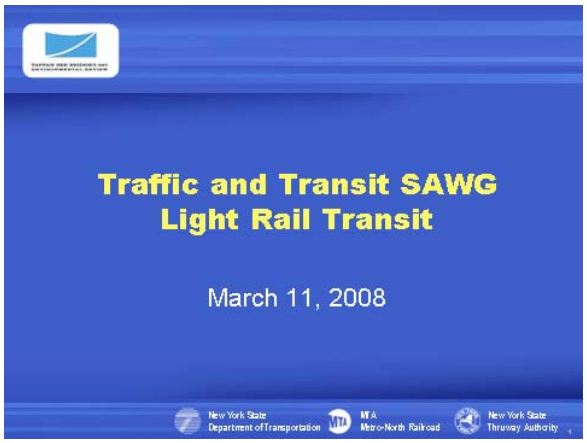
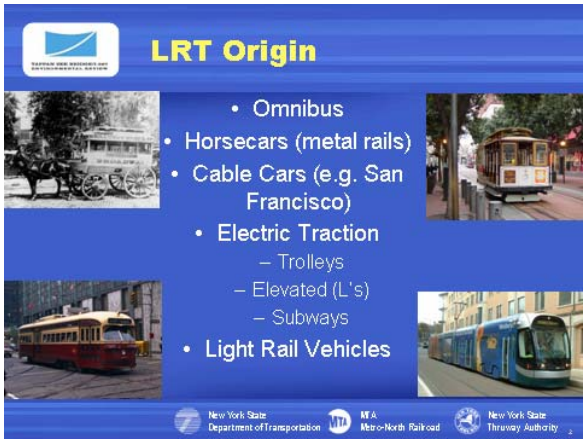
Agenda Item 2
Technical Presentation



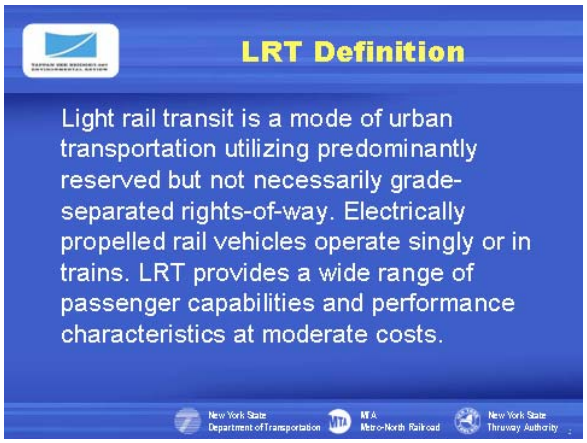
Slide 1

The purpose of the meeting was to review the TSM alternative and provide SAWG members the opportunity to comment on that alternative.



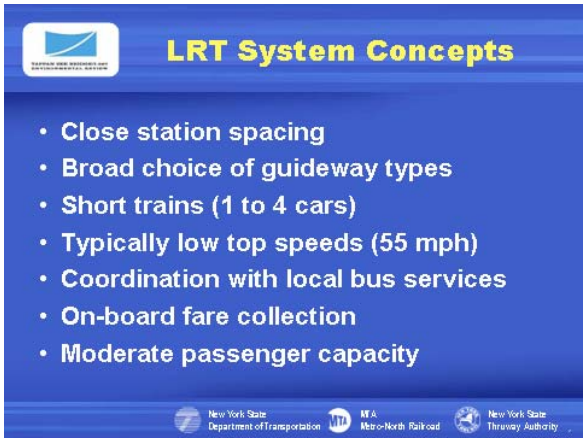
Slide 2

Light Rail Transit is the current version of the original streetcar technology, which actually began with horse-pulled carriages. The PCC car on the lower left of this slide was the dominant transit mode in the early 1900's. In the 1970's European versions of the trolley, updated to current technologies and operating requirements led to the modern LRT vehicle.



