

**BUS FACILITY JOINT DEVELOPMENT PRACTICES**

**INITIAL REPORT**

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**Real Estate and Development Department, SCRTD**



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## 0.0 EXECUTIVE SUMMARY

Although the great majority of the District's owned real estate area is in bus facilities, these properties' joint development potential has been given relatively little attention. This report re-interprets and illustrates joint development policies and procedures in specific application to bus facilities.

### 0.1 A BALANCED MIX OF OBJECTIVES

Joint development has always been seen accomplishing a range of objectives, and this is especially true with its application to bus facilities. While revenue generation will almost always be a factor, joint development is equally important for its potential to mitigate environmental impacts, improve the operational flexibility of bus facilities and to preserve the long-term value of District real estate assets.

### 0.2 IMPLICATIONS FOR SITE ACQUISITION

At many bus facility locations, the District probably does not own as much property as would be optimum or ideal. Not that all of this additional property would be put into operating facilities. Most, if not all, would be best put into spaces and activities that relate to the surrounding neighborhood. Such development is likely to provide only moderate revenues, though it should be configured so as to at least pay for itself. The primary "payoff" is in allowing the District's bus operations and the surrounding community to co-exist with one another.

### 0.3 INTENSE, ON-SITE DEVELOPMENT

With only a few, minor exceptions, significant joint development within existing bus maintenance facilities can be only accommodated through use of air rights. To use these air rights requires that a platform and related appurtenances be constructed over the bus facility. The heights and spans involved make such platforms expensive. Only when surrounding land values are relatively high and very little vacant land is available will air rights be potentially marketable.

0.4 RECOMMENDED ACTIONS

Joint development potentials in one form or another exist at most major bus properties. A procedure should be established that periodically reviews each property and, to the extent appropriate, analyzes joint development potentials and programs appropriate actions.

This would require the Real Estate Department's Development unit to be formally established and staffed.

## 1.0 BACKGROUND

On August 13, 1987, the RTD Board of Directors adopted Policies and Procedures for Joint Development of Metro Rail and Bus Facilities. These policies and procedures brought together objectives previously articulated in Milestone Six (January 1983) and Policies and Procedures for Implementing Joint Development (November 1983) and explicitly expanded these objectives to include bus facilities as well as rail transit facilities.

### 1.1 Purpose of This Document

Much of the discussion of transit-related joint development has focused upon rail transit facilities. While that area will become increasingly important to the District, a major part of the District's real estate assets have been and will continue to be for bus facilities. This report seeks to interpret and illustrate application of joint development policies (specifically, section 2.0 of the August 13, 1987 Policies and Procedures) in the funding, acquisition, improvement and management of the District's bus facility properties.

### 1.2 Purpose of Joint Development

For a transit agency, a major attraction of joint development is the potential for revenue. That, however, is not joint development's only purpose. In a number of joint development's application to bus facilities, revenue may, in fact, be only a subsidiary consideration. Of potentially equal importance would be the mitigation of environmental impacts, the improvement of land use patterns in the community and greater flexibility in the management of District facilities.

If joint development is seen as strictly a revenue device for the District, we are not likely to be successful in making much use of it. Joint development will be then seen as competing with or contradicting the goals of the communities and cities the District serves. This conflict is needless. We need the cooperation of local communities to successfully use joint development and there are many ways that it can be used to mutual advantage.

### 1.3 Qualifications and Limits of Data

This report seeks to draw upon and integrate the District's experiences in facility site design, land use planning, environmental impact management, real estate market analysis, property acquisition and structural engineering. The data used is very preliminary, often making use of "default" ("typical case" or "rule-of-thumb") data. This report is, therefore, preliminary and should be revised and re-examined as experience is gained.

The cost data figures used in some cases are estimates by Bus Facilities Engineering staff, making a wide range of hypothetical assumptions; other cost figures reference standard estimating guides, such as Marshall and Swift.

In some other cases, cost figures could only be developed in the course of a relatively extensive engineering design and analysis and, as a result, remain to be determined. These remaining figures, however, are not thought to be fundamental indicators of feasibility.

Market rate figures reflect conversations with brokers about recent listings and leases. They would need to be followed with more rigorous research of data and evaluation.

None of this data is of sufficient precision for project planning and design. Its purpose is to help identify opportunities which might merit the additional time and expense involved to develop a project concept and do preliminary financial analyses.



## 2.0 A JOINT DEVELOPMENT FRAMEWORK

In order to systematically evaluate the joint development potential of a bus facility, it is necessary to establish a framework or a set of concepts that relate the various ways development potential might be exploited in and around bus facilities.

### 2.1 The Patronage Component

Some forms of joint development capitalize upon the flow of people using a connection to a transit station or terminal. Other cases exploit unused space over or around a transit facility. Still other instances may combine these two approaches.

With bus facilities, the primary development potential lies with under-utilized space over and around maintenance facilities. In these instances, there is no connection with transit services per se. Lacking the ingredient of people means that the development opportunities are much more determined by the surrounding area. In high density, built-up areas, the opportunities are likely to be very significant. In low density, less populated areas, the joint development opportunities are likely to be less attractive.

A bus terminal (as opposed to a maintenance yard) does, of course, introduce the patronage component to bus facility joint development. The potential is maximized in such instances where strong linkages and relationships can be forged with surrounding development.

### 2.2 Development Constraints of Diesel Bus Facilities

Environmental impacts are the major obstacle to realizing bus facility development potential. Diesel buses are much noisier than state-of-the-art rail transit vehicles. Yet, because of the ventilation combustion engines require, enclosing and containing this noise is much more problematical than with electric transit vehicles. In addition to being very noisy, enclosed diesel bus facilities also tend to become soiled with exhaust soot, brake shoe and tire dust. Such areas are typically much less attractive to patrons or commercial clientele than rail transit platforms and mezzanine areas.

Rail (or other guideway) transit vehicles move in controlled, tightly defined spaces. Buses require large areas to maneuver and, thus, much larger spans for any overhead structures. There is, moreover, a certain amount of risk to a structure from errant bus movements. Whenever buses might be towed or where vehicle hoists are used for servicing, additional headroom allowances have to be made.

### 2.3 Differences in Land Use and Location

Rail transit subway stations are most likely to be in the most densest, most valuable inner-urban locations. Maintenance facilities, whether bus or rail, are of necessity built in much less intensely developed, often outlying areas.

Generally, development rights are most likely to be exploitable in highly urbanized commercial zones. Such areas have the high land values and the high demand for traffic exposure and accessibility that can justify the high costs of air rights structures. Commercial uses, such as retail and office activities usually provide the highest rental rates. Commercial activities are also generally high amenity uses, so they have to be thoroughly isolated from the impacts of bus facility operations.

