TRANSPORTATION

OVERALL SERVICE

In 1980, the Planning Board devised a strategy for staging and regulating the rate and amount of growth throughout the County, based upon the availability of public facilities and services (Fifth Growth Policy Report, June 1979). That strategy has been implemented by the Planning Board's approval of the 1981 Report on Comprehensive Planning Policies. That document amended the Planning Board's administrative guidelines for the Adequate Public Facilities Ordinance. It advances a concept of total level of transportation service was advanced which considers both transit availability and roadway congestion.

This concept holds that where a high level of transit is available, a somewhat higher than normal level of roadway congestion is acceptable. Areas having both Metrorail service and a high level of feeder bus and community bus service (which thus provides the down-county driver greater mobility than drivers in less urbanized areas) do not require the same free-flowing roadway conditions as would a non-transit area in the upper County. The critical intersection capacity analysis, applied under local area review as part of the Adequate Public Facilities Ordinance, is now used as the determining factor in the approval of subdivision developments affected by severely congested major intersections.

The entire Bethesda-Chevy Chase Planning Area is expected to achieve an acceptable overall level of transportation service under projected levels of growth of both population and employment, both prior to and after Metrorail and the expanded bus system are in service. Overall, the Bethesda-Chevy Chase area is judged capable of receiving additional growth (above what is in the "pipeline," i.e., proceeding through the approval process based upon sewer authorizations) of 2,072 dwelling units and an employment increase of 10,500 (equals to 2.1 million square feet of office space). Such growth would occur within the Bethesda and Friendship Heights CBD's, at the several Federal installations and in the Westbard area. On a gross basis, it appears that substantial growth is possible throughout the Planning Area without exceeding the projected capacity of the future transportation network based on the recently adopted Comprehensive Planning Policies.

PUBLIC TRANSIT

The advent of Metrorail service at the nearby Bethesda and Friendship Heights Metrorail stations is expected to have a significant influence upon local travel patterns. The proposed County funded Ride-On bus service will offer the opportunity for community linkage to these nearby Metro stations. Furthermore, the present Metrobus service will be restructured when the rail service is opened in 1984. At that time the through buses to downtown Washington will terminate at one or another of the Rockville Line Metro stations.

In the fall of 1983, the County will institute Ride-On bus service in Bethesda, similar to the system which has been operated by the County for several years in the Silver Spring area. The County has purchased 16 buses for the initial Friendship Heights, Bethesda, NIH, and Grosvenor Ride-On system and 19 more will be purchased for expanded service when the Shady Grove Metrorail line

opens. The main purpose of the Ride-On service is to provide for routes within the residential communities; one or more routes will serve the Westbard area. The Montgomery County Department of Transportation (DOT) has been conducting public forums to insure that the routes will be both acceptable and serviceable to the community. At the public forums, DOT has been providing information regarding route location, frequency of service and destinations.

Recent adjustments to the transit terminals at both the Friendships Heights and the Bethesda stations have given priority siting for the use of the Ride-On as well as Metro buses. At this time, it is difficult to evaluate the future level of bus service to Westbard, either as to the extent of the route network or as to frequency of service on such routes. Similarly, it is difficult to forecast with any precision just what effect the enhanced transit service will have on travel patterns within, through and around the Westbard area. Improved bus service in the Westbard area should result in a decrease in automobile dependency and thus tend to reduce traffic congestion.

Metrobus service currently serves portions of the Westbard area. The T-2 and T-3 Routes, which operate on River Road from Rockville and Potomac into the District of Columbia, provide service with a 15 minute headway during the peak hours in the peak direction and a 30 minute headway during the off-peak hours. The N-4 and N-5 Routes run on Massachusetts Avenue from Glen Echo into the District, providing 10 minute peak and 24 minute off-peak service. In addition, there is a D-3 Route which operates from Westbard Avenue to Massachusetts Avenue to Sangamore Road to MacArthur Boulevard. This route provides 20 minute headways inbound in the morning and 30 minute headways outbound in the evening. Generally, transit service can be described as adequate for those peak hour trips destined to office centers in the District of Columbia. Current planning indicates that both River Road routes would be diverted to the Friendship Heights station when all District-bound buses are terminated at selected Metrorail stations. This will provide direct service from Westbard to Friendship Heights, which is not now available, and thereby improve travel to downtown Washington and other parts of the region via Metrorail. The net effect of truncating the line-haul buses at transit stops will be a quantum leap in Metrobus capacity, allowing for either increased route service, more frequent service, or both.

The successful functioning of the Westbard area is highly dependent upon the amount and quality of public transit service. There is a critical need to serve this area both by the enhanced Metrobus routing and the future Ride-On service. These services can decrease the potential for automobile travel and thereby tend to improve traffic congestion and, at the same time have a favorable effect on traffic passing through Westbard to the District of Columbia and elsewhere. This Plan recommends that both Ride-On and Metrobus service to this area be substantially enhanced.

EXISTING HIGHWAY SYSTEM

The Westbard Sector Plan area is served by two parallel major highways, River Road (Md 190) and Massachusetts Avenue (Md 396), which radiate from the District of Columbia into Montgomery County. River Road is a four-lane 48 feet wide roadway between Western Avenue and Little Falls Parkway. It is a four-lane 68 feet wide roadway (with a flush median for continuous left turns)

between Little Falls Parkway and Ridgefield Road. From Ridgefield Road to the Capital Beltway it is a four-lane median-divided roadway Massachusetts Avenue, which has been reconstructed within the past five years, is a four-lane 50-62 foot wide roadway (with left-turn storage lanes) between Western Avenue and Sangamore Road.

Interconnecting these major highways within the Westbard area are two principle roadways; Westbard Avenue-Ridgefield Road and Little Falls Parkway. Westbard Avenue is 48 feet wide and connects with River Road directly via a short segment of Ridgefield Road, a 48 foot wide roadway. Little Falls Parkway is a two-lane 24 foot wide roadway between Massachusetts Avenue and River Road and a four-lane median-divided roadway north of River Road. Commercial traffic is prohibited on the parkway.

A number of public and private access rights-of-way are located within the commercial/industrial area. Included in this category are Landy Lane, Dorsey Lane, Clipper Lane, and Butler Road. With the exception of Landy Lane, these access roadways are privately maintained due to their substandard right-of-way and design.

TRAFFIC ANALYSIS

For this analysis, traffic data was compiled from the intersection counting program conducted by the Montgomery County Department of Transportation. These counts, taken between March 1978 and January 1979 at ten separate intersections, provide excellent data for a general evaluation of traffic operations in the Westbard area. The following table indicates the specific locations and dates of each traffic count. The accompanying maps show the AM and PM peak hour traffic volumes derived from the intersection count data.

