

**IV ENCUENTRO UPR/MIT SOBRE EL TREN URBANO
ENERO DE 1998
UNIVERSIDAD DE PUERTO RICO
RECINTO DE RIO PIEDRAS**

THE CARACAS METRO AN OPPORTUNITY FOR URBAN CHANGE.

ARQ. DAVID GOUVERNEUR

- PROF. UNIVERSIDAD SIMON BOLIVAR
DEPARTAMENTO DE ARQUITECTURA, CARACAS**
- PROF. UNIVERSIDAD METROPOLITANA,
MAESTRIA DE DISEÑO URBANO, CARACAS**
- EX VICE-MINISTRO DE DESARROLLO URBANO DE VENEZUELA**

1) INTRODUCTION:

THE CONSTRUCTION OF A MASS TRANSIT SYSTEM MUST BE CONSIDERED AN UNIQUE OPPORTUNITY TO GUIDE OR INDUCE FAVORABLE URBAN CHANGE, AVOIDING POSSIBLE NEGATIVE EFFECTS. THE SYSTEM IS OBLIGED TO PERFORM ADEQUATELY FROM A TRANSPORTATION POINT OF VIEW. IT IS ALSO NECESSARY TO FORSEE URBAN OPPORTUNITIES AND TAKE INTO ACCOUNT THE VARIETY OF URBAN ISSUES RELATED TO THE SYSTEM WHICH MAY CONDITION IT'S PLANNING AND IN TURN HAVE A SIGNIFICANT INFLUENCE ON THE CITY.

THESE OBVIOUS FACTS ARE NOT ALWAYS CONSIDERED. MANY OF THE BENEFITS AND PROBLEMS RELATED TO THIS TYPE OF PROJECT ARE USUALLY NOT FORSEEN. THEREFORE THE LESSONS LEARNED FROM SYSTEMS IN OPERATION MAY BE EXTREMELY HELPFUL FOR THE PLANNING OF FUTURE EXTENSIONS OR FOR NEW PROJECTS.

PLANNERS MUST TAKE INTO CONSIDERATION THE PARTICULAR CONTEXTUAL AND CULTURAL ISSUES THAT WILL CONDITION, DETERMINE OR INFLUENCE TECHNICAL, FINANCIAL, SOCIAL, POLITICAL AND BEHAVIORAL DECISIONS.

POSSIBLE OPTIONS TO FOLLOW:

- TO CONSIDER THE PROJECT AS PART OF A COMPREHENSIVE PLANNING STRATEGY.**
- TO CONCENTRATE EFFORTS ON THE TRANSPORTATION ISSUES AND GUIDE, STIMULATE OR EVEN RESTRAIN FROM INTERVENTIONS OF FORSEABLE CHANGE.**
- A MIXED APPROACH**

2) WHICH ARE THE MOST COMMON URBAN OPPORTUNITIES RELATED TO THE PLANNING AND CONSTRUCTION OF A RAPID TRANSIT SYSTEM?

RELATED TO URBAN PATTERNS:

-TO RESOLVE TRANSIT PROBLEMS, EASE CONGESTION, REDUCE TRAVEL TIME, CREATE NEW LINKS AND TRIPS. COMPREHENSIVE PLANNING MUST TAKE INTO CONSIDERATION THE COMPLEX RELATIONS AMONG THE DIFFERENT MODES OF PUBLIC AND PRIVATE TRANSPORTATION IN RELATION TO THE URBAN STRATEGY -AS ONE PACKAGE-.

-TO IMPROVE CITY PERFORMANCE AND URBAN QUALITY BY MODIFYING RESIDENT-EMPLOYMENT-COMMERCIAL AND RECREATIONAL RELATIONS AND THEIR LOCATION PATTERNS.

-TO INDUCE CHANGES IN LAND USE, DENSITY, LAND VALUE, FAVOR THE CREATION OR CONSOLIDATION OF SUB-CENTERS, TRIGGER NEW URBAN DEVELOPMENT, REINFORCE EXISTING TRENDS AND CREATE NEW ONES.

THE SYSTEM USUALLY PROVIDES THE OPPORTUNITY TO INCREMENT DENSITY, FAVOR MIXED USE, ENHANCE URBAN ACTIVITY, TO MODIFY LAND OCCUPATION PATTERNS AND IMPROVE ENVIRONMENTAL STANDARDS. IT MAY ALSO HELP TO INTRODUCE NEW INFRASTRUCTURE AND SERVICES, CREATE OR RESHAPE PUBLIC SPACE, AND ESTABLISH NEW GUIDELINES FOR URBAN DEVELOPMENT.

RELATED TO MANAGERIAL AND TECHNICAL SKILLS

THE SCALE OF THE PROJECTS, TIME SPAN AND TECHNICAL DIFFICULTY USUALLY REQUIRE THE INTRODUCTION OF AD-HOC MANAGERIAL SOLUTIONS, SUCH AS THE CREATION OF SPECIAL PLANNING AGENCIES TO ADDRESS SIMULTANEOUSLY REGIONAL, METROPOLITAN AND LOCAL ISSUES.

