specious: superficially plausible but actually flawed.

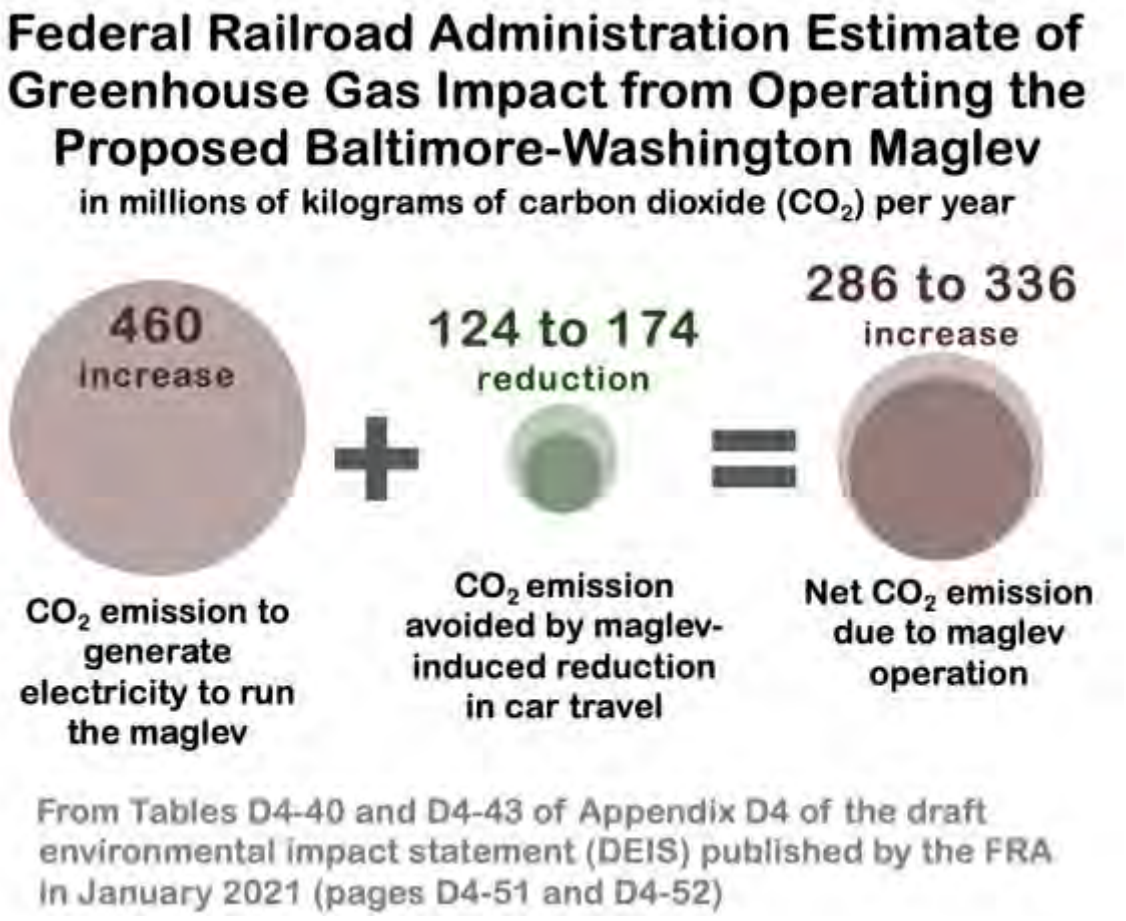
Contrary to what the Washington Post published, the amount of car travel that the maglev replaces does not determine whether maglev operation causes a net increase or decrease in greenhouse gas emissions. What determines the sign and the magnitude of net emissions is whether or not generating the electricity to run the maglev would emit more carbon dioxide than would be avoided through the maglev-related reduction in car travel. It also matters how much carbon dioxide would be emitted to construct the maglev track and related facilities. The next two sections of the present article examine in greater detail the greenhouse gas impact of maglev operation and construction.[1085]

[1084] The Louis Berger report summary did not state the company's estimate for the maglev's lifetime. Kato and Shibahara (2005) used 60 years for the useful life of the maglev track. Maryland DOE (2021) states impact of expanded telework (Table 3.2-8, pg. 103) and car emission standards (Table 3.2-5, pg. 91).

[1085] Baltimore Sun on 9 Feb 2021; Luz Lazo in the Washington Post on 2 April 2021; In April 2021, The Northeast Maglev website still claims that the maglev would reduce greenhouse gas emissions by 2 million short tons.

CO_2 from Operating the Maglev

The bottom line is that the draft environmental impact statement (DEIS) indicated that operating the maglev would emit 286 to 336 million kilograms more carbon dioxide each year than would be emitted if the maglev were not operated. This information is found in Appendix D4 of the DEIS. The mathematical details are explained in the appendix of the present article and are shown schematically in Figure 1 of the present article. The article's appendix is found at in this PDF version of the article.



A schematic diagram showing how the draft impact statement calculates the net CO_2 emissions from operating the proposed Baltimore-Washington maglev.

The case for building the maglev is weakened because the DEIS identified an ***increase*** in greenhouse gas emissions due to maglev operation. The DEIS-identified increase certainly paints the maglev in a different light than the ***decrease*** in emissions suggested by the 2015 Louis Berger report that was discussed earlier in the present article.

While Appendix D4 of the DEIS shows that maglev operation would increase greenhouse gas emissions, the DEIS contains two misleading statements on this topic.

First, consider Section 16 of Chapter 4 where it claims that the "FRA did not quantify the powerplant emissions required for [maglev] train operations and facilities" (pg. 4.16-3). In actual fact, the Federal Railroad Administration did provide an estimate for one kind of emissions. Specifically, it provided an estimate for the CO_2 emissions from powerplants providing the maglev its electricity. The agency did so in Table D4-43 of Appendix D4.

An even more misleading statement in Section 16 is that operating the maglev "will not increase greenhouse gas emissions." A careful reading of this statement's rather convoluted context reveals that the statement is meaningless. Here is the statement in its context with italics added:

> The SCMAGLEV system will operate entirely on electricity, with the exception of certain maintenance vehicles. As a result, the SCMAGLEV train ***will not increase greenhouse gas emissions***. However, as described in Section 4.19 Energy, the SCMAGLEV system will result in an increase in power consumption in the region. Therefore, an increase in greenhouse gas emissions from powerplants would likely occur. (Chapter 4.16, pg. 4.16-11)

It is embarrassing that the Federal Railroad Administration would be willing use such tortured logic in a effort to insert a misleading statement (the maglev "will not increase greenhouse gas emissions") into the DEIS.

To be perfectly clear, it is a true statement that the maglev would decrease CO_2 emissions if one looks only at the forecasted reduction in car travel due to the maglev and one ignores the CO_2 emissions from generating the electricity to run the maglev. This statement is true but beside the point. The important question is the net effect of operating the maglev. This important question is addressed in Appendix D4 of the DEIS as discussed in the preceding paragraphs.

CO_2 from Constructing the Maglev

The DEIS does not quantify the greenhouse gas emissions that would result from manufacturing the material needed to construct the maglev's elevated track, tunnel, and associated facilities. In fact, the DEIS does not even mention that such emissions would occur.[1086]

For this reason, the analysis in Kelley (2020) appears to be the only publicly available estimate of the greenhouse gas impact of constructing any portion of the Baltimore-Washington maglev. A common simplification employed by planners is to estimate the greenhouse gas impact of a construction project based on the emissions to manufacture just the cubic meters of concrete and tons of steel that the project would require.

Kelley (2020) estimated these quantities and found that constructing the tunnel and elevated track for the proposed Baltimore-Washington maglev would release 316 to 815 million kilograms of carbon dioxide. This emission range is assuredly an underestimate because Kelley did not attempt to estimate the carbon dioxide emissions that would result from constructing the maglev stations, control facility, or train-maintenance facility.

Is the Maglev "Green"?

When evaluating whether or not a project would be environmentally friendly, there is more to consider than just kilograms of carbon dioxide.

Speaking in broad terms, the proposed maglev would involve building massive concrete structures, which would decimate green space here and there. It would involve trying to entice people to travel farther and faster at great expense and with great expenditure of energy. In many ways, such a project would be the opposite of environmentally friendly. Environmental harm, expense, and "induced" travel are each documented in the draft environmental impact statement that was published in January 2021. Such evidence suggests that the maglev isn't "green." [1087]

A green future is possible for the Baltimore-Washington region. Efforts are being made to realize such a future. The maglev would do little if anything to contribute to this effort. Let's talk specifics.

Each community within the region could be strengthened so that it better meets the employment and recreation needs of its residents. Such a transformation would reduce the

[1086] In Chapter 4.16 starting on pg. 4.16-3, the DEIS explains its CO_2 emission-modeling method. The DEIS emission numbers are found in Appendix D4, pg. D4-51 to D4-53.

[1087] 15% of maglev trips would be "induced" travel, i.e., travel between Baltimore and Washington that would not have occurred if the maglev were not built: Appendix D4, Table D4-29, pg. D-45. Construction cost of $15 to $17 billion: Appendix D4, Table D4-8, pg. D-21. Negative impacts would occur to the following areas of kinds of resources: historical sites (Chapter 4.8); scenic resources (Chap. 4.9); recreational facilities (Chap. 4.7); environmental justice (Chap. 4.5); quality-of-life (Chap. 4.4); hazardous waste sites (Chap. 4.15); forests, forest-interior species, and habitats of rare, threatened, and endangered species (Chap. 4.12); wetlands (Chap. 4.11); economic harm during construction (Appendix D4, pg. D-18 to D-30); and lost revenue for Amtrak and MARC commuter trains (Appendix D4, Table D4-47, pg. D-54).

need for long-distance travel across the region, and in turn, would reduce the region's carbon footprint. In addition, expanded options for teleworking could be made available for when interaction with a distant workplace is required. Just this sort of vision was articulated years ago and has motivated decisions within a planning body called the Metropolitan Washington Council of Governments. Describing the idea, this organization has stated the following:

> Locating homes, employment centers, schools, and other activities in closer proximity, and expanding transit, telecommuting, bicycling, and walking options can reduce vehicle miles of travel per capita and improve accessibility throughout the region (MWCOG 2010, pg. 18)

The Council states elsewhere that it intends for "expanding transit" to mean the following: expanding transportation options that maximize accessibility and affordability. The proposed Baltimore-Washington maglev would fail to contribute to this goal because the ticket price would be $40 to $80 one way, per person.[1088]

Conclusion

The Federal Railroad Administration has determined that the proposed Baltimore-Washington maglev would increase greenhouse gas emissions each year that it were operated. This increase is relative to the emissions that would occur otherwise if the maglev did not operate and people used other transportation options. This greenhouse-gas emission increase is based on information stated on pages D4-51 to D4-53 of Appendix D4 of the draft environmental impact statement (DEIS). The Federal Railroad Administration published this document in January 2021.

The greenhouse-gas discussion in the DEIS is summarized by the following list:

- Maglev operation would increase net CO_2 emissions by 286 to 336 million kilograms per year relative to the No Build option.
- The net CO2 emissions are the sum of two factors: 460 million kilograms of CO_2 emissions annually from generating the electricity to run the maglev and 124 to 174 million kilograms of CO_2 emissions avoided annually assuming that some car travel would be replaced by maglev travel.
- The net CO_2 emissions are not stated explicitly in Appendix D4, but they may be calculated from data found in two tables of Appendix D4.
- The DEIS does not estimate the CO_2 emissions from manufacturing the concrete and steel to build the maglev's elevated track, tunnel, and other facilities.
- The DEIS Executive Summary makes no mention of the maglev's impact on CO_2 emissions.

[1088] Accessibility quote: MWCOG 2010, pg. 9; ticket price: Appendix D2, pg. D-107, D-108.

- It is unclear what would motivate the Federal Railroad Administration to deemphasize in the DEIS its findings about the greenhouse-gas emission impact of maglev operation. It is also unclear why the agency did not estimate the greenhouse-gas emission impact that would result from maglev construction.

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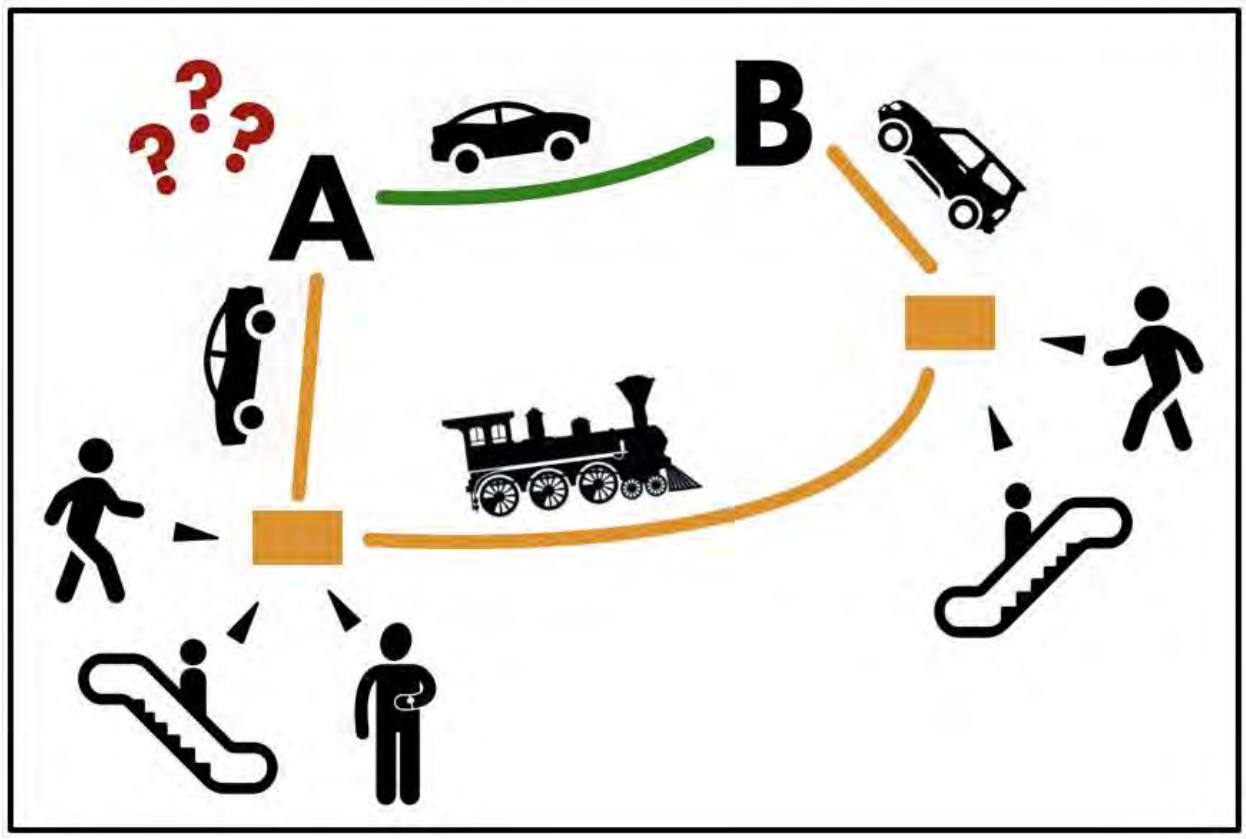
About the Author: *Owen Kelley has a science background, and in his free time, he enjoys exploring and writing about the forests around Greenbelt. In recent years, he has written several articles about the proposed Baltimore Washington maglev.*

Disclaimer: *Kelley is writing in his capacity as a individual citizen examining a non-partisan issue of interest to the public. If errors are suspected, please contact him at okelley@gmu.edu.*

LXXXII. Appendix – Article Reprint: Kelley, Owen A. "The Maglev would serve a small geographic area." *Greenbelt Online*. March 25, 2021.

Most maglev customers would start and end their trips near a maglev station, limiting the project's utility to the region. The maglev's draft environmental impact statement leaves it to the reader to piece this story together.



How much time would riding the maglev really save you? Enough that you'd pay the ticket price instead of driving directly to your destination?

This is the second in a series of articles about the proposed Baltimore-Washington maglev, reconsidered in light of the project's draft environmental impact statement that was published in January 2021. The first article in this series examined whether the maglev would significantly reduce regional road congestion. This second article examines whether the maglev would serve the whole Baltimore-Washington region or just relatively small areas near the three maglev stations.

To explore this question, the article estimates how far from the maglev stations most maglev customers would start and end their trips based on information in the draft environmental impact statement and other documents. One approach to this question is to calculate how much time the maglev would save people relative to the time that would otherwise be spent driving directly to the destination. It is disappointing that the draft impact statement itself lacks a map to show where most maglev customers would start and end their trips.

Introduction

A magnetic-levitation rail line has been proposed to connect Baltimore and Washington. To evaluate this proposal, it would help to have a sense of where most of this rail line's customers would start and end their trips.

It is important to know where most "maglev" customers would start and end their trips because much of the economic benefit from operating the maglev may concentrate in the same area. The maglev's draft environmental impact statement (DEIS) is vague about how geographically concentrated would be the maglev ridership and economic benefits. Would they be concentrated tightly near maglev stations or spread out more evenly over a large region? The DEIS quantifies the maglev's economic impact over vast area, the Washington-Baltimore Combined Statistical Area. In contrast, the DEIS calculates its forecast for the maglev's ridership over a smaller, but still large, area that is defined by a 25-mile radius around each maglev station. These areas are shown in Figure 1 of the present article.[1]

As explored in the present article, even a 25-mile radius seems like an overestimate of the maglev's reach. Instead, most maglev customers would probably start and end their trips within a small subset of the 25-mile-radius area around each maglev station. The present article suggests that most counties in the Washington-Baltimore Combined Statistical Area would have few if any maglev customers starting or ending their trips there.

Elected officials and the public would like to know which counties and cities would benefit from the maglev and which would be harmed by its construction and operation. For example, the DEIS estimates that 390 to 440 jobs would be created directly or indirectly as a result of operating the maglev, but the DEIS is silent on the question of where these jobs would be located. The maglev's many negative impacts are quantified in various sections and appendices of the DEIS.[2]

It would have been helpful if the DEIS had plotted contours on a map or used some other means to visualize where most maglev customers would start and end their trips. The public is unable to find this information in official sources, such as the studies, memos, and data requests that are the source of the DEIS's maglev ridership forecast. These documents are hidden from public view. Their existence is known only from footnotes in the DEIS. Fortunately, enough information is published in the DEIS to guide the analysis in the present article.

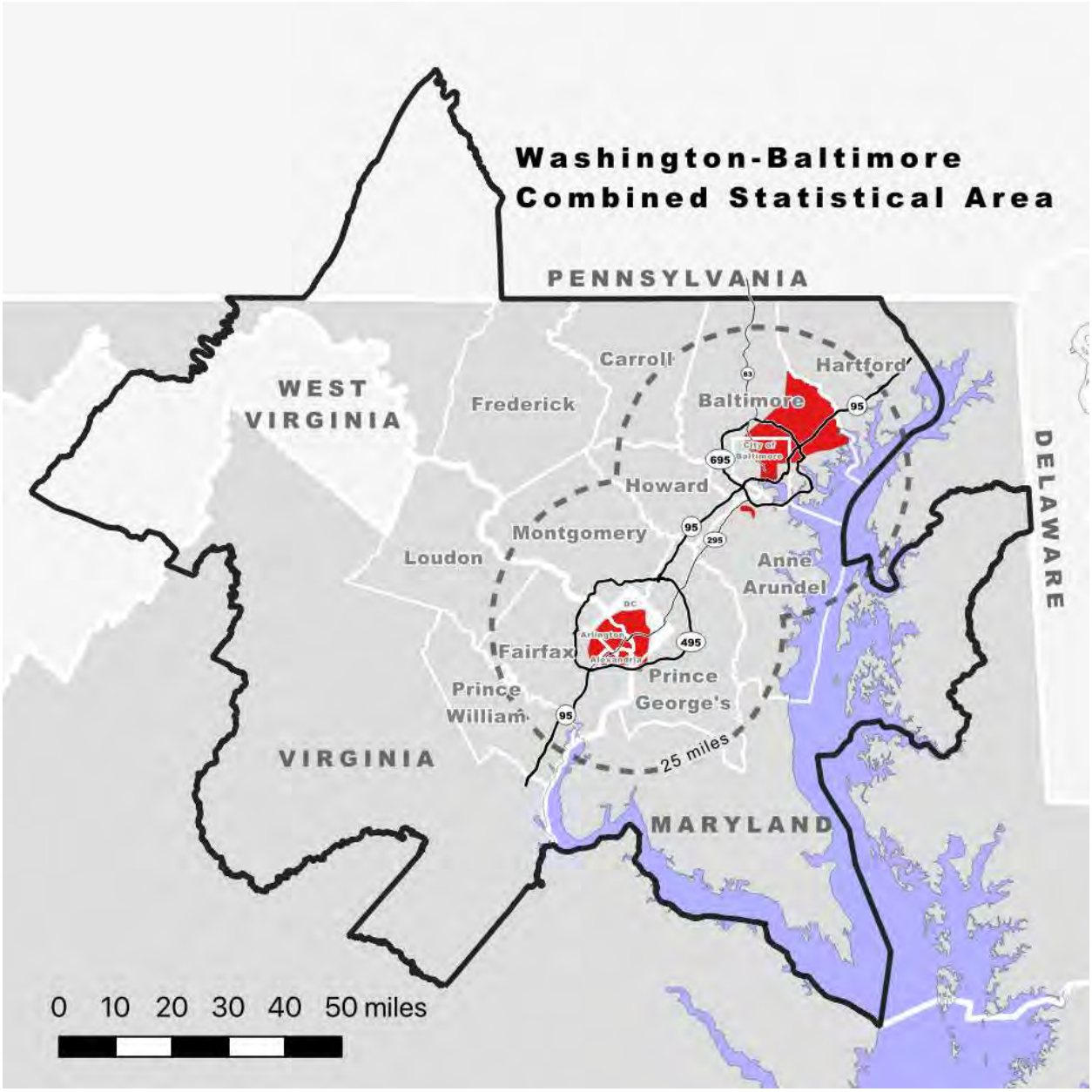


Figure 1. *A map showing four areas discussed in relation to the proposed Baltimore-Washington maglev. The red area represents one realization of where most maglev customers would start and end their trips during rush hour. The same red area is also shown, at a higher magnification, in Figure 2.*

Background

In January, 2021, the Federal Railroad Administration published the draft environmental impact statement (DEIS) for the proposed Baltimore-Washington maglev. The DEIS states that using the maglev would save a traveler 8 to 27 minutes relative to the time that the traveler would otherwise spend driving directly to his or her destination.[3]

Because maglev tickets would be so expensive, it is plausible that people would ride the maglev only if it saved them at least 8 to 27 minutes. The DEIS states a ticket price of $40 to $80 per person, one way. The cost of driving between Baltimore and Washington is approximately $7 per car, one way, based on the average trip length stated in the DEIS and the AAA estimate for the cost of fuel and maintenance for a typical car. As a result, the maglev-vs.-car price difference is $33 to $73, one way, with one person in the car, and much more than $33 to $73 with multiple people in the car, such as on a date or family outing.[4]

Travel-time saved and travel cost are factors that transportation planners consider when forecasting the ridership for a transportation proposal. The DEIS states that these factors were included in the model that forecast the ridership for the proposed Baltimore-Washington maglev.[5]

Method

The present article identifies the maglev ridership area by exploring where the maglev would save a customer approximately 8 to 27 minutes relative to the amount of time that the customer would otherwise have spent driving directly to the destination.

To estimate travel-time saved, first pick a trip origin and destination with one of the points in the Washington area and the other point in the Baltimore area. Calculate the time to drive between these two points. From that time, subtract the time that it would take to travel between the same two points using the maglev, which in simplest form would mean driving to a maglev station, riding the maglev, and riding a car to the destination. Various online applications can provide car travel time between any two points, and time spent on the maglev itself can be estimated from information in the DEIS and other documents. The details of this calculation are described in Appendices 1 and 2 of the present article, which are available in the PDF version of this post.

The present article estimates travel-time saving for a scatter of trip origin-and-destination pairs in order to build up knowledge of where on the map the maglev travel-time savings would be in the 8-to-27-minute range that the DEIS provides. The computations are made slightly more complicated because two stations are proposed at the Baltimore end of the trip, one at Camden Yards and one at Baltimore/Washington International (BWI) airport. The solution is to calculate travel-time saved for one or the other Baltimore maglev station, and then use whichever value is greater.

One simplification employed in the present article is to assume that travel to and from the maglev stations occurs by car, without modeling the option of subway travel to and from the Washington maglev station. Supporting this simplification, the analysis in Appendix 3 of the present article finds that, in almost every case, a subway ride would not save time over driving to the downtown Washington maglev station. The existence of the Washington subway has little impact on the geographic extent of the maglev ridership area.

The calculation method used here is kept simple because the goal is merely to determine whether the maglev ridership area would fill the entire 25-mile-radius area that is studied in the DEIS or if the ridership area would be much smaller than that.

Results

The three sections below identify jurisdictions in which most maglev travelers would start and end their trips during rush hour or in light traffic. Also identified are jurisdictions with little area or no portion of them served by the maglev regardless of the road-congestion level. One finding is that the proposed Baltimore-Washington maglev would have an easier time competing against car travel during rush hour than when road traffic is light. In other words, the maglev ridership area is larger during rush hour than when road traffic is light.

The Maglev Ridership Area during Rush Hour

How far one can travel from a maglev station and still save 8 to 27 minutes depends on how close the other end of the trip is to the other maglev station. Figures 2 and 3 show two possible realizations of the maglev ridership area during rush hour. One option emphases access to the Washington area and the other option emphases access to the Baltimore area.
Figure 2 emphases locations at the Washington end of a rush-hour trip while still reaching an appreciable number of locations in the Baltimore area. Optimized in this way, the maglev ridership area would include about half of the District of Columbia; most of the City of Alexandria, Arlington County, and City of Baltimore; and less than half of the Baltimore County suburbs.

In contrast, Figure 3 shows the maglev ridership area optimized in the opposite way. Figure 3 emphasizes locations at the Baltimore end of the trip. In this case, a portion of eastern Carroll County and northern Anne Arundel County can be reached. This portion of Carroll County is sparsely populated and this portion of northern Anne Arundel County contains Glen Bernie and Pasadena. Few people would make use of the maglev in this scenario because only a small portion of the District of Columbia can be reached at the other end of the trip. The following portions of the District of Columbia cannot be reached: the Capitol building, Capitol Hill, most residential areas in the District of Columbia, and the federal offices just south of the National Mall.

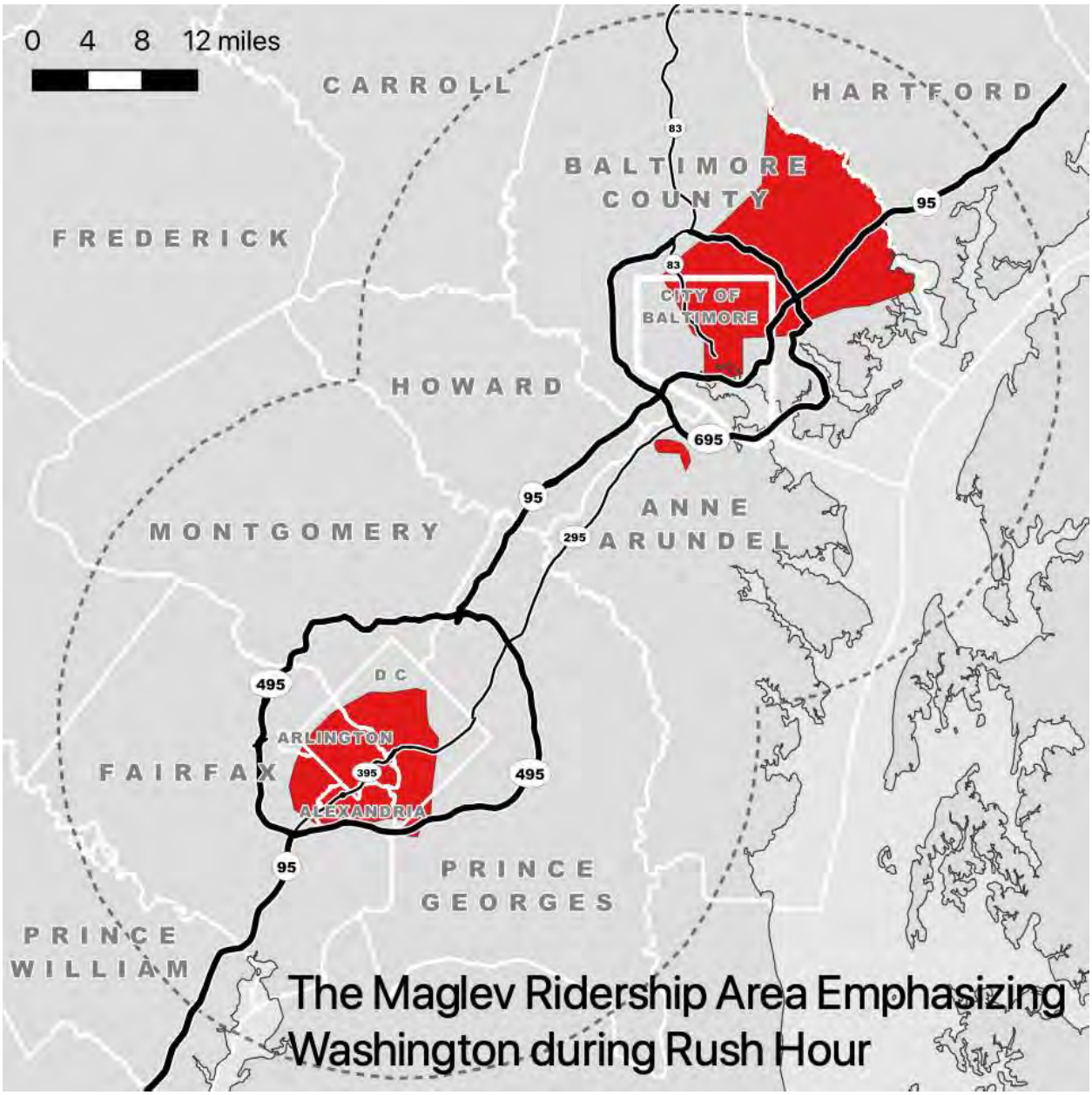


Figure 2. *During rush hour, the maglev ridership area (shown in red). This area is optimized to reach many locations at the Washington end of the trip. The ridership area is reduced at the Baltimore end of the trip so that the goal can still be realized of the maglev trip saving the traveler at least 8 to 27 minutes of travel-time relative to the time that would otherwise be spent driving directly to the destination.*

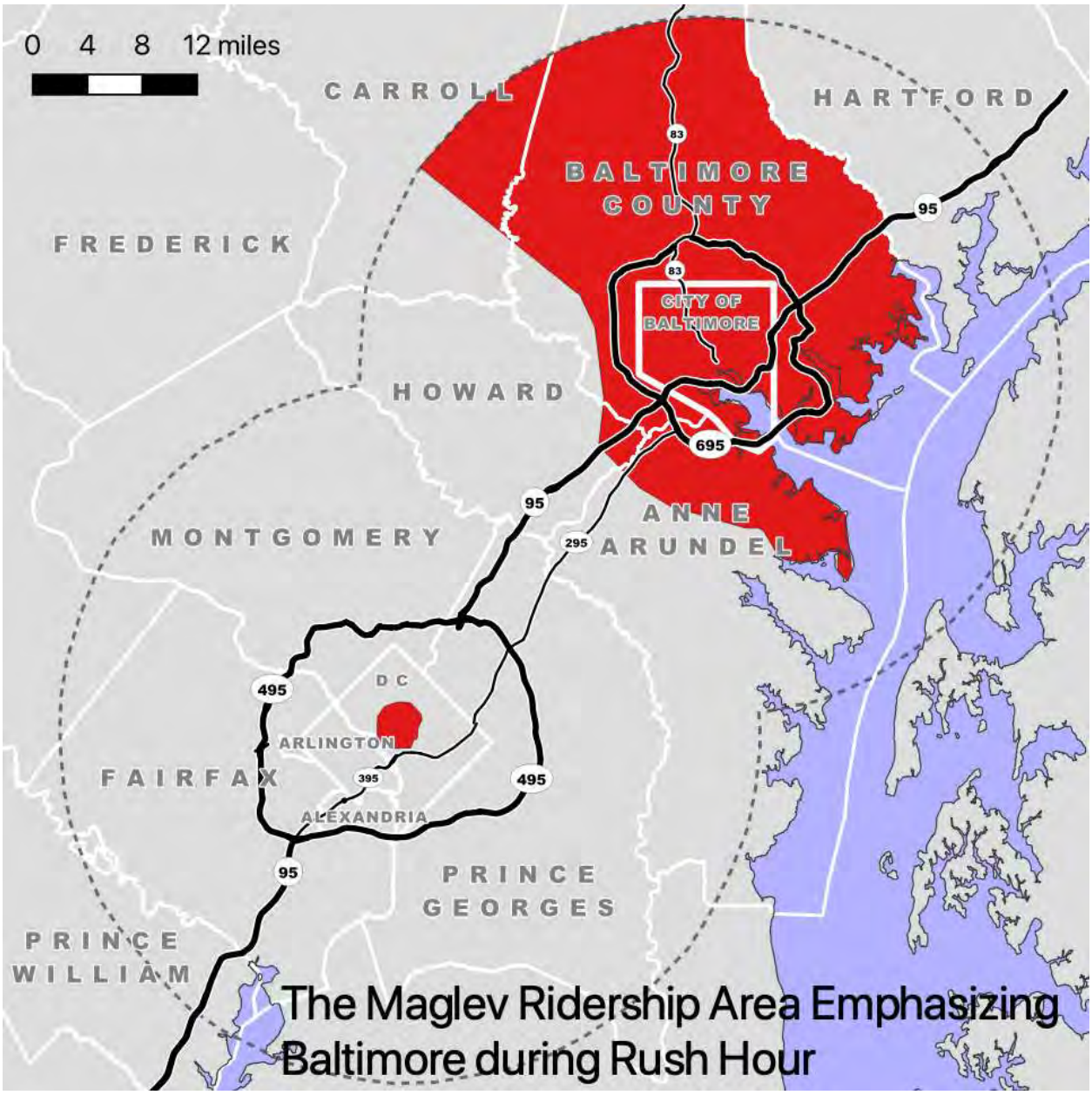


Figure 3. *The same as Figure 2 except that the maglev ridership area (shown in red) is optimized to reach more locations at the Baltimore end of the trip during rush hour. Simultaneously, locations reachable at the Washington end of the trip are reduced so that the goal can still be realized of the maglev trip saving the traveler least 8 to 27 minutes of travel time relative to the time to drive directly to the destination. Few people would make use of the maglev under these circumstances because few locations can be reached in Washington.*

The DEIS forecasts that approximately 15% of maglev travelers would be airline passengers headed to or from BWI airport, and the present article neither confirms nor questions that forecast.[6]

The present article does, however, suggest that the BWI maglev station would have limited utility for points other than the airport's main terminal. Figure 2 shows a small maglev ridership area that is located just to the north and east of BWI. From the rest of the business parks and residential areas within a few miles of BWI, one can easily reach Interstates 95 and 295, which are direct routes to Washington. Starting from these locations, one can reach the BWI main terminal from only one direction (the west) and the airport's main road loop can be slow due to congestion. In this way, the existing road network would geographically isolate a maglev station adjacent to the BWI main terminal.

To summarize the rush-hour results, the maglev would save the traveler approximately 8 to 27 minutes over an area that is much smaller than the area of the DEIS-supplied 25-mile radius about the maglev stations.

Careful examination of Figures 2 and 3 reveals that the maglev ridership area is bunched to the side of the maglev station that is furthest from the other maglev station. In other words, the maglev ridership area is mostly south and west of downtown Washington and north and east of downtown Baltimore. This makes sense because you aren't going to save much time using the maglev if your trip starts and ends between the two cities. In this case, traveling to and from the maglev station would take you far out of your way.

Another thing evident in Figures 2 and 3 is that the maglev ridership area is larger at the Baltimore end of the trip than at the Washington end of the trip. This asymmetry is due to the fact that the proposed Washington maglev station at Mount Vernon Square would be stuck in the middle of an area with especially slow rush-hour traffic and many traffic lights. In contrast, the maglev station proposed for Baltimore's Camden Yards would be a short detour from routes that would take drivers initially south and west toward downtown Baltimore along Route 83 and Interstate 95 and subsequently south toward Washington.

The present article excludes Hartford County from the maglev ridership area at the Baltimore end of the trip. Slightly less than half of Hartford County is within the DEIS's 25-mile radius from the maglev station proposed at Baltimore's Camden Yards. The lack of an existing market for the maglev in Hartford County is indicated by US Census data. Census data shows that almost no Hartford County residents commute to jobs in Washington and almost no Washington residents commute to jobs in Hartford County. Following the same sort of logic, the DEIS states that it shrunk or expanded its 25-mile-radius area, as necessary, to reflect existing travel patterns.[7]

The Maglev Ridership Area when Road Traffic is Light

In light traffic, the maglev would save travelers 8 to 27 minutes over an even smaller area than it would during rush hour. Two factors contribute to the maglev's limited utility when road traffic is light. First, directly driving to the destination is much faster in light traffic than in rush-hour traffic. Second, maglev trains would be less frequent outside of rush hour, and therefore

one would wait longer for the next maglev train. These two factors influence the size of the maglev ridership area shown in Figure 4.

When road traffic is light, the utility of the maglev is limited in several ways. First, only a small portion of downtown Washington and downtown Baltimore would be included in the ridership area, as shown in Figure 4.

Second, Appendix 2 of the present study suggests that the maglev would save travelers only 10.5 to 17.5 minutes of travel time when road traffic is light, i.e., the lower half of the target range of 8 to 27 minutes. Such limited travel-time savings suggests that, outside of rush hour, only wealthier maglev riders would find the maglev travel-time savings sufficient to justify the $40 to $80 maglev ticket price.

Last, the ridership area depicted in Figure 4 applies only to various non-rush-hour times during which there are maglev departures at least every 15 minutes. In contrast, maglev departures that are 30 minutes apart may occur during off-peak weekend hours, and at these times, the maglev ridership area would essentially disappear.

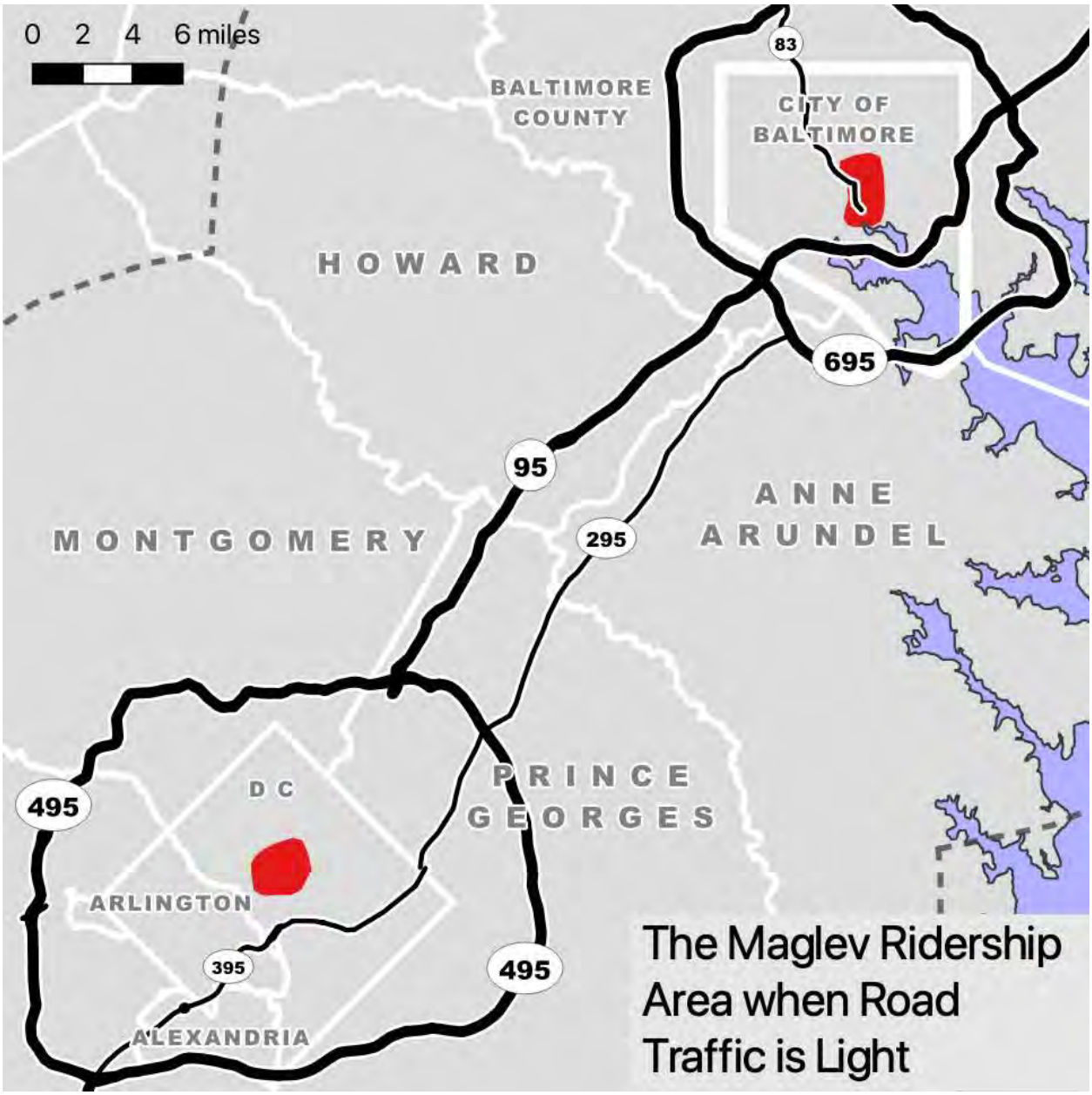


Figure 4. *The maglev ridership area when road traffic is light. Because road travel is so much faster in light traffic and maglev trains would be less frequent outside of rush hour, the maglev can outcompete car travel over a smaller area in light traffic than during rush hour. About 10 to 18 minutes of travel time would be saved when road traffic is light if both the trip origin and destination are in the portion of downtown Baltimore and downtown Washington that are colored red in this map.*

Jurisdictions Not Served by the Maglev

The present article finds that many counties are outside of the area served by the maglev but are included in the DEIS study area. Based on the travel-time analysis in the present article,

elected officials and members of the public should read with skepticism any claim that the Baltimore-Washington region, as a whole, would benefit from the maglev rather than a few small areas near a maglev station.

Even during rush hour, few if any maglev customers would start or end their trip in the majority of the counties within the jurisdiction of the Metropolitan Washington Council of Governments or the Baltimore Metropolitan Council. These counties are outlined in white in Figure 1 of the present article. In addition, few maglev customers would start or end their trips in the majority of the counties in the Washington-Baltimore Combined Statistical Area, which is also shown in Figure 1. In fact, few if any maglev customers would even pass through these counties on their way to or from a maglev station.[8]

Conclusion

The present analysis compares travel time when a trip is made using the proposed maglev between Baltimore and Washington or is made entirely by car. The results of the analysis are maps of the maglev ridership area, the area near maglev stations where most maglev customers would start or end their trip.

In the present article, the maglev ridership area is modeled as the area where the maglev would save a traveler approximately 8 to 27 minutes compared to the time that the traveler would otherwise spend driving directly to his or her destination. The maglev's draft environmental impact statement (DEIS) asserts that a maglev customer would save this much time. More importantly, travel-time savings at least this great are a plausible prerequisite for people who travel between Baltimore and Washington to find the maglev to be an attractive option in light of the maglev's $40-to-$80 ticket price per person, one way.

During rush hour, the present article finds that the maglev would save travelers about 8 to 27 minutes on trips that start and end in at least half of the area of each of these jurisdictions: the District of Columbia, the City of Alexandria, Arlington County, Baltimore County suburbs, and the City of Baltimore. Even during rush hour, few if any maglev customers would start or end their trips in the majority of the counties within the jurisdiction of the Metropolitan Washington Council of Governments or the Baltimore Metropolitan Council.

When road traffic is light, the maglev ridership area would be even smaller. It would include, at most, only a portion of downtown Washington and downtown Baltimore. The reason for the maglev's limited utility when road traffic is light is that there would be fewer maglev trains per hour than during rush hour and car travel would be much faster than during rush hour.

During both rush hour and periods of light road traffic, most maglev riders would start and end their trips in a small portion of the 25-mile-radius area about each maglev station, the 25-mile radius that the DEIS used in its ridership forecast. The present article comes to this conclusion, and the DEIS neither confirms nor denies it. Elected officials and the public should investigate

for themselves whether the maglev's forecasted economic benefits are realistic given that the DEIS forecasted these benefits over such a large area and the present article finds that maglev ridership would be concentrated over a much smaller area.

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Notes

[1] CSA: Chapter 4.6, pg. 4.6-1; 25-mile radius: Appendix D2, pg. C-106.

[2] 390-440 jobs: Chapter 4.6, pg. 4.6-8. Negative impacts would occur to the following areas of kinds of resources: historical sites (Chapter 4.8); scenic resources (Chap. 4.9); recreational facilities (Chap. 4.7); environmental justice (Chap. 4.5); quality-of-life (Chap. 4.4); hazardous waste sites (Chap. 4.15); forests, forest-interior species, and habitats of rare, threatened, and endangered species (Chap. 4.12); wetlands (Chap. 4.11); economic harm during construction (Appendix D4, pg. D-18 to D-30); and lost revenue for Amtrak and MARC commuter trains (Appendix D4, Table D4-47, pg. D-54).

[3] DEIS: FRA 2021; 8-27 minutes: Appendix D4, pg. C-6.

[4] The DEIS considered and rejected a maglev ticket price as low as $27 and chose instead to base its ridership forecast on a $40–$80 ticket price: Appendix D2, pg. D-107, D-108; $7.08 cost of making a typical trip between Baltimore and Washington by car based on a 39.6-mile trip length (Appendix D4, Table D4-59, pg. E-82) and a $0.1787-per-mile cost for medium sedan (AAA 2020).

[5] Willumsen 2014, Chapter 5; Ortuzar and Willumsen 2011, Section 15.4; Ridership forecast model: Appendix D2, pg. B-104 to E-110.

[6] Only 14.5% of maglev trips would be downtown-to-airport, with the remaining 85.4% downtown-to-downtown: Appendix D4, Table D4-25, pg. D-42.

[7] 25-mile radius: Appendix D2, pg. C-106; US Census Bureau (2015).

[8] Map of counties in MWCOG (2010, pg. 5) and BMC (2020, pg. 6).

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LXXXIII. Appendix - Reprint: Kowalski, M. "SCMagLev DEIS Part 1 – Evaluation and Summary – NO BUILD.

SC Maglev DEIS Part 1 – Evaluation and Summary – NO BUILD

EXECUTIVE SUMMARY

The DEIS for the SC Maglev has huge omissions on every topic leading to critical and major deficiencies:

- The DEIS proposes what amounts to a segment of a much larger line, poorly concealed as a stand-alone system to improve primarily commuting and business between Washington, Baltimore, and BWI.
- The critical SC (Super Conducting) components are presented only at the top level without any detail, leaving unanswered a host of critical technology questions. This belief-based appeal to only the heritage successes of the Japanese system is an abdication of responsibility.
- The Needs analysis is largely based on traffic studies that predate COVID-19. Thus, the economics analysis is outdated. Much greater use of teleworking may eliminate a large part of the need. The traffic and economics analyses are partly based on data (Origin/Destination pairs, ridership data requests) that are not available to the public. Full disclosure is required.

- Investment in improving and modernizing current infrastructure (Amtrak, MARC) and possibly adding a 3rd lane to the Baltimore Washington Parkway would satisfy needs at much less cost.
- A proper cost analysis including debt servicing and margins has not been done. Even internal consistency in costs is lacking. Comparison to SC maglev attempts elsewhere indicate that huge cost overruns will ensue, thus requiring either a tax payer bailout or total abandonment.
- The high cost of tickets ($60 one-way between end-stations) means the SC Maglev would benefit mostly the wealthy. This project does not achieve economic equity for the community.
- Large communities in Prince George's County along the viaduct (Greater Laurel, Greater Greenbelt) will suffer tremendous adverse traffic impacts during construction, threatening gridlock. Adverse impacts on residential neighborhoods in close proximity to the viaduct will be severe, particularly in decreased property values. An analysis of South Laurel communities shows yet additional adverse impacts in traffic flow though Baltimore-Washington Parkway (BWP) interchanges, Electromagnetic Interference (EMI), noise, vibration, and aesthetics during both construction and operations. As green space is erased quality of life will degrade. The synergism of these impacts will change the nature of the communities towards urbanization. All this will happen without any benefit, as there is no station in Prince George's County.
- Safety and Security plans are underdeveloped to the point of negligence. The proponents talk about the importance of importing Japan's culture of safety but present almost nothing to indicate how that is achieved in technology, management or operations. The present security plans are more appropriate to a regular train system than a high-technology showcase. Possible terrorist activities are nearly ignored, while the SC maglev system itself exhibits a host of vulnerabilities.
- Transmission lines might not be able to supply sufficient electrical power without upgrades, leading to increased cost and schedule delays. Most importantly, the impact of the SC Maglev on grid reliability is unknown and potentially very dangerous.
- The SC maglev project will threaten the missions of both the Beltsville Agricultural Research Center (BARC) and the Patuxent Research Refuge (PRR). The areas impacted are biologically well-studied landscapes that have yielded important discoveries. There will be an irreplaceable loss of biodiversity, which cannot be recreated elsewhere. The aggregate impacts on wildlife, flora, waterways, wetlands, and farm land will be devastating and permanent.

The reviewers strongly oppose construction of the SC Maglev. While SC Maglev train technology may have some future role to play somewhere in the US, the present DEIS unequivocally shows that this is the wrong project in the wrong place and at the wrong time. No improvements or modifications to the DEIS can produce an acceptable FEIS that selects one of the 12 proposed alignment alternatives. The reviewers unequivocally endorse the NO-BUILD option.

PREFACE on the NEPA PROCESS

Fundamental questions concerning the NEPA process:

1. The DEIS was prepared by the FRA (Federal Railroad Administration) with technical assistance from MDOT (Maryland Department of Transportation, Ch.0, sec ES.1, pg ES-1) and technical input from BWRR (Baltimore-Washington Rapid Rail, LLC; sec ES.1.2, pg ES-3). Appendix A shows that the preparation team consists of individuals from FRA, MDOT, and contractors/consultants. The signing authority is FRA. Further, in sec ES.8, pg 26 the Next Step section states that after incorporating any changes caused by public comments the FRA completes a final FEIS and issues a ROD (Record Of Decision), which appears to be the critical go/no-go approval point.

To the average person there is an appearance of conflict of interest: the federal agency in charge of the EIS process also makes the decision on *whether* to build and *what* to build. The reviewers have already heard sentiments expressed by neighbors as to this being a "done deal". The last sentence of section 1.2.3 of the DEIS is insufficient to dispel this belief and none of us are experts on NEPA.

As a retired federal employee the principal reviewer recalls strongly that it is the duty of all federal agencies and personnel *at all times* to avoid <u>even the appearance</u> of a conflict of interest and to <u>embrace fairness</u>. Thus, it is strongly recommended that the FRA make public an elaboration on section 1.2.3 concerning NEPA process and decision areas of responsibility within the FRA. This might be done easily by posting an addendum, perhaps an org-chart and short explanation on the MAGLEV website. In the interest of fairness this should be done as soon as possible while people are deciding whether it is worth their effort to comment. At last resort, such an explanation should appear in the FEIS and ROD.

2. The DEIS appears to have no explanation for the criteria used in the ROD selection, except that given by the Project Sponsor in Appendix G.11 as to their determination of a Preferred Alternative Selection. Obviously, the FRA selection will involve a complex decision matrix. Has this matrix already been determined, and if so, what weighting is put on various aspects, e.g., transportation needs vs. environmental impacts? Will this matrix be explained in the ROD?

3. Appendix A.5 lists 83 individuals from FRA, MDOT, and assorted contractors/consultants who prepared the DEIS. The preparers have impressive credentials. However, <u>no one</u> in this list appears to have a degree in, understanding of, or experience in SC magnet technology. Indeed, from the DEIS it is not clear that BWRR yet employs any such expert. In producing a FEIS and a ROD, it is essential that at least one expert in this field is included in the NEPA decision process. While there has not been any SC maglev in the US, there are capable experts. An internet search revealed one possibility, but no contact was made with this individual: <u>http://www.thompsonrd.com/</u>. Experts in arcane technology tend to be advocates, so care

must be taken to ensure that the person(s) selected are neither advocates nor opponents of SC technology.

4. The DEIS has little discussion of oversight. The one exception appears to be the annual FRA audit of SSP (System Safety Plan) compliance and other possible audits. Who ensures that the proponents follow other regulations and live up to promised mitigations? Who monitors and assesses progress? Who determines if the project is getting into trouble or should be terminated? The FRA can issue RPAs or other regulatory measures, but impacts are diverse (transportation, environmental, social) and many appear to lie outside FRA's core expertise. Certainly, any of the FRA's positions/decisions would have to be issued before a Build Alternative was selected in a FEIS.

EVALUATION (AND SUMMARY) OF DETAILED COMMENTS

Document Organization: This section is an evaluation of the DEIS. Topics may include a summary of from the "SC Maglev Part 2 - Detailed Comments – NO BUILD" attachment (as indicated) or not. Items are grouped in three ranks of deficiency: Critical, Major, and Other. Critical Deficiencies deal with the entire rationale for this project and must be addressed in any FEIS. Major Deficiencies must also be addressed with sufficient detail in any FEIS. Major Deficiency topics follow topics in the DEIS, but not necessarily in the same order. Other Deficiencies are relevant and important but may require less detail to address. In all deficiency categories topics are not prioritized; each has approximately the same weight. The addition of Detailed Comments (Part 2) for some topics and not others is a function of reviewer expertise and does not indicate greater importance. All acronyms are defined in Appendix A of the DEIS. Part 2 contains a Table of Contents for both Parts 1 and 2.

I. Critical Deficiencies

A. **Independent Utility:** It is well known from the SC Maglev and TNEM (The Northeast Maglev) websites that the SC Maglev project is meant to be the first link in an eventual Washington-to-New York design. The only data presented are for a stand-alone commuter line with only three stops. Is this DEIS for only one portion of a much larger project compliant with federal law? What happens if any one of the jurisdictions in Delaware, Pennsylvania, New Jersey, and New York refuse? Without the entire run to New York, the proposed maglev is a system without rational purpose. This DEIS should be voided and replaced with a DEIS for the entire length, not just this demonstration link.

B. **Maglev Critical Components (and SUMMARY):** There is an appalling lack of detail about of the maglev critical components, notably the SC magnets, the train cars, the guideway, and the control system. Regardless of the impressive Japanese safety record or their technical success the NEPA process cannot abdicate responsibility. The SC components appear to be taken as a given with known provenance and thus requiring no explanation. Section 3.1

appears to be only a top-level description in the technology: it utterly fails to reassure. While this is certainly a Draft EIS, the paucity of information on critical systems makes it impossible to determine their impact in multiple domains, including construction, cost, schedule, operation, economics, and safety. Hence the justification of the entire project is called into question. Whether this omission by the proponents was intentional (to defer to the FEIS) or an oversight, it does not bode well. Given the sparkling claims made about system heritage, it is indeed strange that the proponents have only a few references to the critical technology buried in Appendix D.11. Surely a wealth of technical data from the Japanese heritage test track must exist. Much more than a top-level summary should have been included in the DEIS and as a separate section and/or Appendix.

The Japanese maglev system is claimed as a proven system with a 50-year heritage; this overstates the case. Moreover, references within the DEIS to the "bullet train" heritage of safety should be qualified. Both trains are fast but it is misleading to claim heritage from one technology to another while at the same time advertising the other as transformational. Further, the current Yamanashi test track extension was completed only in 2013, and numerous technical and operational upgrades were made to predecessors in earlier years. The Yamanashi track has been semi-operational in something akin to a tourist mode. The true test of an operational intercity system will not occur until 2027, when extensions of this line are completed. Yet, the system is simultaneously advertised as both transformational and a proven technology, a logical inconsistency. In essence, the proposed SC maglev from Washington to Baltimore is no more than a Beta-test of an operational system to be built contemporaneously with the Japanese Beta-test system.

Finally, while the system is claimed to be transformational, this is only partly true. The system is unusual in that the trains are not independently propelled, but by no means unique. The SC magnet systems on the train cars and the guideway systems together comprise the "engine". It is an AC electric motor unwound into a linear geometry. Both the cars and the guideway are needed; either one alone does not work. Linear traction systems are not transformational, and the best historical example is the famous San Francisco cable car system, where the train car is pulled by a cable and has no motor. Electric street cars and buses have a motor but electrical power is delivered using overhead wires, and the Washington DC Metro is powered from a 3rd rail. The transformational part of the SC maglev is the high speed achievable through the use of superconducting magnets for propulsion and within a dedicated guideway, which is itself part of the engine. However, transformational technologies bear a greater burden of proof and validation to be acceptable for immediate public use, with both safety and a sustainable business model being prime challenges. Historical examples of disastrous transportation systems that claimed to be transformational include the Titanic, the Hindenburg, the Challenger & Columbia Space Shuttles, and the Concorde. The common element among these examples was a costly technology that benefitted primarily a wealthy clientele and it was safety that triggered their demise. (It is noteworthy that after the Challenger disaster the US government shifted the use of Shuttles away from launching commercial telecom satellites).

C. **Effects of COVID-19:** All the economic projections appear to be done using traffic studies that appear to pre-date COVID-19. The proponents acknowledge reductions experienced in mass transit systems (pgs 2-8, 2-10, 2-14), but such reductions are not mentioned in the traffic analysis, section 4.02 and its appendix. Two paragraphs in Section 4.6.3.2 (pg. 4.6-12 and -13) argue that telecommuting might make the SC maglev more attractive for commuters going into their office only a few days per week. However, higher telecommuting rates might also lower commuter ridership below the viability threshold. In sum, the sensitivity of ridership and hence economics to telework has not been adequately explored. The situation is clearly dynamic and the proponents offer no projections for the post-COVID-19 world. To be sure, it is expected that recovery from the pandemic will return the transportation and economic sectors to some normal but that normal may not be the same as pre-COVID-19. Both government and business have embraced telework at levels never before seen. Traffic studies should be repeated before an FEIS is released. https://www.pymnts.com/travel-payments/2020/post-COVID-19-battle-for-business-travel-rages/

II. Major Deficiencies

A. **Transportation (and SUMMARY):** The traffic analysis has severe flaws. It does not list the O/D pairs used to generate ridership nor discuss how sensitive results are to input values. More fidelity should be present in the results in Tables D.2-15 and D.2-16. Nevertheless, the current results do not support the claim that the SC maglev reduces regional roadway congestion compared to the NO BUILD option. Indeed, it makes things slightly worse.

