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PROCEEDINGS OF THE 42ND
ANNUAL MEETING OF THE
TRANSPORTATION RESEARCH FORUM

Annapolis, MD
November 29 - December 1, 2000

To: Transportation Research Forum
One Farragut Square South, Suite 500
Washington, D.C. 20006-4003

June 20, 2000
X3

From: Robert Schumacher, P.E.
311 Packman Ave., Mt. Vernon, N.Y. 10552 (914) 668-2117

Re: Paper on Intermodal Transportation
(See TRF "WANTED" leaflet)

Enclosed is a Resume of my background and qualifications

This paper is submitted in response to the objectives stated in the above leaflet

"A Vision of the Future of Intermodal Passenger Transportation"
and

"addresses barriers to combining passenger transportation services."

For more than 30 years it has been assumed that

L i g h t R a i l T r a n s i t (L R T)

is the way-to-go for an urban area to have its first rail transit line

More than 30 years ago, Buffalo, San Diego, and some Canadian cities ushered in the Era of LRT. Ever since then, LRT has been acclaimed as the method for making rail transit much more affordable for smaller urban areas.

Previously it had been assumed that an urban area had to have a population of about a million in order to consider rail transit seriously. Even then, it was not easy to win the approval of the voters for a bond issue to pay for it..

The new technology of LRT offered a scaled-down, but still very attractive, form of rail transit that was more affordable not only for those areas but also for many areas with populations of less than a million.

As a member of the LRT Committee of American Public Transit Assn. (APTA), I find LRT to have many desirable features. Its lower cost makes it much more affordable for urban areas where the costs of subways would be prohibitive. It has a modern image. Where it runs along a route with a mile or more between stops, it can travel at a good speed. It can operate along various types of right-of-way: --

not only subway, el, railroad track
but also the median strips of streets
or even in the streets themselves
(like an old-fashioned trolley car).

Speed

One serious deficiency of LRT is that, while it can operate at a fairly good speed over most of its route, especially along private or reserved right-of-way, its overall speed is not good enough to achieve one very important objective: -- Attracting a significant number of middle-class Americans out of their automobiles, off of congested highways.

A new LRT line is patronized mainly by the same people who formerly rode buses -- the very poor, the very young, the very old. People who have choice in their mode of transportation may pay lip service to mass transit in principle but, in practice, will try it once and then go back to their automobiles where, even in heavy traffic, they feel that they travel faster, more conveniently, and/or more comfortably.

Trolley cars

A particular deficiency of every LRT line is that it operates through the streets of the central business district (CBD) exactly like an old-fashioned

trolley car. 50 years ago, nearly every city in the world abandoned its extensive system of trolley cars and replaced them with buses -- and for good reasons. Why should we now, 50 years later, put the trolley cars back ?

Trolley cars were an abomination to the movement of all other traffic -- automobiles, taxis, trucks, ambulances, police cars, fire trucks. With their steel wheels locked onto fixed steel rails, they had no flexibility. A parked car, a fire hose, or any slight intrusion into their required clearance would bring the entire operation totally to a halt. Passengers getting off or on would have to step directly into the path of fast-moving vehicles unless a platform were provided that would consume valuable space in a street.

This paper proposes that the Era of LRT be carried to a new, higher level that I call

Express Rail / Local Bus (XR/LB)

to achieve a much higher quality of rail transit service than LRT but at a much lower cost .

With respect to the criteria given in the TRF leaflet, XR/LB could mark "the beginning of a new era (of) intermodal passenger transportation (with much greater) efficiency and economy (both) for carriers (and for the) customer . . . "

XR/LB is best described in the 8-page brochure enclosed,

Proposed Tidewater Transit Plan (PTTP) for the Norfolk - Virginia Beach area

Page 2 presents a "Statement of Principle" that begins with

"The millions of words I've read about mass transit have not included a single statement of the principle (the importance of express service) upon which this paper is based . . . "

That is not hyperbole, it is literally true. The only exception that I have ever

seen is the anecdotal item in the Times below quoting two superintendents of the New York Transit System saying exactly the same words that I had been writing for years previously.

I was a speaker at APTA's "Intermodal Workshop", Denver, August 1998. This item was included in the handout I distributed.