Industrial zones are less likely candidates for air rights development. They are generally low value, outlying areas where less of a value has been typically placed on accessibility and location. Industrial uses are typically low in amenity values as well and are thus more compatible with bus facility operations. But unless there is a particular locational attribute unique to a District property, industrial uses will be only marginal candidates for air rights development.

Residential zones are the least likely candidates, particularly in those instances where continuing bus maintenance operations are contemplated and air rights development revenue is important. However, joint development's ability to mitigate environmental impacts may have a very important role where a bus facility has to be situated in a residential area. A transition buffer of speciality designed multi-family residential on District-controlled land would have been one way, for instance, of resolving the impacts of bus operations at a site such as Division 6.

In such cases, joint development income alone may not be impressive. Even expensive apartments on land ground-leased from the District could be expected to make only moderate rental payments. Development strategies would, however, "pay off" to the District in terms of overall District objectives in retaining a site, good community relations, mitigated property costs, and so forth.

Finally, there are a variety of other unique possibilities, such as institutional uses, that may be able to exploit situations that would otherwise be too marginal to be worth the effort. Not to be forgotten should be the obvious: the District may itself discover value in making more intense use of its properties, either for activities related to bus yard operations or for other, unrelated District requirements.

### 3.0 BUS MAINTENANCE FACILITY NEEDS AND ISSUES

The purpose of the District's bus divisions is to efficiently provide for the servicing and storage of our bus fleet and to provide supporting facilities for operating and maintenance personnel. In any pursuit of development opportunities, these requirements have to be first and primary.

To this primary mission we must add the need to operate and develop our facilities in compatible and responsible manner, given the context of the surrounding community. Taken together, these priority considerations heavily qualify what development potentials can be effectively exploited in around bus facilities.

The counterpoint to these constraints on joint development is the adverse environmental impacts open bus facilities have upon surrounding properties. While community desires and real estate market limitations may delimit what forms joint development can take, joint development itself is the key strategy to both managing environmental impacts and to getting the best performance out of the District's real estate assets.

While each District property has its own set of circumstances and concerns, certain problems and patterns seem to frequently re-appear. The following issues are among the most common.

#### 3.1 Lack of Space

Lack of space is a very common problem, especially in the District's inherited properties. But even in newer properties, such as Divisions 7 and 9, operational space needs often come to exceed the available site area.

In acute cases, such as with old Division 8 (now Location 24), this lack of space can force an abandonment of the property at obviously great expense. In many other situations, lack of needed space can force a lot of dis-economies upon bus operations.

#### 3.2 Inability to Buffer Adjacent Uses

In many instances, division properties are too tightly configured to allow for proper separation and buffering of operations from adjacent uses. In acute cases, such as

with Division 6, this can force the abandonment of the property. In other cases, such as with Divisions 3, 5, 7, and 12, it is a source of contention with property owners and, on occasion, their elected representatives. In general, it contributes to the community's resistance to the siting of our facilities and negative relations with local jurisdictions.

### 3.3 Demands for Yard Enclosures

When the failure to acquire enough site area and to adequately buffer bus operations become acute, demands are made to enclose a bus facility. This is extraordinarily expensive, costing perhaps \$10 to \$20 million or more.

In locations where property values are extraordinarily high, facility enclosure may be the most cost effective response. A key proviso, however, is that very high property values should also be situations where very intense property development is necessary and permitted. In such situations, air rights development over the bus facility would be expected to be permitted and feasible. Enclosure of the bus facility is then accomplished and, at least for the most part, paid for by air rights development.

At most of the District's properties, land-intense buffering strategies (even including residential relocation expenses) are likely to be more cost effective than building-intensive (enclosure, air rights) strategies. Wherever land-oriented joint development strategies are feasible, they should be pursued. Land costs usually rise as time goes and higher value, adjacent development may limit future options. Land, unlike structures, is not a depreciating asset and, if properly managed, can often pay its own way.

The District should be aware and watchful of the land-verses-building cost equation in the programming for existing and future bus facilities. There can too easily arise situations where a yard enclosure is demanded, yet there is little or no possibility of air rights joint development to help offset enclosure costs. These situations must be avoided.

### 3.4 Constrained Access

Because bus facilities do not value street frontage for business purposes or commercial exposure, there has been a tendency not to insist upon full street frontages in site acquisitions. Unfortunately, a lack of street exposure has, in a number of instances, contributed to problems in access and optimizing circulation within a division. This is probably most acute at Division 7, but it is also an issue at properties such as Division 12, Location 24, and Terminal 40.

### 3.5 Inflexible Site Areas

Neither of our operations nor the community around our properties stays constant. Some of our properties have seen the earliest generation of trolley cars, then successive generations of transit buses and may see yet future generations of transit vehicles. Some properties may become surplus for a generation or so, only to become necessary and useful at a future time with a shift in demographics, transit usage, operational requirements and the like.

Similarly, areas that were once low density may increase in value and become higher density. Higher land values may shift land uses away from those with sparse employment to commercial or residential uses involving much higher occupancy levels. Traffic patterns may change and the buffering requirements for the adjacent community may change as a result.

From a real estate perspective, these are problems but they are also opportunities, providing there is the flexibility to respond and adapt to changing circumstances. This flexibility usually comes from site acquisitions that have provided for a reasonable range of long-term land uses and that have taken a flexible, accommodating perspective on future operational requirements.

From a public agency perspective, the District has a special responsibility to support local government's efforts to rationalize land use patterns and land tenure, to promote optimum development, and to provide for orderly

land use succession. The District should regard itself as being constrained from acquisition actions and other real estate practices that tend to fragment land tenure, might reduce the general utility or buildability of parcels, or that would otherwise limit future opportunities for land improvement. Very often, this may involve bringing a larger, rational parcel under a single ownership rather than simply "scalping" out a minimal site area.

In some instances, this policy may indicate the inclusion of more premium property, such as a street frontage, than is absolutely required for the District's immediate operations, but where such property would have substantially reduced utility if disassociated from a larger parcel. In other cases, the inclusion of a more marginal back strip of property may be indicated. In some other cases, the acquisition of still-occupied adjacent uses for leaseback may be indicated. Such leaseback acquisitions would serve to protect the District from a future "hold-out" against access or expansion plans.

Perhaps even more important, however, is wherever development is on land leased from the District, complaints from adjacent property owners about the impacts of bus operations can effectively be precluded.