NO commuter in Greater Laurel (population 140,303) or Greater Greenbelt (population 31,777) is likely to use the maglev for daily commuting. It goes against common sense. Ground truth, based on a long history of observation, agrees well with the MWCOG and BMC models and existing analysis along the BWP. This also suggests that much cheaper alternatives (e.g., a 3rd lane on the BWP, Amtrak, MARC), refurbishment of interchanges, and diligent road maintenance can restore LOS to acceptable values without resorting to the expensive SC maglev.

Two other factors have great importance. First, the SC maglev ridership is predicted to devastate MARC and Amtrak operations, which would likely have to be scaled back thus reducing ridership options. Second, the proponents have not discussed the impacts on ridership should their future goals of northward expansion come to fruition. The proposed SC maglev designed as a Baltimore – Washington corridor commuter train could not be easily expanded to accommodate these goals without either reducing the local ridership and costly expansions with extremely adverse environmental and social consequences.

B. **Economics (and SUMMARY):** The Economics discussion suffers from severe gaps and omissions. By limiting the property value discussion and calculations to just areas

surrounding stations and the TMF, the Long-Term (Recurring) Market Responses may vastly underestimate adverse impacts on all communities in between the BWI and DC stations. Extensive new calculations should be done and these should include the MOWs, Tunnel Portals, FA/EE facilities, plus all portions of the tunnels & viaduct. Moreover, a larger radius of 1.5 miles is appropriate. Similarly, the short-term costs in lost time to travelers (and residents) not associated with the project should be examined quantitatively. The nature of the large range in predicted short-term impacts on business costs needs to be explained. The proximity of the maglev to the BWP may lead to additional automobile accidents; a quantitative analysis should be done.

Finally, the SC maglev is in direct competition to the MARC and Amtrak systems, and to a lesser extent bus transit operations and even airline flights. Building the SC maglev puts the MARC and Amtrak systems in jeopardy in the Baltimore – Washington corridor. Upgrading the MARC and Amtrak according to present NEC plans and long-term goals would solve most of the regional traffic problems at far less cost.

With an average ticket cost of $60 one way a yearly commute would cost $30,000, which is far beyond the means for the median household income in all jurisdictions in the combined Baltimore-Washington Statistical Area. Thus, the SC maglev is a project that would disproportionately benefit the wealthy. The benefits would not be equitably distributed.

The DEIS currently limits comparisons ONLY between the J- and J-1 BUILD OPTIONS and the NO BUILD option, but planned upgrades to roadways, commuter rail (MARC), intercity (Amtrak), and bus are included in the NO BUILD (Section 3.3.1, pg 3-8). A variant on the NO-BUILD option should also be investigated, namely adding a 3rd lane to the BWP in each direction. While this has not been examined it is likely a much cheaper option than the SC maglev and without the staggering adverse financial, social, and environmental consequences. In effect under the J and J-1 options, the SC maglev would already function as a 3rd lane with a sizeable "toll". A 3rd lane on BWP has been consistently rejected on the grounds that it destroys its scenic nature. However, the proposed maglev, towering over the BWP, certainly does just that.

C. **Neighborhoods: Prince George's County (and SUMMARY):** The lack of a station in Prince George's county means "no gain for much pain" during both construction and operation phases. The omission of a station in the BWRR plan is intentional and probably non-negotiable since the speed profile (Fig. A2-2, Appendix D.10, pg 10.6-29) shows the train only achieves its maximum velocity for a 25-km length starting in the tunnel south of the south portal and extending throughout the viaduct to the north portal. A station in Prince George'**s** county, especially along the viaduct, would make it impossible to achieve maximum velocity (300 mph) for any reasonable length, thus extending the travel time and defeating the fundamental purpose for building the system.

Economic impacts, particularly property value losses, are discussed in item II.B in both this document and the Part 2 document. There are other severe impacts, particularly along the viaduct. The proposed haul routes will flood all major local roads and even minor roads in Greater Laurel and Greater Greenbelt with hundreds of trucks per day. The synergism of so much construction and its associated traffic going on essentially simultaneously in years 2-4 will likely produce gridlock in many locations. Proposed mitigation measures are unlikely to be sufficient to prevent this. Businesses will suffer loss of income and both residents and travelers (especially on the BWP) will suffer significant delays making their time schedules uncertain and frustrating.

By way of an example, impacts for both alignments were examined in detail for that portion of South Laurel that lies just south of the BWP/Rt197 interchange, some 4000 residents divided into 6 communities encompassing apartments, condominiums, townhomes, and single-family homes. Weekday construction traffic is likely to effectively cut off these communities from Greater Laurel for a 34-month period, and there are numerous weekend road closures at the BWP interchanges. Maglev ramps over BWP/MD197 exit and entrance ramps will drastically reduce LOS and elevate accident rates. EMI interactions with cars has been ignored in the DEIS, but may cause failure of some car systems, such as anti-lock brakes. The very existence of the elevated viaduct will block TV antennae, cell phones, direct TV and solar panels for the nearest unlucky residents. Mitigation measures may reduce noise and vibration impacts during construction but they cannot eliminate them. The question of vibration impacts on water wells and geothermal heat pumps has been ignored. The aesthetics analysis shows the South Laurel communities will have high visual impacts and the rendering analysis is incomplete. Finally, the J alignment would require the displacement of the Snowden family cemetery, which the reviewers here find both disrespectful and obscene.

In summary, the South Laurel communities will suffer severe and unacceptable impacts in property values, traffic flow, EMI, noise, vibration, and aesthetics during construction and operations. Residents will see it, hear it, feel it, and fight its traffic problems each and every day. Quality of life will degrade. The synergism of all these impacts will change the nature of the communities, becoming more urbanized and without any benefit.

D. **Safety (and SUMMARY):** There are a host of technological safety issues left unanswered by the DEIS on essentially all critical components (SC magnets, SC coils, refrigeration systems, guideway coils, guideway design, train car design and performance, power grid interconnections). There are no results given for component and system tests done by the JRC. There is no discussion of technology compatibility with US standards. The FRA has outlined five Compliance Measures, but the proponents have supplied for this DEIS almost nothing but notional plans. The operational success of the system hangs on the ability to import and cultivate the culture of safety that exists only at the JRC. No detailed training or staffing plan was submitted for the DEIS. Finally, major gaps exist over a wide range of topics in Operations Safety particular those relating to dangerous debris on the guideway

(e.g., biological, snow/ice, foreign objects launched onto the guideway), viaduct evacuation, and unanticipated events (e.g., train breakdowns).

E. **Security (and SUMMARY):** The methodology used for evaluating hazards is gravely incomplete, as the discussion neglects Low-Frequency High-Severity events, such as 9/11, the Oklahoma City bombing, the Tokyo sarin attack, and the London subway bombings. The SC Maglev has a higher probability than normal for a rail facility to be the target of a terrorist attack. The described defenses are passive and will not deter vandals, criminals, or terrorists from attacks for example on the viaduct guideway. Because passengers sit essentially inside the engine, planted bombs (timed or suicide) will produce far greater fatalities than other rail systems as critical SC subsystems are nearby, which may suffer secondary explosions. Plausible nightmare scenarios exist both for High-Value Targets (NSA, Secret Service Training Center) and Low- to Medium-Value targets (BWP traffic, homes, and buildings located above tunnels and near the viaduct). There are numerous vulnerabilities including launching of objects on the viaduct (in person or by drone), attacks on the control center (physical or cyber), and passenger screening. The DEIS discusses none of this in any useful detail.

   In conclusion, the extremely short Safety and Security sections are mere outlines, lumped together, and with few details and large gaps. This borders on negligence and suggests that neither is a high priority for the proponents.

F. **Energy (and SUMMARY):** The regional supplier PJM has sufficient generation capacity to meet the SC Maglev's requirements. However, transmission is congested in the Baltimore-Washington area and a TFS would determine what modifications to the grid might be needed. These would add cost and schedule delay to the project. Most importantly, the impact on grid reliability is unknown and potentially very dangerous. The DEIS does not discuss grid isolation to prevent damage in case a system failure on the SC Maglev dumps power back on the grid. Finally, there is no discussion of how the maglev would react to partial or complete power outages during operation.

G. **Environmental Impacts:** The SC maglev, associated facilities, and its TMF, regardless of which location is chosen, will threaten the missions of both the BARC and the PRR, both of which are premier research centers with 100-year histories. It is not just a case of acres lost to the maglev footprint, but adjacent areas will also be affected. The reviewers dispute the belief that any amount of mitigation or best practices, no matter how well intentioned or in conjunction with participating agencies, can completely eliminate severe impacts, which will be felt far downstream into the Chesapeake Bay watershed. Of particular worry are the impacts on Beaver Dam Creek, which serves as the reference stream. The areas impacted are biologically well-studied landscapes that have yielded important discoveries. They also retain their original biodiversity and contain numerous threatened species of plants, insects, and birds. There will be an irreplaceable loss of biodiversity, which cannot be recreated elsewhere. Additional adverse impacts with the loss of green space include reduction in

cooling, carbon and air filtering, and eco-focused recreation. In summary, the aggregate impacts on wildlife, flora, waterways, wetlands, and farm land will be both devastating and permanent, especially for both the BARC and the PRR.

III. Other Deficiencies

A. Despite the efforts in public involvement the reviewers here were not informed of the maglev until after the scoping process had ended. The maps in section 5 show only a single public meeting in the Greater Laurel area (Figure 5.3-2, section 5.3.4, pg 5-15), where it might be expected that opposition would be strongest. Nevertheless, the discussion on pgs 5-16 to 5-18 from communities along other alignment choices indicate strong concerns on all of the topics presented here and on others. It appears that few comments were of unqualified support. The petition on the TNEM website solicits ONLY support.

B. The transfer of Federal and publicly owned land to a private firm sets a dangerous precedent with potential ramifications throughout the country. Further transfers will be that much easier to justify as other entities nibble away at what remains. Inevitably the last large green space in the Baltimore Washington corridor will be destroyed permanently.

C. **Utilities:** The single paragraph in Section 4.20.5 (pg 4.20-4) dealing with temporary utility disruptions during construction constitutes only a promise "to minimize temporary service disruptions to the greatest extent possible," and to grant "prior notification of outages to affected utility users." This is primarily an electricity issue but possibly also water service. It is also a life-threatening issue for people who may be at home but on some level of life support. (Hospitals usually have emergency generators; nursing homes might not.) In cold weather it is also an important issue for homes that depend on electric heat pumps of on electric baseboards to supply heating. (Even gas furnaces require electricity for control.) A detailed plan is lacking.

D. In Section 4.06 (pg 4.6-10), BWRR received a railroad franchise from the Maryland Public Service Commission in Nov. 2015. In Appendix G10 (pg 10), the BWRR claims: "As a franchised railroad BWRR has the power to construct power generation for its facilities pursuant to its franchise and Certificate of Public Convenience and Necessity (CPCN)". <u>However, there is no discussion in the DEIS of either expertise or a track record at BWRR or TNEM in constructing or running a railroad, much less in state-of-the-art technology like the SC Maglev.</u> Their websites advertise expertise only in project development, engineering, construction, and finance. Staff photos show no technical or operational personnel and none are mentioned. A single engineering contractor firm is found in the Appendices (Louis Berger, now called WSP); their relationship to the sponsor is not explained.

E. There is no management plan or organization chart for the project sponsor BWRR. The only schedule is top-level only in Appendix G7 (pg 0).

F. There is no discussion of a commitment to hire US citizens as employees or US contractors. There is no discussion of a commitment to hire small business and/or disadvantaged business contractors.

G. There is no discussion of technology proprietary to the JCR.

H. If the project collapses who pays for removal? After the 2006 Lathen disaster, the German test track was approved for removal, but some 15 years later it is still waiting, a slowly decaying eyesore. Damage to the PRR and other environmental assets will be permanent, even were the SC Maglev removed. ROM cost estimates for removal and a notional plan (schedule, materials disposal) should be provided in the DEIS and reserve funds set aside in case of project collapse.

ENDORSEMENT

The comments and opinions in these documents are endorsed by the Montpelier Woods Homeowners Association Board of Directors. These documents are submitted as a good faith response to the call for public comments on the SC Maglev DEIS 15 January 2021. Some reviewers have chosen not to reveal their identity. The reviewers are residents of Montpelier Woods, Laurel, MD.

PRINCIPAL REVIEWER CURRICULUM VITAE

- Ph.D. in Physics and Astronomy, Northwestern University 1982
- Retired 2017 from 33+ years as a federal employee (Astrophysicist) at the U.S. Naval Research Laboratory (NRL), Washington DC
- Vast experience in analysis and scientific interpretation of ground- and space-based astronomical data, R&D of technologies for ground and space applications, and management of both R&D and space-flight programs
  - 49 publications Principal- or Co-author in refereed scientific journals, 76 meeting presentations
  - Principal or Co-Investigator on 18 proposals that secured $9.4M in competed funds from internal (NRL) and external (primarily NASA) sources
  - World-renowned expert in R&D of multilayer diffraction gratings. Other areas of R&D expertise include X-ray/EUV detectors at both room and superconducting temperatures.
  - Science and/or Technical participation in national and international orbital space-flight missions: HEAO-1, HEAO-2, Spartan-1, ROSAT, ASCA, Hinode (Solar-B), USA on ARGOS
  - Rocket Scientist: 3 NASA sounding rocket missions (J-PEX)
    - 2 as Project Scientist,
    - 1 as Principal Investigator
  - Team Leader or Principal Investigator on 5 major proposals for orbital satellite missions (proposal values in the range $40M-$147M)

- 6+ years as a Contracting Officer Representative, managing a portfolio of ~20 contracts with a total value of ~$45M

REVIEWERS

Michael P. Kowalski, Principal Reviewer
Elizabeth L. Hobbins, Co-Reviewer
Deborah O. Barrett, Co-Reviewer

LXXXIV. Appendix - Reprint: Kowalski, M. "SCMagLev DEIS Part 2 – Detailed Comments – NO BUILD v4.0." 2021.

SC Maglev DEIS Part 2 – Detailed Comments – NO BUILD

Table of Contents

Notes:

1. Not all sections in Part 1 have a counterpart here in Part 2.
2. All acronyms used in Parts 1 and 2 are defined in Appendix A of the DEIS.

I. Critical Deficiencies

B. Maglev Critical Components

1. Section 3.1 gives no technical information on the critical maglev system (SC magnets, train cars, control system). The MDOT project website has only a figure which identifies the SC magnet systems as critical components that operate at superconducting temperatures produced by Liquid Helium (https://www.bwmaglev.info/index.php/overview/what-is-scmaglev). Since critical components (coils) are also installed on the guideway and its engineering design is critical to operation, the guideway also is a critical component. The provenance of this system is the Yamanashi test track, but little technical information can be found on its website. A useful top-level technical summary, including photographs of SC subsystems and conceptual basic operation is given at: https://en.wikipedia.org/wiki/SCMaglev , which includes photographs of a magnetic bogie and of levitation and guidance coils. The only technical information in the DEIS is found in two recent references found in Appendix D.11 EMI (ref 24, pg 10; and ref 30, pg 11) and the comments below assume the information in these references is valid for the DEIS proposed SCMagLev.

2. The Japanese system uses Nb/Ti superconducting magnets; Nb (niobium) and Ti (titanium) are commonly available elements with a wide variety of applications. The Nb/Ti alloy has a transition temperature to superconductivity of ~10 K, thus requiring liquid Helium (He) as a refrigerant. These magnets appear to be mounted in bogies (modules). SC magnetic bogies (and SC coils) are located only on the train and are used for propulsion and work in conjunction with propulsion coils on the guideway, the latter being powered at 8 Hz. Levitation and guidance coils within the guideway are passive and when the train exceeds 90 mph the induced magnetic forces are sufficient to both lift the train and keep it centered in the guideway. At lower speeds the train rolls on rubber wheels, which are retracted once it levitates. A location sensor allows each train to travel in its own electromagnetic bubble with no power applied to the guideway propulsion coils in locations without a train.

For an adequate review of this DEIS, an example of the some of the basic data needed was published in 1994 (https://www.osti.gov/servlets/purl/10150166) for versions of the MLU001 and MLU002, but these data are now obsolete. Some dimensions of the train cars are given in Appendix G4 (Table 4.1, pg 4).

Notwithstanding the references in Appendix D.11, many technical questions remain:

- A 16-car maglev train has 34 SC magnets and 136 SC coils. Figures are shown and data are given for the magnets.
  - It appears from the figures that each train car (including the nose cars) has an SC magnet on both sides, accounting for 32 SC magnets. What is the purpose for the other two? Where are they located?
  - What is the purpose of the SC coils, where are they located, what do they look like, and what is the relevant data?
  - How many joules of energy are stored by the current circulating in each SC magnetic and SC coil?
  - Forces data are absent.

§ What nominal forces (newtons) are exerted by the SC elements during acceleration? At maximum speed? During deceleration?

§ What nominal forces are exerted by guidance and levitation elements at maximum speed? During turns?

§ What maximum forces (newtons) are exerted by the SC elements? How close is this to the design limit for the SC elements?

o Where are the SC magnets and coils fabricated (in Japan or in the US under license)?

o What is the expected lifetime of SC magnets and SC coils?

o How sensitive is train operation to degradation or failure of single or multiple SC magnets and SC coils?

o How sensitive is train performance to magnet or coil replacement? What procedures are required to replace failed SC magnets and SC coils? Do replacements require precise physical alignment or magnetic field trim and/or calibration?

o Are repairs to SC magnets, SC coils, guideway coils, communication equipment, etc. all done in the TMF or are these elements returned to Japan? In either case, how many spare units of all types are kept on hand for fast replacement?

o Is any of the SC technology proprietary?

· Train car and train set data are absent.

o What is the width and weight of train cars (not given in Appendix G4)?

o What gaps exist between train cars? How do gaps affect performance? How do gaps affect train noise production?

o Describe the rubber wheel system for velocities < 90 mph (number of wheels, locations, deployment mechanism, door mechanism, deployment time, etc.). How are the train cars kept centered on the guideway when the tires are being used?

o Train weight data are absent.

§ What is total weight of a train unloaded?

§ What is the total weight of a train loaded with passengers/luggage to total capacity?

§ The kinematic performance of trains will vary with train weight. Does the system modify propulsion forces to accommodate different train weights?

o Is there any “checked luggage”? Where is it stored? What is the available volume per car?

o What are luggage weight & volume allowances, carryon and checked (if any)?

- Where are the train cars fabricated (in Japan or in the US under license)?
- Does the rolling stock arrive with SC elements already mounted or is this done in the TMF?
- Is any of the train car technology proprietary?

· Describe in detail the Inductive Power collection system used to provide on-board power in train cars for lighting, AC, electronics, etc. Is any of this technology proprietary?

· Describe in detail the communication/control system (hardware, software, operating modes, etc.) Is any of this technology proprietary, to whom, and what are the conditions under which it is being used?

· Describe the guideway propulsion coils, levitation coils, and guidance coils: materials, dimensions, weight, nominal current and current limits, etc.

- How many of each type are there along the alignments?
- Where are they fabricated (in Japan or in the US under license)?
- Are they installed in the guideway sections prior to mounting or after mounting?
- Electrical Supply
  - § Describe electrical and signal connections along the guideway?
  - § Are all cables on the inside of the guideway? If not, describe outside cables?
  - § Are coils grouped in sectors? If so, describe groupings.
  - § If one sector loses power how much time is required to switch to an alternate interconnection?

· Obviously, guideway sections will not be all identical as the guideway has to bridge rivers, ramp up and down different grades and slowly curve both to the left and to the right over the 40-mile run.

- What alignment tolerances are required on mounting guideway sections?
- What are guideway loading values?
- Figure 2 in Appendix G.7 (pg. 0) shows only the top level schedule, and item 13 shows that guideway/system installation is a long process lasting from Qtr1/Yr1through Qtr1/Yr7. Elements for both the tunnel and viaduct sections may be precast or cast on site using traditional methods; installation may involve subcontractors. Precast substructure elements will be staged at identified laydown areas. Where are guideway sections fabricated and by whom?
- Describe guideway switching mechanisms

§ At stations

§ At TMF entrance/exit

o The majority of Yamanashi test track heritage is within mountain tunnels affording stable climate conditions. Only about 5 km (3 miles) of the run does not have overburden (Fig. 11 in Japan Railway & Transport Review No. 68, Oct 2016), which is split into 5 main segment each about 1 km long. There are also a number of much shorter segments without overburden. Three of those km-long segments are within about 8 km of the start, where the train has not yet have achieved maximum velocity. In contrast, for example the J alignment, the single Maryland viaduct section, is much longer ~21km/13mi, and all of it is operated at maximum velocity.

§ Climate data show that the prefecture including the Yamanashi test track has an average temperature range of 36-84 degrees F, while the average for Maryland is 23-87 degrees F. However, the standard deviation and extremes must also be considered. Have Maryland climate conditions been compared to those for the Yamanashi test track and/or the Japanese EIS for its extension? Such comparisons are necessary to determine whether required tolerances can be maintained.

§ Long-term weathering of the guideway must also be taken into account. How often must guideway sections be replaced in the viaduct?

o Train-guideway distances are absent.

§ What is the nominal horizontal distance between train cars and the guideway?

§ What is the minimum distance between train cars and the vertical guideway wall on curves at 300 mph (give both values, if different for left-hand and right-hand curves)?

§ What is the minimum curve radius (give both values, if different for left-hand and right-hand curves)?

§ How does the applied power curves and force curves vary for left-hand and right-hand curves?

§ Is the guideway banked to accommodate turns? If so, give bank angle vs curve radius relation.

o It appears that elevation/plan drawings in Appendix C Part D do not give guideway turn radii at appropriate locations. Inspection shows that over the total distance of both alignments, northbound trains will execute at least 4 yaw maneuvers; yaw-left, yaw-right, yaw-left, and yaw-right.

o Is any of the guideway technology proprietary?

· In Appendix G.9 (Capital and Construction Costs) items 50-100 are blank. These elements book the costs of rolling stock, presumably including their SC magnet bogies. None of the sub-elements of element 10 Guideway and Track seem to book their SC magnets. Yet the grand totals (after including escalation costs) are in rough agreement with

the $10-$12B total costs shown for top-level Project Construction Costs in the bottom row of Table ES4.3-2. It strains credulity to expect that the SC-maglev critical components and the rolling stock together are negligible costs. So where are the costs of these critical components booked? Are these components (in kind) part of the $5B loan from the Bank of Japan?

3. Complex refrigeration systems are needed to liquefy He at -452 deg F (4.2 K) but Figures and discussion in Section 3 do not show any such systems in the TMF. In Section 3.3.2.6 Power Facilities, it states that liquid He (hereafter LHe) "would be supplied in sealed, temperature-controlled containers that would be transported to the SCMagLev project and stored in the TMF", but there is no other discussion of LHe in the DEIS. Nevertheless, from the Appendix D.11 references it is clear that each SC magnet bogie must have its own refrigeration system.

· A number of local commercial suppliers of LHe exist and deliveries are usually done by truck to a variety of customers (e.g., scientific use, medical MRI). Do local suppliers have sufficient capacity to provide the required LHe and still meet obligations to other customers?

· The magnet refrigeration systems have LHe storage tanks which have superinsulation and liquid Nitrogen (LN2) to prevent the rapid warming and boil-off to gas that would otherwise occur if LHe was exposed directly to room temperature. Do the SC magnets and SC coils arrive at the TMF prefilled with LHe?

· These refrigeration systems (often called cryogenic) are closed loop but must be continually supplied with electricity. Otherwise, enough heat from the outside would eventually conduct inwards to boil the LN2 and then the LHe. Re-liquefying the entire contents of a storage tank that has gone completely gaseous may not be possible (and is energy intensive) without removing the gas to a separate facility. What is the time that a refrigeration unit can remain without power and still be able to re-liquefy whatever gas has boiled off?

· While the refrigeration systems are closed loop (sealed) systems small amounts of gas boiled off as a result of residual heat might escape the system. How often do the LHe systems have to be "topped off"?

· **Cost:** He gas is perhaps the most non-renewal of all non-renewable materials, and alternatives for achieving low temperatures are both still in development and more expensive. While He is the second most abundant element in the universe it is relatively rare on planet Earth. Even worse is that He gas is so light that when released to the atmosphere it floats to the top and eventually leaves planet Earth. Moreover, the He atom also diffuses through many materials such as the rubber/plastic of a birthday balloon. So every He birthday balloon that has ever been inflated is contributing to the irretrievable loss of He from the planet. About 10% of present He gas usage is in balloons. He gas is a by-product of natural gas mining but only a few mines produce it. The US is fortunate to have good mining capacity and to have built a strategic government reserve in the early 20th century. Unfortunately, the government reserve is being privatized, which has produced extraordinary volatility in the price of He gas. Of course LHe includes both the cost of the gas and the sizeable cost-per-unit-volume of liquefying the gas. With COVID-19 temporarily reducing the demand for birthday balloons the price of LHe has temporarily stabilized to ~$20/liter. Unless new sources external to the US can make up the difference, that price is expected to rise rapidly after the pandemic. Proven reserves suggest that the world supply

of He might last from 25 to 200 years at present consumption rates, perhaps less if large SCMagLev systems become common.

- How much LHe is used in each SC magnet and each SC coil refrigeration system?

- How much LHe is used total by each train?

- Given the total number of trains in use and the expected replenishment rate, how much LHe is needed yearly for operations?

· **Safety:** There are standard MSDS sheets with routine safety procedures for handling LHe and LN2 cryogens and transferring these liquids into storage tanks. However, there are at least two critical safety questions:

- The first concerns rupture of storage tanks from, for example, physical damage caused by incidents whether accidental (e.g., train wreck) or intentional (e.g., vandalism, terrorist attack). LHe boils to gas explosively on contact with normal air temperature when storage units are ruptured. Thus, there is both a shock hazard AND an asphyxiation hazard as the He gas then displaces breathable oxygen, the extent of both hazards depending upon the amount of LHe in the system being ruptured. (Similar arguments hold for LN2 in the storage tank insulation jacket.) The DEIS Safety section (Appendix G.6, Section 4.21) require the project to identify hazards and develop safety plans. Note that LN2 is also used for cooling SCMagLev equipment in addition to SC magnet refrigeration systems (Section 4.18, Table 4.18-3, Broadband Emissions row, pg 4.18-9).

- The second critical question involves SC magnet "quench". One reference in Appendix D.11 describes the SC magnets as "quench free", but no details are given and this claim must be verified. If SC magnets reach a temperature greater than the material (Nb/Ti) transition temperature the material instantly transitions to the normal temperature resistive state hence losing its functionality. This also releases the tremendous amount of energy stored in the current, which may be sufficient to damage or destroy the magnet and nearby equipment, perhaps including the LHe storage tanks, thus causing a secondary explosion. What guards are in place to prevent magnet quench, especially during operation? If such an event occurs during operation at high speed what procedures does the system take to minimize effects and preserve life?

- The DEIS gives no details beyond top-level about the command/control system. This requires great elaboration in any FEIS.

· **Future Upgrades:** So-called "high temperature" superconducting materials that require refrigeration but NOT to LHe or even LN2 temperatures are in development. One favored material is $Bi_2Sr_2CaCu_2O_{8+\delta}$. There are many technical hurdles, but research continues and great strides have been made. Can the proposed SCMagLev be retrofitted in the future with high temp superconductors? If not, an uncomfortable situation could develop where the system became obsolete shortly after construction was completed.

II. Major Deficiencies

A. Transportation

1. **Traffic Analysis:** Do the MWCOG and BMC regional traffic models accurately reproduce the present traffic count rates and reliability indices? In Section D.2E.2 (Appendix D.2, pgs E-115 to -118) the Project Sponsor adapted these models for the maglev traffic analysis. To determine potential ridership, the Project Sponsor identified travel volumes between key origin/destination O/D pairs (Appendix D.2, pg B-104). The choice of (O/D) pairs might influence ridership results and a large number of pairs spanning the entire Baltimore Washington corridor is necessary to understand traffic flow sufficiently. What O/D pairs did the Project Sponsor use? The ridership results in Table D.2-2 (Appendix D.2, Section D.2A.2.1, pg A-3) are 70,069 for the Cherry Hill station choice and 77,764 for the Camden Yards station choice. These are critical values of ridership for viability and economics. What is the sensitivity of those results to the input parameters (e.g., O/D pairs, ticket cost)? This might be expressed by putting an uncertainty range on the values based on all modeled results.

2. **Ground Truth Validation:** The SCMagLev alignments are parallel to the BWP throughout the entire viaduct and much of the tunnel sections. Therefore, for commuter car traffic between Baltimore and Washington the maglev will have its greatest effect, better or worse, on this major artery. Model analysis is often validated using direct experience (ground truth) and the application of common sense. The observations and conclusions summarized below come from the principal reviewer of this document, who commuted for 32+ years (1985-2017) from South Laurel (BWP/Rt197 or BWP/PowderMill interchange) to the U.S. Naval Research Laboratory in southeast Washington DC along the BWP to the "split" and then on Kenilworth Ave (DC 295), a distance of 21 miles. Note also that this reviewer habitually listened to WTOP traffic reports every 10 minutes for the duration of the commute, which is factored into the observations:

- From the MD197 southwards the bulk of traffic is going south in the AM rush hour and north in the PM rush hour.

- Local centers of employment (e.g., Ft. Meade/NSA, NASA/Goddard) and local commuting within Prince George's and Anne Arundel counties account for a smaller but significant stream of traffic that may be opposite to the rush hour bulk directions.

- Overall there has been a steady and even increase in traffic density and decline in reliability. Commuters have shifted travel times to accommodate so that "rush hour" is longer that an hour. In 1985 the typical commute was 30 minutes going south and 35 minutes going north. In 2017 that commute had increased about 10 minutes in both directions. (Note that about half of this commute time was on Kenilworth Ave/DC295, which itself has gone through various phases of upgrade and repair.)

- Significant traffic backups and reduced reliability are generally caused not by high traffic density alone but by accidents, which may occur more frequently with high traffic density. Accidents mostly occur at/near interchanges, where turbulence to the traffic flow is introduced by merging automobiles.

- The accident rate decreased markedly after BWP refurbishments of the Federal portion (18 miles south of MD175) were completed, the first major repair campaign to be done since the roadway was opened in 1954.

- Repair, reconstruction, or replacement of all bridges, except for the I-95 bridge over the BWP (which is owned by the State of Maryland) and the NASA exit bridge (which is owned by NASA).

- Reconfiguration or reconstruction of six interchanges (MD32, MD197, MD410, MD193, MD202/450, US/MD201) excluding the I95 and NASA interchanges.

- Repair of underlying concrete slabs/joints and recoating with asphalt, widening shoulders on both sides of travel lanes.

- While a 3rd travel lane was not added, a long northbound exit lane from Powder Mill to MD 197 was added. The exit lane is critical in drawing off significant amounts of northbound PM rush hour traffic that is headed for points in Greater Laurel.

- The work was completed over a 3 year period (1999-2002) in phases, which successfully minimized traffic flow impacts.

· Overall, the BWP refurbishments reduced accidents, particularly because of improved (longer) merge lanes. Traffic flow greatly improved to the LOS in 1985.

· Note the presence of a 3rd lane traffic lane on the state portion nearer to I695 and on southbound of MD202 to the "split" also improves traffic flow in those portions.

· The present LOS on the BWP has slipped from the level in 2002 to that shown for the PM rush hour reliability index in D.4-6 (Appendix D.4, Section D.4D.2.4.2, pg D-39), which is about the same as that just prior to the 1999-2000 refurbishments. This figure chosen for the DEIS, taken from the 2019 Maryland State Highway Mobility report, is something of a worst case. The AM case is less severe, and this report has many informative figures and tables. There are several causes for this loss in LOS, among them:

- A relatively higher accident at the Powder Mill and Route 197 interchanges, especially southbound during peak AM, primarily because of the large number of cars entering the highway from the Greater Laurel area. The Powder Mill interchange was not included in the 1997-2002 refurbishment.

- The failure to regularly maintain the BWP surface. At one point in March 2019, speed limits between MD197 and MD198 were dropped to 40 mph because a plethora of pot holes had disabled many cars. This situation persisted for several months until emergency funds could be found to resurface the road.

- Growth in traffic volume.

· The principal reviewer's experience is not unique. Along the maglev viaduct section two regional entities can be defined (data taken from https://www.unitedstateszipcodes.org/):

- Greater Laurel, including the incorporated City of Laurel, all zip codes that touch the BWP, and/or zip codes for those regions often referred to as satellites of the City of Laurel

  - § 20707, 20708, 20723, 20734, 20705, 20763, 20755

§ Population: 140,303

§ Housing units (non-rental): 54,469

o Greater Greenbelt, including the incorporated City of Greenbelt and one other zip code north of the BWP/I95 interchange that touches the BWP

§ 20770, 20769

§ Population: 31,777

§ Housing units (non-rental): 13,557

o A good fraction of the residents in these regions use the BWP in commuting in the AM to points southwards and entering at MD32, MD198, MD197, Powder Mill Road, and MD193. It goes against common sense to expect any of them to drive north to the maglev stations in Baltimore or at BWI to then go south to Washington DC. A similar argument holds for the reverse direction.

In summary, obvious conclusions can be drawn from these observations:

· Refurbishing BWP interchanges (and those of other north-south arteries: I95, MD29) can increase LOS.

· Adding a 3rd lane to the BWP throughout its entire length would produce a high LOS without the SCMagLev.

· All roads require regular scheduled maintenance to perform at design limits.

· Common sense arguments belie any hope that any residents of Greater Laurel or Greater Greenbelt will use the SC Maglev for daily commuting

Finally, in Section D.2A.15.2 the mitigation discussion for every single work site subsection requires regional roads to be maintained in good repair. Funding for road maintenance is traditionally done using fuel taxes on trucks, but there is no guarantee that such taxes are obligated to any project. With the SCMagLev massive construction will be going on more or less simultaneously along the whole alignment for at least 3 years. Thus, road degradation will exceed the available resources to keep impacted roads in good repair.

3. Tables D.2-15 and D.2-16 in Section D.2A.5.4 (Appendix D.2, pgs A.5-25 to -26) do not give a complete picture of the modeling results. They should both be split into two tables that show AM and PM hours that include the peak periods (rush hour). Given its proximity to the maglev it is surprising that more entries along the BWP were not included in these tables. Motorists mitigate backups by choosing suitable alternate routes which may require a decision at each and every interchange along a freeway depending on their final destination (so-called "bailout traffic"). Without higher fidelity it is hard to obtain a complete picture. The following links along major North-South roads should be included: BWP@MD197, BWP@I95, BWP@MD410, BWP@NewYorkAve (Kenilworth-MD50 split), I95@MD32, I95@MD198, I95@MD200, MD29@MD32, MD29@MD198, MD29@ MD200. Finally, a summation row should be included at the bottom of each table.

Nevertheless, the present results in Tables D.2-15 and -16 do NOT support the claim that the SCMagLev reduces regional roadway traffic volumes in the 2045 Horizon Year compared to the NO BUILD option. Indeed, for the BWP@MD198 entry the predicted volume increases compared to the NO BUILD by 1.79% and 0.24% for the Cherry Hill and Camden station alternatives, respectively. There are few negative values in the percent change column between NO BUILD and BUILD for the Cherry Hill option, and all of the negative values for the Camden option are less than 1%. Thus, SCMagLev operations do nothing to decrease traffic congestion problem on the BWP and in fact may make matters slightly worse.

Finally, it is difficult to reconcile the results in Table 4.2-3 (Section 4.2.3.4, pg 4.2-7) for the row "Diverted from Auto" with the results in Tables D.2-15 and -16. The results in Table 4.2-3 for 2045 are 14,877,281 and 16,480,393, depending on the Baltimore station. This is a daily average of 40759 and 45152, lumping weekday and weekends together. The net daily changes in Tables D.2-15 total just a few thousand. What are the origin points of the riders who diverted to automobiles? It appears to be somewhere other than the regions reported in Tables D.2-15 and -16, which samples primarily the intercity corridor and not the Baltimore and Washington city cores.

4. The operations plan developed in Appendix G4 assumes 16-car trains (each ~1300 ft long), which is what that Station platforms can accommodate. (Note that the BWI station is somewhat shorter, which implies that passengers to/from this station will be segregated into designated cars.) The service plan in Table 5.1 of this appendix calls for 8 trains/hour during peak periods. Given dwell times for boarding at BWI and for the desired turnaround time of 20 minutes or less at the end stations, it appears that 8 trains/hour is at or near maximum capacity. (Safety margins are discussed in item II.D in this document).

- How many total trains will the proposed SCMagLev need to function at peak periods?
- What is the maximum number of trains the system can accommodate?
- How many trains can the TMF accommodate?
- How many will normally be stored in the TMF overnight?
- How many trains are stored overnight at the end stations?
- How many reserve trains/cars are kept on hand?
- Are any reserve trains kept at the end stations during daytime operations?

Summing over rows in Table D.2-1 (Appendix D.2, section D.2A.2, pg A-2) the system capacity is 67,056 passengers per day in both directions, for a total of 134,112. The forecasted ridership in Table D.2-2 is 70,069 or 77,764 depending on the Baltimore station chosen, respectively. Hence the forecasted ridership is either 52% or 57% of this capacity. Capacity can only be increased by adding cars, which may not be possible for the given station lengths or by increasing the rate of trains. If the system is eventually extended to points north (Wilmington, Philadelphia, New York City, Boston) as advertised, how much of the original designed capacity is needed to accommodate passengers boarding in Washington for these destinations? To create additional capacity trains could certainly be added during off-peak times, but the system is advertised as making regular commuting to these locations possible, so off-peak times may not be popular. However, reducing the

allocation of tickets to local (Washington-Baltimore) commuters would violate the basis on which the original system was approved. The operators would therefore have to sequester tickets for local commuters at the level prior to any line extensions, and other alternatives (MARC, Amtrak) might no longer be available. Express trains are considered in Appendix G4, but, outside of the stations, there is only a single "track" in each direction in the Baltimore-Washington corridor, so the system might not be expandable to meet the new requirements. Horizontal expansion of the alignment in both the tunnel and viaduct sections would be both prohibitively expensive and come with further adverse environmental and social impacts surpassing the original construction. Moreover, additional trains might require expansion of the TMF and/or the addition of other TMF(s) further north.

5. In Section 4.2.4.4 (pg 4.2-10) the predicted diversion of MARC ridership to the SC Maglev is 32% of the annual MARC ridership on the Penn and Camden lines. In Section 4.2.5.4 (pg 4.2-12) the predicted diversion of Amtrak ridership to the SC Maglev is 94% of Amtrak ridership at the three stations. For MARC and Amtrak these reductions may prove catastrophic. (Bus systems also suffer high losses, but can adapt more readily by changing routes.)

6. In Section D.2A.5.2 (Section D.2, pgs A.5-21 to -23) MD 197 should be included in the discussion as a major East/West Roadway. It is similar to MD 32 in its southeast to northwest orientation at its intersection with the BWP, and the BWP/alignment interchange is a major node in the proposed construction. It should also be highlighted in color in Figure D.2-7. Similarly, the Powder Mill Road/BWP is a major node in the construction, and it should be included in the discussion and highlighted in Figure D.2-7.

7. Page numbering inconsistency: Appendix D.2 pg A-8 (file page 13) turns to pg A.4-9 (file page 14), i.e., the page number has "picked up" the section number. It then goes back from A.11-41 (file page 46) to A-42 (file page 47). This annoying inconsistency occurs in other pdf files. There should be a uniform system of page numbers.

8. In Table D.2-3 (Appendix D.2, Section D.2A.2.2, pg A-3) the rightmost column values for "Changes in VMT" do NOT equal the difference (NO Build – Build) for the 2030 Year. They DO equal that difference for the 2045 Year. What is the source of this apparent error? There is a similar but small discrepancy in the rightmost column in Table D.2-4 (Appendix D.2, Section D.2A.2.3, pg A-4) for the 2045 Camden Yards option.

9. In section ES.4.3.1, (pg ES-15) the number of jobs created by SCMagLev is given as 390-440. In Appendix G15 (Table 1, pg 2) the employment range is 1,350-2,080. What is the source of this apparent discrepancy?

10. The DEIS appears to lack a weekend service plan during which commuters are presumably absent. Thus it is difficult to separate the ridership calculations into weekday and weekend.

B. Economics

1. Much of the analysis appears to depend on Ridership Data Requests with multiple reports referenced for over several years (e.g., ref 2, pg 4.6-2; refs 7, 9, pg 4.6-3; ref 31, pg

4.6-13). The DEIS and appendices do not appear to include these reports or the data, nor can they be found on the BWRR or TNEM websites. However, like the O/D pairs chosen, without their inclusion it is impossible for the public to understand the basis on which the economic arguments have been made. For such a large project as the SC Maglev full transparency should be required, and the Ridership Data Requests should be included for public comment.

2. The economics arguments seriously underestimate adverse Long-Term (Recurring) Market Responses (Appendix D.4, Section D.4D.2.5.1, pg D-58) on communities in Prince George's and Anne Arundel counties and particularly along the viaduct portion. Calculations are done only for regions around the three choices for the TMF and around the DC and Baltimore stations. The region around the BWI station is ignored because of the prevalence of airport functions. Further the impact radius chosen for calculations is only ¼ to ½ mile. Together these choices produce: (a) increases in property values around the stations, as people are willing to pay more for housing within walking distance of transit, and (b) negligible losses in property value at both BARC site TMFs and minor losses at the MD 198 TMF. Further, the discussion emphasizes effects on the tax base, mostly ignoring losses in residential property values. To obtain a true evaluation of maglev effects on residential property values, the calculations must be redone:

· MOW, Tunnel Portals, FA/EE facilities, and all portions of the tunnels and viaduct should be included.

· A radius of ¼ mile is appropriate to tunnel portions since the primary risk to residents is the effect of vibration on basements and other foundations.

· Along the viaduct that radius should be increased, as suburban residential areas have less density and generally larger properties. Real estate agents use radii up to 1 to 3 miles in calculating residential property value "comparables"; a radius of 1.5 miles is a fair compromise. It is well-known that properties near train rails are not as highly valued. While the maglev train will not have a horn, noise, vibration, and visual impacts are still present. Section 4.4.4 (pgs 4.4-4 to 4.4-15) has a long list for both J and J-1 alignments of community regions in Prince George's and Anne Arundel counties with adverse aesthetic impacts, many evaluated as M to H. These will change the nature and feel of whole communities from suburban to urban/industrial, with a consequent negative impact on property values. While only a relatively small number of residents may be displaced, ironically those who remain will be the unlucky ones because of their proximity to the maglev. Along the viaduct a radius of 1.5 miles will capture losses in entire communities including Greenbelt, Greenbriar, Applewalk, Laurelwood, Pheasant Run, Montpelier Woods, Montpelier Hills, Montpelier, Snowhill Estates, Briarwood, Maryland City, and Russett. Results from all added regions (MOWs, portals, FA/EE, tunnel & viaduct) should be included in Tables D.4-51 and D.4-52 (Appendix D.04, Section D.4D.2.5.1, pgs D-64 to D-65) and in the discussion. Moreover, results in those tables should be separated into business and residential losses. This will give a complete, accurate, and fair picture of all tax revenue and property value changes.

· Property value losses are unusual in that they are incurred as early as the date that the maglev is approved, as realtors are obligated to inform potential buyers of potential adverse impacts, which certainly applies to the maglev in Prince George's county given both

its short- and long-term impacts. However, losses are not accrued until the owner sells the house. It is even possible that losses could put some property mortgages "under water". Indeed, adverse traffic consequences during the construction phases will be apparent to buyers; many will not care to wait years until construction ends and will buy elsewhere, the losses to the seller then becoming obvious. Owners who then reluctantly decide to sell-out while they can at a loss will also pay an additional penalty (as do renters) for moving expenses as well as the challenges of uprooting a family and finding suitable housing that fits their job (commute) and personal situation. Owners, who wait longer hoping for property values to recover, might not be rewarded as the nature and feel of the community has changed irretrievably. Of course, owners also pay less in property tax, but simple calculations reveal that this offset comes nowhere near compensating for the loss in home value, even after decades. Sadly, long-term owners may not even realize they have suffered a loss in property value unless they have carefully tracked home value and tax assessments year by year. In summary, residential homeowners along the entire length of either SCMagLev alignment will likely suffer a real monetary loss from maglev proximity, and to be fair these losses should be calculated and booked against claimed benefits. Just as important, these losses are not shared evenly in their county (or city) but suffered only by those who had the great misfortune to have bought a home without foresight that its location would one day be near to a maglev.

3. Section D.4D.2 (Appendix D.4, pg D-17) discusses short term impacts on business during the construction phase. (Note that in Section 4.6.3.2, pg 4.6-20, there appears to be an omission, as there is no discussion of business impacts at the Route 197/BWP interchange, despite the nearby presence of the Crystal Plaza.)

Regarding business losses it is stated on pg D-27 that "There is limited literature and no standard methodology that focuses on quantifying the social costs associated with the impacts that results from construction" and references are cited. The results in Table D.4-6 (pgs D-17 to D-18) show a wide range of uncertainty for every choice of Build Alternative (e.g., $18.5M - $233.5M for the preferred J-03 alternative). Is this large range a result of the methodology or uncertainty in input values to the methodology? Why are these results not broken down into separate geographical areas along the alignment where local impacts can be more easily seen? More importantly, despite the extremely detailed discussions on the great value of monetized time saved by maglev users, there is only a single qualitative paragraph (Section D.4D.2.2, pg D-24) and no quantization concerning the monetized time lost during construction by travelers not associated with the project during construction (a large portion of which are likely to be nearby residents). There should be, as it is not fair to evaluate time benefits quantitatively without also evaluating time costs. Why has this been ignored?

Finally, on revenue loss for businesses (e.g., food, entertainment, etc.) during construction there are a couple of sentences that strongly contrast in attitude with the numerous mitigations promised throughout (Appendix D.4, section D.4D.2.2.1, pg D-28): "These industries are believed to be most impacted because the ability to make comparable transactions - purchase groceries or a coffee for example - elsewhere in the community is greatest. By contrast, professional services transactions are less likely to be tempered as people are less willing to change dentists, lawyers or hair stylists once they have found a professional with whom they are comfortable. They are more willing to accept the travel inconvenience to visit the dentist that makes them comfortable and knows them." The first

sentence is Darwinian, and the second leaves affected residents with the realization of the grim choices forced upon them. Together they introduce considerable doubt about the sincerity of promises for community involvement.

4. While neither MARC nor Amtrak has made service plans to mitigate the ridership losses predicted in the Transportation analysis, it is apparent that jobs will be lost, but without specific plans these losses cannot be quantified. However, in fairness, they should also not be ignored. The DEIS should state that a yet-to-be-quantified offset of the positive jobs economic impact of 390-440 produced by the SCMagLev (Section ES.4.3.1, pg ES-15: and elsewhere). Without precise job categories it is not yet possible to determine whether workers at MARC and Amtrak can transfer their job skills to the SC Maglev. Thus, it is possible that there may be no net gain in transportation jobs produced by the maglev, even possibly a loss. Moreover, the $24.3M-$27.4M in earnings from the maglev is approximately offset by competing transportation systems losses of $23.2M-$24.8M (year 2030) as shown in Table 4.6-2 (Section 4.6.3.2, pg 4.6-1). Similar calculations might offset gains predicted for the SCMagLev in other parameters such as emissions. In effect the SCMagLev may be approximately neutral providing no significant gain in the transportation sector other than the time saved for which SCMagLev users have paid.

5. Section D.4D.2.4.7 discusses in quantitative detail the benefits produced by reduced accident rates because of the predicted decrease in auto traffic when the maglev becomes active. It ignores the possibility that the accident rate along the BWP might actually increase as result of the maglev during both the construction and operation phases, a true irony indeed. There are certainly data which can be used to quantify the accident rate during highway construction. During operations the “startle” effect, which is caused by aerodynamic noise at portals, will be mitigated by hoods (section 4.17 pgs 4.17-11, -13, and 4.17-19). However, while there may be less noise, the close proximity of the elevated SCMagLev to the BWP will make each and every train passage visible to BWP automobiles (e.g., Appendix D.6, Section D.6.1.3.3, Figures D.6-32 and -33, pg 6-14 at BWP/PowderMill Road, and Figures D.6-38 and -39, pg 6-44 at BWP/alignment). Train passes will be comparable to landing large jet aircraft, but at much closer distances than at airports. For the J-alignment the viaduct and train passages will both cast a shadow on the BWP at times in the morning, particularly during winter months. For the J-1 alignment options, the afternoon sun will cast shadows particularly during summer months. Motorists may be distracted by train passages both by direct observation and by shadow, thus resulting in accidents. The possibility of increased accident rates on the BWP should be investigated quantitatively, as increases may reduce or completely offset claimed benefits in accidents.

6. The expected average cost of a 1-way SCMagLev ticket is given as $60 (Appendix D.4, section D.4D.2.5.4, pg D-81), which is slightly more than Acela, 4 times greater than Amtrack or auto, and nearly 8 times greater than MARC. A yearly commute (50 5-day weeks) would cost $30,000. Only wealthy people can afford such an expense and 30% of the predicted maglev non-airport ridership (Table D.4-19, Appendix D.4, section D.4D.2.4.1, pgs D-35 to D-36) is expected to be commuters. Such costs are far beyond the means of most households. In fact, no one making the median income of all the jurisdictions show in Figure D.4-3 (Appendix D.4, section D.4C.2, pg C-11) can afford to commute to work on this train.

7. What value has been assumed for the cost/liter of LHe and with what margins to accommodate market fluctuations (see item I.B.3 on this document)? Given the total

amount of LHe required for system charge and for replenishment if any, what are the total costs? Values should be booked in the spreadsheets in Appendix G.9.

8. The Total Capital Cost column (rightmost) in Table D.4-8 (Appendix D.4, pgs D-21 to D-22) ranges from $13.8B to $16.2B over the 12 alignments. Projects Construction Costs in Table ES.4.3-2 (Section ES.4.3.1, pg ES-20) and on spreadsheets (including escalation) in Appendix G.9 are in the range ($10.6B to $12.4B). What is the cause for these differences?

9. The DEIS gives the total positive jobs economic impact produced by the SCMagLev as 390-440 (Section ES.4.3.1, pg ES-15). Appendix 15 (pg 1) puts the total manpower requirement as 690-750. What is the source of this apparent discrepancy?

10. Recommend that Table 4.6-2 (Section 4.6.3.2, Appendix 4.06, pgs 4.6-1 to 4.6-2) include another row at the bottom of the tab le showing Net totals (a summation) from all previous rows: Values for 2030 are $28.1M and $45.l for (J-01, J-02…) and (J-04, J-05…) alignments, respectively. Values for 2045 are $78.4M and $108.4 for (J-01, J-02…) and (J-04, J-05…) alignments, respectively.

11. Appendix G15 states that O&M cost information is proprietary, and thus the FRA has agreed to accept an O&M staffing analysis. Presumably this is temporary. Given that taxpayer funds are liable to be solicited, financial viability is a major concern and important details (such as debt service costs) need to be disclosed before a ROD can be made. Will BWRR be required to reveal to FRA a complete detailed costing plan before a ROD?

12. Minor error in page numbering: In Section 4.06 page numbers start at 4.6-1 through 4.6-9 (pdf file pg 13) at which point the numbering system starts over again, the next page being 4.6-1 (pdf file pg 14).

C. Neighborhoods: Prince George's County

Economic impacts, particularly property value losses are discussed in item II.B in both this document and the Part 2 document. There are other severe impacts in Prince George's County, particularly in Greater Laurel and Greater Greenbelt along the viaduct. Item 1 discusses haul routes across these regions and Items 2-7 below discusses community impacts in more detail for one example, namely that portion of South Laurel that lies just south of the BWP/MD197 interchange. Similar arguments could be presented for communities just north of the intersection, such as Montpelier Hills and Montpelier, and those near the BWP/MD198 interchange, such as Maryland City and Russett.

1. **Haul Routes:** Haul Routes are needed to remove soil and other debris and for materials and precast structures (as much as 10.5 ft in width) to be transported from staging areas (e.g., Konterra) to worksites and laydown areas. The haul routes are discussed qualitatively in Section D.2A.15 (Appendix D.2, pgs A-52 to A.15-91) and mapped in Figures 17-19 and Tables 13-15 in Appendix G.7 (Section 7.4 to 7.5, pgs 24-31). They show that both Greater Laurel and Greater Greenbelt will be flooded with several hundred trucks daily traversing all or portions of every major artery including MD193, MD197, MD198, MD201, and Route 1. Even smaller roads, some single lane each direction, will be pressed into service including Powder Mill Road, Contee Road, Muirkirk Road, Odell Road, Springfield Road, Soil Conservation Road, Beaver Dam Road, and Brock Bridge Road. Some of these are inadequate in size and load bearing capability (e.g., Beaver Dam Road, Brock Bridge Road) and will have to be upgraded. In Appendix 11, the Alternatives Comparison Maxtrix (pg 10),

for the sponsor's preferred alternative (J3) would require 2.25 million truck trips, an unfathomable number. As most construction is complete by the end of year 6, this would amount to 1,500 trucks per day, although during peak years 2-4 the daily rate might be much higher. Moreover, these trucks would not be spread out evenly along the alignment but concentrated along haul routes, at laydown locations, and at work sites.

Traffic control maps in Appendix G.2 Part I (TCP 13 – TCP 41) show traffic control restrictions will affect both NASA GSFC and NSA. Road closures will require long detours. Depending on the selected alignment and location of the TMF not all these roads will be used. However, most of the proposed haul routes are common to both alignment choices and any choice of the TMF. A number of mitigation measures (truck lanes, truck turning lanes, retiming signaled intersections, traffic studies, dedicated contact number) are proposed, but there is a high likelihood that extensive backups will be created daily starting with the AM rush hour as workers arrive and which, because of the truck traffic, do not dissipate during the day, thus extending to after the traditional PM rush hour. Note that many haul routes from staging to laydown areas have turns at narrow intersections, thus making the transportation process both difficult and slow. In summary, the synergism produced by so much construction traffic (workers & trucks) may well produce extensive gridlock in major parts of Greater Laurel and Greater Greenbelt, thus drastically reducing quality of life for many of their combined 172,080 citizens and lasting at least 34 months.

2. South Laurel communities south of the BWP/MD197 interchange

- Townhouse/Single Family: Pheasant Run (north side of MD197)
- Single Family: Montpelier Woods (north side of MD197), Snowden Pond (south side)
- Condominiums/Apartments: Applewalk, Laurelwood, The Villages at Montpelier (south side of MD197)

Other: Halltown, and approximately a dozen homes along Snowden Road and MD197 apparently unaffiliated with homeowner's associations

- Population (July 2020) (https://maryland.hometownlocator.com/maps/address/)
  - 1544 north side of MD197
  - 2439 south side of MD197
  - Total: 3983

The DEIS has grossly underestimated construction phase impacts. While only a few homes will be displaced by eminent domain, on other topics the discussion is confined largely to the 500 ft LOD. All communities south of the BWP/MD197 interchange will be severely impacted during the construction phase.

Construction Traffic: The traffic impact on the BWP/MD197 worksite is shown in Table D.2-33 (Appendix D.2, section D.2A.15.2, pg A.15-86) A total of 51 trucks per day and 190 worker vehicles will be arriving/leaving for viaduct and electrical substation construction. This is an enormous amount of traffic concentrated in a very small region, amounting to 1

truck every 11 minutes in the unlikely event that truck arrivals were evenly space throughout the day. Workers will arrive at 7 am and the construction area will be active 7 am to 4 pm daily. Viaduct construction is scheduled to last 34 months over years 2-4 and substation construction for 24 months over years 2-6. For the J alignment there will also be a 200x90 meter laydown at the present Harley Davidson site. The laydown for the J1 alignment will be at the Suburban Airport site accessed by Brock Bridge Road. Both alignments will have a laydown at Powder Mill with 45 trucks and 90 workers arriving daily. An additional 56/44 trucks and 112/90 workers will arrive at Beaver Dam Road if either the BARC west or BARC east site is selected along with 145 trucks and 150 workers for the South Portal Construction site. Greenbelt and Soil Conservation Roads will provide access to this site.

The DEIS quotes traffic counts on MD197 of 28,700 daily but with the following description: "MD 197 is two lanes in each direction, with the two directions separated by a grass median." (Appendix D.2, section D.2A.15, pg A-56) It should be clarified that the grassy medium disappears within about 100 meters north and south of the interchange. Also, as the laydown is on the south side of MD197, vehicles must cross MD197 to bring these materials to work sites north of MD197. Moreover, for the J-alignment there are construction activities for Support Facilities SCM SVS 07 (adjacent to the northbound BWP MD197 exit lane) and SCM SVS 08 (west of southbound MD197 and between the northbound flyover exit lane and northbound BWP). Together with the laydown activities, there will be severe traffic impacts during the construction phase on the northbound MD197 exit lane from the BWP.

A traffic count of 28,700 daily for MD197 is not trivial. Moreover, MD197 narrows to a single lane each direction just south of the South Laurel Drive intersection which is well within the LOD. All six South Laurel communities listed above access the outside world only through MD197. Those on the north side have 3 minor roads accessing MD197, only one of which is signaled (Snowden Road). Those on the south side have only two access roads, also only one of which is signaled (South Laurel Drive). All but two access points to MD197 for these 6 communities are essentially within the 500 ft LOD, and the two exceptions (Basswood Drive, Snowden Pond Road) are not signaled, despite repeated appeals by residents to implement a signal. Residents leaving their homes will encounter huge delays just getting onto MD197. These delays will introduce uncertainties in all travel, whether for commuting to work, basic trips for shopping, medical appointments, etc.

Their travel problems will not end even after escaping the local BWP/MD197 tangle for in almost all directions they will encounter additional construction traffic and activity at other construction sites and so yet more delays: at Powder Mill Road, at Brock Bridge Road (for the J-1 alignment), at Contee Road, at MD198, and construction-related congestion on the BWP in both directions. Even the only escape route to the nearest alternate grocery stores in Bowie (>6 miles distant) along MD197 will share the construction traffic up to Powder Mill Road. Weekends will not be exempt as roadblocks are scheduled to be set up on 4 weekend days, closing BOTH MD197 and the BWP at the alignment, something that was never done during the 1999-2003 refurbishment of this interchange. There are also a host of road closures scheduled at/near the BWP/Powder Mill and BWP/MD198 interchanges and other roads (Table 23, Section 6, Appendix G8, pg 35). In summary, the ~4000 residents of South Laurel will be effectively cut off from the outside world during the construction phase, some 34 months.

Finally, much of the WSSC facility at Canadian Way in South Laurel is well within the 500 ft LOD for Alignment J viaduct construction and the additional 6 meters of work area appears to extend right up to the WSSC boundary (Appendix G2, Part G, pg 22; Appendix G1, part A, pg 36); Support facility SCM SVS10 sits just west of the viaduct. Appendix G7 (Section 17.3, pg 79) states: "Discussions have been initiated with the Washington Suburban Sanitary Commission (WSSC) about the potential use of a parking lot for one of its administrative facilities as a TBM retrieval shaft and future FA/EE location. No major WSSC infrastructure is expected to be impacted." The second sentence, underlined here for emphasis, strains believability. Also, Canadian Way, which will be heavily used for access to the worksite, is the sole access for WSSC workers. There is no other discussion about the South Laurel WSSC facility in the DEIS.