IT ALSO IS NECESSARY TO CONSIDER THE COMPLEX RELATIONS AMONG TECHNICAL, LEGAL, FINANCIAL, SOCIAL, POLITICAL, OPERATIONAL, MAINTENANCE AND CULTURAL ASPECTS, WHICH MAY RESULT IN THE INTRODUCTION OF TECHNICAL AND MANAGERIAL SKILLS THAT WILL BE IN PLACE LONG AFTER THE SYSTEM IS IN OPERATION.

THE PROJECT MAY REQUIRE THE DETECTION, RELOCATION, AND IMPROVEMENT OF INFRASTRUCTURE, AS WELL AS CHANGES OF THE ROAD SYSTEM AND SERVICES, FORCING DIFFERENT UTILITY AGENCIES TO WORK TOGETHER. IT MAY ALSO REQUIRE THE IMPLEMENTATION OR IMPROVEMENT OF DATA SYSTEMS, CADASTRAL RECORDS, OR INTRODUCTION OF CHANGES IN THE TAXATION SYSTEMS, SUCH AS THE APPLICATION OF "VALORIZATION" TECHNIQUES.

THE PROJECT MAY REPRESENT AN OPPORTUNITY TO INTRODUCE NEW OBJECTIVES, PROCEDURES AND TOOLS IN ORDER TO CONTROL OR CREATE URBAN FORM, SUCH AS NEW APPROACHES IN THE NEGOTIATION PROCESS BETWEEN THE PUBLIC, THE PRIVATE SECTOR AND THE COMMUNITY, OR THE INTRODUCTION OF URBAN DESIGN PACKAGES VS. THE USE OF TRADITIONAL ZONING, ETC.

RELATED TO SOCIAL AND CULTURAL PATTERNS

THE SYSTEM MAY INDUCE OR REQUIRE CHANGES IN BEHAVIORAL PATTERNS, SUCH AS NEW TRENDS IN RELATION TO PRIVATE CAR OWNERSHIP AND THE USE OF PUBLIC TRANSPORTATION, STIMULATE AWARENESS OF THE URBAN ARENA, THE DEVELOPMENT OF A SENSE OF PLACE, CITY PRIDE AND A "CULTURE OF LEISURE".

THE SYSTEM MAY STIMULATE WIDER OPPORTUNITIES FOR CHOICE OF JOBS, RESIDENCE AND RECREATION, AND ENCOURAGE INTERACTION BETWEEN DIFFERENT SOCIAL GROUPS, EASE SOCIAL TENSION, ETC.

THE REDUCTION OF CONGESTION, IMPROVED ECONOMIES AND NEW OPPORTUNITIES FOR RECREATION MAY HAVE A POSITIVE EFFECT ON THE CITY'S MOOD, REDUCE THE CRIME RATE, ATTRACT TOURISM AND ENCOURAGE URBAN AMENITIES.

3) SOME OF THE MAIN ISSUES, TRENDS, AND POSSIBLE NEGATIVE EFFECTS IN TERMS OF CITY PERFORMANCE TO BE AWARE OF, DURING THE PLANNING, DESIGN AND OPERATION OF THE SYSTEM?

AN OBVIOUS BUT NO ALWAYS ACHIEVED GOAL IS THAT THE SYSTEM MUST WORK, THE PROJECT MUST MAKE SENSE, MOVE PEOPLE AND RESULT IN AN ALL AROUND COST/BENEFIT GOOD DEAL.

THE ALIGNMENTS AND STATIONS MUST BE LOCATED WHERE USER DEMAND IS ENSURED OR WHERE IT WILL OCCUR WITH LITTLE EFFORT ONCE THE PROJECT IS IN OPERATION.

STATIONS SHOULD BE LOCATED ON THE MAIN CITY NODES AND CORRIDORS IN ORDER TO NATURALLY ATTRACT USERS, WHO WILL CONSIDER THE SYSTEM A TRUE OPTION COMPARED TO OTHER MEANS OF TRANSPORTATION. THIS MAY REQUIRE HIGHER COSTS FOR THE ACQUISITION OF LAND AND TO ATTEND COMPLEX LEGAL, TECHNICAL AND OPERATIONAL PROBLEMS. THE LONG TERM BENEFITS WILL JUSTIFY THE INITIAL EFFORTS AND COSTS.

SPECIAL TAXATION METHODS, NEGOTIATION PACKAGES AND TRADEOFFS MAY BE USEFUL TOOLS IN ORDER TO REDUCE COSTS, ESPECIALLY IN CONGESTED URBAN AREAS.

BELOW GRADE SOLUTIONS ARE HIGHLY RECOMMENDED, ESPECIALLY IN DENSE URBAN AREAS, DESPITE HIGH COSTS. ELEVATED OR ON GRADE SOLUTIONS MAY RESULT IN NOISE, PHYSICAL BARRIERS, VISUAL POLLUTION AND PRESENT ADDITIONAL SECURITY AND MAINTENANCE PROBLEMS.

IN LOW DENSITY URBAN PATTERNS, LINES AND STATIONS SHOULD BE PLANNED TAKING INTO CONSIDERATION THE OPPORTUNITIES TO INCREASE DENSITY, CREATE SUB-CENTERS.

INCENTIVES MUST BE PROVIDED IN ORDER TO STIMULATE TRANSFER TO AND FROM DIFFERENT TRANSPORTATION MODES TO THE MASS TRANSIT SYSTEM, AS PART OF A CAREFULLY PLANNED STRATEGY TO GUARANTEE DEMAND AND USER ACCEPTANCE OF THE SYSTEM.

