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REGIONAL TRANSIT BOARD

Public Hearing
on the Regional LRT Coordination Plan

November 14, 1990

The following have signed up to testify:

	Name	Address	City
1.	Mark Mizen	168 E. 6th Street	St. Paul
2.	Art White	203 Greenvale, Apt. 203	Northfield
3.	Lisa Lee	181 Sherburne Ave.	St. Paul 55703
4.	Dora Mead	112 E. Elmwood Place	Minneapolis 55419

REGIONAL TRANSIT BOARD
Mears Park Centre
230 East 5th Street
St. Paul, Minnesota 55101
612/292-8789

October 23, 1990

Dear Elected Official/Agency Representative:

The Regional Transit Board, the Joint Light Rail Transit Advisory Committee, and the Metropolitan Council cordially invite you to attend a half-day Peer Review Forum to discuss several important regional light rail transit issues on Wednesday, November 14, 1990.

The forum will address the organizational and implementation strategies proposed to plan, construct, and operate a regional light rail transit system in the Twin Cities metropolitan area. This second forum, a follow-up to one held on June 15, 1990, will complete the peer review process for the Draft Regional LRT Coordination Plan. The Coordination Plan is the second of two legislatively-mandated documents addressing coordinated LRT development in the Twin Cities metropolitan area. The first document, the Light Rail Transit Regional Development and Financial Plan, was adopted by the RTB in February, 1990.

The Peer Review will be held from 8:00 a.m. to 12:00 noon on Wednesday, November 14, 1990, at the Earle Brown Center on the St. Paul campus of the University of Minnesota. The panel will consist of six national experts who have experience overseeing and managing new rail transit design and construction projects, and will include:

- Policy board members from cities now building an LRT system
- Transit system executive director from a city now building an LRT system
- Operations manager of a new LRT system
- Rail transit system design and construction manager from the public sector side
- Rail transit system design and construction manager from the private sector side

Please consult the attached agenda for details. A map illustrating the Center's location, and the Executive Summary of the Draft Regional LRT Coordination Plan are enclosed.

We hope you will be able to join us. Please RSVP to Ms. Cherie Mann at the RTB at 229-2758 by November 8th if you plan to attend.

Sincerely,

Michael J. Ehrlichmann
Chair, Regional Transit Board

Steve Keefe
Chair, Metropolitan Council

John Derus
Chair, Joint Light Rail
Transit Advisory Committee

/cm
Enclosures

REGIONAL TRANSIT BOARD

10/24/90

DRAFT AGENDA

PEER REVIEW ON DRAFT REGIONAL LRT COORDINATION PLAN

8:00 a.m.-1:30 p.m.
November 14, 1990
Earle Brown Center, Room 135 B-D

8:00	20'	Coffee, Juice and Danish; Social Time
8:20	10'	Welcome and Introductions-Moderator • Purpose of this Peer Review • Overview of Day's Activities

Session I-Organizational Alternatives

8:30	15'	Introductory Background and Overview-Consultants Regardless of who is selected to be the lead LRT implementation agency, what are some of the key principles to keep in mind when structuring an LRT implementation organization, including policy board role, manager's role, staff's role, etc. Review and comment on MTC's proposed organization plan and staffing plan for LRT operations and maintenance.
8:45	45'	Panel Responses (six panelists, 7-8 minutes each) • Panelist #1-Jacki Bacharach, LACTC • Panelist #2-Susanne Wilson, SCCTD • Panelist #3-Chuck Anderson, DART • Panelist #4-Peter Tereschuk, San Diego Trolley • Panelist #5-Peter Schmidt, Maryland MTA • Panelist #6-Gene Courtney, Morrison-Knudsen
9:30	30'	Questions from the Floor
10:00	5'	Summary of Session I-Moderator

10:15	15'	Coffee Break

Session II-Implementation Methods, Schedule and Budget

10:20	15'	Introductory Background and Overview-Consultants Regardless of the specific implementation method selected, offer words of wisdom on what to watch out for in contract writing and administration, avoidance of claims disputes, etc. What are some of the guiding principles that are needed for a successful LRT design and construction undertaking? Review and comment on the proposed LRT master Implementation Schedule and Budget, looking at the overall time lines and construction staging/start dates.
10:35	45'	Panel Responses (six panelists, 7-8 minutes each) • Panelist #1-Jacki Bacharach, LACTC • Panelist #2-Susanne Wilson, SCCTD • Panelist #3-Chuck Anderson, DART • Panelist #4-Peter Tereschuk, San Diego Trolley • Panelist #5-Peter Schmidt, Maryland MTA • Panelist #6-Gene Courtney, Morrison-Knudsen
11:20	30'	Questions from the Floor
11:50	5'	Summary of Session II-Moderator

(If Time Permits)

11:55	10'	General Comments by the Panelists on Any Aspect of the LRT Coordination Plan
12:05	15'	General Questions from the Floor on Any Aspect of the Regional LRT Coordination Plan

12:20	Break
12:30	Luncheon
1:15	Guest Speaker-To Be Announced
1:45	Adjournment

PANELISTS
RTB PEER REVIEW
ON REGIONAL LRT COORDINATION PLAN

November 14, 1990

Category I - Elected Officials/Policy Board Members who have overseen the design and construction of new rail transit systems.

1) Commissioner Jacki Bacharach, member, Los Angeles County Transportation Commission (LACTC) and councilmember, City of Rancho Palos Verdes. As a member of the LACTC for the past eight years, Ms. Bacharach has overseen the design and construction of the $870 million "Blue Line", a 22-mile long LRT line linking downtown Long Beach with downtown Los Angeles. Construction of this LRT line, the first to open in the 150-mile system planned for the metro area, was funded entirely from the proceeds of a 1/2¢ regional sales tax dedicated to public transit and approved by the voters in 1980.

   Recently, the LACTC and the regional transit system operator, the Southern California Rapid Transit District, formed a new organization to design and build all rail transit lines in Los Angeles County. It is called the Los Angeles County Rail Construction Corporation and has a Board of Directors composed entirely of seasoned professionals in the engineering and construction industry.

2) Supervisor Susanne Wilson, member, Santa Clara County (California) and Santa Clara County Transit District Board of Supervisors, and board member, Guadalupe Corridor Joint Powers Board. The Guadalupe Corridor Joint Powers Board was formed in 1982 to oversee the design and construction of a $500 million, 20-mile LRT line and a $200 million, 11-mile freeway in San Jose, CA. The members of the Joint Powers Board include the county, the county transit district (same governing board as the county), the state Department of Transportation, and the two affected cities. As a county supervisor and member of the GC Joint Powers Board, Ms. Wilson has overseen the design and construction of the LRT line and freeway for the past eight years. This LRT line was funded ~50% by federal (UMTA Section 3) funds, 20% by state (gas tax) funds and 30% by local (1/2¢ transit sales tax) funds. The county transit district is now finishing up the construction of this first LRT line and is pursuing the implementation of a second 10-mile LRT line, again with partial state and federal funding.

Category II - Executive Director/General Manager of a Transit Agency that has overseen the design and construction of a new rail transit system.

3) Charles "Chuck" Anderson, Executive Director of the Dallas Area Rapid Transit (DART) District and former city manager of the City of Dallas. DART is funded through a 1¢ regional sales tax dedicated to public transit. DART is embarking on an ambitious program of transit fixed-guideway implementation, including an initial LRT system, a commuter railroad system and bus/HOV lanes. The initial LRT system consists of 20 miles of LRT on 3 lines radiating out from downtown Dallas and costing ~$600 million. DART is funding most of this program with its regional sales tax, but is using UMTA's new "Overmatch Initiative" program to fund some of the LRT lines' outer segments. Mr. Anderson has been instrumental in establishing DART's organization for final design and construction, including a combination of staff and consultants.

Category III - Operations Manager/Director who has managed the start-up and operation of a new rail transit system.

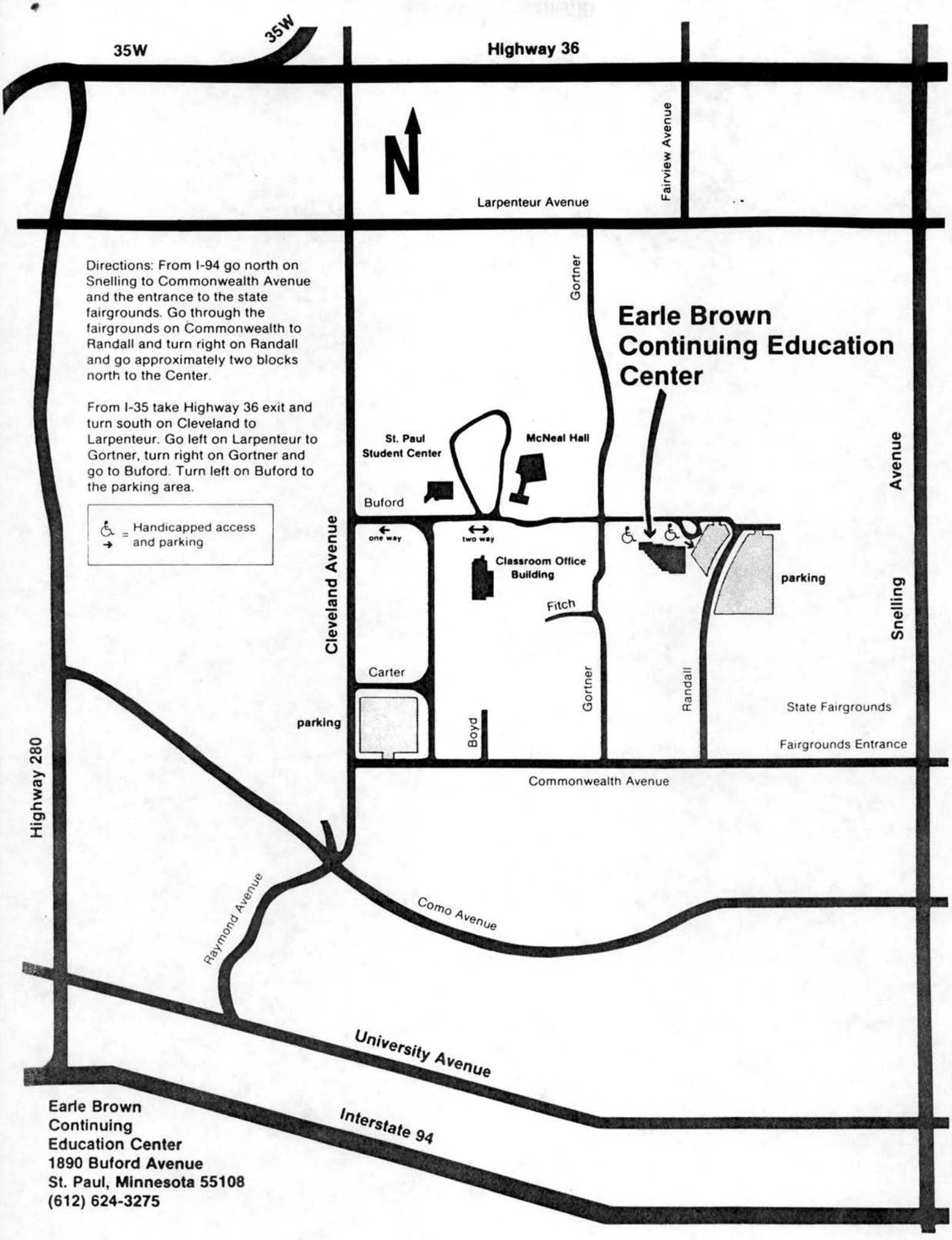
4) Peter Tereschuk, Vice President for Operations for the San Diego Trolley Corporation, Inc. for the past nine years and formerly with PATCO in New Jersey which operates the Lindenwold rail transit line into downtown Philadelphia from suburban New Jersey. Mr. Tereschuk has been with San Diego Trolley, Inc. since its inception in 1981, and has overseen the start-up and operation of three LRT lines in the San Diego metropolitan area which now comprise a 35-mile, 71-vehicle system carrying over 60,000 daily riders. In 1988, San Diego voters approved a 20-year 1/2¢ regional sales tax for surface transportation improvements, one-third of which will go towards LRT system expansion. Within the next ten years, the San Diego Metropolitan Transit Development Board (similar to the Twin Cities RTB, but with the addition of LRT design and construction capability) plans to expand the San Diego LRT system to over 100 miles and 200 vehicles, providing a truly comprehensive regional network. Mr. Tereschuk has been involved from the beginning in setting up an efficient and well-run organization to operate and maintain the regional LRT system. San Diego Trolley, Inc. can be very proud of its 90%-plus LRT farebox recovery ratio (i.e., passenger fare revenues pay for 90%-plus of the systems operating and maintenance costs).

Category IV - Overall Design and Construction Manager from the Public Sector who has managed the design and construction of a new rail transit system.

5) Peter Schmidt, Deputy Director for Development (Rail Transit) for Maryland Department of Transportation's Mass Transit Administration, is overseeing the design and construction of a new 27-mile long LRT line in Baltimore, Maryland. The project is being managed by a division of the state DOT, which also finances and operates all public transit services in the State of Maryland. The $460 million LRT project is to be funded almost entirely by the state, with some funds expected to come from the federal government (UMTA Section 3) through the "Overmatch Initiatives" Program, for some outermost segments, similar to Dallas. This project has been championed by Maryland's Governor William Shaefer, who formerly was the mayor of Baltimore and an LRT advocate there. Interestingly, the Baltimore LRT project has no policy oversight board-it is run entirely by Mr. Schmidt, his DOT-MTA staff and consultants. The project is being designed and built similar to Sacramento and San Diego for a very low cost per mile, lots of single-tracking on lightly used railroad rights-of-way and a surface alignment downtown.

Category V - Overall Design and Construction Manager form the Private Sector who has managed the design and construction of a new rail transit system.

6) Gene Courtney, Vice President for Construction Management with Morrison-Knudsen Engineers and Contractors is currently overseeing design and construction management projects in Baltimore, Los Angeles, San Diego and San Jose. Mr. Courtney has many years of experience in the heavy construction industry, both in the U.S. and abroad for one of the world's premier engineering and construction firms. Mr. Courtney is especially well-qualified to talk about various construction management methods and organizational structures from the private contractor's perspective.