TABLE III

WESTBARD TRAFFIC COUNT STATIONS

Location	Date	Day of the Week
MASSACHUSETTS AT:		
Brookway Drive	6/6/78	Tuesday
Westbard Avenue	1/16/79	Tuesday
Little Falls Parkway	9/6/78	Wednesday
Baltimore Avenue	3/21/78	Tuesday
RIVER ROAD AT:		
Springfield Drive	10/17/78	Tuesday
Ridgefield Road	5/11/78	Thursday
Little Falls Parkway	5/25/78	Thursday
Willard Avenue	8/15/78	Tuesday
WESTBARD AT:		
Ridgefield Road	12/13/78	Wednesday
LITTLE FALLS PARKWAY AT:		
Dorset Avenue	5/25/78	Thursday

The level of service of a roadway system is typically measured by analysis of the peak hour traffic demands at

critical intersections and expressed as an alphabetic scale from "A" (best) to "F" (worst). In Montgomery County, Level of Service "D" is used for planning purposes; it is frequently regarded as an acceptable level of service for a given geographic area, but not necessarily each intersection. Level of Service "D" can be described as a predominantly stable traffic flow condition with occasional instability of the flow. At this level of service, vehicle delays are moderate to heavy and signal time deficiencies are experienced for short durations within the total peak period. However, the traffic flow is such that periodic "valleys" occur, thereby preventing unacceptable traffic backup and congestion.

Through Traffic

Both Massachusetts Avenue and River Road are major automobile commuter roadways radiating out from the District of Columbia. Little Falls Parkway and Westbard Avenue provide cross-connections for commuters destined for the District of Columbia and Virginia via MacArthur Boulevard and Canal Road. While some continued in-fill growth in the Bethesda-Chevy Chase Planning Area will add somewhat to the commuter volumes, most of the new burden will come from the Potomac Subregion, five to fifteen miles northeast of the Westbard area. The Potomac Planning Area is expected to grow by some 4,400 dwelling units over the next ten years. Many of these new commuters will be destined for new employment centers in North Bethesda and elsewhere in the Rockville Corridor.

A general estimate is that the new growth will produce 1,760 new peak-hour trips (.4 trips per household). The largest fraction, 75 percent, is expected to use the Beltway and the eastbound (Democracy, Tuckerman, Montrose) and northbound (Seven Locks, Falls, Route 28) roads which would not affect the lower Bethesda-Chevy Chase area. The remaining 440 trips would be shared by George Washington Parkway, MacArthur Boulevard, Massachusetts Avenue, River Road, and Bradley Boulevard. Considering the relative traffic capacity of these roads, it would be fair to assume the addition of about 100 peak-hour, District-bound commuter trips each on River Road and Massachusetts Avenue.

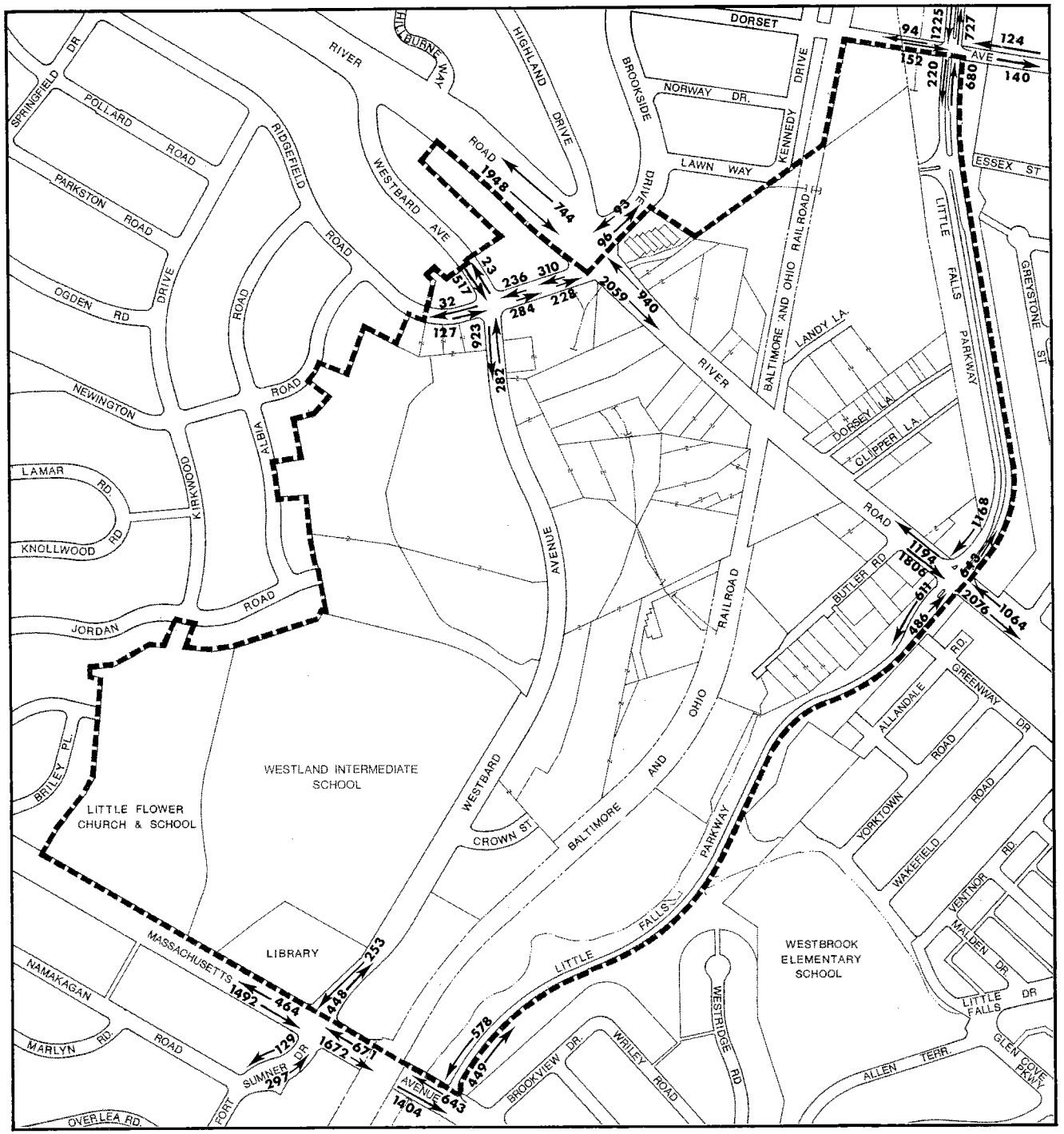
The effect of new employment in nearby areas will also add to commuter trips in Westbard. Over the next ten years some 2,000 new jobs are likely to be located in the Friendship Heights (Maryland and D.C.) Central Business District, some part of which would affect the Westbard road system. Assuming 50 percent of the employees would arrive in the peak hour and that 55 percent would be auto drivers, then 550 peak-hour auto trips could be assumed. Estimating for the various directions of arrival at Friendship Heights suggests that 100 of these could use River Road and another 50 would be added to Massachusetts Avenue.