TRIPS BETWEEN RESIDENTIAL, EMPLOYMENT AND COMMERCIAL AREAS MUST BE CAREFULLY CONSIDERED, HOWEVER IT IS ALSO RECOMMENDED TO LINK THE SYSTEM TO SERVICES AND URBAN COMPONENTS WHICH ARE OF GREAT SIGNIFICANCE TO THE COMMUNITY, SUCH AS: HISTORIC AND TRADITIONAL CENTERS, MARKET PLACES, MEDICAL CENTERS, UNIVERSITIES, SPORTS AND RECREATION FACILITIES, PARKS AND BEACHES.

THE PHASING OF THE SYSTEM IS CRUCIAL, IN ORDER TO GUARANTEE SUCCESS OF THE PROJECT, ENSURE USER ACCEPTANCE, HIGH RIDERSHIP AND TO GAIN POLITICAL SUPPORT FOR FUTURE EXTENSIONS. IN DEVELOPING COUNTIES THIS USUALLY MEANS THAT THE INITIAL PHASES MUST CONNECT DENSELY POPULATED LOW INCOME AREAS TO EMPLOYMENT CENTERS AND PUBLIC SERVICES.

PLANNERS MUST INFORM THE DIFFERENT PUBLIC AGENCIES, DEVELOPERS AND THE COMMUNITY OF WHAT IS BEING PROPOSED, DECISIONS TAKEN AND WORK EXECUTED, IN ORDER TO MINIMIZE RESISTANCE, AS WELL AS INCORPORATE REASONABLE SUGGESTIONS, AND ESTABLISH LEVELS OF COOPERATION AND RESPONSABILITY.

EFFORTS SHOULD BE MADE TO MINIMIZE FURTHER CONGESTION, NOISE, ENVIRONMENTAL DECAY AND COMMUNITY INCONVENIENCE DURING THE CONSTRUCTION OF THE PROJECT. IF THE PROJECT IS CARRIED OUT IN AN EFFICIENT MANNER, THINKING OF WAYS TO REDUCE SUCH PROBLEMS AND ADEQUATELY INFORMING THE COMMUNITY OF THE EVENTS IN PROGRESS AND THE SOLUTIONS APPLIED, THE PUBLIC USUALLY WILL BE PATIENT AND UNDERSTANDING, AWAITING THE BENEFITS OF THE PROJECT.

AREAS NEAR STATIONS FREQUENTLY BECOME DESIREABLE FOR COMMERCIAL OR MIXED USE. PLANNERS MUST BE PREPARED TO DEAL WITH THIS TREND. LAND VALUES TEND TO RISE. HOW CAN THE CITY FORSEE DEVELOPMENT OPPORTUNITIES, AVOID SPECULATION, PROPOSE JOINT DEVELOPMENT PACKAGES AND SET DESIGN STANDARDS?

WEAKER URBAN STRUCTURES, SUCH AS LOW INCOME AREAS, DETERIORATED NEIGHBORHOODS, INCREASE THEIR VALUE. HOW CAN THE CITY AND THE PRIVATE SECTOR BENEFIT FROM THESE CHANGES WITHOUT HARMING THE ORIGINAL RESIDENTS OR ENDANGERING IRREPLACEABLE CITY FABRICS?

THESE ARE ONLY A FEW OF THE ISSUES THAT MAY BE CONSIDERED IN THE PLANNING OF A MASS TRANSIT SYSTEM TAKING INTO ACCOUNT THE ALL AROUND URBAN PHENOMENA. NO TWO CITIES OR NEIGHBORHOODS ARE ALIKE. UNDERSTANDING WHAT IS APPROPRIATE OR NOT IN A PARTICULAR CONTEXT MAY PROVIDE ANSWERS IN ORDER TO ADRESS THE PROPER ISSUES IN SIMILIAR AS WELL AS DIFFERENT SITUATIONS.

4) THE CARACAS METRO

CITY INFORMATION.

-CAPITAL OF VENEZUELA

-POPULATION: 3.5 MILLION+.7 MILLION COMMUTERS PER DAY

-POPULATION IN INFORMAL SETTLEMENTS: 1.2 MILLION .

-ECONOMY: POLITICAL, TRADE AND SERVICE CENTER.

-NATIONAL OIL REVENUES, ADMINSTRATED FROM THE CAPITAL, FUEL AN ENORMOUS BUREAUCRACY WHICH REPRESENTS A SIGNIFICANT SEGMENT OF THE LABOR FORCE OF THE CITY AND THE COUNTRY.

-POLITICAL FRAMEWORK: 5 MUNICIPALITIES IN THE INNER VALLEY, 12 IN THE METROPOLITAN AREA. TWO GOVERNORS: FEDERAL DISTRICT AND STATE OF MIRANDA. HIGHLY COMPLICATED ADMINISTRATION AND SEPARATION OF RESPONSABILITIES BETWEEN FEDERAL, REGIONAL AND LOCAL AGENCIES. UNTIL RECENT YEARS, PLANNING DECISIONS WERE TAKEN MOSTLY BY THE CENTRAL GOVERNMENT DUE TO HEAVY FEDERAL FUNDING AND WEAK TAXATION BASE. THIS SITUATION IS RAPIDLY CHANGING.