Earle Brown
Continuing
Education Center
1890 Buford Avenue
St. Paul, Minnesota 55108
(612) 624-3275

APPROVED DRAFT 10/17/90

EXECUTIVE SUMMARY

LIGHT RAIL TRANSIT COORDINATION PLAN

REGIONAL TRANSIT BOARD

DRAFT
EXECUTIVE SUMMARY
LRT COORDINATION PLAN

APPROVED BY THE

JOINT LRT ADVISORY COMMITTEE

OF THE

REGIONAL TRANSIT BOARD

ON

OCTOBER 17, 1990

EXECUTIVE SUMMARY

The "LRT Coordination Plan" was prepared in response to legislation passed by the 1989 Minnesota Legislature. It is a companion document to the "LRT Development and Financial Plan" published by the Regional Transit Board in February, 1990. The Coordination Plan is intended to provide guidelines for the implementation (design, construction and operation) of Light Rail Transit (LRT) in the Twin Cities. The Plan includes the following elements:

- Organization plan
- Implementation strategies
- Schedule and budget for ten-year plan and two-year plan
- Design guidelines
- Operations and maintenance plan
- Coordination of LRT with land use planning
- Process for updating the Regional LRT Plan
- Next steps in implementing LRT

The LRT Coordination Plan was prepared by the Joint LRT Advisory Committee for approval by the Regional Transit Board with review and comment by the Metropolitan Council and the Commissioner of Transportation. The Joint LRT Advisory Committee is made up of representatives of the seven county Regional Railroad Authorities, the Metropolitan Transit Commission and the Department of Transportation.

WHY LIGHT RAIL TRANSIT?

The Twin Cities, like many other growing metropolitan areas, will face severe transportation problems in the future. Population and employment are growing. Travel patterns are changing. Congestion is increasing while highways are deteriorating. Transportation problems in the metropolitan area can no longer be easily solved. Resources are limited; right-of-way for new highways is often unavailable; and people are demanding better alternatives. It is clear that transit will be relied upon more heavily in the future to meet peak hour transportation needs in congested corridors, in the downtowns, and in suburban employment centers.

Light Rail Transit is an important tool for responding to the transportation challenges being faced by the Twin Cities. It is certain that significant improvements in the level and quality of transit service will be needed in the future. The planning and implementation of an LRT system in the 1990s may avoid a transit crisis in the 21st century.

While LRT is not a panacea for all transportation needs, it offers distinct qualities which could bring significant benefits to the Twin Cities. Most importantly, LRT offers an opportunity to revitalize regular route transit service in the Twin Cities and to restructure transit services to better meet changing travel needs throughout the metropolitan area. Key potential benefits of LRT are:

- **LRT can significantly increase transit ridership** by providing better service coverage, better frequency, and shorter travel times for transit trips. The modern design, quality image, and high predictability of rail attracts many new riders who would not typically consider bus transportation. Once introduced to LRT service, new riders have a higher tendency to use the bus for connecting service to LRT.

- **LRT will enhance the existing bus system.** Buses will continue to serve most transit needs, including the important function of a "feeder system" to LRT lines. Restructuring of existing bus routes will provide better suburb-to-suburb connections, improved neighborhood circulation, and better transit opportunities for the reverse-commuter. This restructuring around fixed LRT schedules will provide an opportunity to improve the timeliness of the entire bus system and coordinate a wide variety of transit service options and providers.

- **An LRT and bus system is more cost-effective** than an all-bus system in moving large numbers of people. The primary reason for this operating cost advantage is that LRT is less labor intensive--one operator/driver can serve up to 450-500 passengers. Often the cost of constructing an LRT system can be recovered over several years through operating cost savings.

- **LRT can play an important part in relieving peak hour congestion** in key commuter corridors. LRT has been successful in attracting people away from the automobile in highly congested corridors because it decreases transit travel times. The improved service coverage, trip frequency and reliability of LRT also adds to the perception that LRT is a high-speed mode of transportation which is competitive with the automobile.

- **LRT can also play an important role in relieving downtown congestion** and improving air quality by reducing the number of buses and automobiles using downtown streets and reducing the need for additional parking.

- **LRT's physical characteristics provide a wide range of operating advantages** over other modes of transit including improved ride quality, increased operating speed, variable capacity, increased cost efficiency and all-weather reliability.

- **LRT offers people with special transit needs a new versatility**, increased freedom of movement, and much broader access to the metropolitan area. LRT can provide better accessibility for transit dependent people, as well as better mobility for all riders.

- **LRT can provide environmental benefits** by reducing auto and bus emissions as riders choose the clean powered electric rail service over gasoline powered modes. LRT also runs quietly because of its electrical power source.

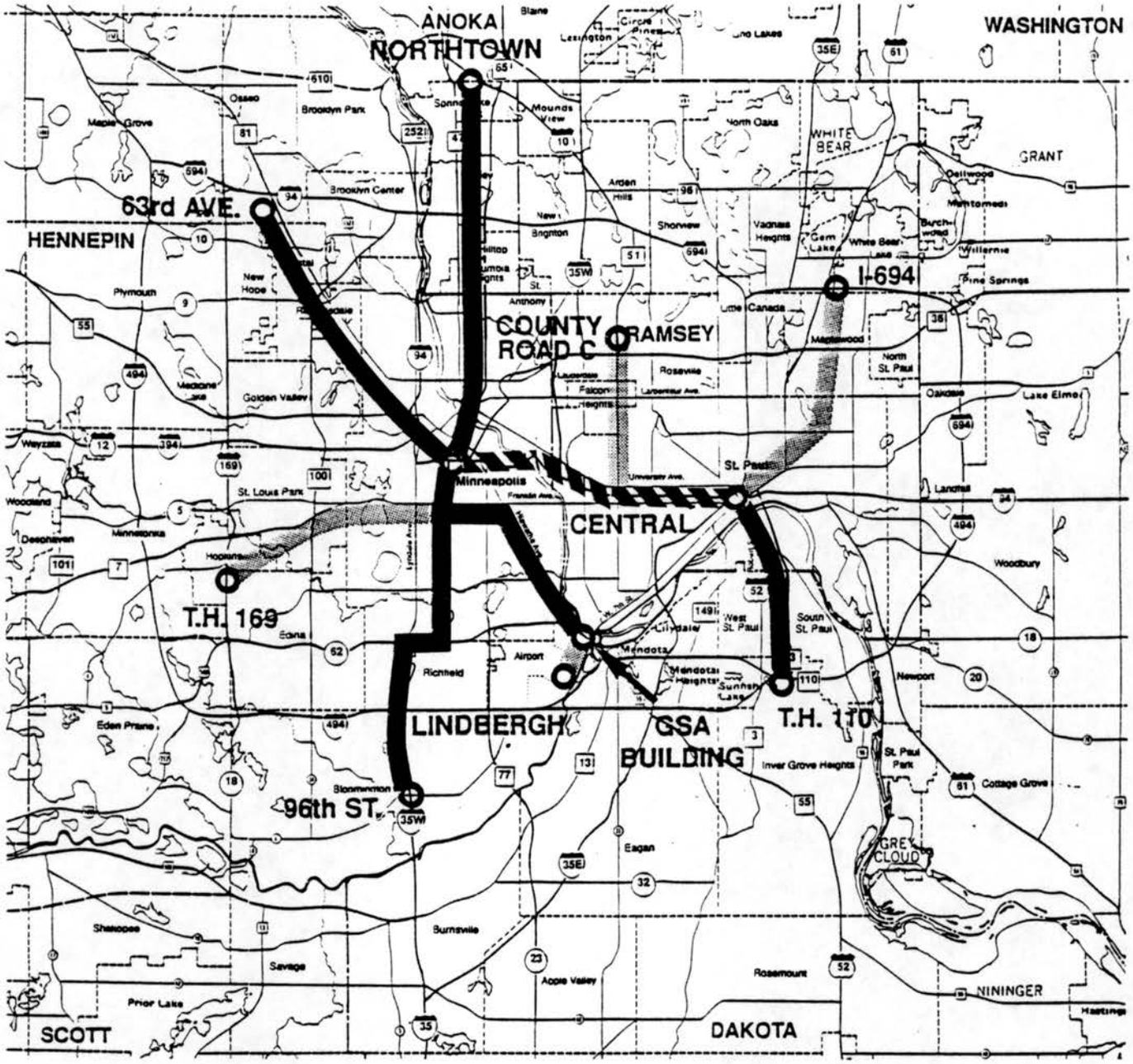
- **LRT can help focus retail, office and residential development.** It can be used to complement existing or planned developments or to restructure new development activity.

- **A strong transit system will enhance the economic vitality of the metropolitan region**, making it more attractive to new businesses, visitors and special events. By enhancing the quality of life and economic attractiveness of the Twin Cities metropolitan area, LRT indirectly benefits the economy of the entire State.

TEN-YEAR LRT PLAN

The recommended staging for the ten-year LRT plan is shown in Figure 1-1. The plan includes 83 miles of LRT service and is estimated to cost $1.6 billion (1991 dollars). The three stages of the ten-year plan are:

Group	Corridors, Facilities, Extensions
A	Central Corridor (downtown Minneapolis to downtown St. Paul)
	St. Paul downtown loop
	Minneapolis downtown tunnel
	Central operations and maintenance facility
B	Minneapolis tunnel extension to 29th Street
	Hiawatha Corridor to GSA Building
	Minneapolis Northeast to Northtown
	Minneapolis Northwest to 63rd Avenue
	Minneapolis South to 96th Street
	St. Paul South to T.H. 110
C	Minneapolis Southwest to T.H. 169
	St. Paul Northeast to I-694
	St. Paul Northwest to County Road C
	Extension of Hiawatha to Lindbergh Terminal
	Extension of Minneapolis South to T.H. 13



LIGHT RAIL TRANSIT COORDINATION PLAN

STAGING FOR MAXIMUM 10-YEAR LRT PLAN

RTB

FIGURE 1-1

The LRT Coordination Plan focuses on the implementation of this ten-year plan with emphasis on the tasks and decisions required to implement Group A of the plan.

The LRT Coordination Plan also sets forth a strategy for the implementation of the remaining Group B and C corridors in the ten-year plan. These corridors would be implemented during the ten-year timeframe (1992 to 2001) based on the availability of funding and the priorities set forth in the Development and Financial Plan. The Coordination Plan provides a process for the periodic review and updating of the regional LRT Plan.

ORGANIZATION PLAN

The organizational structure recommended by the Joint LRT Advisory Committee is a Joint Powers Board which would act as the lead agency, for LRT final design and construction. The Joint Powers Board would be established with representation from the seven Regional Railroad Authorities, Mn/DOT and the regional agencies. The Joint Powers Board, through its own staff or through delegation to an existing agency, would be responsible for the final design and construction of all LRT corridors. A state or regional agency would provide program management oversight. The RTB and Metropolitan Council would continue to set regional policies and priorities and would continue to review and approve LRT plans and designs. The MTC would be the operator of the LRT system. The Regional Railroad Authorities would continue to have lead responsibility for LRT corridor planning, environmental assessments, and preliminary engineering to completion of the 30 percent level of design.

IMPLEMENTATION STRATEGIES

Three alternative strategies for the implementation (design and construction) of LRT are considered suitable for use in the Twin Cities. These are:

- **Current Industry Practice.** Under this alternative, the Joint Powers Board or its designee would complete 100 percent of the design of the facilities (civil works) and would award multiple contracts for construction. The Joint Powers Board would complete performance specifications for the systems elements and would award multiple contracts for design, furnishing and installation.

- **Turnkey.** Under this alternative the County Rail Authorities would complete 30 percent of the design of the facilities (civil works) and complete performance specifications for the systems elements. A single contract would be awarded to a turnkey contractor by the Joint Powers Board who would be responsible for design, construction, furnishing and

installation of all facilities and equipment associated with the LRT project. The turnkey contractor would also be responsible for a test period of operation. A turnkey project may also involve private financing by the contractor to reduce the net cost of the system to the public.

- **Hybrid Approach.** Under this alternative, the Joint Powers Board would complete 100 percent of the design of the facilities (civil works) and would award multiple contracts for construction. The Joint Powers Board would complete performance specifications for the systems elements and would award a single contract to a systems turnkey contractor for design, furnishing and installation of all vehicles and equipment needed for the LRT project. The systems turnkey contractor may also be required to operate the system for a test period. Private financing could also be a part of the systems turnkey contract.

The selection of the most appropriate implementation strategy will be dependent on conditions within existing corridors. Therefore, the Joint LRT Advisory Committee has recommended that the selection of a preferred implementation strategy be made by the Joint Powers Board on a corridor-by-corridor basis. The implementation strategy selected for a specific corridor should be the alternative which best addresses the following recommended selection criteria:

- Impact on project cost
- Impact on project schedule
- Owner risks
- Owner control
- Quality of end product
- Requirements for funding commitment

SCHEDULE AND BUDGET

The Joint LRT Advisory Committee has recommended a budget and schedule based on a funding assumption of a one cent regional sales tax for broad-based transportation purposes with 1/2 cent dedicated to LRT construction and 1/2 cent returned to counties and municipalities within the seven county metropolitan area for transportation purposes. Under this scenario, construction could begin on an LRT corridor every 12 months. The Central Corridor would be completed in 1997/1998. Construction could begin on all Group B corridors and two Group C corridors within the ten-year (1992 to 2001) timeframe. Four Group B corridors would be completed by 2001. It is assumed, as proposed in the Development

and Financial Plan, that $200 million (1991 dollars) of federal funding will be obtained for the ten-year plan and a 10 percent local share will be provided by the counties for Group B and C corridors not receiving federal funds.

DESIGN GUIDELINES

Light Rail Transit (LRT) is a mass transportation system which utilizes a steel-wheeled vehicle running on a steel track, powered by overhead electrical wires. Vehicles may operate singly or may be trained together. Consists of up to three vehicles are recommended for the Twin Cities based on block lengths in the two downtowns. LRT will serve as the backbone of the regional transit system, supported by a bus system which will be reconfigured to feed the LRT lines.

The LRT system proposed for the Twin Cities is conceptually a high speed, high capacity, moderate cost, commuter service radiating out from the two metro centers. Travel to and through the metro centers as well as within corridors is expected. To accomplish these objectives, the system will utilize high-platform level boarding, predominantly exclusive (but not necessarily grade-separated) rights-of-way, and stations spaced approximately one mile apart. The system will be fully accessible to mobility-impaired people.