3. **Traffic Impacts during Operation:** Even after construction, viaduct crossovers on the entrance/exit lanes of the BWP/MD197 interchange will continue to have great adverse impacts on car traffic flow, thus contributing to accidents on both roads and degraded LOS.

· J alignment (distances measured from Appendix G, Part A, pgs 34-35):

o The northbound BWP exit ramp at MD197 serves northbound MD197 by way of a flyover ramp and bridge over MD197 southbound. Approximately 334 meters of that is under the viaduct. Thus, the viaduct elevation at STA124+400 is planned to be ~14 meters above the flyover ramp grade and ~28 meters above southbound MD197 grade (Appendix G, Part E, PP-56). The flyover ramp is at a slight angle to the viaduct and emerges from under it for another ~222 meters (although displaced eastwards no more than 18 meters) before finally curving to the left to merge with the MD197 northbound. The merge comes right at the location where the flyover ramp again ducks under the viaduct for a distance of ~53 meters. Thus, the right-hand merge with the northbound MD197 traffic comes at highway velocity in permanent shadow from the viaduct. Under these conditions there is an extremely high probability for accidents.

o The northbound BWP also serves MD197 southbound by an additional lane that splits to the right (east). There is ~230 meters of travel under the viaduct before the additional lane curves to the right, around what is planned to be the laydown area, until it reaches a point perpendicular to MD197 at a traffic signal, allowing traffic to turn left or right. A left turn at this light allows residents of Pheasant Run to turn right on Mallard Drive to access their community. Going straight along Snowden Road allows access to Montpelier Woods. Turning right and traveling short distances allows subsequent right turns at South Laurel Drive (for Applewalk, Laurelwood, and The Village at Montpelier), at Snowden Pond Road (for Snowden Pond), or to continue on towards Powder Mill or points further south on MD197 (Bowie).

o The entrance lane from northbound MD197 to the northbound BWP would have a similar length of 90 meters directly underneath the viaduct beginning right at the split from northbound MD197 thru traffic.

· J-1 alignment (distances measured from Appendix G, Part B, pgs 35-36):

o The southbound exit from the BWP to MD197 will go under the viaduct for a distance of ~58 meters before emerging several hundred meters before the signaled intersection with MD197, now reunified into a 2-lanes both directions.

o The loop entrance from northbound MD197 to southbound BWP will have a ~61 meter section under the viaduct.

o The viaduct is within 10 meters of the southbound BWP travel lanes for distance of ~590 meters starting just north of the MD 197 southbound exit until the viaduct crosses over southbound MD197.

o The entrance ramp to the southbound BWP from southbound MD197 is long and will be directly under the viaduct for ~459 meters.

· Common to both alignments: The long stretches of roadway in excess of 38 or even 50 meters directly underneath the viaduct do not permit the use of single hammerhead column supports for the guideway (drawings TY01 and -02, Appendix G2, Part D). Rather straddle bent mountings (TY-04) will be required. In the constricted geometry around the interchange, it is not clear whether even these mountings will fit. However, any modifications of the exit/entrance roadways to snake around viaduct mountings would defeat the careful engineering of the BWP interchange refurbishment, introduce dangerous conditions that lead to accidents, and likely result in slowing exit traffic from the BWP to the point where backups occur onto the BWP.

Analyses similar to that above for the BWP/MD 197 interchange can be done for the Powder Mill, MD198, MD 32 interchanges. The latter two along with the MD197 interchange were part of the BWP refurbishment (1999-2002) and were designed to minimize accidents and improve traffic flow. Traffic impacts might be marginally less severe for the MD32 (full cloverleaf) and MD198 (half-cloverleaf) interchanges because of the design of their on/off ramps and because the BWP crosses them at an angle closer to perpendicular.

<u>However, in summary the overall picture is that the proximity of the SCMagLev viaduct to the BWP introduces complicated challenges to motorists at the interchanges, leading to a great potential for accidents and significantly degraded LOS flow on the BWP and on all four roads that have interchanges with it (Powder Mill Road, MD197, MD198, and MD32).</u> Moreover, the viaduct mountings will essentially lock-in the proposed modified design of the interchanges, making it virtually impossible to correct any flaws or even to modify them in the future.

4. There are potential sources of EMI interference.

The first potential source of EMI interference involves cars traversing entrance/exit ramps under the viaduct (see item II.C.3 above). For the J-alignment cars on the northbound BWP flyover exit ramp to MD197 are traveling approximately 14 meters under the viaduct for a distance of 334 meters (1102 ft). If one includes all 3 segments (directly under, just east, directly under the viaduct) of that exit ramp the distance is 609 meters (2010 ft). For an exit speed of 30 mph the car transits in 25 seconds or 46 seconds for the two choices, respectively. However, an SCMagLev train of length 396 meters (1300 ft) (Appendix G4, Table 4.1, pg 4) and moving at 500 km/hour (300 mph) will completely traverse its own length over a car in ~3 seconds. Thus, traverse events where cars are under/near the viaduct for the entire duration of the train passage will be quite common especially at rush hour times.

· Any car systems that are susceptible to a magnet field varying at 8 Hz may be threatened. Note that a minimum viaduct distance of 20 ft was determined for humans, and while there is adequate discussion about interference to sensitive receivers, there is no discussion about cars.

o In Table D.11-6 (Appendix D.11, section D.11.1.5.1, pg 11) the measured field 7.5 meters from the Yamanashi train was 2680 mG. Applying the inverse square law for the 14-meter distance of the car this is reduced to 769 mG at the car, a value that is 128 times larger than that (6 mG) of the car itself (Table D.11-7). A second measurement of 200 mG in Table D.11-8 (pg 11) at 6.7 ft horizontal, 26 ft vertical distance is reduced to 81 mG at the car, still a factor of 13 greater than the car itself. While these values are comparable or less than that of the Earth's natural background field of 470 mG it is their time varying nature (8 Hz) that makes them a potential threat.

o One such car system is the Anti-lock braking system which has a magnetic Hall-effect sensor in each wheel and triggers braking at 15 Hz, close to the 2nd harmonic of 8 Hz. (Note that a Doppler shifting will increase the fundamental frequency for oncoming trains and decrease it for receding trains, but for e-m radiation the shift is infinitesimal even at the maximum train velocity, and thus can be disregarded.) Together with fields in the range 81-769 mG, there is some probability of the SCMagLev passage causing a malfunction of the anti-locking braking system. Roadways directly under the viaduct are prime areas for ice to collect in cold weather with water dripping off the viaduct, making it critical to have properly functioning anti-lock brakes. Note that the suggested use of warm water to remove snow/ice from the guideway might lead to extremely hazardous conditions on roadways beneath if the water is not properly channeled to drainage systems as part of the storm water removal process.

o For the J-1 alignment, similar arguments hold for the ~590 meter (1947 ft) stretch of the southbound BWP and for the 459 meters (1515 ft) southbound MD197 entrance ramp to the BWP (item II.C.3 above).

o There may be other car systems that are susceptible to EMI from the SCMagLev. Using data bases of materials, equipment, and designs from car manufacturers, a thorough investigation involving theory, modeling, and test should be made of all car systems operating at or near 8 Hz and its harmonics.

· In Appendix D.11.1.6.2 (Appendix D.11, pgs 14-15) the statement is made: "No impact would be expected, as the SCMAGLEV project would operate on different frequency bands. The FCC allocates different bands of the electromagnetic spectrum for different uses: cellular phones, radio control equipment and other communication devices have dedicated bands so that EMI cannot occur." While the premise is true, the conclusion (underlined here for emphasis) ignores another class of problems, namely that of line-of-sight interference.

o The elevated viaduct is a large dense structure (possibly filled with grounded rebar). It has large currents flowing for propulsion, levitation, and guidance and its coils are likely surrounded with grounds. Thus, it has the potential to block direct line-of-sight signals from TV transmission towers, cell-phone towers, and direct satellite transmission. These signals have much higher frequency than 8 Hz and thus have much lower acceptance angles for reception.

§ For the South Laurel communities listed above lines of sight from rooftop antennae to both Washington and Baltimore TV transmission towers would cross the viaduct and depending on elevation might be blocked. A sizeable number of active TV antennae have been installed in these communities as cable TV has lost its popularity, and these could be effectively blocked by the viaduct. Moreover, lines of sight to the cell phone tower in the Crystal plaza might also be blocked.

§ Homes close to the viaduct on its north side (e.g., in Montpelier Hills, Maryland City, Russet) might have blockage of direct satellite reception, as all such satellites are at relatively low altitudes in the southern sky.

§ The cell phone tower in Crystal plaza sits near a laydown area for the J-1 alignment. Would this transmitter have to be moved? If so, where would it be relocated?

o For the J-1 viaduct, homes close to the viaduct on its north side would experience a shadow from the viaduct. Any investment by homeowners in solar panel energy would be reduced in value.

· In Section D.11.1.5.3 (Appendix D.11, pg 13) the text appears to misquote reference 33 (Ohsake, H.). The text reads: "a 16-car SCMaglev train would be comprised of 34 total superconducting magnets and 136 superconducting coils. The magnets use Bi2223 superconducting wires, each with a maximum flux density of 5.2 T". The numbers of magnets and coils are taken from slides 8 and 9 of that reference, but in that case the superconducting wire is Nb/Ti, which requires LHe cooling. Bi2223 is discussed in slides 16-20 of the reference, but (a) the "wires" are actually implanted in a resin (REBCO), and (b) there is no need for LHe cooling. Since the proponents have indicated on their websites and in the DEIS of the need for LHe (Section 3.3.2.6), it is concluded here that this is a misquotation, but one however that does not affect the argument in this section as the only operative number is the maximum flux density of ~5 T. In this document it is assumed that that Nb/Ti wires and LHe cooling are being used.

5. **Noise & Vibration:** The discussion of noise and vibration in Section 4.17 and Appendix D.10 is confusing.

· Operation Phase Noise Impacts

o Background noise was measured at the locations of 20 receptor locations involving 4000 receptor sites within an 800 ft screening distance (Table D.10-6, pg 10-14)

o In the discussion in section D.10.4.2.1 and the counts in Table D.10-7 the units are not given. Are these counts/day or some other unit of time?

o It appears that the results given in Table D.10-6 are the predicted total counts (moderate/severe) summed over all receptors, thus for the alignments. If so, then the predicted counts at each receptor location should be given.

o There are 104 train passages (Table A1, pgs 10.6-27 to -28) each day in both directions for a total of 208. There are 9 receptor locations (N3-N9) in the viaduct region (disregarding N20 at the MD198 TMF), all at locations where the SCMagLev is moving at maximum speed. One would expect a total of 9x208 = 1872 counts daily

(moderate+severe). Yet the totals over the alignment are in the approximate range 500-660. Is there a range of noise output for every train passage? Why this difference?

o In Appendix D.0.4.2.2 (pg 10-18): FRA predicted airborne noise up to 2,100 ft from the guideway. This impact distance is due to a combination of the aerodynamic effects of high-speed train operations, the elevated guideway and the low background noise level.", where (ref 7) "The FRA impact criteria are based on a sliding scale whereby low background noise level result in more stringent thresholds". The net effect is that most if not all in the South Laurel communities will likely be able to hear the train passages 208 times every weekday of the year (somewhat less on weekends) regardless of whether the noise levels exceed the formal definition of moderate or severe. Note that this is a periodic noise source, which is much more annoying than a random source.

o Proposed mitigation measures include track design, tunnel portal design, augmented parapet walls, and sound attenuation walls. The first three of these are probably more effective but more costly. Some of them would be difficult or impossible to implement once the line is built and in operation. The last measure, sound attenuation walls, is the most common, but would effectively destroy the scenic view which defines the BWP. Moreover, the train's minimum elevation of 10 meters over grade might render such barriers ineffective. In summary, the DEIS does not address the noise problem sufficiently.

· Construction Noise and Vibration Impacts: Sound attenuation barriers and non-impulsive equipment must be mandatory.

· Operation Phase Vibration Impacts: The analysis has important omissions.

o The Methodology is based on the FRA's *High-Speed Ground Transportation Noise and Vibration Impact Assessment* guidelines. These guidelines do not assess the sensitivity of ground water wells, sceptic systems, or geothermal heat pumps.

§ At least four properties in the Montpelier Woods community in South Laurel have geothermal heat pumps at distances in the range of 2300-2800 ft from the guideway. More are planned, and it is possible that they exist in the other South Laurel communities or elsewhere along the alignments. All implemented systems use vertical ground loops of depths in the range 300-600 ft. Geothermal heat pumps represent considerable financial investment by the property owners.

§ The extent of well usage and sceptic systems is not known to the reviewers of this document, but cannot be ruled out in South Laurel or elsewhere along the alignments.

§ It is mandatory that a survey of properties along the entire alignment be made, especially in tunnel areas to ensure that no geothermal heat pump loops or wells are destroyed.

o The analysis is based on "typical" soils (Appendix D.10.2.2.2, pg 10-12). The FRA guideline states (Ch 8, section 8.2.1, pg 8-5): "It is well known that there are situations in which ground-borne vibration propagates much more efficiently than normal. The result is unacceptable vibration levels at two to three times the normal distance. Unfortunately, the geologic conditions that promote efficient propagation have not

been well documented and are not fully understood. Shallow bedrock or clay soils are often involved. One possibility is that shallow bedrock acts to keep the vibration energy near the surface. Much of the energy that would normally radiate down is directed back toward the surface by the rock layer, with the result that the ground surface vibration is higher than normal."

§ Appendix G13 gives extensive geotechnical profiles along both alignments but it is not clear how far these profiles extend in directions towards communities near the alignments.

§ Other geological data bases might be used if they cover the affected communities with sufficient spatial resolution.

o In summary, the vibration analysis should be redone for communities near the alignments assuming "efficient" soil propagation if no other data are available. Lacking guidelines, calculations should be based on first principles and/or on analogous systems. The end question is at what distance from the maglev is it safe to use wells and geothermal heat pumps?

· Operation Phase Noise-Induced Vibration Impacts: Noise-induced ground vibrations at 8 Hz may also affect car systems near and/or under the viaduct, but Doppler shifts for trains arriving and receding the moving cars must now be applied to determine the relevant harmonic frequencies. The auto's rubber tires might sufficiently attenuate such vibrations, but first principle calculations should be done using sound speeds appropriate for the soils given in Appendix G13.

6. **Aesthetics:** Aesthetic impacts were evaluated along both alignments including the entire viaduct and the TMF locations.

· Nine CAA (#5 - #13) used in Appendix D.06 to evaluate aesthetic impacts along the viaduct and the TMF locations (Figure D.6-1, section D.6.1.1.2, pg 6-7). Figures D.6-6 through D.6-14 map the locations. Regardless of the chosen alignment, Tables D.6-7 through D.6-9 show H (high) impacts for over half the locations evaluated with the remaining locations split approximately evenly between M (moderate), L (low), and RI (relatively imperceptible). The H locations are split about evenly between the alignments. As might be expected resources on the north side of the BWP show visual impacts for the J-1 alignment and resources on the south side show higher values for the J alignment.

· CAA #7 South Laurel residential areas show generally H visual impact with moderate to high sensitivity for the J alignment.

· Members of the Snowden family were early colonists of Maryland arriving in the 17th century. The family owned much of the land through which the SCMagLev would traverse, and they were friends of George & Martha Washington (who really did lodge there on trips north). Some of their iron mining operations, among the first in America, were located near where Brock Bridge Road crosses the Patuxent River. Active historic homes still dot the landscape and are on the National Register of Historic Places. These homes are operated by the M-NCPPC.

o Snow Hill manor at Contee Road and MD197 is 4000 ft from the BWP but the view is blocked by trees.

o Montpelier Mansion, located at Muirkirk road and MD197 is the historical and cultural centerpiece, with a full yearly program of events many of which are located on the east lawn towards the BWP. The mansion sits on a small hill approximately a half mile from the BWP and thus has a direct view of the SCMagLev J-1 alignment from across the Montpelier park. While this distance is formally just outside the 2,000 ft criteria, the lawn area is not. The reviewers of this document believe that the Mansion's historical significance warrants an exception and request that it be included in the noise and vibration analysis.

· In Section D.6..1.3.3 (Appendix D.06) the illustrative renderings along the viaduct are incomplete and deceptive.

o While the airplane views are useful in understanding the relationships between guideway and its facilities to the existing environment, aesthetics are evaluated on ground views. There are only three ground views along the viaduct, all of which are located from the perspective of a traveler on the BWP, not from a resident. This perspective reduces the incongruity of the maglev by putting it in the context of another transportation artery, thus giving a favorable but unfair picture. Given the high visual impacts determined for residential neighborhoods additional renderings (before/after) are needed for both alignments:

§ J: Parking lot of New Life Christian Center (Pheasant Run) looking direct West towards MD197 flyover ramp; alternate location is parking lot of nearby 7-Eleven; a 3- or 5-photo mosaic would give a true picture of the immensity of the viaduct compared to its surroundings

§ J: Just at east edge of cul-de-sac on Pheasant Run Ct looking directly west towards MD197

§ J: northbound MD197 100 yds south of Canadian way looking toward split between northbound MD197 and northbound entrance ramp to BWP

§ J: Southern parking bay for 11742 S. Laurel Dr apartments looking WSW (260 deg east of north) towards 11746 S. Laurel Dr apartments

§ J: north side of gymnasium building belonging to Tabernacle church on S. Laurel Drive (south side of power ROW) looking WNW (280 deg east of north) towards BWP

§ J-1: Corner of Apache Tears Ct/Ispahan Loop looking ENE (20 deg north of east) towards Montpelier Hills townhomes at Ivory Fashion Ct

§ J-1: Corner of Muirkirk Rd/Hermosa Drive looking SE (120 deg east of north) towards Montpelier Hills Recreation area

o Two of the three renderings (Figure D.6-33, pg 6-41 and Figure D.6-39, pg 6-44) show the base of the mounting piers, which is open and free. Exact fencing locations are not given in the DEIS, but given safety and security concerns it is unlikely that viaduct piers such as in Figures D.6-33 and D.6-44 can remain unfenced, where any vandal is only an easy baseball throw from the viaduct. Figure D.6-33 and perhaps one more of the existing or additional renderings should show fences. Finally, fencing degrades with time and without regular trimming will become an eyesore with growth of invasive vines

and weeds. Proper maintenance of fences and surrounding grounds is often reduced or eliminated when budgets become tight.

o It is disingenuous to use renderings in summer months when tree leaves partially camouflage. Deciduous trees are leafless approximately 5 months of the year, and to be fair worst case (winter months) impacts should be shown throughout. (The burden of proof should be on the proposers.)

7. Additional Community Impact: In Section 4.4.4.2 (Table 4.2-1, pg 4.4-5 and pg. 4.4-13) the J alignments would require the displacement of Snowden private cemetery within the PRR. (The word "displacement" in the DEIS is a euphemism intended to mollify.) Reburial would be done with consultation of the family and according to all applicable law. However, it is indeed sad that important historical ancestors could not be left to eternal rest in a 100x100 ft plot of earth.

D. Safety

1. Technological Safety

· Safety issues discussed in previous sections

o LHe: Item I.B.3

o SC magnet quench: Item I.B.3

o BWP throughway accidents: Item II.B.4

o BWP interchange accidents: Item II.C.3

o BWP interchanges EMI on automobiles systems: Item II.C.4

o BWP interchanges snow/ice removal: Item II.C.4

o BWP interchanges noise-induced vibration on automobile systems: Item II.C.5

· Describe results of component safety tests, including but not limited to physical tests, crash tests, theoretical modeling, standards applied, lifetime and material fatigue tests.

o SC magnets, SC coils, refrigeration system

o Guideway and coils (propulsion, levitation, guidance)

o Command/Control elements (including software)

o Train cars (normal and intermediate, car linkage); particularly important is the question of train car crumpling during back-end collisions

o Rubber wheels, mounting and retraction systems, wheel covers

o Guideway switching systems

· Describe results of system wide tests (Yamanashi test track, not predecessors unless relevant). Include results from performance, identified problems and solutions.

· Standards applied to testing and deviations from the baseline Yamanashi test track are absent.

o Describe standards of testing in Japan and compare to US standards.

o Describe any deviations in dimensions, materials, usage, values, etc., between the Japanese system (e.g., SC elements, train cars, guideway, turning radius, etc.) and those proposed for the SC Maglev.

· At 300 mph how would the train react to a bowling ball sized rock launched onto the guideway or a deer that had vaulted over the fence (even for a 10 ft fence, it has happened when a deer vaults from a slightly elevated mound)?

o On a curve during a momentary power failure could the train crash into the guideway walls, thus damaging or destroying guideway coils and SC magnet and coil systems and possibly generating secondary explosions (magnet quench, LHe storage tank rupture)?

o Could the rubber wheel systems be damaged making deployment impossible for one or more cars?

o How would train cars react if one or more wheels were damaged or did not deploy?

· At 300 mph, a train will cover 440 ft in one second. If a switch to an alternate substation takes even 100-msec the train has moved 44 ft, approximately half a train car length and has thus lost phasing with the propulsion coils.

o How much time does the switch to an alternate substation take?

o Will the train location device be able to find a train that is not where it expects it to be?

o What happens if a total grid collapse occurs?

2. Managerial Safety

· **Avoiding Hubris:** The 7 pages in the Appendix G6 Memorandum devoted to safety are little more than an outline. However, they do contain a statement (pg 4) that the reviewers here believe has no place in any safety document: "Unlike steel-on-rail systems, it is not possible for an SCMAGLEV trainset to derail due to the U-shaped design of the guideway and the stable dynamic performance created by the large magnetic forces." Admittedly it does contain an element of truth, for the maglev cannot derail because there is no rail from which to derail. However, by concluding that a derail is not possible the statement violates the culture of safety principle on which the Japanese system has been built. The statement can only be excused out of unfamiliarity.

o ALL complex technical systems have flaws, sometimes hidden, but waiting to be exploited by nature or by man, by intention (security) or by accident (safety). The more complex, the more hidden, and the likelihood of more catastrophic consequences. The

"unsinkable" Titanic, the Challenger & Columbia disasters, Three-Mile Island, Chernobyl, and Fukushima are a few examples.

o It is interesting that the statement is qualified with the words "difficult for a vehicle to derail" in Section 4.22.3.2 (pg 4.22-7) and further qualified in Section 4.22.4.2 (pg 4.22-13) with an explanation that guideway walls constrain the vehicle to "prevent" derailment. The reviewers of this document dispute even that assertion, as discussed in item II.D.1 above.

· **SC Technology Heritage:** The true heritage of SC magnet technology lies not in transportation but in high-energy physics particle colliders. The levitating aspect of the SCMagLev is a new application, but the principles of propulsion and guidance of beams of subatomic particles have long been known to physicists. While dozens of small colliders exist spread across the world, the current pinnacle of success is the internationally supported CERN high-energy physics collider in Europe. This system is 27 km in circumference and contains nearly 10,000 state-of-the-art SC magnets, which are much larger than those designed for the SCMagLev. These SC magnets are maintained by an army of scientists, engineers, and technicians, who are leaders in the field of SC technology. While the SCMagLev has much more modest goals, the question of having staff members with adequate science/engineering expertise is still important

· **Importing the Culture of Safety:**

o <u>The reviewers of this document acknowledge and salute the Japanese achievements and record of safety on SCMagLev technology.</u>

o <u>However, that record exists as yet only in Japan, not in the US.</u> Importing and cultivating the expertise is not guaranteed.

o Compliance Measures #1 - #5 outline elements of a comprehensive safety program. Training is an essential part of the System Safety Program and Emergency Preparedness Plan to achieve an adequate handoff of experience and understanding. Compliance Measure #3 - Inspection, Testing, and Maintenance, may requires a higher level of technical expertise.

§ How long is the training period? The challenges of achieving an experience level equivalent to 50 years should not be underestimated.

§ How many JRC representatives will assist in this training, testing, and commissioning?

§ How many JRC representatives will remain during operations?

§ Will JRC representatives be paid from project funds for training, testing, and commissioning?

§ Will JRC be available for consultation after operations commence?

§ The top-level schedule (Figure 2, Appendix G7, section 3.1, pg 6) show slightly less than 2 years of testing and commissioning. New trainees will not have access to a

working US system for training before this time. Will US trainees go to Japan to obtain hands-on experience prior to operations?

o What staffing of US professionals with experience in SC technology is required during construction and during operation?

3. **Operational Safety:** A wide variety of issues must be addressed.

· In Appendix G, pt E, viaduct elevation plan drawing PP-55 shows change in grade from 2.43% at STA 122+800 to -0.51% at 123+800.

o A system may be safe but still provide an uncomfortable ride. What G-forces apply? Include 3-axis (pitch, yaw, roll) accelerometer spectrum.

o Are these results safe for people with medical conditions (e.g., heart problems)?

o Compare SCmaglev grades/G-forces to those in the Yamanashi test tract and its planned extensions and to other mass transportation modes (airplanes, bullet trains, commuter trains)

o Will seat belts be available for emergencies?

· There is no discussion of debris effects on the train during operations.

o Describe the aerodynamics of the nose on the end train cars. Does the nose shape produce any Bernoulli effect resulting in aerodynamic lift?

o The rounded nose does not appear to function as a “cow catcher” and might actually deflect debris downward under the train carriage. What is done to mitigate such damage?

o Deflected debris might damage train car undersides, wheels if deployed during the impact, and wheel doors when wheels are retracted (leading perhaps to non-deployment when needed).

o The intense magnetic fields will draw ferrous metal debris (e.g., metal food cans) towards the magnets toward the strong fields of the train’s SC magnets at the precise time the train is moving through the guideway. What is done to mitigate damage?

· Describe the operational sensitivity to biological debris.

o High speed collisions with birds are likely especially given the proximity to the PRR, thus possibly causing damage to undercarriage.

o Large amounts of autumn leaves and occasionally larger tree branches will be blown into the guideway.

o Given the proximity of the PRR, insect collisions will be common. Most notably, Brood X of the 17-year cicada will emerge in 2021 and again in 2038. It is the largest brood in the US with densities up to 1.5 million/acre. Cicadas can easily fly to viaduct heights especially from nearby trees. Their tymbal frequency is 4.3 kHz but they are

attracted to lawnmowers, weed-whackers, leaf blowers, power drills and anything else that vibrates. Thus, it is very likely that the viaduct would be covered with them in astronomical numbers, perhaps curtailing operations. They are most active during the day, and their life cycle is 4-6 weeks.

· The DEIS does not describe the snow/ice removal process in detail. Obviously snow events can occur during operations. The Northeast Maglev website suggests that hoods and a warm water sprinkler system might be used.

- https://northeastmaglev.com/faq/#Technology

- How does such a system drain to storm water to prevent refreezing hazards elsewhere?

- How much power is required to deice the entire viaduct portion of the guideway?

- How much water is used?

· Operational plans currently call for a nightly inspection, maintenance, and cleaning during 23:00-05:00.

- The SC Maglev plan is apparently in reaction to the 2006 collision of a maglev with a maintenance vehicle in Lathen Germany. This resulted in 23 deaths and 11 injuries (10 severe). The cause was attributed to failure by the crew of the maintenance vehicle to follow proper communications protocol.

- Despite the desire to avoid a repetition of that event, given the variety of natural (weather, biological) and manmade (material thrown onto the guideway or blown there by the wind) hazards as well as train and/or guideway breakdowns, it is certain that guideway operations will occasionally be suspended during the day for unanticipated maintenance, rescue, and/or cleaning.

- TMF and Switching

  - § Are all trains stored nightly in the TMF or are some stored at end stations after TMF processing in advance of next day operations?

  - § How many trains can be stored in the TMF? How many trains can be stored nightly at end stations?

  - § Are all trains processed (cleaned, inspected) every night in the TMF?

  - § Describe the inspection process: train elements inspected, duty cycle, etc.

  - § How many spare trains if any are present and where are they stored?

  - § What is a train speed profile as it leaves a guideway for the TMF? As it enters a guideway?

§ In keeping with right hand running (Appendix G4, Table 4.1, No.5, pg 4), it appears that for all TMF choices the entrances appear to be from the northbound guideway and exits are to the southbound guideway. Is this accurate?

- Section 4. (pg 4.22-16) mentions the presence of an on-board crew
  - How many individuals per train?
  - What are their functions?
  - Where are they located?
  - Is passage between cars possible to provide first aid?

- Especially for J alignment, viaduct evacuation along the 3-mile stretch alongside the PRR from MD197 to MD198 would be difficult. First responders would need a well maintained and suitably sized access road. However, at least 15 busses would be required to evacuate a full train of 762 passengers. Building a suitable road into the PRR greatly magnifies the biological impacts. Alternately, the BWP would have to be closed for evacuation.

- Using the train speed profiles of Appendix G4, and a 20 minute turn around, a single train will complete a loop (and hence 1 train passage each direction) in 70 minutes (see also Table 3.4-5, section 3.3.2.9, pg 3-37). Thus more than 8 trains are required to maintain peak period service unless train turnaround time is kept to 15 minutes at both ends. (The minimum appears to be 10 minutes.)
  - Do the end stations have sufficient room to house a spare train during peak service?
  - What are the average and the minimum train-to-train distances during peak service?
  - At 300 mph what is the minimum train stopping distance?
  - Describe the emergency stop procedure.
  - Even under computer control, there must be a margin of safety to avoid train backend collisions. This, plus passenger boarding considerations, will set the maximum hourly service rate?
    - § What is this margin of safety in distance and in time?
    - § What is the maximum hourly service rate?
  - In the event a train becomes disabled at but makes it to an end station is the intent to add spare trains from the TMF without interrupting service?
  - How are trains removed if they cannot make it on their own to an end station?

- There appears to be no discussion about the ticketing process, which may affect passenger processing and therefore system operations.

o Do riders buy a reserved ticket for a destination and a given train time or do they just buy a ticket and pick the next available train?

o In the former case, what do passengers do if their assigned departure train is unavailable because of a service disruption?

E. Security

1. The terrorism analysis in Section 4.22.3.3 (pg 4.22-7) is confined to Maryland and Washington DC for the period 2000-2017 and at the national level discusses only attacks on rail stations. They cite a low incidence level and suggest that attacks on other types of targets are more likely. These are gross oversights bordering on negligence. Low-Frequency High-Severity events (Table 4.22-1, pg 4.22-5) are the hardest to predict but are applicable to the SCMagLev. Note that attacks may be based on long-held or historic grievances. Relevant examples involving transportation infrastructure or conveyances include:

· Foreign Terrorism in the US:

o Sept. 11, 2001

o Mass transportation devices (aircraft) used as weapons

§ World Trade Center

§ Pentagon (just across the river from DC)

§ Thwarted attempt presumed to target the US Capitol Building: had it succeeded the event would have only then been qualified for inclusion in the analysis in Section 4.22.3.3.

· Domestic terrorism in the US:

o April 19, 1995

o Oklahoma City

o Truck bomb outside of Murrah Federal Building

· Domestic terrorism in Tokyo:

o March 20, 1995

o Sarin chemical attack

o Coordinated attacks in the subway

· Domestic/Foreign terrorism in London:

o July 7, 2005

o Coordinated bombings in the subway

· Foreign terrorism in Madrid:

  o March 11, 2004

  o Coordinated bombings in the subway

· Greater Focus in US on Domestic Terrorism 2021

2. Previous incidents suggest a higher probability than normal for a rail facility like the SC Maglev to be a target. Possible motivating factors include:

· The SCMagLev is a US partnership with a foreign country.

· The technology may be perceived as eliminating US jobs.

· The technology is cutting edge.

· The system may be seen as a symbol, being the first of its kind in the US.

· Two High-Value targets are nearby: NSA and US Secret Service/James J. Rowley Training Center.

· Multiple Low-to-Medium Value targets are nearby: BWP traffic, homes and buildings both over the tunnel sections and near the viaduct.

3. SC Maglev Vulnerabilities

· The guideway does not physically constrain the maglev train. The train is ALREADY airborne. If for any unanticipated reason the guideway is breached or the train encounters a large heavy foreign object, a stopped train, or a ruptured (misaligned) guideway section, it will fly in whatever direction physics dictates. At 300 mph the cone of destruction will be long, and it will widen considerably as debris scatters off objects on the ground.

  o SC Maglev Kinetic Energy

    § Assume: 1000 tons fully loaded train, based on approximate internet values for train cars

    § Speed: 500 km/hour

    § Kinetic Energy: 2100 MJ

  o 767/200 used in the Sept. 11, 2001 attacks

    § South Tower impact Kinetic Energy: 3658 MJ

    § North Tower impact Kinetic Energy: 2540 MJ

    § http://web.mit.edu/civenv/wtc/PDFfiles/Chapter%20IV%20Aircraft%20Impact.pdf

- **Conclusion:** The SC Maglev has approximately the same Kinetic Energy as that of the aircraft that impacted the two World Trade Center buildings. Damage to objects on the ground can be expected to be comparable.

· The mostly passive defenses (fences, camera monitoring) described in Section 4.22 are more appropriate for criminal activity and vandalism than for resisting terrorists.

- Fences 10 feet in height will do nothing to deter vandals or terrorists from launching onto the viaduct guideway heavy objects that are larger than the gaps between train and guideway walls and floor.

- Commercially available drones can lift 40 lbs of debris, explosives, etc. onto the viaduct guideway

· The long viaduct makes it both hard to defend or even monitor completely. Response times to remote areas under attack will likely take much more time to arrive than for the attack to be completed. The number of security personnel (60-70) given in Appendix G15 is far too small to guard the system 24/7 effectively in addition to their other duties such as screening of passengers.

· Unlike other types of rail systems, maglev passengers essentially sit inside the engine, close to critical parts (e.g., SC magnets, SC coils), that themselves have explosive potential (item I.B.3).

· Nightmare scenarios

- While the train velocity vector normally points along the viaduct, an experienced terrorist team could blow up a viaduct mounting in advance of a train and collapse the guideway towards their target of choice. Even with power cut off, the train's momentum will do the rest according to the laws of physics.

- There is a single command/control center. Disable or destroy this center, and as many as 8 or more trains are in jeopardy.

- There are numerous communications relays any of which could be a targeted by itself or in conjunction with other attacks.

- Suicide terrorist bringing a bomb onto the train.

- Terrorist breaching TMF security and hiding a timed bomb on the train. (Note that careful screening of all personnel is necessary to prevent a terrorist from recruiting a worker or becoming a worker.)

- All of these scenarios or similar ones can be commonly found in video games, movies, and of course the internet. There is nothing unthinkable, classified, or particularly imaginative in any of them. While similar scenarios can be constructed for aircraft and normal trains, the maglev's unique status should be cause for more caution.

· For the MD198 TMF the train's velocity vector near MD198 (STA 130+000) temporarily points directly at the NSA although 2 miles distant. What is the train velocity on the exit ramp to this TMF? Are they on rubber wheels at this location?

· As described, the control/command system software will be vulnerable to cyber and other threats

- o Command/control system should be isolated from internet.
- o Redundancy in computer systems is critical.
- o Power backup is necessary in case of local blackout.

4. It appears that TSA airport level screening will only occur at the BWI terminal. Given the probabilities (Item 2 above) and vulnerabilities (Item 3 above) it may be prudent to install TSA screening at the end stations as well. However, passengers would then incur significant time delays and this would also reintroduce the time uncertainties that the system hopes to avoid.

F. Energy

1. **Wind Power:** The BWRR has an ambitious plan to power the SC Maglev by developing, in partnership with an experienced affiliate, some 13 wind powered electric stations in western Maryland (Appendix G10). Existing transmission grids would be used to deliver power, and the total output would be 905 MW. None of these systems has been built yet. However, since they are small (70 MW) the approval process to obtain a CPCN exemption is not complex, although a public hearing is still required. The likelihood of final approval for this auxiliary wind power is not clear, but the question has little relevance as energy generation is not the driving constraint.

2. Energy Consumption

· Each train requires 35 MW during acceleration which is 0.02% of PJM generating capacity. Since 8 trains during peak periods are only 0.16%, it appears that existing generation resources are likely sufficient to meet the SG Maglev need even without resorting to additional wind power. The estimated total of 4 trillion MMBtus/year would represent an increase of 3.3-3.4 trillion MMBtu/year over existing consumption in transportation after subtracting the expected decrease in auto traffic. This is ~3% of the yearly energy requirements for the combined Baltimore Washington Area (Table 4.19-2, Section 4.19-2, pg 4.19-4), a sizeable fraction for a single user, which should therefore be viewed with concern. In times near peak loads who gets priority? Note also that if electric cars use becomes more prevalent or even dominant then the SCMagLev will be competing with electric car demands for the same resources making it certain that demand could not be met with current transmission capacity and perhaps even electrical energy generation.

· However, the critical constraint is not electricity generation, but transmission capacity, which is congested in the Baltimore-Washington area. With multiple trains needing power rapidly the SC Maglev needs are complex (Figure 4.19-5, section 4.19.3.2, pg 4.19-13) especially at peak periods (which overlap PJM peak demands from other customers. The question turns to the transmission capability for the 7 proposed substations (and another for the choice of TMF) given in Section 3.3.2.6 (pg 3-34). None of this is discussed in the DEIS.

To accommodate the SC Maglev PJM would respond to the project sponsor's application for long-term service by initiating a TFS, which might require grid system

upgrades to mitigate adverse impacts on regional grid reliability. These modifications may require additional cost, responsibility and construction time. Recent events in Texas have highlighted the fundamental but perhaps little appreciated importance of grid reliability and its vulnerabilities to weather and other unanticipated events. The inherent risk that the SCMagLev poses to grid reliability is as yet unknown. It could be unacceptably large, and thus the project cannot be approved before a TFS determines impacts and solutions if any.

· What is the electrical usage during the maintenance period 23:00-05:00

  o For each ancillary facility (substations, MOW, FA/EE, operations center, signals and communications)

  o For train subsystem (e.g., SC magnet and SC coil refrigeration)

  o For TMF activities

  o For train transport to/from the TMF.

· Energy Usage on less than yearly scales

  o What is the SCMagLev daily energy usage (integral under the curve of Figure 4.19-5 added to the usage during the maintenance period)?

  o What is the weekly energy usage (weekends have reduced train operations)?

3. **Grid Isolation:** There is no technical detail on how the maglev electricity needs are buffered from the grid. Obviously surges to other customers must be avoided.

· If for example SC magnets quench will power be dumped back onto the grid? What level of surge suppression is needed to prevent damage to the grid and to other customers? For example, could solar panels be damaged?

· In the case of partial power outage, the system is supposed to switch to a different power substation (Table ES3.1-1, Section ES.3.1, pg ES-8). Could alternate substations handle the added power requirement, especially during peak service?

4. Apparent minor bookkeeping error: Appendix G.10 pg 5 pie chart sum is 186,788 MW installed generation capacity. Table Grand Total is 199,439.5 MW installed capacity (underlined here for emphasis. Why this discrepancy?

LXXXV. Appendix: Submission Reprint: Kurtz, Josh – "Draft Environmental Impact Statement and Draft Section 4(f) Evaluation Baltimore-Washington Superconducting MAGLEV Project Comments Submission." *Chesapeake Bay Foundation*. May 24, 2021.

Established more than 50 years ago to 'Save the Bay,' the Chesapeake Bay Foundation (CBF) currently represents approximately 94,000 members in Maryland. Our education department operates 15 field programs for students and teachers across the Chesapeake Bay watershed. CBF's land and oyster restoration programs have created and enhanced oyster reefs in the Chesapeake Bay and its tributaries and established riparian buffers, wetlands, and forests throughout the Maryland portion of the watershed.

CBF's mission to achieve clean water in the Bay and its tributaries also benefits from the contributions of the Beltsville Agricultural Research Center and Patuxent National Wildlife Refuge. These facilities would be heavily impacted by the project sponsor's proposed alignments. Both expect the loss of environmentally active lands to have substantial negative impacts on research that improves the ability of Chesapeake Bay stakeholders to manage pollution and natural resources effectively. In addition, the carefully managed forests, wetlands and open spaces that could be cleared or filled on these sites directly protect water quality.

While the following comments focus on three major topic areas (water and wetlands impacts; nutrient and sediment impacts from forest loss and construction activity; and environmental justice), there are two initial matters of importance with respect to this DEIS about which we are also particularly concerned: the description of purpose and need, and the alternatives studied. These two requirements for developing an environmental impact analysis are foundational components which greatly shape outcomes. We believe that, as described, they fail to conform to EIS regulations, guidance, standard protocols, and extensive caselaw.

1. The statement of purpose and need unlawfully predestines the outcome.

With respect to the statement of "Purpose and Need," its structure should avoid improperly foreordaining the outcome.[1089] An inappropriate and too narrow purpose and need leads to an inappropriate and necessarily too cramped alternatives analysis (see below). In this case, the purpose and need statement too directly predicts the outcome, which circumstance should be eschewed. But even if the purpose is stated as "building a high-speed system to reduce travel time to meet the capacity and ridership needs of the Baltimore-Washington region"[1090], and

[1089] See, e.g., Simmons v. U.S. Army Corps of Engineers, 120 F.3d 664 (7th Cir. 1997), 667.
[1090] Baltimore-Washington Superconducting MAGLEV Project Draft Environmental Impact Study (January 2021), [hereinafter SC MAGLEV DEIS], ES-6.

even if the agency proposing this solution is given more deference than appropriate as to what the purpose should be, how can the SCMAGLEV possibly stand up?

First, the SCMAGLEV as described is not a "system" but a single, two-way, two-destination train from each of the two end-point termini. While its two terminal stations (depending upon their ultimate locations) may be accessible to other transportation modes in those two cities, and while the single additional station at Thurgood Marshall-BWI Airport will provide a modest amount of access to air transport to those who can afford the cost of that access from the terminal stations, the SCMAGLEV does not a "system" make. People who live along the corridor (and who will absorb all the adverse impacts of its location – see below) will be unable to access the train unless they are able to drive to one of the two inner-city termini or the airport.

Second, despite the overly generous ridership figures developed, we sincerely find it hard to fathom how the train can "meet the capacity and ridership needs" in the region and the generalized corridor if it will only make one stop between its two terminal stations, and if a one-way ticket average fare was projected in this study to cost at least $60.00 (in 2020).[1091] Who but the wealthy will be able to afford to use it? Due to the cost (currently projected at seven times that of the MARC commuter train between Baltimore and Washington), the needs of most of the current commuting public in the area – and especially of the underserved within its corridor -- will decidedly not be met by this new service. Thus, it is extremely difficult to understand how this short service, with but two stops and an extraordinarily high fare, can "meet the capacity and ridership needs" in the region. Instead of a system, the SCMAGLEV will essentially serve as a multi-car, very fast, "limousine" that costs billions of dollars to build, which will significantly disrupt communities and the natural and augmented environment along its path (see below).

2. Viable alternatives to truly improving transit service in the corridor are not considered.

The study of "all reasonable alternatives" has been described by reviewing courts since the passage of National Environmental Policy Act (NEPA) as the heart or linchpin of an environmental impact statement.[1092] While truly speculative alternatives, or ones which cannot possibly fulfill the purpose, need not be considered, all reasonable ones must be.

Here, as has been the case in several recent transportation projects in Maryland, a major transportation agency (in this case the Federal Rail Administration) presents and analyzes *no* alternative to the *already selected mode and configuration* of two termini, one station in between, and the use of magnetic levitation technology. This is, of course, because there are no alternatives -- *if* (as in this case) *ultra-high speed* is the major criterion for deployment, rather than accommodating, expanding, improving, and even making speedier, transit service along

[1091] Id. at 4.5-18; 4.6-13 suggests it could go as high as $80.

[1092] See e.g., Alaska v. Andrus, 580 F.2d 465 (D.C. Cir.), vacated in part as moot, 439 U.S. 922 (1978), 474- 476; NRDC
v. Hodel, 865 F. 2d 288 (D.C. Cir. 1988), 295.

the corridor to better provide for the needs of the regular traveling public. In this DEIS, thus-hobbled by its cramped purpose and need, there are only alternative *alignments* in one corridor, alternative *locations* for terminal stations on either end, and several possibilities for storage yards and maintenance facility *sites* -- along with, of course, the mandated "no build" alternative.

This serious DEIS defect also relates directly to the purpose and need statement which frames the entire study, noted above as unnecessarily and indeed, inequitably narrow. There is currently no alternative to this technology, in this configuration, if the sole purpose is extremely high-speed access between two termini with one location in between. The National Environmental Policy Act (NEPA) requires a detailed statement on "alternatives to the proposed action."[1093] That central requirement was improperly removed from this environmental impact analysis before it even began.

This DEIS puts the caboose before the train.

With those preliminary considerations set forth, CBF finds the following substantive issues presented in the DEIS:

I. All alternatives except the 'No Build' alternative represent an unacceptable loss of wetlands detrimental to the Chesapeake Bay, with significant impacts to waterways.

II. The proposed mitigation for significant forest loss from the SCMAGLEV is insufficient to offset new pollution loads to impaired and high-quality waters that are tributaries to the Chesapeake Bay.

III. The adverse environmental impacts of the SCMAGLEV are to be absorbed, almost exclusively, by minority or low-income communities and neighborhoods, increasing environmental inequities in the Chesapeake Bay region.

CBF substantive issues discussion.

II. All alternatives except the 'No Build' alternative represent an unacceptable loss of wetlands detrimental to the Chesapeake Bay, with significant impacts to waterways.

By 2009, Maryland lost 70% of its wetlands compared to pre-Colonial times,[1094] 60,000 acres of which were lost just since the 1940's.[1095] While regulatory programs are now in effect to slow the loss of wetlands in Maryland, major projects such as the SCMAGLEV proposal have the potential to directly impact significant wetlands throughout all of the DEIS considered build alternatives within the alignment corridor.

[1093] The National Environmental Policy Act of 1969, 42 USC § 4332, Sec. 102 (2)(C)(iii).
[1094] Dahl, Thomas E., Wetlands Loss Since the Revolution, National Wetlands Newsletter, Nov/Dec 1990.
[1095] Fears, Darryl, Study says US can't keep up with loss of wetlands, Washington Post, Dec. 8, 2013.

Indirect impacts to wetlands from fragmentation and disruption of natural hydrology are mentioned in the DEIS, but not quantified and are therefore assumed to be underestimated. Moreover, the damage to wetlands within the considered corridor occurs within cherished national, State and local recreational areas enjoyed by diverse populations of Marylanders. The stated purpose and need of this project is to build a high speed rail yet the DEIS wetlands and waterways section has scant mention of species adapted to and dependent on wetlands and waterways for their survival which may be incompatible with high speed rail through and over wetlands, such as large flocks of migratory birds. The DEIS fails to adequately avoid wetland impacts by choosing an alignment corridor and build alternatives which convert precious undeveloped lands within an urban corridor without consideration of redevelopment on already existing converted lands. As such, all alternatives except the No Build alternative represent an unacceptable loss of wetland functions and values.

<u>The SCMAGLEV fails to fully gauge the lost value of wetlands affected by the project.</u>

The DEIS does not acknowledge the long-term federal investment and reliance on large, intact wetlands to continue fulfilling Beltsville Agricultural Research Center and Patuxent Research Refuge missions.

In section 4.11.3, the SCMAGLEV DEIS describes the project's affected environment, noting that the largest and most complex wetlands occur on publicly owned research lands such as Beltsville Agricultural Research Center and Patuxent Research Refuge. This is not an accident. Research facilities such as this require large, intact wetlands in context with their upland watersheds and buffers of native vegetation to conduct research on long-term trends of the wetlands themselves, fish and wildlife management experiments and agricultural best management practices. The DEIS does not acknowledge the long-term federal investment and reliance on large, intact wetlands to continue fulfilling that mission nor does it indicate any effort to define the relevance of those wetlands to researchers and the public that benefits from that research.

The DEIS does not acknowledge the lost value of wetlands that serve as recreational areas for underserved populations.

Similarly, the value these wetlands have to the general public as recreational space, especially for underserved populations in the urban corridor or the function of those wetlands in the context of protecting water quality in Chesapeake Bay are not evaluated. Simply mentioning that these wetlands are connected to downstream regional waterways does not assign their functions and values to those waterways suggesting the domain of the Project Affected Environment is far too small. So, in fact, Table 4.11-1 underestimates the real affected area by orders of magnitude.

Despite claiming to address indirect impacts, the DEIS evaluation's domain is limited, ignoring hydrology downstream.

The introduction to section 4.11.4, Environmental Consequences, claims that both direct and indirect impacts are considered, if the domain of the evaluation is only within the Limit of Disturbance, effects to hydrology downstream of all affected areas is not considered. Filling, removal of fill, diverting, converting to a different wetland type and placement of permanent structures will affect hydrology, plant species distributions and fish and wildlife dependent on the existing associations. These effects frequently go beyond the limit of disturbance or "footprint" of the direct impact because of hydrologic and sediment transport process alterations at the direct impact site. Because the domain of the Affected Area excludes downstream areas, the summary of effects in Table 4.11-2 again grossly underestimates the real potential indirect impacts of the build alternatives, and any site specific shifts in the location of those ecological functions is effectively dismissed as having no impact.

The DEIS fails to acknowledge the long-term impacts of a conversion of palustrine emergent to palustrine scrub shrub cover.

Moreover, it is inaccurate to state in section 4.11.4, Environmental Consequences, that temporary conversion of cover type from Palustrine Forested wetlands (PFO) to Palustrine Emergent (PEM) or Palustrine Scrub Shrub (PSS) merely "alters" the environmental functions. For species adapted to PFOs, those functions will be lost for decades whether replanted, allowed to naturally regrow or are permanently maintained for access. This temporal loss of function for all PFO should be reflected in more careful consideration of avoidance and minimization as well as significantly higher mitigation ratios.

Considering the Patuxent River's recent identification as a critical habitat for Yellow Lance freshwater mussels, this DEIS should specifically determine the potential for adverse effects on that habitat.

As for waterways, Table 4.11-3 is probably much more accurate than the wetland tables above in this section because of the relative size of infrastructure at those crossings compared to wetlands. However, since publication of this DEIS, US Fish and Wildlife Service identified the Patuxent River upstream of the Affected Area as critical habitat for the Yellow Lance freshwater mussel. The Waterways sections of the Final EIS should be updated with any information from that designation on the potential to impact the Yellow Lance or any of its host fish' ability to freely migrate to and from that critical habitat.

The DEIS fails to assess impacts to wetlands with consideration of their relationship to adjacent uplands and connections to groundwater aquifers.

Section D.7D.2.4, Wetlands, identifies wetlands appropriately using accepted delineation methods but assesses impacts to those discreet polygons as though they could exist without

the complex hydrology of adjacent uplands and connecting groundwater aquifers. In particular, Figure D.7-15 "Comparison of NTWSSC and Field Delineated Boundaries" suggests that the impacts are less somehow because the jurisdictional boundaries of those wetland polygons are smaller than the mapped NTWSSCs. Mapping discrepancies aside, the larger boundary is more precise in identifying the upland, surface water and potential groundwater interconnections required to sustain RTE species and rare plant assemblages like bald cypress swamp that have unique ecological value regardless of whether their origin was human planted or naturally occurring.

The DEIS fails to provide any quantitative estimate of erosion and sediment pollution during construction.

CBF has broad experience responding to incidents of erosion and sediment control lapses during construction by hired contractors, especially if not carefully overseen by the agencies responsible for environmental permits. Sometimes these pollution events far exceed the scope of long-term permanent effects of the existence of the built project. Section 4.11.4.3, Short-term Construction Effects, simply identifies the circumstances under which these incidents could occur and minimization measures generally apply, but this does not provide the reader with an estimate of the limits of these additional impacts.

<u>The DEIS fails to adequately avoid and minimize extensive and long-term environmental impacts to wetlands and waterways.</u>

The DEIS fails to avoid and minimize of Palustrine Forested wetlands and floodplain wetlands.

Section 4.11.3.1, Wetlands, mentions that many of the Palustrine Forested wetlands (PFO) are within floodplains of perennial waterways but assigns no value to their current function within those systems. Floodplain wetlands are crucial for absorbing storm flows and their associated pollutant loads to downstream waterways. Trees within these riparian settings also help to stabilize stream banks and provide critical fish habitat within those waterways. This suggests their value may be higher than other Palustrine Forested wetlands in other more isolated settings which should affect decisions on avoidance, minimization, and compensatory mitigation ratios, but it does not seem the DEIS gives this subset of PFO any special value. The section goes on to identify a subset of these wetlands and other NTWSSC wetlands where agencies requested avoidance or minimization because of the presence of Rare, Threatened or Endangered species. But doing so should occur for ALL wetlands and specific higher mitigation expectations should be set for all riparian PFOs.

The methodology for selecting a 30-foot buffer for wetland is not adequate, does not reflect state law and is not justified.

In Section 4.11 Wetlands and Waterways of the DEIS, 4.11.22 Methodology, the Federal Rail Administration defined the geographic limits of the project impact area for wetlands and

waterways plus a 30-foot buffer. The DEIS does not justify the selection of this buffer size pursuant to any of the regulatory programs. While MDE regulates a 25-foot buffer for normal non-tidal wetlands, Section 4.11.21 states that Nontidal Wetlands of Special State Concern (NTWSSC) are regulated including a 100-foot buffer. Although later in the section, it states that NTWSSCs were evaluated based on maps produced by MD Dept. of Natural Resources of the wetlands themselves, it does not suggest the full 100-foot buffer for those wetlands was considered.

The DEIS fails to indicate that the applicant will be required to employ heightened avoidance and minimization strategies for notable waterbodies.

Section 4.11.3.2, Waterways, lists certain waterbodies as "notable" because the affected area was at their headwaters or bounded by NTWSSC. However, this section does not indicate that avoidance, minimization, or compensatory mitigation criteria will be applied any differently because of their notable designation. Also, regardless of the 2020 rulemaking on Waters of the United States, ephemeral streams still have an impact on water quality when they hold water, even if not (currently) considered jurisdictional.

The DEIS presents and fails to avoid unacceptable impacts to long-term reference monitoring stations in the Anacostia and to the stronghold watershed of the Little Patuxent.

Appendix D7, Natural Environment Technical Report, Watersheds, states,

> Upper Beaverdam Creek is the least developed sub-watershed within the Maryland portion of the Anacostia watershed. As such, it has been used by MDE and other agencies as a reference stream for the Coastal Plain portion of the Anacostia. The Anacostia Watershed is also a designated location by the Urban Waters Federal Partnership, which aims to improve interagency collaboration to restore the Anacostia. The USEPA studies of the Anacostia indicate that it has lost 6,500 acres of wetlands and 70 percent of its forest cover, resulting in impervious surfaces covering more than 25 percent of the watershed as a result of urbanization. It is however indicated as ecologically steadily improving.[1096]

SCMAGLEV's highest level of impact of any watershed is in the Anacostia. Disruption of long-term reference monitoring stations with a development of this scope and scale will render those stations meaningless for future comparisons and reverse the trend of ecologically steadily improving conditions. We find this impact unacceptable from both an ecological standpoint and for the degradation of water quality that would occur within the headwaters of a tidal system on which many underserved communities depend.

[1096] SCMAGLEV DEIS, Appendix D at 7C.3.1.

Also in Appendix D7, the DEIS, it states,

> MDE designates Stronghold Watersheds, which are "watersheds around the State that are the most important for the protection of Maryland's aquatic biodiversity. These locations are the places where rare, threatened, or endangered species of fish, amphibians, reptiles or mussels have the highest numbers." Within the SCMAGLEV Project Affected Environment, the Little Patuxent River Watershed is a Stronghold Watershed.[1097]

So, from the standpoint of dwindling biological diversity in a rapidly urbanizing corridor, the Stronghold nature of the Little Patuxent must be preserved suggesting the "greenspace" development concept of the SCMAGLEV is completely inappropriate.

Weaknesses in Maryland's anti-degradation program demand that water quality impacts to Tier III waters are avoided entirely.

In the section on water quality in Appendix D, the DEIS states,

> MBSS data helps the MDE designate certain waterbodies as Tier II High Quality Waters, which are "waters that have water quality that is better than the minimum standard necessary to meet designated uses." FRA identified two locations; Beaverdam Creek, a Tier II stream segment within Beaverdam Creek Tier II Catchment; and T the Patuxent River Upper Watershed Tier II Catchment, with Tier II waters.[1098]

CBF's experience through three Triennial Reviews of Water Quality Standards, with MDE management of the state's anti-degradation program, suggests that no additional protective measures will be required to prevent degradation of these high-quality waters and they will become degraded as a result of the SCMAGLEV construction. Avoiding impacts to them entirely is the only way to prevent degradation in violation of the Clean Water Act.

The DEIS fails to identify downstream impacts of altering 100-year floodplains. These impacts cannot be mitigated through work in other locations, so the DEIS must include avoidance strategies.

In the section on floodplains in Appendix D, the DEIS states,

> Within the SCMAGLEV Project Affected Environment, areas of 100-year floodplain are associated with several surface waters and waterbodies within the previously identified watersheds: the Anacostia River and tributaries, an unnamed tributary to Brier Ditch, Beck Branch, Beaverdam Creek and tributaries, Patuxent River and tributaries, Little Patuxent River and tributaries, Stony Run and tributaries, Dorsey Run, Patapsco River and tributaries, Middle Branch Patapsco River, and Gwynn Falls.[1099]

[1097] Id.
[1098] Id. at 7C.3.2.
[1099] Id. at 7C.3.4.

The functions of these floodplains are site-specific. The impacts cannot be mitigated through work elsewhere. Each of these floodplains attenuate floods that would otherwise cause bank scour and downstream sedimentation. Such downstream consequences are not identified or quantified in any way by the DEIS.

The DEIS fails to avoid impacts to Scenic and Wild Rivers that provide opens-space and recreation opportunities to millions of Marylanders.

In the section on scenic and wild rivers in Appendix D, the DEIS states,

> Scenic Rivers are rivers whose shorelines are dominated by forest, agricultural land, grasslands, marshland, or swampland with a minimum distance for development of at least two miles for the length of the river and have been given such status by MDNR. FRA identified two state Scenic Rivers located within the SCMAGLEV Project Affected Environment: the Anacostia River and the Patuxent River.[1100]

Both of these scenic rivers would cease to be scenic if the SCMAGLEV development came within 2 miles as allowed by the definition of scenic and wild rivers of Maryland. These rivers are also within proximity to millions of urban Marylanders with ever-shrinking access to open space and are heavily used for recreation both on and along both banks of the rivers.

The impacts of allowing encroachment on the Anacostia and Patuxent Scenic Rivers segments could not be mitigated at some other location. Only deep tunnel build options should be considered for these crossings. The tunnels would also need to be sufficiently long so as to prevent the disruption of the scenic corridors and associated floodplain and fish and wildlife functions. As stated above, however, other impacts associated with all build alternatives are unacceptable.