#### 4.0 BUS FACILITY SITE ACQUISITION PRACTICES

In view of the identified needs, problems and opportunities of bus yards, a number of "improved practices" are suggested to guide bus facility site acquisition. The objective of these policies is to help improve the development potential of the District's real estate assets, to better provide for and protect some of the essential operating requirements of bus facilities and, to the extent possible, enhance the value of District property to the surrounding community.

These are only a select few practices are no means inclusive. They are only intended to complement or amend the large, established body of real estate acquisition procedures the District utilizes.

The practices identified here, and the strategies identified in the following section, expand upon the policies identified in Section 2 of the recently adopted Policies and Procedures for Joint Development of Metro Rail and Bus Facilities.



#### 4.1 Control Property Frontages

Wherever possible, frontage along streets, especially major streets, should be purchased or at least brought under District control.

There are three basic reasons for this practice. One is to fully protect the District's ability to provide access to its facility. Second, it is important so as to protect the full value of the District's holdings and avoid fragmentation of land tenure. Third, it is important in order to protect the District from owners of higher valued, commercial frontage property who might come to feel that an adjacent bus facility is unreasonably compromising their properties.

Because of the added expense per unit area of frontage areas and, thus, the imperative to return as much unused development potential to revenue use as possible, at least some of the area involved in frontage acquisitions should be above minimal operations requirements so as to provide flexibility for locating driveways, alternative joint development building configurations and so forth.

#### 4.2 Acquire Transition and Buffer Areas

In many instances, the District faces obvious conflicts in use, such as where a division yard directly abuts residential properties. There are two dimensions of this sort of problem. One is a problem of physical design and planning. There is a need to provide a physical transition between our facilities and other uses that are not compatible with the District facility. This transition area could be a landscaped buffer or other open space with walls and fencing.

Open space, however, is expensive, especially in built-up urban areas. Local residents may appreciate the added parklands, but this kind of real estate would be a heavy burden for the District to bear--if it were feasible at all.

What would be more practical in urban areas is for the District to bring into being an intermediate or transition band of development around bus divisions. This would be some sort development of a type and intensity that is compatible with both District operations and the surrounding community. To be effective, however, the District has to own title to the underlying land. Only with that control can the District insure that improvements on the land and the leaseholders occupying the premises remain appropriate and compatible transitions between the community and bus operations. To minimize holding costs, the District could, after purchasing a buffer, reconvey title to a purchaser with "Conditions, Covenants and Restrictions" in the title that would "run with the land" and restrict future use. However, this might not actually be much cheaper than retaining underlying ownership and ground leasing out the holdings. It would also run the risk that the restrictions might somehow lapse or be rescinded in the future.

A primary purpose of planning and zoning ordinances is, of course, to provide for such transitions. But City plans and zoning often fail to adequately anticipate individual site conflicts such as the District faces. Moreover, the District's operational requirements may require a facility in an area that might not have been designated for uses such as a District facility. Local jurisdictions have sometimes not endeavored to adequately provide for particular facilities in their plans, such as bus yards, because they are viewed as unwanted on the local level.

Whatever the case, the District, with its unique facility requirements, is virtually forced to take special initiatives for the buffering and the transitions between our uses and the surrounding community joint development is our only real, available tool.

#### 4.3 Acquire Complete, Rational Buildable Sites

District properties should, wherever possible, contribute to a pattern of development and/or tenure that is reasonable, rational and provides for an orderly succession of improvements and uses. In its property acquisitions, the District should not limit itself exclusively to its immediate requirements, but also give reasonable consideration to scenarios of future land use in the area (intensification, shifts in use, etc.) so as to insure the future adaptability of a site to evolving needs.

Examples of a "rationalized" site acquisition could include:

- consolidation of fragmented frontages;
- acquisition of enough frontage to provide for access points unimpeded by future intersection queues; and
- acquisition of adjoining smaller, irregular, left-over, "flag" or remainder parcels that could logically be merged with the District's primary site.

#### 4.4 Leasing Verses Selling Available Development Potential

As transit operations change, sometimes expanding, sometimes having to contract, it is inevitable that there is a less than perfect "fit" between current operations and current properties. Occasionally, all or part of a property is termed surplus to current operations.

The typical public agency procedure in such instances is to auction off the property. This has the attraction of providing the District an immediate lump sum payment. But it may have numerous drawbacks.

One, the revenue value of the land to the District on a long-term lease is almost always significantly greater than an immediate sale. This owes, in part, to the fact that the District typically has very low carrying charges (debt service, taxes, etc.) on its properties. More significant, however, is that once an old District property is cleared, it can very often be upgraded to much more intense uses, thereby substantially raising the land values over the "as is" condition that exists at the time of an auction.

A second drawback is the opportunity cost of a replacement site. There may be instances where the District is completely and irrevocably withdrawing from a part of a region and can contemplate never again needing operational support in the area. In most cases however, there is the distinct possibility that transit demands and operational requirements will shift in the future and that, at a future time, the property could have a much greater value to the District than it has at the moment. This is particularly true in more built-up urban areas where the costs of re-assembling a maintenance facility site and demolishing existing improvements is quickly becoming insurmountable.

## 5.0 DEVELOPMENT STRATEGIES FOR BUS FACILITIES

This is an initial list of ideas and approaches. It will be added to or modified as experience and insight is gained. What this list serves to do is help identify opportunity areas or existing properties that should get our attention.

### 5.1 Shift Yard Below the Level of Street Frontage

One of the aspects that diminishes the value of bus yard development rights is that, typically, they are overhead rather than at "ground level." This tends to relegate such development rights to lesser value uses. Where the main yard level can be dropped below the level of a prime street frontage, it raises the possibility that at least some airspace over the yard area could be utilized as prime "ground floor" commercial space, thus commanding premium rents (see Figure 1).

An important corollary of a depressed bus yard is that the perceived presence of the yard is much reduced. Although a high block wall might shield people and adjacent property somewhat from the noise and movement of buses, the facility remains very much an intrusion. To make commercial development more attractive, this sensed intrusion has to be removed and depressing a facility is one way of achieving that.

Depressing an entire facility in otherwise level ground would, in many cases, be just too expensive. However, many sites have slopes that a moderate amount of grading might be able to exploit. Creating a depressed yard area is likely to increase drainage and slope retention costs; these additional costs have to be evaluated in light of prospective development and environmental benefits. On the other hand, it is conceivable that land leases on street front "condominium" structures might be so negotiated so that a developer assumed some of those expenses as an "in kind" payment toward his leasehold obligations.

## 5.2 Place Yard Structures Away from Prime Street Frontage

There is a natural inclination to place a facility's structures along street frontages in order to give the property a "face" to the surrounding community, facilitate pedestrian access and so forth. In actuality, however, street frontage has only a nominal value for District buildings. There is no commercial value to "exposure" for our buildings, nor is accessibility to the public usually a factor.