One of the most important potential advantages of light rail is that it can improve the cost-effectiveness of the regional transit system. However, the implementation of light rail does require a major capital investment. The LRT system to be built in the Twin Cities should be reliable and moderate in cost. To accomplish this objective, the LRT system will utilize conventional "off-the-shelf" LRT technology. Designs and materials will be selected which are attractive but are moderate in cost, easy to install and inexpensive to maintain. Grade separations and tunnels will be provided only where it can be shown that they are needed to address topographic or operational concerns.

The LRT Coordination Plan provides design guidelines for:

- Light rail vehicles
- Stations
- Park-and-ride lots and bus transfer facilities
- Accessibility features for seniors and the disabled
- Track system
- Electrification system
- Train signal system
- Communication system
- Fare collection system
- Landscaping and architectural treatments
- Operations and maintenance facilities

OPERATIONS AND MAINTENANCE PLAN

The Metropolitan Transit Commission will be the agency responsible for LRT operations and maintenance, and has prepared an organization and staffing plan for the provision of these services. The MTC operations and maintenance plan addresses overall operating policies as well as specific operational issues related to security, communications, signalization, dispatching and training. Key operating policies are:

- The LRT hours of service will be comparable to those of the present day bus system (approximately 5:30 a.m. to 1:30 a.m.).

- Scheduled train frequency will be adjusted to meet passenger demand. The maximum time between trains will be 10 minutes during peak hours and 30 minutes during off-peak hours.

- Operating policies will be adopted to assure reliable service. This will include contingency plans for emergencies, training programs for personnel, and maintenance schedules which do not conflict with peak times of operation.

- Fare collection will be barrier free and self-service. Passengers will purchase tickets from vending machines on station platforms. Fares will be in conformance with adopted RTB/MTC policies and will be consistent with other transit fares in the region.

- Feeder bus service will take the form of timed transfers and will be designed to enhance overall transit service in the region. The feeder bus system will be planned using guidelines that include travel time, route spacing, rail/bus integration, and transfer standards.

- A thorough and ongoing training program will be provided for all train operators. Operators will be subject to an annual review of their operating and safety records.

- A system security plan will be prepared with assistance from municipal, county and state public safety agencies.

To assure reliability, minimize expense and promote a high level of passenger satisfaction, the MTC maintenance program will be based on a proactive, preventive approach. All inspections and component replacements will be completed in conformance with the guidelines and intervals recommended by suppliers. Emphasis will be given to those measures which increase vehicle availability and reduce system downtime and resulting service interruptions.

LRT AND LAND USE COORDINATION

The Metropolitan Council has prepared a planning framework for coordination between the development of an LRT system and land use-related activities. These guidelines are not mandatory but will serve as information and guidance to cities affected by the implementation of LRT. Cities will continue to be responsible for land use-related decisions. The recommended planning process includes five phases:

- **Phase I--Land Use Evaluation.** This phase, which would be accomplished during preliminary design (10%) and environmental reviews, involves a review of local comprehensive land use and transportation policies, an assessment of the potential impacts of the LRT line, and an assessment of station locations.

- **Phase II--Station Area Land Use Planning.** This phase, accomplished during preliminary engineering (30%), includes development of conceptual land use planning around LRT stations, amendments to comprehensive plans, and further refinement of the location and sizing of park-and-ride facilities.

- **Phase III--Detailed Station Area Land Use Planning.** This phase of planning would be undertaken during final design of LRT and involves development of a final station area land use plan, preparation of an economic market analysis, and preparation of an implementation plan.

- **Phase IV--Station Area Preparation.** Once LRT construction is initiated, cities would take the necessary steps to implement station area plans including land acquisition, negotiations with developers, and implementation of financial plans.

- **Phase V--Station Area Development** would occur after the LRT system begins operation and would continue 10-20 years after the system is open.

PROCESS FOR UPDATING THE REGIONAL LRT PLAN

The regional LRT plan will be reviewed annually and formally updated every two years as part of RTB's update of the Five Year Transit Plan. Changes in corridor priorities will be based on the following conditions:

- Selection of final corridor alignment and station locations

- Completion of environmental reviews

- Significant changes in implementation costs

- Significant changes in patronage forecasts

- Local and agency plan approvals
- Readiness for construction
- Any other significant changes in projected performance of the corridor

As part of this process, it is expected that the benefits and costs of LRT in each corridor can be better assessed as more detailed information becomes available. As a result, corridor priorities can be further refined based on cost-effectiveness, availability of funds, regional goals and other technical criteria.

A. MEMBERS OF THE JOINT LRT ADVISORY COMMITTEE

APPENDIX A

Membership of the
Regional Transit Board's

Joint Light Rail Transit Advisory Committee

John Derus, Committee Chair
Hennepin County Regional Railroad Authority

Paul McCarron, Committee Vice-Chair
Anoka County Regional Railroad Authority

Diane Ahrens
Ramsey County Regional Railroad Authority

Donald Chapdelaine
Dakota County Regional Railroad Authority

Darryl Durgin
Minnesota Department of Transportation

Dan Erhart
Anoka County Regional Railroad Authority

Carole Faricy
Metropolitan Transit Commission

Earl Gnan
Carver County Regional Railroad Authority

Ruby Hunt
Ramsey County Regional Railroad Authority

John Keefe
Hennepin County Regional Railroad Authority

Bill Koniarski
Scott County Regional Railroad Authority

Russ Larkin
Washington County Regional Railroad Authority

Donald Maher
Dakota County Regional Railroad Authority

Sam Sivanich
Hennepin County Regional Railroad Authority

Ray Waldron
Metropolitan Transit Commission

Mpls - Star Tribune, Nov. 13, 1990

Analysis

Agencies clash over building of light rail

By Laurie Blake
Staff Writer

Who should build light-rail transit in the Twin Cities? The metropolitan-area counties? The state Transportation Department? The Regional Transit Board?

It may not matter much to residents, who, a poll says, generally favor light-rail construction, but the question of who builds may well determine whether a system is built at all.

Officials in competing agencies disagree about who should direct construction.

If they don't find an answer before the new year, when they plan to ask the Legislature to pass a 1-cent or half-cent metropolitan-area sales tax to pay for light rail, construction could be stalled for at least a year.

"Unless we get all the participants to agree on a model for implementation, it risks losing support at the Legislature," said Michael Ehrlichmann, Regional Transit Board chairman.

State Sen. Keith Langseth, DFL-Glyndon, a legislative leader on transportation issues, put it more bluntly. If the counties cannot agree to participate in the project with the state Department of Transportation in charge, he said, "It won't proceed. We just won't have a bill."

"It doesn't seem to be sinking in, and that probably does mean that we aren't going to have it this session," Langseth added.

Light rail Continued from page 1B

Why such strong feelings about who gets to build?

For one thing, the light-rail project will be visible and expensive, costing as much as $1.6 billion if all 83 miles are built. Officials are eager to take credit, and they want the project done right.

Langseth said that he and other legislators think light-rail construction is too big for the counties to handle and that legislators would not feel comfortable entrusting them with state money.

"We feel that for an undertaking that big, it has to be people with the kind of professional know-how that can handle it," he said. "DOT (the Transportation Department) is a state department, and we feel they have the expertise with the engineers and experience." The Transportation Department reports to the Legislature.

Although the counties may know more than the state about light rail, it would be too difficult to have seven counties handling the project, Langseth said.

County officials want to direct construction because they initiated the planning and are most interested in seeing it built.

The Joint Light Rail Transit Advisory Committee has recommended that its seven member counties form a joint-powers board to direct the final design and construction of light rail with help from state and regional transportation officials.

"As long as you include local government officials who have furnished the leadership, it will be built," said committee Chairman John Derus, a Hennepin County commissioner. "When you opt us out and hand it over to a bureaucracy (the Transportation Department), it will never get built. They simply don't have the interest."

Ramsey County Commissioner John Finley and Hennepin County Commissioner Jeff Spartz, who also serve on the Regional Transit Board, agree with Derus that the Transportation Department's first priority is building roads.

If light rail is to be built on a highway, then the department, which doesn't have a light-rail engineering staff, should take the lead in design and construction, Finley said. But a joint-powers board of the counties should control the project, he said.

In San Diego, Sacramento and Los Angeles, the county, not the state, built light-rail lines using state money, Finley said.

This week the Metropolitan Council is expected to add its voice to the call for state and regional control. Last week its staff report said that if the money for light rail is to be collected from a metropolitan sales tax, as proposed, then state and regional officials can better assure that it is built in the best interests of the entire metropolitan area.

It recommended turning over the project to the Transportation Department and the Regional Transit Board, while allowing the Met Council to oversee and approve planning and engineering.

On Nov. 26 the Regional Transit Board is scheduled to take all arguments into consideration and make its recommendation to the Legislature about who should build the system.

Citizens will have their chance to comment on the matter from 7 to 9:30 p.m. Wednesday at a hearing before the Regional Transit Board at the Mears Park Centre, 230 E. 5th St., St. Paul.

OUTLINE FOR LRT PUBLIC HEARING

I. Welcome members of the public, VIPS, etc
(list of VIPs will be given to you after we get their names from sign-up sheet)

II. Purpose of public hearing
- hear public input on draft regional light rail transit coordination plan

III. Draft LRT Coordination Plan Background

The Twin Cities area has been discussing whether or not to implement a rail transit system for the metropolitan area since the late 1960's. Since the early 1980's, this debate has focused on light rail transit.

Over the years, there have been several starts and stops, with shifts in agency responsibilities for rail transit planning

Planning became more tangible in 1988, when Hennepin County became the first of the seven county Regional Railroad Authorities to adopt a comprehensive LRT system plan for Hennepin County. The six other metropolitan area counties have since followed suit. All have either developed a county-wide LRT system plan or are in the process of developing one.

Watching the planning for LRT going on, the 1989 State Legislature revised the process to require a coordinated, regional approach. The Legislature directed the RTB to prepare a regional plan to develop, construct and coordinate LRT in the Twin Cities metropolitan area. The independent county rail authorities now coordinate with the Regional Transit Board as members of the RTB's Joint LRT Advisory Committee, along with representatives of Mn/DOT and the MTC.

The first of the two-part regional plan, the Regional LRT Development and Financial Plan, was finalized in February of 1990. This document identified and prioritized ten and twenty year plans for LRT throughout the Twin Cities region.

The Draft Coordination Plan being reviewed today is the second and final document under this mandate. The Legislature directed the Joint LRT Advisory Committee to prepare the Draft Coordination Plan and submit it to the RTB for approval.

The Coordination Plan addresses several fundamental policy and funding issues regarding the regional LRT system. The most important appear to be:

- Who will direct the final design and construction of the system?
- What construction method, or methods, will be used?
- What kind of a light rail transit system should be built here, and what kind of service should it provide?
- How fast should the LRT system be implemented, and how much money will be required?
- How should the LRT system be financed at the regional level (type of tax and amount)?

Adding to the overall need to finalize the regional plans for LRT is the fact that several corridors in the ten year plan have now advanced to the preliminary engineering phase under the direction of the county Regional Railroad Authorities. The region is now at a decision point regarding the construction of the highest priority corridors of the regional LRT system.

Funding requests for LRT implementation will soon be presented to the 1991 State Legislature. But first an agreed-upon plan to ensure a coordinated, efficient, cost-effective regional LRT system must be in place.

IV. Dave Minister will give an overview of the plan.

How & when not where

V Ground rules for this hearing

A. State your name and address and who you are representing

B. If you have written comments, please submit them to the board secretary before you speak.

C. Point your testimony to the plan that is in front of us.

D. Limit your comments to ten minutes.

E. If you do not want to speak, but would like to offer written comments, the RTB will receive those comment until Friday, November 23. There are sheets on the table for written comments.

V. Conclusion/Adjournment

A. Thank public for participating in this process

B. Note how important it is for them to be involved

---

1) Define the universe

~~briefly~~ ~~describe~~ give 3 examples

2) Based on European impressionistic evaluate the evolution of Etruscan pottery

3) Map the ~~genetic~~ DNA structure of the Y chromosome.

REGIONAL TRANSIT BOARD

Public Hearing
on the Regional LRT Coordination Plan

November 14, 1990

The following have signed up to testify:

	Name	Address	City	
✓	1. Mark Mizen	168 E. 6th Street	St. Paul	nggt
✓	(2) Call Art White	203 Greenvale, Apt. 203	Northfield	nget
✓	3. Lisa Lee dwelling unit removal	181 Sherburne Ave.	St. Paul 55703	nggt
✓	4. Dora Mead	112 E. Elmwood Place	Minneapolis 55419	da

Gibson's

REGIONAL TRANSIT BOARD

Public Hearing
on the Regional LRT Coordination Plan

November 14, 1990

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2.	Art White	203 Greenvale, Apt. 203	Northfield
3.	Lisa Lee	181 Sherburne Ave.	St. Paul 55703
4.	Dora Mead	112 E. Elmwood Place	Minneapolis 55419

REGIONAL TRANSIT BOARD

ROLL CALL AND ATTENDANCE SHEET

DATE: 11/14/90

BOARD OR COMMITTEE: G. A. - Ltt

Member Name	Present	Vote	Vote	Vote	Vote	Vote	Vote	Vote	Vote
Mike Ehrlichmann	✓								
Doris Caranicas (P)	✓								
John Finley (A&F)	✓								
Ruth Franklin (A&F)	✓								
Ed Kranz (A&F)	✓								
Sandra Hilary (P)									
Terry O'Toole (P)									
Jeff Spartz (Chair-P)	✓								
Norbert Theis (P)									
El Tinklenberg (Chair-A)									
Richard Wedell (A&F)	✓								

Visitors

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Staff

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(list of VIPs will be given to you after we get their names from sign-up sheet)

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V. Conclusion/Adjournment

A. Thank public for participating in this process

B. Note how important it is for them to be involved

Sign up Sheet
for Testifying on
the Regional LRT Coordination Plan
November 14, 1990

Name	Representing	Address/Telephone Number
✓ L J LYSTIG	Self	10441 Beard Ave. Bloomington
	Either sign-up should/it be necessary at a PUBLIC Hearing!	da
✓ TIM PRESCOTT	SELF	1917 EMERSON S. 377-7467 da
✓ Beth Popalisky	SELF	10231 4th Ave SE 331-3308 ?da
Call Jim Peterson	self	4332 Ewing Ave S 926-8025
✓ GARY HANSON	SE COMO MPLS	843 22nd Ave SE 378-3851 next SS
✓ LESLIE DAVIS	EARTH PROTECTOR	1138 PLYMOUTH BLDG. MPLS 55402 nyet 375-0202
nyet Tom MAHowald		

Sign up Sheet
for Testifying on
the Regional LRT Coordination Plan
November 14, 1990

	Name	Representing	Address/Telephone Number	
✓	Thelwyn D. Allen	self	Maine P.O. Box 10853 Mpls. Minn. 55458 3893	da
✓	Jim Steinwarth	Citizens For Light Rail	Oakdale 773-9670	da
✓	John Laddaha	CLRT	5725-2 ave So. Mpls. 867-6714	
	Call MIKE RIDLEY	CITY OF EDEAN	454-8100	
✓	Richard Hanson	self	292-1601 34 Front Ave.	da St. Paul
	Wayne		〃	
			〃 Neither	
			〃	
			Judge Hagen	1867

Sign up Sheet
for Testifying on
the Regional LRT Coordination Plan
November 14, 1990

Name	Representing	Address/Telephone Number
✓ Tom Agar		4445 Abbott So. dal? Mpls, MN 55410

REGIONAL TRANSIT BOARD
Mears Park Centre
230 East 5th Street
St. Paul, Minnesota 55101
612/292-8789

NOTICE OF PUBLIC HEARING

TO RECEIVE COMMENTS ON THE

DRAFT REGIONAL LIGHT RAIL TRANSIT COORDINATION PLAN

Wednesday, November 14, 1990
7:00-9:30 p.m.
Mears Park Centre Chambers
230 East Fifth Street
St. Paul, Minnesota 55101

The Regional Transit Board will hold a public hearing to receive comments from local agencies, communities and interested parties on the Draft Regional Light Rail Transit Coordination Plan. The draft Plan was prepared under the direction of the RTB's Joint LRT Advisory Committee and recommends provisions for the design, construction, operation and financing of the proposed light rail transit system for the Twin Cities metropolitan area.