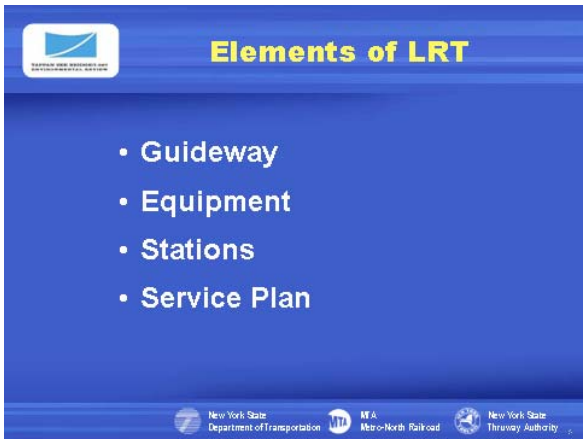
Slide 3

The key point of the LRT technology is its flexibility. It can operate in street with mixed traffic or on its own exclusive guideway. The "Light" in LRT refers to light capacity and light cost, it was intended to be a lower cost option to modern rail rapid transit systems.



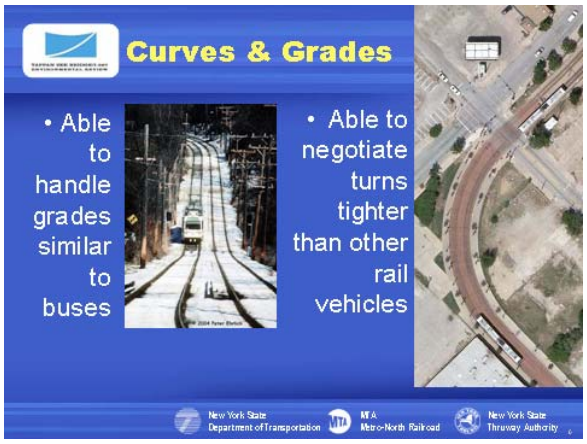
Slide 4

LRT systems are primarily designed for moderate or short distance trips in urban areas. So they feature more stations per mile than RRT or CRT. They are also designed to operate as single car trains but can be joined in trains of up to 4 cars. Because they start and stop often and may operate in mixed traffic, they have a lower top speed than CRT or RRT systems, usually around 55 mph.



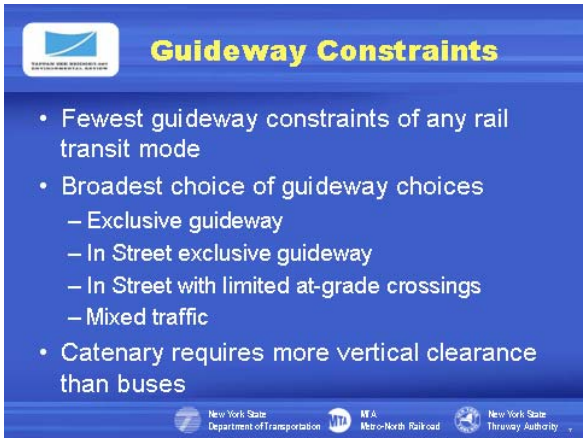
Slide 5

Like the other guideway transit technologies, LRT systems have the same elements. The guideway, vehicles, stations and an operating plan for how they will run.



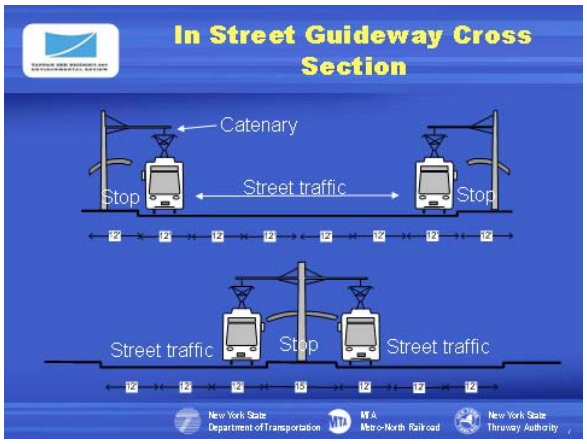
Slide 6

Because LRT's are intended to be capable of running in streets they have the ability to climb steeper grades than CRT systems and make tighter turns. The picture at the left is of a line in Pittsburgh and the turn shown in the photo on the right is in the Dallas Area Rapid Transit System. Of course, steep grades and tight turns affect system speeds for LRT systems as they would any other rail technology.



Slide 7

Being designed for street operations, they can work in a wide array of guideways. They typically – but not always – include an overhead wire, the catenary, for power distribution. This allows people and vehicles to cross the tracks without danger of electrocution from the power system.

