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MARYLAND COALITION FOR RESPONSIBLE TRANSIT

What Impact Would the SCMagLev Have on Our Communities?

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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 heath 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).[1,2]

[1] 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/

[2] 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.

- 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.

    - 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.[3,4]

- Maryland is a radon gas "hot spot." Average measurements across the state range for 0.2 pCi/l to 61 pCi/L.[5] 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."[6]

- 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

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.

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[3] 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.)

[4] 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.)

[5] Radon Levels Across Maryland. phpa.health.maryland.gov/OEHFP/EH/Pages/Radon.aspx.

[6] American Cancer Society. "Radon and Cancer. Last reviewed December 6, 2011. www.cancer.gov/about-cancer/causes-prevention/risk/substances/radon/radon-fact-sheet.

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
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(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.
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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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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.