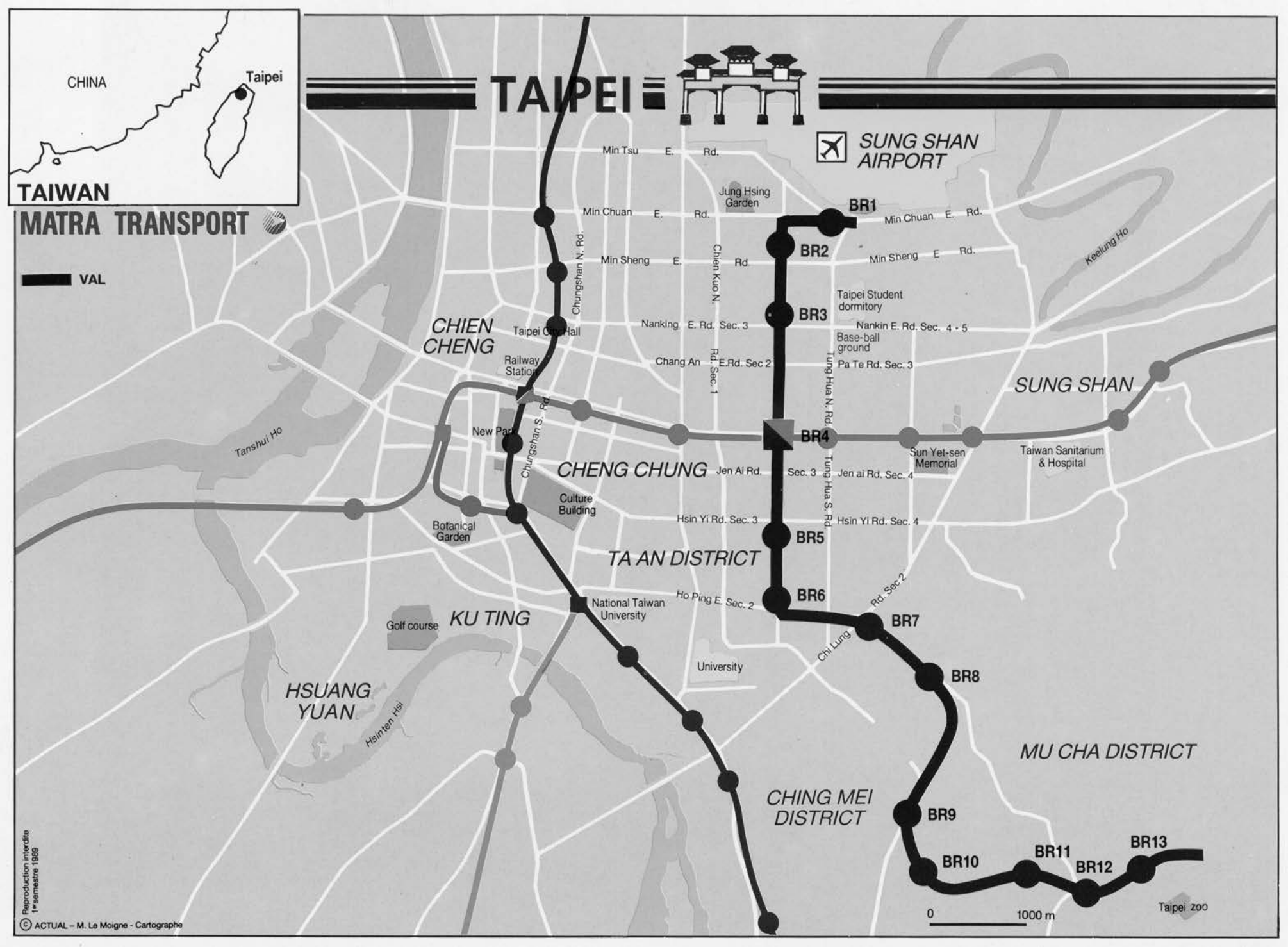
The Regional Transit Board is legislatively required to submit the Draft Regional Light Rail Transit Coordination Plan to the Metropolitan Council, the Minnesota Department of Transportation and the public for review and comment. After appropriate review and discussion, the Plan will be adopted by the Regional Transit Board and submitted to the Minnesota Legislature.

Written comments on the Plan will be received through November 23, 1990. Those wishing to present comments at the public meeting or receive copies of the draft Plan should contact Cherie Mann at 229-2758.

Michael J. Ehrlichmann
Chair

TAIPEI

MATRA TRANSPORT


CHINA
Taipei
TAIWAN
TAIPEI
SUNG SHAN AIRPORT
MATRA TRANSPORT
VAL
BR1
BR2
BR3
BR4
BR5
BR6
BR7
BR8
BR9
BR10
BR11
BR12
BR13
Min Tsu E. Rd.
Min Chuan E. Rd.
Min Sheng E. Rd.
Jung Hsing Garden
Chungshan N. Rd.
Chien Kuo N.
Keelung Ho
Taipei Student dormitory
Nanking E. Rd. Sec. 3
Nankin E. Rd. Sec. 4 - 5
Base-ball ground
Chang An E.Rd. Sec 2
Pa Te Rd. Sec. 3
Rd. Sec. 1
Tung Hua N. Rd.
CHIEN CHENG
Taipei City Hall
Railway Station
SUNG SHAN
Tanshui Ho
New Park
Chungshan S. Rd.
Sun Yet-sen Memorial
Taiwan Sanitarium & Hospital
CHENG CHUNG
Jen Ai Rd.
Sec. 3
Jen ai Rd. Sec. 4
Tung Hua S. Rd.
Culture Building
Hsin Yi Rd. Sec. 3
Hsin Yi Rd. Sec. 4
Botanical Garden
TA AN DISTRICT
Ho Ping E. Sec. 2
Rd. Sec. 2
National Taiwan University
Golf course
KU TING
Chi Lung
University
HSUANG YUAN
Hsinten Hsi
MU CHA DISTRICT
CHING MEI DISTRICT
Taipei zoo
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1000 m
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1er semestre 1989
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臺北之未來

"Like Any Growing Teenager" *

In spite of a sustained effort to extend its road network, Taïpei, the capital of Taïwan - 4.8 million inhabitants - is outgrowing its infrastructure and its former city limits.

Economic growth and prosperity - an annual average household income in excess of U.S. $ 10,000 in 1987** - trigger a highly mixed land use «with residences, offices and retail stores often located in the same area», i.e. lower densities. At the same time, a higher concentration of service sector employment is taking place in the central business district.

Beyond the present situation, population forecasts point to a minimum of 6 million inhabitants by the year 2000.

However, by no means are demographics the most striking anticipated change : the average household income will increase by 150 % by the turn of the century, and a direct consequence is a forecasted 400 % increase in automobile ownership.

At present, 4,200 buses (operating on 300 routes) and two railway lines handle 42 % of all daily trips. As the road system of the metropolitan area suffers worsening congestion during the peak periods of travel as a result of the population and automobile ownership increases, buses are becoming more overcrowded and service is deteriorating.

Today in Taïpei, there is ample evidence that overall growth and increasing private car ownership are quickly eroding the public transport's share of the nearly 8 million total daily trips. It is also quite evident that the bus network that accounts for 92 % of public transport cannot cope with the anticipated 12 million daily trips by the year 2000.

Taïpei's growth and its consequences on the urban environment have become a focus of public and political concern.

Planning for the future

In view of the present situation and prospects, the Ministry of Communication and the Taïpei Municipal Government have approved a plan calling for the implementation of a Mass Rail Transit - M.R.T. - system (conventional heavy rail) supplemented by a Medium Capacity Transit - M.C.T.S. - (Automated Guideway Transit System). The objective of the plan: maintain, or, hopefully, increase the public transport share of total daily trips within the metropolitan area.

The M.R.T. currently under implementation will provide a maximum passenger flow in excess of 30,000 riders per hour per direction.

The M.C.T.S. now under construction is a fully automated MATRA VAL system designed to meet the city's requirement in a corridor located between Mucha and the central part of Taïpei. The system is designed to meet the city's requirement of a maximum passenger flow between 10,000 and 20,000 passengers per hour per direction.

BROWN LINE

OPERATION

- Commercial speed ..... 20 mph (32km/h)
- Passengers carried at opening ..... 35 (million/year)
- Operating personne ..... 195 (excluding management and administration)

PHYSICAL CHARACTERISTICS

- Line length .... 7.2 Miles (11.5 km)
  - Overhead ..... 6.7 Miles (10.7 km)
  - Underground ..... 0.5 Mile (0.8 km)
- Number of stations 13
- Rolling stock (VAL 256) 102
  - Addition to rolling stock 62
- Initial capacity (pass/hour/direction) 10,000
- Maximum capacity (pass/hour/direction).. 23,000

* Rapid Transit Systems Planning in Taipei Taipei Municipal Government, Republic of China.

** Estimated value.

台北市中運量捷運系統

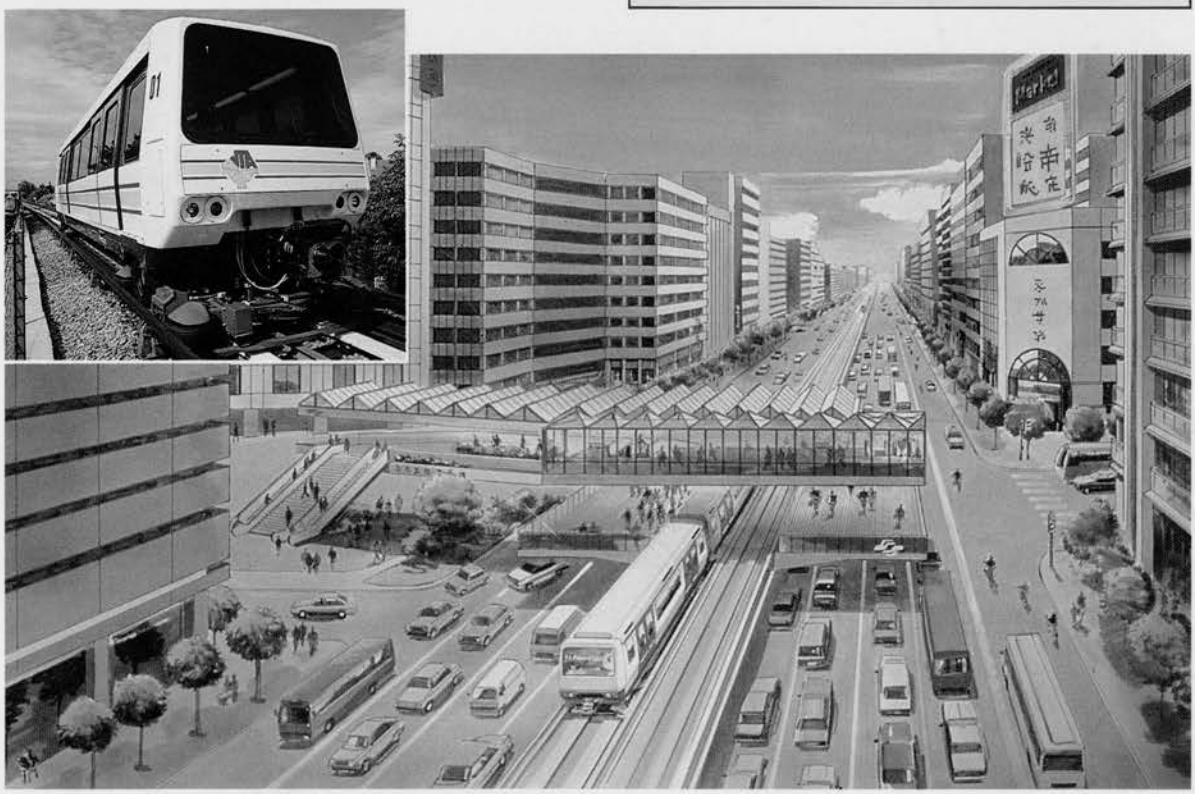
MATRA TRANSPORT Awarded the first leg of the M.C.T. Program

In July 1988, following an extensive competitive bidding process, MATRA TRANSPORT was awarded a contract to supply a VAL 256 system. Other bidders included UTDC of Canada, WESTINGHOUSE of the United States, GEC from U.K. and MITSUI and HITACHI from Japan.