New employment over the next ten years in the Bethesda CBD could have a reverse commuting effect on Little Falls Parkway. A generous estimate is that 100 peak-hour trips would be involved.

The net effect of through trips on River Road over the next ten years would be to add about 200 peak-hour trips at the Ridgefield Road intersection. About 300 additional trips may seek to pass through the Little Falls Parkway intersection.

Level of Service Concept

The ability of a highway system to carry traffic is



TRAFFIC VOLUMES

AM PEAK (8:am-9am)

(AS OF YEAR 1978)

Sector Plan Boundary

906 → Number of Vehicles and Direction of Movement

Source: Mont. County Dept. of Transportation

Figure 13

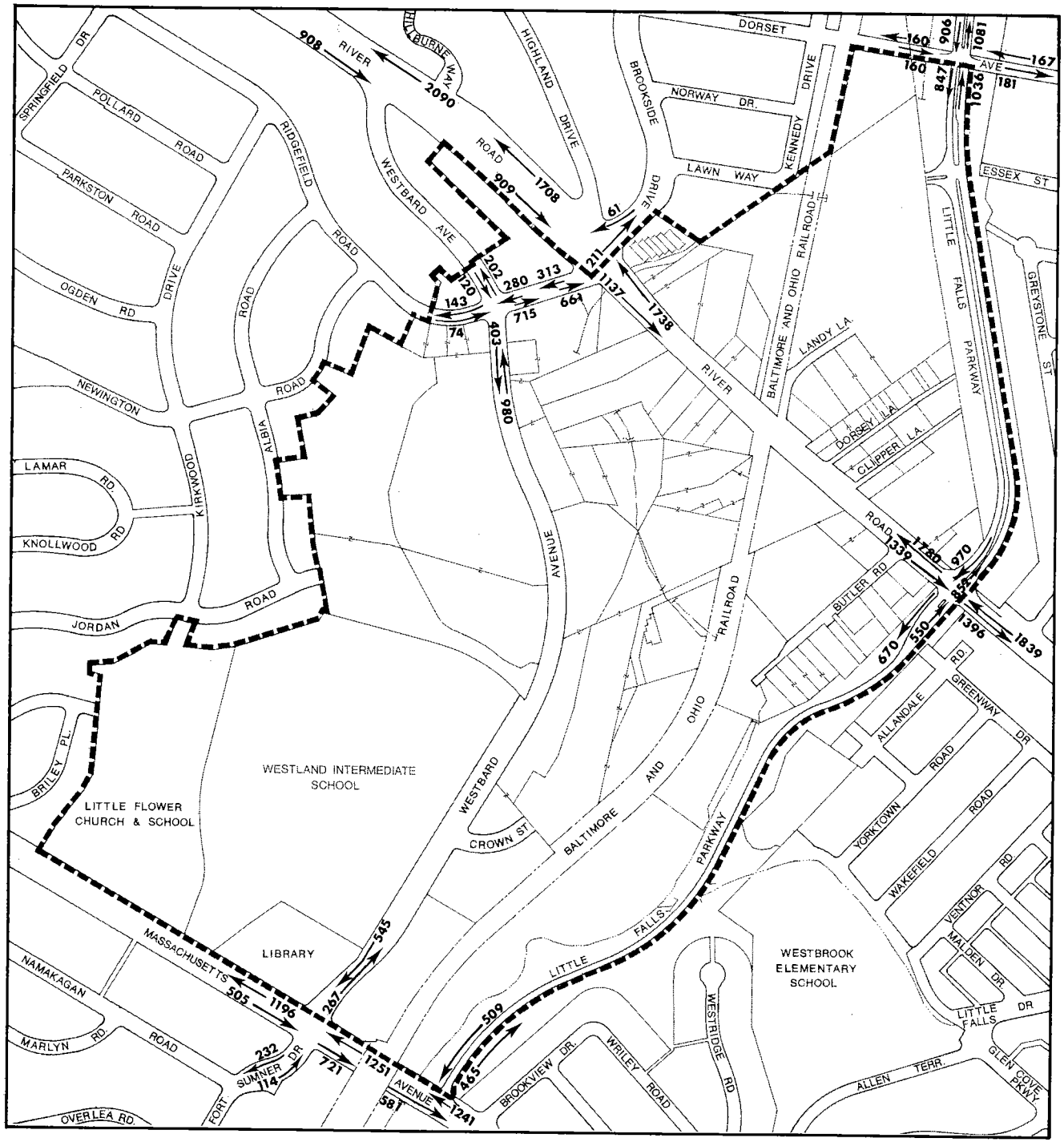
WESTBARD SECTOR PLAN

Montgomery County, Maryland

0 150 300 600 900 F

0 45 90 180 270 M

September 1982



TRAFFIC VOLUMES

P M. PEAK –

River Road:(4:30-5:30 pm)
Massachusetts:(5:pm-6:pm
(AS OF YEAR 1978)

Sector Plan Boundary

715 → Number of Vehicles and Direction of Movement

Source: Mont. County Dept. of Transportation

Figure 14

WESTBARD SECTOR PLAN

Montgomery County, Maryland

0 150 300 600 900 F
0 45 90 180 270 M

September 1982

expressed in terms of "Service Level" at the critical locations (usually intersections). "Service Level" is defined alphabetically as follows:

"A" Conditions of free unobstructed flow, no delays and all signal phases sufficient in duration to clear all approaching vehicles.

"B" Conditions of stable flow, very little delay, a few phases are unable to handle all approaching vehicles.

"C" Conditions of stable flow, delays are low to moderate, full use of peak direction signal phase (s) is experienced.

"D" Conditions approaching unstable flow, delays are moderate to heavy, significant signal time deficiencies are experienced for short durations during the peak traffic period.

"E" Conditions of unstable flow, delays are significant, signal phase timing is generally insufficient, congestion exists for extended duration throughout the peak period.

"F" Conditions of forced flow; in the extreme, both speed and volume can drop to zero. Usually results from queues of vehicles backing up from a restriction downstream.