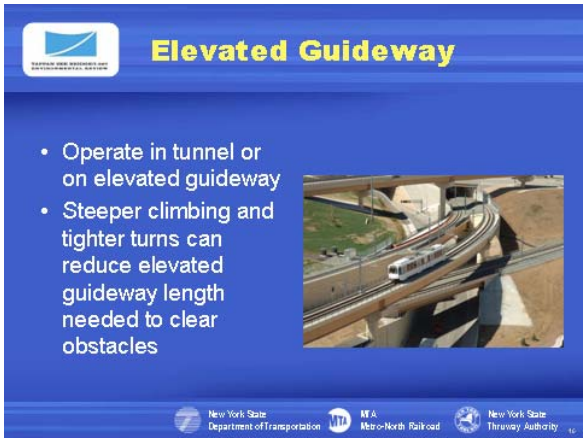


Slide 8

This slide shows two fairly typical LRT in street configurations. In each case the guideway requires one lane width to operate. In both cases the view is at a station location.

Slide 9

Most systems do NOT allow vehicles to drive down the tracks, but they do allow them to cross them. This shows the Dallas system's downtown transit mall, and as you can see people are crossing behind the vehicle at an intersection as they would if it were a bus.

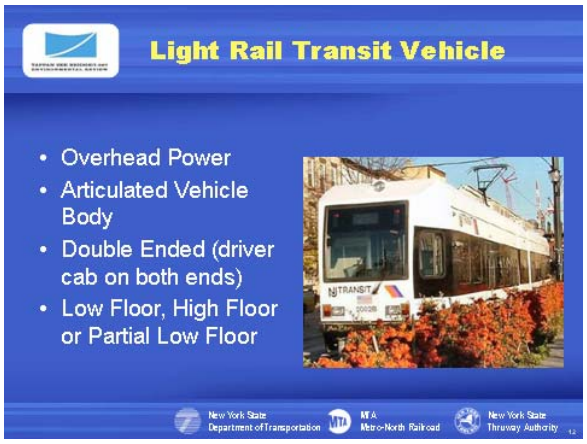


Slide 10

Because the LRT vehicles can climb grades up to about 6% and make tighter turns than RRT or CRT vehicles, when they must go over an obstacle they can do so in less distance, reducing the amount of elevated guideway and saving money.

Slide 11

There is a wide array of LRT vehicles available on the market. There is significant competition between vehicle manufacturers and each system tends to be somewhat customized to fit the needs of the operating environment.

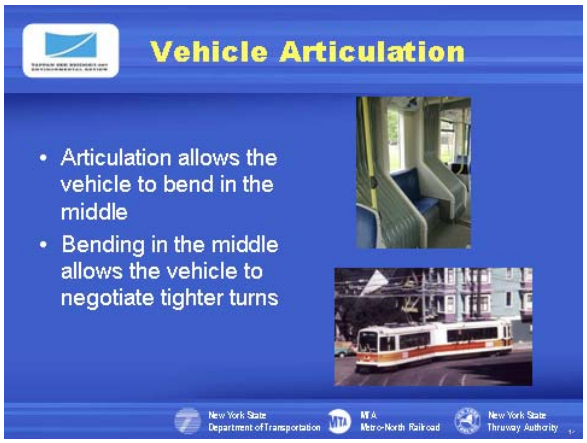


Slide 12

This is the Hudson River Waterfront LRT system. As mentioned, it has an operator's cab at each end so trains can reverse direction without being turned around. They can have low floors for level boarding from curb height platforms, high level floors or a mix.

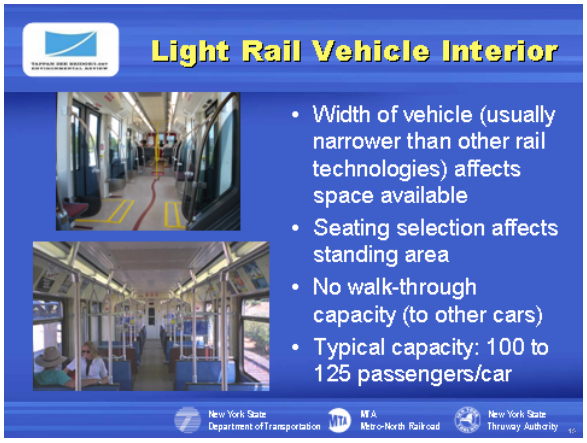
Slide 13

The top right hand slide is of a diesel powered LRT vehicle, so they do not HAVE to be electrically powered, and the choices for traction power keep getting broader with hybrid systems coming on line. As you can see, they also can have very different appearances.