The $ 263 million (U.S.) contract - excluding civil construction - calls for a 7.2 miles double track system with 13 stations and 102 air-conditioned, wide-body VAL 256 vehicles, to be operated initially in 4 car consists ; to accomodate future traffic, all stations are designed for six car consists. This rolling stock is the same that was selected by the Jacksonville Transportation Authority - J.T.A. - in 1985 for down-town Jacksonville, Florida and the City of Chicago for O'Hare International Airport.
Public opening of the first VAL line in Taïpei is scheduled for end of December 1991

The Taïpei contract is the first French metro sale in the Far East and the first automated urban metro in Asia outside Japan.
This choice illustrates just how vast the scope of the VAL system success is ; it now ranges from airport internal services with hourly traffic of about 2,000 passengers to cities requiring medium capacities in excess of 20,000 passengers per hour.

After being selected by the cities of Lille and Taïpei for their urban metros, MATRA TRANSPORT has firmly established itself as the leader in automated guideway transit systems.
Taïpei is the eighth city to decide to implement a VAL system bringing total VAL system guideway length, either in service or under contract to almost 70 double-line miles.
With now over 525 cars under contract worldwide, VAL is without doubt the world reference in the field of light automatic public transit systems.



TAIWAN BRANCH
7th floor, annex Bldg (G) Formosa Plastic Bldg
no. 201-18, Tun Hua N.Road.
Taipei, Taïwan, R.O.C.
Tel : (02) 718-5200
Fax : (02) 713-8846

MATRA TRANSPORT
48-56, rue Barbès BP531
92542 Montrouge cedex (France)
Phone : (33) (1) 49.65.70.00
Fax : (33) (1) 49.65.70.93

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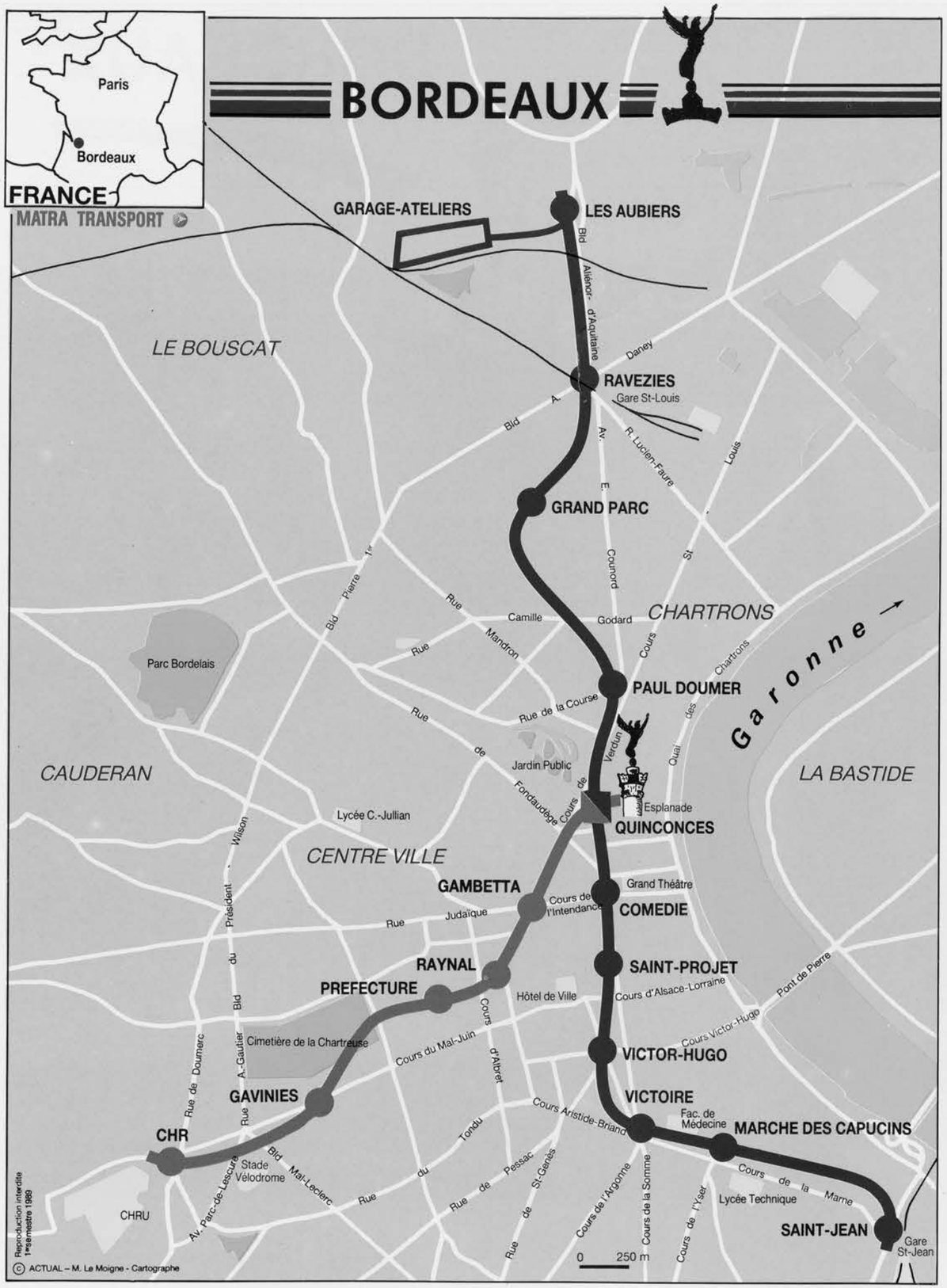
BORDEAUX

MATRA TRANSPORT



THE VINTAGE CITY

BORDEAUX, the fifth largest city in France with a population of 600,000, has seen its population grow by 20 % in the last 20 years. Since the mid 1960's, the number of passenger trips within the city limits has more than doubled thereby creating increased traffic congestion and demand for parking in the downtown area.

Bordeaux has one of the highest vehicle populations in France with 220,000 personal automobiles. With more people driving their cars in the central business district and surrounding areas, traffic conditions have deteriorated and have adversely affected the existing bus network and caused bus service quality to suffer.

The architectural uniqueness and beauty of the downtown area did not allow for any substantive new road construction to take place, and city officials did not want to use quality space for new car parking lots.

Master plans for the city show a 0.5 to 1.0 per cent growth rate per year. The Regional Plan designates the northern sectors of the city for future residential development and the Bastide train station area downtown as the only area near the city center for commercial redevelopment. Future business development zones include other areas downtown, the Bastide, the Lac in the North sector, the CHR sector to the West, but also Merignac and its airport, Pessac and Talence.

As a result of the master plan, new passenger trips will follow a North /South axis from the Saint-Jean station to Quinconces near the city center and then on to Grand Parc and the lake. Additional new trips will follow a Southwest /West axis : Pessac - University and Talence - Town Center. Finally, an East-West line from the Hauts-de-Garonne, via Bastide, to Quinconces, Town Center and the CHR.

VAL OVER LIGHT RAIL

City officials, at first, had considered constructing a light rail system for Bordeaux, similar to the ones in Buffalo, N.Y. and Portland, Ore, in the U.S.

However, studies showed that at-grade land requirements for the light rail would require it to run away from the denser zones in the city center thereby resulting in much reduced expected patronage.
Also, a light rail route closer to the city center was incompatible with the narrow streets.

PHYSICAL CHARACTERISTICS	1st phase	Full network
- Line length	11.5 km / 7.2 miles	35 km / 22 miles
Viaduct	6.5 km / 4 miles	NA
Underground	5 km / 3.2 miles	NA
- Number of stations	17	40 to 45
- Rolling stock (VAL 206)	50	130
- Initial capacity (pass/hour/direction) : line A	7,000	NA
line B	3,000	NA
- Maximum capacity (pass/hour/direction)	10,000	10,000
OPERATION		
- Trains.km/year (million)	1.85	5.5
- Passengers carried (million/year)	32.6	65
- Operating personnel	130	NA
- Productivity (pass/employed/year)	250,000	NA
- VAL share of public transport	49%	75%
- Population density/km of line (R=600 m.)	6,800	NA

Furthermore, even on the city outskirts the existing highway network did not allow for constructing an at-grade exclusive right-of-way in the median strip or along existing roads. The coexistence of the light rail and general road traffic was deemed to have resulted in mediocre service which would only further deteriorate over time.

IMPLEMENTING THE VAL

In November 1986, a cost-benefit analysis was conducted and the Bordeaux Town Council, decided to go ahead with the MATRA VAL system.

In May 1987 the Council approved the start of preliminary engineering for construction of the first line. Results of these engineering studies were approved in July 1988 and final engineering is now underway. Opening of the first line is scheduled for late 1994.
The main line system will consist of 6.75 miles of double lane guideway consisting of 0.81 miles elevated, 0.43 mile cut and cover, 5.51 miles deep tunneling. The yard will consist of 1.59 miles of single lane mostly at grade.
The initial inventory of rolling stock will consist of 50 VAL 206 vehicles, the same vehicles as employed by Lille.
The line A, from «Saint-Jean» to «Les Aubiers» and line B, from «Quinconces» to «C.H.R.» will be put in revenue service at the same time. Initial system capacity on line A will be 7,100 passengers per hour per direction with a peak headway of 105 seconds.

Cutting transport times down to one third of their current value on the main axes served by the metro will allow a 20 to 25 % increase in the numbers using all the mass transit systems in the district.

MATRA TRANSPORT
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rue Robert Caumont
33300 Bordeaux
Phone: (33) 56.39.92.37
Fax: (33) 56.39.82.56

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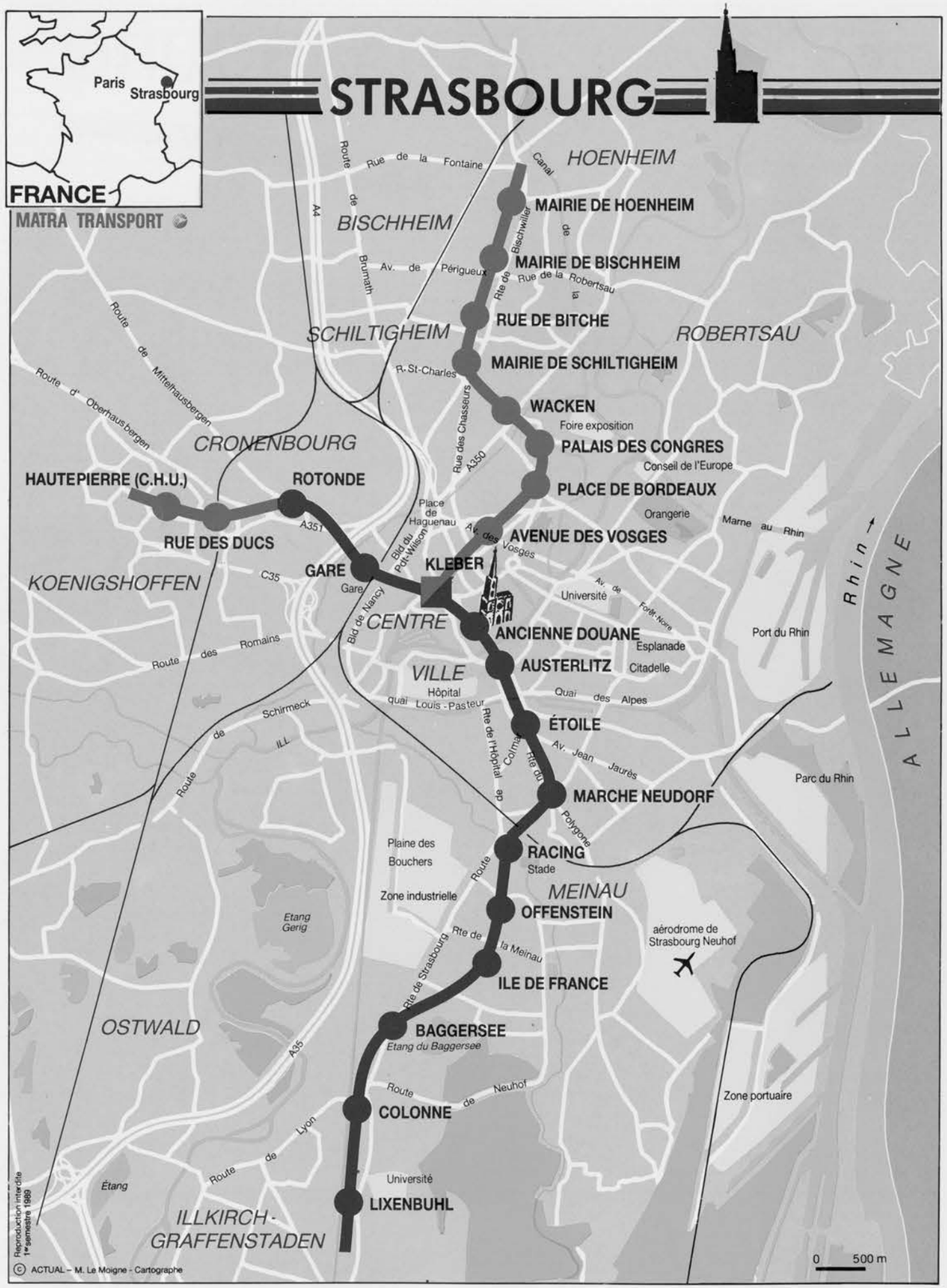
STRASBOURG

MATRA TRANSPORT



THE CROSSROADS OF EUROPE

Of all of the regional capitals within France, **Strasbourg** with a population of 400.000 is in a special position since it is the host city of European Parliament. As a result, its influence spreads far beyond its own region.
The region has an exceptional historical heritage and, being a border town, Strasbourg is more concerned than any other regional capital with the impending creation and implementation of the European Common Market in 1993.

The historical legacy of Strasbourg has hindered the penetration of the personal automobile as the dominant mode of travel within the city. It is unthinkable to adapt the city center to the automobile.
As a result, to increase accessibility to the city center, while at the same time preserving the historical character, in 1975 the Strasbourg Town Council decided that an exclusive right-of-way transit system was the preferred approach over mixed traffic at grade light rail.
In 1982, detailed studies were undertaken to define a 15 mile light rail system to represent the backbone of the future transit network. There was local concern over the capital costs required for the project. Initially the studies highlighted the need for a 1.5 mile tunneled section of the alignment in the central business district.