The major objective of XR/LB is to increase the SPEED of that rail service. This is essential not only in order to increase the patronage of transit-dependent people but especially to attract a larger portion of American middle class away from their automobiles.

That objective of speed should be measured not so much in running-time or miles-per-hour but in the riders' PERCEPTION of the speed of the vehicle. There are many cases on New York subways where a passenger has a choice between an express and a local. Even where the local provides a seated ride, the overwhelming preference is to stand aboard the express. The rider has the perception that the express is much faster although the saving may actually be only a few minutes. They feel an emotional satisfaction in traveling quickly past local stations compared to

stopping at each of those stations,
doors open,
passengers off and on,
doors close,
then a short run to the next station.

A fast rail express is the ONLY type of transit that will attract large numbers of middle-class Americans out of their automobiles.

An article in The New York Times,
June 26, 1998 about the Flushing
line of the New York subway

These words are almost identical to what I wrote several years previously.

CAR talk:
"I can't believe how many people don't take the local," Gregory J. Lombardi was saying yesterday at the Shea Stadium subway station, getting ready for this weekend's Mets-Yankees series. Mr. Lombardi is the car equipment superintendent on the 7 line, the best-liked and most efficient of the city's subway trains. "It's only like a five-minute difference."
"Not even five," said Dennis Peppel, the line superintendent, wearing his orange-mesh vest of authority. "More like three and a half."
"Yeah," Mr. Lombardi said. "And people run for it even though they won't get a seat."
"I've seen people get off the local at Woodside, and walk across the platform and wait for the express," Mr. Peppel said, shaking his head in disbelief. "The local is going to get there before that express, but they give up a seat to stand in an express that's crowded. I'll never figure that out. They have this perception that they're zipping by all those stations, but when you really look at the big picture, three and a half minutes is really nothing."
If it were any other line in the

Pages 3-to-5 are from the handout for my presentation at the 1995 National Convention of American Society of Civil Engineers (ASCE) in San Diego, also previously at the 1988 National Convention of Transportation Research Forum (TRF) in Toronto. Those details were developed as a proposal for a subway in Los Angeles back in the days when

that system was being planned. Had that been adopted, Los Angeles would now have a much better and much cheaper subway system than the fiasco-ridden experience that they have had.

Pages 6 and 7 show how XR/LB could be applied for surface lines such as existing railroad tracks or even any available right-of-way such as a median strip or an abandoned railroad. That would be the case in almost any urban area that aspires to have its first rail transit line. Although Los Angeles is perhaps the last big city to build a heavy-duty subway line, yet the isometric drawing of a subway in the centerfold of the PTP brochure could still have wide application. Portland, Oregon, for example, has a very successful LRT which now extends both east and west of its CBD. With that success has come the problems of an old-fashioned trolley car operation in the downtown streets. In this case, there is the additional problem that the length-of-train required for increased capacity would extend too far back and would block cross streets in the CBD. Portland should build on the success of its LRT by reconstructing the short CBD section exactly as shown in that centerfold: -- the station would be within walking distance of most downtown destinations plus also it would offer cross-the-platform transfer to any place in the Region that is served by the bus system. Such a fast move through the CBD area would add greatly to the success of that LRT.

Page 8 lists the incredible advantages that XR/LB would offer in Norfolk - Virginia Beach -- a much higher-quality transit service than LRT at not more than 10% (**ten percent !**) of the cost.

Cross-the-Platform Transfer

A very important element of XR/LB that symbolizes this unique and innovative concept is the transfer of passengers between buses and trains. (Nothing could be more "intermodal" than that.) There are perhaps

hundreds of thousands of places in the world where large numbers of people make such a transfer.

A 6-year-old child would recognize that the best method for that would be across-the-platform, exactly like between a local and an express on the New York subways.

Yet, incredibly, not a single one of those hundreds of thousands of places is arranged that way. A consultant's report may make perfunctory reference to "feeder bus" service. Bus stops are frequently located "near" a train station. A bus stop may happen to be just across-the-platform from one of the tracks at a station -- but, in every case, crossing over to the other track requires either climbing 20 feet up-and-down or walking across tracks on which (frequent? high-speed?) trains operate. No place in the world has the trains and buses across-the-platform from each other in both directions as shown herein.