The following table indicates the "Critical Lane Volume" range to be used in determining "Service Level":

Service Level	"Critical Lane Volume" Range (vehicles per lane per hour)
A	1,000 or less
B	1,000 to 1,150
C	1,150 to 1,300
D	1,300 to 1,450
E	1,450 or greater to 1,600
F	1,600 or greater

CONCLUSIONS

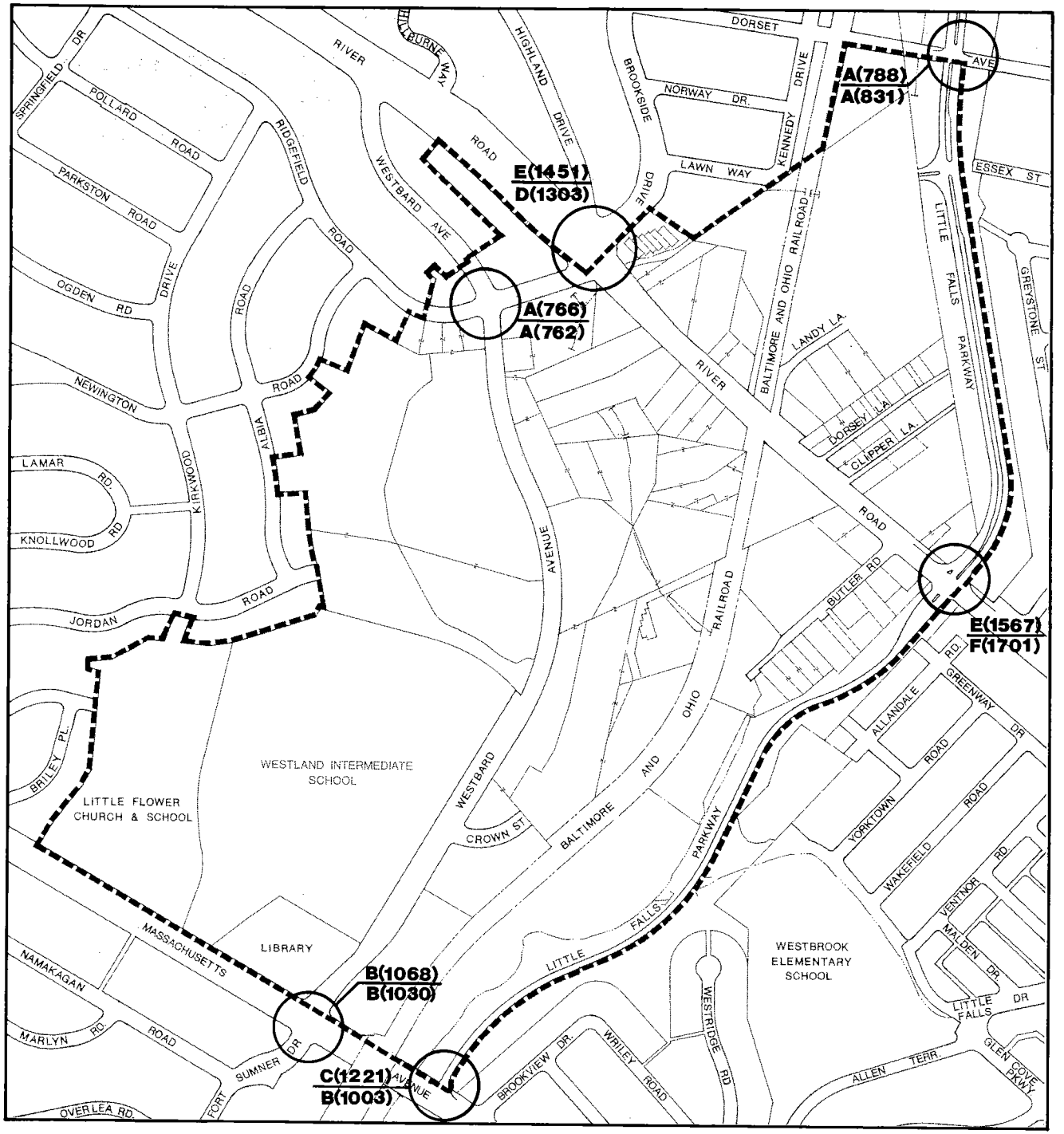
Calculations of the peak hour conditions at each of the intersections analyzed in the Westbard vicinity are shown on Figure 14. This analysis indicates that:

1. The Massachusetts Avenue intersections operate at Level of Service "C" or better during the AM peak hour and Level of Service "B" or better during the PM peak hour;

2. The River Road intersection at Ridgefield Road operates at Level of Service "E" and "D" during the AM and PM peak hours;

3. The River Road intersection at Little Falls Parkway operates at Level of Service "E" and "F" during the AM and PM peak hours, respectively;

4. The River Road intersection at Willard Avenue operates at Level of Service "C" and "F" during the AM and PM peak hours, respectively; and



LEVELS OF TRAFFIC SERVICE

(AS OF YEAR 1978)