In some situations, a District administration ("Transportation") building may be a desirable and effective buffer between the yard operations and, for instance, a residential area across a street. Wherever commercial or industrial uses might be compatible with the neighborhood, however, revenue structures may be a more effective use of a buffering frontage strip than District structures. In these instances, District structures should be shifted out of the prime rental zone, perhaps toward a rear or side property line or to an overhead level.

If structures (such as bus garage) can be designed so as to fully contain or direct away noise and effects that would otherwise be broadcast into adjacent properties, then a "back lot" arrangement may also serve to buffer adverse impacts there as well (see Figure 2).

In any event, it is important to keep open the options for street frontage with revenue potential. Any development program should also incorporate elements for buffering yard impacts and for accommodating shifting access needs.

## 5.3 Identify Air Rights with Potential Utility to Adjacent Properties

Air rights without substantial direct street frontage are unlikely to have any commercial value. However, situations may evolve where property values are so high and existing space so constricted as to make airspace over District property sufficiently valuable to a particular adjacent property (see Figure 3) as to be exploitable.

A prime candidate for this kind of airspace would be automobile parking that might otherwise have to be put underground. As with street frontage condominium arrangements, the viability of such arrangements is enhanced where the District property is lower than adjacent properties.

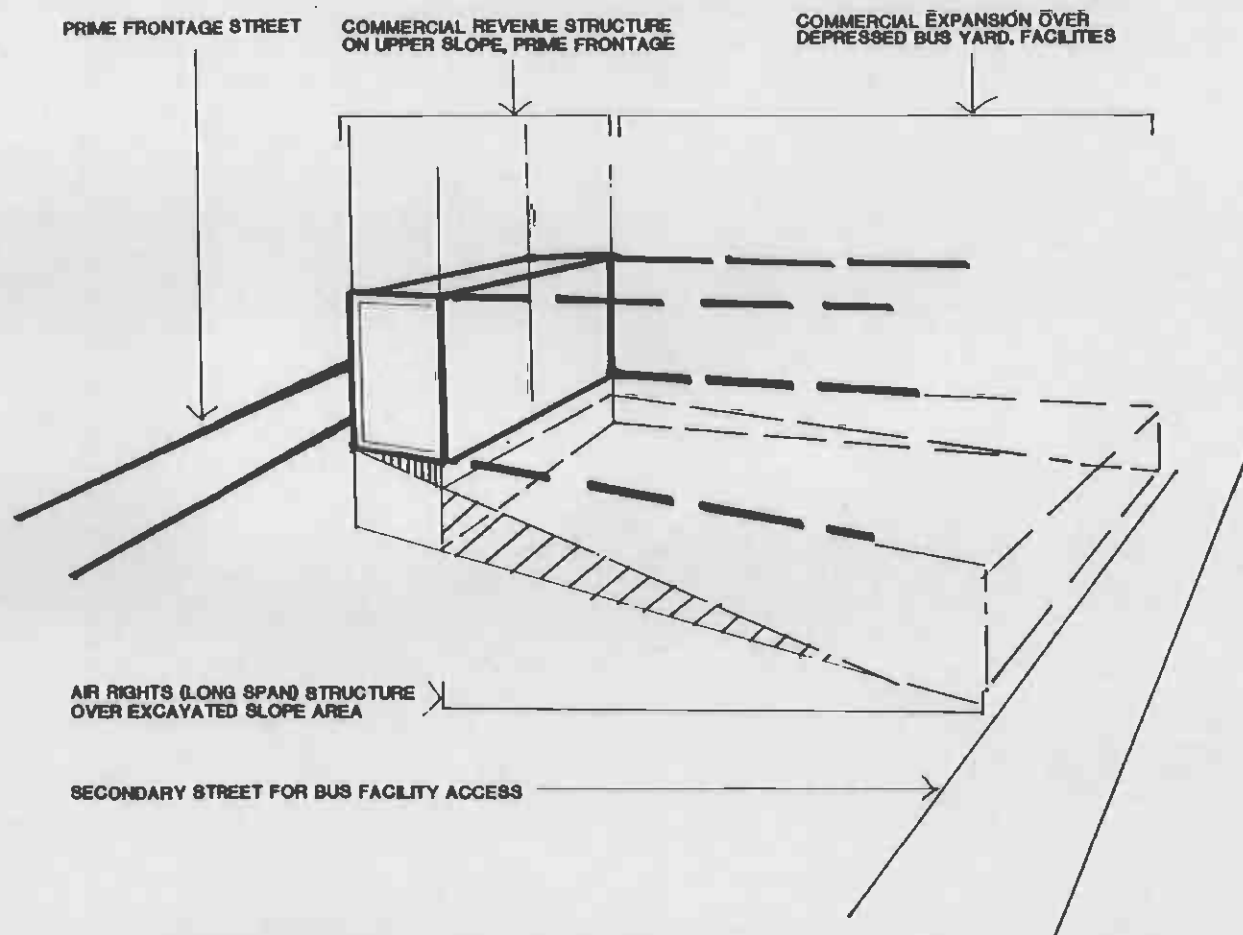


FIGURE 1

ILLUSTRATION OF A BUS YARD DEPRESSED BELOW GRADE OF ADJOINING PRIME STREET FRONTAGE

#### 5.4 Share District and Revenue Area Automobile Parking

In areas where substantial structured automobile parking is already required, there may be some economics in a single structure to serve a number of adjacent users. Figure 4 illustrates an example attached to a joint-use office structure.

The greatest economics of shared parking accrue when each user has different peak usage patterns. District employee parking, however, tends to have an extended all-day pattern, thus tending to conflict with most other revenue uses. Parking in a residential area, such as for parking overflow in older, crowded apartment districts and/or where overnight security might be desirable, might be the closest complimentary parking usage pattern.

## 6.0 STRUCTURAL COSTS OF AIR RIGHTS

Once one or more conceptual frameworks have been identified for a given situation, the economic feasibility or desirability of a bus facility joint development scheme needs to be evaluated. There are two basic elements of economic feasibility. One is the cost (to whatever party) of the structure necessary to utilize airspace development rights. Typically, this is some sort of a platform over (or under) a bus yard. Second, how much the real estate market is willing to pay for these airspace development rights needs to be established.

There will most likely be several phases to this process, varying in emphasis according to the site being considered.

First, there is the need to assess the basic cost feasibility of air rights or joint development. This will often revolve around the cost of some kind of platform over the bus yard. Platform costs are treated very schematically in this section. If it appears that a particular concept has potential, a preliminary design can be developed and costed out as with greater precision by engineers.