If an urban area were to introduce a new rail transit system based upon the XR/LB concept which would include that cross-the-platform feature, that alone would win world renown. Delegations of transit specialists came to San Diego from all over the world 30 years ago to observe how the Tijuana Trolley (LRT) made rail transit much more affordable for smaller urban areas. An XR/LB rail line that is even more affordable and gives higher quality of service to riders should achieve similar world acclaim.

Transit planners would come to observe, for the first time ever, people transferring between trains and buses merely by walking a few steps across-the-platform. It seems astonishing that such a simple and obvious feature could win and deserve such acclaim. Yet, logic indicates that it would.

Just the recommendation of cross-the-platform transfer could, by itself, make this paper worthy of world acclaim. Again, it seems astounding that such a simple and obvious feature could win and deserve such acclaim. Yet, logic indicates that it would.

ROBERT SCHUMACHER

Transit Engineer, P.E.
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311 Packman Avenue
Mt. Vernon, N.Y. 10552
March 1991

Resume

Education

Master's Degree - Urban Planning, Columbia University, 1967
Master's Degree - Civil Engineering, Polytech. Inst. of Bkln., 1957
Bachelor's Degree - Civil Engineering, Cooper Union, 1942

Tau Beta Pi (Engineering Honor Society) - inducted as "Eminent Engineer",
Cooper Union Chapter, November 1985

Professional Engineer License - New York State

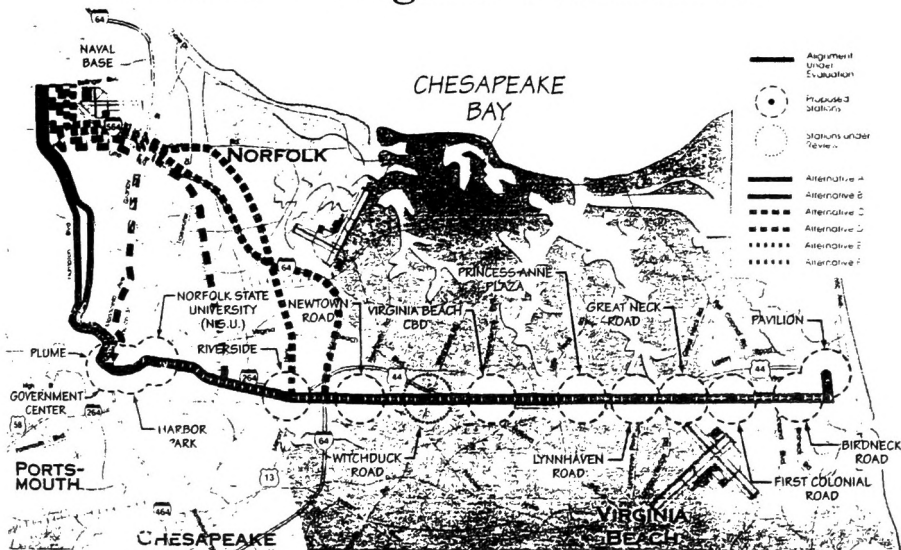
Professional

Since 1985 Appointed by Governor Cuomo to the MTA Citizens Advisory Council
March 1987 Retired from regular employment, active on committee work, consulting,
etc. in transportation planning and miscellaneous professional areas.
1969-1987 Director of Mass Transit Planning, New York City Dept. of Transportation
1968-1969 Supervisor, Inspectors of Track & Structures Railroad Div., New York
State Public Service Commission
1961-1968 Transportation Planning Engineer, New York State Office of Transportation
1956-1961 Civil Engineer, New York City Transit Authority;
Assistant to the General Manager;
Asst. Supt., Structures Dept., Maintenance of Way
1936-1956 Engineering office design and field supervision of heavy industrial
construction for private consultant firms; continuous except for --
1943-1946 First Lieutenant, Corps of Engineers, Army of the United States,
World War II; Germany - Philippines

Miscellaneous

Various intensive graduate-level courses in transportation planning and engineering.
Instructor in Transportation Planning at Pratt Institute.
Active on national and local committees of American Society of Civil Engineers.
Consultant on transportation planning projects. (Numerous articles published by
American Society of Civil Engineers and others available.)