URBAN ASPECTS

-LINEAR DEVELOPMENT PATTERNS DUE TO GEOGRAPHICAL AND LEGAL CONSTRAINTS: NARROW VALLEYS SURROUNDED BY PROTECTED OPEN AREAS (NATIONAL PARK AND GREEN BELT).

-VERY HIGH DENSITY, LACK OF LAND FOR CONTINUOUS CITY EXPANSION, DEMOGPAHIC PRESSURES CREATE LEAP DEVELOPMENT IN OUTER CITIES 25 MILES AWAY, AS PART OF THE GREATER METROPOLITAN AREA.

-THE URBAN STRUCTURE FOLLOWS A MIXED USE, MULTINODAL PATTERN, STRETCHING ALONG THE MAIN CORRIDORS OF THE VALLEYS. DENSITY TENDS TO DIMINISH AND RESIDENTIAL USE TO INCREASE ON SLOPES AWAY FROM THE MAIN CORRIDORS.

-THERE IS HIGH MOBILITY IN ALL DIRECTIONS IN THE INNER VALLEYS AND AT PEAK HOURS FROM THE FRINGE AND OUTER CITIES TO THE CORE OR VICEVERSA.

-THE CITY EXPERIMENTS CONSTANT INCREASE OF DENSITY AND CHANGES OF URBAN FORM, IN FORMAL AS WELL AS IN INFORMAL AREAS.

-LOW INCOME GROUPS ARE MOSTLY LOCATED ON THE FRINGE OF THE VALLEYS ON STEEP SLOPES, WITH SEVERE RESTRICTIONS FOR VEHICULAR AND SERVICE ACCESS.

-EXTENSIVE, COSTLY AND MULTILEVEL HIGHWAY SYSTEM IS OVERLAID ON THE CITY FABRIC, CREATING BARRIERS. HIGH PERCENTAGE OF CONGESTION IN SUCH ARTERIES IS CAUSED BY REGIONAL TRANSIT.

-HIGH CAR OWNERSHIP. LOWEST GAS PRICES IN THE WORLD.

-LACK OF LAND LED TO INDUSTRIAL RELOCATION 15 YEARS AGO, MODERATE AIR POLLUTION IS CAUSED ONLY BY VEHICLES.

-DRAMATIC STANDSTILL CONGESTION LED 20 YEARS AGO TO CONSIDER THE PLANNING AND CONSTRUCTION OF THE METRO AS A NATIONAL AND CITY PRIORITY. SEVERAL OPTIONS WERE EVALUATED, SUCH AS AN ELEVATED MONORAIL.

-THE VERY HIGH DENSITY AND LINEAR PATTERNS OF THE CITY DETERMINED, THAT DESPITE THE ELEVATED CONSTRUCTION COSTS FOR LAND EXPROPRIATION AND TECHNICAL DIFFICULTIES, THE METRO WAS THE MOST APPROPRIATE SOLUTION.

-ABUNDANT NATIONAL OIL REVENUES PROVIDED FINANCES FOR THE PROJECT AT THE TIME IT WAS NEEDED THE MOST.

-A CARACAS METRO AGENCY WAS CREATED, UNDER THE SUPERVISION OF THE SECRETARY OF TRANSPORTATION, FOR THE PLANNING, CONSTRUCTION AND MANAGEMENT OF THE PROJECT. IT HAS NO LEGAL RELATION WITH LOCAL GOVERNMENTS OR CITY PLANNING AGENCIES. IT MAINTAINS A HIGHLY QUALIFIED NON-POLITICAL STAFF, WHICH HAS GAINED HIGH PUBLIC RECOGNITION AND HAS BEEN UNDER THE SAME MANAGEMENT FOR 23 YEARS, DEVELOPING A STRONG CORPORATE CULTURE.

-THE METRO IS WIDELY CONSIDERED ONE OF THE COUNTRY'S GOOD EXAMPLES OF PLANNING, DESIGN, CONSTRUCTION AND MANAGEMENT.

-DESIGN OF LINES AND STATIONS WAS CARRIED OUT BY LOCAL FIRMS. CONSTRUCTION AND SUPPLIES WERE CONTRACTED WITH FOREIGN AND LOCAL FIRMS.

RELEVANT SYSTEM FEATURES

-THREE LINES ARE IN OPERATION (WHICH REPRESENT CLOSE TO 50% OF THE PLANNED NETWORK).

-OPERATION OF FIRST SEGMENT OF LINE 1 BEGAN IN 1983

-43 KM. OF LINES

-42 STATIONS

-1.4 MILL. PASS/PER DAY. VERY HIGH RIDERSHIPS. CONGESTION ON PEAK HOURS.

-27 METROBUS CONNECTING LINES

-THE METRO SYSTEM HAS NO FORMAL RELATION WITH OTHER MEANS OF PUBLIC TRANSPORTATION. THE WEB HAD DEVELOPED UNDER A PIECE MEAL BASIS.

-SOME CHANGES HAVE BEEN INTRODUCED IN FUTURE PLANS IN RELATION TO INITIAL OPTIONS AFTER EVALUATING SYSTEM AND CITY PERFORMANCE, INCLUDING BY-PASSES AND PARALLEL LINES.