<u>Agency coordination and review, in advance of reviewing comments to this DEIS, is contrary to the purpose and spirit of NEPA.</u>

In the section on wetlands and waterways in Appendix D, the DEIS states,

> Coordination with the regulatory agencies for submission of a Joint Federal/State Application for the Alteration of Any Floodplain, Waterway, Tidal or Nontidal Wetland in Maryland (JPA), is currently ongoing and anticipated to coincide with release of this document.[1101]

This statement suggests that the public input being sought by this DEIS under The National Environmental Policy Act (NEPA) is a mere formality and will not result in any changes to the preferred alternative's quantified impacts already being coordinated by state and federal agencies. While it may be prudent to identify specific agency concerns through Joint Evaluation Meetings about avoidance and minimization of each alternative for purposes of scoping and

[1100] Id. at 7C.3.5.
[1101] Id at 7D.3.

informing this DEIS, going forth with processing of an individual permit assumes the project will move forward under the identified alignment.

NEPA states that all federal agencies shall "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources."[1102] Yet, the statement of this DEIS that joint evaluation of impacts has already begun seems to convey that alternative alignments not proposed in this DEIS that result in fewer impacts to wetlands and waterways will not be considered. In that case, the Chesapeake Bay Foundation's efforts to review and comment on the DEIS are a waste of time. While streamlining certain interagency DEIS processes may make sense, doing so at the consequent expense of necessarily ignoring public input in the NEPA process is inappropriate and unacceptable.

III. The proposed mitigation for significant forest loss from the SC MAGLEV is insufficient to offset new pollutions loads to impaired and high-quality waters that are tributaries to the Chesapeake Bay.

Forest loss and construction activity from SCMAGLEV will likely add significant, impermissible loads to impaired and high-quality waters. The proposed mitigation of those new loads may reduce but would not fully offset their impacts. Additional pollution flowing into Chesapeake tributaries, such as the Patapsco, Patuxent, and Anacostia as a result of the SC MAGLEV project, burden the Bay clean-up, creating challenges not accounted for in state Watershed Implementation Plans.

The DEIS fails to fully offset new pollution loads to the Chesapeake Bay, creating new burdens for Maryland in achieving Total Maximum Daily Load reductions required by the US EPA.

As referenced in the DEIS, the Chesapeake Bay and many of its tributary rivers and streams are listed as impaired waterways under Section 303(d) of the Clean Water Act. As a result of those impairments, the Chesapeake Bay states, including Maryland, asked the U.S. Environmental Protection Agency to develop a Total Maximum Daily Load (TMDL) for nitrogen, phosphorous and sediment in the Chesapeake Bay and its tributaries. The Chesapeake Bay TMDL establishes specific pollution loading limits for all major source sectors, including agriculture, wastewater, stormwater, septic systems, atmospheric deposition, and forest.[1103] These limits represent the maximum amount of pollution that the Chesapeake Bay can assimilate while meeting water quality standards. Specific target loads for each sector have been assigned for the Bay watershed, the State of Maryland, major basins within the state, and county jurisdictions. All of these allocations require reductions from current loads. The state, in coordination with its local

[1102] The National Environmental Policy Act of 1969, 42 USC § 4332, Sec. 102 (2)(E).

[1103] United States Environmental Protection Agency (2010). Chesapeake Bay Total Maximum Daily Load for Nitrogen,
Phosphorus and Sediment.

jurisdictions and the U.S. Environmental Protection Agency, has developed a Watershed Implementation Plan to provide reasonable assurance that these reductions will be achieved.

Construction of the SCMAGLEV corridor and associated stations, major maintenance facilities and exhaust/access ports along the route could result in damaging increases in pollution loads including nutrients, sediment, and toxic contaminants. Systemic, long term increases in pollution loads could result from the conversion, filling, or degradation of porous, bio-active resource lands such as forests, wetlands, and mixed open areas along the route. The Chesapeake Bay Foundation is also concerned about greater air deposition of nitrogen from the significantly increased energy generation required to power the system.

This DEIS inappropriately relies on Maryland's existing legal and regulatory standards to prevent or fully offset pollution from the SCMAGLEV while undermining existing state forest conservation easements.

CBF rejects the notion that standard erosion, sediment control, post-construction stormwater, and forest conservation practices would fully prevent a pollution increase and forestall the potential degradation of Beaverdam Creek or further impairment of Chesapeake Bay tributaries. Most mitigation options presented by the project sponsor to address natural resources are already required by state law. These laws reduce impact but do not fully protect local waters from forest loss and construction activity.

Compliance with Maryland's Forest Conservation Act results in a significant net loss of woodlands, even after replanting requirements are considered. In fact, until nearly 80% of the trees on the site are removed, the project sponsors must only replant one acre for every four acres converted to development. If the state delineates a broad "net tract area" for the project, SCMAGLEV may not end up with any replanting requirement at all, despite clearing more than 400 acres of forest. These losses are compounded by the fact that the DEIS proposes to impact up to 39 *existing forest conservation easements* – land that was specifically set aside as mitigation for prior forest clearing in the area. Cutting these forests not only results in direct impacts from the SCMAGLEV project, but also delays the ecological mitigation, possibly by decades, for damage done by past projects. The DEIS must account for this cumulative effect.

The DEIS can and should quantify the change in nitrogen, phosphorus and sediment expected from construction activity using the Chesapeake Assessment and Scenario Tool.

Construction activity is an extreme land disturbance that Erosion and Sediment Control regulations like those in Maryland struggle to contain. Violations, intentional or not, are common. Even when practices are installed and fully functional, a construction site is among the highest-polluting land covers recognized by the Chesapeake Bay Program (CBP).

CBP's Phase 6 Watershed Model indicates that urban impervious land loads nitrogen at a per-acre rate that is 13 times higher than forest, and phosphorus at a rate nine times higher than

forest. Phosphorus loads during construction could be as much as 32 times higher than the current forested condition. The Bay Model includes the application of standard control practices in these loading estimates.[1104] The DEIS can and should quantify the change in nitrogen, phosphorus and sediment expected with each alignment using the Chesapeake Assessment and Scenario Tool.

The DEIS fails to examine the contribution of each alternatives direct, indirect, and cumulative impacts to impaired water bodies and identify conflicts with the Chesapeake Bay Total Maximum Daily Load and local Total Maximum Daily Load requirements.

Under the TMDL framework, new or expanding loads to an impaired water body must be accounted for and fully offset so there is no increase in pollution.[1105] It is highly likely that the SCMAGLEV, as proposed, will result in new pollution loads from construction activity and permanent land conversion from forest to urbanized uses. To our knowledge, these increases are not accounted for in the state's TMDL allocations, nor are they mitigated for in the Phase III WIP. The Tier I EIS should examine the contribution to changes in pollution loads caused by each alternative's direct, indirect and cumulative impacts and identify any conflicts with the Chesapeake Bay TMDL and any applicable local TMDLs. The project sponsors should identify the feasibility and expense of offsetting these loads in accordance with federal law.

The DEIS fails to comply with Maryland's Tier II watershed requirements.

Furthermore, an increase in pollution loads in a high-quality Tier II watershed must either fit within the assimilative capacity of that waterbody or obtain approval of a Social and Economic Justification from the Maryland Department of the Environment. The DEIS includes neither of these required showings. Given the potential nutrient and sediment increases from construction and extensive forest clearing, it would be inappropriate to advance the EIS without reconciling the assimilative capacity of the Tier II waters within the study area.

IV. The adverse environmental impacts of the SCMAGLEV are to be absorbed, almost exclusively, by minority or low-income communities and neighborhoods, increasing environmental inequities in the Chesapeake Bay region.

Just as examining true alternatives comprises the heart of an EIS process, equity and disproportionate impact are at the heart of evaluating environmental justice impacts. When virtually all of the adverse impacts of a project are to be experienced and absorbed by minority or low-income communities and neighborhoods, and when those communities mostly become the victims of its establishment rather than having an equitable share in its benefits, a serious and substantial environmental injustice is identified.

[1104] EPA: Chesapeake Bay Program Phase 6 Watershed Model – Section 2 – Average Loads Draft Phase 6. June 1, 2017.
[1105] 40 CFR § 122.4(i).

In the case of the SCMAGLEV that is precisely the case, as shown in the facts uncovered in the DEIS, some of which are demonstrated with the impact information summarized below. It is not only the specific kind of inequity routinely and systemically created by major transportation and other public infrastructure projects which have been imposed upon environmental justice (EJ) communities for decades but is also the kind of disproportionate adverse impact addressed by, and to be avoided in every way possible, in accordance with Presidential Executive Orders 12898[1106] and 14088.[1107]

102 of 124 (85%) of the block groups within the impact area in some way exceed one or more environmental justice (EJ) thresholds.

Of the block groups within the impact area ("project affected environment"), 59 are minority majority, 10 are low income, and 33 have both characteristics.[1108] These communities will bear the brunt of the impacts from this project yet reap few or none of the benefits: "Generally, the majority of the SCMAGLEV project impacts for each Build Alternative . . . would occur within EJ populations, given that the large majority of the Affected Environment consist[s] of EJ populations."[1109]

18 of 20 community facilities identified are within EJ population areas, and nearly all property acquisitions would occur in neighborhoods and areas containing EJ populations.

18 of 20 community facilities identified are within EJ population areas, and while impacts differ according to alignments and SCMAGLEV facility locations, "nearly all property acquisitions and disruptions to community facilities would occur in neighborhoods and areas containing EJ populations."[1110] These include, for example, the acquisition of numerous commercial and industrial properties near a possible Cherry Hill station in Baltimore, as detailed in Chapter 4.4; and full or partial acquisition of numerous residential properties along the right-of-way or due to the placement of ancillary facilities. Table 4.4-1 contains a list of potentially impacted neighborhoods and community facilities, with a designation as to what such temporary or permanent impacts might be. These include, for example, the permanent displacement of the Woodlands Job Corps Training Center in the alternative that includes the MD 198 train maintenance facility – objected to by the U.S. Department of Labor since it is the "only one of two of its kind the D.C. area and relocating it would be extremely costly;"[1111] displacement of the Medmark (Addiction) Treatment Center in the alternative which includes the Cherry Hill Station in Baltimore; and both acquisition of the New York Avenue Playground and Park, and permanent displacement of the private family Snowden Cemetery in another set of alternative

[1106] Executive Order 12898 (February 11, 1994).
[1107] Executive Order 14088, §§219-223 (January 27, 2021).
[1108] SCMAGLEV DEIS, 4.5-6.
[1109] Id. 4.5-10.
[1110] Id.
[1111] Id. 4.5-11.

alignments.[1112] Property acquisitions would occur in Summerfield, South Laurel, Maryland City, Severn, and other neighborhoods.

Cultural resources in and among EJ Communities may be adversely impacted.

An extensive list of cultural resources in and among EJ communities may be adversely impacted by the various alternative alignments.[1113] Many cultural resources that will be adversely impacted are listed or eligible for listing on the National Register of Historic Places, a program largely administered by state-level (and District of Columbia) historic

preservation agencies. A station at Camden Yards, for example, would require the permanent destruction of the historic, NRHP-listed Old Otterbein United Methodist Church (1785-1786).[1114]

State and local parks within EJ areas would be adversely affected.

12 of 14 state or local parks that would be adversely affected are within EJ areas (the other two impacted parks, Greenbelt Park and Patuxent National Wildlife Refuge and Research Center, are federal). In Alternative J1, Maryland City Park would lose four playing fields and a paved trail, although the communities around it are not well served by recreational facilities because of the existence of Fort Meade and the Patuxent NWRRC. Greenbelt Forest Preserve, part of nationally historic City of Greenbelt, would experience adverse impacts, as several uses within it would be foreclosed and one set of alternative alignments (J1) would have the viaduct traverse and permanently affect about 40 acres of the Hamilton Woods and North Woods tracts.[1115]

47 of 56 areas identified as moderate to high visual impact zones in the DEIS are in EJ-identified block groups or neighborhoods.

With respect to *aesthetics* and *visual quality*, 47 of 56 areas identified as moderate to high visual impact zones were in EJ-identified block groups or neighborhoods. The longer "Alignment J" viaduct produces more impacts, versus a longer deep tunnel that would be a part of alternative J1[1116] , but overall, a 150-foot high elevated trainway or viaduct anywhere along the route would become a highly visible neighborhood intrusion when seen from medium distances; when residences, buildings or community gathering places are close to the support structures; when the viewshed is more open than shielded by trees; or when the viewer is in a somewhat elevated location. One example is the direct visual intrusion, in the South Laurel neighborhood, upon The Villages at Montpelier Apartments, Applewalk Condominiums, and Laurelwood Condominiums, where the viaduct could be as close as 90 feet away and a forest

[1112] Id. 4.4-5.
[1113] Id. Chapter 5.
[1114] Id. 4.4-8.
[1115] Id. 4.5-11-12.
[1116] Id. 4.5-13.

buffer would be completely removed.[1117] The construction and placement of high-tension power lines to serve a new substation would also adversely affect aesthetics visual quality.[1118]

Any direct economic development or improvements in adversely affected EJ areas is unlikely based on the DEIS.

The DEIS states that (one of the only) positive impacts on EJ communities will purportedly come from the 8,700-10,560 annual construction jobs needed over the period.[1119] It is not made clear that these may not all be continuous nor all full-time equivalent jobs. Further, none of these jobs will be allocated or limited to those living in EJ neighborhoods but rather will be regionally available. Thus, they are just as likely to be filled by a worker from upper Baltimore County, Howard County, Montgomery County, Alexandria or Fairfax in Virginia, or elsewhere in Prince George's or Anne Arundel Counties, as someone from the adversely impacted EJ communities along the line.

It is also unlikely that there would be any direct economic development or improvement in most of the otherwise adversely impacted EJ areas, since there are no station areas to be accessed therein except around the possible Cherry Hill terminal station in Baltimore and certain neighborhoods in Washington, D.C. While positive economic impacts will be unlikely with respect to most EJ areas, there is a very good possibility of gentrification and residential or business displacement impacts occurring in the two terminal cities, due both to station placement and improved access – with the most displacement and gentrification occurring in lower-priced Baltimore.[1120]

Environmental health is likely to be adversely impacted during construction.

Spills and perhaps hazardous materials from various construction-related equipment and materials are likely in and around maintenance facilities and activities, such as fuels and oil leaks from trucks, excavators, loaders, and the like, solvents and other liquids from degreasing activity, storage tanks, polluted stormwater from temporary and permanent parking facilities, etc. Construction activities include digging and deep excavation, tunneling, pile driving, stockpiling of materials, and the like; both fugitive dust and noise and vibration, and the potential for exposure to hazardous materials is higher in those locations.[1121]

Transportation impacts from trucks and other heavy vehicles working on the extensive project and traveling on local roads are likely; these include regular congestion, detours, or constant noise exceeding healthy levels. More concerning, temporary (i.e., over the course of five years of construction activities) small particle (PM 2.5) air pollution from diesel exhaust is likely,

[1117] Id., 4.4-11.
[1118] Id.
[1119] Id. 4.5-12.
[1120] Id. 4.5-13.
[1121] Id. 4.4-9.

which can exacerbate lung diseases such as COPD and asthma, as well as cardiac effects[1122]; these are known to affect EJ communities more than the general population as a whole.[1123] Such effects occur even when the air quality is within air quality standards. Communities such as Adelphi, Hyattsville, Riverdale and numerous EJ neighborhoods along alternative routes will experience adverse health impacts at least for a period of five years.

Noise and vibration impacts could persist during regular SCMAGLEV operation, with impact areas closest to the viaduct almost entirely in EJ communities.

Design features enclosing noise-producing elements with walls and louvres, for example, will be used as mitigation but the DEIS does not offer an estimate of the geographic reach or extent/severity of vibration impacts due ostensibly to the newness of the technology being used (although it is technology now in use in Japan). While some mitigation is possible using dampening techniques, it is not clear how effective that can be.[1124] Indeed, no matter how much shielding is employed, there would be vibration impacts on "multiple residential properties" located above the tunnel portions of the J01-J06 alignments in the Woodlawn, New Carrollton, Greenbelt, and South Laurel neighborhoods.[1125] Such community facilities as the Tabernacle Church and Learning Center, the New Life Christian Center, Resurrection Church and others would be impacted by noise and vibration due to proximity to the trainway or viaduct in certain alternative alignments.[1126]

SCMAGLEV operations will necessarily create electromagnetic fields.

[1122] 83 FR 42986, 43337, August 24, 2018; Peters A, Dockery DW, Muller JE, Mittleman MA. (2001). Increased particulate air pollution and the triggering of myocardial infarction. Circulation. 2001 Jun 12;103(23):2810-5; Thurston GD, Ahn J, Cromar K, Shao Y, Reynolds H, Jerrett M, Lim C, Shanley R, Park Y, Hayes RB. (2016a). Ambient Particulate Matter Air Pollution Exposure and Mortality in the NIH-AARP Diet and Health Cohort. Env. Health Persp. 2016 Apr;124(4):484-90. doi: 10.1289/ehp.1509676; Zanobetti A, Schwartz J. Air pollution and emergency admissions in Boston, MA.. J Epidemiol Community Health. 2006 Oct;60(10):890-5; U.S. Environmental Protection Agency (2009). Integrated Science Assessment for Particulate Matter (Final Report), Washington, DC, EPA/600/R-08/139F, at 2-10, 2-11 at http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=216546; Mar TF, Koenig JQ, and Primomo J. (2010). Associations between asthma emergency visits and particulate matter sources, including diesel emissions from stationary generators in Tacoma, Washington. Inhal Toxicol. Vol. 22 (6): 445-8.

[1123] U.S EPA, Integrated Science Assessment for Particulate Matter (Final Report, Dec. 2019), U.S. Environmental Protection Agency Washington, DC), EPA/600/R-19/188, 2019, §12.5.4; Miranda ML, Edwards SE, Keating MH, Paul CJ. "Making the environmental justice grade: The relative burden of air pollution exposure in the United States." Int J Environ Res Public Health. 2011; 8: 1755-1771; O'Lenick, CR et al. Assessment of neighbourhood-level socioeconomic status as a modifier of air pollution-asthma associations among children in Atlanta. J Epi Comm Health. 2017:71(2):129-136; Di Q, et al, Air Pollution and Mortality in the Medicare Population. N Engl J Med, 2017; 376:2513-2522.

36 Thurston, GD, Written Report of George D. Thurston Regarding the Public Health Impacts of Air Emissions From the Wheelabrator Facility, Nov 2017 (report for the Chesapeake Bay Foundation), 5.

[1124] Id. 4.5-16.

[1125] Id. 4.4-10.

[1126] Id. 4.4-11; 4.4-6.

In addition to noise and vibration, SCMAGLEV operations will necessarily create electromagnetic fields.[1127] While there are safety standards for exposure to non-ionizing radiation for workers in occupational settings, there evidently are none in Maryland for residential exposure.[1128] The DEIS states that "there will be a magnetic field generated . . . [and] shielding and other mitigation will be designed to fully comply with International Commission on Non-Ionizing Radiation Protection and WHO guidelines and technical specifications."[1129] The DEIS should reveal what levels of EMR are likely to occur at set distances from trackage and electrical facilities, what the international guidelines and specifications are with respect to those levels, and precisely what will be the mitigation used to shield people, pets, and electronic equipment from adverse exposure levels.

Temporary and permanent changes from the SCMAGLEV project may decrease access, mobility, and community cohesion in EJ neighborhood and communities.

Changes to access and mobility, as well as community cohesion, often accompany the construction of large public infrastructure projects adjacent to, across, or within neighborhoods and communities. The DEIS identified a "project affected environment" (PAE) for neighborhoods and community facilities as an area within a 500-foot buffer around the proposed build alternatives alignments and within a quarter mile buffer around stations and maintenance facilities."[1130] Both temporary and permanent impacts would occur due to construction (road detours and blockages, noise and vibration, etc.), and permanent changes would occur as properties are acquired and neighborhoods change accordingly, with on-going noise and vibration of the operations or visual quality also impacting both residential areas and community facilities.[1131]

In summary, the adverse and sometimes serious social, community and environmental impacts of this project will almost solely be experienced within EJ neighborhoods along its alternative alignments and near its termini, while these communities will unlikely obtain many of its purported benefits, such as temporary or permanent jobs, beneficial community investment, or improved accessibility. This is precisely the kind of inequity and disproportionate impact which defines environmental injustice, which has characterized hundreds of major transportation projects for decades, and which at least two Presidential Executive Orders aim to reduce or eliminate. It should weigh heavily against the FRA proceeding with the SCMAGLEV project.

[1127] Id. 4.18-1.

[1128] This begs the question as to whether such standards exist elsewhere (i.e. in other states) for residential exposure, and how the levels of electromagnetic radiation (EMR) produced through the use of this train technology and equipment may compare with such standards, with respect to nearby homes, schools, yards, and parks. To the extent such standards exist, this information should have been made available in the DEIS, for comparison purposes.

[1129] SCMAGLEV DEIS, 4.5-18-1.

[1130] Id. 4.4-2'

[1131] Id. Table 4.4-1.

Conclusion

The lack of articulated purpose and need for the SCMAGLEV project, coupled with the broad and permanent adverse environmental impacts it would affect, indicate that this project should not proceed as planned. The impacts of the SCMAGLEV, some, but not all of which are captured by the DEIS, are extensive. Wetlands and waterways will be lost and damaged, including stronghold watersheds that support other natural systems, area used for monitoring and environmental research, and habitats of rare threatened and endangered species.

Additional impacts, not considered by the DEIS, should be acknowledged and weighted. The SCMAGLEV fails to fully gauge the downstream effects of harming wetlands and polluting waterways that are tributaries to the Chesapeake Bay and provide natural flood protection to a highly populated region. The extra burden this project creates for Maryland's environmental commitments under the EPA's Total Maximum Daily Load mandate are not considered in the DEIS. The DEIS fails to quantify the change in nitrogen, phosphorus and sediment loads expected from construction activity.

The DEIS describes clearing more than 400 acres of forest for the SCMAGLEV project, an action which may not, under current state law, implicate any mitigation. This loss is compounded by the fact that the DEIS proposes to alter up to 39 existing forest conservation easements – land that was specifically set aside as mitigation for prior forest clearing in the area. Cutting these forests not only results in direct impacts from the SCMAGLEV project, but also delays the ecological mitigation, possibly by decades, for damage done by past projects.

The adverse and sometimes serious social, community and environmental impacts of this project will almost solely be experienced within EJ neighborhoods along its alternative alignments and near its termini, while these communities will be unlikely to obtain many of its purported benefits, such as temporary or permanent jobs, beneficial community investment, or improved accessibility. This is a glaring concern in the project's design and should weigh heavily in the FRA's consideration.

Despite identifying many significant impacts, the DEIS sets forth no less-damaging real alternatives for analysis, except the no-build alternative, creating a high-stakes dynamic. The purpose of "building a high-speed system to reduce travel time to meet the capacity and ridership needs of the Baltimore-Washington region"[1132] inevitably excludes reasonable alternatives, a requirement of NEPA.

The project's need should be based upon an intention to improve transit between Baltimore and Washington for the total population of users instead of solely for the privileged few. This outlook would bring multiple alternatives into analysis. In addition to considering other modes of transit and improvements to existing systems, the DEIS should be required to consider

[1132] Baltimore-Washington Superconducting MAGLEV Project Draft Environmental Impact Study (January 2021), [hereinafter SC MAGLEV DEIS], ES-6.

already existing rights-of-way for their location, such as the medians of major highways like I-95.

Should the SCMAGLEV be considered for construction instead of other possible transit modes, the impacts, some of which are well-explored within the DEIS, must be sought to be avoided, minimized, and mitigated in a meaningful way. Based on the Chesapeake Bay Foundation's analysis, the SCMAGLEV simply should not further be considered along this corridor, because adequate mitigation and avoidance is not possible in many of the route alternatives presented for such issues as wetlands, forests, and adverse impacts upon environmental justice communities and neighborhoods.

While transit improvement and enhancement in Maryland can certainly support the Chesapeake Bay's long-term recovery, CBF finds that the potential adverse environmental impacts from this project far outweigh any possible benefits. The content of this DEIS, and the issues described in the comment above, necessarily require that the FRA take a step back and reconsider the wisdom of embarking on this project.

LXXXVI. Appendix – Article Reprint: Levy, Alon. "Is Maglev Right for D.C.?" D.C. Policy Center. Articles, Transportation. March 22, 2018.

Last decade's excitement about the prospect of high-speed rail in the United States gave way to disappointment over project cancellations and mounting costs. Instead of conventional high-speed rail (where trains run at 200 miles per hour), several ventures have come forth with proposals to build new, even faster technologies, such as magnetic levitation (maglev) and underground vacuum tubes (Hyperloop). These proposals would operate very high-speed trains separate from the conventional rail network. But are these technologies really a good fit for D.C. and the rest of the Northeastern United States? There are reasons for skepticism.

You might have heard of Hyperloop, the brainchild of Tesla Motors and SpaceX CEO Elon Musk, which promises to run trains at airplane speeds through vacuum-sealed tubes. But despite fawning press coverage, Hyperloop would need to clear some major technological and practical barriers to become reality: Musk's original idea was riddled with technical errors, and the more serious attempt by Hyperloop One to build a working demonstration has only been able to match the speed of high-speed rail. Aside from the technical challenges, the service still has

serious practical problems to grapple with, such as securing the vacuum tubes against vandalism or terrorism.

Maglev is a more interesting proposition. Though the main progress is currently happening in Japan, a U.S.-based company supported by the Central Japan Railway Company (JR Central) is pitching JR Central's SCMaglev technology for a Baltimore-Washington line, which it claims would connect the two cities in 15 minutes. [Note: This paragraph originally stated that Siemens was the company involved. The article has been corrected to reflect this change.]

Japan has had a conventional high-speed rail network since 1964, called the Shinkansen (also known as the "bullet train.") It was the busiest high-speed rail network in the world until China recently overtook it, but its passenger density remains higher than that of the Chinese network. With the Tokyo-Osaka line aging and nearing capacity, private operator JR Central is investing in a parallel maglev line, called the Chuo Shinkansen, to open in stages between 2027 and 2037.

[MCRT Editor's note: Due to delays and increasing costs, currently the building schedule is slipping. As of October 23, 2023, MCRT could not find the revised opening date.].

Unlike Hyperloop, however, JR Central's maglev technology has been extensively tested. JR Central began research into this technology in 1963 and opened a short test and development track in 1977, and after privatization began more intensive commercial testing in 1997, on a test track to be incorporated into the Chuo Shinkansen. The planned commercial top speed is around 314 miles per hour, well below the maximum achieved in tests. (There is also a short-orphaned line in Shanghai, using technology owned by Siemens.)

[MCRT Editor's note: The SCMaglev is based on research and designs dating from 1960 by James Powell, PhD and Gordon Danby, PhD while working at the U.S. Department of Energy's Brookhaven National Laboratory in New York. See: Appendix – Article Reprint: Womer, Dan. "SCMagLev – A Short History of MagLev Development and its Potential Future." November 8, 2017]

However, while maglev is both technically feasible and safe it is not a good fit for the economic and geographic needs of the Washington region, or for the Northeast Corridor in general. Maglev would not provide a very large reduction in door-to-door travel time even if it could serve central locations, such as D.C.'s Union Station or New York's Penn Station. Moreover, serving such locations in the first place is inherently more difficult than on conventional rail, which could increase costs considerably. Finally, whereas more or less any conventional train can run on any conventional track, maglev is vendor-locked: the two well-tested systems in the world, Siemens' system and JR Central's system, are incompatible, which would increase costs even further.

[MCRT Editor's note: the degree to which maglev is "safe" is in question, especially following the Transrapid Maglev crash on September 22, 2006[1133]]

The relationship between speed and distance

The higher top speeds that these new rail technologies promise is most useful on long-distance lines with trips that would originally take multiple hours. This is because super-fast rail speeds won't actually save passengers that much time for shorter trips, such as the trip from D.C. to Baltimore.

Think of it this way: People travel between their home and their ultimate destination (such as a hotel), and not just between train stations. Therefore, the full trip time includes both access time at the home end and egress time at the destination end.

For example, people who live in Tenleytown need about half an hour to reach Union Station by Metrorail, and would probably leave 40 or 45 minutes before the train's scheduled departure time, to cushion against delays on Metrorail. At the other end, they might need to spend another 20 minutes traveling from the train station, such as Baltimore Penn Station or New York Station, to their ultimate destination. This additional travel time—somewhat more than an hour—is independent of train speed.

If the total access and egress time is an hour, then increasing the speed of the train has diminishing returns beyond a certain point. Reducing the travel time of a train from three hours to an hour and a half through high-speed rail means reducing door-to-door travel time from four hours to two hours and a half, a sizable reduction. But then reducing train travel time further from an hour and a half to 45 minutes means reducing door-to-door travel time to 1:45, a noticeable but not game-changing improvement.

[MCRT Editor's note: And at the far higher ticket price than MARC, the value of the potential time savings of the SCMaglev over MARC is greatly minimized.]

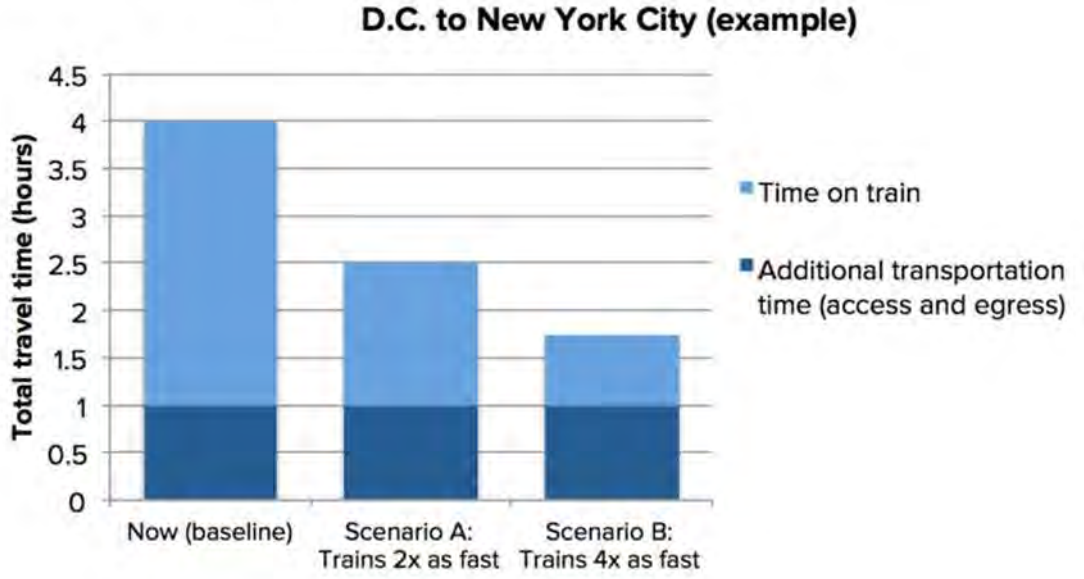
The travel times described above are for New York-Washington trips. But for closer-in connections, faster trains save even less time. The Acela Express connects Washington and Baltimore in half an hour today whereas JR Central says maglev would do the same trip in 15 minutes. While a 15-minute trip time between Washington and Baltimore sounds like a game changer, in reality, the total trip time (including travel to and from the stations) is likely to be more like 1:15, down from 1:30 today—only a minor improvement.

[MCRT Editor's note: the next generation of Acela capable of higher speeds has passed FRA testing, and is now in pre-operational testing on the Northeast Corridor. Current Amtrak planning is the new system will start service in the 2024 to 2025.]

[1133] "Lathen train collision." Wikipedia The Free Encyclopedia. Page last edited on August 30, 2023. https://en.wikipedia.org/wiki/Lathen_train_collision.

How would faster trains impact door-to-door travel times?

The higher top speeds promised by new rail technologies would be most effective for long-distance lines, but have diminishing returns for shorter routes, such as D.C. to New York.



Faster rail technologies would have even less of an impact on total travel times between D.C. and Baltimore.

This is why the maglev line under construction in Japan aims at fairly long distances. The plan is to connect Tokyo and Osaka in a little more than an hour, down from two and a half hours by the Shinkansen today. This line is planned to open in segments due to its high construction cost, but the first segment, Tokyo-Nagoya, is much closer in distance to the New York-Washington trip than Baltimore-Washington. Today, the Shinkansen connects Tokyo with Nagoya in an hour and a half, and the under-construction maglev train will cut this to 40 minutes. There are no

plans to open intermediate segments between Tokyo and some of its suburbs, because at such a short distance, maglev provides too little of a time benefit for the cost of construction and operations.

Within the U.S., maglev could be useful for longer segments. New York-Washington might be feasible as part of a longer line connecting the Northeast with Charlotte, Atlanta, and Miami. A line between New York and Chicago would also be useful: the two cities are about 800 miles apart by high-speed rail, a trip that a conventional high-speed train could do in about five hours but that maglev could do in three, which would be competitive with air travel. (In Japan, Shinkansen trains connecting cities in three or three and a half hours have a 70 percent share of the market with airlines, but for trips that take five hours their share drops to 10 percent.)

However, committing to building such a long maglev line means committing to spending a very large up-front investment. A maglev line connecting New York, Washington, and Atlanta could be successful, but would require 800 miles of construction. Could such a line be built at reasonable cost? The answer is probably not, and the reason has to do with the "last mile" problem and other challenges of urban construction.

The "last mile" problem

The most difficult infrastructure construction is in urban areas. As the United States was building its rail network in the 19th century, the First Transcontinental Railroad opened in 1869, but the first connection across Baltimore only opened in 1873—and the first connection across New York didn't open until 1910, with Penn Station.

Today, the situation is much the same. Outside urban areas, infrastructure construction can take advantage of available rights-of-way along power line corridors, Interstate highways, and railroads. High-speed tracks, especially maglev, must have gentle curves, but it's usually not that difficult to use exurban land for their necessary sweeping turns. But in urban areas, land is expensive and the only way to build new rights-of-way involves tunneling.

To avoid tunneling, most high-speed railroads in the world use low-speed railroad tracks for the last few miles into major cities. France has the busiest and most extensive high-speed rail network in Europe, the TGV; while TGV lines allow trains to run at 186-200 miles per hour nearly the entire way, the last few miles into Paris and the major secondary cities are on slow legacy track, often shared with commuter trains and low-speed intercity trains. This way, no tunnels are needed except in mountainous areas.

Leveraging existing urban rail approaches to reduce costs is not possible on maglev, which is technologically incompatible with conventional rail. As a result, the Chuo Shinkansen needs to tunnel under the entire Tokyo urban area to reach Central Tokyo. A total of 90 percent of the Tokyo-Nagoya segment will be in tunnel, driving up construction costs, which currently stand at

$90 billion for just 255 miles. As a design compromise, JR Central does not reach Tokyo Station, but terminates at Shinagawa, a secondary business district located a few miles out.

In the Northeastern United States, every big city has conventional rail approaches from both sides. Conventional high-speed rail could run to Union Station from the north and continue south to Virginia, and could also make use of existing approaches to Philadelphia 30th Street Station and New York Penn Station. The tunnels to New York are crowded—Amtrak would like to add new tunnels in the Gateway Program—but there is capacity in the existing tunnels today for a long high-speed train every 15 minutes replacing Amtrak's current service. Maglev could not use existing approaches in the same way; it would need new tunnels under all the major cities of the Northeast, driving up costs.

Vendor lock-in

The last mile problem would increase the cost of civil infrastructure for maglev. But the cost of the technology itself is likely to be elevated as well, because of the problem of vendor lock-in.

Rail tracks are an old technology from the 19th century, but essentially an open one: any train that meets the required clearances can run on them. A rail operator that wishes to buy new trains can procure them from a large number of vendors based in Europe or East Asia; small changes in specs based on local conditions are routine and easy to accomplish. Even more advanced rail technology has multiple vendors: European Train Control System (ETCS) is an open standard that's increasingly common throughout Europe as well as in much of the rest of the world, with several competing conglomerates manufacturing compatible systems for high-speed and legacy conventional rail.

No such standard exists for maglev. Siemens' Transrapid system generates magnetic levitation in an inherently different way from JR Central's system; if the United States installs the JR Central system in the Northeast and is dissatisfied with the technology, it will not be able to simply switch to Siemens. Without the pressure of competition, it is likely that either maglev operator would overcharge American states for its system, making large profits at the expense of the American public. [MCRT note: underline added for emphasis.]

The situation is different domestically within Japan, as JR Central owns its maglev technology. But everyone else facing the decision of whether to buy proprietary maglev technology or multi-vendor high-speed rail using ETCS signaling should consider the fact that ETCS has ample competition and maglev does not.

For fast trips to Baltimore, conventional high-speed rail wins out

Maglev remains risky, based purely on the fact that it would require commitment to a proprietary technology belonging to a private company. However, it could still potentially be a useful option on some long routes where airplanes typically win out over ground transportation today, including New York-Chicago and New York-Miami. But the route most important to the District in this case—the connection to New York—is too short, and the Baltimore-Washington route that has also been discussed is so short it would not justify even conventional high-speed rail by itself.

For these shorter routes, there's a stronger case for conventional high-speed rail. The Northeast Corridor has good legacy track alignments into the big cities. A conventional high-speed solution would be able to use this existing infrastructure in ways that maglev could not; relatively little investment would be required within the District, where infrastructure is the most expensive.

In fact, the Northeast Corridor is so replete with good legacy rights-of-way that any cost-efficient solution would need to incorporate Amtrak and conventional rail. The best solution is to commit to making the current system work, upgrading it to high-speed rail standards but maintaining its fundamental characteristic as a mixed system using shared tracks in land-constrained city centers. If the cost of such an endeavor is too high, the cost of maglev is yet higher. If maglev belongs in the U.S., it belongs on other corridors, and quite possibly it belongs in another half-century.

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Alon grew up in Tel Aviv and Singapore. He has blogged at Pedestrian Observations since 2011, covering public transit, urbanism, and development. Now based in Paris, he writes for a variety of publications, including New York YIMBY, Streetsblog, Voice of San Diego, Railway Gazette, and the Bay City Beacon. You can find him on Twitter @alon_levy.

LXXXVII. Appendix – Letter Reprint: NASA. "SCMaglev – NASA Comments" Letter to the FRA." June 14, 2021.

From: Anderson, Susan
To: Osterhues, Marlys (FRA); Bhatnagar, Shreyas (FRA); Bratcher, Brandon (FRA); Mielke, Matthew (FRA); Bottiger, Barbara [USA]; Lauren Molesworth; Jacqueline Thorne; Kelly Lyles
Cc: Lauren Hunt; Cheskey, Mark
Subject: SCMAGLEV - NASA Comment
Date: Monday, June 14, 2021 3:32:16 PM
Importance: High

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CAUTION: This email originated from outside of the Department of Transportation (DOT). Do not click on links or open attachments unless you recognize the sender and know the content is safe.

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From: Montgomery, Lizabeth R. {Beth} (GSFC-2500) <lizabeth.r.montgomery@nasa.gov>
Sent: Wednesday, May 19, 2021 1:11 PM
To: info@BaltimoreWashingtonSCMaglevProject.com
Subject: GSFC Comments on SCMAGLEV Draft Environmental Impact Statement (DEIS)

SCMAGLEV Team,

NASA Goddard Space Flight Center is submitting the following comments on the SCMAGLEV DEIS. These comments reinforce our comments submitted in November 2020 on the Administrative DEIS. If you have any questions regarding our comments, please do not hesitate to contact me.

Thank you for the opportunity to comment on the DEIS.

Beth Montgomery
GSFC-Greenbelt NEPA Manager

NASA Goddard Space Flight Center's Comments on the SCMAGLEV DEIS

NASA is concerned about SCMAGLEV impacts on operations at NASA's Goddard Geophysical and Astronomical Observatory (GGAO) facility on BARC property. A Trainset Maintenance Facility (TMF) located at the BARC Airstrip would have devastating impacts on the GGAO operations and the science data collected. The GGAO site was specifically selected because of its remoteness and isolation from human activity. Part of the site's current importance is that

the data collected at this very stable site has a 50+ year history. Specific impacts are listed below.

- Impacts from vibration, lighting, radio frequency (RF) interference, EMF, and traffic would jeopardize the quality of the measurements that all satellite missions and other applications rely on.

- The long-term geodetic measurements made at GGAO require a stable environment, with a requirement for accuracy of the geodetic coordinates at 1 mm and a stability of 0.1 mm/yr. The construction and operation of a major facility adjacent to the GGAO, such as a TMF, could disturb the stability of the GGAO site through ground deformation due to dewatering or other activities. This would render the data from this site difficult, if not impossible to use, disrupting the essential contribution made to the national and global reference frame used for all civil and scientific applications.

- Artificial lighting from a TMF would negatively impact the optical systems at GGAO. Many of these operations can only be performed at night and any nearby artificial lighting would severely limit or eliminate these capabilities. These include regular satellite laser ranging to Earth orbiting satellites including Global Navigation Satellite System (GNSS) satellites, as well as on occasion interplanetary laser ranging experiments.

- RF Interference from Wi-Fi and any other transmitting device (in the 2-14GHz range) would interfere with highly sensitive operations and in some situations may damage the equipment, which would compromise the ability of the Very Long Baseline Interferometry radio telescope to routinely participate in sessions to determine Earth Orientation Parameters, including UT1, the change in the rotation angle of the Earth. UT1 is an essential input to all GNSS positioning (civil, military, and scientific).

- Significant EMF could negatively impact the sensitive equipment used for many of the systems at GGAO.

- Traffic/Roads: Rerouted roads could negatively impact nearly all the systems operating at GGAO due to increased light pollution and vibration from changes in the traffic patterns.

- NASA believes that adequately resolving impacts to operations at GGAO through mitigation measures would not be possible.

NASA appreciates the inclusion of the NASA's concerns and those of other federal agencies in the Executive Summary of the DEIS. It is important that the impacts on science and operations be considered, along with the environmental impacts, in the decision making process and the EIS should reflect this.

Susan Anderson, AICP
Vice President
Environmental Manager
Susan.Anderson@aecom.com

LXXXVIII. Appendix – Article Reprint: Obando, Sebastian. "California's high-speed rail cost rises to $105B, more than double original price." February 15, 2022. *Construction Drive*.

Photo from California High-Speed Rail Authority

Dive Brief:

State transportation officials tacked on an additional $5 billion to the budget for California's high-speed rail project, according to a 2022 business plan report, bringing the total projected cost to $105 billion.

That $5 billion increase is due to distancing the train from the Cesar E. Chavez National Monument in the Central Valley and tunneling tracks near Burbank airport, according to the Associated Press. The completed 500-mile high-speed system will run between Los Angeles and San Francisco.

The high price of the project, which ballooned from its original $40 billion estimate in 2008, mirrors an overall trend of costlier rail projects in the U.S. when compared to similar or even more complex projects in Europe, according to an analysis by the Eno Center for Transportation.

Dive Insight:

High costs are almost synonymous with rail projects in the U.S., especially in the California region.

That's because costs around healthcare and pensions are incorporated into the direct capital cost of a project, according to the Eno Center report. That differs from some other countries, where nationalized healthcare and pension plans are paid for through general taxation as opposed to employers.

In California, contractors routinely point to the high-methane zones in the underground environment around Los Angeles, another factor that drives up project costs in the area, according to the report.

Along with higher costs, rail projects in the United States take longer to build, too. U.S. projects with minimal tunneling take about six months longer to construct than similar non-U.S. projects, the report said.

That's because U.S. public transit agencies rarely have the structure, authority or experience to deliver a major transit construction project, which requires support from local jurisdictions, the ability to acquire land as necessary, secure local permits to close streets and relocate utilities and flexibility to hire top talent to lead the project.

Many international projects constructed below grade have similar costs to those that are at-grade in the United States. For example, a 9.3-mile-long Metro Line in Toulouse, France, was built entirely underground at a cost of about $176 million per mile while Houston Metro's 3.2-mile-long Green Line is all at-grade and cost $223 million per mile.

"Increased investment in early underground exploration and a stronger design review process with standardized checklists could help curtail a significant amount of the change orders," the Eno Center report said.

LXXXIX. Appendix – Article Reprint: Park, Carol. "Lessons from Asia for the Northeast Maglev." *The Daily Record*. December 7, 2018.

In China, a bullet train crash in the city of Wenzhou in 2011 killed 40 people. The crash was blamed on poor design and mismanagement.

In Taiwan, the bullet train system rang up $1.5 billion in losses over seven years, requiring a $1 billion government bailout.

In South Korea, a high speed rail line connecting Seoul to Incheon closed in 2018 after just four years of service because 77 percent of seats were unoccupied.

Across the Pacific Ocean, supporters of "Maglev" in the United States are gearing up to create an American version of the Asian rail disasters.

The Northeast Maglev is a proposed magnetic levitation train that would travel at 311 miles per hour, carrying passengers between Baltimore city and Washington in 15 minutes. The Maglev team hopes to start construction on the ostensibly private project in 2020.

Maglev enthusiasts have been pushing the project despite warnings of significant risks, just like the supporters of the bullet train did in Asia. For instance, the South Korean government built the Seoul-Incheon line despite consistent warnings of inadequate demand. The project was politically, rather than commercially, driven: Korean officials wanted to present a futuristic version of Korea to the international community as part of the 2018 Pyeongchang Winter Olympics.

Maglev supporters in Maryland have similar non-business motives for backing the project. Baltimore has been experiencing a steady population decline over the years, and many supporters believe that connecting the city to economically vibrant D.C. could reverse that trend. This vision has blinded the advocates to serious concerns about the project.

First, though the project purports to be a private effort, high-speed train projects are generally magnets of questionable government subsidies. "We can't build our infrastructure 100 percent privately," said Wayne Rogers, the CEO of Northeast Maglev. Building the Maglev line from Baltimore to D.C. is estimated to cost between $12 billion to $15 billion So far only $5 billion in private investment has been secured for the project, so taxpayers will be on the hook to finance the rest of the project.

[MCRT Editor's note: now $16.8 billion.].[1134]

Second, it's highly doubtful the Maglev will fail to attract sufficient ridership to make it economically viable. According to Maglev officials, the service would target the "elite business travelers" and charge higher prices than Amtrak, which already provides regular rail service between the two cities. Just as with the Seoul-Incheon line, there are also numerous bus companies that provide affordable trips along the Baltimore-D.C. route.

[1134] Baltimore-Washington high-speed maglev project moves ahead after federal review - The Washington Post. Retrieved October 29, 2023.

Finally, building the Northeast Maglev will inevitably disrupt the communities along the line because of noise and electromagnetic fields, not to mention the hurtling trains. As the Maglev will only make three stops, the affected residents are unlikely to experience any commercial or economic development in their neighborhood.

Supporters of Maglev dismiss these concerns. They argue that the success of bullet trains in Japan demonstrate that these hurdles can be overcome.

That's exactly what officials in China, Taiwan and South Korea thought, only to discover that the situation in Japan is unique. Most of Japan's 128 million inhabitants live in a few densely populated cities. Many of those residents are rich enough to afford expensive train tickets. Compared to Japan, the situation is the polar opposite in Baltimore, where many of the residents who depend on public transit are low-income workers. If these residents are to commute between Baltimore and D.C., they would need an option that is affordable and easily accessible from their homes. Maglev is neither.

The Northeast Maglev project should be scrapped before it is too late. There are many transportation priorities that are more worthy of attention.

In early 2018, Baltimore's Metro subway line closed for a month. According to the American Public Transportation Association, the closure was due to the Maryland Transit Administration's lack of expertise and poor communication. Meanwhile, the D.C. Metro system is a never-ending series of service disruptions, crumbling infrastructure and safety failures.

If Maryland wants to improve its transportation system, it should focus on ensuring that its existing projects are safe and managed properly. Whether this is done by restructuring the MTA or by privatizing some of its operations to incentivize better performance, it will not take billions of dollars to ensure that Maryland residents have reliable public transportation.

According to Maglev's Rogers, "Infrastructure is fundamentally a government responsibility, which has failed." He is right. Many governments across the ocean have failed by partnering with private companies to build trains that turned out to be costly, dangerous, and reliant on government support. We can avoid recreating the same high-speed catastrophe in North America by abandoning the Northeast Maglev.

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Carol Park is a senior policy analyst in the Center for Business and Economic Competitiveness at the Maryland Public Policy Institute. She can be reached at cpark@mdpolicy.org.

XC. Appendix – Article Reprint: Rector, Kevin "'It can be done': Futuristic Japanese maglev train could revolutionize travel from DC to Baltimore, and beyond." October 27, 2018. *The Baltimore Sun*.

TSURU, YAMANASHI, JAPAN — Two hours from Tokyo's blinking neon center, the sleek white train shoots out of a mountain tunnel at nearly 311 mph —levitating about four inches above its guideway as it glides past the surrounding rice fields.

The train's long aerodynamic nose and bold blue streaks, a contrast against the forested slopes, make it seem unreal, like a prop from a space film re-purposed as a rural amusement ride. But it is in fact the world's fastest train, what Japanese Prime Minister Shinzo Abe has called "the crystallization of our most advanced technologies."

The magnetic levitation, or "maglev," train is so fast it draws exclamations from schoolchildren and retirees at a nearby exhibition center, who bemoan the blurriness of their photos. A few hundred feet down the mountain, it shakes the cinderblock walls of 91-year-old Moriyoshi Suzuki's tidy family home. On board, where the liftoff feels like that of a jet taking wing, riders' gape at a speedometer as the train tears through the region's jagged topography.

"It was very comfortable," said Megumi Kawamura, who won online lottery tickets to ride the 27-mile exhibition line with her husband, Kazuki, and their 3-year-old son."

It was a lot faster than I imagined," her husband said, drawing grins from officials with the Central Japan Railway Co., or JR Central, which developed the train.

The crowd-pleasing demonstration line was designed to test the technology, but also to deliver a message. The point, says Torkel Patterson, a former U.S. naval officer who serves on the railroad's board of directors, "is that this is ready for prime time. It's not just some technology that 'could be' someday." Indeed, after 50 years and billions of dollars in Japanese research and development, JR Central says its maglev train is ready for its big rollout — and not just in Japan, where the company has already begun an $80 billion project to extend the mountain test track a 272-mile commercial line from Tokyo to Osaka by 2037. [The magnetic levitation or maglev train in Japan can reach 311 mph while floating above its test track. Backers who want to build a similar line in the U.S. say it could transport travelers from Washington to Baltimore in 15 minutes, and from Washington to New York in an hour.

For nearly a decade, the company also has been working with a team of well-connected U.S. partners to lay the groundwork for a second maglev line along the Northeast Corridor, perhaps some day to Boston. In its first phase, they say, it could transport travelers from Washington to

An elevated guideway emerges from a tunnel above farmland. The maglev pushes a wave of air out of the tunnel that causes noise and vibrations, so a special hood is used to more gradually vent the air. (Kevin Rector / Baltimore Sun)

Baltimore in 15 minutes, and later from Washington to New York in an hour, with stops along the way at BWI Marshall Airport and Philadelphia, among others.

It's a proposal with the potential to dramatically alter the lives of people up and down the corridor, but particularly those in post-industrial Baltimore, which has lost population for decades and struggles to hold onto an economic base beyond the universities and hospitals that anchor it. Developers and other business interests in the city eye the train as a potential shot in the arm, allowing them to someday pitch their properties as the D.C. suburbs.

Equally passionate are the train's opponents, who see it as a perk for the wealthy that would do nothing to improve the clogged highways and dysfunctional mass transit systems that most central Maryland residents rely on. Maglev is a point of disagreement between friends and neighbors, and between political candidates. Republican Gov. Larry Hogan supports exploring the idea. Ben Jealous, Hogan's Democratic challenger in the Nov. 6 election, adamantly opposes the project.

Barbara Jackson, a member of the Beacon Heights Civic Association, attends the rally at Veterans Memorial Park to oppose a maglev train in Maryland. Kim Hairston / Baltimore Sun)

As the Japanese maglev project has gotten off the ground, the U.S. proposal —long considered a half-cocked fantasy in Washington power circles and gritty Baltimore bars — has gained momentum, too. In 2015, the Obama administration provided a $28 million grant for a study of the Baltimore to Washington proposal. Hogan's administration agreed to sponsor Baltimore Washington Rapid Rail [BWRR], a U.S. company that would operate the proposed line, through the federal review process.

And the state's Public Service Commission granted BWRR rights to operate a railroad through the region using a long-dormant franchise that was abandoned in 1935 by the now-defunct Washington, Baltimore and Annapolis Electric Railroad Co.

> [MCRT Editor's note: With the Public Service Commission grant to BWRR to operate a railroad using a long-dormant franchise of the Washington, Baltimore and Annapolis Electric Railroad Co., came with the authorized use of eminent domain - that is the right to expropriate (take) private property for public use, with payment of compensation.]

The number of potential routes for the new maglev line was narrowed to two earlier this year, and a more detailed analysis of the routes — both of which would be more than two-thirds

tunnel and follow the Route 295 corridor — is due out this fall. Congress, meanwhile, is considering an additional $150 million appropriation for maglev projects, which BWRR officials say would be enough to push their proposal through engineering and possibly into construction.

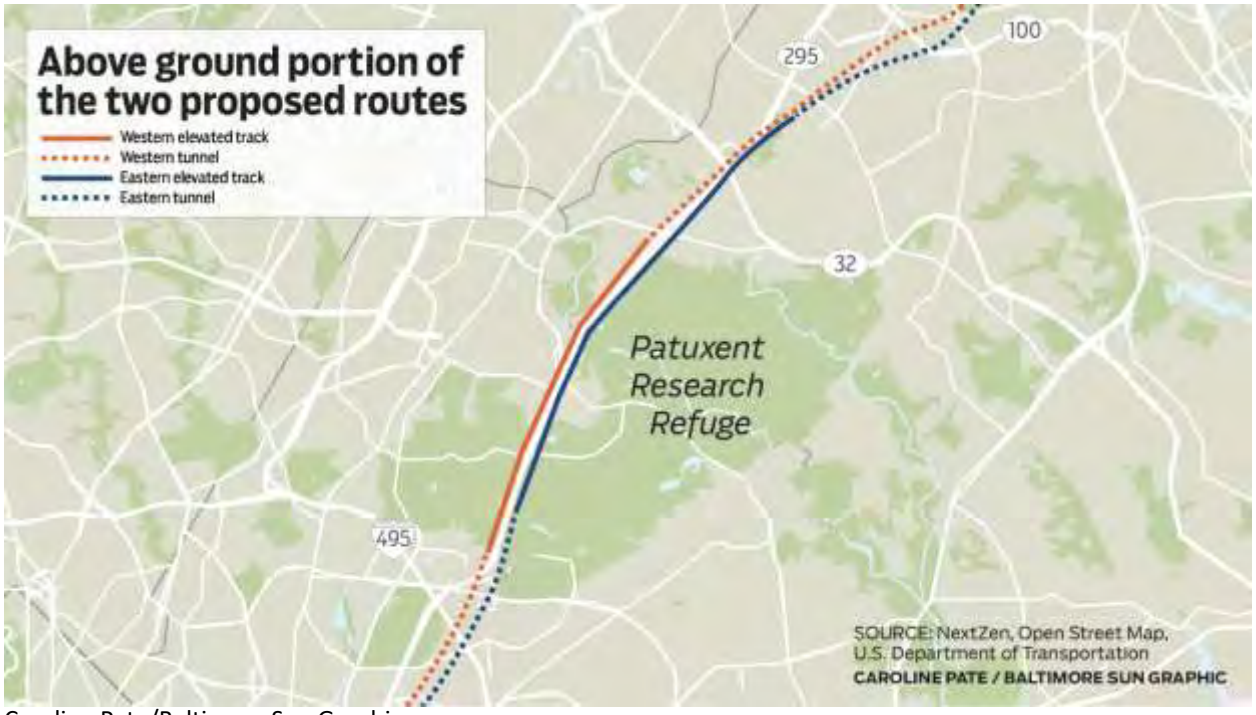
From there, it would take another $10 billion to $15 billion, by BWRR's calculations, to actually build the line from Washington to Baltimore — much of which would have to come from federal coffers, even if the project attracts massive private investment.

[MCRT Editor's Note: As of March 2021, the estimated cost to build the SCMagLev between Baltimore and D.C. has risen to $16 billion and as stated above "much of which would have to come from federal coffers . . ." These tax dollars would have a far higher impact by being used to rebuild, maintain and enhance current transportation systems and infrastructure, which serve a far broader spectrum of the area's population.]

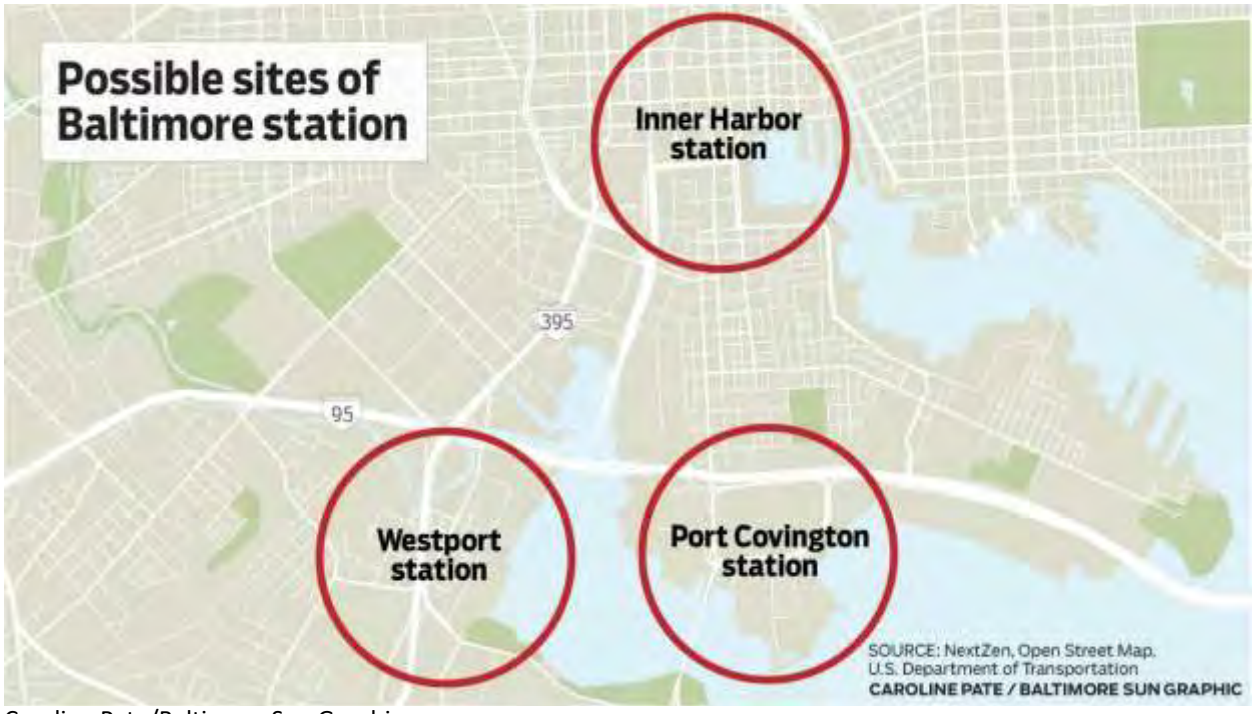
The project's Japanese backers, at JR Central and in the Japanese government, know that gives sticker shock to many U.S. officials and taxpayers. But they are highly motivated to see the U.S. project move forward, in part because it would help them realize economies of scale in the production of their own line in Japan. And it would create a more global market for the maglev expertise they've developed within their workforce.