Proposed Tidewater Transit Plan (PTTP) for the Norfolk -- Virginia Beach Area



Norfolk Southern LRT Alternative

A conventional transit plan ...

shown above is from the "Executive Summary" May 1996, page 3, of the Norfolk-Virginia Beach Corridor Study for the Tidewater Transportation District Commission. It shows --

A length of about 18 miles

13-or-14 stations (Witchduck Road is labeled "potential future station")

\$376,500,000 estimated cost

Year 2003 estimated completion

Designated as LRT ("Light Rail Transit")

That type of slow, stop-and-go local (and operating through the streets of downtown Norfolk and to the Pavilion in Virginia Beach like an old-fashioned trolley car) is NOT likely to attract many middle-class travelers out of their automobiles, away from congested highways. It would be patronized mainly by the same people who now ride the buses.

The pages that follow show a relatively small Amendment to the above plan that would provide the very large advantages listed on the back page.

Robert Schumacher, P.E., Transit Consultant
311 Packman Ave., Mt. Vernon, N.Y. 10552

February 1997
(914) 668-2117

Statement of Principle

The millions of words I've read about mass transit have not included a single statement of the principle upon which this paper is based: —

Rail mass transit should be designed to serve ALL strata of the population, including the great mass of middle-class and upper-middle-class who aspire to good living and who have ample choices in their mode of transportation.

It should not serve only those who have no other choice, the very poor, the very young, the very old.

Two reasons: —

1. Patronage by as many people as possible is needed to support the very costly operation of rail systems and also to add justification for the large public subsidies.

2. Justifiably or not, it is a fact of life that any facility — a park, a school, a restaurant — that is patronized mainly by poor people will have an unattractive image.

The Middle Class

Every day, in suburban communities like Chappaqua, New York, tens of thousands of the most affluent people in the world (even those with two or more automobiles in their driveways) willingly choose rail transit

for their trips to Manhattan. And not only to-and-from work; they, their wives and children, their visitors from the City patronize the rail service at all hours of the day, the evening, and the weekend because it gives them a comfortable, economical, convenient, and fast ride to a central city area where traffic and parking make the automobile not convenient.

On the other hand, if the rail service from Chappaqua to Grand Central were a slow stop-and-go local such as is typically proposed for new LRT systems, not many people from those areas would use it. Imagine also that the train were to enter the Grand Central area not in a tunnel but along the street like an old-fashioned trolley car.

The Poor

So much for the affluent middle-class; what about poor people?

The Harlem area in New York City is world-renowned as a place of people in poverty. In eastern Harlem they ride the Lexington Avenue express which they like far better than the local. In western Harlem they ride the A express; part of the Harlem jazz culture is "Take the A Train".

The evidence is overwhelming: — People of ALL income levels like a fast express far better than a slow stop-and-go local.

How to Provide Express Service?

New York is virtually the only city in the world that has 4-track subways with separate express and local services. At express stations, riders transfer across-the-platform between the two.

Even New York can no longer afford to build 4-track subways. All subway proposals for New York since World War II, such as Second Avenue, have been 2-track subway locals.

An urban area contemplating a new rail transit system stretches the limits of feasibility to pay for a 2-track line, let alone 4 tracks.

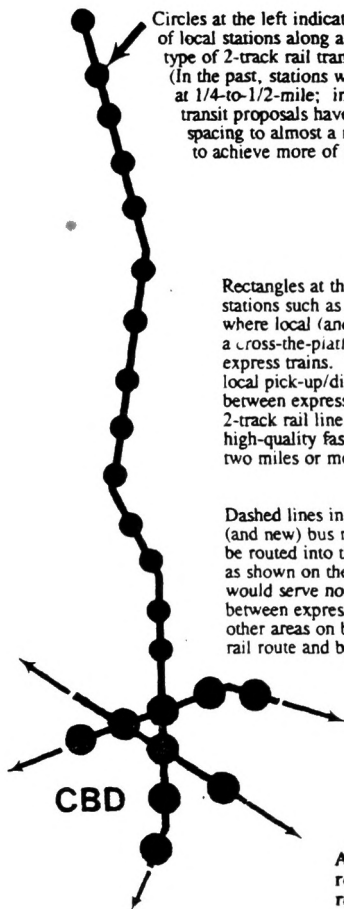
How then, to provide express service?