Sector Plan Boundary

AM. → E(1451) → Critical Lane Volumes
PM. → D(1303) → Critical Lane Volumes

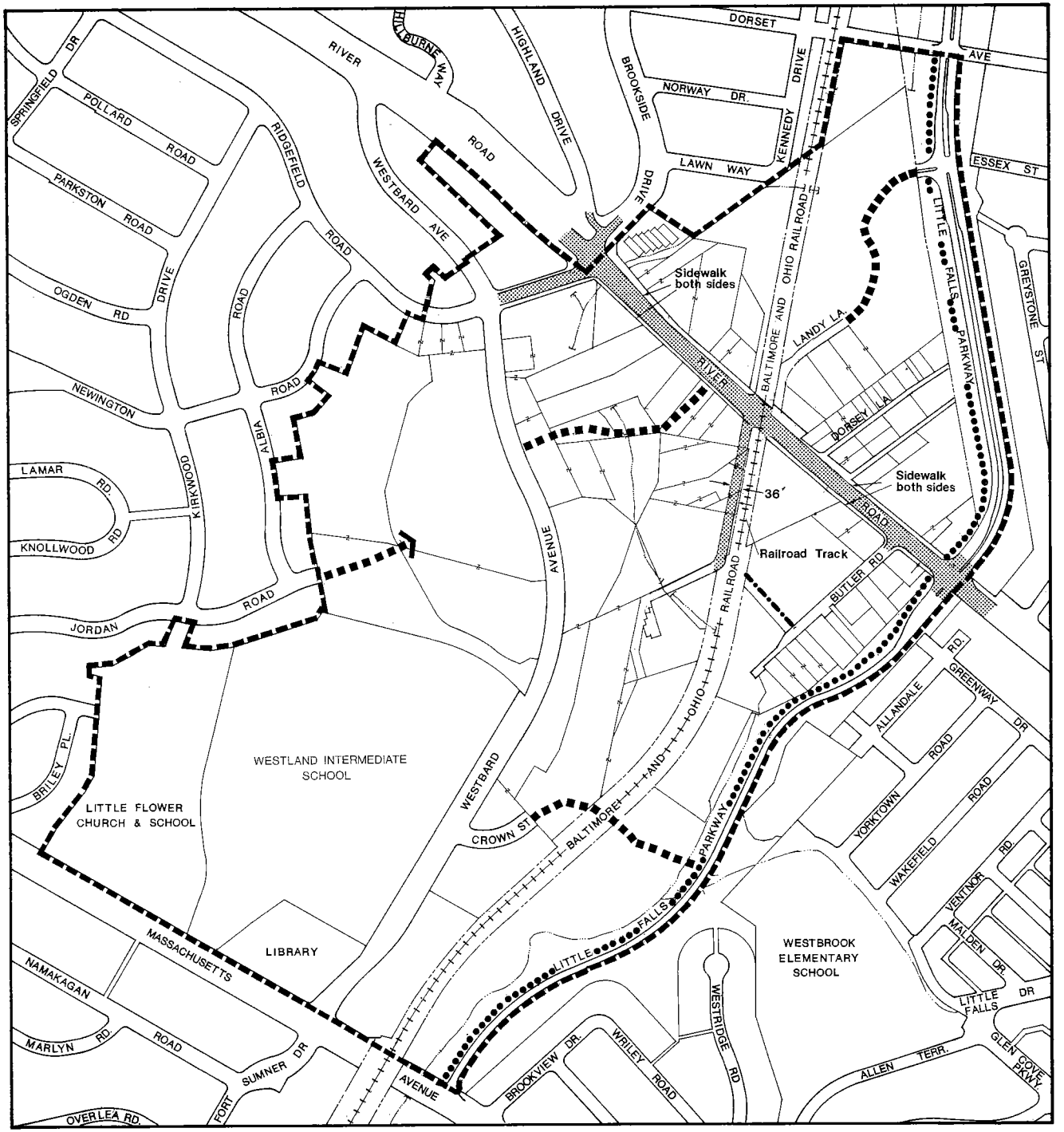
Figure 15

WESTBARD SECTOR PLAN

Montgomery County, Maryland

0 150 300 600 900 F
0 45 90 180 270 M

September 1982



RECOMMENDED ROADWAY IMPROVEMENTS

- Sector Plan Boundary
- Desired Roadway Connection
- Proposed Pedestrian Pathway
- Proposed Paving Width
- Existing Bikepath

Figure 16

WESTBARD SECTOR PLAN

Montgomery County, Maryland

0 150 300 600 900 F

0 45 90 180 270 M

September 1982

5. The remaining intersections operate at acceptable Levels of Service during the AM and PM peaks.

In general, the data shows that the most unacceptable traffic operations occur in the segment of River Road between Ridgefield Road and Willard Avenue. Heavy through volumes together with substantial cross-volumes and left turns combine to produce Levels of Service somewhat below acceptable standards for the length of River Road within the Westbard area. However, it is significant that the approach roadways as measured at the outlying intersections (with the exception of the PM peak at River/Willard) are functioning quite well and display generous reserve capacities. There is no problem getting to or through Westbard, except for the above section of River Road.

The Ridgefield Road and Little Falls Parkway intersections suffer because of heavy cross and turning movements. This congestion may be creating a localized pollution problem. A possible remedy in each case could be to add one or more additional lanes to handle these heavier movements at the intersections.

Between the two critical intersections, considerable traffic frictions occur because of the high number of driveway entrances and the uncontrolled left turns across the roadway. Existing gas stations having multiple driveways are among the offenders in this regard. Since gas stations require special exception permits, any change to existing permits will afford the Planning Board and the Board of Appeals opportunities to require consolidation and reduction in the number and width of driveways.

The following section discusses several possible approaches for consideration.

POSSIBLE IMPROVEMENTS

River Road Alternatives

Between Ridgefield Road and Little Falls Parkway, the existing commercial/industrial development generates a substantial amount of traffic movements entering and exiting the River Road traffic stream. Based upon data provided by the Joint Committee on the Westbard Plan (JCWP), a civic organization, 25 percent of the vehicles which enter or exit this segment at Ridgefield Road or Little Falls Parkway are concluded to have an origin or destination within the commercial/industrial area.

Traffic operations are severely impacted by the high percentage of vehicles with an origin or destination within the commercial/industrial area. Left turn movements from River Road are difficult due to the continuous left turn lane and the haphazard location of access points. Left turn movements from adjacent driveways and access roadways are particularly difficult due to the need to cross both directions of the traffic stream without the benefit of traffic controls or signals.

Pedestrian movements across River Road are difficult and dangerous due to the unprotected 68 foot wide roadway that must be negotiated.

Traffic capacity, as measured by the Level of Service calculations at Ridgefield Road and Little Falls Parkway, is deficient for current traffic demands. Poor air quality may be another consequence of the congestion.

Given these problems and issues, a number of alternatives have been developed which attempt to mitigate these concerns. Schematically, the various options are shown on Figures 16 and 17. For each of these alternatives, the following advantages and disadvantages can be identified:

Alternative 1: MD DOT/SHA-MCDOT Resurfacing and Restriping Plan

This would require no additional right-of-way or construction outside the existing curb line. It would maintain a continuous left-turn lane operation similar to the current operation. Improved Levels of Service for the PM peak hour would be achieved; however, there would be no change in the Levels of Service for the AM peak hour. The problem of left turn movements from driveways and access roadways would increase slightly, particularly from the north side of River Road.

Alternative 2: Parallel Service Drives

This would require substantial additional rights-of-way plus the demolition of existing buildings. Extensive relocation would be needed at the ends of the service drive to provide adequate turning radii for all types of vehicles. The main benefit would be the elimination of the left turn problems associated with the continous left turn lane. It would require a signalized intersection in close proximity to Ridgefield Road and Little Falls Parkway in order to provide access to a majority of properties abutting River Road.

The result would be no additional capacity at the Ridgefield Road or Little Falls Parkway intersection. Although it would provide pedestrian safety areas for crossing River Road, it would separate the bus stops from the main pedestrian system. The severe right-of-way and relocation costs effectively eliminate this alternative as a viable option.

Alternative 3A: Six-Lane Undivided with Flared Intersections

This would require little, if any, additional right-of-way. Curb reconstruction would be required only in those areas adjacent to intersections. Left turn movements from River Road would be consolidated at identifiable locations.

It would provide additional capacity at the Ridgefield Road and Little Falls Parkway intersections during both the AM and PM peak hours. Right-turn movements and bus loading operations would be shifted into an additional lane, effectively developing two lanes for through traffic. Pedestrian crossing problems would be aggravated due to the added lanes and the wider roadway cross-section at the intersections. A raised island at the intersections could be installed as a pedestrian haven.

