

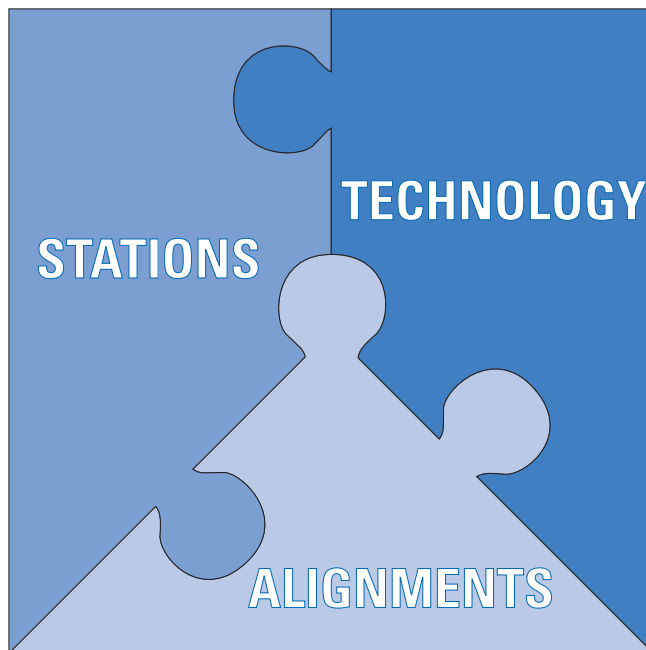
NORTHWEST RAIL TRANSIT TECHNOLOGY



NORTHWEST RAIL ENVIRONMENTAL EVALUATION

The Northwest Rail Corridor is a proposed 41-mile high-capacity fixed-guideway transit corridor between Denver Union Station (DUS) and Longmont, passing through Denver, North Denver, Adams County, Westminster, Broomfield, Louisville, Boulder and Longmont.

The project has three pieces: alignments, stations and technology.



Alignment: The project's expected alignment will use the right-of-way of the BNSF Railway. Starting at DUS, the alignment generally parallels I-25, US 36 and SH 119.

Stations: The NW Rail EE will evaluate the station sites that were suggested by two previous studies: The US 36 Corridor EIS and the Longmont Diagonal EE. However, FasTracks-funded stations are assumed to be 71st/Lowell and US 36/Church Ranch in Westminster, Flatiron/96th in Broomfield, Louisville, 30th/Pearl in Boulder, along SH 119, and Longmont.

TECHNOLOGY

Commuter rail vehicle technology is being evaluated. Commuter rail is a passenger train that can be operated either by diesel fuel or electricity. This transit mode is used for local or regional service, typically of longer distances, operating between a central city and surrounding community or activity centers. Commuter rail vehicles are heavier than light rail and comply with Federal Railroad Administration (FRA) crash-worthiness standards; therefore, they may operate in an existing freight rail corridor. The NW Rail project may evaluate two types of commuter rail: diesel multiple unit (DMU) and electric multiple unit (EMU).

DMU









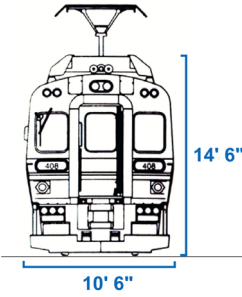
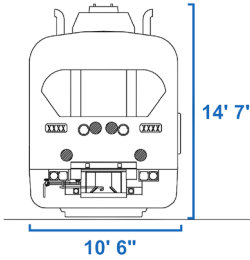
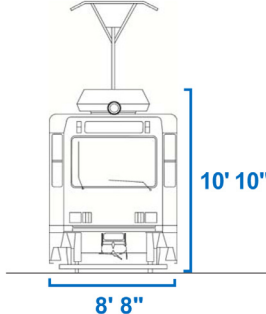



- Self-propelled diesel passenger car
- Diesel motor powers railcar
- No locomotive required
- Single car or multiple unit trains

EMU



- Self-propelled electric passenger car
- Electricity from overhead catenary (wires)
- No locomotive required
- Single car or multiple unit trains

EMU & DMU CHARACTERISTICS COMPARISON

	EMU	DMU	LRT (FOR COMPARISON)
EXTERIOR IMAGES			
INTERIOR IMAGES			
PROFILE VIEW			
POWER	Electric-overhead catenary (wires)	Diesel - similar to two semi engines	Electric-overhead catenary (wires)
CAR SIZE	10'6" x 14'6"	10'6" x 14'7"	8'8" x 10'10"
MAXIMUM SPEED / ACCELERATION	79 mph 3 mph/second	79 mph 2 mph/second	55 mph 3 mph/second
OPERATING GRADE	<4%  4 feet	<3%  3 feet	<4.6%  4.6 feet
SEATED CAPACITY / CAR	90 seats	81 seats	64 seats

HOW DO THESE CHARACTERISTICS AFFECT THE NORTHWEST RAIL CORRIDOR?

Power: The overhead catenary (wires) of the EMU cause a visual obstruction. Typical heights of the wires are approximately 28 feet above the rails. The catenary on an EMU is similar to LRT. The diesel engine of the DMU is similar to two semi-engines.

Maximum Speed/Acceleration: EMU accelerates slightly quicker than DMU; therefore the EMU trip time is slightly faster.