Second, what the real estate market is willing to pay for the development rights involved has to be determined. The District staff begins by checking for some comparable sales, leases and other real estate transactions in the area. If the possibility of joint development is indicated, more detailed surveys and market analyses would be undertaken.

### 6.1 Overall Cost and Basic Feasibility

In attempting to market airspace and other under-utilized development potential around the District's bus facilities, we are competing with what the surrounding real estate market has to offer. For airspace development to be attractive, the cost to a developer of acquiring and making usable the rights to this airspace has to be less than what he would have to pay for available, comparable real estate.



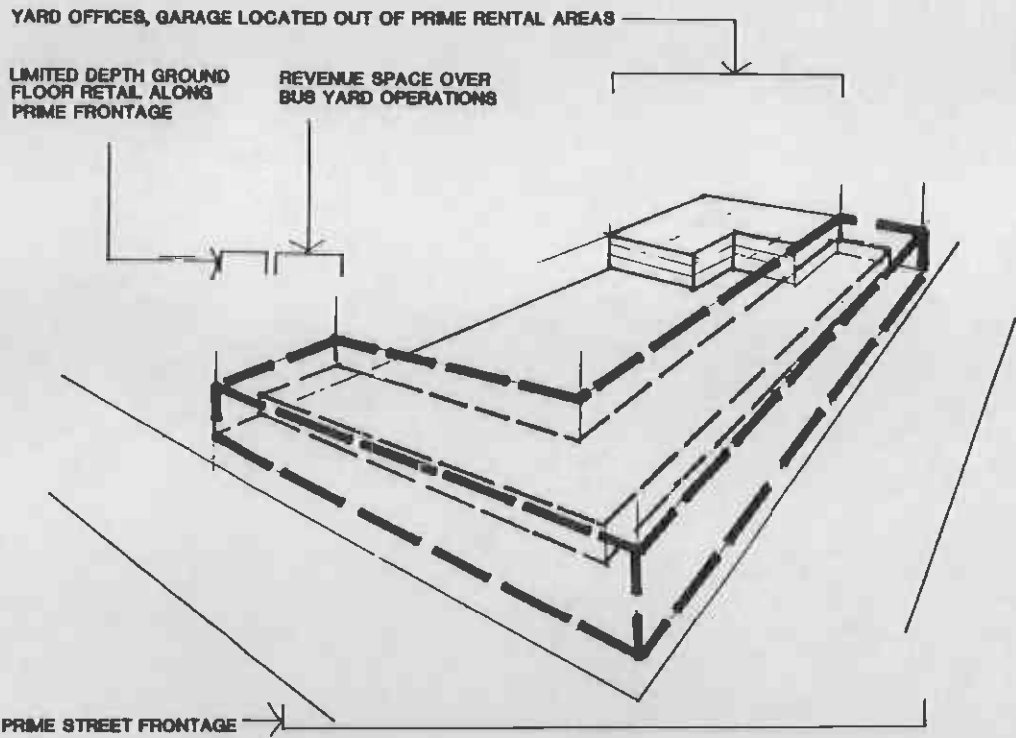


FIGURE 2

ILLUSTRATION OF BUS DIVISION  
STRUCTURES RELOCATED OUT  
OF PRIME FRONTAGE AREA

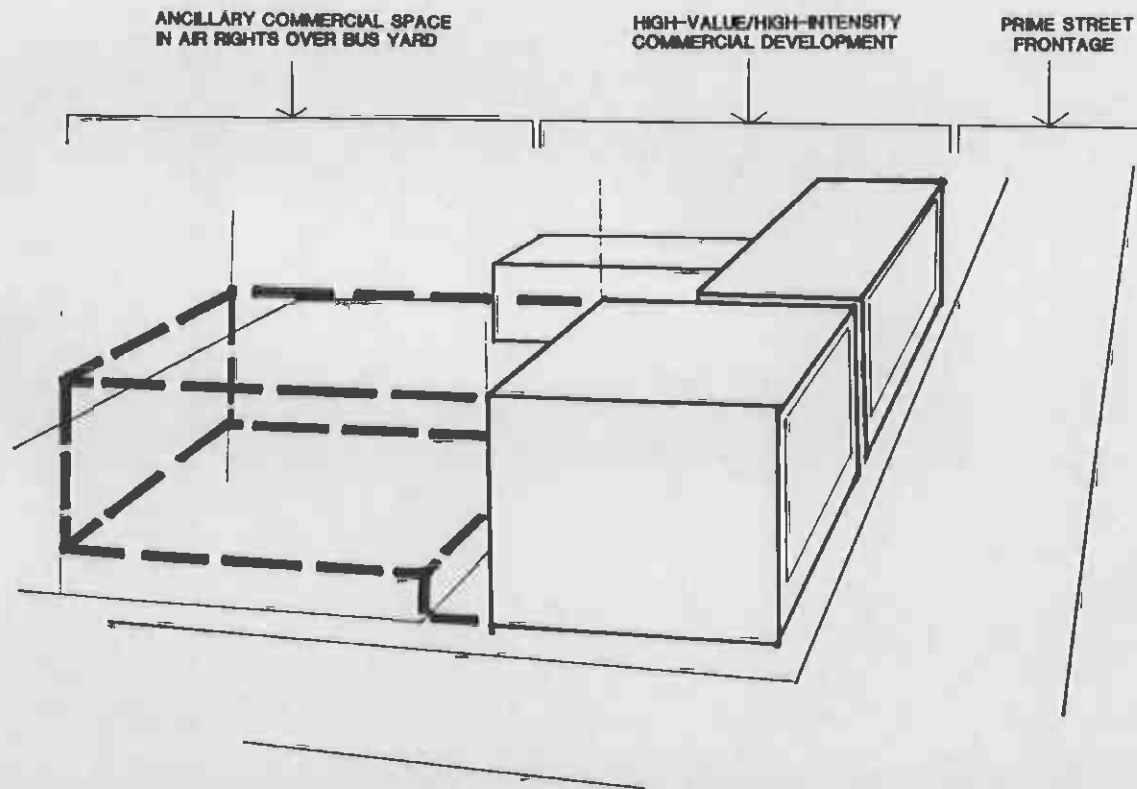


FIGURE 3

ILLUSTRATION OF BUS YARD AIR RIGHTS  
UTILIZED BY AN ADJACENT PROPERTY'S  
DEVELOPMENT

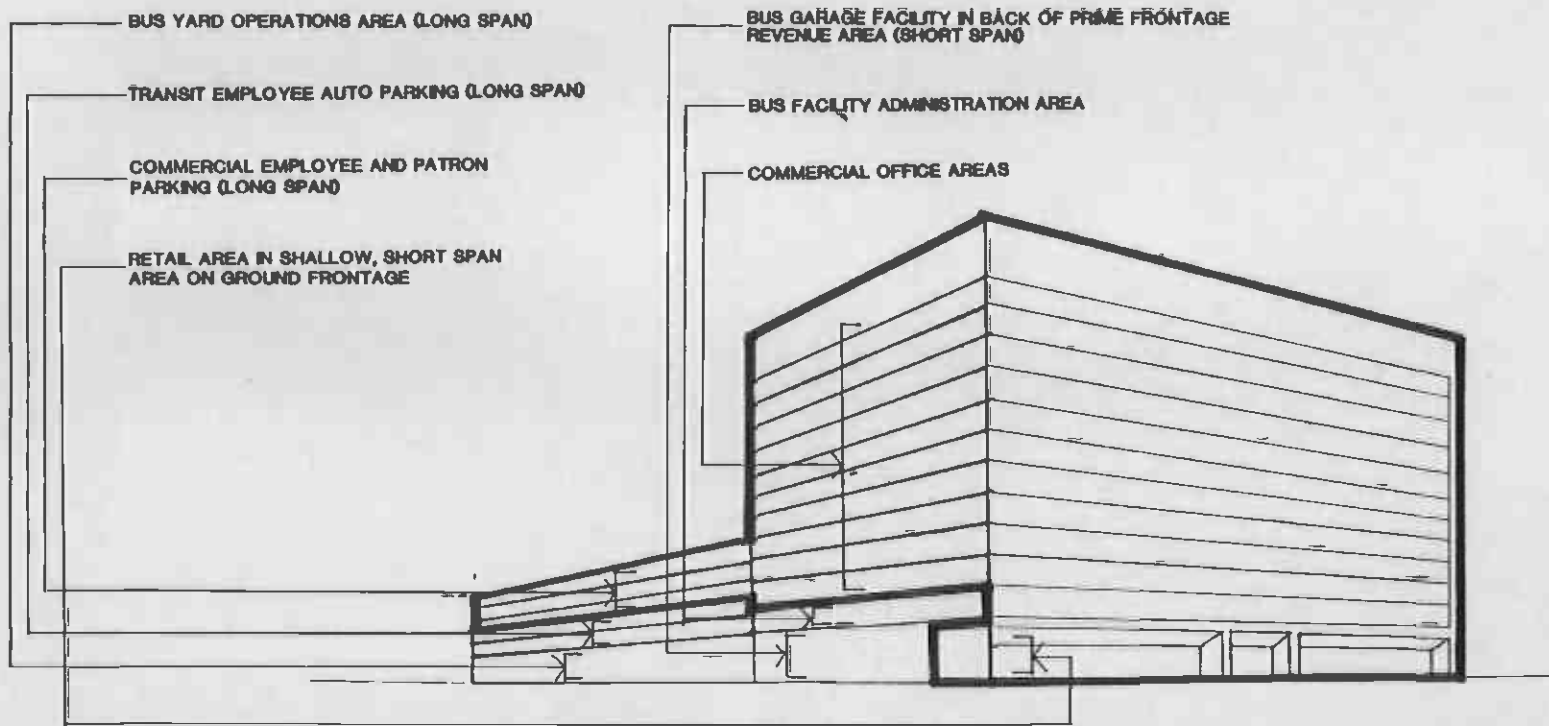


FIGURE 4

ILLUSTRATION OF INTEGRATED TRANSIT/REVENUE  
STRUCTURE COMBINING SHORT AND  
LONG SPAN STRUCTURES

For airspace or other leased development to be reasonable and feasible for the District, the total costs associated with realizing this leased development has to be less by some identifiable margin than the revenue returned to the District. That is to say, all other things being equal, there should be a reasonable return to the District.

While there are a variety of real estate market factors that bear upon the price and demand for bus yard airspace, a very fundamental component is whatever costs are involved in building a structure over the yard to support whatever use is to be made of the airspace.

Unless a developer or a real estate user can amortize the cost of the required structure, along with his rent payments and related expenses, at a rate that is less than competitive, available real estate, there can be neither an economic or a physical basis for airspace development.

What follows is a very synoptic treatment of some key cost in developing an air rights structure. Actual projects, as designed, could turn out to cost much more. This sort of analysis provides only the most preliminary screening for projects. A preliminary set of cost indicators is summarized in Table 1. These indicators should be reviewed, refined and updated as experience is gained.

## 6.2 Basic Platform Structure

One of the simplest and most direct ways to provide for air rights development is to simply construct a giant platform over the open bus yard and/or yard structures.