[MCRT Editor's Note: "And it would create a more global market for the maglev expertise they've developed within their workforce." Also consider, construction companies selected to build the SCMagLev system will be large and have an existing, trained and experienced workforce. How does this statement and use of existing workforce personnel square with the promises by BWRR for the creation of large numbers of jobs for local labor?]

Map: Proposed routes for new maglev train
Both proposed maglev routes leave Baltimore near Westport and use tunnels for more than two-thirds of the distance to Washington. One runs along the eastern side of Baltimore-Washington Parkway, the other along the western side. The site of a station in each city is still unclear.



Caroline Pate/Baltimore Sun Graphic



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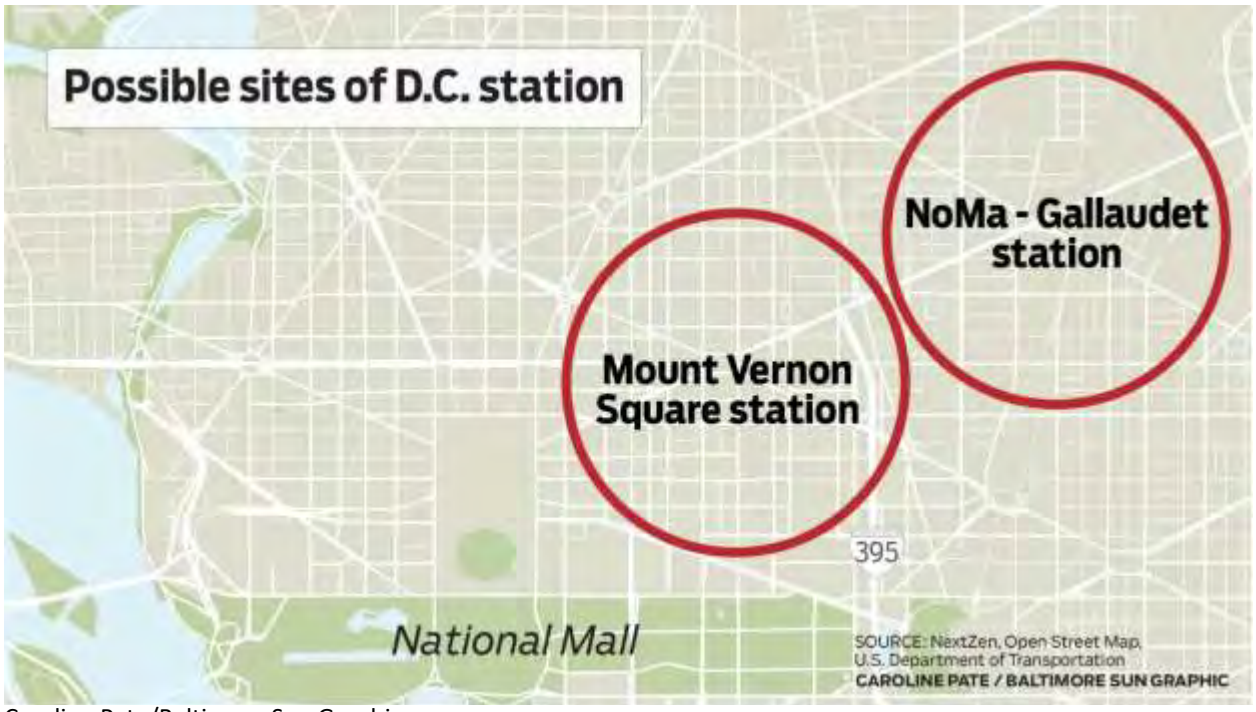


Caroline Pate/Baltimore Sun Graphic

To soften the potential financial pain, JR Central — which had more than $12 billion in operating revenues in 2017 from its existing Japanese rail business — has offered to waive licensing fees for BWRR's use of its technology. It has also promised to assist the Maryland company in securing billions of dollars in low interest Japanese loans to float as much as half the construction costs.

"We are prepared to make an all-out effort to support them from a technology point of view," said Shun-ichi Kosuge, JR Central's executive vice president.


Shun-ichi Kosuge, JR Central's executive vice president, said the Japanese railroad company is "prepared to make an all-out effort" to support the proposal to bring the company's maglev train technology to the United States. (Kevin Rector / Baltimore Sun)

With the Japanese support, a mix of additional private investments and billions in grants and loans from the U.S. government, BWRR officials say they can reach full financing. If all goes well, they say, they could start construction on the Washington-to-Baltimore leg as early as 2020 and potentially open it by 2027, the same year the first leg of the Japanese line is to open.

[MCRT Editor's Note: As of October 2023, delays in the Tokyo to Nagoya extension of the SCMagLev project will push the completion date past 2027.][1135]

They contend the benefits of the rail line warrant the needed federal support.

Backers say the train would ease highway congestion, free up airspace, cutdown on lost hours and increase American productivity. They say it would revitalize post-industrial cities like Baltimore, reduce carbon emissions from cars and planes, provide a new industry for unionized labor, and make the U.S. a global leader in high-speed rail. They say construction and operation of the line would create more than 200,000 jobs.

More ominously, they argue that it is necessary to help prevent almost-certain economic stagnation between Washington and New York in coming years if nothing is done to alleviate growing congestion.

"It's a big investment. It's a lot of money. But the idea is to shrink the geography," Patterson said. "It's about transformation, not transportation."

Critics of the proposal — and there are many — say proponents vastly underestimate its many costs, and overstate its benefits. They say a maglev line will disrupt neighborhoods and communities, making them less safe and less desirable places to live. The train will blow through their towns, they say, without stopping or providing any local benefits. They fear it will fail to attract sufficient ridership, and that BWRR will have to be bailed out by taxpayers.

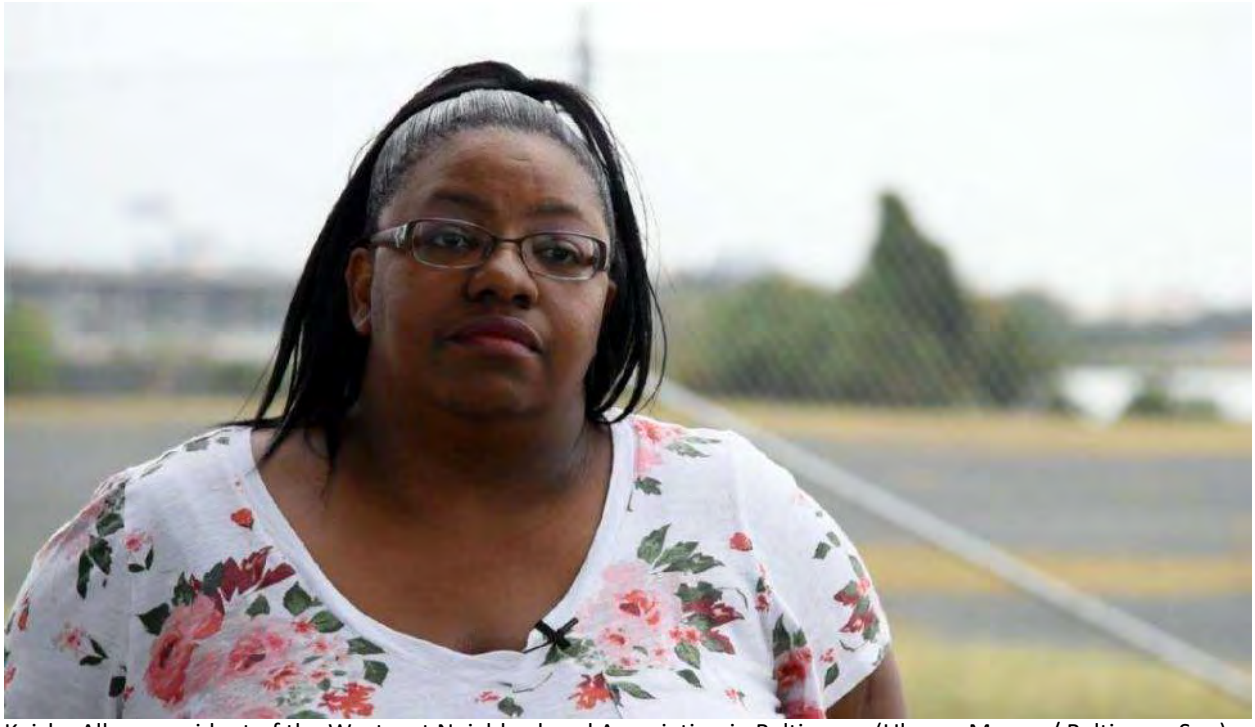
They argue that the massive undertaking likely would require billions more in federal backing than BWRR currently estimates. And they question the very premise of building a 40-mile train line for $15 billion — enough money to pay for thousands of miles of new highways, for example, or the entire Baltimore schools' budget for more than a decade.

[MCRT Editor's Note: As of March 2021, the estimated cost to build the SCMagLev has risen to $16.8 billion.][1136]

One citizens group launched a Change.org petition to halt the project, calling it a "boondoggle" and attracting nearly 1,800 signatures. "We don't see how the hell they're going to generate enough revenue to cover the costs," said Dan Woomer, a 66-year-old Linthicum resident and a member of the group.

[1135] Maglev line starting date still up in the air as costs keep rising | The Asahi Shimbun: Breaking News, Japan News and Analysis. Retrieved October 29, 2023.
[1136] Baltimore-Washington high-speed maglev project moves ahead after federal review - The Washington Post. Retrieved October 29, 2023.

“Not only is it, ‘You're going to disturb my backyard,’ but even more importantly, we feel it is a project that is not going to benefit the local community,” said Steve Skolnik, president of Greenbelt Homes, a historic cooperative in one potential path of the train.



Keisha Allen, president of the Westport Neighborhood Association in Baltimore. (Ulysses Munoz / Baltimore Sun)

“It’s scary,” said Keisha Allen, 43, president of the Westport Neighborhood Association in Baltimore, who fears being displaced by the project. “I’m waiting for the shoe to drop, that it’s going to be something bad, and that we’ll have to find an attorney — like we have the money for that.”

Officials at BWRR say they appreciate community concerns and will continue working to alleviate them as the federal review moves forward. But they also assert that their plan is financially sound, and that community disruptions will be minimal in comparison to the overall benefits to the region. They note that much of the train’s path would be 10 stories underground.

Wayne Rogers, the former Maryland Democratic Party chairman who is BWRR’s chairman and CEO, says the project’s costs are manageable with the right financing structure on the front end. He insists the company does not need — and doesn’t plan to ask for — any ongoing government subsidies to offset future operating costs, unlike existing mass transit in the region.

The U.S. would be foolish not to take advantage of five decades of Japanese development and accept JR Central’s generous help, he says — and before the Northeast stalls out. “Let’s take

their train, take the advantage of all of that, lift it up, bring it into our corridor, and really transform everything," Rogers said. "It can be done."

3.9 inches off the ground it's the stuff of science fiction.

When cooled to minus 452 degrees Fahrenheit, a titanium alloy becomes a powerful super-magnet. Built into a train, such magnets interact with others in the walls of a guideway — producing forces so strong they not only propel the train forward at record-breaking speed, but keep it perfectly centered along its track and3.9 inches off the ground.

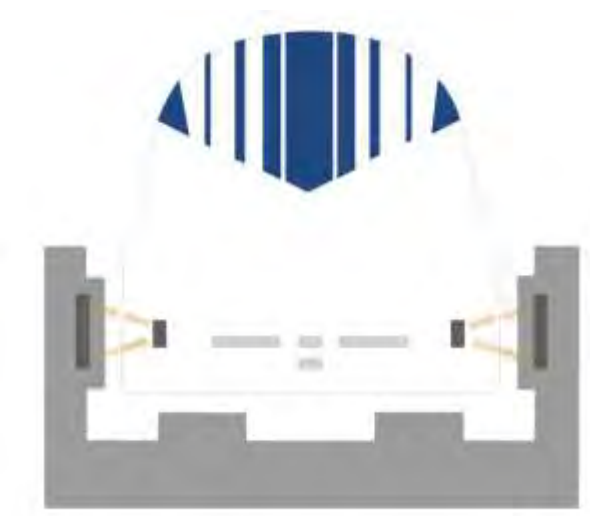
It will never derail, railroad officials say — even in the event of an earthquake, and even if power is cut to the system.

Riding the maglev doesn't diminish its otherworldliness. When the train rumbles to life, starts to move and hits about 70 mph, you can feel it suddenly lose touch with the ground as the magnets work their magic. The speed quickly doubles, then triples, then quadruples.

Meanwhile, the fastest train in the U.S. is the Acela Express, which tops out at 150 mph and runs significantly slower along much of its track due to curves, older infrastructure and other passenger and freight traffic along its shared right of way.

Graphic: How maglev works
Maglev technology uses powerful magnets to lift, center and propel the train along a guideway. The magnets — made with a titanium alloy cooled to minus 452degrees Fahrenheit — are built into the train. They interact with other magnets in the guideway walls.

Levitation



Magnetic forces between the train and the guideway keep the train centered and3.9 inches off the ground. They also propel the train forward.

The construction of a Northeast maglev train operating at 311 mph would immediately catapult the U.S. to the cutting edge of rail travel, surpassing industry leaders in Europe and China. And because the U.S. is so far behind at the moment, Rogers believes the leap would not just be monumental, but revolutionary — comparing it to villages in developing countries that never had landline phone service suddenly getting cellphones.

“We can go right from having no high-speed rail to having the fastest train in the world,” he says. “We have to do something today if we want to solve not only the problems of today, but the problems of tomorrow.”

Those problems are clear. The Northeast Corridor is “big and getting bigger,” Rogers says, set to grow from 51 million people now to 58 million by 2040. It is already defined by congestion, with half of the worst highway bottlenecks and half of all air delays in the country, he says.

Auto, air and rail traffic in the region are projected to grow along with the population. No major projects are in the works to alleviate the associated slowdowns.

[MCRT Editor’s Note: With the approval by the FRA of Amtrak’s Northeast Corridor development plan in 2017, Amtrak secured $2.7 billion in loans and has been upgrading rail, switch, stations and operating infrastructure all along the northeast corridor, all improving speed, service and reliability. As of October 2023, Amtrak has built the next generation 200 mph Acela train set, which passed FRA testing and is now in pre-operational testing on the Northeast Corridor.][1137]

The maglev would provide immediate relief, its backers say. According to a commercial viability study conducted by BWRR, the first stretch of the line could attract more than 13 percent of the estimated 117 million trips per year currently made between Baltimore and Washington — two-thirds of which would come off area roads.

[MCRT Editor’s Note: This statement is highly unlikely. One - it will be unlikely people will give up their personal vehicles to travel, park and ride the SCMagLev at a cost of $40 to $80 one-way when they can drive to their place of work. Demographics of the Baltimore population do not have the income to select the option to ride the high cost SCMagLev. Three - the time savings for anyone not within a relatively short distance from one of the SCMagLev stations would be insignificant compared to the use of a personal vehicle, car/van pool, or use of existing transportation services such as the far lower cost MARC. Four - the location of the SCMagLev’s Baltimore station at Cherry Hill is not comparatively or conveniently situated as are Amtrak’s and MARC’s Penn station, and MARC’s West Baltimore and Camden Yards stations.]

Rogers said fares will depend on the amount of money provided by the federal government on the front end, and on demand for the service once it begins. But he predicted they would be competitive with fares between Baltimore and Washington on Acela, which generally range between $50 and $100, depending on time and class of ticket.

The system would be capable of running trains every five minutes, carrying up to a thousand passengers per train, Rogers said. Frequent service — a proven selling point of Japan’s popular Shinkansen trains — would be a top priority.

[1137] Fitzgerald, Thomas (October 4, 2023). "Amtrak's inspector general says first of new $2 billion Acelas don't meet federal standards". *Philadelphia Inquirer*. Retrieved October 5, 2023.

“If you have frequency, people will mode-shift,” Patterson says. “The frequency of service makes people think, ‘Let’s just take the train.’”

[MCRT Editor’s Note: This statement is true only when the location of the stations in comparison to the potential rider is close and the total cost in time and money is better than using other forms of transportation. The anticipated costs of riding the SCMagLev, coupled with the station locations significantly limit the population who will make use of the high-cost SCMagLev.]

A major criticism of the proposal is that it won’t be affordable for everyday commuters, who rely on mass transit the most. Rogers said the company is considering a special fare for such riders, but hasn't made any decisions. He also said officials are looking for ways to work with airlines.

The two alignments shortlisted under the ongoing National Environmental Policy Act review include just one stop between Washington and Baltimore, beneath BWI Marshall Airport. The idea is that a traveler could fly into BWI, grab her bags, go down an escalator to a maglev station and be in D.C., Wilmington or Philadelphia in a matter of minutes. Airlines with gate capacity in Baltimore but not in those other cities might be interested in selling that combination of travel, Rogers says.

The Northeast, he says, with its many large cities and airports along a relatively short corridor, is “perfect for a high-speed rail solution.”

‘For sure I will use it’

Time is money. So, Toru Hiroishi, an IT consultant in his early 40s, already relies on Japan’s super-high-speed Shinkansen “bullet” trains to visit far-flung customers.

He gets from Tokyo to Osaka — about 320 miles, roughly the distance from Baltimore to Providence, R.I. — in just 2 ½ hours. But the planned maglev line between the cities will cut his travel time to Osaka in half.

“For sure I will use it,” Hiroishi said as he waited one evening for a Shinkansen train back to Tokyo after a meeting in Osaka. “Even if it’s expensive, it’s less time-consuming, and I can use that time to meet with as many customers as possible.”

In the small town of Nakatsugawa, the promise of a new maglev station is welcomed by Yuki Watanabe, a travel agent whose small office is just across the parking lot from the town’s existing regional train station. Small and squat, the station sits near a dilapidated hotel that is slated for demolition. The maglev could come here within a decade as the first leg of the line is built.

Watanabe's customers are mostly locals going elsewhere for holiday. He wonders if, once the maglev is built, visitors arriving in Nakatsugawa on the new train will buy trips to the nearby towns of Magome and Tsumago, outposts along the ancient road between Tokyo and Kyoto that are now tourist attractions.

"This is a story of 10 years from now," he says, "but this is a business chance."

Up the mountain in Magome, 74-year-old shopkeeper Tomoko Watanabe wears a shirt that reads, in English, "Develop a nonchalant attitude." She, too, wonders what the maglev train will bring.

"If the visitors increase, then it will be nicer here," she said. "Even if I'm not here, it will be nicer for the next person."

It wasn't long ago that, with a downturn in the economy and in visitors, it became too difficult to pay someone to tend her shop, which she inherited from her parents. So now she stays here to do it herself, seeing her husband on the weekends when he travels from their home in Nagoya. She wonders if the train could ease that arrangement, or increase business enough to let her hire again.

Regardless of the financial impact, everyone she knows is intrigued by the faster connection with Tokyo, about 200 miles away. An 88-year-old relative told her that, if she lives to see the maglev, she has her mind set on "Ginbura," or window shopping in Tokyo's famed Ginza shopping district.

"I think everybody has dreams like that," Watanabe said.

In the U.S., the Northeast maglev proposal has won lots of similar support, including from regular commuters along the corridor, the business community, and some people who live along the proposed route.

Robert Snyder, 62, is a retired Prince George's County elementary art teacher who has lived for 30 years in the Greenbelt cooperative, 1,600 homes built during Franklin D. Roosevelt's administration. Snyder's home is close to where the western maglev alignment would pass through the community. He is a big supporter of the project, and says there are others like him whose voices are being drowned out by the project's opponents, who are louder.

He said he believes such a massive project would be in keeping with the New Deal ethos that inspired Greenbelt; help the U.S. stay competitive with countries like Japan, China and those in Europe; create good science, technology, engineering and math jobs for the next generation; and help move the country away from diesel and other fossil fuels and toward a greener future — especially as the percentage of electricity derived from renewable energy sources like wind and solar increases.

He understands that the cooperative wants to protect its historic character, but says it shouldn't "stay in the past, like we're a living museum."

[MCRT Editor's Note: It is unlikely FDR would be a supporter of building a high cost, tax dollar funding transportation system for the more affluent customer who could afford the price of a ticket. FDR would be far more likely to support the enhancement of affordable existing transportation systems that serves the far broader population, so all people have access to and can make use of transportation services to better their and their family's lives.]

Milena Rodban, a 32-year-old geopolitical risk consultant, lives in Brooklandville north of Baltimore and commutes to Washington a couple of times a week for work and to visit family and friends. She usually takes MARC or Amtrak trains between Penn Station and Union Station, but finds them slow and unreliable. She would love for the maglev to be built.

With reasonable fares, she said, the maglev could inspire people across the Washington area to consider living or opening businesses in cheaper Baltimore.

In Rodban's view, building the train also makes geopolitical sense, as it would benefit both the U.S. and Japan. "They've done all of the hard work in developing and testing this, and they are really the experts. This would be a big symbolic measure for us to be able to work with them."

"Whether I end up losing a house or not, I'm still excited to see this thing built."
Doug Wise, 43, owns four homes in Baltimore's Westport neighborhood

Doug Wise, 43, owns four homes — one of which he lives in — in Baltimore's Westport neighborhood, one of the locations being considered for the Baltimore maglev station. He believes that, if the project moves forward, it would benefit the area and the entire East Coast, even if it forces him and his neighbors to give up their homes through eminent domain.

"Whether I end up losing a house or not, I'm still excited to see this thing built. Because if we can get this one built, maybe we can get more built, up and down the coast," he said. "I'm interested in the technology and hope that it can do something good for the neighborhood."

Of course, not everyone supports the maglev, in Japan or in the U.S.

'A negative legacy'
All along the planned Japanese maglev route and the proposed U.S. line, residents are fighting to stop the projects or at least force concessions from the railroads — for a variety of reasons.

Yasuo Sekijima, an attorney for 738 residents suing to halt the Japanese project, says his clients believe neither the government nor JR Central has properly considered safety issues,

environmental threats or the potential lack of profitability as Japan's population shrinks — from 127 million in 2015 to 88 million by 2065, according to one national projection.

Sekijima said his clients are concerned that the project's route cuts across fault lines and will be vulnerable to earthquakes. They think planned tunnels deep below the mountains will make emergency evacuations — including in the event of a terrorist attack — nearly impossible. They believe the tunnels will negatively impact ground water and endanger their drinking supply.

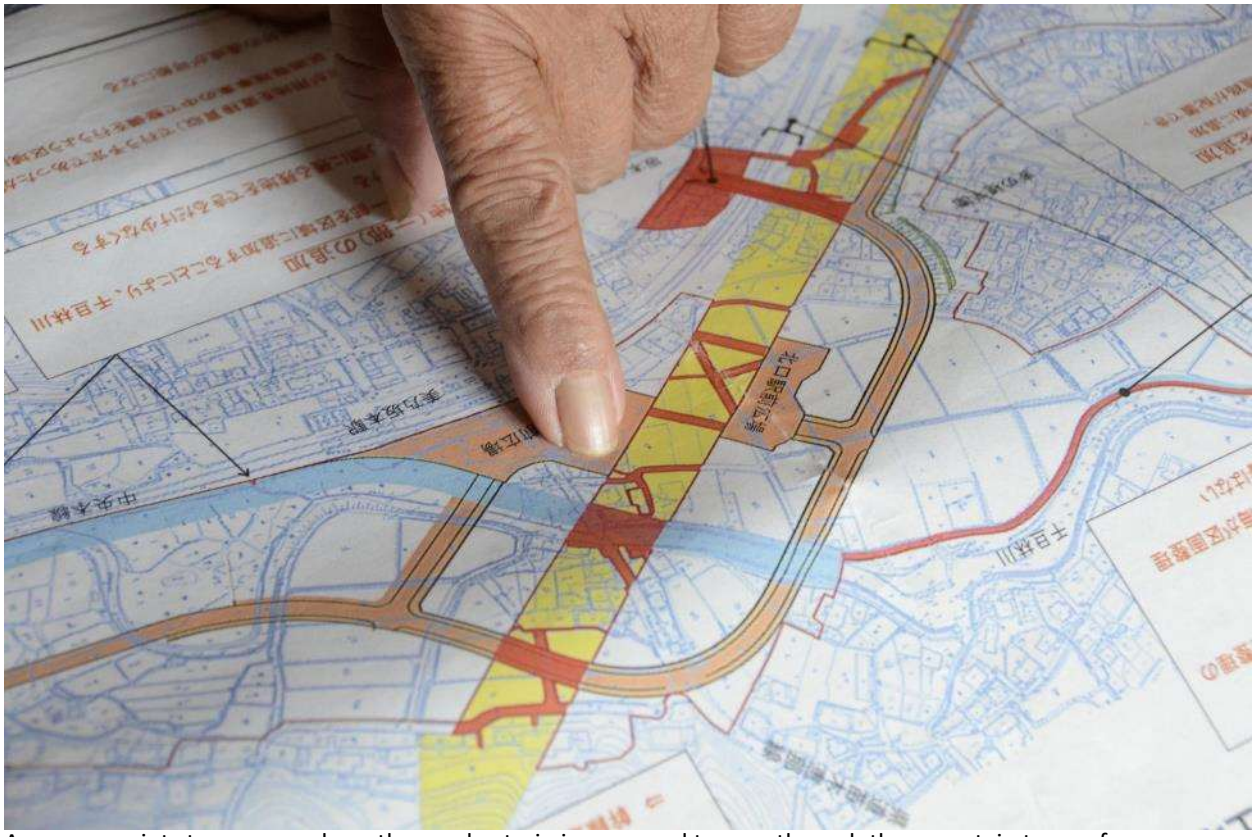
And they believe JR Central officials have been "hiding the truth about their plans." He hopes the lawsuit at least forces more information into the open.

Teruo Kawamura, a retired professor and the lead plaintiff in a lawsuit to halt the Japanese maglev project, said he was dismayed when he began to research the impacts of the existing Yamanashi test line on the surrounding environment. Naomi Schanen / For The Baltimore Sun)

Teruo Kawamura, the lead plaintiff, is a retired professor who taught environmental issues through literature at Keio University. One recent afternoon, he stood beneath a piece of the Yamanashi test track stretching above peach orchards, pointing to a cement channel full of rolling water. This once was a tiny dirt stream, he said, but when JR Central tunneled into the nearby mountains, it changed the way ground water moved. Suddenly, much more water was feeding into the little stream, and far less into a nearby river. JR Central had to redirect the stream to send water back to the river. He fears such changes will be repeated all along the route.

“It is highly possible that it will leave a negative legacy for future generations.” he said.
Back in Nakatsugawa, a woman in her 80s, who asked not to be named for fear of making herself a target, said she has been told by JR Central and government officials that her longtime home near the existing train station is in the path of the maglev line, and will have to be demolished.

She has been told she will be compensated, but that’s little consolation. Her home, where she’s lived for more than 50 years, is in a central location that she likes, she said. She and her family are trying to negotiate for a new location that is equally convenient.



A woman points to an area where the maglev train is supposed to pass through the mountain town of Nakatsugawa. She has been told her longtime home will be demolished, and is hoping she will be given an equally central location to live. Kevin Rector / Baltimore Sun)

“We’re having to move from one of the best spots, so we’re requesting to be moved nearby.”

Hideki Kashida, a freelance journalist who has written two books on the maglev, said JR Central and the Japanese government have been acting as if construction is a foregone conclusion while ignoring major hurdles in its way — including the difficulty of obtaining all the land needed for construction of the line, stock yards and access roads.

Kashida says neither JR Central nor the government know where they will put all the waste soil from the tunneling, which he estimates would be enough to fill 50 stadiums. And, he said, they have failed to address community concerns about uranium deposits in areas where tunnels are

to be built, which concerns people, particularly in Gifu Prefecture, where miners exposed to uranium years ago developed lung cancer.

“People don’t want this near their village,” he said.

A diverse coalition of residents who live along the U.S. route have many similar concerns.

Opponents of a proposed magnetic levitation train in Maryland say it would make their communities less safe and less desirable places to live, and worry about a range of impacts from noise to vibration to electromagnetic forces.

Dennis Brady, 64, is a Bowie resident who helped form the grassroots Citizens Against SC [Superconducting] Maglev. The Navy veteran, nuclear engineer and former Bowie city councilman says the group has members from across the region, not just along the two possible routes.

Many don’t believe BWRR’s claim that the train won’t use state funds, or that it will only cost $10 billion to $15 billion. Residents worry about the potential use of eminent domain to take properties for access roads, maintenance facilities and ventilation shafts all along the route.

They’re also concerned about the potential harm caused by vibration, noise and electromagnetic fields; the adverse impact on existing local trains that actually stop along the corridor; and problems from the tunneling, which they say could disrupt underground aquifers and expose residents to naturally occurring radon.

Skolnik, president of the Greenbelt cooperative, said his community supports mass transit over further growth of highways in the state. But they believe the maglev would serve only “a small number of rather high-end people.”

A better idea, he said, “would be to spend that money to improve the Amtrak lines so that the Acela trains could actually run at the speeds they are supposed to run at.”

Anay Hernandez, 29, one of about 30 people who recently protested in Bladensburg against the project, said information has not been shared well with the area’s large Spanish-speaking community. Her mother, Leticia Carino, 49, fears she will lose her house if the maglev is built.

Buttons in opposition to a maglev in Maryland sit on a table during a rally at Veterans Memorial Park. Kim Hairston / Baltimore Sun)

“We didn’t know anything about it until like a week ago,” Hernandez said. “My mom was like, ‘We have to do something. Let’s go to the protest.’”

Allen, president of the Westport group, said BWRR plans that draw a big circle around her neighborhood as a possible site for a maglev station are “frightening” — especially given Baltimore’s history of black communities’ being destroyed when major infrastructure projects are built.

She said she would welcome the maglev if it were built on the vacant waterfront in Westport, didn’t displace black families and raised local home values. But she recalls family members’ being forced out of their homes when a never-finished highway was built through the middle of West Baltimore years ago.“

This crap has got to stop where [developers say], ‘We’re not going to tell you anything until we have something to offer you,’ and that’s basically a pink slip and some chump change telling us to go find somewhere else to live,” Allen said. “That’s a bad habit in Baltimore.”

‘We’ve looked at all of these things’

Officials with JR Central, BWRR and governments in both countries say many of the concerns voiced by opponents are overblown or misplaced.

Kosuge, JR Central's vice president, said every big rail project faces local opposition, but most Japanese residents will benefit from the shorter travel times between Tokyo and Osaka. He also said JR Central is "not ignoring" those who live close to the track and have concerns. It has developed solutions around groundwater issues, noise, vibrations and electromagnetic concerns — which he said are all overstated.

Officials with JR Central note that the company has been studying the project for years alongside Japan's central government, which has invested heavily in the railline.

[MCRT Editor's Note: ". . . has invested heavily [emphasis added] in the railline." The Japanese government, JP Rail, and THEM have a vested interested in seeing the SCMagLev is built. If successful, all will receive substantial financial returns. But those returns may well be paid by tax payers' dollars from many who cannot afford a ticket.]

After a 3½ -year environmental study, the railroad developed measures to prevent damage to underground water systems. Its officials say they are addressing concerns about uranium deposits and waste soil, and conducting "various investigations to ensure that we are completely prepared, both in terms of our equipment and our operational systems, for all eventualities."

An older model maglev train is seen on the experimental track in Yamanashi. Japan's state-of-the-art maglev train set a world speed record on April 21, 2015 in a test run near Mount Fuji, clocking more than 600 kilometers, or 373 mph. Toru Yamanaka/AFP/Getty Images)

Some residents near the Yamanashi test track say the company has negotiated with them in good faith to find solutions to problems.

The 91-year-old Suzuki said when the first tests began in 1997, the train caused such a massive boom each time it emerged from its tunnel that homes shook violently. He said JR Central officials listened, and made good on promises to diminish the local impact — including by developing a hood to go over the track at the tunnel exit to reduce noise and vibration.

[MCRT Editor's Note: ". . . train caused such a massive boom each time it emerged from its tunnel that homes shook violently." How does this fact square with TNEM's claim that because there are no steel wheel on steel train involved, the system is quite?]

Now, Suzuki said, most residents in his village "are not opposing" the maglev, though they plan to continue negotiating "for the least impact possible."

Rogers said he understands that residents have lots of questions about the potential U.S. line, and said more answers will be forthcoming as the federal review process continues. But like Kosuge, he said many of their fears are misplaced.

"One of the great things about taking technology that is actually in existence, and has been tested for years and years and actually has people riding on it, is we don't have to speculate about impacts," Rogers said.

"Are you going to have noise? We can actually measure the noise of a real train. Or, are you going to have vibration if you're in a tunnel? We can actually measure the vibration that's in a tunnel and come back with real numbers."

Noise levels, vibrations, electromagnetic fields all would fall well below permitted levels, Rogers said. "We've looked at all of these things."

[MCRT Editor's Note: If you can measure the noise, vibrations and electromagnetic field, where's the analyses and report(s)? What are the "Permitted" levels?]

Hiroyuki Ohsaki, a professor in the department of advanced energy at the University of Tokyo.
Kevin Rector / Baltimore Sun

Rogers also says the train would have positive environmental effects by taking cars off the roads. BWRR estimates a reduction of 2 million tons of greenhouse gases. The maglev would use large amounts of electricity, but Hiroyuki Ohsaki, a professor in the department of advanced energy at the University of Tokyo, said it would be far less than airplanes would use carrying the same number of people. And Rogers says renewable energy sources — such as wind farms he's helped to develop in Western Maryland — could provide the energy needed.

[MCRT Editor's Note: Constructing the SCMagLev track between Baltimore and Washington would release significant amounts of CO_2. The DEIS states the SCMagLev operations between Baltimore and Washington will be NOT be carbon neutral (see pages 4.19-7 through 4.19-15) "the SCMAGLEV system and ancillary facilities will increase net transportation energy consumption by approximately 3.0 trillion Btus. For context, this would be enough energy to power around 88,900 average homes for one year." According to Energy Information Administration's 2018 data, about 75 percent of Maryland's electricity is generated from nuclear and natural gas. Generating the electricity needed to operate the SCMagLev, which one report out of Japan says requires five-times the energy needed for other high-speed trains, would increase CO_2 emission.]

In terms of the alignments, Rogers said BWRR would prefer the one along the eastern side of Route 295 because its effect on the surrounding communities would be smaller. It may not require any homes to be taken through eminent domain, the elevated portions of the track would be farther from homes, and construction would have less impact on Route 295, he said. The western alignment's impact is potentially greater and less clear, he said.

Whichever route is picked, Rogers said his company will approach any necessary home purchases "in good faith" and at "fair market value."

[MCRT Editor's Note: What is the "Fair Market" value for a home or business about to be demolished? How does a "fair market" buyout help the elderly with reverse mortgages where they are using the home's value to help support their final years? Once the reverse mortgage is paid off (as required with the sale of the home), would they have any retirement income left?]

Politically speaking
In the usual ways of business and politics, proponents of a Northeast maglev have quietly been laying the groundwork for the project for a decade now.

By 2009, JR Central was eyeing the corridor as its best shot at exporting its maglev technology successfully. (The company has studied transportation corridors around the world, and determined the Northeast Corridor is currently the only one outside Japan that has a large enough ridership potential to support the maglev's high costs.)

Yoshiyuki Kasai, then chairman of the railroad and a powerful figure in Japanese business and politics, recruited Patterson, an unassuming Japan expert and former National Security Council member. Patterson had helped lead U.S. foreign policy in Asia during both Bush administrations between stints in the private sector, including with U.S. defense contractor Raytheon Co.

Once he was convinced of the merits of the idea, Patterson didn't waste much time in reaching out to Rogers, who had experience developing hydroelectric power facilities abroad and was working on building the Western Maryland wind farms as chairman of a small energy company.

Thomas V. Mike Miller, Md. Senate president, Wayne Rogers, BWRR and The Northeast Maglev CEO, Kevin Plank, Under Armour CEO and The Northeast Maglev advisory board member, and Sen. Ben Cardin attend an opening reception for The Northeast Maglev's Baltimore headquarters in 2015. Steve Ruark / Baltimore Sun)

The two knew each other from the U.S. Naval Academy in Annapolis, where they'd gone through plebe summer together in 1972. Patterson said he felt Rogers had the right

combination of experience in global infrastructure development and local politics in Maryland to help get the maglev project off the ground.

Rogers began flying to Tokyo to meet with Patterson and other JR Central officials. And soon enough, they made him an offer: If he started a U.S. company to operate a maglev line in the U.S., JR Central would waive the licensing fees for its technology and help secure billions in loans — ostensibly from the government-owned Japan Bank for International Cooperation, though the bank has denied any promise of funding.

By 2010 the joint Japanese and American team now behind the maglev began dumping millions of dollars into advancing the project. Since then, the maglev has been promoted at the highest levels of government. Shinzo Abe, Japan's prime minister, who is a friend of Kasai, has been a big backer, even touting it during a meeting with President Donald Trump at the White House in February 2017.

"I'm sure you would appreciate the speed, the comfort and safety with the latest maglev technology — from Washington, D.C., to New York where Trump Tower exists, only one hour," Abe said in Japanese.

Trump was reportedly not listening to a translation and didn't understand Abe. He has not discussed the train in public.

Mike Cavanaugh, chief of the trade and economic policy unit at the U.S. Embassy in Tokyo, said the U.S. maglev project is clearly important to the Japanese, but it is still viewed by U.S. officials as a "very long-term project" in its "very early days," and with many unanswered questions, including how it would be financed and amortized over time.

Sho Ishii, director for overseas projects in the Japanese transportation ministry's railway bureau, said Japan and the U.S. "are one of the closest alliances in the world," and the Northeast maglev would be mutually beneficial.

The U.S. could massively benefit from Japan's technology and financial backing, leaping to the forefront of rail travel without having to invest in the decades of research that Japan has already done.

Ishii acknowledged that neither the central government nor the Japan Bank for International Cooperation has made specific pledges to invest in the U.S. project, but said they likely would be willing to do so if Washington signaled it wanted to build the train.

In the U.S., the maglev has held a more prominent position in trade discussions on the state level.

Maryland Governor Larry Hogan, right, and his wife Yumi took a test trip in 2015 on a maglev train that is undergoing testing by Central Japan Railway, at the Yamanashi Maglev Test Track in Tsuru, Japan. Ko Sasaki/for The Washington Post)

Hogan rode the test train in Yamanashi during his administration's first international trade mission to South Korea, China and finally Japan in 2015. On the morning he rode the train, Hogan met with Abe, who told him not to blink between tunnels, lest he miss a glimpse of massive Mount Fuji out the train's window.

He also met with JR Central officials and engineers, and said he came away impressed.

"It started to look more real, rather than some futuristic Star Trek [technology] that would never happen," Hogan said.

The following summer, in 2016, Hogan and Japan's then-ambassador to the U.S., Kenichiro Sasae, signed a joint memorandum of cooperation on economic and trade relations that listed the maglev as an area for cooperation. Still, Hogan says he has made no decisions about the future of the maglev in the state, and won't until the federal environmental review is completed.

BWRR officials say they don't need any state cash. And Hogan has said he won't pay for it.

[MCRT Editor's Note: If "BWRR officials say they don't need any state cash" then why have BWRR and the surrogates opposed state legislation that bars the use of state taxpayer dollars to build, operate or maintain the SCMagLev?]

"If we thought it was something that would benefit the state greatly, we certainly would be willing to provide rights of way and things like that," Hogan said. "But investing billions in taxpayer dollars is not something we are willing to do."

(He's taken a similar stance on Elon Musk's less-advanced "Loop" proposal to build a tunnel beneath Route 295, in which "autonomous electric skates" would travel about 150 mph between Baltimore and Washington. The Loop is not as advanced in the federal review process as the maglev proposal.)

Jealous, Hogan's challenger in next month's election, said he opposes the maglev project because "it's not clear how most Marylanders could afford it" even if the federal government and BWRR could find the money to build it. Officials should instead be focused on mass transit "that will actually help the people of Maryland, at a price they can afford, get to where they need to be as efficiently as possible," Jealous said.

"I guess I'm traditional in that way: I think mass transit should be for the masses," he said. "This is rapid transit for the rich."

Local politicians who represent communities along the proposed rail line are split. Baltimore Mayor Catherine Pugh and D.C. Mayor Muriel Bowser, both Democrats, have expressed cautious optimism and an open mind about the project, and the Legislative Black Caucus of Maryland supports it. But many state delegates who represent communities between the cities oppose it.

"They really don't have the details. They don't understand what it could do to a community," said Del. Pam Beidle, a Linthicum Democrat. "If they start it and don't have the money to finish it, what happens then?"

We put a man on the moon
Bradley Smith, director of the Office of Freight and Multimodalism in the Maryland Department of Transportation, said he expects a report with more details on the final two alignments, potential station locations and other facilities to be released under the federal review process this fall. A subsequent report identifying one final route, and potentially more information about estimated construction cost, ridership and fare pricing could come next year — as could a final decision from the Federal Railroad Administration as to whether the project should advance.

Rogers said he hopes a favorable FRA decision comes by 2019, so construction could begin as early as 2020. From there, “how long it’s going to take to build it really depends on the alignment selected and the construction technology, because tunneling is done in terms of feet per day,” he said. But he said BWRR thinks it could be built within a 7-year construction window.

Once the train line reaches Baltimore, he and others said, they will be eager to push on as quickly as possible to Philadelphia and then New York, which is the real prize.

“It’d be a cash cow to New York,” Patterson said.

JR Central officials, who have long been the shadow force behind the U.S. line, said they are ready to play a long game in the Northeast, just as they have in Japan.

Residents who won online lottery tickets to ride the maglev test train in Yamanashi smile as the train picks up speed. Kazuo Okamoto /For The Baltimore Sun

A screen at the front of a maglev car shows the speed the train is traveling: 500 kilometers per hour, or about 311 mph. Kazuo Okamoto /For The Baltimore Sun

“Given the magnitude of this project, it is not something that you can casually or easily decide in a few years, or in a span of 10 years,” Kosuge said. “This requires long-standing efforts.”

Rogers agreed. He said he knows the maglev seems fantastical, but so did plans to build the first steel-wheel railroad from Baltimore all the way to Ohio, or to buildout a massive interstate highway system across the U.S., or to land on the moon. The U.S. tradition is to pursue such futuristic projects “not because they were easy, but because they were hard,” he said.

“Look at John F. Kennedy standing up and saying we’re going to put a man on the moon in 10 years. And we did it! And that was at a time when we had no technology whatsoever to take a person into space,” Rogers said.

“For me to say I’m going to take a train that already exists in Japan and bring it forward? I don’t think it’s as great a leap as some of the things that our forefathers have done.”

What’s next
A federal analysis of the two proposed routes is expected this fall.

Next year, a draft Environmental Impact Statement is expected to identify a preferred route. The public can comment.

By 2020, the Federal Railroad Administration is expected to issue a final report saying which line, if either, should be built.

If political leaders in Washington and Annapolis decided to back the project, its developers would have to come up with $10 billion to $15 billion to pay for it.

[MCRT Editor's Note: As of January of 2021 the estimated price tag had increased to potentially $16.8 billion.][1138]

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Reporting for this article was funded in part by a fellowship from the International Center for Journalists. Junko Takahashi, an ICFJ translator based in Tokyo, contributed to this article.
krector@baltsun.com. [MCRT Editor's Note: Kevin Rector no longer works for the Baltimore Sun.]

Kevin Rector is an investigative reporter with a focus on criminal justice. He previously covered the Baltimore Police Department and city crime. Kevin joined The Baltimore Sun in 2012, is an Ellicott City native and a Terp.

XCI. Appendix - Letter Reprint: Rogers, Wayne. BWRR Letter to Anne Arundel County Council. April 16, 2021.

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April 16, 2021

Dear Council Chair Lacey, Vice-Chair Rodvien, Members Pickard, Volke, Pruski, Fiedler, and Haire:

On Wednesday I was surprised to learn of a County Council work session in which the Council discussed a proposed Resolution, 24-21, which seeks to oppose BWRR's Maglev train project. We have never been contacted about this or to answer any questions about the Project. I am

[1138] Baltimore-Washington high-speed maglev project moves ahead after federal review - The Washington Post. Retrieved October 29, 2023.

sure through no fault of your own, information presented at this work session was either factually incorrect or at best highly misleading. I am confident that you would want this brought to your attention before taking an ill-advised action, negatively impacting your constituents, based upon faulty information. This letter is a short attempt to address some of the misinformation, illustrate the benefits that the Project will bring to Anne Arundel County and hopefully lead you to the conclusion that more review and dialogue is needed before such an action would be contemplated.

The proposed Resolution states that "Anne Arundel County has the highest acreage of residential zoning and many existing homes would have to be acquired in order for the Baltimore-
Washington Maglev Project to be constructed." This is categorically false. BWRR's proposed alignment (and indeed all SCMAGLEV Build alternates under review) will require zero residential displacements.

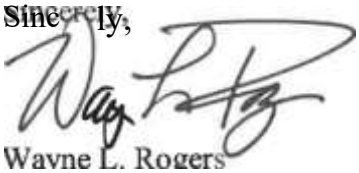
The Maglev project was planned ahead of Anne Arundel County's new General Development Plan, Plan2040, yet it is strikingly consistent. As a long term Anne Arundel County resident, a Naval Academy graduate who started my business here in 1980, I applaud the County's longterm vision of improved transportation investment, easing traffic congestion to improve quality of life, and improving environmental quality like the air we breathe. These are all goals that we share and are represented in the Maglev Project. As Plan2040 repeatedly notes, the County is at a critical juncture with regard to its land consumption and transportation strategies. With a significant expected increase in the County residential and workforce population by 2040, the Plan makes clear that current traffic congestion and environmental decline will only be exacerbated without fundamental change. The Maglev Project is a huge step in the right direction of required fundamental change. The Maglev Project will reduce traffic in a major central artery by 9 to 12%, combat climate change while increasing economic growth by billions of dollars, provide tens of thousands of jobs and all while promoting diversity, equity and inclusion.

To date there have been nearly 19,000 people who have signed a petition in full support of the Project along with over 350 Anne Arundel residents who have written letters of support to their elected officials. I am sure you have heard from hundreds of Anne Arundel County residents upset about this resolution as I have. The foregoing does not include the numerous endorsements from civil rights, business, labor and other groups representing tens of thousands of others,

including but not limited to: the National Association of Building Trades Unions, the Eastern Atlantic Carpenters Union, the Laborers International Union of North America, Baltimore-DC Building Trades Council, the Northern Anne Arundel Chamber of Commerce, the Greater Baltimore Urban League, the National Action Network, People for Change, and the National Capital Baptist Convention. We hope that moving forward we can work together on solving our joint problem of regional gridlock, achieving meaningful emissions reductions, and boosting economic opportunities through this transformational project, in a spirit of cooperation and dialogue.

The Council taking any action on this Resolution, other than to vote unfavorably, while lacking full and accurate information, is neither in the best interest of Anne Arundel County nor the State of Maryland. I am pleased to brief the Council on any detail of the Project they would like or to respond to any and all questions that you may have. Attached is an abbreviated response to the handout utilized at the work session and the Resolution, due to the shortness of time since the Resolution was announced.

Sincerely,



Wayne L. Rogers

The following pages contain factual corrections to the misinformation presented in County Council Resolution 24-21 and its accompanying workpaper:

Claim #1: "Within the Baltimore-Washington Maglev Project Affected Environment, Anne Arundel County has the highest acreage of residential zoning and many existing homes would have to be acquired in order for the Baltimore-Washington Maglev Project to be constructed," and "Impacts from the proposed Baltimore-Washington Maglev Project include the disruption of community cohesion, businesses, and community facilities; the intrusion of large transportation structures into residential and forested areas;

This emotional claim conjures up images of an above-ground train barreling through and displacing homes, schools, offices, and parks. This both false and misleading. BWRR's proposed alignment (and all proposed SCMAGLEV routes currently under study as alternate to the proposal) are almost entirely in deep tunnel, between 100-200 feet underground. The only exception to this, representing less than 30% of the route, is where the project is on elevated viaduct, immediately parallel to the Baltimore Washington Parkway and on federal property. As factual matter, there will not be a single residential displacement in either Anne Arundel County and the entire state of Maryland. Over the past nearly ten years of planning, BWRR has sought to avoid any residential displacements and minimize impacts to businesses and parks to the greatest extent possible. BWRR is fully aware of the legacy of highway construction. For that reason Maglev went to extraordinary levels of planning and expense to avoid residences. For example, Maryland road projects between 1965-1980 displaced 94,000 people from poor minority populations. More recently, the Purple Line and proposed 270/495 expansion each are displacing approximately 50 residences. BWRR has worked hard, and at considerable cost, to place more than 70% of the entire project in deep tunnel excavated by a tunnel boring machine to entirely avoid residential displacements. Not only is BWRR not taking any homes, but our above- ound viaduct is only next to the existing Baltimore Washington Parkway for a short segment, which has 120,000 cars per day creating noise and pollution. In this environment the Maglev, floating on air, not steel wheels or car engines will not be creating noise or pollution. As the independently produced DEIS lucidly notes (4.4-4), "the above-ground viaduct would not bisect communities. " Moreover, the DEIS continues that all Build Alternatives "were located as close to existing transportation corridors as possible. In addition, large portions of the SCMAGLEV Project have been designed as guideway tunnels, with 75 to 83 percent of the Build Alternatives located in tunnel" (4.12-23).

[1] Not in My Neighborhood: How Bigotry Shaped a Great American City (2010). Antero Pietila. Page 219.

Claim #2: "The proposed Baltimore-Washington Maglev Project would reduce travel time to meet the capacity and ridership needs of the Baltimore-Washington region but would also cause significant social, economic, resource, and property impacts."

While the preceding paragraph should clear up concerns about property impacts, as the overwhelming majority of the SCMAGLEV project in deep tunnel, the claim above argues that there will be negative social and economic impacts from the Project. There are no facts to substantiate this statement. In contrast, Anne Arundel County can except a windfall of economic and social benefits from the Maglev project. A portion are as follows:

1. During an estimated seven-year construction period, the independently-produced DEIS predicts the need for more than 161 ,000 job-years of labor. That means the equivalent of adding 23,000 jobs per year for seven years. According to the DEIS (4.6-16), this construction effort will cost $13.83 billion, with $8.8 billion of that being direct labor earnings across the state of Maryland. There is no doubt that a significant portion of those taxable labor earnings will be reaped by Anne Arundel County. This rapid need for varied levels and forms of labor is entirely compatible with Anne Arundel Plan2040 's consistent theme of developing a skilled workforce within the County. For example, Plan2040 's Goal Healthy Economy 2 seeks targeted growth in new areas and seeks increased opportunities for innovation. Bringing Maglev, the fastest and most technologically advanced train in the world, to Anne Arundel County is the epitome of forward-thinking innovation. To help train this workforce, BWRR looks forward to working with local institutions like the Anne Arundel Community College, the Anne Arundel Workforce Development Corporation (AAWDC) and their perfectly-tailored "Bridges to Construction" program, and eventually tapping Anne Arundel' s wealth of cyber and electronics experts for system operations and security.

2. As addressing systemic racial inequality and providing opportunities for previously neglected and perennially underserved groups is long overdue, BWRR seeks to contribute to this effort as much as possible. On March 1 st, 2021 BWRR announced a Diversity, Equity, and Inclusion Plan to ensure local minority communities reap the economic rewards of this project. The plan laid out the following construction goals: (a) at least 40% of the construction workforce will be from diverse populations in which the route travels through, and at least 25% of construction spend will be on Minority-Business Enterprises ("MBEs") and Women Business Enterprises ("WBEs"). There will be particular emphasis to work within EJ communities and local community colleges to train and establish apprenticeships as the project progesses. The BWI station will employ many Anne Arundel residents, in addition to jobs in operations and maintenance, helping provide stable and well-paying local jobs. Many ofjobs are already being created today in the planning work for the train. By providing training and apprenticeship opportunities to local minority populations, BWRR will provide these groups with pathways to stable well-paying jobs. Darryl Barnes, Chair of the Maryland Legislative Black Caucus,
endorsing the project's plan, noted that "the current pandemic shows that communities of color are particularly vulnerable during hard times, which is why a project like the SCMAGLEV train offering tens ofthousands ofjobs and billions ofdollars ofinvestment

must be taken seriously T...]jobseekers, contract seekers, and others will be better off thanks to these pathways for county residents to grow and sustain wealth. [2] " In addition to Mr. Barnes support, a large number of civil rights organizations have agreed the Project will bring economic benefits to local communities at a scale unparalleled in the state of Maryland.

Tied to the direct economic benefits the Project will bring to Anne Arundel County is the boom that can happen for both BWI airport and its surrounding neighborhood. With direct approximately five-minute service to Baltimore and eight-minute service to Washington DC, BWI will become the airport of choice for residents and travelers of both cities. Plan2040 repeatedly notes what an economic engine the airport is for the County, and with passengers expected to increase by 82% in the coming two decades [3] (on top of the 25 million currently) the Maglev will enable the airport to increase efficiency and allowing the County to leverage BWI into the leading airport of the region. Airlines will bring new routes to BWI, and businesses will relocate to be closer to the region's new premier long-distance hub. This will inevitably boost County tax revenue, opportunities and prestige.

Moreover, Plan2040 notes that the County should seek to promote development in the vicinity of BWI (Goal Healthy Economy 4.1) — and a station at BWI would greatly assist this effort. Not all BWI Maglev passengers need be air passengers, people from nearby the airport can be to DC within 10 minutes! With nearby land only 50% of the value it ought to have, especially around Stoney Run (Plan2040, Vol. Il P. 130), and Plan2040 making clear that Northern Anne Arundel County can use an economic boost, with stations at both BWI and Cherry Hill, Baltimore City, will help spark an economic renaissance in this area.

Figure 1: Rendering of Proposed BWI SCMAGLEV Station, From DEIS Chapter 4.9

[2] https:/msa.maryland.gov/msa/mdmanual/06hse html/msa17067.html
[3] DEIS Chapter 2, P.ll

Several of Plan2040 's Built Environment Goals support transit-oriented development. Having access to the world's fastest train connecting our two major cities of Baltimore and Washington significantly improves the airport and opportunity in Anne Arundel County.

Claim #3: The Resolution claims in several parts that auto-traffic is unlikely to be reduced by the Project, and that Project is likely to result in environmental deterioration. Since these claims are intertwined, below is a combined response:

As the independently produced DEIS, along with numerous other planning documents including Plan2040 make clear, our region's traffic is some of the worst in the country. The Baltimore Washington Parkway, Interstate-95 between Washington DC and Baltimore, and other major roadways between the two cities possess increasingly unbearable congestion: by some metrics, Maryland is unfortunately number one for worst in the country traffic[1139] . If there is one item of transportation planning learned over the past several decades, it is that building more lanes does not in the long term alleviate congestion but requires constant expansion with population increase and with induced demand. [1140] While the National Park Service[1141] notes that the BW Parkway has the worst traffic of the National Capital Region parkways, it presents no viable solutions for how to mitigate this traffic. In fact, the Fort Meade Alliance recently noted that while the BW-Parkway was designed for 50,000 cars per day, it now sees frequent traffic exceeding 120,000+ users per day[7]. These are precisely BWRR's target population to take off Anne Arundel's major roads like the BW-Parkway. The BW Parkway has not been improved since it was built in 1954 and is now over 200% over capacity. **The Maglev Project is the transportation equivalent of adding eight lanes to the Parkway.** One can imagine the environmental issues with expanding the Parkway by eight lanes.

The Project will take cars off our roads, having the dual benefits of easing congestion and improving our air quality. One of the major objectives of this project is to take cars off the road. As stated in the independently-produced DEIS (4.2-6), Maglev is expected to divert between 1 1.3 million to 12.6 million cars off the road by its opening year, to more than 16 million cars per year by 2045! This translates into a 9-12% reduction in regional Vehicle Miles Travelled ("VMT") (DEIS 4.16-10), or 57,000 less car trips per day. This reduction of car use, which will be predominantly on busy DC-Baltimore through-ways like the Baltimore-Washington Parkway and 1-95, will lower regional tailpipe emissions and improve regional air quality (DEIS 4.2-7). By 2045, as SCMAGLEV ridership increases, the service is expected to divert between 393 and 437 million VMT. These steep auto reductions cannot come soon enough as the EPA already notes that most of the SCMAGLEV project area, including vast parts of Anne Arundel County, are already in non-attainment status air quality[8] . Therefore, by taking DC-Baltimore through

[1139] DEIS Chapter 2, Purpose and Need

[1140] Duranton, G., Tumer, M.A. (2011) The Fundamental Law of Road Congestion: Evidence From US Cities. American Economic Review.

[1141] NPS PEPC - NPS National Cpital Region Long Range Transportation PlannP.100 Transportation — Fort Meade Alliance (ftmeadealliance.org) Nonattainment Areas for Criteria Pollutants (Green Book) I US EPA

traffic from the major roadways between Washington DC and Baltimore, communities in between will benefit as there will be fewer passing cars who leave nothing in your communities save for emissions, noise, and congestion. There is no other proposed project in Maryland with the ability to take that many cars off of our region's roadways.

As Plan2040 Goals Built Environment 10 and 15 seek to have more multimodal travel that is safe, environmentally friendly, and can reduce growing congestion, the Project is entirely consistent with the County's aims. Moreover, Plan2040 notes that Anne Arundel County wants to be in line with the Maryland Healthy Air Act (P. 159) and 2016 Greenhouse Gas Reduction Act which seek to limit C02 and increase renewable energy. With the Project taking more than 1 1 million cars off the road per year and the plan to powering the train with renewable energy we will help achieve the County's ambitious clean air goals transportation and energy, actually achieving two goals in one.

Claim #4: "The cost to use the Baltimore-Washington Maglev System has been estimated to be prohibitive for some, notably low-income populations"

Though it is early to predict exact ticket pricing — as route selection, detailed engineering, permitting, and mitigation methods all need to be finalized — BWRR is looking into innovative ways to make the train accessible to all Marylanders regardless of income. We do know that ticket prices will vary based on a number of factors including destination, expected capacity, day of the week and time of day. A last-minute purchased ticket for a weekday rush-hour business traveler will likely be higher than a ticket bought two weeks in advance for a Saturday afternoon ride, or a commuter that rides every day. We anticipate opportunities to provide specialized pricing to local employers, university students, and government employees. Moreover, and with special relevance to the Anne Arundel County, is the plan to work with airlines to incentivize combined ticketing with trips from BWI to Washington DC and Baltimore.

At this point, we expect ticket prices to target $1 per mile. As a comparison, Acela tickets are $ I .30 per mile[1142] . The claim has often been made against the Project that driving between Washington DC and Baltimore is much cheaper, giving time, of course, no value. However, according to a recent study [10] (February 2021) by the Johns Hopkins University 21st Century Cities Institute on the economic benefits of improving HSR between DC and Baltimore, this might not be true. The study estimated a round-trip car trip, including standard IRS mileage rate of $.58 and a monthly parking permit, coming out to $64. As the DEIS notes, fares may be as low as $27, or a $54 round trip. This means that, instead of spending $64 on a round trip drive which pollutes our air and water with harmful emissions to sit in unbearable traffic for a frip over an hour, for less money you could ride Maglev, emission-free, and in 15 minutes at 311 mph. Higher fares were tested in surveys to determine demand versus cost and ridership not the price that will charged. This survey as other items has been taken out of context in the Resolution workpaper. It should be further noted that the real cost of a MARC ticket (with 2/3 of

[1142] DEIS 4.6-13

[10] Investinf-inn-high—speed-rail-to-washington d.c. to boiost-baltimore-economy.pdf (jhu.edu)

the cost paid for by the Maryland taxpayer) is similar to this level, without the speed and comfort advantages. BWRR would work with the State, employers, airlines, universities and the federal government to devise ways to lower ticket prices for the public, including low-income populations.