URBAN CHANGE

THE CARACAS METRO IS THE MOST IMPORTANT URBAN PROJECT IN THE CITY'S HISTORY. IT HAS CHANGED, IN A SHORT TIME, ITS ENTIRE PERFORMANCE AND ENVIRONMENTAL QUALITY. ALTHOUGH THERE WERE NO FORMAL TIES BETWEEN THE METRO AGENCY AND THE NATIONAL, REGIONAL AND LOCAL PLANNING AUTHORITIES. THESE HAVE BEEN SOME OF THE TRENDS

-THE CITY HAS BEEN PULLED TOGETHER

THE METRO HAS HELPED TO PULL TOGETHER A CONGESTED, SEGREGATED URBAN FABRIC, MAKING IT MORE COMPETITIVE WITHIN THE NATIONAL AND THE CARIBBEAN MARKETS. AT THE SAME TIME IT HAS MULTIPLIED THE OPPORTUNITIES OF CHOICE FOR JOBS, PLACE OF RESIDENCE, SERVICES AND AMENITIES, PARTICULARLY FOR LOW INCOME GROUPS. IT HAS SAVED CARACAS FROM TOTAL PARALYSIS, RESULTING IN LESS CONGESTION IN CERTAIN CORRIDORS AND DRASTIC REDUCTION OF TIME REQUIRED TO MOVE FROM THE FRINGE AREAS TO THE INNER VALLEYS AND WITHIN THE URBAN CORE.

THE METRO HAS MADE THE CITY MORE DEMOCRATIC, REDUCING SOCIAL SEGREGATION AND TENSION, ENHANCING MOBILITY THROUGHOUT THE ENTIRE CITY FABRIC.

THE METRO HAS PROVIDED AN EFFICIENT AND HIGHLY USED MODE OF PUBLIC TRANSPORTATION, AFFECTING, IN A SIGNIFICANT MANNER, THE QUALITY OF LIFE OF 80% OF THE POPULATION.

EVEN DURING PERIODS OF SEVERE SOCIAL UNREST, 7 YEARS AGO, THAT FOLLOWED THE FALL OF OIL PRICES, WHICH LED TO RIOTS AND VANDALISM NOT RECORDED IN THE COUNTRY'S MODERN HISTORY, THE METRO WAS RESPECTED BY ALL. THE INTENSIVE USE OF PREVIOUS SELECTIVE COMMERCIAL FACILITIES AND SERVICES, THE OVERCROWDING OF PARKS AND RECREATIONAL FACILITIES, THE RISE OF NEW COMMERCIAL ACTIVITIES WITHIN INFORMAL AREAS, AND WIDESPREAD INVESTMENT NEAR STATIONS AND ALONG CORRIDORS, ARE GOOD INDICATORS OF SUCH URBAN CHANGE.

THE METRO HAS CREATED A HIGH QUALITY UNDERGROUND WORLD OF PUBLIC SPACE.

AFTER 15 YEARS IN OPERATION, THE TRAINS, STATIONS AND COMMERCIAL GALLERIES STILL ARE HEALTHY ENVIRONMENTS DEFENDED BY THE USERS. THIS IS A SPECIAL PHENOMENA IN A CITY THAT WAS CHARACTERIZED BY LOW MAINTENANCE AND POOR CIVIC BEHAVIOR. A STRONG SENSE OF PLACE IDENTIFIES THE SYSTEM. STATIONS FREQUENTLY OFFER CLUES OF THE URBAN CONDITIONS ABOVE.

SITE SPECIFIC DESIGN SOLUTIONS, THE USE OF LONG LASTING MATERIALS AND OF EASY UPKEEP, BRIGHT COLORS, A GOOD COMBINATION OF NATURAL AND ARTIFICIAL LIGHTING HAVE HELPED TO ACHIEVE THESE RESULTS.

A COMBINATION OF CAREFULLY PLANNED TECHNIQUES TO CREATE A USER-FRIENDLY ENVIRONMENT, EDUCATING VS. ENFORCING, OFFERING A-1 QUALITY SERVICE, TRAINING OF PERSONNEL, PUBLIC RELATIONS AND COMMUNICATION METHODS (GRAPHIC AND SOUND) HAVE BEEN GIVEN GREAT IMPORTANCE BY THE METRO AGENCY.

A MAJOR PROGRAM OF URBAN IMPROVEMENTS, IN TERMS OF INFRASTRUCTURE, ROADWORK AND TRAFFIC MANAGEMENT AND OPEN SPACE WERE CONSIDERED CRUCIAL ELEMENTS OF THE PLANNING PROCESS.