Further studies of alternative means of integration of the at-grade transit system within the central business district revealed considerable contraints both for the residents and vehicular traffic. It soon became clear that sending the light rail underground was necessary for most of the downtown area.
This decision made the light rail alternative much more expensive than previously estimated, thereby taking away its main advantage over the exclusive right of way automatic guideway transit VAL system.

PHYSICAL CHARACTERISTICS	**1st phase**	**Full network**
- Line length	10 km / 6.2 miles	16.5 km / 10 miles
Viaduct	0.8 km / 0.5 mile	1.5 km / 0.9 mile
Underground	9.2 km / 5.7 miles	15 km / 9.1 miles
- Number of stations	13	24
- Rolling stock (VAL 206)	38	70
- Initial capacity (pass/hour/direction)	4,500	4,500
- Maximum capacity (pass/hour/direction)	9,000	9,000
OPERATION		
- Trains.km/year	1,350,000	NA
- Passengers carried (million/year)	29	NA
- Operating personnel	106	NA
- Productivity (pass/employed/year)	270,000	NA
- VAL share of public transport.	55%	NA
- Population density/km of line (R=600 m.)	8,000	NA

After further comparative life cycle cost studies between light rail and VAL in 1985, the Town Council decided in late 1985 to proceed with a VAL automatic guideway transit system and to contract an initial 6.5 mile line linking the suburbs of Illkirch and Cronenbourg. All but a small section of the line will be underground, thirteen stations and 19 trainsets (married pairs) will be provided. VAL was preferred over light rail and buses for its superior frequency of service and its operational flexibility.

Alternative Analysis : A new up-date

Financing for the project will be provided by a state subsidy of $ 100 million (570 million French Francs) and a gradual increase in the local transport tax
When the VAL is opened, the bus network will be reorganized in order to offer improved service to the largest possible number of users. In order to encourage automobile drivers to take public transport, no less than 7 of the 13 stations will have parking lots.

When it opens, this first line is expected to carry nearly 29 million passengers per year, which is close to that of line N°.1 on the Lille metro. This represents 55 % of public transport journeys in the urban district.

Eventually, the Strasbourg metro network will extend over about 10 miles. This future network will offer excellent service to the region, which is rather spécial in that it cannot expand eastwards owing to the presence of the port.

Recently, site construction has been delayed, the new town council, elected in March 1989, wishing to up date the previous alternative analysis .

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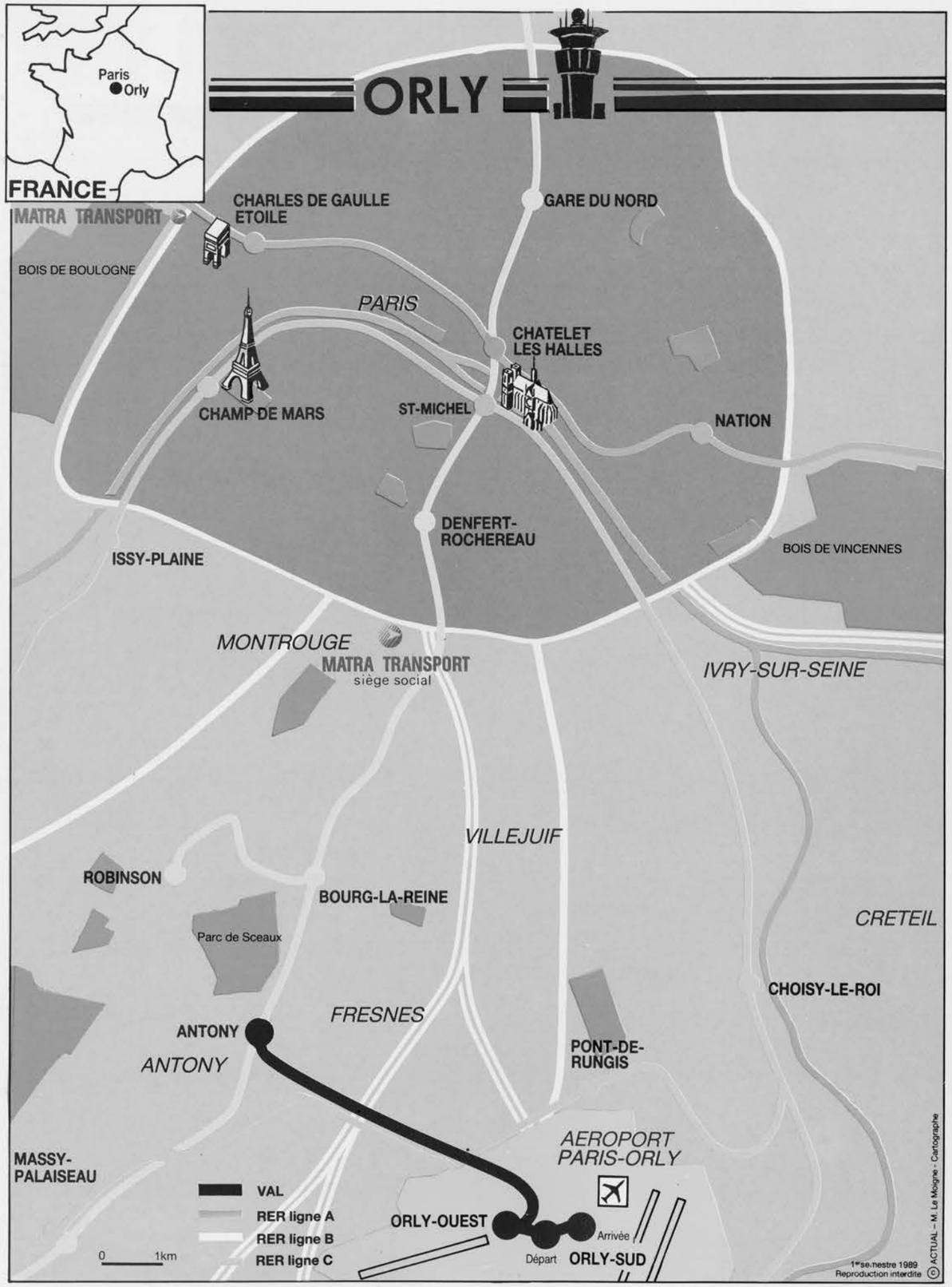
MATRA TRANSPORT



A PRIVATE VENTURE

No Government Subsidies Involved

The unique aspect of this project sponsored by MATRA, RATP (the Paris Transit Authority) and AIR INTER, the French domestic carrier, is that it is a complete private financial venture which excludes any national, state or local subsidies or guarantees.

Paris, not unlike a number of major cities who needed a fast, efficient transit link to their suburban airport, resolved its problem of access improvement with the ORLY VAL Project . Domestic air travel, which is most of Orly's traffic, has been expanding at an annual rate close to 10 % over the recent years. Business travellers arrive in increasing numbers at Orly in the early morning hours to find the access to and from the center of Paris sometimes taking as long or longer than actual flying time. Existing bus service to and from the airport gets tied up in traffic jams.

To bring a solution to this frustrating situation, authorities in Paris turned to the private sector to look for a solution. In December 1987, the Paris Transportation Administration chose the VAL system put forward by MATRA, RATP and AIR INTER as the favored alternative to the conventional heavy rail system proposed by the French National Railways (SNCF).

The ORLY VAL Project

The ORLY VAL will consist of a 4.5 mile double lane line connecting both airport terminals to Antony, a rail station of the regional rail system that gives access to the entire urban area : 400 stations.

The fleet is made up of 8 train sets of 2 VAL 206 vehicles, the same married pairs as in service in Lille with an adapted seating arrangement and luggage racks. During the peak periods trains operate at 4 minute headways. During off-peak periods trains run every 8 minutes.

On average, travel time to twenty of the major destinations within Paris will be 35 minutes .

PHYSICAL CHARACTERISTICS	
- Line length	7.2 km / 4.5 miles
Overhead	4.5 km / 2.8 miles
Underground	2.7 km / 1.7 miles
- Number of stations	3
- Rolling stock (VAL 206)	16
- Initial capacity (pass/hour/direction)	2,560
- Maximum capacity (pass/hour/direction)	4,900
OPERATION/EXPLOITATION	
- Trains.km/year	830,000
- Passengers carried (million/year)	4.2
- Operating personnel	62
- Productivity (pass/employee/year)	67,700

This will represent a 15 minute saving compared to the chartered buses presently connecting Orly to downtown Paris. This service improvement will result in substancial ridership, estimated at 4.2 million per year at service start-up. The project is scheduled to be completed in time to initiate service by the end of 1991.

The Economics of the Project

The ORLY VAL project is a franchise granted for a period of 30 years. By accepting the franchise, the partners : MATRA-RATP-AIR INTER and a bank consortium including INDOSUEZ, CREDIT LYONNAIS and CAISSE DES DEPOTS commit themselves to implement and operate this $ 225 million project. The owner's equity of the ORLY VAL company will amount to $ 52 million. The remaining funds required to build the project will be raised by the consortium of banks.

On the basis of 4.2 million passengers, annual revenue will reach $ 33.6 million while operating expenses will be $ 8 million including $ 1 million of taxes.
The balance will serve to repay the loans : a 25 year, $ 85 million loan ; a 20 year, $ 68 million loan ; and a 18 year, $ 92 million loan.

In addition, the company will compensate RATP for an estimated $ 10 million annually corresponding to the free transfer of ORLY VAL passengers onto the metro network. The internal rate of return is an estimated 14.6 %.

The project represents a certain risk for the operating company insofar as the government will not be acting as guarantor. These risks have been carefully scrutinized and a great deal of effort has been made in appraising demand in relation to a fare policy.
As far as operating costs are concerned, the VAL in Lille now has a 6 year track record and both MATRA and RATP are confident in the system's technical and economic performance.
During the operation period, all events, resulting in a receipt decrease or in an operation cost increase, will lead to the franchise being faced with cash flow deficiencies.

The financial viability of the project is founded on the fare box receipts which must be enough to cover :
- the operating cost,
- debt service.

The main risk which could affect this balance is ridership risk. A great deal of effort has been made in appraising the demand in relation to a fare policy. In contrast with existing conventional practice, the proposed fare is approximately 25 % higher than charged to the air traveller using the chartered buses. Three different traffic studies and a survey conducted in Orly's airport have shown that this fare was well accepted by the future riders, considering the excellent level of service offered.

The traffic assumptions and projections taken into account in this unique and forward looking financing plan have been purposely conservative and considered by experts as having a good probability of being reached starting with the first year of operation.

Sensitivity tests have been carried out to test the financing strength to low levels of traffic.
These runs have shown that in case of very pessimistic levels of traffic (3.6 million passengers) or of traffic rising slower than that forecasted, a cash flow shortage might occur during the first 5 years of operation.

To solve this problem and to allow an adaptability of the fare policy to the traffic, two mechanisms have been developed.

They are based on cash flow advance made over a 5 year period by :

- AIR INTER for a total amount of about $ 17 million,
- the share holders for a total amount of $ 10 million.

The financial viability of this project has been strong enough to convince private firms and banks to create the first private venture in public transportation in many years.

Innovative Financing, a Reality

Public-private ventures for fixed guideway mass transit facilities are a reality.
The ORLY VAL project is proof-positive.
Privatization has offered the Paris Transportation Administration very substantial and tangible benefits, while minimizing risk. In ORLY VAL there is a practical distribution of roles and responsabilities.
Cost containment and time management are assured through the safeguards of the financial plan and the «turnkey» contract with the private consortium.

There is a direct, definite transportation benefit by connecting the airport to the RER which allows excellent service between downtown Paris and the airport - without the need for public financing.
By entering into a management contract, the Authority has protected itself against potential cost overruns and time delays while insuring quality control.
From the private consortium's perspective, the contract offers a guaranteed incentive for the successful completion. Early commitment to a private consortium insured ongoing interaction with the public sector.
It began with a site specific design of the system which allowed client concerns to be addressed promptly and efficiently while fully recognizing the cost and time impacts of changes on the proposed financial plan.
In terms of operational specifications, the desired levels of service and reliability are incorporated right into the operator's contract.

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TOULOUSE

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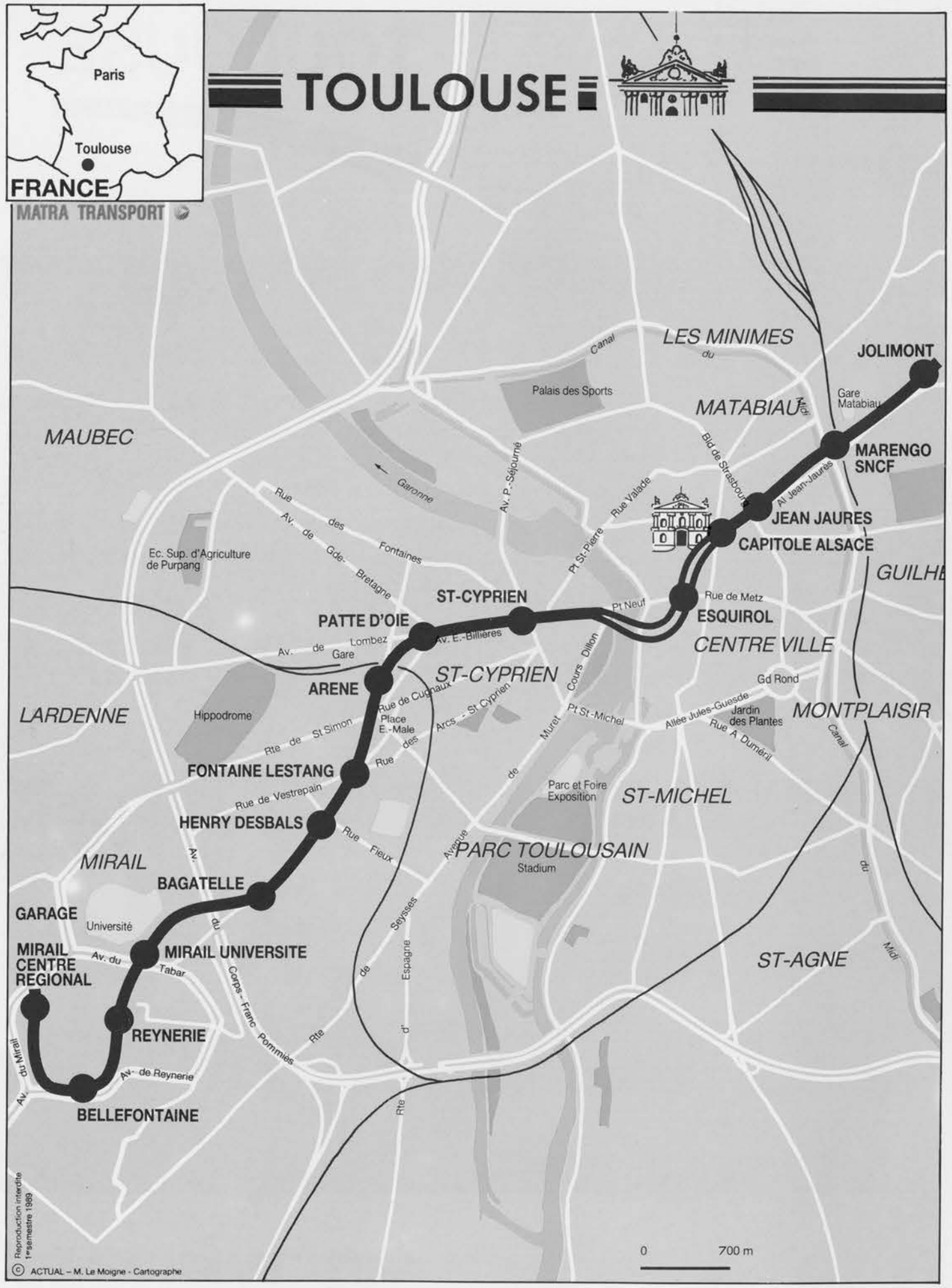

LA VILLE ROSE

Coping With Downtown Traffic Congestion

TOULOUSE, a city of 600,000 people in southern France selected MATRA's VAL system over light rail in 1985. Since the city size did not warrant a conventional metro solution, officials there analyzed both a light rail and a VAL automated guideway transit system.

