Using Value Enhancement To Finance People Movers in Suburban Activity Centers

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Traffic relief that permits an additional increment of development is the foundation for public-private cooperation in building people movers to serve suburban activity centers. The most important variables in assessing economic potential are land prices, scale of the activity center, and degree of congestion relief that the project will bring. Using people movers as circulation systems to reduce internal, site-specific automobile trips is unlikely to justify significant private investment. However, reducing regional automobile use through strategies that incorporate people movers can generate economic value. People movers, therefore, are viewed as passenger distribution systems that disperse travelers arriving on a variety of regional transport modes to destinations throughout the activity center. The distribution or circulation systems are envisioned as a mix of walkways and people mover technologies, with an emphasis on flexibility and phased implementation. Shuttles and miniloops operating at close headways are more likely to find application than grand loops linking a few key locations. Revenues from the sale of new development rights, property taxes, special assessments, public matching funds, and user fees are projected for activity centers of varying sizes to derive financing scenarios for congestion mitigation systems. Certain institutional problems in implementation are presented and a profile of activity centers most likely to be candidates for people movers is discussed.

The major transportation problem of activity centers is congestion. Unless people movers find a role in traffic mitigation, their deployment in suburban commercial areas will remain a novelty.

Developers must be convinced to invest by value, not faith in engineers and equipment purveyors. Financing infrastructure through public-private partnerships is an economic process. The value created by people movers can be quantified and translated into dollar terms. Do the costs exceed the level of justifiable investment, leaving politics and other intangibles aside?

People movers have been applied successfully at airports, as downtown circulators, and as shuttles capable of overcoming distances or physical barriers (such as rivers, railroad tracks, and highways) to link outlying development projects with high-value locations. Why haven't the economics justified more projects in suburban activity centers?

The approach traditionally used to assess project feasibility is to have system planners determine the optimum solution. The resulting bottom-line is then given to the finance group to find the money. This review takes the opposite tack—it seeks to quantify the value a people mover can create and then challenges the technicians to find solutions that fit the pocketbook.

Perhaps defining the envelope of economic viability will lead to more, as well as better, technology applications.

ASSUMED CONGESTION MANAGEMENT STRATEGY

Assuming that people movers can help manage congestion in suburban commercial zones, an approach to traffic abatement is postulated that involves constructing linkages between buildings and projects within activity centers, integrating uses to maximize benefits from the linkages, establishing a reinforcing parking policy, and using regional transport modes to feed the internal circulation system.

In today's activity centers, the distances between buildings, frequent lack of sidewalks, limited mix of uses, absence of weather-protected linkages, and plentiful free parking promote automobile use. Building a strong circulation system will tend to minimize internal automobile trips. However, the level of trip reduction on a site-specific basis is unlikely to justify the economics of people mover technology.

Reducing traffic at the regional level is needed to permit meaningful private investment. Incorporating people movers into an internal distribution system that efficiently disperses workers and shoppers arriving at the commercial area's periphery on regional feeder modes (such as heavy rail, express bus, HOV lanes, light rail, vanpool, and ridesharing) could achieve this goal. The distribution system must connect scattered destinations throughout the activity center quickly and conveniently to promote usage.

The internal system cannot succeed in its traffic reduction mission without supporting investment in regional transport.

THE PEOPLE MOVER'S ROLE

It is assumed that people movers only will be built where justified by distances and passenger densities. The postulated passenger distribution system may be a mix of walkways, moving sidewalks, and people movers. Along legs where large, undeveloped spaces exist within activity centers (and fixed facilities cannot be justified until in-fill sites are built out), it may even be appropriate to run shuttle vans on a temporary basis. It is also possible that a mix of people mover technol-

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ogies may be used because of differing density, distance, reliability, or cost considerations.

Investing large sums in infrastructure before generating income to pay for it is a well-traveled route to financial disaster. Staged circulation system implementation that retains maximum flexibility is vital in suburban commercial centers, where multiple sites under different ownership are involved and no predictions can be made regarding the order in which projects will come on stream.