Claim #5: "While an environmental impact study is required by law to thoroughly evaluate the environmental effects of the proposed Baltimore-Washington Maglev Project, an independent study of the transportation needs of the Baltimore Washington region, including an assessment of how the region's future needs could be satisfied by other less damaging alternatives, is needed before a project of this magnitude should be considered."

The Northeast Corridor has been studied extensively for high-speed rail (HSR). The first was as a result of Japan instituting high speed rail in 1964. The US passed the "High Speed Rail Act of 1965" to develop HSR in this corridor. Today Japan has had 57 years of high speed rail service. Japan Central Railroad moves 150,000,000 passengers a year on its high speed rail service, with a train every 4 minutes. The average delay for a year is 20 seconds and there has never been a fatality. Their 311 mph SCMAGLEV train and our once an hour Acela frain average 86 mph are not even comparable. 57 years later and many studies later we are still calling for more studies. The Purpose and Need for this Maglev Project was studied in 2016. The statement is posted online at bwmaglev.info.

There have been many regional studies conducted and they are supportive of high speed rail, both directly and indirectly. The Baltimore City Masterplan details the need to preserve right-of way for regional Maglev rail, while the National Capital Planning Commission's Federal Elements Transportation Section voices support for increased regional rail and specifically notes "Expansion of high speed and high capacity passenger rail can help improve inter-city connectivity from the region to other destinations across the eastern United States. Major transportation initiatives within the region range from megaprojects like the Baltimore Washington Superconducting Magnetic Levitation Project" (P.6).

The NEC Future study referred to in the factually incorrect handout utilized at the work session specifically stated that Maglev be studied and treated separately from the NEC Future plan, which focused on improvements to existing infrastructure, not new alignments and technology.

Moreover, over the past decade numerous Amtrak and MARC planning documents have made clear that overcapacity is the major issue in this region of the Northeast Corridor. Put simply, you can't have faster high-speed rail if an increasing number of slow commuter and freight trains share limited track space with Acela. According to the 2010 NEC Infrastructure Master Plan, by 2030 passenger rail between Baltimore and Washington, D.C. could realize capacity utilization higher than 100 percent[i] [1143] while the 2014 NEC Commission added that multiple segments of

[1143] The NEC Master Plan Working Group consisted of FRA, Amtrak, 12 northeast states, and the District of Columbia.
Northeast Corridor Infrastructure Master Plan.

the NEC are experiencing critical infrastructure challenges due to capacity constraints [1144] . On a more regional level, MDOT-MTA expects at least 70 percent of all MARC system stations to be at capacity by 2025 [1145] while also noting that scheduling more trains to meet increasing ridership demands of 2-3% per year is increasingly difficult as the high volume of Amtrak trains prevent the number of MARC trips that can be provided on the NEC [14]. These capacity constraints mean that the number of MARC trips will remain stagnant even as demand for MARC service grows. [1146] This is supported by a February 2021 Johns Hopkins 21st Century Cities Initiative report that found that due to track capacity and rolling stock limitations, the only realistic option to increase express rail speeds between DC and Baltimore would be to cut out local MARC commuter stops. [1147] Thus, by building a new line and dedicated Maglev ROW, we can ensure that intermediary stations — for example, stations in Anne Arundel County— don't have their service cut.

Claim #6: "Areas that will be drastically affected by the Baltimore-Washington Maglev Project in Anne Arundel County includes residential, commercial, and industrial districts, major roadways, and neighborhoods such as Maryland City, Fort George G. Meade, Jessup, Hanover, Harmans, Severn, Linthicum, and Linthicum Heights."

This claim is simply not true. In deep tunnel for over 70% of the whole route, the Project is out of sight and nearly undetectable for nearly the entire route with minimal surface impacts. Where the project is on elevated viaduct, it is entirely next to the Baltimore-Washington Parkway (MD 295). Maryland City and Jessup are on the other side of the Baltimore- Washington Parkway from the proposed alignment that, according to the Fort Meade Alliance, has more than 120,000 daily car trips. A train floating on air will not have a "drastic" impact on a neighborhood on the other side of a four lane highway, with a forested edge and trees in the median, that already is bearing 120,000+ cars per day. Reduced traffic will reduce impacts. With regard to Hannans and Hanover, the project will be in deep tunnel and undetectable. Additionally, concerning Hanover and Stony Run, Anne Arundel Plan2040 specifically notes that the County wants to see more growth and development in Stony Run and northern Anne Arundel County. A BWI station will help power this growth without adding to the already severe traffic problem.

Claim #7: "The potential resource impacts from the proposed Baltimore-Washington Maglev Project include disturbances to historic resources; disturbances to and pollution of the Patuxent River, Little Patuxent River, Anacostia River, and Beaverdam Creek, which are tributaries of the Chesapeake Bay; potential impacts on air quality, geologic resources,

[1144] (34 Northeast Corridor Infrastructure and Operations Advisory Commission. (February 2014). State of the Northeast Corridor Region Transportation System)

[1145] (25 Maryland Department of Transportation, Maryland Transit Administration. MARC Growth and Investment Plan Update 2013 to 2050. Retrieved March 2017 from https://mta.mar yland.gov/sites/default/files/mgip update 2013-09- 13.pdf -14 MDOT VITA MARC Cornerstone Plan P.58)

[1146] SCMAGLEV DEIS P. 2-10

[1147] Investing in High-Speed Rail to Washington D.C. to Boost Baltimore's Economy (Ronald J. Hartman and Mac McComas, Johns Hopkins 21st Century Cities Initiative, February 2021) P.5)

electromagnetic fields and electromagnetic interference; destruction of ecologically significant contiguous forest and forest interior dwelling species (FIDS) habitat; and contamination of the Patapsco and Patuxent aquifers, which are key sources of groundwater in the region."

This claim is a string of misstatements, coupled with assuming that BWRR' s proposed alignment is built, as well as all of the alternates also being built. Only one would be built.

For example, Maglev will be in deep tunnel beneath the Anacostia River, approximately 200 feet below yound level and 75 feet beneath the riverbed. There will no impacts to the Anacostia River at all. With regard to the Patuxent and Little Patuxent Rivers, the Maglev will be in elevated viaduct approximately 110 feet in the air and the pillars supporting the viaduct will not be placed in the water. Moreover, with trainsets not emitting any air or liquid emissions, there will be no pollution to Anne Arundel's rivers. And with regards to Beaverdam Creek, BWRR's preferred Alignment J-03 would entirely avoid sensitive areas of Beaverdam Creek. Any wetlands surrounding the areas or spurs to the Creek would be mitigated. The DEIS succinctly captures these points in Chapter 4, Section 12, Page 22 by noting:

"To minimize bisecting large areas of intact sensitive habitats, Build Alternatives J-01 through J-06 and JI-OI through Jl-06 were located as close to existing transportation corridors as possible. In addition, large portions of the SCMAGLEV Project have been designed as guideway tunnels, with 75 to 83 percent of the Build Alternatives located in tunnel. **As a result, habitats and sensitive species associated with the Anacostia River and Patapsco River crossings have been avoided. Additionally, based on agency input, the Project Sponsor revised the location of an ancillary facility to avoid impacts to the federally threatened swamp pink and extensive wetlands in the Harmans area of Anne Arundel County**, as detailed in Section 4.11 Wetlands and Waterways. Although the SCMAGLEV Project would span across or tunnel beneath major waterways and their tributaries to avoid impacts to aquatic and riparian habitats, temporary construction-related instream activities may be necessary, as outlined in Section 4.11 Wetlands and Waterways. **Build Alternatives largely avoid fisheries resources and migration paths associated with major stream systems and/or high-quality Tier Il Waters (Anacostia, Patuxent, and Patapsco Rivers, Beaverdam Creek, Baltimore Harbor and tributaries) by tunneling below or spanning over the systems."**

Impact on air quality is positive, and electromagnetic emissions are 1/10,000th of the amount the World Health Organization would deem an issue. Any forest or tree areas would be replaced with a greater than current amount, so there is, at a minimum no net loss. There is nothing to contaminate the Patapsco or Patuxent aquifers and no evidence anywhere to support this claim.

Inflammatory language is not an engineering study or a fact.

XCII. Appendix - Article Reprint: Vujan, Vukan and Casello, Jeffrey M. "An Evaluation of Maglev Technology and Its Comparison With High-Speed Rail." March 2002. *Transportation Quarterly*.

Source: ResearchGate

Abstract
High-speed rail (HSR) systems have a proven record of efficient services in about a dozen countries. Recently, Magnetic Levitation (Maglev) technology for high-speed ground transportation (HSGT) has been proposed for many intercity and regional lines in Germany, Japan, United States, and other countries. Maglev developers claim that their system can achieve higher speeds, have lower energy consumption and life cycle costs, attract more passengers, and produce less noise and vibration than high-speed rail. This article presents a systematic comparison of the proposed Maglev system, specifically the German Transrapid, and high-speed rail systems.

The analysis reaches the following conclusions on the three most important system characteristics.

1. Recent developments of HSR have reduced the advantage of Maglev in higher speeds, so that the differences in travel times on typical interstation spacings would be small.
2. High-speed rail has a huge advantage over Maglev due to HSR's compatibility with existing rail networks.
3. High-speed rail involves a lower investment cost, while operating costs on Maglev are still uncertain. Energy consumption is estimated to be lower for high-speed rail.

[MCRT Editor's note: Japanese researchers Anki and Kawamiya state that the SCMagLev "constitutes not only an extraordinarily costly but also an abnormally energy-wasting project, consuming in operation between four and five times as much power as the Tokaido Shinkansen" (also know as the Japanese wheel-rail high-speed "Bullet" train.][1148]

All other features, like riding comfort, system image, grade climbing ability, noise, etc., are not significant enough to make one mode superior to the other. Thus, the benefits of high-speed rail strongly outweigh Maglev's small travel time advantage. Based on this conclusion, the soundness and direction of US federal policy of investing in Maglev systems while neglecting high-speed rail and Amtrak is questioned.

[MCRT Editor's note: ". . .the benefits of high-speed rail strongly outweigh SCMaglev's small travel time advantage."

[1148] Harding, R. "Japan's new maglev train line runs headlong into critics." *Financial Times*. October 17, 2017. www.ft.com/content/5d4e600a-9e12-11e7-8b50-0b9f565a23e1. page 2.

Report

Any proposal for an entirely new transportation mode requires a thorough system analysis that must address, among others, the following questions:

1. Is there a demand for the new mode?
2. Is the proposed new mode feasible, and shown to be operationally ready for implementation?
3. What is the current state of existing modes serving this demand?
4. Does the proposed mode as a package of benefits and costs improve upon the current modes?

The purpose of this article is to analyze a proposed new mode of guided high-speed ground transportation (HSGT), Maglev, and evaluate its technical, economic, social and other aspects. The need for high-speed ground transportation modes is discussed in the following section. To provide the relevant background and needed understanding of issues involved in introducing a new mode of transportation, the developments in high-speed ground transportation are presented.

Two sections focus on present status of high-speed rail networks and speeds, and Maglev transportation system development. This leads to the next section with the very important comparison of Maglev with high-speed rail systems, including technical, operational and network/system aspects of these two transportation modes. Lastly, a review of U.S. federal policy with respect to high-speed ground transportation is presented.

This article draws heavily on previous research work evaluating the proposed Baltimore—Washington Maglev System[1149] presented in an unpublished report by this paper's prime author.[1150] This original report led to substantial debate on the viability of Maglev systems.[1151]

High-Speed Ground Transportation - The Increasing Need for HSGT

The need for high-speed ground transportation systems has greatly intensified in recent decades. All industrialized countries have faced two serious transportation problems in urbanized regions and in major intercity corridors. First, highway and street congestion have become a chronic problem, causing longer travel times, economic inefficiencies, and deterioration of the environment and quality of life. Second, congestion problems are occurring at airports, with similar high user and social costs.

Under these worsening transportation conditions, high-speed ground transportation has emerged as a vital concept. HSGT is by far the most efficient means for transporting large

[1149] Maryland Transit Administration (MTA)."The Baltimore Washington Project Description," 2000.
[1150] Vuchic, Vukan R. "The Maglev Transportation Systems and the Baltimore-Washington Proposed Project—An Independent Expert Review," unpublished report, January 2001.
[1151] "Maglev vs. High Speed Rail: The Debate." *The Urban Public Transportation Monitor*. March 20, 2001.

passenger volumes with high-speed, reliability, passenger comfort, and safety. While highway and air traffic consist of thousands of vehicles driven by individual drivers following mostly advisory traffic control devices, high-speed ground transportation is a physically guided system on fully controlled ways with fail-safe electronic signal control. This provides not only an order of magnitude higher safety but also reliable operation even under capacity conditions.

While high performance and environmental compatibility are necessary features of HSGT, the high-speed is critical in determining the optimal role of this mode. Conventional railways operating with maximum speeds of 100 kilometers per hour—km/h— (in the US, with the exception of the Northeast Corridor, maximum speeds are still limited to 125 km/h only) cannot compete with freeway travel in the same corridors. Similarly, because of the speed restrictions on high-speed rail, air travel dominates on distances exceeding 300-400 km. Thus, railways were losing their market, except when highway congestion, restricted parking or other factors made travel by other modes very inconvenient.

The Importance of High-Speed and Its Optimal Values

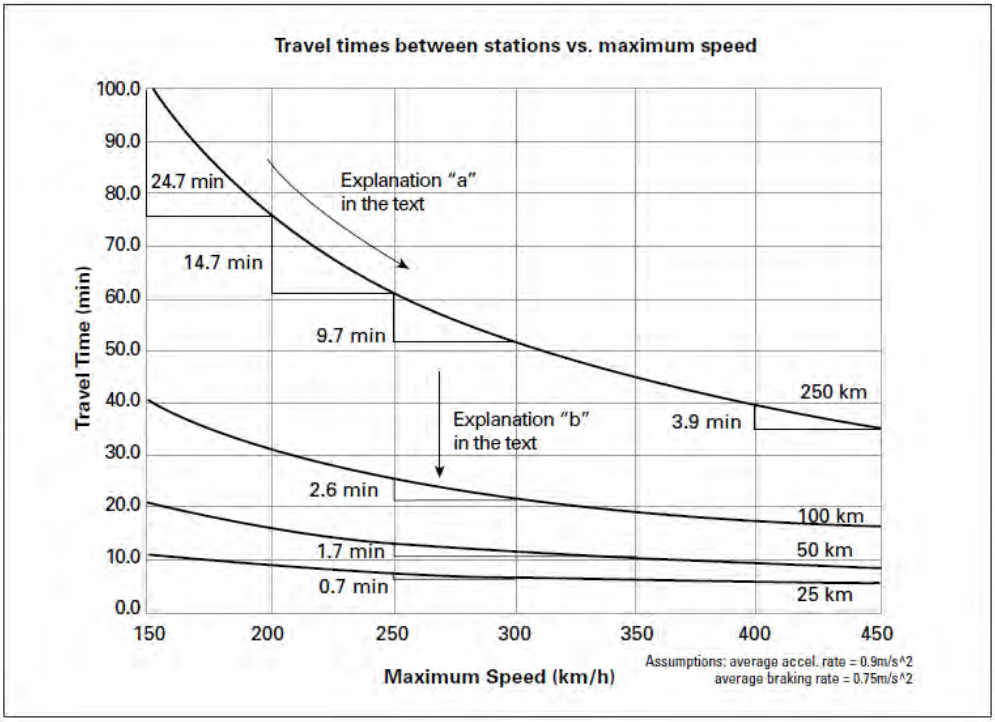
One of the goals in building HSR systems has been to increase the domain in which railway is the superior mode not only in convenience but also in speed or travel time. This goal has been successfully achieved in many locations. The introduction of the first Train a Grande Vitesse (TGV) on a new 417 km long line between Paris and Lyon in 1981, resulted in switching most of the air travel on this link to TGV.[1152] Developers of the German Intercity Express (ICE) set the goal that high-speed rail should offer average travel speed twice higher than the car and half as high as air travel (including the advantage of railway in center city delivery, instead of remote airports). The introduction of an electrified line with Acela trains is expected to divert many trips between Boston and New York from air to Amtrak. Based on these advances of high-speed ground transportation in increasing its optimal domain, it is now considered the range in which it can have a dominant role is between 100 and 1,000 km, depending on the relative speed of high-speed ground transportation and its competitors in a given corridor.

Reducing travel time is critical to its success. However, the limits to which top speeds should be increased deserves careful scrutiny:

a. Increases in maximum speed have decreasing marginal gains in travel time savings. As illustrated in Figure 1, on a 250 km long interstation distance an increase in maximum speed from 150 to 200 km/h reduces travel time by 24.7 minutes; from 200 to 250 km/h saves another 14.7 minutes. A further speed increase from 250 to 300 km/h saves only 9.7 minutes. If maximum speed would be increased from 400 to 450 km/h, the gain would be only 3.9 minutes. This shows that for any given distance, the marginal value of increasing the maximum speed results in decreasing travel time savings. In other words, the speed increase from 200 to 250 km/h is much more effective than an increase (hypothetically) from 400 to 450 km/h.

[1152] Roth, Daniel L. "The TGV System: A Technical, Commercial Financial, and Socio-Economic Renaissance of the Rail Mode." University of Pennsylvania, 1990.

Figure 1: Impact of Increases in Maximum Speed on Travel Times for Different Station-to-Station Distances



b. Travel time reductions due to higher speeds depend very much on the length of run between stations. This is also shown in Figure 1. For example, if maximum speed is increased from 250 to 300 km/h, travel time will be reduced by 9.7 minutes on a 250 km long run; the same speed increase would bring only a 2.6-minute travel time saving on a 100 km long run, and a negligible saving of 1.7 minutes on a 50 km long run. This shows that the benefits from high speeds are great on long interstation distances but very small or negligible on short distances.

c. Marginal cost of increases in maximum speed (in system design, construction, operating costs, etc.) grows more than proportionally with speed. In addition to increased precision required in guideway and vehicle design, energy consumption increases with the speed due to the exponential increase of air resistance.

To summarize, the cost-effectiveness of investments in designing higher speed systems decreases as the maximum speed grows.

These facts show that the optimal domain for high-speed ground transportation systems is on long interstation lengths, such as 100 km. On shorter distances, the gains in travel time are so small that it is difficult to justify the high investment. For example, very important and functional lines between center cities and airports (Frankfurt, Zürich, and London-Heathrow are

outstanding examples) may not be candidates for HSGT (as proposed for Pittsburgh, Baltimore, Munich, and Shanghai), because they require much higher costs and bring very little additional benefit, regardless of technology.

d. It is also important to emphasize that with respect to maximum speed there are two very different concepts:

Maximum experimental speed for any transportation system technology is the speed reached under specially planned and arranged conditions, for which the guideway, power pickup, signals and vehicles are specially equipped; the test is usually done under special operational arrangements, safety precautions, etc.

Maximum operating speed is the speed for which the system has been designed for regular, daily operation under normal conditions. The entire system—its infrastructure, vehicles, controls, reliability, etc., must be designed so that this speed can be operated on a daily basis, withstanding the handling of passengers, reasonable weather variations, and operated by qualified personnel (but not an entire team of specialists supervising and intervening in every minute of system operation).

Maximum experimental speed is very important for evaluation of the system's characteristics and potential for development. However, it is the maximum operating speed that defines actual, achievable performance of the system. The difference between the two is quite large: maximum experimental speed may be as much as 50-80% greater than the maximum operating speed. Consequently, it is very important to distinguish these two speeds, and in comparing different systems, to always compare the two corresponding speeds. Comparing the maximum experimental speed of one system to the maximum operating speed of another system is false and highly misleading.

Developments 0f High-Speed Rail

A brief review of the development of the high-speed rail transportation systems, the only technology currently used for high-speed ground transportation, is given here. Through these years of extensive developments, high-speed rail has been defined as rail systems providing regular services at speeds exceeding 200 km/h.

Developments in Different Countries Since the 1960s

Japan built the first high-speed rail system, and thus initiated the concept of high-speed ground transportation, when it opened the first Shinkansen Line in the Tokaido Corridor (Tokyo-Osaka) in 1964, with cruising (operating) speed of 210 km/h. This Shinkansen Line was later extended to Fukuoka, including a tunnel between the islands of Honshu and Kyushu, with a total length of 1,079 km. The operating speeds have been raised, through improved infrastructure and rolling

stock, to 240, 270 and, finally, 300 km/h. This line carries more than 400,000 passengers per day.

Progress in extending and further improving the Shinkansen is continuous. Shinkansen-type trains, which are somewhat smaller size and lower speeds, have been introduced also on some narrow-gauge lines (1.067 meters); double decker cars have been successfully introduced; new lines are being built; and speeds of 350 km/h are being designed. These lines have a reputation for high reliability, comfort and safety, and have operated for decades without a passenger fatality, despite the extremely high passenger volumes.

France opened its first TGV line between Paris and Lyon, 417 km long, in 1981. The line attracted high ridership from the beginning, including many previous car trips, newly generated trips, and the majority of airline trips on this intercity corridor. Cruising speed on this line has been 270 km/h.

In the following years, TGV Atlantique was built from Paris to the southwest, then to Lille in the north and the Channel Tunnel. Extension from Lyon to Marseilles on the Mediterranean Coast was opened in June 2001, with maximum operating speeds exceeding 330 km/h.

Germany was several years behind France in opening its first high-speed rail line in 1991, ICE, between Hannover and Würzburg with a maximum operating speed of 250 km/h. However, Germany was the leader in upgrading a number of existing rail lines to the speed of 200 km/h, at a much lower investment than new high-speed rail lines require. Although with less publicity, many lines in Germany have been operating at this speed since the 1980s.

Several new lines have been opened or are under construction in Germany, including Mannheim-Stuttgart, Frankfurt-Cologne, Berlin-Hannover, and Berlin-Hamburg.

Italy, Spain, Belgium, Sweden, The Netherlands, Taiwan, Korea, and several other countries have also been active in this field with some lines in operation in the former five countries, and some under construction in the latter two.

The United States has given much less attention to high-speed rail than most of its peers. Similar to Great Britain, the government and Congress consider minimizing operating assistance to intercity passenger railroad services (Amtrak) more important than maximum passenger attraction. The imposed requirement by Congress on Amtrak to achieve economic self-sufficiency by 2003, has forced Amtrak to introduce extremely high fares. These fares prevent attraction of many trips from highways, where no self-sufficiency requirement is imposed.

The first high-speed rail system in the United States, Acela in the Northeast Corridor, has been introduced only recently, in 2000. This progress is, however, only upgrading of an existing line, and that is happening decades after Japan, France, Germany, and other industrialized countries opened their first entirely new high-speed rail lines.

High Speed Rail technology: French TGV train, Paris-Lyon. Source: F. Dechamps.

Amtrak's Acela is the first high speed rail system introduced in the United States. Source: Amtrak.

Present Status of HSR Networks and Speeds

In summary, high-speed rail lines have been operating for 38 years with excellent efficiency and safety. Initially opened as individual lines, HSR has grown since the 1980s into networks with more than 1,000 km in Japan and a European system with integrated lines between France (with the Channel Tunnel to Great Britain), Switzerland, Germany, and Belgium. With many lines under construction, high-speed rail will in a few years also connect Sweden, Denmark, The Netherlands, Italy, and Spain. They have been remarkably successful in attracting passengers and improving economic efficiency. Basic compatibility of all these rail systems is a fundamental feature for construction of this integrated international network of high-speed ground transportation lines.

As noted above, maximum operating speed is the most important element of high-speed rail, and its phenomenal progress in the world's most developed systems requires some elaboration. Test runs during the 1960s and 1970s gradually increased maximum experimental speeds from 250 to 350 km/h. A major breakthrough happened in Germany in 1988, when an ICE test train achieved 406 km/h. This was followed by another leap in the speed record in 1991, when on an experimental run, a TGV train established the record speed for rail systems of 515 km/h! Maximum operating speeds, achieved by hundreds of trains daily in several countries, are now in the range of 250 and 300 km/h, with the French TGV system recently achieving an average speed of 317 km/h on a 1,000 km run.

Maglev Transportation System Development

Since the 1960s, more than 100 new guided transportation systems have been proposed as concepts, and several dozens of them have been physically developed and tested. As in every research and development process, many of these concepts were unrealistic and infeasible, but a few have progressed to full development and successful implementation. Examples are the

ALWEG Monorail (Seattle, Tokyo, and several other Japanese cities), Westinghouse C-100 People Mover (in many airports, Downtown Miami), MATRA's VAL system (Lille, Toulouse, Chicago O'Hare Airport), UTDC's Skytrain (Vancouver, Toronto— utilizing Linear Induction Motors— LIM, similar to Maglev systems), and several others.

Magnetic Levitation (the Maglev transportation system) is another new technology for guided transportation systems with strong public appeal because of its unique feature: the vehicles are supported as well as propelled by magnetic forces, so that there is no physical contact between wheels and guideway surfaces. A brief history of Maglev developments is presented here.

Maglev for Urban Transportation

Research and development of Maglev transportation systems started in Germany around 1970, and it produced two systems: an urban transit system, Transurban, and an intercity high-speed system, Transrapid. The Transurban system was believed to be ready for application and the government of Ontario contracted its manufacturer in 1973 to build a line in Toronto. However, after construction had started, the system faced technical problems in test operations, including difficulties with vehicles negotiating curves. The specifications of the system could not be achieved, and the project was cancelled.

[MCRT Editor's note: "The specifications of the system could not be achieved, and the project was cancelled." But not until taxpayer dollars were expended and lost.]

Another version of an urban transit system utilizing Maglev technology was more successful. The M-Bahn system, also developed in Germany, was built and successfully operated on two short lines, in Berlin and in the airport of Birmingham, England. Both systems were later dismantled for nontechnical reasons.

[MCRT Editor's note: "Both systems were later dismantled for nontechnical reasons." But again, not until taxpayer dollars were expended and lost.]

Intercity Maglev Developments in Germany and Japan

Transrapid development proceeded because Maglev operating features are more effective when applied to high-speed than to low- and moderate-speed transportation systems. Strongly encouraged and financially supported by the German government, Maglev has been researched and developed through a succession of models, presently reaching the eighth generation— Transrapid 8. A full-scale, 30 km long oval test track has been built in Emsland, Germany, where thousands of train runs have been performed, proving physical feasibility of this new system. It has also reached the maximum speed of 436 km/h on a test run, and it is claimed that the limiting factor was the length of the test track. The test facility has been open to visitors for many years, with thousands of persons having ridden the Transrapid system.

During the last 20 years there have been efforts to implement the Transrapid system. Numerous proposals were made in Germany for various new intercity lines, but the most serious proposal was for a new Berlin-Hamburg line.[1153,1154] The alignment and station locations were selected and the design was prepared in great detail. After eight years of intensive planning, design, and discussions of impacts and costs, a final evaluation was made of the entire project, including a comparison with high-speed rail technology. The project was faced with escalating infrastructure cost estimates, increasing project complexity, decreased ridership projections, and lingering questions regarding the advantages of Maglev technology over HSR systems.[1155,1156]

[MCRT Editor's note: With the Transrapid crash in September 22, 2006[1157] which killed the operator, a crew member, 70 percent of the passengers (23), and injured 11 others, 10 seriously . . .", lingering questions regarding the advantages of Maglev technology over HSR systems, and the other issues noted before, the decision was made in 2011 to end the Maglev project. "The Transrapid originated as one of several competing concepts for new land-based high-speed public transportation developed in Germany. In this competition, the Transrapid primarily competed with the InterCityExpress (ICE), a high-speed rail system based on "traditional" railway technology. The ICE "won" in that it was adopted nationwide in Germany . . ."][1158]

The cancellation of the Berlin-Hamburg project raised various points and a question: this 292 km long line has a length where Maglev could fully utilize its high-speed performance, it connects the two largest German cities with intensive travel, and it can use an alignment without many obstacles. If Maglev is not feasible for that line, is there any potential for it in Germany?[1159] Yet, Maglev promoters called for the allocated DM6.1B (US $3B) federal funds to be used for Transrapid demonstration projects at other locations. Among numerous proposals, two have become "finalists": a 37 km long line in Munich, from the railway station in center city to its recently opened airport, and a 78 km long "Metrorapid" line from Düsseldorf to Dortmund, serving cities in the Ruhr area. The debate about these projects includes diverse views. Promoters expect benefits for the German industry and potential for export; critics challenge the purpose of building Maglev on the lines where its high-speed capabilities bring

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[1153] Raschbichler, Hans Georg. "The Berlin-Hamburg Superspeed Maglev System." ETR—Eisenbahntechnische Rundschau, No. 12, 1998.
[1154] Jäns, Eberhard. "The Superspeed Maglev System from the Operator's Viewpoint," ETR—Eisenbahntechnische Rundschau, No. 12, 1998.
[1155] Rothengatter, Werner. "Beantwortung von Fragen des Ausschusses für Verkehr für die öffentliche Anhörung 'Magnetschwebebahn Berlin—Hamburg.'" ("Answers to Questions of the Transportation Committee for Public Hearings on the Maglev Berlin-Hamburg Project"), 1996.
[1156] Hondius, Harry. "Metrorapid: Prestigeprojekt oder sinnvolle Ergaenzung des SPNV?" Der Nahverkehr 9/2001, pp. 38-42. ("Transrapid for Ruhr: A Prestige Project or Functional Completion of the Regional Transit Network?"), 2001.
[1157] "Lathen train collision." Wikipedia – The Free Encyclopedia. https://en.wikipedia.org/wiki/Lathen_train_collision.
[1158] "Transripid. Wikipedia – The Free Encyclopedia. https://en.wikipedia.org/wiki/Transrapid.
[1159] Ibid.

little advantage over the parallel railway lines at an extremely high investment and uncertain operating costs.

[MCRT Editor's note: ". . . critics challenge the purpose of building Maglev on the lines where its high-speed capabilities bring little advantage over the parallel railway lines at an extremely high investment and uncertain operating costs.]

In addition to these serious technical studies and projects, there has been an intensive publicity campaign aimed at showing Transrapid applications in dozens of corridors around the world. Lists were published identifying 28 corridors in the United States alone, with a total length of 16,311 km as "candidates" for Transrapid. The potential export market was one of the arguments used intensively in Germany to secure government financing for system development and later implementation. Interestingly, a strong argument used by Maglev promoters in the US to get federal funding was that this system would have a strong export potential for US industry.

Research and development of Maglev technology in Japan dates as far back as 1962, but major efforts to develop a high-speed Maglev system began in the 1970s. The technology is somewhat different than the German Transrapid: the Japanese model utilizes superconductivity and the vehicle-guideway design is based on repulsive magnetic forces, while Transrapid uses attracting magnetic forces. The repulsive suspension technique is inefficient at low speeds, so that trains run on rubber tires up to the speed of 100 km/h before becoming magnetically levitated. This dual suspension makes vehicles more complex, but the tests of high-speed running have proven the technological feasibility of the system.[1160,1161] In fact, the Japanese Maglev system, now known as MLX01, holds the world record with an experimental speed of 551 km/h. In testing, two Maglev vehicles met on adjacent guideways while traveling at a relative speed of 1,003 km/h!11[1162]

Extensive planning of a new Tokyo- Osaka line has been underway in recent years. However, no final decision about construction has been reached. There is presently an effort to further develop the Maglev system, including modifications to the guideway, a significant change that will require a multiyear effort of development and testing.

In conclusion, extensive developments and testing of Maglev train technology have been made in Germany and Japan for several decades. Test vehicles have carried passengers on short lines at exhibits and test tracks. Major efforts to construct a line that will utilize this technology have been made for many years at many locations, but only one line has been committed to construction: During spring 2001 Shanghai signed a contract to construct a Transrapid line from

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[1160] JR Central. MLX01—MagLev eXperimental 01: Technical Report, 1996.
10. "Superconducting Maglev Technology on the Threshold of the 21st Century." Technical Report, 1996.
[1161] "Superconducting Maglev Technology on the Threshold of the 21st Century." Technical Report, 1996.
[1162] Railway Technical Research Institute. "History of Maglev R&D." www.rtri.or.jp/re/maglev/html/english/maglev_history_E.html.

the city to the airport. In Germany and Japan there is no line in operation or under construction yet.

[MCRT Editor's note: Japan went on to build a redesigned SCMaglev, which promotors want to bring to the U.S. Germany pulled the plug on their Maglev following years of significant delays and cost overruns, and following the crash in Lathan, Germany on September 22, 2006 which killed 70 percent of the passengers and injured the rest.]

Comparison of Maglev with High-Speed Rail System

Based on the analysis presented above, we can now answer three of the four questions presented in the introduction.

1. Is there demand for Maglev?
Functionally, Maglev represents a high-speed ground transportation system, for which there is an increasing need in many major corridors, as shown above in the high-speed ground transportation section. It is likely that this need will increase in the future.

2. Is Maglev feasible?
Maglev represents new technology: magnetic levitation and linear induction motor (LIM) propulsion. Clearly, to be deployed, a system must be physically and operationally feasible not only under controlled conditions, but also in permanent operation under "real world" conditions. This includes such external factors as public reaction, handling crowded conditions, adverse weather, incidental occurrences of technical defects, short power interruptions, etc. As explained in the above section focusing on Intercity Maglev developments in Germany and Japan, all indications are that this question can be answered positively for both systems, Transrapid and MLX01. The Maglev system can be considered to be technically and operationally feasible.

[MCRT Editor's note: Here, in this report from 2006, the issues of safety, operability under "real world" conditions is noted. Today, in 2021, we are again questioning the safety and crashworthiness of the SCMaglev. FRA Rules of Particular Applicability must be established, and the SCMaglev train and associated systems must be evaluated against these U.S. standards before any consideration of building the SCMaglev moves forward.]

3. What existing modes are available for high-speed ground transportation?
High-speed rail currently serves this demand and has a proven performance record (speed, safety, efficiency, reliability, etc.), and a known cost structure.

4. Is the proposed Maglev transportation system, as a "package" of performance, costs, positive and negative impacts and externalities, better than, or at least comparable to the existing systems which can provide the same type of service?

This question, critical in deciding which mode should be selected for given lines or intercity corridors, is evaluated in a condensed form in the following section. This comparison is extremely important, but has been given little attention or avoided in the proposals for Maglev projects.

Common Errors in Comparing Modes

It is a common phenomenon that a new transportation system, utilizing a new technology or method of operation, is presented to civic and political leaders, and the general public—citing not only innovative features but also many features not unique to that technology. Often, comparisons are presented of a new, perfectly designed system with an existing system, designed many years ago, sometimes worn out from long operation. This kind of "promotional" presentation of new modes and systems has been used for many systems, such as monorails, pneumatic tube trains, GRT (group rapid transit), OBahn, and numerous others, most of which were either physically infeasible, or inferior to existing systems.[1163]

A professional review of the specific differences between the new and existing modes is often performed later, and it obtains much less publicity than the promotional or "marketing" efforts. In most cases such systematic, objective comparisons show that many of the cited "advantages" of the new system were actually not unique to the proposed system: that a newly built system with conventional technology would have many of the same features, while involving lower or no development costs, sometimes having lower operating costs, and proven maintenance procedures.

A rational, unbiased comparison of two technologies, based on a systematic evaluation of their major elements must be made. The two modes must be compared with each other as "packages" of their performance/ costs/impacts. This is a standard methodology for comparison of alternative proposed modes for a specific area or alignment.[1164]

Comparison of HSR and Maglev Systems

The experiences and data about the latest HSR and Maglev systems' performance, as collected from the technical literature, are used for the following summary review of the major characteristics of the two technologies.

Maximum Speeds and Travel Times

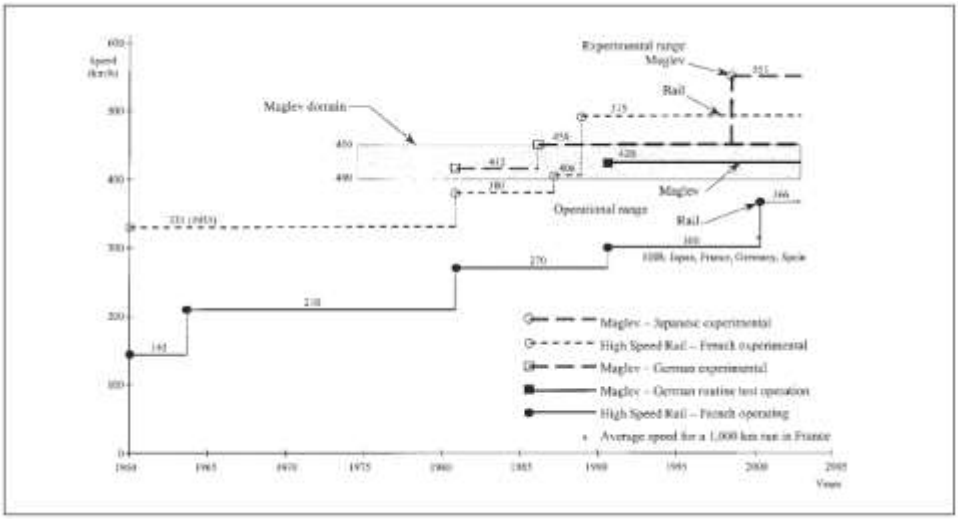
The widespread belief that Maglev would operate at much higher speeds than HSR comes from an incorrect comparison: maximum experimental speeds of Maglev systems are being compared with operating speeds of high-speed rail. As discussed above, these two speeds are

[1163] Vuchic, Vukan R. Urban Public Transportation Systems and Technology. Prentice-Hall, 1981.
[1164] Vuchic, Vukan R. "Comparative Analysis." George E. Gray, and Lester A. Hoel, editors, Public Transportation, Chapter 10, Prentice-Hall, 1992.

drastically different, and the proper comparison can be made only between the corresponding speeds. Thus, the comparison, shown in Figure 2, is as follows.

[MCRT Editor's note: The widespread belief that Maglev would operate at much higher speeds than HSR comes from an **incorrect comparison** [emphasis added]: maximum experimental speeds of Maglev systems are being compared with operating speeds of high-speed rail.]

Figure 2: Maximum Speeds of High-Speed Ground Transportation Modes



The difference between maximum speeds of Maglev and HSR has been drastically reduced in recent years.[1165] The maximum experimental speeds of the two modes are in the same range: for Maglev (Japanese), it is 551 km/h, HSR (France) has achieved 515 km/h, and German Transrapid, 450 km/h.

With respect to operating speed, hundreds of HSR trains operate daily on several lines at the speed of 300 km/h, and an average speed of 317 km/h was achieved on the new Lyon-Marseilles TGV line. Infrastructure for the Madrid-Barcelona line is being designed for maximum speeds of 350 km/h, and top speeds on TGV have now reached 366 km/h. Since there is no operating Maglev line, a regular operating speed of that system remains to be proven. It would certainly be substantially lower than the experimental speeds. Therefore, assumed operating speeds on proposed Maglev lines are hypothetical, not more realistic than assuming the same speed for a high-speed rail system.

If we assume, however, that Maglev achieves in operation 420 km/h, regularly reached in Transrapid test operations, the impact of this higher speed than high-speed rail has on travel times on most interstation spacings would be small. As the diagram in Figure 1 shows,

[1165] Eastham, Tony R. "A Re-evaluation of Maglev for High-Speed Ground Transportation." Fourth International Conference on Unconventional Electromechanical and Electrical Systems. St. Petersburg, Russia, June 21-24, 1999.

increasing the maximum speed from 350 km/h (HSR) to 420 km/h on a 100 km run results in travel time savings of approximately one (1) minute.

Initial acceleration rates of high-speed rail and Transrapid are comparable, because they are limited by passenger comfort. Transrapid has a higher acceleration rate than HSR in higher speed domains, which gives it an advantage on long interstation spacings. Yet, in most cases this results in a small percentage reduction in travel time. Maglev promoters correctly claim that Transrapid can travel faster through curves with limited radii and negotiate gradients of up to 10%, while high-speed rail is limited to 4%. The fact is, however, that most of these features are irrelevant in actual applications. Excessive guideway superelevations in curves are not acceptable for vehicles which have standing passengers, and it would be hardly practical to design a high-speed ground transportation line with 8- 10% gradient, regardless of technology. Thus, in actual design it becomes obvious that these technological maximum capabilities seldom translate into higher operating speeds. For example, simulation of the proposed Baltimore-Washington Transrapid line shows that it would have an average speed of 183 km/h. On a line with similar length, the Japanese Shinkansen travels at 209 km/h.

Consequently, Transrapid still has higher maximum speed and acceleration in highspeed ranges than high-speed rail, but its advantage in travel times over typical interstation spacings would be quite small. Even on spacings of 100 km, the difference would be about one (1) minute.

Intermodal Compatibility and Network Aspects

Maglev's switches are much more complex than rail switches. Therefore, Maglev is less capable of serving different branches or interconnected networks. The Maglev system is primarily conceived as a mode to serve long distance travel by a single shuttle-type line, rather than a connected network.

[MCRT Editor's Note: Maglev's switches are much more complex than rail switches. Therefore, Maglev is **less capable of serving different branches or interconnected networks**. The Maglev system is primarily conceived as a mode to serve long distance travel by a single shuttle-type line, **rather than a connected network**].

High-speed rail, with its simple switches and extensive existing networks, is designed and operated as a transportation network, with benefits to both the operator and the passenger. With the exception of the Japanese Shinkansen lines, all other high-speed rail lines, although designed to different standards for high-speed operation, allow their trains to extend their running to existing rail facilities. This results in great benefits from lower construction costs (joint use of tracks, yards, maintenance and other facilities and entire sections of lines), shorter implementation times, fewer environmental impacts, lower external costs, and reduced local opposition to construction. While building new sections for high-speed operations, providing connections to existing lines extends the reach of the high-speed rail network, allowing high-speed trains to be routed to cities not directly on new lines. For example, ICE trains in Germany

go from the new high-speed line between Hannover-Würzburg to Hamburg, Frankfurt and other cities at speeds of 200 km/h or less. Similarly, Amtrak's Acela trains could operate to Harrisburg at speeds which that line allows. This network integration ability results not only in great convenience to passengers, but also reduces the need for transfers, which can often offset the travel time gains achieved by high-speed rail.

[MCRT Editor's note: . . . allow their trains to extend their running to existing rail facilities. [Resulting in] lower construction costs (joint use of tracks, yards, maintenance and other facilities and entire sections of lines), shorter implementation times, fewer environmental impacts, lower external costs, and reduced local opposition to construction. . . building new sections for high-speed operations, providing connections to existing lines extends the reach of the high-speed rail network, allowing high-speed trains to be routed to cities not directly on new lines.]

Thus, the intermodal compatibility and network aspects of high-speed rail make it superior to the Maglev system.

Investment Costs, Operating Costs, and Energy Consumption

Guideway and station construction costs depend very much on the alignment, primarily whether the guideway is constructed at grade, aerially or in tunnel. Maglev requires entirely separate rights-of-way, special facilities that are incompatible with existing systems. This results in substantially higher investments in terminal areas, particularly in tunnels, due to its larger profile. For any given alignment, estimates in the USDOT[1166] report indicate that Maglev would have somewhat (10-20%) higher costs than high-speed rail. Subsequent estimates for the seven US demonstration projects and several German proposals show a much greater cost difference, with Maglev expenditures about two times greater than those for high-speed rail. In addition, HSR can use existing tracks for some short sections, particularly in downtown areas, where construction costs are highest. Consequently, with respect to investment costs HSR is significantly superior to Maglev in the same corridor and on a comparable alignment.

[MCRT Editor's note: . . . HSR can use existing tracks for some short sections, particularly in downtown areas, where construction costs are highest. Consequently, with respect to investment costs HSR is significantly superior to Maglev in the same corridor and on a comparable alignment.]

Maintenance costs are sometimes claimed to be lower (or even nonexistent) for Maglev, but this seems to be an unrealistic assumption. Maglev has a significant advantage due to its lack of physical contact with the guideway, but any change in highly precise alignment would require extremely costly repairs. Moreover, very complex electronic instrumentation on the guideway and on trains requires very sophisticated maintenance. Estimated maintenance costs per

[1166] USDOT. High-Speed Ground Transportation for America. USDOT, Federal Railroad Administration, September 1997.

kilometer figures for the seven proposed Maglev projects in the US vary among themselves by as much as a factor of 10.[1167] More information on this item is needed from suitable demonstration projects to make a valid comparison of the two modes.

Maglev does not have wheel resistance as rail vehicles do, but its magnetic levitation requires continuous energy consumption, which may be greater than the energy required to overcome wheel rolling resistance.

> *MCRT note:* One report from Japan finds the SCMaglev can use up to ***five-times*** the energy when compared to high-speed rail.

Another factor in energy consumption is the use of the linear induction motor (LIM), which uses more energy than the rotating electric motor. It has been observed that systems utilizing LIM, such as the Vancouver Skytrain and the Toronto Scarborough line, use between **20** and **30**% more energy for traction than similar rail vehicles with conventional rotating electric motors (in this comparison both types of vehicles are on wheels, so that levitation has no influence on energy consumption).

For all these reasons Transrapid is likely to have substantially higher energy consumption per square meter of vehicle floor area than the latest German high-speed rail train, ICE-3. An analysis by Hanstein[1168,1169] has shown that when correct comparisons between Transrapid and ICE-3 are made, i.e., consumption per square meter of car floor, the former shows higher energy consumption. Jäns[1170] data confirm this. In conclusion, high-speed rail consumes less energy than Maglev per comparable unit of train capacity.

[MCRT Editor's note: high-speed rail consumes less energy than Maglev per comparable unit of train capacity is also reported in Harding, R.[1171]]

Riding Comfort

Extremely high comfort—smooth ride and low internal noise—have been amply demonstrated on most of the existing high-speed rail systems, including the Japanese Shinkansen, French TGV and German ICE systems. Visitors driven on the Transrapid and, particularly, on the Japanese

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[1167] See as examples: USDOT, Federal Railroad Administration, "California Maglev Deployment Project, Project Description," and "Atlanta-Chattanooga Maglev Deployment Study," June 2000.
[1168] Hanstein, Richard. "Is There Anything Maglevs Can Do Better than Railways?" http://home.tonline.de/home/rsdhanstein/rh_2eng.htm, March 10, 1999.
[1169] Wissenschaftlicher Beirat beim Bundesminister für Verkehr. "Anmerkungen zum Betreiber und Finanzierungskonzept der Magnetbahn Transrapid," Internationales Verkehrswesen 46, 1994. ("Comments about Organizational and Financing Concepts for Transrapid.")
[1170] Jäns, Eberhard. "The Superspeed Maglev System from the Operator's Viewpoint," ETR—Eisenbahntechnische Rundschau, No. 12, 1998.
[1171] Harding, R. "Japan's new maglev train line runs headlong into critics." Financial Times. October 17, 2017. www.ft.com/content/5d4e600a-9e12-11e7-8b50-0b9f565a23e1.

test Maglev [SCMaglev] train, have often experienced considerable vibrations and noise levels. Thus, high-speed-rail still has an advantage over Maglev with respect to riding comfort.

System Image and Passenger Attraction

It is argued that a demonstration line of Transrapid is needed to test and evaluate public acceptance of this new mode, vehicle levitation and high-speed travel. Actually, the greatest innovation among these elements is high-speed travel, for which the public has already demonstrated acceptance with the introduction of Shinkansen and TGV, primarily because of large time savings. Innovative technical features, such as welded rails offering smoother ride and lower rolling resistance and high-speed rail switches, while significant for improved system performance, did not have a direct influence on passenger attraction.

[MCRT Editor's Note: Between Baltimore and D.C. Amtrak and MARC are already running on smother and quieter welded high-speed rail.]

It is likely that the shape and levitation of Transrapid trains [and by extension SCMaglev trains] would have very good public appeal. High-speed rail systems, however, now also have a drastically different form and look than conventional railways had only 25 years ago, and new body designs are continuously being developed. It is therefore difficult to find any major difference between the appearances of the two modes. The long-term impact of these exotic features, however, is likely to be limited, as has been demonstrated by monorails. Since the demonstration projects of the 1950s and 1960s, monorails have been called the "system of the future." However, monorails are used only where exotic novelty is more important than passenger service and operating efficiency: Disney World, Las Vegas, and similar other locations. It should be noted that incompatibility of monorails with other modes is one of their major shortcomings.

It can be said that Transrapid would initially have an advantage over HSR with respect to public appeal; on the other hand, rail systems are known to draw a great public appeal with their rail technology and network operations with interline schedules, etc., which Transrapid would not have. The passenger attraction would depend on the speed, comfort and integration with other modes, not differences in vehicle support and propulsion method.

It is not likely that either high-speed rail or Maglev would have a significant advantage over the other in system image and passenger attraction.

Impacts on Surroundings

Indications are that Maglev, not having physical contact with guideway, has lower noise[1172] and vibration along the line than high-speed rail. Rail lines have an advantage in their greater ability to utilize at grade tracks in urbanized areas. In high-density areas both modes must use tunnels.

Conclusions

The preceding comparisons of Maglev and HSR systems features are summarized in Table 1. Their review shows the following differences in the three most important features:

1. **Travel time:**
Maglev, despite higher top speeds and greater acceleration, has little travel time advantage in real-world applications.

2. **Intermodal compatibility:**
High-speed rail has an extremely significant advantage in its compatibility with other transportation systems and with built-up areas.

3. **Cost structure:**
High-speed rail is less expensive to construct, has a known operating cost level, and has an advantage in energy consumption.

The remaining features, such as riding comfort, system image, impacts on surroundings, as well as grade climbing capability, are of much lesser importance (and differences between the two systems are not major), so that they would not have a significant influence on mode selection.

The conclusion of this comparison is that the advantages of Maglev over high-speed rail are few and they are very small. They are far outweighed by the advantages of HSR, particularly in system network and compatibility characteristics and investment cost. The limitation on networking and incompatibility with other transportation systems makes Maglev extremely inconvenient for integration in intermodal systems, which actually represent the "transportation system of the future."

[MCRT Editor's note: . . . the advantages of Maglev over high-speed rail are few and they are very small. They are far outweighed by the advantages of HSR, particularly in system network and compatibility characteristics and investment cost. **The limitation on networking and incompatibility with other transportation systems makes Maglev extremely inconvenient for integration in intermodal systems** which actually represent the "transportation system of the future."]

[1172] Ibid.

Table 1: Comparison of Maglev and HSR Technologies in Critical Systems Characteristics

SYSTEM FEATURES	MAGLEV	HSR
a. Travel time factors		
• Maximum speeds	420 – 450 km/h (261 - 280 mph)	300 – 350 km/h (186 - 217 mph)
• Acceleration rates	Higher at upper speed range	
b. Intermodal compatibility		
• Network connectivity	None / single lines	Excellent / extensive networks
• Use of existing infrastructure	New and elevated guideways, tunnels and stations needed	New lines combined with existing lines and stations can be used
c. Costs		
• Investment costs[16]	$12 - 55 M / km ($19 - 88 M / mile)	$6 - 25 M / km ($10 - 40 M / mile)
• Operating and maintenance costs	Uncertain	Known
• Energy consumption[17]	Higher than HSR	
d. Additional factors		
• Riding comfort		Superior
• System image / passenger attraction	Excellent, plus initial innovation interest	Excellent / superior network accessibility
• Impacts on surroundings	Lower noise and vibration	Tracks mostly at grade

Sources: [1173,1174]

Consequently, there is no positive answer to the basic question: "Why build a Maglev system?" While that system has some exotic features, Maglev is not competitive with existing high-speed ground transportation systems, i.e., high-speed rail. The usually implied superiority of Maglev over high-speed rail, and its aura as a "system of the future," are based on an artificially created image of superiority in speed, lower energy consumption and better passenger attraction, none of which is supported by facts at this time.

[MCRT Editor's note: . . . implied superiority of Maglev over high-speed rail, and its aura as a "system of the future," ***are based on an artificially created image*** of superiority in speed,

[1173] See as examples: USDOT, Federal Railroad Administration, "California Maglev Deployment Project, Project Description," and "Atlanta-Chattanooga Maglev Deployment Study," June 2000.
[1174] Hanstein, Richard. "Is There Anything Maglevs Can Do Better than Railways?" http://home.tonline.de/home/rsdhanstein/rh_2eng.htm, March 10, 1999.

lower energy consumption and better passenger attraction,
none of ***which is supported by facts***.]

Comments on Federal Policy and Actions

There is a large difference between the evaluation of the technology presented above, and the results of federally conducted studies. The FRA [Federal Railroad Administration] report, High-Speed Ground Transportation for America[1175], presents a conceptual comparative analysis of three possible systems for the Northeast Corridor: Accelerail (high-speed trains on upgraded railroad lines), high-speed rail with mostly new alignments, and Maglev. This analysis, reproduced here as Table 2, correctly shows that high-speed rail has an advantage over Maglev in its ability to use existing rail lines (where desirable), and that it has "service-proven technology and cost structure."

Table 2: Selected Inherent Advantages of HSGT Technological Options

Selected Characteristics	Advantages of technologies with respect to each other (+ means the technology has an apparent inherent advantage)		
	Accelerail	New HSR	Maglev
Trip-time and revenue performance		+	+
Initial cost	+		
Autonomy from existing railroads		+	+
Through train potential over other railroads	+	+	
Service-proven technology and cost structure	+	+	

Source: [1176]

However, being politically mandated to justify Maglev as a "solution," the report deceptively compares the speeds of the two technologies. For HSR, current operational speeds are set at 200 mph, while Maglev is evaluated at 300 mph, a speed even greater than Transrapid's experimental speed. The report merely mentions in a footnote that "French National Railways have successfully tested [HSR] at speeds well in excess of 200 mph." This unrealistic speed difference leads to passenger travel times computations that give Maglev an advantage over high-speed rail. Thus, the conclusion of that report that Maglev has a higher benefit/cost ratio than HSR is based on confused concepts and incorrect assumptions.

[1175] USDOT. High-Speed Ground Transportation for America. USDOT, Federal Railroad Administration, September 1997.
[1176] Ibid

[MCRT Editor's note: . . . the report deceptively compares HSR at current operational speed of 200 mph, versus Maglev experimental speed at 300 mph.]

The fact that the high-speed rail has a "service proven cost structure," while the costs of Maglev are subject to many hypothetical assumptions further undermines the report's conclusion that Maglev would have a "higher benefit-cost ratio" than high-speed rail in the Northeast Corridor. Thus, distorted facts about operating speeds and cost comparisons with drastically different reliabilities are used to satisfy the political mandate that Maglev should be proclaimed "superior" to the existing modes—Accelerail and high-speed rail.

The entire US Federal Maglev Program follows the same pattern that has taken place in Japan and in Germany in the last couple of decades: it is a program promoted by technology suppliers, rather than by transportation operating agencies or in response to public needs.[1177] Actually, there is neither an interest by operators, nor is there proof that the public would benefit more from Maglev than from other transportation systems. In spite of the claims of great significance of this system for industry, engineering research and development, as well as attraction of passengers exceeding that of any other mode, there have been few concrete proposals to finance these systems by private investors. All efforts on Maglev projects, in Japan, Germany, and the USA, are aimed at getting large amounts of public funds and only limited private participation.

[MCRT Editor's note: Again, building and operating the SCMaglev will likely require large quantities of tax dollars far better used to repair, maintain and enhance existing transportation systems, which serve a far broader demographic range of people than the high-cost SCMaglev would serve.]

The proposed Maglev Demonstration projects in the USA (Baltimore-Washington and Pittsburgh), in Germany (Munich and Ruhr), as well as the line under construction in Shanghai, are such short lines, that it will not be possible to test and demonstrate Maglev capabilities on them (high-speed, reliability, operating costs, and others). A longer line with considerable passenger potential which is not served by a railway at present, such as Las Vegas-Los Angeles, would be a much more appropriate demonstration project.

The strong and persistent promotion and political support for this mode can be explained by the lobbying aimed at the general public and politicians who are laymen with respect to transportation systems technology. Again, the same pattern exists in all the countries: Maglev is promoted on a political basis, while it is strongly disputed by many professionals such as engineers and economists.

[1177] Rothengatter, Werner. "Beantwortung von Fragen des Ausschusses für Verkehr für die öffentliche Anhörung 'Magnetschwebebahn Berlin—Hamburg.'" ("Answers to Questions of the Transportation Committee for Public Hearings on the Maglev Berlin-Hamburg Project"), 1996.

Most Maglev reports, in Germany and USA, include only superficial comparisons with high-speed rail, and those comparisons are largely deceptive: Maglev is compared with existing or upgraded railroads, rather than with new high-speed rail systems which would be the closest alternative to the proposed Maglev. Further, most benefits listed in support of the Maglev, such as the need for high-capacity, high-speed systems, reduction of highway congestion, environmental benefits, and others, are actually those valid for any high-speed ground transportation: they are technology-neutral. The fact that most of these benefits could be achieved by high-speed rail also, is not mentioned.

[MCRT Editor's note: ". . . . Maglev reports . . . include only superficial comparisons with high-speed rail, and those comparisons are largely deceptive: Maglev is compared with existing or upgraded railroads, rather than with new high-speed rail systems which would be the closest alternative . . . benefits listed in support of the Maglev, such as the need for high-capacity, high-speed systems, reduction of highway congestion, environmental benefits, and others, are actually those **valid for any high-speed ground transportation** they are technology-neutral. The fact that **most of these benefits could be achieved by high-speed rail also, is not mentioned.**" This is what The Northeast Maglev (TNEM) and the Baltimore-Washington Rapid Rail (BWRR) are doing now in promoting building the SCMaglev.]

While both the German and Japanese Maglev system feasibility has been demonstrated, neither superiority nor equivalence of this technology with high-speed rail has been proven. Disadvantages of Maglev in comparison with high-speed rail strongly outweigh their advantages.

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Source: Vujan, Vukan and Casello, Jeffrey M. "An Evaluation of Maglev Technology and Its Comparison With High Speed Rail." March 2002. *Transportation Quarterly*, Vol. 56, No. 2, Spring 2002 (33–49). ©2002 Eno Transportation Foundation, Inc., Washington, DC. www.researchgate.net/publication/297471032_An_Evaluation_of_Maglev_Technology_and_Its_Comparison_With_High_Speed_Rail.

XCIII. Appendix – Article Reprint: Womer, Dan. "SCMagLev – A Short History of MagLev Development and its Potential Future." November 8, 2017.