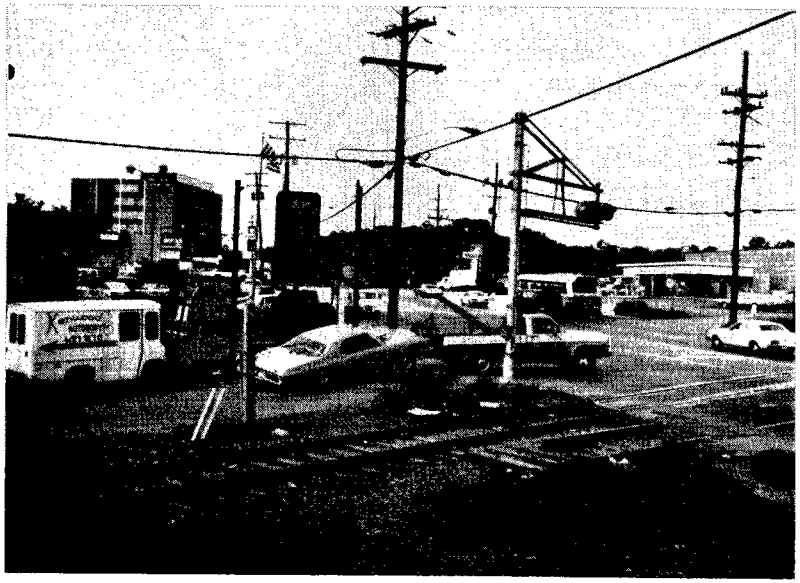
Alternative 3B: Six-Lane Median Divided

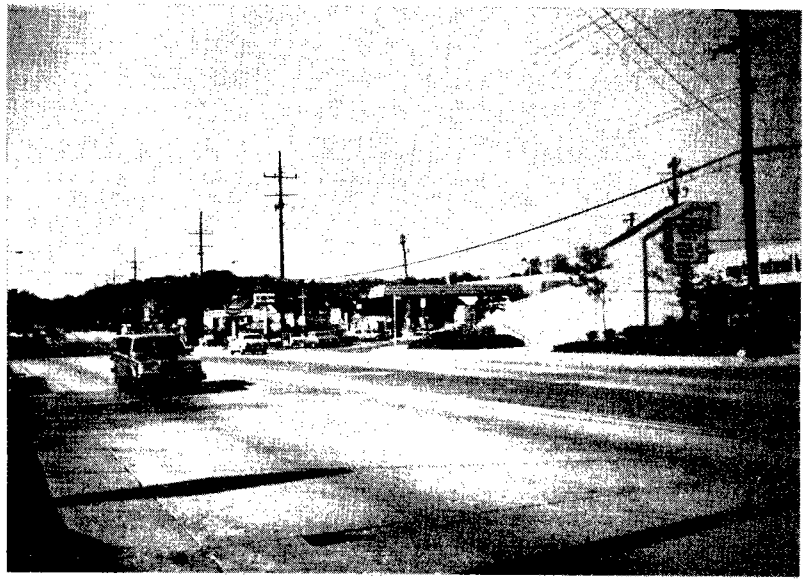
The same factors would be present as for Alternative 3A except that this one necessitates substantial reconstruction between Ridgefield Road and Little Falls Parkway and would probably require additional right-of-way. It would improve pedestrian movements by providing a mid-street refuge area. The median strip would also allow for some visual amenities in the form of trees and low plantings as will be discussed in the Urban Design Chapter.

Alternative 4: Existing Mid-block Cross-Section with Flared Intersections

The present roadway cross-section and lane markings would be retained so as to allow free left turns from anywhere in the middle lane. The intersections at Little Falls Parkway and Ridgefield Road would be flared to provide additional turning lanes. Such improvements could provide additional traffic capacity and improve traffic operations and level of service.

Particular care must be taken in the design of the intersection at River Road and Little Falls Parkway because of the concern for residents of the Kenwood





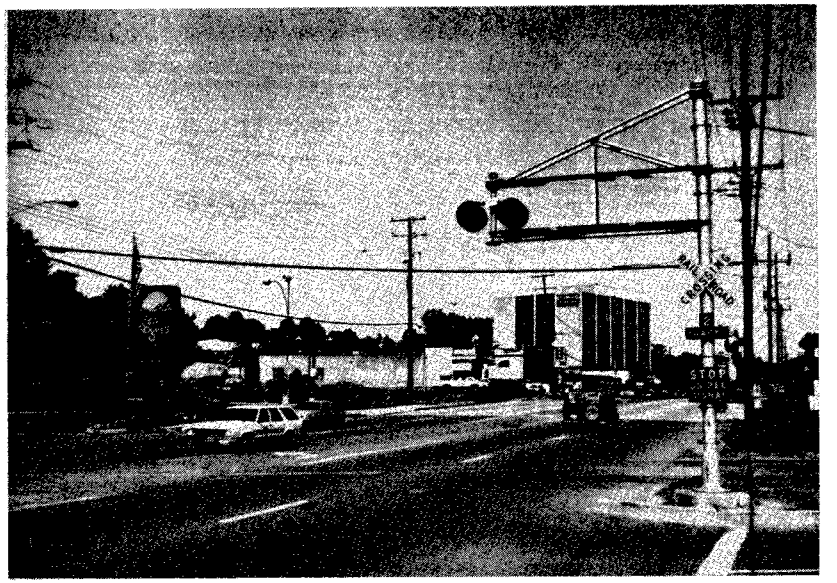
Condominium. A design study should consider whether the free right turn from Little Falls Parkway to River Road should be retained in view of the inconvenience and hazards to pedestrians and bicyclists. The study might also consider the possibility of easements across other properties to improve access to the Kenwood Condominium.

Another operational improvement might be to install a pedestrian-activated signal. The County DOT recommends a median strip at the intersection to serve as a pedestrian haven. This could be considered even if the median did not extend much beyond the intersection.

Intersections with River Road

Alternatives 3A and 3B both involve the consolidation of left-turn movements at identifiable intersections. The distance from the Ridgefield Road intersection to the Little Falls Parkway intersection is approximately 2000 feet. Under the State Highway Administration (SHA) criteria of no less than 750 feet between adjacent intersections, it is apparent that a no more than two intervening intersections should be considered.

Equal spacing of such intersections would place one at Dorsey Lane and the other adjacent to Talbert's. While such locations would provide direct access for a few properties adjacent to River Road, it is obvious that a large majority of properties (and trips) could not be serviced at all without developing an internal roadway system to connect such intersections. It is further obvious that any roadway system which attempts to interconnect at these points would destroy a number of businesses and properties. Such an option does not appear viable and should not be considered further. Alternatively, the possibility of developing a single mid-point intersection is considered to be more feasible, especially since the mid-point between Ridge-



field Road and Little Falls Parkway is located just about at the B&O Railroad right-of-way.

Discussion of Alternatives

If cost were no object and if individual businesses were not adversely affected, the parallel service drive scheme would be ideal. Were it not for the perceived difficulty of effecting left turns from River Road to gain access to individual properties, the six lane with a raised median would provide the best level of traffic service. At the opposite end of the spectrum, making no change would continue the travel delays and inconveniences experienced during the peak hours.

The easiest and least expensive improvement to achieve is the restriping plan recommended by the State several years ago; however, the the narrow lane widths and the lack of increased in-bound capacity are drawbacks. Alternative 3A (restriping mid-block to six lanes and flaring the intersections) appears to offer the greatest benefit in terms of improving traffic service with minimal public expenditure. Left turns from each of the middle lanes would be allowed, but with some interruption to traffic. The businessmen located on River Road prefer the present arrangement in which left turns take place from a 16-foot protected lane. Their position is supported by representatives of the nearby residential communities.