Few generalizations about distribution systems, beyond the need for flexibility, are possible because suburban activity centers themselves defy generalization. They come in all sizes and shapes—some linear, some clustered—and are even hard to define. Some may be served by highway only, whereas others may be accessed to varying degrees by public transit systems (Bethesda, Md., and Tysons Corner, Va.).

As a result, the people mover building block is assumed to be the shuttle or miniloop—an approach contrary to the assumption that passengers don't want to make transfers. Although admittedly less than ideal, the positives of a building block approach, in terms of opportunities for phased deployment, reduced cost, and enhanced flexibility, far outweigh the negatives.

Ridership models are sensitive to transfers, speed, and other factors that influence the cost of people movers. However, patronage projections have no value in financing fixed guideway systems—no one in the United States accepts fares as a core revenue source to cover capital outlays.

Given the lack of credence placed in farebox projections by the financial markets, why allow patronage models to bias technology choices toward uneconomic solutions?

To maintain speed and limit passenger frustration, minimal waiting times at intersection points can be specified. Connecting walkways and transfer stations also can be income-generating locations for service and retail activity, automatic vending, advertising, etc., as well as sites for day care centers or other uses that minimize automobile trips.

The grand loop that seeks to serve an entire area with a single technology is costly and unlikely to be sufficiently flexible to suit the hodge-podge development pattern that exists in most activity centers. Such systems may be appropriate for new centers, like Los Colinas, that are master planned with people movers in mind.

Incrementalism also can lower the stakes of individual decisions so that implementation does not get bogged down. Delays in resolving alignment and technology selection are anathema to private developers, whereas the attendant bickering among vendors and consultants gives credence to latent concerns over reliability and cost overruns. The clamor and delay often cause well-proven people mover technology to lose credibility.

Smaller-scale projects can be, and should be, left in the hands of private developers to implement themselves. Because activity centers typically involve many development sites with multiple buildings on each site, developers can be given a set of performance standards to meet in devising solutions appropriate to their project's design, market, and build-out schedule.

Activity center-wide performance measures, primarily relating to time and convenience factors (to prevent mile-long walkways), allow site-specific distribution systems to be linked into a network that, in turn, interfaces at critical junctures with regional transport modes. System performance standards can be incorporated into zoning codes in much the same way street and utility designs are now specified.

A similar concept was used in Los Colinas to have private developers build sections of the guideway as part of their site improvement requirements. Private, turnkey construction can yield significant cost savings, as well as insulation from the risk of cost overruns.

The role envisioned for people movers will not maximize linear feet of guideway, but it will get systems built when performance requirements dictate and the economics are justified.

GOING-IN ASSUMPTIONS

Free parking and undisciplined land use control will undermine any congestion management strategy. On the other hand, before the automobile option is limited, responsible travel alternatives must be available.

Advocating connections between buildings that network up into a distribution system creates economic and design biases toward clustering development. Property owners and land speculators expecting future sprawl to absorb their sites will not be supportive.

The congestion management strategy previously outlined requires investment in regional transport modes, as well as in activity center distribution systems. Demands on buses, HOV lanes, park-and-ride lots, light- or heavy-rail systems, ridesharing services, etc., will vary by locality. Counties with multiple commercial centers may take different approaches from those with one development concentration. Areas with mass transit facilities face different alternatives than those with none. Depending on existing conditions, the full cost of addressing regional travel needs is likely to exceed the measures presented.

In order to keep the benefits of congestion management investments from being dissipated to neighboring jurisdictions, reinforcing regional growth and tax sharing mechanisms may be needed.

The discussion has been simplified by concentrating on commercial uses in activity centers; however, real-world applications will need adjustments to account for residential, and possibly industrial, uses.