An informative presentation by Jesse Powell, PhD on the history and development of magnetic levitation was produced by the Department of Energy (DOE) Brookhaven National Laboratory (BNL). This 50-minute presentation was given and recorded at BNL to celebrate 50 years of research and development of magnetic levitation, and the ground-breaking contributions made by BNL scientists Powell and Danby. This presentation covers the period of 1959 to the date of the presentation in 2016, discusses how magnetic levitation as a propulsion system works with

the use of low temperature (4 degrees above absolute zero achieved with the use of liquid helium) superconductors, null-flux loops, the magnetic pull-push to propel the train down the raceway referred to as the Linear Synchronous Motor, and the potential future of magnetic levitation transportation in the US. An important fact to note, the science and technology for MagLev and SCMagLev, employed by Germany and Japan, was developed by Doctors Powell and Danby at BNL, and presented with their breakthrough paper in 1966. The link to the presentation is: www.bnl.gov/video/index.php?v=514.

A short history of MagLev Research and Development

Stuck in traffic for 5 hours on the Throgs Neck Bridge on his way to Boston see his girlfriend in 1959, young Brookhaven National Laboratory (BNL) scientist Doctor James Powell started thinking about a faster way to travel. What about using super conductive magnetic levitation, he thought. When he got back to BNL, the young MIT graduate talked his idea over with fellow BNL scientist Doctor Gordon Danby, and together they started to investigate magnetic levitation as a form of transportation. Starting with some of the earlier investigations by American rocket scientist Robert Goddard, and French inventor Emile Bachelet, BNL scientists Powell and Danby dove into their research.

Some Early Work on Magnetic Levitation Transportation

In 1904, the famed American rocket scientist Robert Goddard, while still a college freshman, made the first known breakthrough conceptualizing maglev. In a paper, he proposed a frictionless form of travel by raising train cars off the rails by electromagnetic repulsion roadbeds. The trains would travel at fantastic speeds inside a steel vacuum tube.

In 1910, French-born orphan, inventor and engineer Emile Bachelet applied for a patent on a rail car which for purposes of levitation would use alternating-current electromagnets, and for purposes of propulsion would use solenoids at intervals along a road-bed. In March 1912, Bachelet was granted a patent on the magnetic levitating train system. Carefully arranged magnets would pull and push against each other to thrust the train cars—or at least Bachelet's model—at more than 300 miles per hour. Among Bachelet's supporters were American financier John Jacob Astor, and Great Britain's Winston Churchill.

In 1935, German engineer Hermann Klemper demonstrated that levitation must be achievable with economical power output.

Powell and Danby Enter the MagLev Research

In 1966, following several years of work, BNL scientists Powell and Danby presented a paper on magnetic levitation transportation at the American Society of Mechanical Engineers (ASME) Conference in New York City. Realizing that permanent magnets and electromagnets of the day, as employed by Goddard and Bachelet, would not produce the forces or stability needed to

make magnetic levitation transportation a reality, Powell and Danby experimented with super conducting magnetic devices. Their paper received a lot of attention. Many calls came in. Two counties especially interested in their work were Germany and Japan, both wanting to know more. In 1969, the US granted a patent for their design. In 1971, Powell and Danby presented a paper “The Linear Synchronous Motor and High Speed Transport” at the 6th Intersociety Energy Conversion Eng, Conference in Boston were the revolutionary idea of having the propulsion controlled in the track and not in the vehicle was presented. It is these designs, and their later iterations of these designs, that is incorporated in current MagLev and SCMagLev rail systems.

In 1972, the Germans conceived and began pursuing an experimental maglev vehicle, called Transrapid 02, on the basis of the electromagnetic (attractive) system. By 1979, visitors to Germany's Transportation Exposition in Hamburg could ride on a 36-ton Transrapid maglev train over a very short half-mile test track.

By 1988, Germany had 6-mile straight test track in Lathen, the Transrapid 06 achieved a speed of 250 miles per hour. Much testing has been done. The latest version of the Transrapid, the TR07, has accumulated over 60,000 miles in operational experience at its 19-mile-long, bone-shaped, test track in Emsland, Germany. It is by far, the most tested maglev system in the world. However, the non-superconductive magnetic levitation design and technology employed limits this system currently to pretty much passenger trains, as it does not have the levitation capacity to left and move much heavier freight. Passenger transportation systems generally do not produce the revenues to maintain and operate the system; government subsidies are needed.

Current MagLev

Meanwhile, the Japanese, employing the research and work of BNL scientists Powell and Danby, concentrated primarily on electrodynamic (repulsion) system. This system has a much larger gap between the rail and the maglev vehicle than the German electromagnetic EMS system, up to 7 inches versus 3/8 of an inch, respectively. The Japanese said that the EMS-attractive system gap was too narrow to account for the hilly terrain of Japan, and Japan's occasional earthquakes. As early as December, 1979, Japan's Railway System, which runs its EDS maglev system, ran an unmanned experimental vehicle using this system at a record speed of 310 miles per hour. Successor vehicles, which have concentrated on developing the stability of the vehicles, have geared down the travelling speeds, but have achieved higher accelerations, achieving 7.9 feet/sec2.

One of the important ideas conceptualized by Powell and Danby, to attain the financial revenues needed to operate and maintain this system is its capability to move heavy freight because of the far greater magnetic levitation capability with the use of super conductors. With high-speed interstate freight movement, in time, the system has the potential to generate the revenues needed to cover the operation and maintenance costs, as well as funding needed to expand the system. While SCMagLev would need subsidies to build, start-up and begin operations, once long-haul freight transportation can be included, the revenues could meet and

possibly exceed expenses. If, and this is a huge if, this financial model can be realized, SCMagLev could contribute to the regional economies. But, this will take years, and possibly decades to realize. Until then, subsidies, likely large government subsidies will be needed. Note, SCMagLev as proposed by BWRR is being designed for passenger movement. No indication of freight. As with other passenger rail only systems, government subsidies will likely be needed to operate and maintain the system if built.

Recently, Tesla founder Elon Musk has entered into the maglev transportation with his ongoing development of the Hyperloop, which has attained speeds of 200 MPH on its way to 700 MPH. And their plan is to carry passengers and freight. It's an interesting twist that the original work by Goddard in 1904 had his train running in a tunnel, with the air removed, which would allow the train to attain "fantastic speeds." Elon Mush's Hyperloop runs in a lowered air pressure tunnel, to attain high speeds. Looks like Goddard had something and we are coming back around to some of his ideas, over one-hundred years later. For more information on the Hyperloop see the Nextdoor Linthicum postings "Hyperloop – Info on Maryland's Planning to Build Elon Musk's Hyperloop Between Baltimore and DC" and "Hyperloop versus SCMagLev."

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XCIV. Appendix - Reprint: Woomer, Dan. "Is the SCMaglev Safe." CATS-MCRT White Paper. February 6, 2021

By: Dan Woomer
Edited by: Susan McCutchen

The Baltimore-Washington Rapid Rail (BWRR) (the project developer) and the Northeast MagLev (TNEM) (the promotional entity) have the short-term goal of obtaining Federal Railroad Administration (FRA) approval to build a magnetic levitation (maglev) train between Baltimore and Washington, DC, with the long-term goal of extending the train operation to New York City by way of Philadelphia. Japan's Superconducting Magnetic Levitation (SCMagLev) train is the high-speed, ground-based transportation system TNEM is promoting to build in the northeast corridor of the United States.

Information about the SCMagLev and BWRR's plans to build and operate the system have raised many questions and concerns. This is one of a series of articles that identifies and discusses some the many questions and concerns citizens and communities have identified with moving forward in building and operating the SCMagLev.

Abstract

This article identifies and discusses questions and concerns about the structural safety standards being used to assure passenger crash survivability and the impact of the SCMagLev operation on the residents living near the guideways. The trial operation of the SCMagLev on the present 26-mile test track in rural Japan, mostly in tunnels, does not fully validate its ability to function safely and reliably in day-to-day, high-frequency service in the urban and suburban environment of the Baltimore-Washington metropolitan area. The German Maglev accident of September 22, 2006, which killed 23 people after the safety of the system had been certified by the German government, should be a cautionary note as this project is considered.

Questions & Concerns

(1) How do the structural standards of the SCMagLev compare with US Railcar construction and safety standards?

Lathen - German Maglev crash. Photo DPA. 23 May 2008.

- The longitudinal strength of the vehicles is an important safety consideration. No reduction should be allowed, compared with what would be required for a wheeled rail vehicle, and perhaps the strength requirements for the SCMagLev should be stricter.

    - The SCMagLev vehicle will be confined within the sidewalls of the guideway. In any collision with another train, objects in the guideway (including maintenance or inspection vehicles), devices at the end of the line, or a damaged guideway, there is no alternative but for the SCMagLev train itself to absorb energy. Steel-wheeled trains can absorb the energy of the collision by jackknifing sideways. For the SCMagLev, the walls of the guideway would prevent jackknifing.

    - The entire impact of the incident would either be absorbed by the SCMagLev train being crushed and/or by it buckling in a vertical direction. Buckling in a vertical direction has implications of the vehicle going airborne, possibly leaving the guideway.

- Potential accidents involving guideway switches are another reason vehicle strength should not be lowered from those of wheel-rail vehicles.

(2) What is the risk of the SCMagLev becoming airborne?

- According to the material provided at the scoping and informational meetings, there are no physical barriers in the guideway design to keep the magnetically-levitated vehicle from rising out of the guideway. With the guideway sidewalls restricting air flow, hitting an object that would wedge under the front end of the SCMagLev at high speed and lift it higher into the air could subject the underside of the vehicle to tremendous air pressure that could lift the vehicle out of the guideway, especially if the vehicle is designed with much less weight than a steel-wheeled rail vehicle.

- Are there research and safety reports on the risks of the front end of the SCMagLev accidentally being raised slightly and catching air due to malfunctions in the maglev suspension hardware?

(3) The cross-section of the guideway brings up several issues.

This issue includes:

- Snow accumulation is an issue because it cannot simply be shoved to the sides. The sides may trap objects in the guideway such as wind-blown debris. Debris larger than the space between the vehicle and the guideway would be a serious endangerment to the SCMagLev and the passengers.

- What size object can be tolerated in the guideway?

- What if a fence-jumping deer were to get trapped in the guideway just ahead of a train, with the angle of impact causing the animal to be wedged between the side of the vehicle and the guideway?

- What about a suicidal person?

- Another category of hazard is debris thrown onto the guideway, either from an overhead bridge or simply thrown in from the side of the guideway. What damage would a shopping cart cause? Or a bowling ball or an old lawn mower? Experience by both AMTRAK and MARC in the Baltimore-Washington region has shown these are not just theoretical possibilities.

- How are melting snow and stormwater mitigated as to not further pollute the adjacent community streams and waterways?

(4) Where is the research to show the SCMagLev will not cause human health issues resulting from exposure to the intense electromagnetic radiation?

- The intensity of the electromagnetic radiation emitting from the passage of the SCMagLev varies in complicated patterns not previously tested on humans over the long term. As compared with the German MagLev, the SCMagLev generates a higher level of electromagnetic radiation. BWRR indicated in its November 2018 *Final Alternatives Report* that radiation is so severe that people will not be allowed to be closer than 20 feet from the guideway when underneath it. [(4)]

(5) How limited is the forward view from the SCMagLev?

- It appears from the scoping meetings showing the design and operation of the SCMagLev that an employee will be unable to have a clear view of what is in front of the train. The safety of maintenance workers along the guideway, when handling the train in maintenance and staging yards, or in special situations (such as slow orders), would seem to be hampered without a forward view.

(6) The Federal Railroad Administration (FRA) should provide guideway safety standards for this project, including the following.

- Design tolerances for SCMagLev guideways, including speeds allowed in curves and through turnouts (based in part on the lateral forces able to be resisted), as well as safety parameters for the turnout components, including the alignment tolerances of the moving parts.

- Standards regarding the fixation of hardware on the inner vertical surfaces of the SCMagLev guideway. If such fixtures become loose, they could jam between the vehicle and the side of the guideway, with consequences that would likely compromise the integrity of the passenger compartment at high speed, or bring the train to a high G-force stop, with high-heat or even fire generated by the friction involved between the contacting components. The fixation standard issue would also involve the components of the vehicle that interact with the guideway.

(7) Is the SCMagLev leading face designed to deflect debris?

- The lower part of the front-end shape of the SCMagLev shown in the material provided at the scoping and subsequent informational meetings is not designed to deflect material. Further, its tapered, rounded design would make it more likely that debris would become wedged under or on the sides of the vehicle. As noted previously, such debris could result in a dangerous situation for the SCMagLev and its passengers.

(8) How will routine maintenance be coordinated to avoid a collision with maintenance equipment or personnel?

- Guideway maintenance activities will need to take place during operating periods. For example, what if piece of debris is reported and someone goes out to remove it? That person will need to be inside the guideway and unable to quickly step to the side.

- With larger repairs/maintenance, large equipment will be needed. Again, such equipment and operating personnel will be inside the guideway without the ability to move aside.

(9) How will the SCMagLev steer in an emergency slow-down and stop?

- At speeds of 93 miles-per-hour (150 kilometers-per-hour) or less, the SCMagLev moves along the guideway on rubber wheels. These wheels retract as speed builds [(5)]. During an emergency slow-down and stop at any point on the guideway, what is the ability of the steering (sidewall) components of the SCMagLev to keep the vehicle from contacting the sidewall if the wheels on one side accidentally come down at high speed, causing a turning moment in the vehicle?

Findings/Conclusion

There are many serious issues, questions, and concerns about the safety of the SCMagLev operation, both for the passengers and the residents living near and alongside the guideways. This article identifies and explores some of them.

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(4) Submit multiple public comments often at www.bwmaglev.info/index.php/contact-us. State your objection(s), and always end by saying you support the "No Build Alternative."
(4) Learn more about the concerns and impacts the SCMagLev will have on our communities, see: www.stopthistrain.org/.
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About the Author
Daniel E. Woomer is a community activist and technical expert. He retired after a long career that included positions with Westinghouse Defense Center, Johns Hopkins University's Applied Physics Laboratory, and the U.S. Department of Energy (DOE). During his career with the DOE,

he worked in various positions with the Energy Information Administration and the Office of Congressional and Intergovernmental Affairs, and he helped set up the Office of Technology Transitions. He also served for several years as an adjunct faculty member with the University of Maryland University College, where he developed and taught mathematics, supervisory and leadership classes.

Sources

The principal source of information for this article are responses by Louis T Cerny, PE, to FRA notices, including his November 25, 2016, response to a notice in the *Federal Register*. Mr. Cerny has been involved with maglev proposals since the late 1980s, when he served as the executive director of the American Railway Engineering Association. He has continued to study maglev technology as a private consultant and has commented on many maglev proposals. Mr. Cerny was a voting member of FRA committees that developed safety standards for high-speed rail.

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(2) Cerny, Louis. "Response to November 25, 2016 Federal Register Notice regarding Baltimore-Washington Maglev Proposal (SCMAGLEV)" December 10, 2016.
(3) Discussion with Louis Cerny on October 14, 2020.
(4) Baltimore-Washington Rapid Rail. "Interface with Other Infrastructure (Roads/Bridges/Rail Systems/Structures)." *Final Alternatives Report*, p. 42. https://www.bwmaglev.info/images/document_library/reports/alternatives_report/SCMAGLEV_Alts_Report_Body-Append-A-B-C_Nov2018.pdf. November 2018.
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(6) Lathen German Maglev crash photo credit: news@thelocal.de. May 23, 2008. https://www.thelocal.de/20080523/12045.

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Citizens Against the SCMagLev (CATS) is a confederation of scientists, engineers, experts, community organizations and citizens in support of transportation infrastructure improvements that benefit our communities, state, and nation. CATS opposes the construction of an expensive transportation system serving a small minority of the wealthy at the cost of taxpayer funds far better used to maintain and improve the transportation infrastructure needed and used daily by all citizens, businesses, and commerce. For up-to-date information on the SCMagLev opposition, see our Facebook page at: https://www.facebook.com/groups/CitizensAgainstSCMaglev.

XCV. Appendix - Reprint: Woomer, Dan. "Is the SCMaglev Safe (Part 2)." CATS-MCRT White Paper. January 11, 2021

By: Dan Woomer
Edited by: Susan McCutchen

The Baltimore-Washington Rapid Rail (BWRR) (the project developer) and the Northeast MagLev (TNEM) (the promotional entity) have the short-term goal of obtaining Federal Railroad Administration (FRA) approval to build a magnetic levitation (maglev) train between Baltimore and Washington, DC, with the long-term goal of extending the train operation to New York City by way of Philadelphia. Japan's Superconducting Magnetic Levitation (SCMagLev) train is the high-speed, ground-based transportation system TNEM is promoting to build in the northeast corridor of the United States.

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Questions & Concerns

(10) The Federal Railroad Administration (FRA) approval process must first consider safety before deciding whether to allow construction.

- The SCMagLev safety decisions, that is, the "Rule of Particular Applicability" (RPA),[1] should be completed by the FRA before the Final Environmental Impact Statement (FEIS) or any authorization for construction is issued. This ordering of priorities, in addition to being common sense, is supported by the U.S. Department of Transportation (USDOT) report *Pathways to the Future of Transportation* (USDOT, p.3).

- SCMagLev safety is an important issue, as confirmed by the reporting of an accident on the German maglev at Lathen, the location of the Emsland Transrapid Test Facility, on September 22, 2006. This occurred after its safety had been approved by the German government. Twenty-three (70 percent) of the passengers riding the German maglev system at the time of the accident were killed and the rest were injured.

- On December 15, 2016, Louis Cerny, past executive director of the American Railway Engineering Association, submitted commentary to BWRR asking a series of important safety questions. BWRR responded to Mr. Cerny on January 23, 2017. Their reply included the statement: "Issues related to safety will be addressed in the RPA process." This or similar language was the only answer to six of the critical safety questions he raised.

(11) Japanese wheel-rail history is not transferable to SCMagLev experience.

- Successful Japanese safety experience with high-speed wheel-rail trains since 1964 is no more transferable to the SCMagLev technology than was German high-speed wheel-rail (called ICE) technology to its maglev. The Japanese SCMagLev currently operates on a test track and has not yet operated in regular service. Revenue service on the planned line between Tokyo and Nagoya is not expected to begin until 2027 at the earliest, with many questions being raised in Japan about whether that date can be met.

(12) More questions about the safety issues with SCMagLev vehicles.

- Especially worrisome is the lack of information and data on the crashworthiness of the SCMagLev train and its structural ability to protect occupants of the vehicles. The existing FRA vehicle strength standards are in 49CFR, part 238. Regulation 238.703, for instance, requires a basic vehicle compressive strength. There are many additional requirements. As detailed in Mr. Cerny's comments, there are good reasons the required compressive strength for SCMagLev vehicles should be at least as high or even higher than those for Amtrak trains.

- It is a fatal safety flaw in the project if the current SCMagLev technology cannot support the vehicle weight necessary to meet existing vehicle crashworthiness and occupant protection standards. The Japanese, as the Germans before them, appear to be refusing to provide vehicle compressive strengths. It seems that the present course of action is to push for project approval before SCMagLev vehicle and passenger safety regulations are established.

- Kemp and Smith detail the arguments for the need for crashworthiness of maglev vehicles. In referring to the German "Transrapid" maglev, their report states: "The Transrapid policy is that vehicles do not need inherent crashworthiness as they will be

under close computer control and thus will not crash. The Emsland accident reinforces the fact that, even if there are rigorous procedures to prevent an accident, they are never foolproof. The same is true of automatic systems." (Kemp and Smith, 2007, p. 9). The accident at Lathen would seem to blunt or even negate the argument that computer control will ensure safety.

- The SCMagLev is an extremely complex technological way of accomplishing what is achievable by the relative simplicity of steel wheels and rails.

    - Components of the SCMagLev vehicles must be kept at the unimaginably cold temperature of around 450 degrees below zero Fahrenheit. What are the safety consequences if the elements containing the supercooled liquid are ruptured in an incident?

    - The complexity of having to individually extend and retract dozens of wheels prior to and after each station when speeds drop below 93 miles per hour raises many safety issues. For example, what happens if there is a power failure of the system when the SCMagLev is travelling over 300 miles per hour? Will the train drop to the guideway prior to the wheels coming down? What happens when the SCMagLev hits the guideway at 300 miles-per-hour?

- This will be the first time the FRA is being asked to approve a passenger train operation without a human driver (engineer) on each train. What are the guidelines the FRA will implement to review and approve this driverless high-speed train?

(13) What is the electromagnetic radiation danger from the SCMaglev guideway?

- BWRR has stated that there would be a " … need to maintain a minimum distance of 20 feet between the magnets along the guideway and people traversing below." (BWRR, November 2018, p. 42). This is clearly a negative environmental effect on the area below elevated guideways and, therefore, needs to be discussed in the DEIS and as part of the RPA. Is the 20-feet "avoidance zone" sufficient? Note that the electromagnetic radiation levels associated with the operation of the SCMagLev train are much higher than those generated by the German Transrapid maglev.

- BWRR also explains how passengers will walk under the guideway in tunnel sections during emergency tunnel egress (BWRR, November 2018, p. 10; also see Appendix B: Figure B-3). How would the passengers be shielded from the SCMagLev's electromagnetic radiation, considering that the distance below the guideway is less than 20 feet? The same question applies to concourses under the guideway at stations (BWRR, November 2018, Appendix B: Figure B-2).

(14) The Japanese are questioning environmental (including energy consumption) and financial aspects of this technology.

- Japanese researchers Anki and Kawamiya state that the SCMagLev "constitutes not only an extraordinarily costly but also an abnormally energy-wasting project, consuming in operation between four and five times as much power as the Tokaido *shinkansen*" (or the Japanese wheel-rail high-speed train) (cited in Harding, 2017, p. 2).

- The proposed SCMagLev technology is not needed to achieve the purported goals of this project. While it is understood that this project is legislatively limited to the SCMagLev train, this does not mean the environmental effects of satisfying future traffic needs by constructing it outweigh improving existing and soon-to-be-implemented rail-wheel capabilities. Maglev and steel-wheeled systems have similar speed achievements. The record speeds attained by the Japanese SCMagLev and the French intercity high-speed rail service (TGV) are comparable, 375 miles-per-hour for the SCMagLev and 357 miles-per-hour for the TGV. At these speeds, most of the energy used is in overcoming air resistance, which is basically the same for the SCMagLev and steel-wheel systems. Restricting consideration to the SCMagLev goes against the spirit of "technology neutrality" described in *Pathways to the Future of Transportation* (USDOT, July 2020; see the introductory letter from Secretary Chao).

(15) Until it reaches a speed of 93 miles-per-hour, the SCMagLev will be a guided rubber-tire bus. This creates a "new" series of safety issues the FRA must assess.

- The FRA needs to develop safety standards to assess the safety of the SCMagLev during its "rubber-tire" operation as the train ramps up to 93 miles-per-hour and the magnetic levitation takes over. These new standards should include specific hardware specifications. The "bogies" (called "trucks" in normal railroad parlance), which are the two separate parts of each vehicle to which the wheels are attached, are extremely complex. Each of the two bogies on each car of the SCMagLev train has four wheels for support, which need to be (1) retracted after leaving each station and the train reaches the "levitation" speed of 93 miles-per-hour and (2) extended before each station is reached as the train slows down to rubber-tire speed of 93 miles-per-hour and less.

- In the event of a loss of power, the rubber wheels will automatically descend (BWRR, November 2018, p. 36). Thus, according to the report, the rubber-tired wheels must be able to safely handle supporting the vehicle at 311 miles-per-hour, as well as the near-instantaneous speed change of the rubber tire and wheel rim from zero to 311 miles-per-hour. This is a more stringent requirement than for tires during commercial aircraft landings.

(16) How will breakdowns of the SCMagLev while between stations be addressed?

- What happens when an SCMagLev train has a mechanical issue that causes it to be stopped between stations? The highly-complex nature of the bogies makes it likely such incidents would be relatively common. What procedures would be used to retrieve the stranded train? How would the safety of other trains on the line be assured while the non-maglev rescue locomotive hauls the disabled train down the guideway to the maintenance area?

(17) Work requiring presence of employees in the guideway.

- Work requiring the presence of employees in the guideway cannot realistically be confined to non-operating hours. Therefore, similar safety regulations to those applicable for all other rail workers are needed.

- Unexpected occurrences include mechanical breakdown of a train, debris blown by wind into the guideway, structural checks for safety after damage to elevated guideways, and problems with guideway switches. To avoid having to take the entire system out of service for such incidents, switches between guideways at intervals along the line are needed to allow "single-tracking," such as is done on the Washington Metro. For example, what if there is a medical emergency aboard an SCMagLev train while it is in the BWI station? The more hours the SCMagLev system is out of service each day because maintenance is not allowed during operations, the lower its transportation value.

Findings/Conclusion

The serious issues, questions, and concerns about the SCMaglev's impact, safety, and operation, both for the passengers and for the residents living near and alongside the guideways, continue to mount. This article identifies and explores some of them.

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Endnotes:

(1) The “Rule of Particular Applicability” is the process the Federal Railroad Administration goes through for situations where existing safety standards for railroads need to be modified to suit a particular situation. In the case of the SCMagLev, for example, the guideway would need different detail standards than a typical steel-wheeled train’s railroad track.

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XCVI. Appendix - Reprint: Woomer, Dan. “What’s the Biological and Ecological Impact?” CATS-MCRT White Paper. January 11, 2021.

By: Dan Woomer
Edited by: Susan McCutchen

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Abstract

This article explores some of the biological and ecological impacts on Maryland’s and the nation’s environment associated with building and operating the SCMagLev train system.

The SCMagLev proposed alignment (route) runs underground between Baltimore and Washington, except in one location. This is where the train emerges aboveground and includes two elevated guideways, as well as an aboveground industrial trainyard where the trains are cleaned, maintained, repaired, and stored. To function, this trainyard, which would cover approximately 200 acres, must be completely flat and be able to withstand the weight of thousands of tons of equipment without deforming. To understand the industrial nature of this trainyard, refer to the one built in China that is slightly smaller than the one proposed to be located on our public lands. There will be few significant differences between deployment between the two locations; while watching, the reader must ask whether this type of land use is appropriate for public refuge, research, and conservation lands.[1178]

Questions & Concerns

(1) What impact would building the planned SCMagLev trainyard have on our preserved lands?

- A trainyard would normally be built in an industrial zone within a large city where power, housing, and a skilled workforce would be co-located. The trainyard would be sited in a landscape already built to accommodate and minimize the runoff, lighting, pollution, and ecological impacts such intense and industrial land use requires. Siting a trainyard in a preexisting trainyard would properly place it in a landscape that was long-ago compromised ecologically and currently dedicated to human commercial and business needs. In the same fashion, refuges and parks are dedicated to the needs of wildlife, conservation, research, and the human needs for nature, solitude, clean water, clean air, and a place to recharge our own batteries.

- However, the SCMagLev plan sites the train emerging from its underground tunnel to slice through, destroy, and disrupt the last large, ecologically intact green space left in the Prince George County region. When the SCMagLev train parasitically emerges aboveground, it would access a planned 200-acre industrial site, currently located on existing conservation lands. Building these train lines and trainyards also requires upgrading the existing small rural roads to industrial standards, as well as the creation of a new, high-powered, electrical system and associated transmission corridors. All this development would be placed into an existing, large intact landscape of protected forests, wetlands, and fields, the last such area in the region.

- To accomplish this section of the SCMagLev project, BWRR must have this protected public land transferred to their corporation and be given permission from several federal, city, state, and county agencies to build the trainyard. Agencies and municipalities unwilling to transfer this land may have their land taken by BWRR

[1178] Shanghai High-Speed Train Yard. www.youtube.com/watch?v=OKPqHKmpAOE&fbclid=IwAR0nDnM0VxLlfQVQUUJo0rJ-1Y7V0WBOQvuVbQVJ4ptCn6eu2I0IbwCSKsE%29%29%29.

through eminent domain, a power that was granted as part of the train operation license of the defunct Baltimore and Annapolis Train Company that was purchased by BWRR.[1179]

- The protected parklands in questions are public properties, set aside and preserved for the use of the people of the United States, the local communities, and scientific research. None of these lands have ever been transferred to private hands, and never to groups wishing to build an industrial center.

- Such a transfer of lands is problematic. It sets a precedent for future transfers to private hands of projects that could be deemed "in the public good," allowing construction such as upscale homes, shopping centers, sand and gravel operations, and parking lots, on lands that would never recover from the destruction of the natural environment. Transfers like this lean only one way, toward ecological destruction, and never toward preservation or the good of the area's environment.

(2) What are some of the permanent, unrecoverable biological damages building the SCMagLev trainyard would have?

- *The bottom line*: Building a 200-acre trainyard results in absolute, irreversible ecological damage to the land. The landscapes currently targeted for support and maintenance for the SCMagLev trains have been in forest for millennia. They contain plants, such as the White Fringed Orchid, that are globally rare. The Pitch Pine Barrens ecosystem is at its southern terminus and is also globally rare. This landscape of protected government parklands and research centers is large enough to support and retain almost all the biodiversity that was once, but is no longer, found across the Baltimore-Washington region.

- Much of that biodiversity outside this protected area has been lost, or greatly diminished, due to the combinations of housing developments, shopping malls, business centers, roadways and other built-up industrial, transportation, and recreational facilities. That altered landscape can no longer support most species that once lived and thrived in this area and, instead, is composed mostly of the weeds and nonnative species that follow development and invade the remnant natural landscapes.

- Researcher C. K. Khoury, after reviewing all the public lands in the United States, indicated that the Patuxent Research Refuge (PRR) retains the most biodiversity of the wild relatives of our crop plants, one of many examples of both how rich the biodiversity of the area remains and how important it is to keep this repository. He points out that

[1179] "Eminent domain refers to the power of the government to take private property and convert it into public use. The Fifth Amendment provides that the government may only exercise this power if they provide just compensation to the property owners." See: https://www.law.cornell.edu/wex/eminent_domain.

many of these important wild native plants that could be important for our food security are now rare, un- or under-represented in genetic repositories.[1180]

- BWRR's planned removal of the 200-acre preserve for the SCMagLev trainyard is of an intensity and magnitude that would result in the complete destruction of the existing natural preserve and the invasion and corruption of hundreds of nearby acres.

- All three of the proposed trainyards are located at the headwaters of stream systems of both the Potomac and Patuxent Rivers. These stream systems are filled with fragile springs, bogs, fens, and other wetlands. Their loss and the subsequent pollution from the runoff from these trainyards would bring large pulses of silt and industrial-related, chemical-laden water, all pushed downstream. Rain events would punish and degrade all the streams below these sites.

- The creation of these industrial sites requires the removal of all trees, plants, creatures, and topsoil on the site to level the area to accommodate these long trains. Several feet of gravel, sand, and concrete would be placed on top of this flattened landscape to stabilize the roadbed so that it would be able to handle the weight of all the trains and attendant heavy equipment. Factories would be built both to create and repair these trains. Parking lots would be created for the sites' employees. Roadways would need to be built and augmented to handle the weight of industrial vehicles and increased commuter traffic. In addition, new transmission lines and substations would need to be located to handle the high-energy needs for the site.

- The building of this trainyard in the middle of our protected public lands, as with what has occurred at other industrial sites, would create an invasion portal for non-native species—Tree of Heaven, Asian Bittersweet, Privet, Bush honeysuckle, Norway Rats, House Mice, Kudzu, and many more. These invasive plants and animals would infiltrate the surrounding parklands, seriously disrupting the native wildlife in the area, causing outright destruction of the natural hydrology of the springs, and seeping support of the rare plant and animal communities that filter and preserve our drinking water. This development would inject light, noise, vibration, and pollutants on and into our public parklands, repelling the very animals such refuges are specifically designed to protect and study.

(3) What plant and animal communities would be lost?

[1180] Khoury, Colin. K. "Crop wild relatives of the United States require urgent conservation action." 2020. https://www.pnas.org/content/early/2020/12/09/2007029117.

- The planned site for the SCMagLev trainyard is currently a large protected green space where land, plant, insect, and animal studies have been conducted by public, academic, and private researchers for over 100 years. From this century of work, a long list of species have been scientifically described for the first time and named using specimens found in this area. Literally hundreds of publications have been generated from work done on these public lands. (*Note*: Patuxent is the sole research refuge in the entire National Wildlife Refuge system and the U.S. Department of Agriculture's Beltsville Agricultural Research Center [BARC] is the largest agriculture research station in the world). This region is one of the biologically best-documented sites in the world.

    - The Patuxent Research Refuge has the largest species list of dragonflies and damselflies of any national wildlife refuge or national park in the United States—approximately 112 species. It contains more known species of bees than any other national wildlife refuge in the United States—approximately 221 species, with more new ones found each year. This refuge has what are likely complete, or nearly so, lists of all the plants, mammals, snakes, fish, amphibians, and birds that inhabit the many types of intertwined streams, wetlands, plant communities, and rivers.

- Building the SCMagLev trainyard on the proposed site would destroy these species' habitat, effectively destroying the existing diverse nature living therein. Once built, these lands could never be recovered and the losses could never be mitigated or recreated elsewhere. These current protected areas act as a unit, a compete landscape. They function and exist in connection and relationship with each other, allowing plants and animals to migrate and reestablish populations sequentially across the region as local ecological circumstances change. Destruction of this system with the building of the SCMagLev trainyard and maintenance facilities, would kill this system. The trainyard would result in a new biological desert that would jeopardize the remaining neighboring landscape of trees, forests, and fields, and their inhabitants. When large-scale disasters, such as the inevitable hurricanes, tornadoes, floods, and fires occur, the ability of the remaining habitats to recover would be seriously compromised.

- As an analogy, if you were very wealthy and politically powerful, you could build your house from blocks of stone removed from the National Cathedral in such a way that the cathedral would be left standing. However, with the next earthquake, the cathedral would collapse because your predation of those blocks has weakened the edifice to the point of structural failure. Who would do that? Placing the SCMagLev trainyard in this protected, vulnerable, and endangered site would equally weaken it. Such wounds would ultimately cause the last forested cathedral in the region, an area held sacred to the surrounding communities, to collapse., However, unlike the National Cathedral, the area can never be rebuilt or restored.

(4) Who are the current public landowner groups and what are their lands?

- The National Park Service (NPS) owns and manages the land around the Baltimore-Washington Parkway (Parkway) in the project area. The roadway is purposely surrounded by an unbroken swath of woodlands that connect it to the PRR and BARC. The SCMagLev train lines would run parallel to the Parkway and destroy a wide path through these woods, leaving a strip of woodlands isolated between the Parkway and the train line. This would cause them to be ecologically isolated and functionally dead from the lack of connection to the contiguous PRR and BARC woodlands, and open the construction area to the invasion of weeds and non-native plants. The north- and south-bound lanes are only 40 feet wide; however, the SCMagLev line would be 130-feet wide, dwarfing the impact of the Parkway.

- The U.S. Fish and Wildlife Service owns the PRR, which would be substantially impacted by this project in several locations with the building of the trainyard. The research refuge is home to the Patuxent Wildlife Research Center. It is also home to some of the best-known and most-studied groups of animals and plants in the world. The refuge is currently an almost unbroken swath of woodlands, wetlands, headwater streams, and bottomlands bisected by both the Big and Little Patuxent Rivers.

- The BARC is the world's largest agricultural research center. It was created over 100 years ago and has housed hundreds of research scientists who have used the facility to study all aspects of agriculture. The grounds are a complex of fields, pastures, research areas, study plots, and natural areas.

- The National Aeronautics and Space Administration (NASA) Goddard Space Flight Center would be affected by this project. In the BARC-EAST proposed trainyard (primarily to be located on the PRR and BARC), some of the trainyard would directly impact NASA's optical test site. This site was chosen because the surrounding area was dark, silent, and isolated by the surrounding woodlands and fields. SCMagLev's impacts on the NASA facility would come from adding vibration, light, and sounds that are not compatible with its functioning.

- The Greenbelt Forest Preserve is 254.8 acres of forested land owned by the City of Greenbelt and protected and conserved in their existing natural state for the use and enjoyment of present and future generations. The city purchased the parcels that became the preserve in the mid-1990s and passed legislation in 2003 to designate these lands as a protected "Forest Preserve." This designation protects the land from development and retains it in a natural forested state. Several of the largest, most contiguous forested parcels, which comprise approximately 145 acres, are threatened by the proposed SCMagLev's J1 alignment (route) option. Sixty-five acres would be destroyed by that route, including 12 acres of wetlands. In addition, 6.5 of those acres are designated and protected as Wetlands of Special State Concern by the state of Maryland. The 145 acres are part of a larger unbroken patch of forest that runs from the community gardens at Gardenway to Beaverdam Road in the City of Greenbelt.

- The Forest Preserve is protected by more than municipal ownership. The Maryland-National Capital Park and Planning Commission owns a woodland covenant on one of the largest parcels, which was purchased using Maryland's Program Open Space (POS) funds.[1181] Land purchased using POS funds shall be perpetually protected green space and are federally protected under the Land and Water Conservation Fund Act of 1965. The NPS owns scenic easements on 65 acres of the North Woods Tract of the preserve. These easements establish a federal interest in the green space, such that this land falls within the legal boundaries of the Parkway, although the City of Greenbelt retains ownership of the land itself. Finally, the preserve is protected under Section 4(f) of the 1966 U.S. Department of Transportation Act,[1182] which prohibits the construction of transportation projects within protected green space or historical landmarks unless it is shown that no "feasible or prudent" alternative exists. And as we have identified and discussed in other articles, alternative transportation systems already exists, namely Amtrak & MARC.

- Anne Arundel County has parklands adjacent to the Parkway south of Maryland City, as well as just north of the North Tract of the refuge. The parcels along the west side of the Parkway include playfields for baseball, football, and soccer, as well as a popular dog park. The parcel north of the North Tract includes baseball playfields and floodplain wetlands, as well as the riparian forest along the Little Patuxent River.

- The District of Columbia and the federal government owns some of the land. The Oak Hill site where the proposed Route 198 trainyard would be located is an 800+-acre triangular area bounded by Maryland Route 198 on the south, the Parkway on the northwest, and Maryland Route 32 on the northeast. The Little Patuxent River traverses the site. The majority of this site is composed of an 827-acre parcel owned by the U.S. government, but it has been managed and operated by the District of Columbia since 1921, pursuant to the Federal Appropriations Act of 1923.[1183] Historically, the District operated several facilities on site, including the Forest Haven Asylum, which closed in 1991; the Cedar Knoll Youth Center, which closed in 1993; and the Oak Hill Youth Center, which closed in 2009. Currently, the site houses the Maya Angelou Academy at New Beginnings and the Maryland Job Corps' Woodland Job Corps Center. The Maryland Environmental Trust, the Scenic Rivers Land Trust, and the Patuxent Tidewater Land Trust hold a conservation easement on 250 acres of the site. A great majority of the site is undeveloped. Riparian and upland forest dominate the undeveloped areas, coupled with acidic seepage swamps, wet meadows, emergent wetlands, and the river itself.

[1181] See: https://dnr.maryland.gov/land/Pages/ProgramOpenSpace/home.aspx.
[1182] See: https://www.environment.fhwa.dot.gov/env_topics/4f_tutorial/overview.aspx?h=e/.
[1183] See: https://www.loc.gov/law/help/statutes-at-large/67th-congress/Session%204/c67s4ch148.pdf.

- The proposed trainyard would impact both the developed and undeveloped areas. It would require the destruction of the Woodland Job Corps Center, impact more than a dozen private landowners, and destroy parts of the historic Forest Haven Asylum. It would destroy approximately 115 acres of upland forest and 25 acres of riparian forest, as well as destroy a 2.5-acre forested, groundwater-fed wetland and a 3-acre wet meadow. The published footprint of the trainyard crosses the Little Patuxent River, which would necessitate moving the course of the river. The published footprint of the trainyard would impinge on the conservation easement by 25 acres. The footprint for Route Option J of the SCMagLev viaduct would impinge on the property on the northeast boundary. It would destroy a large beaver pond and several vernal pools with a documented presence of marbled and spotted salamanders, as well as destroy several acres of riparian wetlands.

Findings/Conclusion

There are many issues, questions, and concerns about the building and operation of the SCMagLev will have on the area ecology, environment, and people living near and alongside the guideways, or who study and make use of these forested areas. This article identifies and explores but a few.

Want to Help?

(1) Share this information with your family, friends, neighbors, and community.
(2) Join our Facebook page: www.facebook.com/groups/CitizensAgainstSCMaglev.
(3) Contact your elected officials to express your opposition to building the SCMagLev, go to: myreps.datamade.us.
(4) Submit multiple public comments often at www.bwmaglev.info/index.php/contact-us. State your objection(s), and always end by saying you support the "No Build Alternative."
(4) Learn more about the concerns and impacts the SCMagLev will have on our communities, see: www.stopthistrain.org/.
(5) Make a contribution to support Citizens Against the SCMagLev (CATS) and Maryland Coalition for Responsible Transit (MCRT) at mcrt-action.org. Your donation, in any amount, is appreciated. Thanks for your support!

About the Author

Daniel E. Woomer is a community activist and technical expert. He retired after a long career that included positions with Westinghouse Defense Center, Johns Hopkins University's Applied Physics Laboratory, and the U.S. Department of Energy (DOE). During his career with the DOE, he worked in various positions with the Energy Information Administration and the Office of Congressional and Intergovernmental Affairs, and he helped set up the Office of Technology Transitions. He also served for several years as an adjunct faculty member with the University of Maryland University College, where he developed and taught mathematics, supervisory and leadership classes.

Sources:

The principal source of information for this article is information and discussion with Sam Droege. He grew up in Prince George's County and has worked as a biologist for the past 40 years, specializing in the survey and monitoring of plants and animals.

(1) For high-quality, public domain downloadable photos of insects and other small creatures found in 2020 from the impact sites, see:
www.flickr.com/photos/usgsbiml/albums/72157715288371553.
(2) For photos of the natural areas and agricultural areas that would be destroyed with the building of the SCMagLev, see:
www.flickr.com/photos/189298652@N03/albums/72157715119662111.
(3) For short, low-elevation flyovers of the trainyard site at Maryland Route 198, see:
www.flickr.com/photos/189298652@N03/50427339292/in/album-72157715119662111/.
(4) To watch a flight over the Patuxent refuge and the proposed SCMAGLEV trainyard site, see:
https://www.flickr.com/photos/189298652@N03/50426482948/in/album-72157715119662111/
(5) To watch another flight over the Patuxent Refuge and Beltsville Agriculture Research Center and the proposed SCMagLev trainyard site, see:
www.flickr.com/photos/189298652@N03/50426482948/in/album-72157715119662111/.
(6) An interactive GIS map showing locations of SCMagLev impact areas and overlays of wetlands and other features are found at:
dcgis.maps.arcgis.com/apps/webappviewer/index.html?id=ae88f4ed5cff435cb96b9990bc15e997.

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Citizens Against the SCMagLev (CATS) is a confederation of scientists, engineers, experts, community organizations and citizens in support of transportation infrastructure improvements that benefit our communities, state, and nation. CATS opposes the construction of an expensive transportation system serving a small minority of the wealthy at the cost of taxpayer funds far better used to maintain and improve the transportation infrastructure needed and used daily by all citizens, businesses, and commerce. For up-to-date information on the SCMagLev opposition, see our Facebook page at:
https://www.facebook.com/groups/CitizensAgainstSCMaglev.

XCVII. Appendix - Reprint: Woomer, Dan. "What's the Biological and Ecological Impact? (Part 2)" CATS-MCRT White Paper. January 11, 2021.

By: Dan Woomer
Edited by: Susan McCutchen

The Baltimore-Washington Rapid Rail (BWRR) (the project developer) and the Northeast MagLev (TNEM) (the promotional entity) have the short-term goal of obtaining Federal Railroad Administration (FRA) approval to build a magnetic levitation (maglev) train between Baltimore and Washington, DC, with the long-term goal of extending the train operation to New York City by way of Philadelphia. Japan's Superconducting Magnetic Levitation (SCMagLev) train is the high-speed, ground-based transportation system TNEM is promoting to build in the northeast corridor of the United States.

Information about the SCMagLev and BWRR's plans to build and operate the system have raised many questions and concerns. This is one of a series of articles that identifies and discusses some the many questions and concerns citizens and communities have identified with moving forward in building and operating the SCMagLev.

Abstract

This article takes a deeper look into the existing species and types of specimens of life that would be lost and destroyed if BWRR gains approval to build the SCMagLev train system.

Questions & Concerns

(1) What value do the Beltsville Agricultural Research Center and the Patuxent Wildlife Research Refuge bring to the state, the nation, and the world?

- The U.S. Department of Agriculture Beltsville Agricultural Research Center (BARC) and Patuxent Research Refuge (PRR) represent one of the most biologically well-studied landscapes in the world with intense research and natural history data going back over 100 years.

- Hundreds of government scientists have conducted research and continue to work in these locations, many identifying and describing new species, and most doing research related to the agriculture and natural areas retained by these properties. As part of their duties, lists of species found here were created and their status documented via physical collections. They were accessioned to the National Collection, where numerous

scientific publications about them, including their biological functions and processes, were documented and monitored across the many past decades and into the present time.

- Both research centers represent the largest scientific field stations for their respective U.S. federal agencies. The region is a treasure trove of species of animals, plants, and fungi that were first described by science here, and represents one of the most important discovery locations on the North American continent and in the world.

- Building the SCMagLev as currently planned would destroy this site forever.

(2) What else could happen to the area if the SCMagLev trainyard would be built?

- If the SCMagLev train system is allowed to be built, a large block of the current preserve and refuge will be destroyed forever. Once the SCMagLev trainyard is built, there would be little that could be done to stop additional development and the loss of all remaining forested and protected land in the area.

- Research at BARC has identified over 100 species and ongoing research will undoubtedly find many more.

- The region has retained much of its original biodiversity. For example, the PRR has retained all its breeding bird species except for two—the Broad-winged Hawk and the Bachman's Sparrow. Similar results exist for all the other groups of plants, fungi, insects, and vertebrates.

- The combined protected landscapes of several government agencies have created an integrated and interconnected refuge for the region's plant, animal, fungi, and microorganisms. The extensive nature of these landscapes allows the species living in them to ebb and flow in space and time without becoming locally extinct because of small parcel sizes.

- One of the many important pieces of research in this area was conducted in the 1970s. The study looked at the impacts of forest fragmentation on woodland birds. This research was conducted by two collaborating scientists, Robert Whitcomb (BARC) and Chandler S. Robbins (PWRC). Many of the plots used in these studies are located in the SCMagLev proposed-use areas in BARC.[1184]

- These past and current study sites cannot be recreated elsewhere. Once the landscape is altered with anthropogenic disturbances to the soils, and the vegetation removed and

[1184] R.F.Whitcomb, C.S. Robbins, J.F. Lynch, B.L. Whitcomb, M.K. Klimkiewicz, and D. Bystrak. Edited by: Robert L. Burgess and David M. Sharpe. 1981. "Effects of forest fragmentation on avifauna of the eastern deciduous forest."

replaced with man-made structures, the land is dead for all practical purposes to scientists and to all the original plant, insect, and animal inhabitants.

- In addition to studies by employees of these agencies, the work of past researchers and the existence of ongoing study plots, taxonomic experts, and extensive documentation of the flora and fauna of the region attract other researchers from states, universities, and private groups from around the world. This research and the related economic benefits for the area would be lost.

- The long-abandoned airport area of BARC/PRR has been and is particularly important for rare birds. Over the years, sightings of nationally and regionally extremely rare species have been reported. Some of these rare birds that nest or pass through this area include the Northern Shrike, the Short-eared Owl, the Whip-poor-will, the Merlin, LeConte's Sparrow, the Sandhill Crane, and the Dickcissel. The abandoned airport still retains breeding Eastern Meadowlarks and Grasshopper Sparrows, which are almost completely absent elsewhere in the area. Raptors and grassland species use this area heavily. This is one of the very few remaining transitional habitats; elsewhere, they have become rare or completely absent.[1185]

- As cited on the Friends of Patuxent[1186] and BARC[1187] websites, BARC has 901 documented plant species, and PRR has 282 species of birds, 217 species of bees, and 72 species of butterflies. "Thousands of insect specimens have been collected from the combined properties of BARC and PRR," as noted by Sam Droege, an entomologist. "These specimens are published in various research papers. Several thousand, including ones I have identified, are in my database." (personal conversation with Dan Woomer, 2020)

- This area is also one of the most important places in the world where prehistoric fossil strata have been found. A rich strata of dinosaur bones and associated fossils and, perhaps even more rare, dinosaur trackways, have been and are being found here. These significant prehistoric life discoveries have been found on BARC at the Swampoodle Site. The region, known as "Dinosaur Alley," was the primary source of Maryland dinosaur bones in the nineteenth century, collected by both the Yale Peabody museum and local collectors; many of the prehistoric fossils found in this area are currently residing in the Smithsonian Instititution. Other well-known prehistoric fossil locations are located at NASA Goddard and in nearby Muirkirk at the Maryland-National Capital Park and Planning (M-NCPP) Dinosaur Park, which bracket the BARC sites.[1188]

[1185] Orr, Richard. Photos of the Wildlife and Animals living on and around the Old BARC Airport. www.flickr.com/photos/dragonflyhunter/albums/72157611555242488.
[1186] See: http://friendsofpatuxent.org/.
[1187] See: https://www.ars.usda.gov/northeast-area/beltsville-md-barc/beltsville-agricultural-research-center/.
[1188] For additional information on Prince George's County Dinosaur Park, see: www.mncppc.org/3259/Dinosaur-Park, and mncppcapps.org/pgparks/dino_blog/dino_article.aspx?articleid=17.

- To date, 16 unique type specimens of dinosaurs and fossils have been found in this area and named from these collective sites—and more are likely to be found. The specimens identified and named include the *Glyptops caelatus*, *Rogersia angustifolia*, *Argillomys marylandensis, Goniopholis affinis, Jungermannites noterocladioides, Rogersia angustifolia, Pelletixia amelguita, Arundelemys dardeni, Arundelconodon hottoni, Tanyoscapha sigmanae, Ornithomimus affinis, Priconodon crassus, Pleurocoelus altus, Pleurocoelus nanus, Allosaurus medius*, and *Coelurus gracilis*.

- Of great importance was the type specimen of *Astrodon* Johnstoni found in the 1800s, which was named as Maryland's state dinosaur in 1998. The *Astrodon* lived in Maryland during the Early Cretaceous period, from 95 to 130 million years ago.

- It has been stated about the M-NCPPC region: "Dinosaur Park is the best place to find Cretaceous dinosaur bones in the Eastern United States, and as it happens the best place to find Cretaceous dinosaur footprints on this side of the Mississippi River."[1189]

- Avocational fossil hunter Ray Stanford first started finding dinosaur tracks near College Park, Maryland, in the early 1990s. With the help of professionals and other amateurs (including Dinosaur Park's own David Hacker), over 300 specimens have been recovered to date. Note that these same trackways have been found at NASA Goddard and similar rock formations occur throughout the sites currently planned to be leveled and used for the SCMagLev trainyard.

- In the forested area, studies have shown that BARC Central and East Natural areas are the southernmost points in the world of the New Jersey Pine Barrens ecotype. Note that the BARC East Farm is the land to the east of and the BARC Central Farm is the area just to the west of the Baltimore-Washington Parkway. The BARC East Farm contains the National Champion Dwarf Chinquapin Oak (*Quercus prinoides*) and the State Champion Sand Hickory (*Carya pallida*).

- Globally rare, federal- and state-protected wetlands crisscross both tracts. This landscape represents what is most likely the most silent and light-free landscape left in the Baltimore-Washington Corridor.

- As noted in a prior article, the proposed SCMagLev trainyard enveloping BARC East would be located next to NASA's Optical Test Site and other testing facilities that cannot tolerate vibration or light pollution from a SCMagLev's trainyard facility.

(3) How big is the proposed SCMagLev trainyard?

[1189] http://mncppcapps.org/pgparks/dino_blog/dino_article.aspx?articleid=17.

- The proposed SCMagLev trainyard is approximately 1-mile long by a quarter-mile wide. As a useful comparison, that measures:

    - about one-and-one-fifth times as big as Disneyland.
    - about six times as big as the Pentagon.
    - about 50 times as big as the Kennedy Center.
    - about 150 times as big as a football field.
    - more than three times larger than the 12, 000 parking spaces at Robert F Kennedy Stadium; the proposed area could fit up to 55,000 parking spaces.

(4) Are the losses to Maryland and the United States associated with building the SCMagLev worth it?

- No. Maryland, our nation, and the world will suffer from the loss of species, biodiversity, and access to prehistoric history in this refugia if this proposed project should be approved. Building an expensive, tax-dollar-supported, high-speed transportation system for the wealthy and well-heeled, with little to no long-term value for Anne Arundel or Prince George's counties or Maryland would be of little value, in fact, a major loss on top of the other losses described.

- We would seriously weaken the last large green space between Baltimore and Washington, DC, should the SCMaglev transportation system be built. This area is well-loved by surrounding communities, and their inhabitants would lose the cooling, carbon storage, air pollution capture, calming, and spiritual aspects of this green area space. Recreational runners, walkers, and bicyclists would lose a large part of what is a relatively safe, nature-focused public road network where they can exercise in a healthy environment. Fossil sites would be permanently destroyed and/or rendered unavailable. The region would lose one of the last noise- and light-free environments found between Baltimore and Washington, DC.

(5) What are some of the types of specimens that have been found, identified, and studied in this area?

- Fungi include: *Arthrocristula hyphenata, Arthrocristula hyphenata, Cryptodiaporthe liquidambaris, Cryptodiaporthe liquidambaris, Discosporina carpinicola, Discosporium liquidambaris, Ditopellopsis clethrae, Endophragmiella constricta, Endophragmiella constricta, Endophragmiella constricta, Endophragmiella constricta, Hamigera insecticola, Hyalotia pistacina, Melanconiella elegans, Monilinia fructigena, Mycoleptodiscus terrestris, Myiocoprula gregaria, Ophiognomonia lenticulispora, Ophiognomonia micromegala, Ophiognomonia sassafras, Ovulinia azaleae, Pestalotia longisetula, Phomopsis oxyspora, Polyporus pseudocinnamomeus, Pseudocoprinus venustus, Sesquicillium candelabrum, Sphaceloma plantaginis, Sphaerulina rubi, Sporidesmium sclerotivorum, Trichoderma asperellum,* and *Wrightoporia cylindrospora.*

- Insects include: *Acanalonia conica, Aeolothrips annectans, Aeolothrips annectans, Andrena uvulariae, Anthrax nigripennis, Aulacus schiffi, Baldulus tripsaci, Brachythrips russelli, Brenthis selene marilandisa, Caryomyia aggregata, Caryomyia albipilosa, Cedusa gedusa, Cedusa hedusa, Ceratocapsus barbatus , Ceratocapsus decurvatus, Chrysops vitripennis, Clastoptera proteus anceps, Dolichopus flavilacertus, Forcipomyia mcateei, Hammomyia marylandica, Heterothrips azaleae, Hyalomyzus pocosinus, Hydroporus signatus youngi, Lasioglossum gotham, Madiza nigripalpis, Minettia buchanani, Myrsidea emersoni, Oxythrips divisus, Paracalocoris colon var. amiculus, Paracalocoris colon var. castus, Paracalocoris hawleyi var. fissus, Paracalocoris limbus suffusus, Paracalocoris scrupeus bidens, Phytocoris difficilis, Poanes massasoit hughi, Proctophyllodes pirangae, Prodiplosis platani, Psocus additus, Rhyacionia granti, Trichogramma marylandense, Tricyphona macateei, Typhlocyba eurydice, Typhlocyba eurydice var. discincta,* and *Typhlocyba gillettei var. casta.*

- Invertebrates include: *Babesia mephitis, Babesia procyoni, Besnoitia akodoni, Besnoitia neotomofelis, Besnoitia tarandi, Capillaria pirangae, Cladotaenia cathartis, Cryptosporidium canis, Cryptosporidium ryanae, Cryptosporidium ubiquitum, Cryptosporidium xiaoi, Cysticercus setiferous, Dicelis nira, Eimeria granulosa, Glaphyrostomum mcintoshi, Haemobartonella procyoni, Lotmaria passim, Loxogenes bicolor, Sarcocystis lindsayi, Trichuris sylvilagi, Paratylenchus marylandicus, Meloidoderita polygoni, Aorolaimus helicus, Criconema eurysoma, Criconema civellae, Heterodera weissi, Xiphinema americanum, Meloidoderita polygoni,* and *Allodiplogaster josephi.*

Findings/Conclusion

The loss of the BRAC and PRR preserves for the building of the SCMagLev transportation system would be tragic and irreversible. Major research facilities of national and world importance would be destroyed. The habitat for hundreds of rare birds, insects, and fungi would be lost forever. Suffering such losses to build a redundant, high-cost, and taxpayer-supported transportation system for the elite and well-heeled that has little to no benefit for Marylanders would be unconscionable.

Want to Help?
(1) Share this information with your family, friends, neighbors, and community.
(2) Join our Facebook page: www.facebook.com/groups/CitizensAgainstSCMaglev.
(3) Contact your elected officials to express your opposition to building the SCMagLev, go to: myreps.datamade.us.
(4) Submit multiple public comments often at www.bwmaglev.info/index.php/contact-us. State your objection(s), and always end by saying you support the "No Build Alternative."
(4) Learn more about the concerns and impacts the SCMagLev will have on our communities, see: www.stopthistrain.org/.

(5) Make a contribution to support Citizens Against the SCMagLev (CATS) and Maryland Coalition for Responsible Transit (MCRT) at mcrt-action.org. Your donation, in any amount, is appreciated. Thanks for your support!

About the Author

Daniel E. Woomer is a community activist and technical expert. He retired after a long career that included positions with Westinghouse Defense Center, Johns Hopkins University's Applied Physics Laboratory, and the U.S. Department of Energy (DOE). During his career with the DOE, he worked in various positions with the Energy Information Administration and the Office of Congressional and Intergovernmental Affairs, and he helped set up the Office of Technology Transitions. He also served for several years as an adjunct faculty member with the University of Maryland University College, where he developed and taught mathematics, supervisory and leadership classes.

Sources:

The principal source of information for this article was from correspondence and discussion with Sam Droege. He grew up in the Prince George's County and has worked as a biologist for the past 40 years, specializing in the survey and monitoring of plants and animals.

(1) For high-quality, public domain downloadable photos of insects and other small creatures found in 2020 from the impact sites, see:
www.flickr.com/photos/usgsbiml/albums/72157715288371553.
(2) For photos of the natural areas and agricultures areas that would be destroyed with the building of the SCMagLev transportation system, see:
www.flickr.com/photos/189298652@N03/albums/72157715119662111.
(3) To see short, low-elevation flyovers of the Maryland Route 198 trainyard site, see:
www.flickr.com/photos/189298652@N03/50427339292/in/album-72157715119662111/.
(4) To watch a flight over the Patuxent Refuge and proposed SCMAGLEV trainyard site, see:
https://www.flickr.com/photos/189298652@N03/50426482948/in/album-72157715119662111/
(5) To watch another flight over the Patuxent Refuge and Beltsville Agriculture Research Center and the proposed SCMagLev trainyard site, see:
www.flickr.com/photos/189298652@N03/50426482948/in/album-72157715119662111/.
(6) For an interactive GIS map showing locations of SCMagLev impact areas and overlays of wetlands and other features are found, see:
dcgis.maps.arcgis.com/apps/webappviewer/index.html?id=ae88f4ed5cff435cb96b9990bc15e997.
(7) R.F.Whitcomb, C.S. Robbins, J.F. Lynch, B.L. Whitcomb, M.K. Klimkiewicz, and D. Bystrak. Edited by: Robert L. Burgess and David M. Sharpe. 1981. "Effects of forest fragmentation on avifauna of the eastern deciduous forest." pubs.er.usgs.gov/publication/5210469.