The solution: — My ASCE paper summarized on the next three pages.

This page and the centerspread page that follows summarize my paper presented at the National Convention of American Society of Civil Engineers, San Diego, October 1995.

What kind of design for a new modern rail transit system?

Traditional type

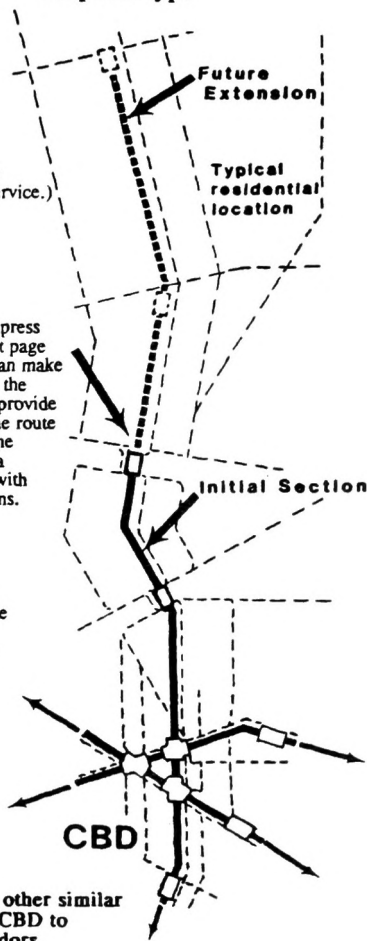


Circles at the left indicate a succession of local stations along a traditional type of 2-track rail transit route. (In the past, stations were spaced at 1/4-to-1/2-mile; in recent years, transit proposals have increased that spacing to almost a mile in an attempt to achieve more of an express-type service.)

Rectangles at the right indicate express stations such as shown on the next page where local (and express) buses can make a cross-the-platform transfer with the express trains. The buses would provide local pick-up/distribution along the route between express stations so that the 2-track rail line could operate as a high-quality fast express service with two miles or more between stations.

Dashed lines indicate existing (and new) bus routes that could be routed into the express station as shown on the next page. These would serve not only the area between express stations but also other areas on both sides of the rail route and beyond.

Proposed type



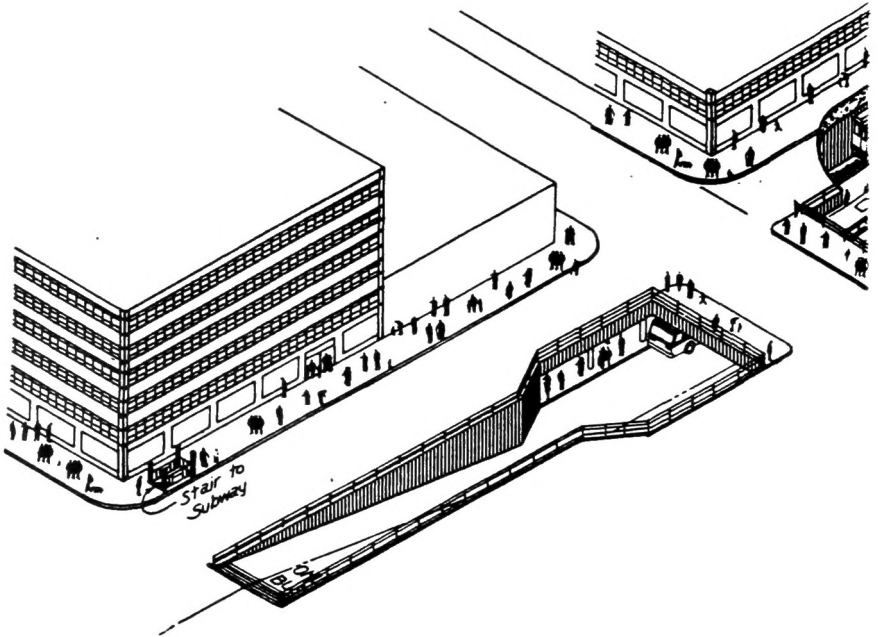
Arrows indicate other similar routes from the CBD to residential corridors.