MEASUREMENT OF CONGESTION RELIEF

If traffic can be reduced through abatement strategies incorporating people movers, then the most direct means of creating value is to increase allowable development within the activity center. By increasing development to the same extent automobiles are reduced, new value can be created and net automobile use decreased.

The typical suburban land use requirement of three to four parking spaces per 1,000 ft^2 of commercial development implies about a 1:1 ratio between parking and development area. If a people mover-inclusive traffic mitigation strategy results in, say, a 40 percent reduction in automobile use, then increasing development density by 40 percent still would yield fewer total cars than the base condition. The automobile reduction is assumed to be achieved through a combination of higher auto occupancy and greater use of other modes (transit, walking, bicycle, etc.). The actual proportions will depend on configuration of the activity center and the regional infrastructure in place.

The relationship between reduced automobile use and higher development density is shown in Figure 1.

Calculations for activity centers of different sizes and varying degrees of automobile reduction are derived from the following relationships:

$$B = D(1 - T)/O$$

Base number of cars $= SB$

Avoided automobiles $= SBG(1 + G)$

Net automobile reduction with development increase $= SBG^2$

where

- S = Scale of activity center in thousands of square feet;
- D = Number of employees per 1,000 ft^2;
- B = Base number of cars accessing activity center per 1,000 ft^2;
- O = Vehicle occupancy;
- T = Percentage using transit, walking, bicycle, etc.;
- G = Percent gross reduction in automobiles and development increase.

In a hypothetical case, assume

- S = 5,000 (5.0 million ft^2);
- D = 3.5 employees per 1,000 ft^2;
- T = 4 percent using transit, walking, bicycle, etc.;
- O = 1.1 passengers per vehicle; and
- G = 40 percent gross reduction in automobiles and 40 percent development increase.

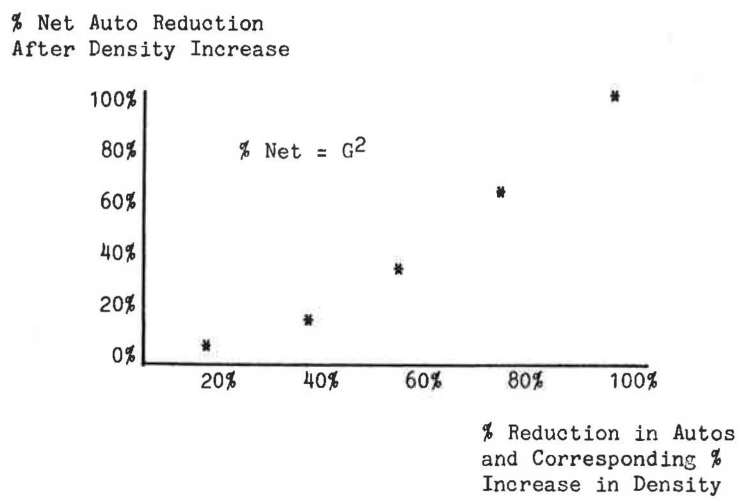
Then B = 3.055 cars per 1,000 ft^2; base number of cars = 15,275 cars; avoided cars = 8,554 cars; and net automobile reduction with density increase = 2,444 cars.

The relationships drawn have simplified the calculation process by assuming a uniform automobile generation rate for all commercial uses and ignoring residential implications. In addition, weighting for peak and offpeak travel has not been incorporated at this stage.

The calculation for avoided automobiles provides an indication of the requirements for alternative transport services. If, in the hypothetical case, 8,554 cars are to be taken off the road, then park-and-ride lots may have to be built, buses acquired, HOV lanes created, and rail vehicles purchased to accommodate the new travel demand. To properly scale new facilities, peak versus offpeak requirements would have to be assessed, as well as commute versus noncommute travel. According to the example shown, plans would have to be made to accommodate 9,409 people, because the cars eliminated had an occupancy of 1.1 passengers.