During previous years the Toulouse Transportation Authority, in response to forecasted increases in development in the urban area, identified growth corridors. Longer term development seemed to suggest that the existing bus surface public transportation could not be maintained and the operating cost projections for an expanded bus network showed a dramatic increase in projected annual deficits resulting in increased costs to the local communities being served.

PHYSICAL CHARACTERISTICS	1st phase	full network
- Line length	10 km / 6.2 miles	20 km /12.4 miles
Viaduct	1 km / 0.6 mile	5 km / 3.1 miles
Underground	9 km / 5.6 miles	15 km / 9.3 miles
- Number of stations	15	30
- Rolling stock (VAL 206)	58	108
- Initial capacity (pass/hour/direction)	5,300	NA
- Maximum capacity (pass/hour/direction)	15,000	NA
OPERATION		
- Trains.km/year	2,340,000	NA
- Passengers carried (million/year)	30	NA
- Operating personnel	145	NA
- Productivity (pass/employee/year)	210,000	NA
- VAL share of public transport	50%	NA
- Population density/km of line (R=600 m.)	11,000	NA

In 1980, the authority made the decision to opt for a higher quality public transportation service by adopting the principle of construction of an exclusive right-of-way network.

The network consisted of three lines :

- two lines each about 6.2 miles long, intersecting at the town center (Mirail - Jolimont for line A and Rangeuil-Casanova for line B).

- a third line serving the community of Colomiers. This line uses an existing railway right of way.

The primary objectives of the Authorities were to preserve the historical buildings and main areas of the downtown as well as the non-regregation of communities. As a result, in April 1984, they adopted the decision to tunnel those portions of the lines in the heart of downtown Toulouse.

Light rail Vs. VAL

After extensive ridership and route refinement studies of the two technology choices, namely, light rail and VAL automated guideway transit, use of cost, service, performance and environmental criteria resulted in the recommendation to use the VAL solution. The recommendation was based on the lower operating costs of VAL over the life of the system and the fact that the light rail Operation and Maintenance cost projections were much more subject to increases due to inflation and other labor work rule assumptions.

The authority selected VAL in July 1985, eventhough the total capital investment cost of the VAL solution was substantially higher than a light rail solution.

The financial feasibility of the project relies on a state subsidy of $ 85 million (1988). An increase in the local transport tax to 1.5 %, productivity gains resulting from the transfer and integration of the existing bus service to the VAL network, and tariff reviews.

Implementing the project

Detailed preliminary engineering was completed in spring 1988 and final engineering is now underway.

The first line will open for revenue service in July 1993.

The line will have 15 stations along 6.2 miles of double-track. The fleet will consist of 29 married pairs VAL 206 units for a total of 58 vehicles.

Franchizing the construction and operation

In July 1988 the authority unanimously voted to award a franchise for the construction and operation of the Mirail-Jolimont line to a company consisting of :

- Caisse des Dépôts et Consignations (a financial institution)
- MATRA TRANSFINEX
- SEMVAT (local operating company)
- local investors.

The franchise covers not only the construction of the new line, but operation of the city's surface network as well. The franchise covers 30 years beginning with revenue service start up.

The management and financial framework is innovative for public transit in that the franchise company's commitment is all inclusive (except for land acquisition costs). The franchise company's commitment to the start of revenue service is contractual and a minimum level of ridership is guaranteed.

The franchise company commits itself to a lump sum amount of operating costs and assures the financing of the investment.
As a result, the franchise cannot rely on public subsidies to simply fill deficits after the fact is known.

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RENNES

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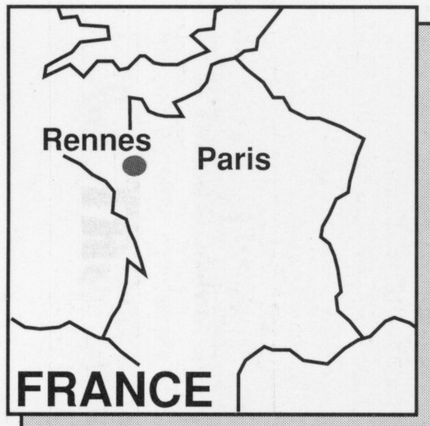

RENNES

MATRA TRANSPORT

PLAINES D'AVENTURES
VILLEJEAN-ANJOU
KENNEDY
CHR
ECOLE NORMALE
L'ILLE
SAINTE-ANNE
MAIRIE REPUBLIQUE
COLOMBIER
GARE
JACQUES CARTIER
CLEMENCEAU
ALBERT 1er
ITALIE
SUISSE
LE TRIANGLE
HAUTES-OURMES
GUSTAVE TOUDOUZE
GENERAL PATTON
PLACE DE L'EUROPE
LES GAYEULLES
PRAIRIES SAINT-MARTIN

ROCADE NORD
ROCADE OUEST
ROCADE SUD
N 137
N 12
N 24
D 177
D 163

Av d'Ile de France
Bd d'Armorique
Av Patton
Route de Fougères
Cimetière du Nord
Rue d' Antrain
Bd Volney
Rue de Fougères
Parc de Maurepas
Bd de Vitré
Parc des Bois
Rue St Martin
R Bizeux
Bd Duchesse Anne
Bd de Metz
R de l'Hôtel Dieu
Bd de Sévigné
Pl Ste Anne
Jardin des plantes
Avenue du Général Leclerc
Rue de Rennes
R St Louis
Pl du Palais
Collège
Rue de Paris
Bd de Strabourg
Pl St Germain
Av Aristide Briand
Av Sergent Maginot
LA VILAINE
Le Mail
Pl de la République
Av J. Janvier
Bd Laënec
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GARE
Cimetière de l'Est
Rue de Châteaugiron
Rue de Vern
Bd G. Pompidou
Bd Jean Mermoz
Bd Georges Clémenceau
Rue de Nantes
Plaine de Jeux de Bréquigny
Collège Jean Moulin
Parc de Bréquigny
Rue de Saint Brieuc

VEZIN LE COQUET
VILLEJEAN
BAULIEU
CESSON-SEVIGNE
CHANTEPIE
SAINT JACQUES DE LA LANDE

Phase 1
Extension

TRACKING THE FUTURE

A certain conception of Brittany

Rennes, with a population of 300,000, is the capital city of Brittany located in western France.
It intends to be a modern city as well as remain the focal point of tradition and modernity.

The rural surroundings, once the main source of the region's strong cultural identity, has changed.
That role has now been passed to Rennes, and the city intends to assume it fully.

Rennes is far from being just an arts-and-crafts museum; its focus is also turned to the future.

The university at Rennes has 40,000 students from all over the region.

The future is also being shaped in the «technopolis» of Rennes-Atalante, where academia, research and industry meet to advance the development of the telecommunications and biotechnology fields.

Any regional capital worthy of its name must be a transportation hub.
In that respect, the completion of the Atlantic TGV is a sort of crowning point of the aggresive policy Rennes has carried out for years to bring the western province into the main steam.
The TGV doesn't only mean that Rennes is only 2 hours from Paris. It also means reinforced rail service that now converges on Rennes from the other towns of Brittany.
This new accessibility only strengthens Rennes' strength as regional capital.

The need for rapid transit

The urban transit study carried out by the Greater Rennes Transport Authority in 1985 projected the following tendencies:

- a 21% increase in automobile traffic to the city center by 1995,
- a demand for parking places in the very center which was deemed incompatible with acceptable land management in the area,
- worsening access conditions to the city center, causing the public to shy away from bus service where quality depends largely on traffic conditions.

These tendencies were considered in the larger context of a residential decrease in the center ; in other words, the increasing traffic is directly related to jobs and other centrally located activities.

The study concluded that by 1995 bus service would become inadequate both in terms of capacity and quality services. The city authorities then decided in 1987 to undertake a feasability study for a light rail.

The TAU* Concept

The feasability study revealed that putting the light rail at grade within the historical district was not an acceptable proposition. The alternative alignment was a 1.7 mile tunnel under the district at a total system cost nearly twice the initial at grade proposal. This drastically reduced the capital cost differential between the light rail and a fully grade separated VAL.
Thus, authorities were convinced to undertake a comparative study of the two options.

For two years, these studies were carried out in depth, using identical methodology. The section of the first VAL line serves 80,000 inhabitants and 40,000 jobs located within 600 yards or less of the stations. This translates into a population density of 14,400 per mile of line, a density similar to line 1 of the Lille VAL. Total capital cost for the automated VAL metro was estimated at $ 330 million, a value 25% higher than the grade separated light rail.

The comparative analysis was extended to encompass long term extensions of the network. It revealed that the VAL network could be extended on a viaduct at a capital cost appreciably lower than the first segment.

The transit network selected is in the shape of the Greek letter tau, which is also the symbol used to express the time interval of a cycle.

PHYSICAL CHARACTERISTICS	Line 1	Full network
- Line length	9 km/5.5 miles	12 km/7.3 miles
Overhead	5.2 km/3.2 miles	8.2 km/5 miles
Underground	3.8 km/2.3 miles	3.8 km/2.3 miles
- Number of stations	17	22
- Rolling stock (VAL 206)	32	n.a.
- Initial capacity (pass/hour/direction)	3,300	n.a.
- Maximum capacity (pass/hour/direct.)	9,200	n.a.
EXPLOITATION		
- Train.km/year (in millions)	1.5	n.a.
- Total traffic (million/year)	20.5	n.a.
- Traffic per mile per year	3.8	n.a.
- Operating personnel	97	n.a.
- Productivity (pass/employed/year)	210,000	n.a.
- Commercial speed	{31.5 km/19.5 m}/h	n.a.

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The Selection of the VAL

The rationale of the choice of VAL over the light rail was made clear in the alternatives analysis :

In the short term :

- Due to the higher service quality, VAL ridership is estimated at 83,000 daily as compared to 60,000 for the light rail ;
- The first VAL line would account for 52% of total public transport ridership ;
- Compared to the all bus solution, VAL was projected to show an overall public transport ridership increase of 21% by the year 2000, where as only 12% increase was projected for the light rail solution ;
- The VAL alignment made it possible to serve the heart of the TGV station. By contrast, the light rail could not come closer than 250 yards ;
- Comparative O + M costs revealed the following :
  . all bus solution : $ 1.10 per trip
  . tram + bus solution : $ 0.90 per trip
  . VAL + bus solution : $ 0.85 per trip
- No interference with automobiles and pedestrians due to grade separation.

In the long term :

- Lower line extension costs,
- Quality of service independent from traffic conditions,
- Reduced operating costs due to lower exposure to inflation through time. The labor cost of the VAL option amounts to only 40% of total, O. & M. costs compared with 60% for the light rail.

In fact strict economic rationality prevailed : the capital cost of the automated metro is 25% higher than of the light rail but it will attract 40% more riders.
With 15,000 riders daily per mile of line, the VAL in Rennes has an efficiency above that of line 1 in Lille.

Citizens of Rennes are very much involved with community matters, but the recommendations of a study alone are not enough to sway them one way or another. For weeks, city officials met with citizen groups in an all out effort to inform the public. This communication effort culminated when 550 Rennais went to Grenoble (light rail) and to Lille VAL for a first hand experience of the two systems. The vote took place shortly after, with 89% in favor of the VAL solution.

LILLE

MATRA TRANSPORT

A SUCCESS STORY

In the early seventies, the Lille metropolis was faced with downtown congestion. The problem was whether to follow current trends and build an urban expressway network, or to conceive a new transport system designed to breathe life back into the down town while preserving it, and at the same time as provid an attractive link with the new town nearby.

AN AUDACIOUS PROJECT

After an international call for bids which initially concerned the single link to Villeneuve d'Ascq new town, the MATRA project was selected and adapted to provide a service for the whole Lille metropolis plus Villeneuve d'Ascq (300,000 inhabitants).
This project proposes:

1 Designing an exclusive right-of-way transport system whose investment costs would be significantly less than those of more conventional rail systems.

2 Offering a quality of service likely to attract a very wide customer base, through high commercial speeds and reduced headway between trains.

3 Achieving the highest possible productivity in order to minimize operating and maintenance costs.

4 Guaranteeing a level of safety higher than that of conventional mass-transit systems.

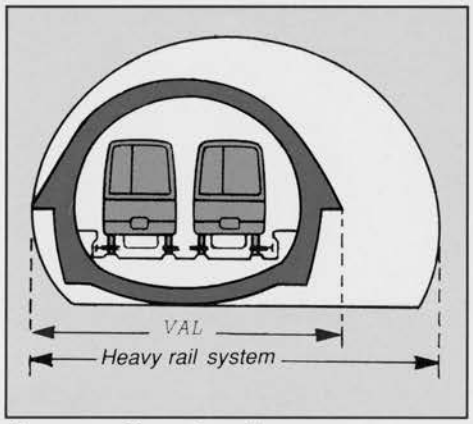
INNOVATION WITHOUT RISK

Full automation: frequency and safety

Automatic train control offers both high train frequency and increased safety. The absence of on-board personnel eliminates a large number of constraints. The VAL trains can be operated with headway of less than one minute.