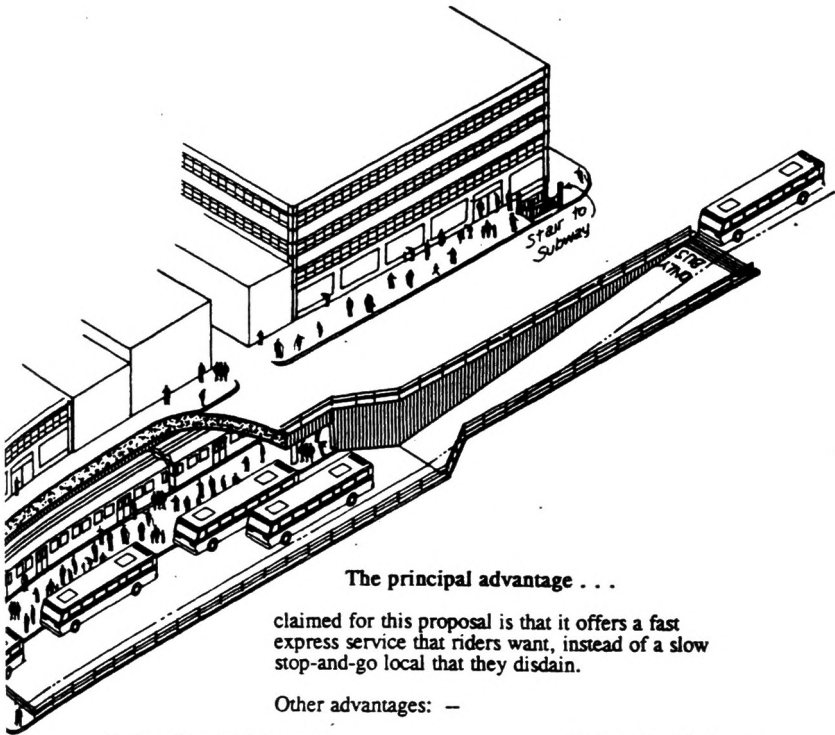
Proposed Express-Rail/Local-Bus System

This isometric sketch shows the method by which local (and express) buses could ramp down to station (or up to an elevated station) to make a cross-platform transfer with an express rail line.

A local bus making normal stops along a route between two such express stations would provide local pick-up and distribution service along the route, very much like a New York subway local and with exactly the same kind of cross-the-platform transfer with the express. This would permit the two-track rail line to run as a high-quality fast express rather than a slow stop-and-go local.

Bus stops along the length of the platform could accommodate also bus routes along parallel adjacent routes, lateral crosstown routes, and express bus routes serving areas beyond the rail line.





The principal advantage . . .

claimed for this proposal is that it offers a fast express service that riders want, instead of a slow stop-and-go local that they disdain.

Other advantages: —

Reduced operating costs

Together with the higher quality of service provided would be REDUCED cost of operation because there would be fewer stations. Also, fewer trains would be required because of the faster running times.

Reduced capital costs

The proposed type express station would be more massive and more costly than one traditional type of station. It would also present ventilation and environmental problems. But fewer stations would mean much lower total capital cost.

Shorter length required for initial starter line

The traditional type of local transit line is designed as an entity in itself requiring a minimum length of route in order to be a viable transit line that provides a sufficient service. The proposed Express-Rail/Local-Bus system would integrate a high-quality express rail line with the existing bus network. Therefore, a much shorter initial starter rail line with convenient cross-the-platform transfers with many bus routes would serve a much larger area than could be served by a single fixed-guideway route alone.

Less costly route construction

A traditional type of rail transit line is usually routed along a major arterial street of a city. That construction is costly, disrupts traffic, and is objectionable to merchants, residents, etc. Under the proposed system, service along that arterial street would be provided by the bus line that already operates there. The rail line (between express stations) might be constructed instead along some nearby available right-of-way or along a street or property that is less valuable, less costly to build on, and with less environmental disruption.