The exercise demonstrates that capital investment that reduces automobile dependency can create value by permitting more growth to occur. The argument that more development means more cars is not necessarily true—as long as promised levels of automobile reduction are realized. However, when roads are saturated, increasing highway supply without influencing automobile trip generation fails the growth dividend test.

A coordinated investment strategy that creates attractive alternatives to single-occupant automobile travel will affect existing, as well as future, development. The result is more equitable because it does not impose behavior modification



G = % Gross change in autos due to higher auto occupancy (O), and/or a higher non-auto travel share (T), and corresponding % increase in permitted development density.

FIGURE 1 Congestion impact of automobile reduction and higher development density.

programs (carpooling, flextime, etc.) on a limited segment of the development base to solve a general problem. Smaller changes affecting all development can achieve better results than a program to radically modify travel patterns only in new projects, or those above a particular scale.

CONVERSION OF INCREASED DEVELOPMENT INTO VALUE

New Development Density

If traffic reduction measures permit additional growth, land values can translate newly available development rights into dollar terms to cover costs. The calculations are straightforward:

$V = DL$

where

D = Area in square feet of new development permitted,
L = Cost per square foot of development rights, and
V = Value in dollars.

Assume

D = 4 million ft^2
L = $35/$ft^2$

Then

$V = 4{,}000{,}000 \times \$35 = \$140{,}000{,}000$

Figure 2 shows values for up to 10,000,000 ft^2 of newly permitted development at prices ranging from $10/$ft^2$ to $45/$ft^2$.

The cost per square foot of development rights is different from cost per square foot of land. If the allowed density on 1 ft^2 of land is 0.33, which is common in suburban areas, then $30/$ft^2$ of development rights equates to $10/$ft^2$ of land value Prices around Dulles Airport are in the range of $30/$ft^2$ of development, whereas the hottest areas of downtown Washington, D.C., are approaching $150/$ft^2$ of development ($1,500/$ft^2$ of land at the 10:1 development-to-land ratio prevailing at these locations.)

The creation and conversion of new development density into dollars by public agencies through negotiated arrangements with property owners is the foundation for financing people movers as an element of congestion management systems for suburban activity centers. Inherent in this assumption is the expectation that there will be market demand for the additional development. Therefore, activity centers in the strongest markets will be most likely to use the concepts outlined.

Although the values shown in Figure 2 may be negotiated, public agencies may be able to realize only a portion of the benefits because of absorption rates, bargaining skills, terms and conditions, etc. Variations of the values shown in Figure 2 are also possible—rather than lump-sum dollars, revenues can be derived over time through lease payments or through periodic sales guided by market conditions.

The greatest determinants of capital dollars available for passenger distribution systems are cost per square foot of development rights, scale of the activity center, and level of automobile reduction. There also is interdependence among the key variables because larger activity centers will tend to have higher land prices.

Table 1 indicates how value enhancement can be extended to estimate revenue sources for suburban congestion management systems incorporating people movers. The purpose