THE CONSTRUCTION OF THE METRO REQUIRED THE DETECTION, RELOCATION, IMPROVEMENT AND EXPANSION OF 40% OF THE CITY'S INFRASTRUCTURE, MOST OF WHICH WAS DETERIORATED OR WAS OFF RECORD. NEW ROAD LINKS, TRAFFIC MANAGEMENT CONTROLS, PROVISIONAL DEVICES, WERE PART OF A COMPREHENSIVE PLAN TO IMPROVE CONDITIONS DURING THE CONSTRUCTION OF THE SYSTEM AND AFTER OPERATION. CARACAS WAS CONSIDERED A CAR ORIENTED CITY. THE METRO HAS MADE IT A MORE LIVEABLE PLACE, REVERSING EXISTING TRENDS BY PLANNING, DESIGNING AND CONSTRUCTING MORE THAN 30 KMS. OF PEDESTRIAN MALLS, PARKS, PLAZAS, PATHS, WITH GOOD LANDSCAPING, USE OF FOUNTAINS, AND STREET FURNITURE. THIS HAS CONTRIBUTED TO INTRODUCE EXTENSIVE URBAN DESIGN .

PROPOSALS OVER THE PUBLIC TURF AND HAS TRIGGERED PUBLIC AND PRIVATE EMULATION. STREETS WERE RECUPERATED FOR PEDESTRIANS, METRO STATIONS HAVE BECOME MEETING PLACES, POINTS OF REFERENCE, SERVICE AND ACTIVITY CENTERS. THIS NETWORK OF OPEN SPACE IS REFERRED TO BY THE METRO AGENCY AS "LINEAS PARALELAS". THE DESIGN SOLUTIONS ENLIGHTEN PARTICULAR FEATURES OF EACH LOCATION, CREATING A STRONG SENSE OF PLACE. ART WORK IS WIDELY INCLUDED IN THE STATIONS AND OPEN SPACES.

THESE IMPROVEMENTS HAVE UPGRADED ENTIRE AREAS, STIMULATING LARGE AND SMALL SCALE URBAN DEVELOPMENTS AND HAVE FAVORED COMMERCIAL ACTIVITIES. THE TRENDS HAVE BEEN VERY DIFFERENT. SOME RESIDENTIAL AREAS HAVE TURNED COMMERCIAL, LOW INCOME AREAS HAVE ALSO BEEN UPGRADED BY INTRODUCING SMALL SCALE MANUFACTURING INDUSTRIES, MIDDLE INCOME RESIDENCIAL AREAS HAVE DEVELOPED WITHIN PREVIOUSLY COMMERCIAL AREAS.

INFORMAL TRADE COMPETING ON THE SAME TURF AS FORMAL BUSINESS HAS LED TO THE INTRODUCTION OF NEW REGULATIONS AND POLITICAL NEGOTIATION BETWEEN THE STREET VENDORS, THE BUSINESS SECTOR, RESIDENTS AND FREQUENT USERS.

LEISURE, IDENTITY, AND PROFESSIONAL REGOCNITION.

PROBABLY ONE OF THE MOST IMPORTANT SIDE EFFECTS OF THE CARACAS METRO IS THAT IT HAS OFFERED THE COMMUNITY THE FREE TIME TO RELAX, ENJOY SPORTS, CULTURE, WHICH IS ONE OF THE PRINCIPAL BENEFITS OF CITY LIFE AND NOT ALWAYS OBTAINED. ALTHOUGH DIFFICULT TO MEASURE, THESE ASPECTS MUST BE A KEY ISSUE TO BE ANALIZED IN ORDER TO EVALUTAE THE SUCCES OF SUCH A PROJECT.

IT IS DIFFICLULT TO THINK OF CARACAS WITHOUT ITS METRO, ALTHOUGH MOST USERS HARDLY REMEMBER HOW IT WAS BEFORE THE SYSTEM EXISTED OR WHILE IT WAS BEING CONSTRUCTED.

THE METRO HAS MOTIVATED A SENSE OF PRIDE, RESPECT AND IDENTIFICATION OF THE USER TOWARDS THE SYSTEM AND TOWARDS THE CITY.

THE METRO HAS HELPED PLANNERS, DESIGNERS, BUILDERS, POLITICIANS, DEVELOPERS, AND THE COMUNNITY AT LARGE TO RETHINK THE CITY, PROVIDING A NEW APPRECIATION OF URBANITY AND HAS PROVED THAT URBAN CHANGE IS POSIBLE. THIS MAY BE THE PRINCIPAL GOAL ASSOCIATED WITH THE CONSTRUCTION OF A MASS TRANSIT SYSTEM.

SOME NEGATIVE ASPECTS AND RECENT TRENDS CONCERNING METRO PERFORMANCE.

METRO UNIONS HAVE BECOME VERY POWERFUL, INTERFEERING WITH NORMALLY GOOD SERVICE. THIS WEEK THE METRO AGENCY HAS ISSUED PUBLIC NOTICES INFORMING OF LIKELY SERVICE CUTS AND DELAYS DUE TO DISAGREEMENTS ON UNION REQUIREMENTS.

DUE TO ECONOMIC RECESSION AND SEVERE INFLATION, FARES HAVE BEEN GRADUALLY INCREASED HOWEVER, TAKING INTO ACCOUNT SOCIAL AND POLITICAL COSTS, THESE INCREMENTS DO NOT ALLOW TO COVER OPERATING COSTS.

MAINTENANCE HAS DECREASED IN SYSTEM AND STATIONS, DELAYS AND BREAKDOWNS HAVE ALSO INCREASED.

THE PUBLIC ACCOSTUMENT TO A-1 SERVICE AND ENVIRONMENTAL CONDITIONS COMPLAIN.