In considering each of the schemes, the greatest relief to traffic congestion will result from improvement to the intersections. Freer movement of traffic through the intersections will also result in improvement to the air quality. Some additional capacity would result from the creation of six moving lanes in Alternate 3A, but the benefits would be somewhat offset by the frequent occurrence of mid-block left-turn maneuvers. The benefits of Alternative 4 to the local business establishments must be weighed against any additional convenience to commuter traffic. The State Highway Administration,

which is the agency responsible for constructing improvements on River Road, may implement any of the above alternatives or other modifications based upon available and relevant data.

Representatives from the State Highway Administration met with local citizens during formulation of this Plan. The highway officials have agreed to undertake a study of possible intersection improvements, including means for improving pedestrian safety near the Kenwood Condominium. While it is normally the State's responsibility for constructing improvements on River Road, options should be provided for developers to participate in making such improvements.

B&O Railroad Roadways

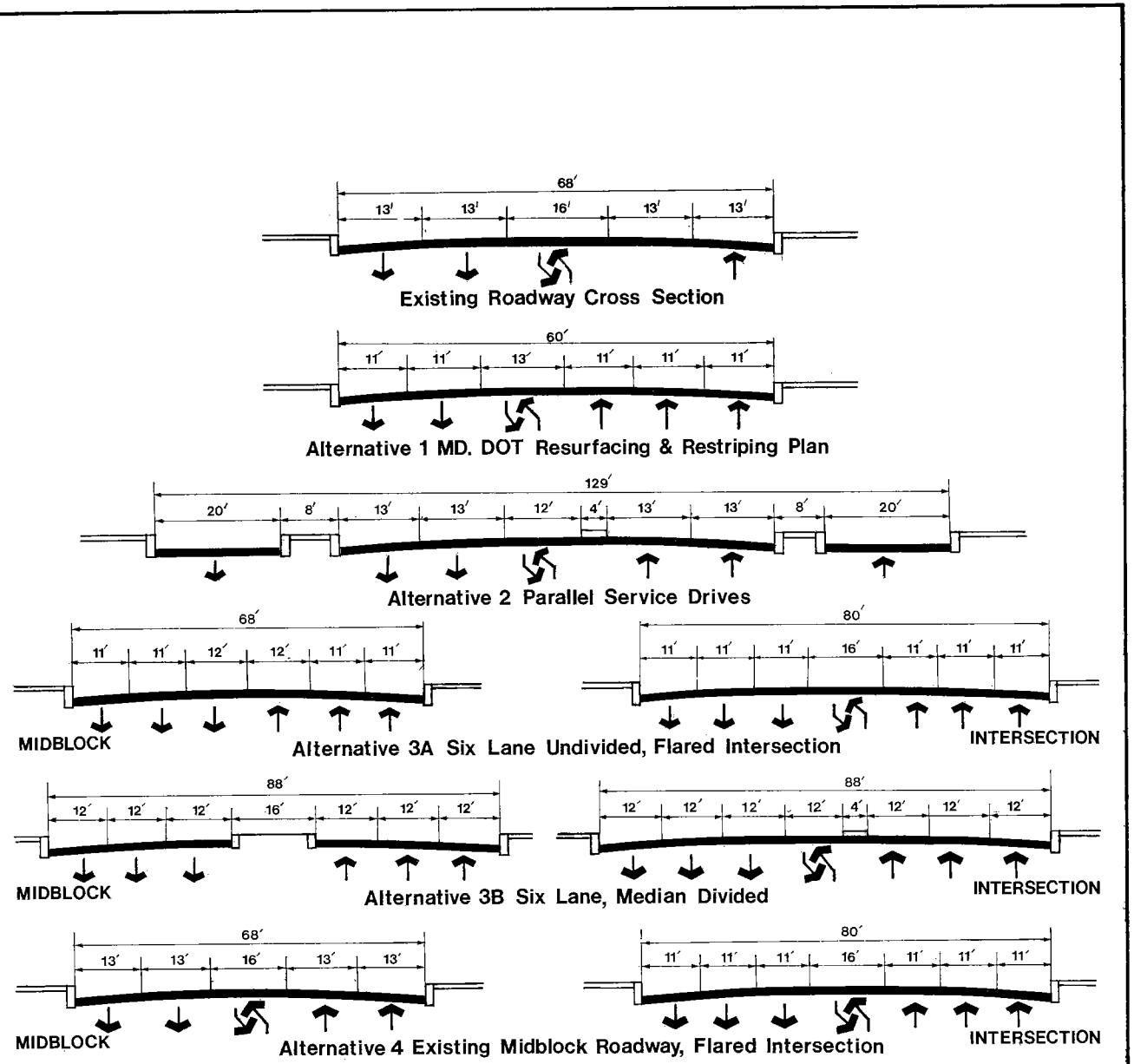
Certain of the interior industrial properties north and south of River Road have difficulty gaining access to River Road due to the lack of adequate interior streets. Access to such parcels is currently provided by means of poorly constructed and maintained driveways, access roads and reciprocal easements over or alongside the B&O Railroad right-of-way. In recent years, the B&O Railroad seriously considered discontinuing the service on this branch. However, the rail line is vital for delivery of chemical supplies to the Federal Water Treatment plant at Dalecarlia as well as bringing in coal for the GSA power plant. Therefore, the Railroad reports that it will continue the line in service indefinitely; this intention is reinforced by their continuing to make roadbed improvements.

Even though the rail line will continue in service, generally no more than one train a day can be expected in each direction. An opportunity exists for the re-use of this right-of-way as a minor industrial roadway to provide enhanced access to the land-locked properties. It is proposed that such a roadway be developed if an agreement can be made with the railroad. Failing an agreement for an adequate right-of-way from the railroad, it may be possible to obtain sufficient rights-of-way from adjoining private properties. The roadway should be limited to serve only the industrially developed properties and not interconnect with existing streets to the north or south.

The County Department of Transportation recommends that the industrial roadway be located alongside, but not within, the railroad right-of-way in order not to inhibit the development of a light rail (streetcar) route in place of the railroad. Studies by the Planning Board staff indicate that such a transit line would not be justified in the forseeable future because of low ridership projections. Also, the B&O Railroad advises that it will continue to improve the roadbed and has no intention of abandoning the service.

From an analysis of the JCWP data, it has been determined that 40-45 percent of the left turn movements that now occur on River Road would use the new intersection created by this roadway. This represents a fairly substantial consolidation of what are currently haphazard and dangerous turning movements.

With this proposed roadway located in or adjacent to the right-of-way of the B&O Railroad, additional elements of a circulation system could be developed which would tend to reduce further the left turn movements along River Road. Specifically, long-range plans would show the ultimate connection of the south and north segments of such new roadway with Butler Road and Landy Lane respectively, thus providing efficient circulation systems in the northeast and southeast quadrants. Although topography, existing development, and current community and property owner sentiments preclude the immediate development of these connections, they could be considered if and when redevelopment occurs in these areas.