Proposed Amendment to the Tidewater Transit Plan

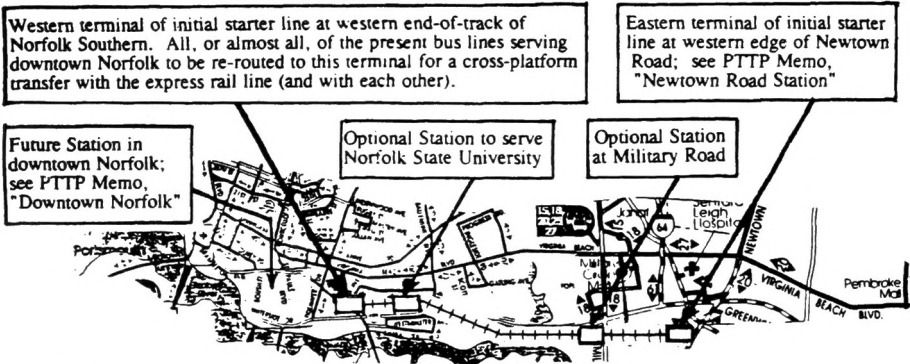
- A relatively small amendment to the LRT plan shown on the cover page would . . .
- reduce the rail portion of the initial starter line from about 18 miles to 4.8 miles,
 - extend only over the existing r-o-w (right-of-way) of the Norfolk Southern tracks,
 - require only 2-to-4 stations instead of 13-or-14,
 - integrate with, instead of ignoring, the extensive existing bus system (see the summary of my ASCE paper on the preceding pages).

With respect to the latter, the Sketch below uses the TRT bus map for its base.

There is no benefit . . .

to be achieved from the costly and intrusive placement of rails in the streets of downtown Norfolk or to the Pavilion in Virginia Beach. The service that vehicles on those rails could provide would not be as good as the bus service that already operates there. Vehicles running on a fixed guideway in a city street have very poor flexibility within mixed traffic. Passengers getting on-off such vehicles present a further problem to the flow of street traffic as well as to their own safety.

The average speed of such vehicles would be about 10-20 mph; modern rail vehicles should run at 60-80 mph. The rail of the "Express-Rail/Local-Bus" system would run at the latter speed. The temporary terminal for the proposed initial starter line would be near the downtown area, where it would connect across-the-platform with numerous existing bus lines that would serve many destinations far better than could any single fixed-guideway route..



Initial Starter Line: 4.8 miles between a bus-transfer station adjacent to downtown Norfolk and a bus-transfer station at Newtown Road.

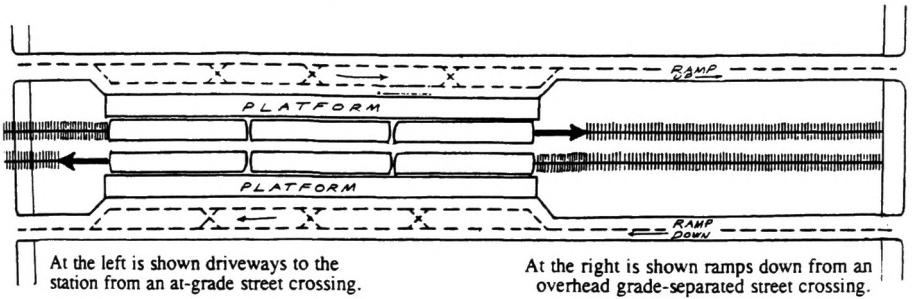
Phase 2: Extend that line into Virginia Beach.

Future: Network of fast express rail lines throughout the Tidewater area utilizing the extensive existing railroad lines (including water crossings). At each express station, spaced about two miles apart, a cross-the-platform transfer with existing (and new) bus lines (see centerfold) serving wide areas. Plus -- a "Grand Central Terminal" station in downtown Norfolk (subway or aerial) as shown in centerfold with cross-the-platform transfers to all bus lines. (Would cost no more than the presently estimated \$376,500,000 for a trolley car in downtown Norfolk.)