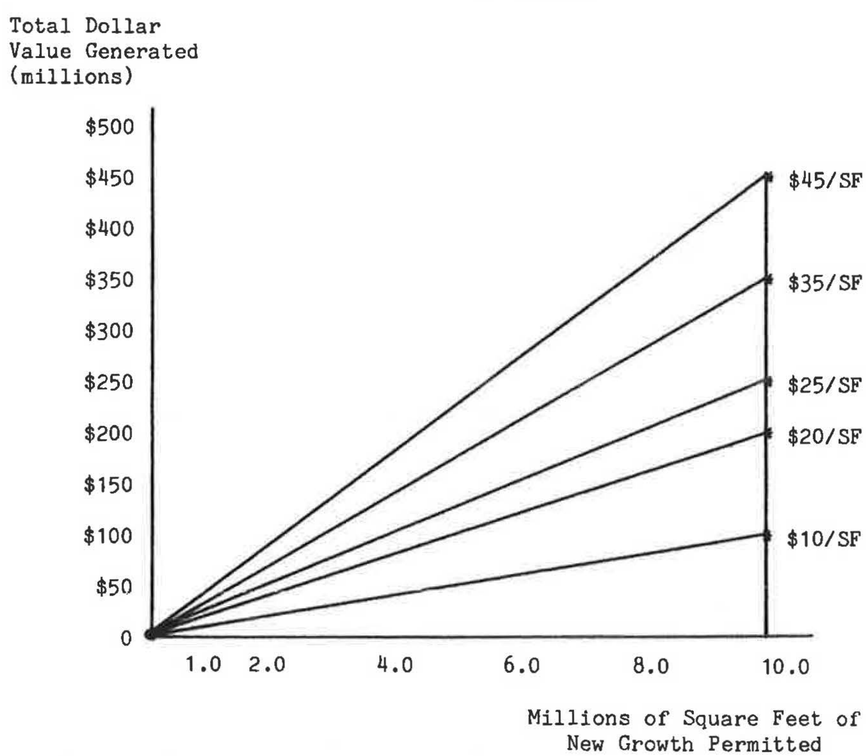


FIGURE 2 Dollar value of incremental growth.

of the table is to convey a methodology for approximating the economic envelope for automobile reduction programs. The model can be adapted to the circumstances and economic relationships in particular activity centers. The remainder of this section describes the four annual revenue sources presented in Table 1.

Property Tax Increment

If a higher level of commercial development is permitted than would otherwise be possible, the locality will realize an increment in property tax revenues. Because commercial properties tend to generate more taxes than they consume in public services, many suburban communities are anxious to attract work sites.

An argument can be made that commercial development represented by the new growth would have occurred anyway, either by expanding the periphery of the activity center, or through evolution of new activity nodes where highway capacity was still available. It is assumed that these alternatives would be perceived as negative from an environmental perspective, as well as from the standpoint of providing public services and utilities over a more scattered area.

The first annual revenue source in Table 1 is based on the property tax increment attributable to new growth permitted by the mitigation program. The figures assume a $2.50/ft^2 property tax rate, which will vary substantially from jurisdiction to jurisdiction. Property taxes in urbanized areas may run above $5.00/ft^2; however, a major attribute of suburban activity centers is that lower occupancy costs and property taxes are a key factor. Again, the idea of the exercise is not to settle on a particular figure, but to lay out a general methodology into which actual values can be incorporated.

A further assumption is that the local jurisdiction will allow 50 percent of the property tax increment to be used for the traffic mitigation program. This is a guess that may be optimistic for some localities and conservative for others.

The key variables to consider in projecting possible local property tax contributions are

TABLE 1 REVENUE POTENTIAL FROM VALUE ENHANCEMENT

Original Development (millions SF)	2.0	5.0	7.5	12.5	20.0
New Density @50% Mitigation (millions SF)	1.0	2.5	3.8	6.3	10.0
Cost/SF Development Rights	$25	$30	$30	$35	$40
Avoided Autos @ 50% mitigation	4,582	11,455	17,182	28,636	45,818
(millions)					
1. New Development Value	$25.0	$75.0	$112.5	$218.8	$400.0
2. Annual Revenue Sources					
Property Tax Increment -1	$1.25	$3.13	$4.69	$7.81	$12.50
Square Foot Assessment -2					
New Development	$1.00	$2.50	$3.75	$6.25	$10.00
Existing Development	$1.00	$2.50	$3.75	$6.25	$10.00
Non-Local Public Match -3	$2.00	$5.00	$7.50	$12.50	$20.00
User Fees -4	$3.44	$8.59	$12.89	$21.48	$34.36
Annual Cash Flow	$8.69	$21.72	$32.57	$54.29	$86.86

Notes:
1. Assume $2.50/SF of new development, 50% contributed to project
2. Assume annual assessment of $1.00/SF new development, $0.50/SF existing development; incorporates on-site and off-site improvement savings and benefits from faster lease-up and higher rental income
3. Assume match of private assessment proceeds from state, federal and/or county sources for savings in road outlays, new tax receipts and other benefits
4. Assume user fees charged for regional transport services or parking facilities at $3.00/day for each avoided auto for 250 days/year, but people mover charges no fee
5. Assume 3.055 cars/1,000 SF base case

- Will the locality share the tax increment?
- What is the new taxable square footage?
- What is the tax rate?
- What share of the tax increment will the locality contribute?