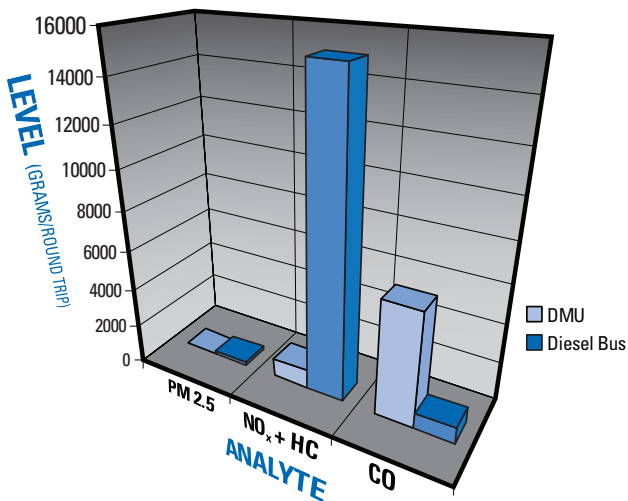
Seated Capacity/Car: EMU and DMU hold more people per car than LRT. Because of this, fewer cars are needed to move the same number of people, and the cost per seat is lower for EMU and DMU. Most riders on EMU and DMU are able to sit during the trip.

AIR QUALITY: EMU VS. DMU VS. DIESEL BUS

In general, EMU creates emissions at the source where electric power is generated while DMU and diesel buses create local emissions, the source being the engine.

DMU VS. DIESEL BUS

Emission Type	DMU vs. Diesel Bus
Particulate Matter (PM 2.5)	DMU < Bus
Oxygen of nitrogen (NOx), hydrocarbons (HC) and ozone (O3)	DMU < Bus
Carbon Monoxide (CO)	Bus < DMU



Notes: PM2.5 ... Particulate matter smaller than 2.5 microns
 NOx..... Oxides of nitrogen
 HC..... Hydro carbons
 CO Carbon monoxide
 Emissions in grams/round trip to provide 404 seats (DMU) and 400 seats (Diesel Bus)

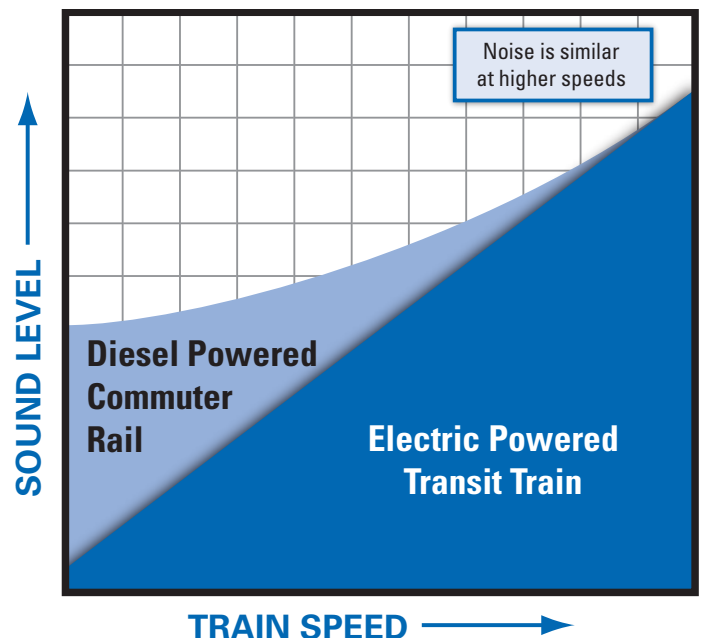
NOISE: EMU VS. DMU

Sources of rail transit noise.

Noise Source:	What does it mean (EMU vs. DMU)?
Wheel and rail contact	Same type of contact
Vehicle propulsion	Diesel engine produces noise; EMU doesn't have an engine
Cooling fans	Same type of fans
Vehicle warning devices (horn)	Same type of horns

HOW DOES TECHNOLOGY AFFECT NOISE?

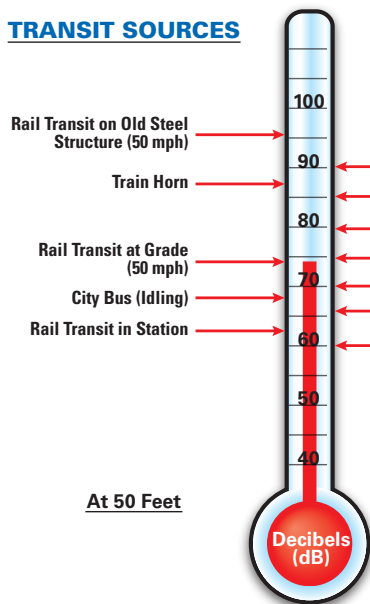
Noise sources are similar for EMU and DMU at higher speeds, because wheel and rail contact noise dominates the engine noise. At lower speeds, DMU is slightly louder because its engine noise dominates the wheel and rail contact noise. There is no significant difference between each technology at grade crossings because the horn noise is louder than engine, wheel and contact noise.



HOW DOES THIS RELATE TO EVERYDAY NOISE LEVELS?

At approximately 50 miles per hour, noise levels for both EMU and DMU are similar to an air compressor. For both EMU and DMU, the train horn is louder than the noise of the engine and wheels.

TRANSIT SOURCES



OTHER SOURCES



HOW CAN YOU GET INVOLVED?

- Visit the project website at: www.rtdnorthwestrail.com
- Send an e-mail to: nwrail@rtd-fastracks.com
- Call (303) 299-2000
- Send a fax to (303) 299-2425
- Mail comments to:
Karen Morales
 Northwest Rail Project
 RTD FasTracks
 1560 Broadway, Suite 700
 Denver, Colorado 80202

TECHNOLOGY SELECTION:

RTD has made a preliminary assessment that electrifying the 41-mile Northwest line would require significant trade-offs to stay within the budget established for the corridor, as diesel technology was identified for the corridor in the FasTracks plan. The Northwest Rail EE will, with public input, examine this issue and advise on the vehicle technology for the corridor.