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Citizens Against the SCMagLev (CATS) is a confederation of scientists, engineers, experts, community organizations and citizens in support of transportation infrastructure improvements that benefit our communities, state, and nation. CATS opposes the construction of an expensive transportation system serving a small minority of the wealthy at the cost of taxpayer funds far better used to maintain and improve the transportation infrastructure needed and used daily by all citizens, businesses, and commerce. For up-to-date information on the SCMagLev opposition, see our Facebook page at: https://www.facebook.com/groups/CitizensAgainstSCMaglev.

XCVIII. Appendix - Reprint: Woomer, Dan. "What Impact Would the SCMagLev Have on Our Communities?" CATS-MCRT White Paper. January 11, 2021.

MagLevTruth
CATS - Citizens Against the SCMagLev
STOP THE MAGLEV TRAIN

MARYLAND COALITION FOR RESPONSIBLE TRANSIT

By: Dan Woomer
Edited by: Susan McCutchen

The Baltimore-Washington Rapid Rail (BWRR) (the project developer) and the Northeast MagLev (TNEM) (the promotional entity) have the short-term goal of obtaining Federal Railroad Administration (FRA) approval to build a magnetic levitation (maglev) train between Baltimore and Washington, DC, with the long-term goal of extending the train operation to New York City by way of Philadelphia. Japan's Superconducting Magnetic Levitation (SCMagLev) train is the high-speed, ground-based transportation system TNEM is promoting to build in the northeast corridor of the United States.

Information about the SCMagLev and BWRR's plans to build and operate the system have raised many questions and concerns. This is one of a series of articles that identifies and discusses some the many questions and concerns citizens and communities have identified with moving forward in building and operating the SCMagLev.

Article Summary

BWRR's current plan is to bore a tunnel 80 to 150 feet below ground level (as measured from the top of the guideway) under more than half of any proposed route. The inside diameter of the proposed tunnel is 43 feet. The goal is to maintain at least 14 meters (about 46 feet) of soil between the top of the tunnel and the foundations of any structure being tunneled under. Most of the tunneling will take place in Anne Arundel County. The current plan is to tunnel from the Baltimore station to the Baltimore-Washington International Airport and on to southern Anne Arundel County, emerge from underground to a raised guideway through one section of

Prince George's County, descend back underground through another section of Prince George's County, and continue underground into and end at the Washington DC station.

To support the underground portion of the system, BWRR intends to build surface facilities to house ventilation plants and emergency exits spaced every three (3) to four (4) miles along the tunnel segments that can be as large as 1.5 acres. Also, BWRR plans call for building power substations and other facilities above and along the route.

In this article, we identify and discuss some of the questions and concerns about the negative impact on communities through which the SCMagLev system will run, as well as the support systems and structures the it requires to be built and operated to support this expensive system.

Questions & Concerns

(1) What will be the impact of tunneling under residential and commercial structures?

- *Tunneling Depth*: Residential foundations are about 10 feet deep. The tunnel itself has an inside diameter of 43 feet; additionally, 2 feet is the estimated thickness of the tunnel walls. The estimate of the depth of the tunnel is 80 feet. The top of the tunnel would only be about 35 feet below the foundation.

- Commercial structures sometimes have foundations that are larger and deeper than those of most residential structures.

- During the tunneling for the Baltimore subway, several building foundations shifted as the tunneling progressed. It was very expensive to relevel and reinforce the shifted foundations.

    - Question - How likely is it that BWRR be willing to correct and repair foundation problems caused by the tunneling to our home and businesses?

- As stated by Cosema Crawford, PE, Senior Vice President representing Louis Berger (the engineering firm hired to study the building of a superconducting maglev train between Washington and New York), compared with the tunneling under Baltimore, the planned SCMagLev tunneling between Baltimore and BWI will be deeper underground and it will employ the latest tunneling equipment that produces less vibration. However, masonry and concrete structures (e.g., foundations and foundation walls) do not respond well to some vibrations; that is, such structures tend to crack as they do not uniformly vibrate. Cracks in foundation walls result where the vibration energy finds a weak point. Such cracks weaken the support for the structure above and lead to water infiltration. In other words, ground and/or surface water (rain and downspout runoff) seeps into the basement. Wet basements bring additional damage to the structure and anything

located in the basement (such as furnaces, washers and dryers, and furniture). The increased moisture creates dangerous mold and other serious health and safety problems for people who live in single-family homes and apartment complexes, as well as for those who work or play in commercial or other types of buildings (e.g., schools, churches).

(2) What dangers do ventilation and emergency access/exit structures bring into our communities?

- BWRR planning calls for the building of ground-level ventilation structures. These structures are required for the ventilation of smoke in the event of fire and will likely also house emergency evacuation stairs. BWRR plans to build one of these surface facilities every three (3) to four (4) miles along the tunnel segments.

- At the October 17, 2017, BWRR-Maryland Transit Administration (MTA) Open House, Ms. Crawford provided the following information:

  - The ventilation facilities' primary purpose is to clear smoke in case there is a fire in the tunnel. The ventilation units will force air into the tunnel on one side of the tunnel section with smoke, and the next ventilation facility will exhaust the smoke-filled air from the tunnel. In other words, one ventilation facility will pressurize the tunnel ahead of the section of the tunnel with smoke and the alternate ventilation facility will depressurize the tunnel to exhaust the smoke to the atmosphere.

  - What kind of fire could occur in a SCMagLev tunnel section? If the fire resulted from a train accident or some type of electrical event, the fuel for the fire could be lubricants, plastics, and electrical wire insulation. "When plastic is burned, it releases dangerous chemicals such as hydrochloric acid, sulfur dioxide, dioxins, furans and heavy metals, as well as particulates. These emissions are known to cause respiratory ailments and stress human immune systems, and they're potentially carcinogenic." (Biemiller, quoting Noelle Eckley Selin, Massachusetts Institute of Technology, 2013).[1190,1191]

  - Clearly, such occurrences could create potential human health impacts. These could include the possibility that toxic and cancer-causing compounds and substances could be exhausted into our communities at any time from these SCMagLev tunnel ventilation facilities. Further, the impact on the value of private properties near these facilities could be negatively affected.

[1190] Biemiller, A. "Can we safely burn used plastic objects in a domestic fireplace? No, you can't. Don't even think about it…" School of Engineering, Massachusetts Institute of Technology. Posted March 12, 2013. https://engineering.mit.edu/engage/ask-an-engineer/can-we-safely-burn-used-plastic-objects-in-a-domestic-fireplace/

[1191] To see the current list of known and probable cancerogenic substances from the American Cancer Society, go to: www.cancer.org/cancer/cancer-causes/general-info/known-and-probable-human-carcinogens.html.

- Question - Who wants to live near a ventilation facility that will potentially spew out toxic and cancer-causing smoke at any time?

(3) Ventilation facilities collecting and releasing radioactive gas into our communities?

- The proposed tunneling route from Baltimore to BWI and onto southern Anne Arundel County, and under Prince George's County into Washington, DC, includes areas with known radon gas levels of .02 pCi/L to 4.0 pCi/L.[1192,1193]

- Maryland is a radon gas "hot spot." Average measurements across the state range for 0.2 pCi/l to 61 pCi/L.[1194] Radon (symbol Rn, atomic weight 86) is a radioactive gas released from the normal decay of the elements uranium, thorium, and radium in rocks and soil. It is an invisible, odorless, and tasteless gas that seeps up through the ground and diffuses into the air. In a few areas, depending on local geology, radon dissolves into ground water and can be released into the air when the water is used. Radon gas usually exists at very low levels outdoors. However, in areas without adequate ventilation, such as underground mines (or the SCMagLev tunnel?), radon can accumulate to levels that substantially increase the risk of lung cancer."[1195]

- A 43-foot diameter tunnel, 80 to 150-feet below ground-level, starting in Baltimore and ending in southern Anne Arundel County will be see the collection of Radon Gas. As high-speed trains run through the tunnel, the air pressure wave at the front of the train will build, forcing air displacement to the sides and over the top of the train, and other lower air pressure areas, including ventilation shaft openings to the surface. If Radon Gas is present, this radioactive gas will be pushed out into the community through the ground-level ventilation facilities. While the level of radioactive gas will likely be low, the impact on the private property values near these facilities will be negatively affected.

  - Question - Who wants to live near a ventilation facility that will potentially spew out cancer-causing radioactive gas at unknown times and levels?

Findings/Conclusion

[1192] About Radon Levels in Anne Arundel County. www.county-radon.info/MD/Anne_Arundel.html - Radon levels in Anne Arundel County average 3.3 pCi/L, with a range from under 2 pCi/L to 61 pCi/L. (Note: pCi/L stands for Picocuries Per Liter.)
[1193] About Radon Levels in Prince Georges County. www.county-radon.info/MD/Prince_Georges.html - Radon Levels for Prince George's County also range from 2 pCi/L to over pCi/L. (Note: pCi/L stands for Picocuries Per Liter.)
[1194] Radon Levels Across Maryland. phpa.health.maryland.gov/OEHFP/EH/Pages/Radon.aspx.
[1195] American Cancer Society. "Radon and Cancer. Last reviewed December 6, 2011. www.cancer.gov/about-cancer/causes-prevention/risk/substances/radon/radon-fact-sheet.

There are many issues, questions, and concerns about the safety of the SCMagLev operation of both passengers and people living near and alongside the guideways, as well as above the tunneled sections. This article identifies and explores only a few associated with the planned ventilation facilities releasing toxic and cancer-causing smoke and radioactive gases into our communities.

Want to Help?
(1) Share this information with your family, friends, neighbors, and community.
(2) Join our Facebook page: www.facebook.com/groups/CitizensAgainstSCMaglev.
(3) Contact your elected officials to express your opposition to building the SCMagLev, go to: myreps.datamade.us.
(4) Submit multiple public comments often at www.bwmaglev.info/index.php/contact-us. State your objection(s), and always end by saying you support the "No Build Alternative."
(4) Learn more about the concerns and impacts the SCMagLev will have on our communities, see: www.stopthistrain.org/.
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About the Author
Daniel E. Woomer is a community activist and technical expert. He retired after a long career that included positions with Westinghouse Defense Center, Johns Hopkins University's Applied Physics Laboratory, and the U.S. Department of Energy (DOE). During his career with the DOE, he worked in various positions with the Energy Information Administration and the Office of Congressional and Intergovernmental Affairs, and he helped set up the Office of Technology Transitions. He also served for several years as an adjunct faculty member with the University of Maryland University College, where he developed and taught mathematics, supervisory and leadership classes.

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(1) American Cancer Society. "Known and Probable Human Carcinogens." Last updated: August 14, 2019. www.cancer.org/cancer/cancer-causes/general-info/known-and-probable-human-carcinogens.html.
(2) Baltimore-Washington Rapid Rail (BWRR) and Maryland Transit Administration (MTA) SCMagLev information posters displayed at Bowie State University Open House. October 14, 2017.
(3) Crawford, C.E., PE. Senior Vice President, Louis Berger (engineering firm). Discussion with Dan Woomer at the BWRR and MTA SCMagLev Open House at Arundel High School. October 16, 2017.
(4) Louis Berger. MagLev-United States http://www.louisberger.com/our-work/project/maglev-united-states.
(5) Radon. https://en.wikipedia.org/wiki/Radon.

(6) Woomer, D. “SCMagLev - Info from Today's BWRR-MTA Open House.” Nextdoor Linthicum Posting. October 14, 2017.
(7) Woomer, D. “SCMagLev – Info on Ventilation Facilities.” Nextdoor Linthicum Posting. October 18, 2017.
(8) Woomer, D. “SCMagLev – Info on Power Stations.” Nextdoor Linthicum Posting. October 18, 2017.
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(10) BWRR & MTA SCMagLev Info posters displayed at the Open House at Bowie State University on 10/14/2017.
(11) About Radon Levels in Anne Arundel County. www.county-radon.info/MD/Anne_Arundel.html - Radon levels in Anne Arundel County average 3.3 pCi/L, with a range from under 2 pCi/L to 61 pCi/L. pCi/L stands for Picocuries Per Liter.
(12) About Radon Levels in Prince Georges County. www.county-radon.info/MD/Prince_Georges.html - Radon Levels for Price Georges County also range from 2 pCi/L to over pCi/L. pCi/L stands for Picocuries Per Liter.
(13) Radon Levels Across Maryland. phpa.health.maryland.gov/OEHFP/EH/Pages/Radon.aspx.
(14) Biemiller, Amy. “Can we safely burn used plastic objects in a domestic fireplace? No, you can’t. Don’t even think about it…” Posted March 12, 2013. Massachusetts Institute of Technology School of Engineering. engineering.mit.edu/engage/ask-an-engineer/can-we-safely-burn-used-plastic-objects-in-a-domestic-fireplace/.

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XCIX. Appendix - Reprint: Woomer, Dan. "SCMagLev - Not the Solution." CATS-MCRT White Paper. February 6, 2021

By: Dan Woomer
Edited by: Susan McCutchen

The Baltimore-Washington Rapid Rail (BWRR) (the project developer) and the Northeast MagLev (TNEM) (the promotional entity) have the short-term goal of obtaining Federal Railroad Administration (FRA) approval to build a magnetic levitation (maglev) train between Baltimore and Washington, DC, with the long-term goal of extending the train operation to New York City by way of Philadelphia. Japan's Superconducting Magnetic Levitation (SCMagLev) train is the high-speed, ground-based transportation system TNEM is promoting to build in the northeast corridor of the United States.

Information about the SCMagLev and BWRR's plans to build and operate the system have raised many questions and concerns. This is one of a series of articles that identifies and discusses some the many questions and concerns citizens and communities have identified with moving forward in building and operating the SCMagLev.

Abstract

The Northeast Maglev (TNEM) ***promises*** *the SCMagLev will alleviate transportation bottlenecks between Baltimore and Washington, D.C., and revenues will sustain and pay for the system*. This and other promises were made by promoters of other expansive high-speed and maglev projects in the United States and worldwide. This position paper delves deeper into the outcomes, consequences, and unfulfilled promises experienced in other countries with moving forward and approving the building of these systems. These bring into question the actual value of building the proposed SCMagLev when there are more higher-value transportation projects in which to invest that provide a far bigger "bang for the buck" than building a train system most D.C. residents and Marylanders cannot afford to ride.

Questions & Concerns

(1) What has happened with Asia's attempts to build and operate new high-speed train systems?

Carol Park, Senior Policy Analyst for the Maryland Public Policy Institute, cites experiences in China, Taiwan, and South Korea, stating: [1196]

- "In China, a bullet train crash in the city of Wenzhou in 2011 killed 40 people. The crash was blamed on poor design and mismanagement."
- "In Taiwan, the bullet train system rang up $1.5 billion in losses over seven years, requiring a $1 billion government bailout." (*Author's Note*: as of 2018)
- "In South Korea, a high-speed rail line connecting Seoul to Incheon closed in 2018 after just four years of service because 75 percent of seats were unoccupied."

(2) What happened with the train in South Korea?

- The South Korean government "built the Seoul-Incheon line despite consistent warnings of inadequate demand. The project was politically, rather than commercially, driven, in that the Korean officials wanted to present a futuristic version of Korea to the international community as part of the 2018 Pyeongchang Winter Olympics."[1197] However, following the Olympics, with the system continuously operating with 75 percent of the seats empty and requiring large government subsidies to maintain operation, South Korea pulled the plug.

(3) What realities are supporters of SCMagLev ignoring and glossing over?

- Park observes: "SCMagLev supporters in Maryland have similar non-business motives for backing the project. Baltimore has been experiencing a steady population decline over the years, and many supporters believe that connecting the city to economically vibrant D.C. could reverse that trend. This vision has blinded the advocates to serious concerns about the project."[1198]

- "First, though the project purports to be a private effort," Park notes, "high-speed train projects are generally magnets of questionable government subsidies,"[1199] as demonstrated by California's bullet train. The Maglev website currently predicts that the project would cost $10 billion to $15 billion without cost overrun. California's bullet train, which was estimated to cost $6 billion originally, has surged to a price-tag of $10.6 billion. If we apply this rate of cost overrun to Maglev, we can realistically expect the project to cost $17.6 billion to $26.5 billion. Even at its current price tag, Maglev would still be one of the most expensive rail lines ever built on a per-mile basis, at an

[1196] Park, Carol. "Transportation Lessons from Asia for the Northeast Maglev." Originally published in the *Daily Record*. The Maryland Public Policy Institute. December 7, 2018. www.mdpolicy.org/research/detail/lessons-from-asia-for-the-northeast-maglev?fbclid=IwAR2C1sAfojicOFJ7J6jXCqvtGmKADrtVAopQpP7XRZnc38V25p8G5wWp2s4.
[1197] Ibid.
[1198] Ibid.
[1199] Ibid.

estimated cost of $250 million per mile."[1200] (*Author's Note*: $15 billion estimate in 2018 is now a $16 billion estimated cost in 2021.)

The Northeast Maglev (TNEM) CEO Wayne Rogers and other Baltimore-Washington Rapid Rail (BWRR) representatives have stated that no tax dollars will be required to build or operate the SCMagLev. However, Wayne Rogers has said: "'We can't build our infrastructure 100 percent privately,' . . ."[1201]

Park writes: "The problems begin here. So far, only $5 billion has been pledged by the Bank of Japan toward construction. This means up to $10 billion more will be needed under the current price-tag, and up to $21.5 billion with the likely cost overrun."[1202] Every other system around the world has experienced cost overruns. "That money will be taxpayers' dollars, a large portion of that likely having to come out of Maryland residents' pockets. Rogers did not hesitate in asking for government subsidy: 'Yes, we'll go raise private investment but it can't all be private investment. We can't rebuild our infrastructure 100 percent privately.'"[1203]

Where would the needed tax dollars come from to subsidize the SCMagLev construction and operations? Most likely the tax dollars will be taken from other far-higher-priority state and national infrastructure projects, such as bridges and tunnels, and highway maintenance, repair, replacement, and enhancement, already long overdue in being addressed.

According to Park: "Unfortunately, the private sector is unlikely to invest in a project that has no evidence for profitability. After all, Maglev would target the elite business travelers and be out of reach of most residents of Maryland or D.C., due to its high-ticket prices. In addition to Amtrak, a variety of private bus companies already provide affordable trips between D.C. and Baltimore. With such narrow ridership prediction, it seems reasonable to be pessimistic about Maglev's revenue stream and profitability."[1204] MARC is also a viable transportation system for travel between D.C. and Baltimore.[1205]

[1200] Park, Carol. "Maglev: A high speed train to higher taxes." The Maryland Public Policy Institute. February 7, 2018. www.mdpolicy.org/policyblog/detail/maglev-a-high-speed-train-to-higher-taxes.

[1201] Park, Carol. "Transportation Lessons from Asia for the Northeast Maglev." Originally published in the *Daily Record*. The Maryland Public Policy Institute. December 7, 2018. www.mdpolicy.org/research/detail/lessons-from-asia-for-the-northeast-maglev?fbclid=IwAR2C1sAfojicOFJ7J6jXCqvtGmKADrtVAopQpP7XRZnc38V25p8G5wWp2s4.

[1202] Park, Carol. "Maglev: A high speed train to higher taxes." The Maryland Public Policy Institute. February 7, 2018. www.mdpolicy.org/policyblog/detail/maglev-a-high-speed-train-to-higher-taxes.

[1203] Ibid.

[1204] Ibid.

[1205] MARC - Maryland Area Regional Commuter train service. ". . . previously known as Maryland Rail Commuter, is a commuter rail system comprising three lines in the Baltimore–Washington metropolitan area. MARC is administered by the Maryland Transit Administration (MTA), a Maryland Department of Transportation (MDOT) agency, and is operated under contract by Bombardier Transportation Services USA Corporation (BTS) and Amtrak over tracks owned by CSX Transportation (CSXT) and Amtrak. With some equipment reaching speeds of 125 miles

Note: According to Maglev officials, the service would target the 'elite business travelers' and charge prices' similar to or higher "than Amtrak, which already provides regular rail service"[1206] between D.C. and Baltimore, and on to New York City.

- Second, between D.C. and Baltimore, Amtrak is far into the Federal Railroad Administration's approval process of upgrading their infrastructure, equipment, and stations to support faster trains on existing rights-of-way. Continuous high-speed rails that have replaced the prior generation rails and a new Baltimore-Washington International Airport train station represent just two of the demonstrable upgrades already completed and in operation, supporting both Amtrak and MARC commuter and traveler services.

- Third, building the SCMagLev "will inevitably disrupt the communities along the line."[1207] The destruction of homes and businesses during the building of the elevated portions of the line and the subsequent noise of the trains, as well as the potential of electromagnetic field exposure and dangerous emissions from the tunneled sections must be taken into consideration. The destruction of a large area of the remaining green space between Baltimore and D.C., is of grave concern. The negative environmental impacts of tunneling and handling of the soils removed to build the tunnel (some of which may still be contaminated from previous landfills[1208]) and the subsequent sound and vibration to homes and buildings generated by the hurtling trains underground are concerns. The negative consequences to our residents, communities, and state far outweigh any marginal benefits of building and operating the SCMagLev would potentially bring to Maryland.

- Fourth, as Park notes: "Given the immense cost estimate of Maglev and no private partners that seem excited to step in, the Maglev project is doomed to become an expensive failure. In addition, using general taxpayers' money to build a high-speed rail system that will be mainly used by high-income residents will only exacerbate Maryland's inequality."[1209]

(4) Who benefits from the SCMagLev?

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per hour (201 km/h) on the Penn Line, MARC is purported to be the fastest commuter railroad in the United States." en.wikipedia.org/wiki/MARC_Train.

[1206] Park, Carol. "Transportation Lessons from Asia for the Northeast Maglev." Originally published in the *Daily Record*. The Maryland Public Policy Institute. December 7, 2018. www.mdpolicy.org/research/detail/lessons-from-asia-for-the-northeast-maglev?fbclid=IwAR2C1sAfojicOFJ7J6jXCqvtGmKADrtVAopQpP7XRZnc38V25p8G5wWp2s4.

[1207] Ibid.

[1208] Anacostia River Park, Colmar Manor, Maryland. https://mde.state.md.us/programs/LAND/MarylandBrownfieldVCP/Documents/www.mde.state.md.us/assets/document/brownfields/anacostia.pdf.

[1209] Park, Carol. "Maglev: A high speed train to higher taxes." The Maryland Public Policy Institute. February 7, 2018. www.mdpolicy.org/policyblog/detail/maglev-a-high-speed-train-to-higher-taxes.

- The elite traveler who can afford the high-ticket price.

- The investors who are seeking to turn a profit, especially if taxpayers' dollars subsidize the building and operation of the SCMagLev, which past international experience has shown would be highly likely.

- JP Rail, the designer, builder, and operator of the SCMagLev, and the Japanese government on interest paid to service the $5 billion loan.

- The proposed SCMagLev segment will only make three stops. The residents of Anne Arundel and Prince George's Counties are unlikely to experience any commercial or economic development in their neighborhoods, yet they will bear the brunt of the pollution, damage, and destruction SCMagLev construction and operation will bring. In short, residents along the route will pay a high price and receive little-to-no benefit from the SCMagLev.

(5) What do the supporters of the SCMagLev say about the projected ridership?

- Park states: "Supporters of the SCMagLev dismiss concerns about insufficient ridership. They argue that the success of bullet trains in Japan demonstrate these hurdles can be overcome. That's exactly what officials in China, Taiwan and South Korea thought, only to discover that the situation in Japan is unique."[1210]

- She adds: "Most of Japan's 128 million inhabitants live in a few densely populated cities. Many of those residents are rich enough to afford the expensive train tickets." [1211] As a culture, most Japanese are willing to overlook the negative consequences the SCMagLev has brought into their communities because of their high level of pride in their country's accomplishments.

- According to Park: "Compared to Japan, the situation is the polar opposite in Baltimore, where many of the residents who depend on public transit are low-income workers. If these residents are to commute between Baltimore and D.C., they would need an option that is affordable and easily accessible from their homes. MagLev is neither."[1212] Americans are patriotic, but the national need for this technology has not been established. The city bus service links to MARC, which provides reliable and cost-effective transportation. It annually moves (Pre COVID-19) over 9 million passengers in and out of D.C.[1213] There is also low-cost bus service between the two cities.

[1210] Park, Carol. "Transportation Lessons from Asia for the Northeast Maglev." The Maryland Public Policy Institute. December 7, 2018. www.mdpolicy.org/research/detail/lessons-from-asia-for-the-northeast-maglev?fbclid=IwAR2C1sAfojicOFJ7J6jXCqvtGmKADrtVAopQpP7XRZnc38V25p8G5wWp2s4.
[1211] Ibid.
[1212] Ibid.
[1213] MDOT MTA Performance Improvement - Ridership. Data through 12/31/2020. Maryland Department of Transportation - Maryland Transit Administration. www.mta.maryland.gov/performance-improvement.

(6) How can the existing systems improve?

Park suggests: "Instead of wasting energy experimenting with dangerous projects like Maglev, Maryland government should redirect its energy to finding more efficient ways to allocate taxpayers' money to improve the safety of the existing transit system in Maryland. Making maximal use out of minimal taxpayers' dollar to improve Maryland's transit network should be the priority."[1214] Focusing on maintenance and safety of the existing systems is key to preventing accidents and improving services, which is far more important than building another train system only the wealthy can afford to ride.

Park concludes: "If Maryland wants to improve its transportation system, it should focus on ensuring that its existing projects are safe and managed properly. Whether this is done by restructuring the Maryland Transit Authority (MTA), or by privatizing some of the current MTA operations to incentivize better performance, it will not take billions of dollars to ensure Maryland residents have a reliable and integrated public transportation systems."[1215]

(7) Where we agree with TNEM's CEO Wayne Rogers.

- Wayne Rogers has stated: "Infrastructure is fundamentally a government responsibility, which has failed."[1216] He is right. Many governments in other countries have failed by partnering with private companies to build trains that turned out to be costly, dangerous, and increasingly reliant on government; that is, on taxpayer support. We do not need to spend tax dollars to subsidize a train system for the wealthy when there are far more important transportation projects in need of funding, projects that serve and are used regularly both by D.C. residents and Marylanders.

[1214] Park, Carol. "Maglev: A high speed train to higher taxes." The Maryland Public Policy Institute. February 7, 2018. www.mdpolicy.org/policyblog/detail/maglev-a-high-speed-train-to-higher-taxes.
[1215] Park, Carol. "Transportation Lessons from Asia for the Northeast Maglev." The Maryland Public Policy Institute. December 7, 2018. www.mdpolicy.org/research/detail/lessons-from-asia-for-the-northeast-maglev?fbclid=IwAR2C1sAfojicOFJ7J6jXCqvtGmKADrtVAopQpP7XRZnc38V25p8G5wWp2s4.
[1216] Ibid.

Findings/Conclusion

Maryland and the United States can avoid recreating the same high-speed "bottomless tax-dollar pit" by abandoning the Northeast Maglev's SCMagLev immediately, before it is too late. The funds should be used to address the many transportation priorities far worthier of attention. These systems are better integrated within our regional transportation infrastructure. Funds should be used to enhance access to the existing rail and commuter transportation systems to continue support of a broader demographic of residents and commerce. These funds should not be used to build a transportation system that only the wealthy can afford to ride. At this juncture, ". . . it is not too late for Maryland officials to stop supporting Maglev, a high-speed train to higher taxes."[1217]

Want to Help?
(1) Share this information with your family, friends, neighbors, and community.
(2) Join our Facebook page: www.facebook.com/groups/CitizensAgainstSCMagLev.
(3) Contact your elected officials to express your opposition to building the SCMagLev, go to: myreps.datamade.us.
(4) Submit multiple public comments often at www.bwmaglev.info/index.php/contact-us. State your objection(s), and always end by saying you support the "No Build Alternative."
(4) Learn more about the concerns and impacts the SCMagLev will have on our communities, see: www.stopthistrain.org/.
(5) Make a contribution to support Citizens Against the SCMagLev (CATS) and Maryland Coalition for Responsible Transit (MCRT) at mcrt-action.org. Your donation, in any amount, is appreciated. Thanks for your support!

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About the Author
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(1) Park, Carol. "Maglev: A high speed train to higher taxes." The Maryland Public Policy Institute. February 7, 2018. www.mdpolicy.org/policyblog/detail/maglev-a-high-speed-train-to-higher-taxes.

[1217] Park, Carol. "Maglev: A high speed train to higher taxes." The Maryland Public Policy Institute. February 7, 2018. www.mdpolicy.org/policyblog/detail/maglev-a-high-speed-train-to-higher-taxes.

(2) Park, Carol. “Transportation Lessons from Asia for the Northeast Maglev.” The Maryland Public Policy Institute. December 7, 2018. www.mdpolicy.org/research/detail/lessons-from-asia-for-the-northeast-maglev?fbclid=IwAR2C1sAfojicOFJ7J6jXCqvtGmKADrtVAopQpP7XRZnc38V25p8G5wWp2s4.

Maryland Public Policy Institute: “The Maryland Public Policy Institute is dedicated to advancing freedom and opportunity for every Marylander. We fulfill our mission by developing and promoting policy ideas that enable Maryland citizens and policy makers to chart a path to a freer and more prosperous future.” (https://www.mdpolicy.org/about/) “The author of the original article is Carol Park, a senior policy analyst in the Center for Business and Economic Competitiveness at the Maryland Public Policy Institute. Ms. Park can be reached at cpark@mdpolicy.org.” (https://www.mdpolicy.org/research/detail/lessons-from-asia-for-the-northeast-maglev?fbclid=IwAR2C1sAfojicOFJ7J6jXCqvtGmKADrtVAopQpP7XRZnc38V25p8G5wWp2s4)

(3) MARC - Maryland Area Regional Commuter train service. en.wikipedia.org/wiki/MARC_Train.
(4) MDOT MTA Performance Improvement - Ridership. Data through 12/31/2020. Maryland Department of Transportation - Maryland Transit Administration. www.mta.maryland.gov/performance-improvement.

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C. Appendix - Reprint: Woomer, Dan. "Amtrak – the Better Alternative." CATS-MCRT White Paper. January 11, 2021

By: Dan Woomer
Edited by: Susan McCutchen

The Baltimore-Washington Rapid Rail (BWRR) (the project developer) and the Northeast MagLev (TNEM) (the promotional entity) have the short-term goal of obtaining Federal Railroad Administration (FRA) approval to build a magnetic levitation (maglev) train between Baltimore and Washington, DC, with the long-term goal of extending the train operation to New York City by way of Philadelphia. Japan's Superconducting Magnetic Levitation (SCMagLev) train is the high-speed, ground-based transportation system TNEM is promoting to build in the northeast corridor of the United States.

Information about the SCMagLev and BWRR's plans to build and operate the system have raised many questions and concerns. This is one of a series of articles that identifies and discusses some the many questions and concerns citizens and communities have identified with moving forward in building and operating the SCMagLev.

Abstract

The existing Amtrak train system, with its ongoing work to improve and enhance services and ridership experience, provides demonstrable evidence that supports the argument for its continued development. It is a far better and more cost-effective solution to address the rail transportation needs of the Northeast Corridor than the construction of the SCMagLev train system - an expensive, elite, and commercially unproven technology system that presents many unanswered safety and financial questions, as well as harmful community and environmental issues.

About Amtrak

Amtrak currently provides intercity passenger rail service with over 21,000 route-miles of track across 46 states, including the District of Columbia, and Canada. Amtrak's *Acela Express*, *Northeast Regional*, *State Supported*, and *Long-Distance* rail services between Boston, New York, Philadelphia, Baltimore, and Washington, DC, provide an expansive array of services for passengers and commuters. As the majority owner of the Northeast Corridor (NEC), Amtrak provides coordinated passenger and freight rail service planning for the NEC, as well as infrastructure access and operational support to eight commuter rail authorities — including the Maryland Area Regional Commuter (MARC) and the Virginia Railway Express (VRE) — and

four freight rail operators. Amtrak's long experience as the U.S. high-speed operator, and the NEC end-to-end user, provides a unique, profound, and expert insight and perspective about the Baltimore-Washington passenger rail transportation network.

Questions & Concerns

Amtrak and the Federal Railroad Administration (FRA) have already analyzed the passenger rail transportation needs between Baltimore and Washington, DC, and found a new train route was not necessary.

Amtrak's *NEC Future* program has already addressed the mobility challenges of the Baltimore-Washington, DC, travel corridor with a focus on the role of passenger rail in meeting current and future challenges.[1218] The FRA has already completed a lengthy and costly evaluation of future transportation needs and considered the capacity constraints of the total transportation system — including rail, highway, and air — to complete a programmatic Environmental Impact Study (EIS) of the *NEC Future* proposals and plans, and Amtrak received FRA's approval. The EIS focused on technology-neutral rail passenger technologies. Although a new alignment (route) was considered, the option of building one was ruled out as being unduly expensive and unnecessary. Instead, the preferred alternative focused on improving the existing rail alignment (route).

The framework for passenger rail investment between Baltimore and Washington, DC, is already in place.

Amtrak, the owner of the NEC between Baltimore and Washington, DC, works collaboratively with the FRA, MARC, and VRE, as well as the Northeast Corridor Commission, the states of Maryland and Virginia, Washington, DC, the Maryland Transportation Authority (MTA), the District of Columbia Department of Transportation (DCDOT), the Washington Metropolitan Area Transit Authority (WMATA), and others, to develop the *NEC Future* to address current and future needs, solve problems, prepare plans, and invest in passenger rail between Baltimore and Washington, DC.

The ability to evaluate the environmental consequences of building and operating the SCMagLev is unclear.

The SCMagLev technology proposed by BWRR is not a proven rail technology nor has it been commercially successful. Data and experience are not yet available to evaluate the potential effects of building and operating the SCMagLev train system on the local and regional economies, existing transportation systems, and the human and natural environment, as required in a Draft Environmental Impact Study (DEIS) and EIS.

[1218] U.S. Department of Transportation and Federal Railroad Administration. *NEC Future: A Rail Invest Plan for the Northeast Corridor*. *Record of Decision*. July 2017. https://www.fra.dot.gov/necfuture/pdfs/rod/rod.pdf. Referred to throughout this white paper.

Additionally, BWRR has clearly indicated this is only the first segment of an SCMagLev line they propose to extend from Baltimore to Boston and Massachusetts to the north, and from Washington, DC, to Charlotte, North Carolina, to the south. This indicates that the current SCMagLev scope provides neither true independent utility nor the full scope of the project as required for a DEIS and EIS.

Substantial investment in passenger rail transportation is already underway between Baltimore and Washington, DC.

Amtrak, Citizens Against the SCMagLev (CATS), the Maryland Coalition for Responsible Transit (MCRT), and a growing number of community organizations, environmental groups, and elected officials at the county, state, and federal levels, question the competing priorities between the Baltimore-Washington SCMagLev project and Amtrak's ongoing upgrades and enhancements.

The SCMagLev calls for construction of a separate maglev network with new guideways, stations, and maintenance facilities. To fund this massive construction, BWRR is anticipating funding from a mix of federal and private sectors.

Amtrak's *NEC Future's* EIS to renew and modernize the NEC infrastructure between Washington, DC, Baltimore, Philadelphia, New York City, and Boston was approved by the FRA. The new $4.7 million recently-renovated Baltimore-Washington Airport rail station used by both Amtrak and MARC is an example of this renewal in progress (see photos).[1219, 1220]

Original BWI Rail Station. Photo by Bob E.

New BWI Rail Station. Photo by B. Taylor

[1219] E., Bob. Photo of original BWI Rail Station. May 29, 2016. foursquare.com/v/bwi-amtrakmarc-rail-station-bwi/4ac9c22bf964a5201ec020e3/photos.

[1220] Taylor, Barbara H. Photos of newly renovated BWI Rail Station and rededication. *The Baltimore Sun*. December 10, 2019. www.baltimoresun.com/travel/bs-md-new-train-station-20191210-u3tc4uizfbc2zn3djp7c2rxije-photogallery.html.

NEC Future has confirmed the need for passenger rail investment on the existing corridor between Baltimore and Washington, DC, including the replacement of the Baltimore and Potomac Tunnels, additional right-of-way and track segments, and modernization and expansion of the Washington Union Station. These and other crucial NEC projects are already well along in the planning process, most having completed the engineering and environmental clearance stages. Several of the upgrade projects have been completed. Over the next 5-10 years, the cost to complete them will require substantial financial commitment from the federal government, Amtrak, and others. These commitments are in direct competition with the plans of BWRR and their proposed SCMagLev train system. BWRR's anticipated January 2021 DEIS must justify the need for the SCMagLev as compared with Amtrak services, acknowledging that Amtrak is already providing passenger and commuter transportation and improving their array of services and NEC systems.

BWRR has openly and repeatedly stated and testified that further public investment has already been committed and they will pursue their efforts to secure additional public, including tax dollar, investments. However, as noted previously, major public passenger rail transportation support (tax dollars) has already been committed to Amtrak and the associated improvements and construction is underway. Public-private investment in projects noted in the *NEC Future* are also underway. To date, Amtrak has secured a $2.5 billion loan with the FRA to purchase new high-speed trains and construct the infrastructure needed to optimize high-speed rail service between Baltimore and Washington, DC.[1221]

Findings/Conclusion

Amtrak does not operate independently. It continues to work collaboratively with the FRA, NEC, MTA, MARC, VRE, DCDOT, and WMATA, as well as the states of Maryland and Virginia, Washington, DC, and others. They have jointly developed the *NEC Future*, prepared the approved Passenger Rail Corridor Investment Plan—which includes enhancement projects through 2040 and beyond—and have started implementing the planned improvements and enhancements to the Northeast Corridor rail system and service.

(2) CATS, MCRT, and Amtrak (which has a history of successful EIS preparation and approval), cannot determine the environmental impact of the SCMagLev train project because: "Data and experience are not yet available to evaluate the potential effects of maglev on the economy, transportation system, and the human and natural environment as is required in a DEIS and EIS."

(3) Amtrak's *NEC Future* has moved past the planning process, including successfully completing the environmental clearance and initial engineering stages, to beginning the actual upgrades and building phase. Financial commitments include a $2.5 billion loan to purchase

[1221] Clabaugh, Jeff. Amtrak's new Acela fleet is on the move (see it). January 23, 2020. https://wtop.com/business-finance/2020/01/amtraks-new-acela-fleet-is-on-the-move-see-it/.

high-speed trains and construct the infrastructure needed to improve high-speed train travel along the Northeast Corridor.

(4) Amtrak's *NEC Future*-related EIS was the result of a costly four-year study, to which the regional, state, and federal stakeholders have concurred and approved Amtrak's recommendations and financial plans to proceed with the enhancement of existing right-of-way, equipment, and facilities.

Continued development and support of Amtrak is a far better solution than moving forward with building the SCMagLev transportation system. Amtrak and its options provide a reliable, technically and financially-proven system at a reasonable cost for near- and long-distance rail transportation that accommodates commuters and passengers. After four years of study by the FRA, which involved the significant use of financial and human resources, and extensive engagement with stakeholders — the federal government, states, cities, the railroads, and the public — the already-completed, approved, and published *NEC Future* lays out a sound plan and investment approach to address the NEC's current and future needs. This approved plan should remain the blueprint for the future of passenger rail transportation between Baltimore and Washington, DC, as well as for the Northeast Corridor.

The competitive SCMagLev transportation system, by comparison, is inordinately expensive, commercially unproven, and potentially damaging to people, communities, and the environment. There are many unanswered safety issues, and it is very likely large government subsidies (tax dollars) will be required to build and maintain and operate the SCMagLev. SCMagLev, a transportation system for the elite and well-heeled traveler, is not justified and should not be approved.

Want to Help?
(1) Share this information with your family, friends, neighbors, and community.
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(2) Woomer, Dan. "SCMagLev - AMTRAK Comment Submission to the Baltimore-Washington Rapid Rail Environmental Impact Study." January 5, 2018
(3) Wikipedia. "BWI Rail Station." en.wikipedia.org/wiki/BWI_Rail_Station.

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CI. Appendix - Reprint: Woomer, Dan. "AMTRAK - Next Generation Acela." CATS-MCRT White Paper. January 11, 2021

MagLevTruth
CATS - Citizens Against the SCMagLev
STOP THE MAGLEV TRAIN

MARYLAND COALITION FOR RESPONSIBLE TRANSIT

By: Dan Woomer
Edited by: Susan McCutchen

The Baltimore-Washington Rapid Rail (BWRR) (the project developer) and the Northeast MagLev (TNEM) (the promotional entity) have the short-term goal of obtaining Federal Railroad Administration (FRA) approval to build a magnetic levitation (maglev) train between Baltimore and Washington, DC, with the long-term goal of extending the train operation to New York City by way of Philadelphia. Japan's Superconducting Magnetic Levitation (SCMagLev) train is the high-speed, ground-based transportation system TNEM is promoting to build in the northeast corridor of the United States.

Information about the SCMagLev and BWRR's plans to build and operate the system have raised many questions and concerns. This is one of a series of articles that identifies and discusses some the many questions and concerns citizens and communities have identified with moving forward in building and operating the SCMagLev.

Abstract

The SCMagLev is in the imagination stage, while Amtrak is building and testing its next-generation Acela, scheduled to start operation in 2021. The new Acela trains will be faster and safer, accommodate more passengers and commuters, and provide a better travel experience. The SCMagLev, a highly-expensive, likely tax-dollar subsidized transportation system for the elite, well-heeled traveler is on BWRR's drawing board, while Amtrak's Acela has already received FRA approval to be built and will soon deploy a functional high-speed train system to enhance Amtrak's array of passenger and commuter services in the Northeast Corridor.

About Amtrak

Amtrak currently provides intercity passenger rail service with over 21,000 route-miles of track across 46 states, including the District of Columbia, and Canada. Amtrak's *Acela Express*, *Northeast Regional*, *State Supported*, and *Long-Distance* rail services between Boston, New York, Philadelphia, Baltimore, and Washington, DC, provide an expansive array of services for passengers and commuters. As the majority owner of the Northeast Corridor (NEC), Amtrak provides coordinated passenger and freight rail service planning for the NEC, as well as infrastructure access and operational support to eight commuter rail authorities — including the Maryland Area Regional Commuter (MARC) and the Virginia Railway Express (VRE) — and four freight rail operators. Amtrak's long experience as the U.S. high-speed operator, and the NEC end-to-end user, provides a unique, profound, and expert insight and perspective about the Baltimore-Washington passenger rail transportation network.

Questions & Concerns

(1) While BWRR is still in the early stages of planning for a new train system, where is Amtrak?

New Acela. WTOP News. Photo Amtrak.

- Amtrak plans to replace its popular Acela trains in 2021 with new ones that will hold more people, travel faster, and have improved safety features. The new trains will shave 15-20 minutes off the popular New York City to Washington, DC, route, which currently takes about three hours. The next-generation Acela will travel at speeds up to 160 miles-per-hour.

- While high-speed rail has struggled to take hold in the United States, Amtrak's new second-generation fast trains are pushing Amtrak toward profitability. CBS News' Kris Van Cleave got a first look at the new Acela being assembled in the United States (as opposed to in Japan for the SCMagLev). Kris Van Cleave traveled to the Hornell factory in western New York, which employs some 800 American employees, to see the new Acela being built and was favorably impressed.[1222]

- The future of America's high-speed rail is starting to take shape in the same place where trains have been serviced, built, and rehabbed by American workers since the 1850s. In Mr. Van Cleave's report, he interviews Stanley Hall, a third-generation train builder, who speaks to the pride of building the next generation of Acela here in the United States: "And it's not just my father and grandfather, my brother comes in here and works. I had several cousins that worked here ... when I was first hired, my uncle helped me a lot to get my job here."[1223]

- Richard Anderson, the former Delta Airlines CEO who now runs Amtrak, said the new Acela is "incredibly important" to the future of the company. "It really lays out a clear vision for what short haul, inter-city passenger rail transportation can do for this country. And, this country is going to need it in more and more corridors because millennials don't want to drive, and you cannot add enough lane miles for 100 million more people," Anderson said.[1224]

- The updated Acela trains will hold about 380 people — 25 percent more passengers than the prior generation — and are designed to tilt as they take turns, allowing them to go faster. Amtrak's most lucrative corridor linking Boston, New York, and Washington, DC, will see a cut in travel time by at least 15 minutes. "We've got to position Amtrak to have a modern product that a millennial wants to get on with high-speed Wi-Fi, craft beers and reliable schedules that beat buses, cars and airplanes," said Mr. Anderson.[1225]

- To gain the magnetic lift and speed of the SCMagLev, many of the FRA train standards for strength and crash worthiness have been "adjusted" to incorporate lighter materials. These "adjustments" have the real potential to render the SCMagLev less crashworthy, resulting in far more serious injuries if there is an accident. While BWRR claims the SCMagLev is very safe, so did the German government in certifying their maglev train; that is, until it crashed on September 22, 2006, killing 70 percent of the passengers and injuring the rest, most severely injured. This accident, as well as significant cost overruns and serious building/deployment schedule delays, forced the German government to "pull-the-plug" on their maglev plans after having invested millions and millions of taxpayer dollars into their costly, high-tech folly. (Kemp and Smith, 2007)

[1222] Van Cleave, Kris. "Inside Amtrak's next-generation Acela train: 'Wi-Fi, craft beers and reliable schedules." CBS News. June 11, 2019. www.cbsnews.com/news/amtrak-new-acela-trains-first-look/.
[1223] Ibid.
[1224] Ibid.
[1225] Ibid.

- The new Acela trainsets will offer passengers faster Wi-Fi, USB charging in each seat, reading lights, and winged headrests (so no one will fall asleep on your shoulder). And, unlike the airlines, Mr. Anderson promises Amtrak will not shrink your seat.[1226]

- Amtrak is nearly 50 years old. The railroad predicts it is on track to break even for the first time by 2021 when the new Acela will start racing along the Northeast Corridor. Mr. Hall plans to be one of the first passengers. "It's just going to be, you know, just pride. Because I know somewhere on that train that there will be a plaque that says that this was manufactured in Hornell, New York." Mr. Hall said. An American train system, Amtrak is built and maintained by Americans, whose jobs will continue to implement, build, and maintain the upgrades, tracks, stations, facilities, and more. The Acela (and other passenger train systems, like MARC and VRE) will offer affordable travel while improving passenger comfort and safety.[1227]


Interior of the new Acela. Photo by Kris Van Cleave.

- To improve their existing rail system, Amtrak continues to replace and upgrade tracks along the Northeast Corridor to accommodate the next generation of Acela trains. These new tracks have also improved the reliability and ride for the low-cost commuter MARC trains. The MARC system carries more than 8 million passengers and commuters each year, and ridership continues to grow. MARC also implemented an upgrade plan and has significantly rebuilt and improved train stations and parking facilities, as well as completed a series of upgrades to both passenger car and locomotive equipment, replacing older equipment with new, more reliable, and more comfortable trainsets.

- Amtrak currently operates 20 Acela trainsets and has ordered 28 new ones, enabling Amtrak to add more service and start reduced travel time non-stops. There is also an excellent potential that the new Acela model could work in other parts of the United States.

[1226] Ibid.
[1227] Ibid.

Findings/Conclusion

(1) Amtrak's *NEC Future*-related Environmental Impact Statement was the result of a costly four-year study. Regional, state, and federal stakeholders approved Amtrak's recommendations and financial plans to proceed with the enhancement of existing right-of-way, equipment, and facilities.[1228]

(2) In contrast with BWRR's expensive drawing-board concept, Amtrak has moved past the planning process, successfully completing the environmental clearance and initial engineering stages, and begun to implement upgrades and start the building, and soon deployment, of the new Acela. Financial commitments, including a $2.5 billion loan from the FRA, are being used to build and deploy the next generation of high-speed trains today, and construct the infrastructure needed to improve high-speed train travel along the Northeast Corridor.[1229]

Continued development and support of Amtrak is a far better solution than moving forward with building the SCMagLev transportation system. Amtrak and its options provide a reliable and technically and financially-proven system at a reasonable cost for near- and long-distance rail transportation that accommodates commuters and passengers. After four years of study by the FRA, which involved the significant use of financial and human resources, and extensive engagement with stakeholders—the federal government, states, cities, the railroads, and the public—the already-completed, approved, and published *NEC Future* lays out a sound plan and investment approach to address the NEC's current and future needs. This approved plan should remain the blueprint for the future of passenger rail transportation between Baltimore and Washington, DC, as well as for the Northeast Corridor.

The competitive SCMagLev transportation system, by comparison, is inordinately expensive, commercially unproven, and potentially damaging to communities and the environment. There are many unanswered safety issues and large government subsidies (tax dollars) will be required to build and maintain its operation. This transportation system for the elite and well-heeled traveler is not justified and should not be approved.

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[1228] U.S. Department of Transportation and Federal Railroad Administration. *NEC Future: A Rail Invest Plan for the Northeast Corridor*. *Record of Decision*. July 2017. https://www.fra.dot.gov/necfuture/pdfs/rod/rod.pdf. Referred to throughout this white paper.
[1229] Ibid.

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(2) Woomer, Dan. "First Look at the Next Generation of Amtrak's Acela." June 13, 2019.

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CII. Appendix: Submission Reprint: Zaleski, Andrew. – "Crazy Train - Is the proposed 300-mile-per-hour maglev train Baltimore's future? Or fantasy?." *Baltimore Magazine*. September 2019.

Northeast Maglev

Without a tape measure, it's hard to tell exactly the distance separating Ed Anderson's backyard and the chain-link fence cordoning off the Baltimore-Washington Parkway. But Anderson says he's sure it's no more than 65 feet. All right, maybe 100 feet. The point is, it's close. And needless to say, that's not what Anderson wants, not for the backyard of his corner townhouse in South Laurel, which is one of several battlegrounds in one of the thorniest transportation conflicts since Governor Larry Hogan canceled the Red Line four years ago.

By 2030, it's entirely possible that a massive train will be hurtling by Anderson's house several times a day. Not just any train: a 311-mile-per-hour superconducting magnetic levitation train. For almost 10 years, Baltimore Washington Rapid Rail (BWRR)—a private group helmed by Wayne Rogers, former chairman of the Maryland Democratic Party—has worked to import the latest high-speed rail technology from Japan. Commonly known as maglev, this proposed train utilizes powerful electromagnets instead of steel wheels. Rubber tires guide the train inside a concrete guideway, but once it reaches 90 mph, built-in magnets interact with others on the guideway, enabling the train to literally hover several inches high and reach speeds exceeding 300 mph in less than two minutes.

The model for BWRR is a 27-mile-long maglev line in Japan. Operated by the Central Japan Railway Company, it's merely a testing track for the company's ultimate goal—a 272-mile-long maglev line between Tokyo and Osaka hoped to be completed by 2037. The first leg of this line, connecting Tokyo to Nagoya, is slated to begin running in 2027.

[MCRT Editor's Note: As of October 2023, the 2027 date has slipped to 2037.]

As it so happens, 2027 is also the date when BWRR hopes to welcome passengers aboard the first leg of its own maglev line: Washington, D.C. to Baltimore in 15 minutes, with a stop at BWI Airport. If that comes to pass, Anderson might have a front-row seat to a superfast train buzzing by atop a 50-foot-high viaduct within a football toss of his house. It may be less noisy than a regular train, but that's of little comfort.

"I definitely would never want that eyesore," Anderson says on a bristling hot May afternoon. "You think I would've bought this property knowing that?"

Since 2016, as part of an environmental and engineering review, Rogers' group, in tandem with the Maryland Department of Transportation and the Federal Railroad Administration, has whittled a potential 14 routes for their maglev train down to two. Each proposed route hews closely to Route 295—one to the east and one to the west. Close to three-quarters of either route would be out of sight in gargantuan, 45-foot-diameter tunnels, but that still leaves about 10 miles of maglev line that needs to travel along bridges. Meanwhile, three locations in Baltimore are being considered for the terminus: one in Inner Harbor, one in Westport, and another in Port Covington.

[MCRT Editor's Note: As of October 2023, BWRR's preferred Baltimore Location is Cherry Hill.]

The years-long review process, however, has done little to assuage the concerns of opponents along the route, as well as those in Baltimore, who prefer public transit dollars be put to local projects. "In Baltimore we have not built any new infrastructure in 40 years," says state Delegate Robbyn Lewis, who represents District 46 in the city. "What the hell are we talking about maglev for?"

"You think I would've bought this property knowing that?"

Yet maglev's supporters think opponents fail to see the bigger vision, one that might link the northeast cities unlike ever before. As the first way station, Baltimore has an opportunity to eventually draw people, business, and investment from up and down the East Coast, one of the world's busiest rail corridors.

"We've lost an entire generation of letting our infrastructure in America deteriorate," says Rogers. "We have to turn that around."

In Maryland, the concept of a maglev line has a crucial supporter in the Governor's Mansion. After riding Japan's maglev test line while on an international trade mission during his first term as governor, Hogan was hooked. This was 2015, and shortly afterward his administration agreed to sponsor BWRR through the environmental and engineering review process currently

underway. Beyond that, state support in the General Assembly and among the general public remains nominal.

Before Hogan even left for Japan, Rogers had laid the groundwork for a maglev train in the northeastern U.S. He knew Torkel Patterson, a Central Japan Railway Company (JR Central) board member, from their time together at the U.S. Naval Academy in 1972. After a series of meetings in Tokyo, the company promised to waive its technology licensing fees if Rogers started a firm to bring maglev to the states. Convincing others of maglev's potential is the task, especially given the full extent of what BWRR is trying to accomplish. "Who would think of driving two hours in their car from Baltimore to D.C. when I could jump on a train in 15 minutes?" says Rogers. "It's going to change the way people think, where they work, and where they live. We're convinced." Rogers exaggerates the drive time a bit—70-90 minutes for a trek to Washington is more common—but he makes a point. Who can afford the cost of that round-trip ticket is another question.

"The real goal is shrinking geography between Washington and New York so that we bring 50 million people within one hour of transportation," he says. Because of that ambition, all of the new infrastructure proposed for the Maryland stretch is on a scale that could accommodate the millions of annual riders Rogers believes will be drawn to a high-speed transportation option.

Yet maglev trains remain unproven in the commercial sense, despite JR Central developing the technology close to five decades ago. To date, there are only two such trains operating, and both are considered "demonstration trains." In China, a maglev train that launched in 2002 shuttles people from Shanghai's airport to the city's business district in just eight minutes. The other is the current test track in Japan. The reason is simple enough: money. Estimates of the cost to lay down one mile of maglev rail can range up to $100 million, a cost that grows exponentially when tunneling is involved.

"I have objections to…do[ing] something exotic when cost-effective alternatives are at our fingertips."

In Japan, the final build-out of the Toyko to Osaka line is expected to cost $80 billion, which offers a sense of how much a maglev train running from D.C. to New York City will cost. Passengers, Rogers suggests, will likely pay a price that's competitive with Amtrak's Acela line—somewhere between $50 and $100, depending on deals and time of day—but other officials have said it will cost more.

So far, according to the Maryland Public Policy Institute, BWRR has raised only $5 billion of the estimated $12-15 billion to build its D.C. to Baltimore line. "I don't have technological or philosophical objections to maglev. I do have objections to the frame of mind that says we have to do something exotic when cost-effective alternatives are right at our fingertips," says Del. Lewis. "It costs a lot of money but won't move a lot of people."

In Baltimore, where finding reliable bus service can be like playing a game of roulette, transportation exists in the realm of reality, not concept. People need buses and subways that run, and on time, Lewis says. Plus, the MARC commuter train already exists between D.C. and Baltimore. Why not expand service and build an additional rail so MARC trains don't have to share space with freight rail and Amtrak's passenger trains?

Rogers parries these sorts of questions. Studies done by BWRR say a maglev could accommodate one-tenth of the nearly 120 million trips taken between the two cities annually. He is also quick to highlight the estimated 74,000 construction jobs the project will create, the very thing that won over support for the project from local leaders of the state conference of the NAACP in June.

Meanwhile, some of the strongest opposition to the project continues to come from residents such as Anderson who live near the routes under consideration. The luster of a high-speed maglev train wears off when they consider the impact construction might have on their homes: boring machines chewing earth, trucks hauling off tons of dirt, tunnels beneath their streets, and ever-present viaducts supporting trips north and south every 10 minutes, as BWRR hopes to do. An independent analysis found the proposed routes affect 916 total parcels of land. "I hate the word NIMBY, because this wouldn't be in our backyard," says Gary Stone, who lives about 10 minutes away from Anderson. "This would be in our front yard." Dennis Brady, former leader of Citizens Against This SCMaglev (SC for "super conducting"), remains skeptical that private financing will cover the cost. "We point out that there isn't a major transportation system in the world that isn't supported by their government."

Meanwhile, maglev true believers are still trying to win over hearts and minds. In late May, it's standing room only as about 65 people try to find space inside the small town hall of Riverdale Park, located in Prince George's County. Most people are equal parts dismayed and flummoxed, even close to three years into the review process. Should they worry about their homes' property values, assuming a visible viaduct is a hundred feet away? Will underground vibrations disrupt neighborhoods and streets? Is the train loud? And what is the real cost in the end anyhow?

David Henley, project director of the proposed maglev train, takes each question in turn: The cost is north of $12 billion, [now $16 million] but BWRR is looking into low-interest, long-term loans for financing, so, no tax dollars. The vibrations are minimal, so minimal that you won't even feel them. Noise? It's rubber tires, not steel wheels, and then the train is on air. He stresses no homes are being taken to make room for a train. As for property values?

"I don't think it'll do anything [to the] land value at all," he says later.

[MCRT Editor's Note: "The vibrations are minimal, so minimal that you won't even feel them." This is ***FALSE***. See the Baltimore Sun's Kevin Rector's October 27, 2018 article reprint in this document's Appendix – ''It can be done': Futuristic Japanese maglev train could

revolutionize travel from DC to Baltimore, and beyond."]

Still, Rogers admits questions remain unanswered. What about the ridership—will ticket prices cover the operating costs? On that, he equivocates a bit. "It's like telling you what your monthly payment of your mortgage [would be], and you haven't built the house yet," he says.

And how about the money required to extend the line to New York City? "We don't know yet," he admits. "There's too many variables in it." Call this the wait-and-watch stage. And here's a plot twist: It could be that the Federal Railroad Administration ultimately says its recommendation is to not build a maglev at all.

A draft Environmental Impact Statement identifying a preferred route is due later this year, followed by five public hearings, including one in Baltimore. The next year will determine whether the rubber meets the guideway, if you will, as the environmental statement is finalized, a route is picked, a full ridership and revenue report is released, and, optimistically speaking, construction begins in 2020. "I guarantee when people are landing at BWI and getting into Washington in eight minutes, the people in New York and Philadelphia are going to want the same thing," says Rogers.

For now, all Maryland folks can do, irrespective of their position on maglev, is wait for the review process to finish unfolding. Don't blink, or you'll miss it.

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