Property tax is an important revenue source because it is readily bondable and can be leveraged to generate capital funding up front.

To organize the revenue sources presented and demonstrate the framework's adaptability to individual cases, several financing scenarios have been devised using the following assumptions:

Item	*Amount*
Scale of activity center	10.0 million ft^2
Gross level of auto reduction	40 percent over base case
New growth permitted by auto reduction	4.0 million ft^2
Base case automobiles	3.055 cars per 1,000 ft^2
Net automobiles reduced after new growth	4,887 cars
Avoided automobiles	17,105 cars
Cost per square foot of development rights	\$35.00/ft^2
Percentage of new density value actually realized	65 percent
Property tax rate	\$2.00/ft^2
Percentage of property tax increment available	50 percent
Assessment rates—	
Existing development	\$0.75/ft^2
New development	\$1.25/ft^2
Nonlocal public match	Equal to assessment proceeds
Capitalization rate for revenues	10 percent
User fees	\$3.00 per avoided automobile per commuting day (250/year)

Note that although the 50 percent tax increment split is maintained in the assumptions, the tax rate has dropped to \$2.00/ft^2.

Financing Scenario A capitalizes value from new development rights and the property tax revenue stream. The balance of the cash flows are used to support annual operating costs and lease expenses. It is important to consider that the capital category of the scenarios could represent the aggregation of numerous, smaller-scale projects implemented over time, as well as the funding potential to undertake a single, larger-scale project all at once.

Financing of Scenario A using leveraged property tax would consist of the following elements:

Item	*Amount (\$ millions)*
Capital	
Sale of new development density	91.0
Leverage incremental property tax	40.0
Subtotal capital	131.0
Annual revenues for operating and lease costs	
Assessment proceeds	
Existing development	7.5
New development	5.0
Nonlocal public match	12.5
User fees	12.8
Subtotal, annual revenues	37.8

Special Assessments

Special assessments are assumed to be levied on new and existing development as a means to translate various tangible and intangible benefits into dollar terms. The benefits include

- Reduction in onsite development costs—primarily internal roads, parking, and site preparation;
- Reduction in offsite development costs—primarily road improvements to facilitate access to the subject property, proffers, impact fees, etc.;
- Faster lease-up because of access amenity and improved project image; and
- Higher rent flow from new retail opportunities and greater land values from better access.

Onsite development costs vary for every property; however, the need to provide internal road systems and surface or structured parking always consumes both land and dollars. Reducing onsite costs is a source of value that can be quantified on a site-specific basis and negotiated with developers on the basis of before-and-after comparisons. A caution note is entered here because institutional issues that are explored in the next section are raised by this assumption.

Offsite improvement is another instance where costs can be quantified on a project-by-project basis. In some cases, predetermined impact fees may be assessed against new projects, whereas in others negotiated proffers may be exacted in exchange for development approvals.

Allowing investments in the distribution system to offset impact fees or proffers reallocates outlays developers are already required to make.

For example, Anne Arundel County, Maryland, has imposed a schedule of transportation impact fees that will drift up to over \$1.00/ft^2 for some office projects, whereas San Francisco levies a \$5.00/ft^2 transportation impact fee. The fees are generally financed over time, either by the jurisdiction or as a land (or development) cost that is folded into a project's permanent financing.

A distinction must be drawn between new and existing development (including instances where property owners' development entitlements have vested even though construction may not be underway or completed) because existing projects may have paid offsite fees and made onsite investments. In these cases, developers, lenders, and tenants must be protected from assessment for benefits already purchased.