There are a number of variables that can significantly affect the cost of the platform. The objective here can be only to develop very general, order-of-magnitude costs in order to establish basic feasibility.

A key variable in a platform's cost is the required span between columns. To minimize development costs and maximize development potential, shorter spans are needed. However, the ideal from a bus operations standpoint would be to have no columns penetrating the yard area and support the platform entirely from the yard perimeter. This would involve spans of hundreds of feet and would be completely infeasible for a level, load bearing platform.

A slightly more realistic span might be that which carries from the centerline of one parking block across an aisle to the centerline of the next parking block, a distance of about 120 feet. This is still an extremely long span and unlikely to be economic under most circumstances.

Reducing the spans from this figure, however, increasingly involves compromises and reconfiguration of the yard's parking and circulation. This, in turn, creates some additional costs: operational inefficiencies, loss of yard capacity and, as a result, a need for additional yard real estate. An absolute minimum span appears to be about 50 feet (using a one-way aisle in the yard layout); a more moderate compromise might be an 85-foot span. These latter two spans were selected as scenarios for evaluation.

For vehicle running areas, a minimum clearance of 16 feet is required. In some hoist locations, 21 feet of headroom may be needed. Hoists, however, might possibly be situated between platform beams; if a minimum beam depth of 2 feet is assumed, the floor-to-bottom-of-beam clearance would be about 19 feet.

The order-of-magnitude costs for a basic platform with these parameters range between \$80 and \$170 per square foot.

### 6.3 Vertical Circulation Elements

Real estate analyses use comparables that have ground-level access. To use air rights, however, vertical circulation has to be provided and these costs added in.

If the airspace is to be used for vehicles (autos, trucks, buses, etc.), ramps will need to be provided up and down from the platform. As shown in Table 1, automobile ramps might cost an estimated \$30,000 per level each. At this time, ramps for heavy equipment require further study.

If any significant occupancies are proposed for an airspace lease, elevators will be necessary. Each passenger elevator might be estimated to cost on the order of \$30,000 per floor; each freight elevator might cost on the order of \$50,000 per floor (reference: Marshall & Swift).