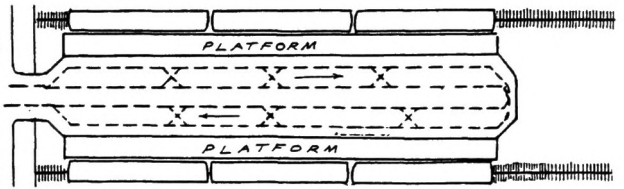
Generated at University of Minnesota on 2021-10-26 15:19 GMT / https://hdl.handle.net/2027/ien.35556044723104 Creative Commons Attribution-NonCommercial-NoDerivatives / http://www.hathitrust.org/access_use#cc-by-nc-nd-4.0

The isometric on the centerspread page shows the method by which buses could ramp down to a subway station (or up to an elevated station) to make a cross-the-platform transfer with an express rail line. For a rail line such as Norfolk Southern at grade level, bus access would be from the

nearby cross streets as shown below. (Because buses have doors only on the right-hand side, the rail line should operate "left-handed" in order to permit cross-the-platform transfer between trains and buses headed in the same direction.) Dashed lines show bus paths.



At the two proposed terminal stations of the initial starter line, the tracks and the adjacent roads would be at-grade. Trains would stop alternately at the two tracks which end at the edge of the adjacent road. Buses would enter a driveway into a loop between the two tracks, stop at bus stops along the platforms, exit via the same driveway.

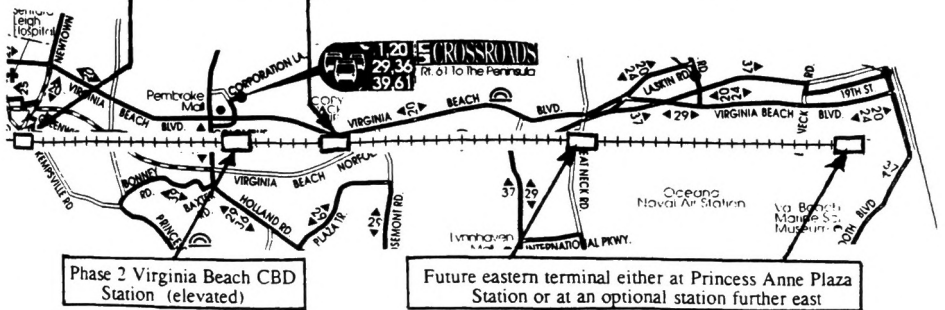


"PTTP Memo" refers to separate memos that will follow.

See back page for list of "Advantages of the Proposed Amendment" →

Phase 2 Newtown Road station (elevated); see PTTP Memo "Newtown Road Station"

Phase 2 station at Princess Anne Plaza where buses along Virginia Beach Blvd. are adjacent to Norfolk Southern track



Advantages of the Proposed Amendment

#1. Costs not more than **ten percent (10%)** of the \$376,500,000 estimated for the plan shown on the cover; savings due to:

- Rail line only along the r-o-w of Norfolk Southern: no rails in the streets of Downtown Norfolk or to the Pavilion in Virginia Beach.
- Integration with (instead of ignoring) the existing bus system would cover a much larger area than could be served by any single fixed-guideway route; little or no additional cost for buses.
- Contract with Amtrak (or VRE?) for initial operation; no capital cost for equipment. After the PTTP has proven successful is time enough to select the optimum train equipment for the system; no need to encumber the initial starter (test?) line with that \$54,600,000 cost (14.5% of the entire \$376,500,000 estimated cost).

#2. In return for that 90% saving, what must be given up? Nothing. On the contrary, the resulting transit service would be of much higher quality:

- A fast rail express, instead of a slow stop-and-go local, is the **ONLY** type of transit that **CAN** attract middle-class Americans out of their automobiles.
- A much larger area coverage through integration with the existing bus network.

#3. The lower cost would permit service to be implemented within about a year instead of in Year 2003.

#4. Further extensions throughout the region possible at relatively low cost. By using standard railroad equipment, the future rail transit network for the entire Tidewater region could make use of existing railroad tracks. An urban-suburban rail system similar to that serving Long Island and Westchester would attract middle-class riders as well as the transit-dependent people who now ride the buses. As shown in the centerfold, fast rail express service would be integrated at every station with buses serving wide areas. On the other hand if the proposed LRT system should prove successful, there is no way that it could be extended except at costs far greater than for the initial line.

#5. World renown for Norfolk - Virginia Beach; delegations from all over the world would come to observe the "Tidewater Transit Plan" as the way to make modern rail transit affordable and feasible in hundreds of urban areas.