Table 1 incorporates the assumption that existing projects are assessed at half the rate of new ones, whereas Table 2 includes a 50¢ differential between the two assessment categories. The more intangible benefits of higher property value accruing from greater accessibility, improved rents, and opportunities for income from new uses accruing to existing development sites are thus separated from the more tangible benefits to new development.

Nonlocal Public Match

A public-private partnership implies that the public sector is prepared to reinvest some of the benefits it receives from the program. Thus far in the scenario, the local jurisdiction is

TABLE 2 ASSUMPTIONS FOR FINANCING SCENARIOS

Scale of activity center	10.0	million square feet
Gross level of auto reduction	40%	over base case
New growth permitted by auto reduction	4.0	million square feet
Base case autos	3.055	cars/1,000 square feet
Net autos reduced after new growth	4,887	cars
Avoided autos	17,105	cars
Cost/square foot development rights	$35.00	per square foot
Percentage of "new" density value actually realized	65%	
Property tax rate	$2.00	per square foot
Percentage of property tax increment available	50%	
Assessment rates -		
Existing development	$0.75	per square foot
New development	$1.25	per square foot
Non-local public match	Equal	to assessment proceeds
Capitalization rate for revenues	10%	
User Fees	$3.00	per avoided auto per commuting day (250/year)

assumed to contribute one-half of its property tax increment—a substantial commitment.

Other benefits at the county, state, and federal levels also may be identified—perhaps through enhanced income or sales tax revenues from greater economic activity, job creation, or other means. Investment in regional feeder modes and the distribution system may offset the need for additional highway construction and maintenance. How to calculate and incorporate these benefits into the project through federal, state, or county contributions could be the subject of another paper.

For the purpose of this simplified analysis, a public contribution equivalent to the proceeds of the private sector special assessment is assumed both in Tables 1 and 2.

Financing Scenario A shows the nonlocal public match as an annual revenue stream, whereas Scenario B capitalizes the equivalent revenue stream into an up-front grant.

Although incremental property taxes are shifted in Scenario B to supporting annual operating costs, there is no reason that all, or a portion of, these funds could not be leveraged in addition to the nonlocal public match.

Financing of Scenario B by leveraged nonlocal public match would consist of the following elements:

Item	*Amount ($ million)*
Capital	
Sale of new development density	91.0
Leverage nonlocal public match	125.0
Subtotal, capital	216.0
Annual revenues for operating and lease costs	
Assessment proceeds	
Existing development	7.5
New development	5.0
Incremental property tax	4.0
User fees	12.8
Subtotal, annual revenues	29.3

User Fees

In this application, the people mover is perceived exactly as an elevator and thus charges no fare.

However, fees may be paid at park-and-ride lots or garages; and regional connector services, such as express buses, vans, rail systems, or shared-ride arrangements, can charge fares. These receipts are estimated in Tables 1 and 2 as $3.00 per commuting day (250 days per year) per avoided automobile. More refined estimates based on the planned mix of regional transport services, anticipated noncommute usage, and vehicle occupancies of the avoided automobile trips can be derived on a case-by-case basis. Reflecting the lack of certainty with which user fees can be projected, it is not possible for such revenues to be capitalized.

PRACTICAL AND INSTITUTIONAL ISSUES

Attempting to fit even the simplified set of pieces just described into place sounds complex enough, but the job is hardly complete. There are other issues that must be confronted if the preceding is to be more than just an academic exercise.

First is the creation and sale of new development density. This concept presumes that an activity center has a defined perimeter and that the local government has established a maximum growth limit within the designated area. In fact, the real world does not operate this way.

Not only are there often blurred boundaries to activity centers, in many cases the existing zoning within designated commercial areas provides for many times more development than either the market or any infrastructure system could absorb. In these cases, zoning by itself does not limit developers from obtaining entitlements, and environmental impact and growth management processes are used as regulators.