#### 6.4 Artificial Lighting

Although bus yards have lighting for nighttime operation, an airspace platform requires that round-the-clock lighting be employed. This requires more light fixtures, perhaps adding \$1-2 per square foot in capital costs (reference: Marshall & Swift). Additional operating costs remain to be determined.

#### 6.5 Mechanical Ventilation

The imposition of an airspace platform will likely require the introduction of artificial ventilation. It is estimated that mechanical ventilation could add on the order of \$1 per square foot in capital costs. The additional operating costs remain to be determined (reference: Marshall & Swift).

#### 6.6 Additional Constraints and Conditions

Keying the platform's height to the highest working height needed in the yard still leaves some disruption of the platform surface. The most significant are the cyclone towers and vent stacks for the bus vacuum. In addition to taking space, a substantial amount of acoustic insulation will be necessary in any adjacent, occupied structures.

Different treatments may be appropriate around those areas above the bus repair areas and vehicle hoists. The platform can use the headroom requirement for the garage area as a requirement for the entire platform or it can adopt a lower height over the yard and work around the garage structures. In any event, any airspace activity areas in the vicinity of bus repair areas may require special acoustic insulation.

—TABLE 1—

BUS FACILITY DEVELOPMENT  
FEASIBILITY PARAMETERS  
preliminary default values

CAPITAL FACTORS

BASIC STRUCTURE

- |     |                                                 |                           |
|-----|-------------------------------------------------|---------------------------|
| 1.  | Basic platform span<br>between columns: 85 feet |                           |
| 2.  | Basic platform cost:                            | \$80-\$170<br>per sq. ft. |
| 3.  | <u>ANCILLIARY STRUCTURE</u>                     |                           |
| 3.1 | Stairs:                                         | tbd                       |
| 3.2 | Auto ramps:                                     | \$30,000/each level       |
| 3.3 | Bus ramps:                                      | tbd                       |
| 4.  | <u>ELEVATORS</u>                                |                           |
| 4.1 | Passenger elevators:                            | \$30,000/unit/floor       |
| 4.2 | Freight elevators:                              | \$50,000/unit/floor       |

ACCESSORIES AND FIXTURES

- |    |                                   |                |
|----|-----------------------------------|----------------|
| 5. | Lighting:                         | \$2.00/sq. ft. |
| 6. | Mechanical ventilation:           | \$1.00/sq. ft. |
| 7. | Perimeter walls,<br>fenestration: | tbd            |

OPERATING FACTORS

- |    |                                                                    |     |
|----|--------------------------------------------------------------------|-----|
| 1. | Additional costs in<br>bus operations due<br>to columns and ramps: | tbd |
| 2. | Lighting costs:                                                    | tbd |
| 3. | Mechanical ventilation<br>costs:                                   | tbd |
| 4. | Elevator operation:                                                | tbd |

## 6.7 Typical Example with a Platform

One example might be a very simplified hypothetical bus yard property 600 by 1200 feet. If, in this example, it is assumed that 300 feet at one end of the yard is left open for various yard structures, that would leave an overall platform area of 600 by 900 feet or 540,000 square feet. Figure 5 illustrates the basic platform for this example. Table 2 enumerates some of the primary costs that would be expected to accrue to prospective air rights development. In this incomplete costing, annual lease payments to amortize the air rights structure range from \$8.70 to \$10 per square foot per year.

This example makes it clear that the cost of an overall platform can easily overwhelm the economic feasibility of utilizing air rights over an active operating yard. In some outlying industrial areas where the District has facilities, land can be bought for \$10 or less a square foot. To be competitive in this cost framework, land values would need to be on the order of \$100 a square foot or more. Only the much more urban facility locations are ever likely to be candidates, given these kinds of costs.

There are other ways of calculating a cost basis besides the cost flow basis in the example. Other methods might consider the tax status of a prospective leasee or alternative approaches to depreciation. In many instances, however, the cost feasibility conclusions are not likely to be significantly different. The leasee, unlike a private property owner, usually has no residual value in his improvements that he can recoup after depreciation. While lease payments, debt service and so forth may create some potential tax considerations, they do not appear to be that much different from competitive, non-air rights situations.

## 6.8 Reducing Net Structural Costs

Imposing a giant platform over an existing bus facility that was not designed with that in mind is the most costly approach to air rights development. Several strategies have the potential for significantly reducing the net structural costs an air rights leasee would have to bear:



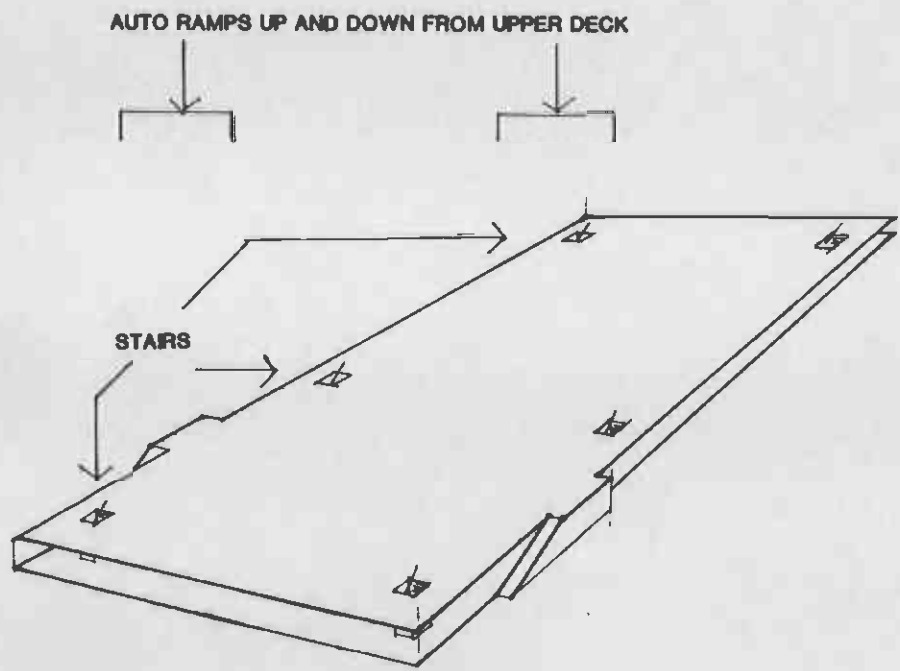


FIGURE 5

ILLUSTRATION OF A SIMPLIFIED  
AIR RIGHTS PLATFORM

—TABLE 2—

**ILLUSTRATIVE EXAMPLE OF ORDER-OF-MAGNITUDE COSTS FOR A  
SIMPLE AIR RIGHTS PLATFORM**

1. Platform Structure  
540,000 square feet at \$85/sq. ft. = \$45,900,000
  
2. Ramps  
2 auto ramps at \$30,000/each = \$60,000
  
3. Pedestrian Access  
Assume no elevators are necessary. Assume 6 staircases required for basic circulation, code requirements at, say, \$8,500 each = \$50,000
  