IN-TURN, SPECIAL TAX EXEMPTIONS AND FUNDING FOR NEW LINES HAS BEEN GRANTED BY THE CENTRAL GOVERNMENT.

5) ADDITIONAL INFORMATION ON THE CARACAS METRO

(MOST OF THE DATA HERE INCLUDED WAS REQUESTED BY MIT/UPR STUDENTS PARTICIPATING IN PREVIOUS TREN URBANO "ENCUENTROS")

The severe congestion, the linear pattern of the city, the very high density and mixed-use development trends throughout the entire urban fabric, the scarcity of land for road construction and city expansion, were among the main factors that led to consider the Metro as the best option in order to improve transportation in Caracas and to induce urban change (in terms of city performance and environmental quality).

Hence, there was wide spread consensus that the construction of the Metro was a main priority not only for the city but also for the country.

In the Caracas Metro Case, funding, at least in the early stages of planning and construction, was not the main issue (during the first 12 years), since the country was going through the peak of the oil boom. The oil industry was nationalized in 1976. Petrodollars provided Federal funding for the project.

Therefore the main phasing issue was to start construction as soon as possible, and to prove that it would result in a viable option, which would significantly reduce transportation time and, in a lesser degree, ease congestion. Perhaps the only fear was that the system would require enormous maintenance costs and that it would be subject to vandalism and crime. (At the time there were no passenger trains or other rail transit system in Venezuela, and the closest image of an underground mass transit system was the New York Subway).

Additionally, the main consideration in selecting alignments and station locations was to guarantee user demand. All efforts were made to place the system over the principal city corridors and nodes, regardless of front costs, technical and managerial problems.

In the long run, the all around benefits of a successful transit system would justify such an approach, considering the particular nature of the city, and the close-to-paralysis situation due to traffic congestion which the city then presented.

The City Planning Agency adopted a scheme called Metro-corridor, which increased density over the already neuralgic centers and city spines. The Metro thus would ensure being in reach of the majority of the population, triggering urban development and in turn, promote growing ridership. Once again, there seemed to be no other solution for Caracas than to handle the increment of density and gradually shift from private car oriented transit and a chaotic and inefficient bus and -colectivo- system to mass transportation, which would be developed in large percentage below grade.

These corridors represented activity centers with very high densities, were served by routes of public transportation, concentrated high real estate values, community services, city landmarks, housing developments, business, and recreational areas.

There was no political, social, or environmental opposition to the proposed alignments. It simply made sense. The metro became a city- wide project of ample acceptance.

In the Caracas case, the general strategy was to get as much of the system into place as soon as possible, taking advantage of the financial bonanza and of favorable public and political support. Technically and financially however, due to the magnitude and complexity of the project, the time frame including planning and construction of the different lines would extend over a 20 year period.

Despite the severe economic recession, affecting the country in the last 10 years, the Metro has been able to keep in line with the project as planned and public support has not declined.

Great importance was given during the planning process (leading to establish the phasing of the project), to detect user demand by elaborating origin-destination surveys, taking into consideration existing behavioral patterns and trends. This was certainly the prime phasing consideration which was to influence all others. It was clear that the selection of alignments and station construction, in order to attain this objective, would coincide with the main city corridors and nodes, requiring high expropriation costs and complex legal procedures. Also great effort was to be made in order to reduce further congestion and environmental problems during the construction.

Once the main decisions on alignment and station location were made, legal, technical, social, financial and environmental considerations were analyzed, leading to more precise project evaluation, which in some cases required minor adjustments of the original proposals. Technical construction solutions, additional studies on soil conditions, hydraulics, location of infrastructure, negotiation with private land owners (reaching agreement on land leasing during construction or provision of bonuses concerning development rights), represented additional factors which helped to make final project decisions.

In the case of Caracas, it was also clear that the main valley corridor, in which more than 50% of the residential population, jobs and amenities were concentrated, was to be granted first priority. Line 1, comprised of 22 stations, was to be developed in 3 phases.

In a second stage, Line 2 (in the planning and design process while line 1 was under construction), was to extend into a secondary valley, serving low income areas and certainly ease congestion of the road work. In this case, due to geographical constraints the outer areas to be served by this line were only connected to the central core by a major highway. This situation not only represented a nightmare for the commuters (4 hour traffic jams), but created overall congestion of the city express and arterial roadwork, interfering with the transportation (passengers and trade) from the city to its main Airport, port and beaches, 15 miles away.

Due to the nature of this route (commuter transportation with high peaks), in order to avoid transferring the congestion to an intermediate point of the system, Line 2 was planned to go into operation all at once. This occurred in 1989.

Line 3 is to extend to an other secondary valley, serving primarily low income areas and incorporating important public services such as the city's main campus. Phase 1 of this line went into operation in 1995. Planning and design of new extensions are in process. Higher income areas (residential or commercial), with high private vehicle ownership, not served by public transportation were excluded from the areas that would be attended by the Metro. In some cases, even if they were located in the vicinity of important urban corridors, the metro stations skipped them and were located only on sites which ensured higher user demand.

Other Technical Aspects: Heavy rail, French made trains, seven cars per train, 80% below grade, tunnels run 30 mts. below surface, 10 % on grade, 10% above. All air conditioned cars. 70% air conditioned stations.

1.3 million passengers per day (65% on line 1, 25 % on line 2, 10 % on line 3).