Slide 14

What allows the vehicles to bend in the middle is the articulation unit in the vehicles. This shows an inside view of those units. They are designed so you can't stick your hand in there and get pinched. The lower picture shows a vehicle bending in a turn.



Slide 15

The choice of interiors is wide open, depending on the need being served. Most LRT vehicles are narrower than a CRT vehicle, usually about 8'6". The top vehicle has no seats and is probably for very short trips where everyone stands, and the bottom shows a vehicle with seats. They can usually handle between 100 and 120 passengers per vehicle.

Slide 16

Light Rail Stations need the same elements as other rail transit or BRT stations, but they can be designed to fit street medians or curb areas.

Slide 17

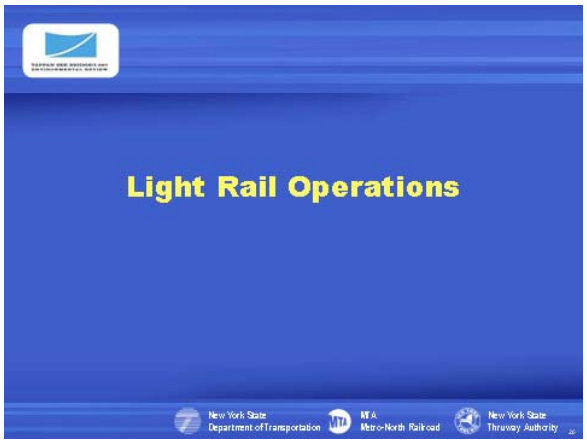
This is a median station and as you can see it has the same elements as other rail stations, but it is end loaded by the ramp in the foreground so people crossing the street in a crosswalk can get on the platform without walking down the guideway.

Slide 18

The range of stations goes from very simple ones that are pretty much the same as a bus stop to more elaborate stations. The top right picture shows a San Diego Trolley station in a commercial building.

Slide 19

As mentioned earlier, street median stations are usually end loaded. This one features a railing so riders cannot step into a moving traffic lane on the back side of the platform.



Slide 20

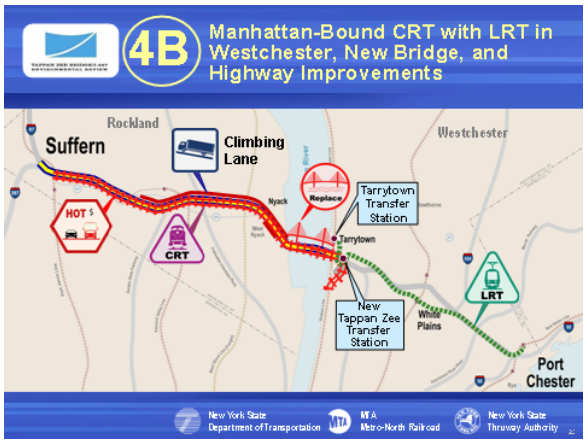
LRT systems operate in more environments than do CRT systems, so they have slightly different rules.

Slide 21

Because they can operate in streets they need to be closely coordinated with the street signal system. They often use preferential signaling so a light can be extended somewhat to allow a train to make it across an intersection, within reason. Preemptive signal systems would allow the train to really overrule traffic signals and they are not common because they can have a negative impact on street traffic.

Slide 22

Now we will talk about the application of the LRT technology to the Tappan Zee Bridge study corridor.



Slide 23

Only alternative 4B has an LRT component, which would operate exclusively in Westchester County. It primarily follows roadways and features more stations than the CRT alternative. We will review it in detail using the alignment drawings on the wall behind me in a moment.

Slide 24

The advantages of LRT are its flexibility, its proven ability to foster Transit Oriented Development and the ready availability of a wide array of vehicles. LRT is really best suited for moderate or short trips, as it cannot provide the same point to point speeds as CRT.

Slide 25

A briefing on the LRT alignment was then conducted.