4. Closure Walls  
Assume existing walls suffice with minor modifications; miscellaneous costs = \$7,500
  
5. Mechanical Ventilation  
Assume 3 exhaust fans and ducting at \$2,500 per unit = \$7,500 plus \$500/year operating costs
  
6. Artificial Lighting  
If total lighting costs at \$2/sq.ft., then 540,000 x 2 = \$1,080,000. Assume 75% of these costs would need to be incurred in outside yard lighting, therefore \$1,080,000 x .25 = \$270,000 net lighting capital cost for platform
  
7. Special Conditions  
Assume no additional costs. Total initial capital costs = \$46,295,000

Total additional operating costs = \$1,100/year

Annual debt service on capital investment amortized in 20 years at 10% interest	= \$5,437,793/year
plus operating costs	<u>1,100/year</u>
	\$5,438,893/year
	= \$10/sq.ft/year
	= \$0.83/sq.ft/month

Alternatively:

Annual debt service on capital investment amortized in 40 years at 10% interest	= \$4,734,100
plus operating costs	<u>1,100</u>
	\$4,735,200
	= \$8.77/sq. ft/year
	= \$0.73/sq. ft/month

- construct District and revenue space at the same time in consolidated structures (illustrated by the example in Figure 4);
- construct airspace over areas where much shorter spans and/or less costly construction are involved, such as with office areas; and
- where the option exists, consider placing bus vehicle operations on top of a platform; with much shorter spans and lower headrooms, below this could be more economical.

A hypothetical example utilizing these approaches is shown in Figure 6. Here, buses enter on the uphill end of a sloping site. At the downhill end of the site, a leasee has constructed a building that has office and retail revenue space on the first floor which extends into an excavated part of the slope. Over the front portion of the leasee's revenue space, upper floors of the building provide space for District administrative functions. Over the rear portion of the leasee's revenue space is a short-span platform structure supporting a portion of the vehicle yard above.

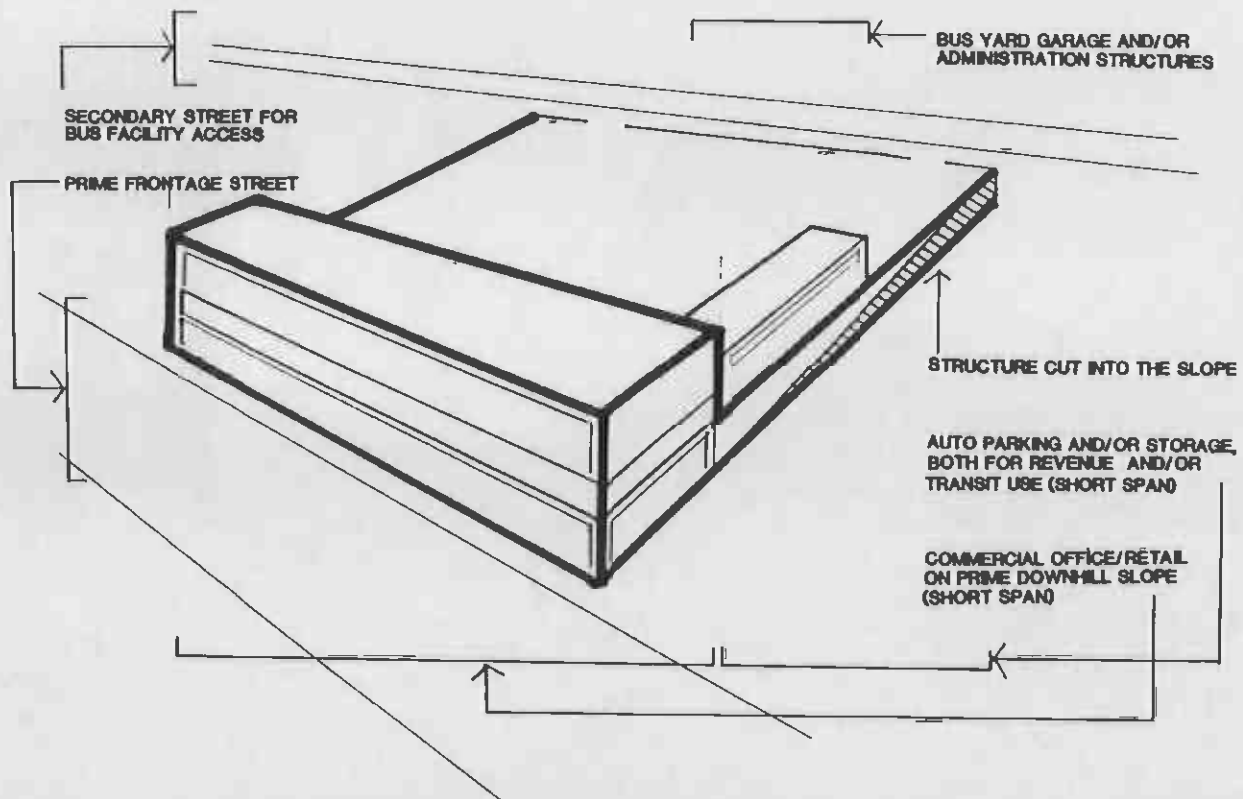


FIGURE 6

ILLUSTRATION OF BUS DIVISION YARD APRON OVER SHORT SPAN STRUCTURED AUTO PARKING/STORAGE AREA

## 7.0 NEXT STEPS

As shown by the example of a basic platform, a simple, direct straight forward approach is very likely to uneconomic in all but the most high value locations because of the structural costs. Any successful airspace development is going to require a blend of design, financing and tenanting measures specially tailored to a site's opportunities.

The structural engineering design and cost factors considered here are very primitive and need refinement. Thus perhaps is best done in the context of an actual project. These first projects will proceed at a somewhat cautious pace as a result.

The Real Estate and Development Department would propose a program that would periodically select facility sites, and, with all of the departments of the Joint Staff Committee, conduct a review and evaluation of development potentials. Through this program, long-range development plans could be developed for District properties found to have development potential. A key aspect of these site-by-site long range

development programs would be the identification of the timeframe and/or factors likely to make joint development measures feasible and what strategies for joint development are the most promising.

This program would be one of a number of real estate activities that would be assigned to the Development unit. Proposals to formally establish and staff this unit are included in the current budget submissions.