ALTERNATIVE PROPOSALS FOR RIVER ROAD

Figure 17

WESTBARD SECTOR PLAN

Montgomery County, Maryland

September 1982

TABLE IV

RIVER ROAD TRIP DIVERSIONS - 1976

Location No.	Name	Total Trips 5-6 PM	Diverted Trips		Generated Trips
1	Central Bank	12	7	60%	5
2	Kenwood Professional Building	19	0	0%	19
3	American Plant Food	8	2	25%	6
22	River Road Bowl	105	53	50%	52
4	Jack's Roofing	5	1	20%	4
5	Talberts	173	104	60%	69
21	Mobil	152	91	60%	61
6	Roy Rogers	222	133	60%	89
20	Access Road	33	0	0%	33
7	Access Road	108	0	0%	108
19	Landy Lane	208	0	0%	208
18	Texaco	42	25	60%	17
17	Exxon	87	52	60%	35
8	Security Storage	8	0	0%	8
16	Dorsey Lane	91	0	0%	91
15	Clipper Lane	14	0	0%	14
9	7/11	106	64	60%	42
10	Shell	72	43	60%	29
14	Kenwood Apartment	73	0	0%	73
11	Butler Road	110	0	0%	110
12	Amoco	41	25	60%	16
13	Mario's	31	19	60%	12
Total		1,720	619	36%	1,101

The following table of PM peak hour trip generation rates are judged to be representative of the expected pattern for new trips that might be generated in the Westbard area after Metro is operating and the augmented bus service becomes available. The application of these generation rates to existing and proposed land development is shown on a separate study Westbard Development Analysis issued in April 1982.

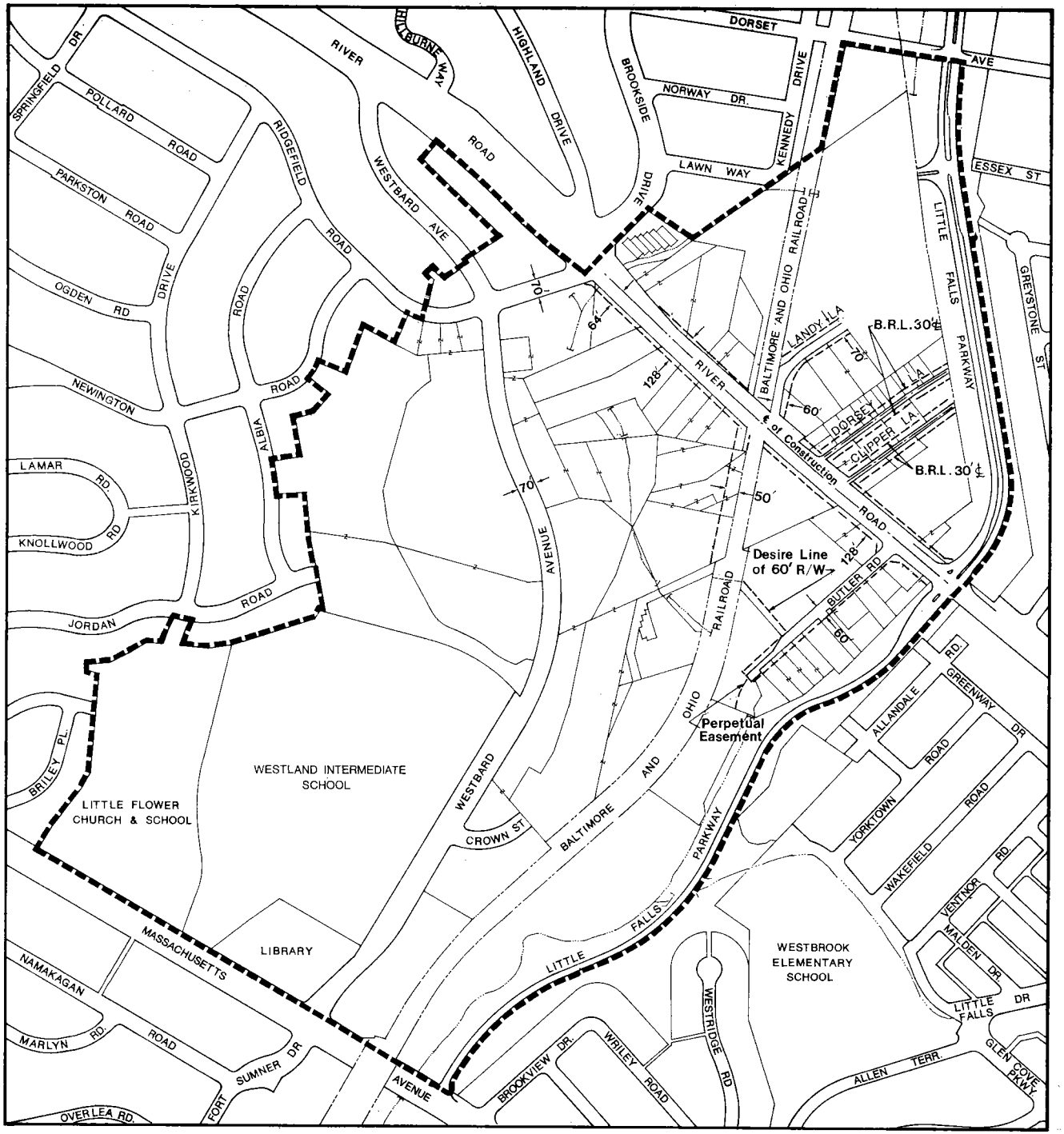
TABLE V

TRIP GENERATION RATES (PM PEAK HOUR)

Type of Development	Vehicle Trip Rate	Directional Split In (%)	Directional Split Out (%)
Residential			
High-rise apartments	0.52 vph/du	75	25
Garden apartments	0.56 vph/du	70	30
Townhouses	0.56 vph/du	65	35
Single-family detached	0.80 vph/du	60	40
Office			
General Office	2.0 vph/1000 sq.ft.	15	85
Institutional office	2.0 vph/1000 sq.ft.	15	85
Retail			
Commercial	2.5 to 3.9 vph/1000 sq.ft.	50	50
Hotel/Motel	0.5 to 3.9 vph/1000 sq.ft.	60	40
Industrial			
Light industrial	1.0 vph/1000 sq.ft.	40	60
Office/laboratory	1.5 vph/1000 sq.ft.	15	85
Auto sales	0.8 vph/1000 sq.ft.	33	67
Heavy industrial	0.19 vph/1000 sq.ft.	40	60

du = dwelling unit
vph = vehicles per hour

Source: Other sector plans in Montgomery County, Institute of Traffic Engineers publications and traffic consultant studies for private developments in the area.



STREET & HIGHWAY PLAN

- Section Plan Boundary
- Existing Right-of-Way
- Proposed Right-of-Way
- B.R.L. Building Restriction Line

Figure 18

WESTBARD SECTOR PLAN

Montgomery County, Maryland

0 150 300 600 900 F

0 45 90 180 270 M

September 1982