Stations: 22 on line 1, 13 on line 2, 5 on line 3.

Length: Line 1, 22 Kms., Line 2, 20 Kms., Line 3, 6 Kms.

System moves close to 10 % more passengers than originally planned, particularly line 1.

Fares: They are highly subsidized. They permit covering only 60% of operating costs. Construction costs were not recuperated, full federal subsidy. Fares vary by distance travelled, every 4 stations there is an increment of the fare. Minimum fare is Bs. 100 equal approximately to .25 dollars. Increment every 4 stations is Bs. 30 equal approx. to .07 dollars. It is possible to transfer between lines, as mentioned, fares will depend on distance travelled. It is also possible to transfer from the Metro lines to Metro buses by paying an additional Bs. 25 increment.

There are 25 Urban Metro bus routes. There are also 4 inter-urban routes (approx. 35 Kms. each) with a special fare of Bs. 300

Average travel time saved: by line 1: 1 to 2 hrs., on line 2: 2 to 3 1/2 hrs., on line 3: 45 mins. to 1hr.

Jobs created by project: during construction 25.000 direct and indirect positions, 4.000 permanent Metro jobs.

Urban development has taken place over and in the vicinity of stations, sometimes reinforcing existing nodes, sometimes creating new sub centers. Virtually no location has escaped from this trend, only a couple of sites in the hands of the public sector, not affected by regular zoning, still await development.

In all cases real-estate values have risen. However, due to heavy inflationary tendencies of our economy in the last 10 years and devaluation of our currency, it is difficult to establish what percentage was directly related to the construction of the system or to show comparative figures.

No taxation or valorization policy was implemented to capture the plus value on private property created by such an important public investment. At the time of its construction there were abundant federal funds.

No policy was intentionally foreseen to stimulate private investment, market forces induced urban change.

This is the type of urban development that has occurred: new office space has been developed in the traditional center of the city mixing with government agencies, historic sites and lower income commercial facilities (Metro Capitolio, Metro La Hoyada).

Residential activity has been developed in traditional commercial and recreational areas (Metro Sabana Grande); middle income housing has emerged in lower income areas (Metro Palo Verde); hotel, office and commercial activity has been developed in former middle and higher income residential areas (Metro Altamira, Metro Parque del Este); commercial activity has flourished in former low income informal settlements including the construction of malls (Metro Pro-patria).

No specific policy was implemented by the Metro agency or other governmental institutions to acquire land before the system went into operation in order later to negotiate with the private sector on urban development opportunities.

The different municipal planning departments introduced changes in zoning, generally allowing higher densities, but have not proposed particular urban design packages or development schemes for specific areas based on negotiation or trade-offs.

Not even specific sites, close to metro stations, in which the public sector owns land have been subject to joint ventures.

No private investment took place in infrastructure, whether related to the construction of the lines and stations or required for private development lots.

The private sector has not developed parking facilities to facilitate transfer from private vehicles to the Metro. However existing or new commercial, hotel, theaters...which include parking facilities are used by metro users to leave their vehicles at the fringe of congested areas. Public support of the Metro is very high. It is considered one of the best government financed and managed projects in the country. There is great citizen pride in the system and it is included in most tourist excursions. Beside the precise plans of the Metro Agency to carry out a major project of urban improvements on the public turf, which has been described in more detail in the previous notes, it can be noted that most of the effects in urban change, such as increment of realstate values, changes in land use, behavioral patterns were results of a laissez-faire attitude, they were non predicted or planned. Here may lie the importance of these lessons which can be incorporated in the planning process under similar conditions.

CONCLUSIONS

THE PLANNING AND CONSTRUCTION OF A MASS TRANSIT SYSTEM REPRESENTS A UNIQUE OPPORTUNITY TO INDUCE URBAN CHANGE, IMPROVE CITY PERFORMANCE, DEVELOP MANAGERIAL AND TECHNICAL SKILLS AND CREATE A BETTER BUILT ENVIRONMENT.

THE SUCCESS IN UNDERTAKING SUCH A PROJECT MAY RELY ON THE ABILITY TO UNDERSTAND THE PARTICULAR CONDITIONS OF THE CITY AND ITS NEIGHBORHOODS AND TO BE ABLE TO ORGANIZE PLANNING AND DESIGN TEAMS WHICH ARE ABLE TO MANAGE SIMULTANEOUSLY THE DIVERSITY OF TECHNICAL, FINANCIAL, POLITICAL, SOCIAL, LEGAL, , QUALITATIVE AND AESTETIC ISSUES INVOLVED.

GOOD RELATIONS, TRUST AND UNDERSTANDING BETWEEN DIFFERENT GOVERNMENT AGENCIES, ACADEMIA, THE PRIVATE SECTOR AND THE COMMUNITY ARE MOST NECESARY. PLACING THE USER AT THE CENTER OF ALL CONSIDERATIONS, UNDERSTANDING CULTURAL ISSUES, BEHAVIORAL PATTERNS AND FORSEING HOW FAVORABLE TRENDS CAN BE ENHANCED AND NEGATIVE ONES MAY BE AVOIDED OR CORRECTED ARE KEY ISSUES FOR THE SUCCESS OF THE PROJECT.

CARACAS, JANUARY 16, 1998.