Narrow profile: lower civil engineering costs

The ability to operate up to 60 trains an hour means that their length and width can be reduced without sacrificing capacity . The volume of the stations, tunnels and rights-of-way is less than that of a manual system: the civil engineering costs are reduced accordingly.



Narrow profile: reduced costs

Complementary transport: the VAL and its platform doors side by side with the streetcar

***VAL** makes light of the constraints*

Remote-supervision: instantaneous detection of anomalies

Remote-supervision informs the VAL operators of the operation of all system subassemblies: 30,000 telemetry signals are processed and renewed every 2 seconds.
By means of permanent diagnostics, preventive maintenance takes the place of corrective maintenance.
System availability is increased, as is the reliability of the vehicles, which can operate for more than 300,000 Miles (500,000 km) without major repairs.

Rubber tires: comfort and performance

Apart from the passenger comfort it offers, rubber tires allow higher performance: ability to handle a grade of up to 7%, vastly reduced noise and an absence of vibration for today's environment conscious society.

Light vehicles: energy savings

The VAL vehicles on line 1b weigh 68,200 lbs(31 tons) unladen and with all equipment, this being 426 lbs (194 kg) per passenger with 4 standing passengers per square meter (116 standing and 44 seated).
This weight to passenger capacity is one of the highest performance figures existing in this field.

HIGH PERFORMANCE DAY AFTER DAY

Commissioned in 1983, the performance of line No. 1 in Lille can at last be realistically assessed.

LINE 1	LINE 2 (1b)
8.2 Miles (13 km)	7.5 Miles(12 km)
18 stations	18 stations
54 trains	29 trains
1/3 viaduct	1/4 viaduct
1/3 underground	3/4 underground
1/3 cut & cover	

Milestones:

1971: R.F.P. for design bids
1972: Matra selected to design the system
1973: Completion of a test track and beginning of prototype testing
1977/8: MATRA obtains the contract to design and build line 1
1983: Line 1 commissioned
1989: Line 2 commissioned

User service

In service 20 hours a day, the trains follow each other at intervals of 1.12 minutes in peak periods and 3 minutes off-peak on weekdays.
For the user, waiting time is thus kept to a minimum.
Optimized acceleration and braking combined with rubber tires enables an average speed of 22 mph (34 km/h) to be attained. From the termini, the centre of Lille is only 10 minutes away.
The train access time is minimized by the elevators and escalators installed in each station, thus also providing easy access for handicapped persons.
Connections are laid out in such a way that walking distances are kept to a minimum.
For example, the VAL platform is side-by-side with the streetcar platform for Roubaix and Tourcoing.

Safety

Automatic train control rules out all risk of human error.
Furthermore, the VAL has platform doors, making it impossible to fall onto the tracks.
More than 150 million passengers have been carried in complete safety.
The presence of the roving teams, surveillance by 400 cameras and the two-way train/station communication system, have also proved effective in combating attacks and vandalism.

Accessible to all

Flexible train control

Automatic train control has the added advantage of being operationally flexible: the absence of driver means that supply can be quickly modified to suit demand.
If an unexpected passenger influx is recorded by the central control unit, it can immediately issue the appropriate telecommands putting extra trains into service.

Availability and punctuality

The passenger has less than 5 chances in a thousand of being delayed by more than 4 minutes when travelling on the VAL.

Reduced waiting, high commercial speed, supply adapted to demand, comfort... all factors which contribute to high quality service.

The system is controlled from the Control Center

Platform doors: total safety

AUTOMATION PAYS DIVIDENDS

THE PASSENGERS VOTE WITH THEIR FEET

When the line was partially opened in 1983, 35,000 passengers used it every day.
One year later the figure was 74,000, then more than 100,000 six months later.
The VAL thus needed only 18 months to win over the majority of its customer base:
the users' reaction to the quality of service offered exceeded all expectations.

One factor in the attractiveness of any transit system is its ability to win new customers.
An analysis of the reasons people give for travelling on the VAL showed that 47% of journeys were not home to workplace or home to school.
This type of ridership proves that the quality of service takes the VAL far beyond transit's usual captive audience

With its 8.2 Miles (13 km), line 1, the VAL covers a population of 106,000 living within 0.4 Miles (600 m) of the line and recorded 120,000 journeys per working day, nearly 30 million passengers a year.
The attraction of the system can be evaluated by looking at the line ridership: 3.7 million journeys per mile per year for line 1.

Attractive station interiors

PRODUCTIVITY: A GIANT LEAP FORWARD

Three essential factors contribute to the high level of productivity achieved by the VAL.

First, automatic train control with an absence of driver or permanent supervision on board the trains.

Secondly, automatic ticket issuing with no permanent personnel in the stations.

Finally, remote supervision enabling the Control Center to react immediately by issuing telecommands, with automatic telemetry detection of the status of all the trains and sub-systems (ticketing systems, escalators, etc.).

Part of the personnel thus relieved of onerous, routine tasks is made available for passenger guidance and advice:
full automation has made the transit system more human.

The results speak for themselves:
in 1988, 191 staff were required to run line 1, broken down as follows:

1. Control Center: 38
2. Passenger information and control: 34
3. Maintenance: 86
4. Administration: 33

The opening of the second VAL line resulted in a staff increase to 240, in other words, less than, a 40% increase although the length of line was almost doubled.

With an estimated overall ridership of 50 million journeys per year in the first year, productivity is up to 190,000 journeys per year per employee.

This is more than two and a half times greater than the average of the urban rail and streetcar networks in Europe and North America.

Future extensions to Roubaix and Tourcoing will enable the VAL to reach its full capacity.

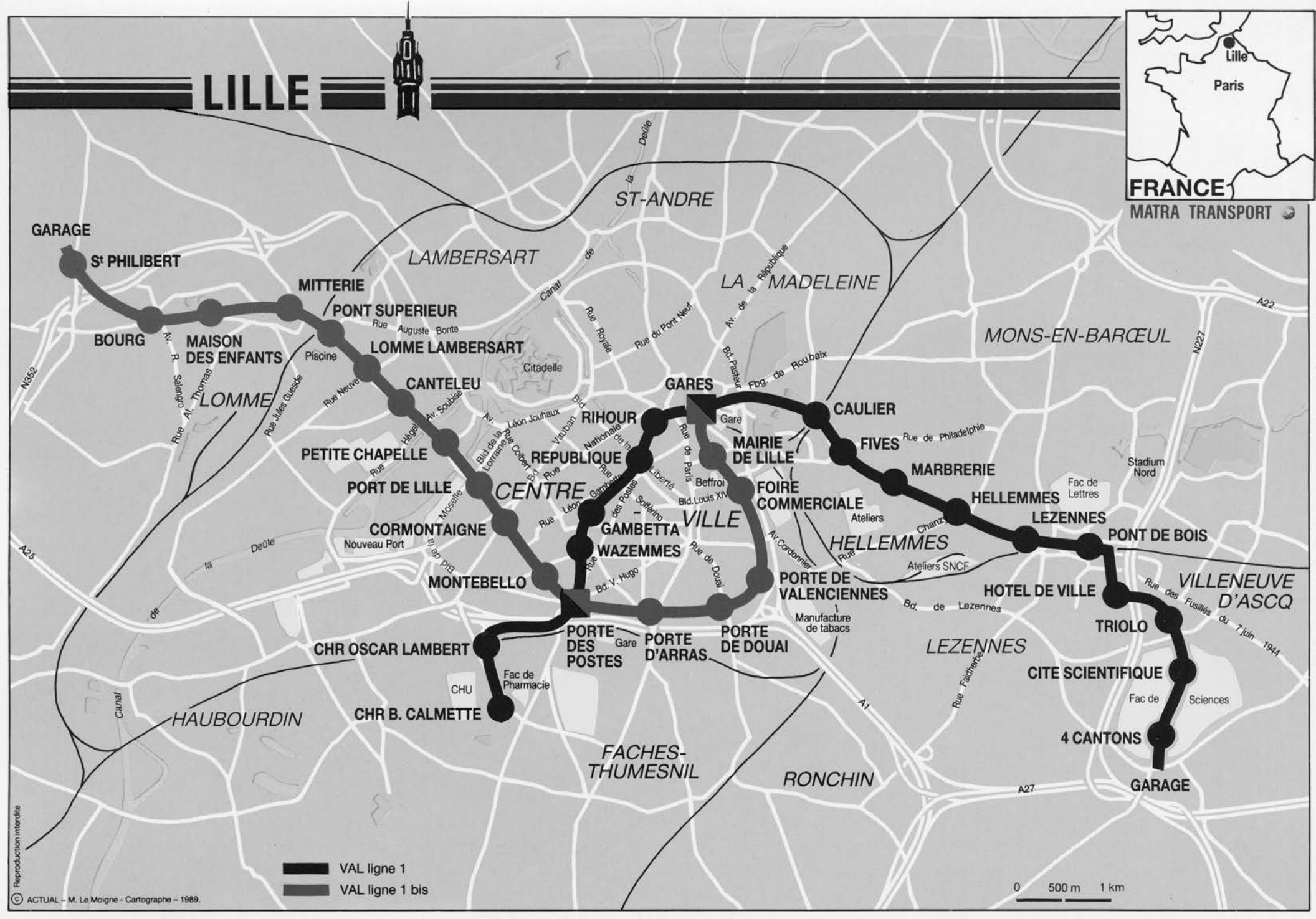
ECONOMIC BALANCE

Very high ridership and productivity twice the average - the results are reflected in the farebox recovery ratios achieved .

By comparison with manual systems, wages and salaries for VAL only account for 42% of the total operating costs. It should be recalled that even in the most advanced manual systems, wages and salaries never represent less than 60% of operating costs and sometimes even exceed 75%.

Since 1985, the farebox revenues have covered the pre-tax operating and maintenance costs .By offering a high-quality service and balancing its operating accounts, the VAL has lived up to its expectations in full - with regard to both the users and those holding the public purse strings.

Station architecture blends well with the site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WAZEMMES
GARES
MAIRIE DE LILLE
FOIRE COMMERCIALE
CAULIER
FIVES
MARBRERIE
HELLEMMES
LEZENNES
PONT DE BOIS
HOTEL DE VILLE
TRIOLO
CITE SCIENTIFIQUE
4 CANTONS
GARAGE
PORTE DE VALENCIENNES
PORTE DES POSTES
PORTE D'ARRAS
PORTE DE DOUAI
ST-ANDRE
LAMBERSART
LA MADELEINE
MONS-EN-BARŒUL
LOMME
HELLEMMES
LEZENNES
VILLENEUVE D'ASCQ
HAUBOURDIN
FACHES-THUMESNIL
RONCHIN
VAL ligne 1
VAL ligne 1 bis
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SUCCESS BY ANY STANDARDS

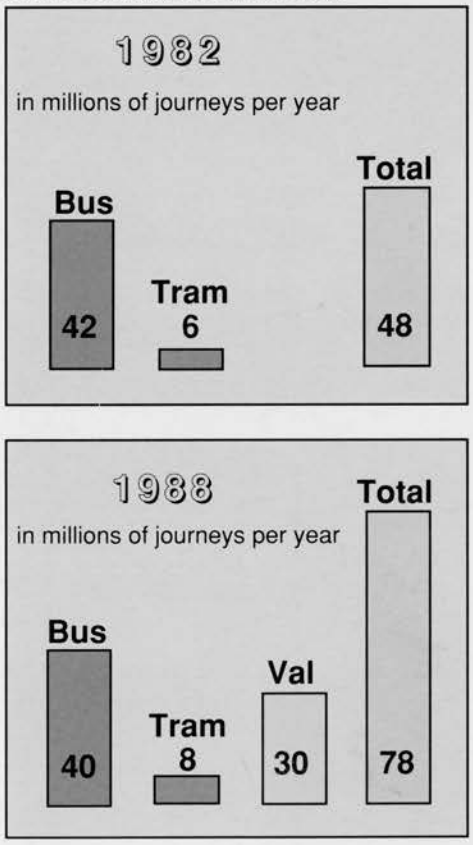
TECHNICAL SUCCESS

The technical options adopted by the VAL have, during the course of operations, proved reliable, practical, efficient and very well accepted by the public.

SUCCESS OF THE TRANSPORTATION PLAN

Since the VAL was commissioned, public transport in Lille as a whole has seen its ridership increase by more than 60%. The network synergy effect has really worked. Automobile traffic fell by 15% in 1983 in the corridor served by the VAL, whose ridership is 6 times greater than the bus service it replaced.

VAL's overall impact on ridership



SUCCESS FOR THE COMMUNITY

The Lille mass-transit system was well integrated into the revised transport plan when it was commissioned and has proved to be more than just a modern transportation system - it is the flagship of the policy of renovation and urban rejuvenation.

The historic town center of Lille today shows the signs of this evident renaissance. The new town, which triggered initiation of the project, is also a success.

ECONOMIC SUCCESS

The VAL offers its Lille users a high-quality service at a price below that of manual systems. Thanks to its full automation, the Lille VAL system has achieved a productivity level which more than covers its operating costs.

INDUSTRIAL AND COMMERCIAL SUCCESS

With automation a new era in mass-transit systems has arrived, and has already gone beyond the Lille experience, although the latter has provided valuable lessons.
In France, and indeed throughout the world, the Lille achievement is today the reference for automated urban transit.

In the United States, the first phase of the Jacksonville VAL is now complete. In Chicago and Taipei (Taiwan), as in Toulouse and Orly, construction is under way. In France, Bordeaux has also opted for the VAL, and in Strasbourg the conceptual design is completed and State funding has been obtained.

Thanks to its success in Lille, with nearly 70 Miles of dual lane (100 km) and more than 500 vehicles in service or on order, MATRA TRANSPORT is today the world's No. 1 producer of automated urban mass-transit systems.

"Porte de Valenciennes" station with César's "The Hand"

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