The result is that downzoning, which is very difficult to achieve, may have to occur; or new zoning overlay districts may have to be created that impose special requirements on future development. The solutions will have to be negotiated with property owners and will vary depending on local law and market conditions.

Second is the timing and sale of new development density. Will existing projects be able to purchase development rights to place additional buildings on vacant land or surface parking? Will the new rights be held in a bank available for lease or purchase? How will prices be set and will they vary over time? Will property owners be able to transfer the rights among themselves? How will timing of the development rights sales compare with the circulation system's construction requirements and operating outlays?

Models and precedents for addressing these issues can be found in other fields, particularly in water and sewer system finance. The ability to build circulation networks incrementally will be an important factor in addressing timing concerns.

Third, the impact of any new procedures or financial requirements on existing projects must be considered in light of the developer's obligations to lenders and tenants. For example, if a locality reduces parking requirements in an activity center to one space per 1,000 ft^2 of development, a developer may still have to secure more parking to attract tenants and convince lenders to provide financing.

In instances where projects are built out and plans are drawn to relocate existing parking to peripheral areas, or surface parking is used for additional development, the terms of existing leases and mortgages will have to be renegotiated. Similarly, who pays assessment fees—the tenant or the developer—will depend on lease terms.

Finally, any attempt to redefine transportation services in an activity center will create instability in the market for development. Involving the private sector early and making sure requirements that emerge from the planning process allow developers to obtain entitlements in an atmosphere of greater, rather than reduced, certainty will improve chances for success.

PROFILE OF LIKELY CANDIDATES

The most likely candidates for people mover systems will be larger activity centers in strong markets, with high land values. These areas have developed credibility with lenders and tenants, and must become more urbanized if future expansion is to occur.

Further road construction is likely to be physically impossible, uneconomic, or environmentally unacceptable. Traffic congestion already may be at the point where it is limiting growth, either by resistance of tenants to lease space, or through an artificial lid on development—such as the adequate-facilities moratorium imposed in Rockville, Md.

Public agencies in hot areas may be enticed to consider creating new development rights if artificial constraints on construction are chasing growth into neighboring localities. Depending on where unplanned commercial activity is occurring in the region, road problems may be exacerbated by through traffic to other jurisdictions, who are at least deriving the benefit of additional taxes.

In weak markets such as Dallas, boosting permitted densities may be ignored by a stagnant market, or could depress land prices beginning to recover from an oversupply of development. New assessments cannot be passed on to tenants and result in lower net rents. Lenders (or federal deposit insurers, as the case may be) need to be convinced that throwing additional dollars for infrastructure on top of current losses will hasten the day of positive cash flow—a tough selling job.

Building infrastructure as a pump priming technique, or as a means to accelerate absorption of large volumes of vacant space, involves a degree of risk that only the public sector can assume.

CONCLUSION

Application of people mover technology in suburban activity centers can be financially feasible if part of a regional traffic mitigation strategy and system costs are related to economic benefits.

To address existing conditions in larger, well-established activity centers—those with the greatest economic potential for people movers—a mix of building linkage techniques and, probably, people mover technologies may be appropriate. The capability for incremental implementation will be a critical success factor.

Reversing the current approach to feasibility analysis by first establishing the magnitude of potential benefits and then designing circulation systems within a cost constraint would be timely.

Future research should examine techniques to reduce construction costs and aesthetic concerns; options for private design and construction of system elements; and consideration of a joint effort with developers, local planning officials, and institutional lenders to recommend alternative solutions to foreseeable implementation concerns.

A promising line of investigation is suggested by William J. Head et al. (*1*).

REFERENCE

1. W. J. Head et al. *Feasibility of Using Composite Materials for Transit Guideway Systems.* USDOT/UMTA University Research and Training Program Report WV-11-0003-7, West Virginia University, Morgantown, April 1985.

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