YOUR RIDE IS HERE.

Purple Line

Montgomery County
TPSS Meeting
May 1, 2014
Light Rail Traction Power Substation

• **IS NOT:**

- Outdoor 230,000 Volt electric utility substation
- Amtrak outdoor 138,000 Volt (output) railway power station (13,200 Volt input)
Baltimore Light Rail Traction Power Substation

- **IS:**

  - Input: 13,800 Volt ac
  - Output: 750 Volt dc
Light Rail Traction Power Substation

• The average power output of a modern light rail TPSS is not large in comparison with typical neighborhood electric power requirements
  – That’s why they can use existing power distribution lines
  – Many PEPCO pad-mounted transformers that are used to provide power to neighborhoods and commercial office buildings have an equivalent or higher average power output than do modern light rail traction power substations
Light Rail Traction Power Substation

- Traction power substations (TPSS) provide power to the light rail system
- Convert the alternating current (ac) electric power supplied by PEPCO into the 750v direct current (dc) power required by the trains
- TPSS get their power from the same PEPCO distribution lines that serve the neighborhood
- TPSS are located approximately every mile along the alignment
- TPSS locations are interrelated - Any significant adjustment of the location of one TPSS will necessitate adjustments to the adjacent TPSS locations.
Light Rail Traction Power Substation

• TPSS are very safe
• They are located in residential neighborhoods throughout the US and the world
• All the electrical equipment in a TPSS is enclosed within a locked building providing security and sound absorption
• There are regular site visits to the TPSS by operations staff
• There would be no safety or health issues associated with this in a neighborhood or adjacent a school
Light Rail Traction Power Substation

- A modern light rail TPSS has more protective features than a PEPCO pad-mounted transformer in many respects:
  - The power transformer in a TPSS is a “dry type” transformer, unlike the typical utility pad-mount transformer that uses oil for electrical insulation
  - Dry type transformers do not leak, and do not catch fire
  - A TPSS also includes additional electrical equipment including a rectifier that changes ac power to dc power
  - All equipment is enclosed by sturdy, grounded metal compartments
  - Electricity cannot “get out” of these compartments
Light Rail Traction Power Substation

Interior View under normal operation

Light Rail TPSS
Denver, CO
Site and Noise Requirements

• Site Requirements
  – Standard Purple Line TPSS are approximately 52 feet by 14 feet
  – Space is required around the building for access
  – A broader clear area (approximately 40 feet by 80 feet) is needed around the TPSS

• TPSS are air conditioned and make a low humming noise, just like your air conditioner at home.

• External audible noise from TPSSs shall not exceed 60 db (A) maximum at any point 3 feet away from the TPSS when energized at rated input voltage and at 100% full load current.
Substation Visual Impact Mitigation

- TPSS visual mitigation in sensitive locations is provided by planting and/or ornamental fencing
TPSS Locations

- There are eight (8) TPSS sites in Montgomery County