Complete Streets Policy – Appendices

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Appendix A:

Guidelines for Neighborhood Traffic Management

GUIDELINES FOR NEIGHBORHOOD TRAFFIC MANAGEMENT

City of Rockville
Department of Public Works
Traffic and Transportation Division

October 2002

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Introduction

"Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users."[1]

"Traffic calming involves changes in street alignment, installation of barriers, and other physical measures to reduce traffic speeds, and/or cut-through volumes, in the interest of street safety, livability, and other public purposes."[2]

Rockville has long been committed to the goal of maintaining livable residential neighborhoods. A major threat to that quality of life has been excessive speeds on residential streets creating an unsafe environment in Rockville neighborhoods, and excessive vehicular traffic, especially where neither the origin nor destination of traffic lie within the neighborhood. The transportation chapter of the City of Rockville's Master Plan outlines policies and recommendations for transportation in Rockville including: **Respect and protect neighborhoods especially from the impacts of regional traffic,** and, **minimize non-local traffic in neighborhoods.** These Guidelines for Neighborhood Traffic Management address this policy as outlined in the Master Plan.

Excessive traffic volume on residential streets is undesirable for several reasons. It is a danger to life, limb, and property. Excessive volume contributes to increased noise, vibration, air pollution, and visual intrusion. Additional traffic loads also hasten the deterioration of the streets themselves. There are several causes of increased volumes of non-neighborhood traffic using residential neighborhood streets, among them are congestion and delay on nearby arterial streets, commercial development in areas adjacent to neighborhoods, and residential street patterns that become convenient routes for through traffic.

To counter the effects of non-neighborhood traffic and excessive speeding, the Traffic and Transportation Division has developed strategies to divert or otherwise alter traffic flow through neighborhoods, as well as strategies to calm traffic and reduce speeds. Remedial measures to reduce traffic volume and speeds have proven to be generally successful, both in Rockville and in many other communities. Effective plans to control neighborhood traffic can create a safer, more pleasant residential environment. An added benefit of diversion techniques is that they reduce incidents of speeding at a proportion equal to or greater than the percentage reduction in traffic volumes.

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[1] Lockwood, I.M., "ITE Traffic Calming Definition," *ITE Journal*, Vol.67 (Washington, D.C.: Institute of Transportation Engineers, July 1997), pp. 22-24.

[2] Ewing, Reid, "Overview: Legal Aspects of Traffic Calming," Compendium of Reference Papers, 1998 ITE Annual Conference (Washington, D.C.: Institute of Transportation Engineers, 1998)

Streets in Rockville are classified as in the table below. Each classification of street serves a different function, and is therefore treated differently with regard to neighborhood traffic calming.

The maximum volume threshold for each neighborhood street classification is defined in the City's Master Plan. Neighborhood streets with volumes exceeding these thresholds are considered to have a volume problem.

Street Classification

Rockville Classification (Standard Term)	**Description**	**Typical Volumes**
Limited Access (Freeway)	Carries through traffic. Lanes are divided by a median. Access points are very limited.	50,000 to 250,000 vehicles per day
Major (Major Arterial)	Carries through traffic. Lanes are divided by a median. Access points are generally limited.	Greater than 25,000 vehicles per day
Arterial (Minor Arterial)	Carries through traffic. Design is more limited than on major streets. Access is less limited.	10,000 to 30,000 vehicles per day
Primary Residential – Class I (Major Collector)	Distributes traffic between neighborhoods and arterial streets. Typically has two traffic lanes.	Class I – In excess of 5,000 vehicles per day
Primary Residential- Class II (Minor Collector)	Distributes traffic between neighborhoods and arterial streets. Typically has two traffic lanes.	Class II – Less than 5,000 vehicles per day
Secondary Residential (Access)	Provides local access to residential properties. All non-primary streets are classified as secondary.	Up to 2,000 vehicles per day
Business District (Major/Minor Collector)	Serves adjacent business land use. Typically has four undivided traffic lanes.	5,000 to 20,000 vehicles per day
Primary Industrial (Major Collector)	Serves adjacent industrial and office land uses. Typically has four undivided traffic lanes.	5,000 to 20,000 vehicles per day
Secondary Industrial (Minor Collector)	Serves adjacent industrial and office land uses. Typically has two undivided traffic lanes.	Up to 2,000 vehicles per day

Scope of Guidelines and Relation to Other Policies

The purpose of these guidelines is to provide a uniform policy for implementing neighborhood traffic management plans in the City of Rockville. The scope of these guidelines is generally limited to the application of controls that divert non-neighborhood traffic around or past residential neighborhoods and devices used to calm traffic speeds on residential streets. The guidelines employ many of the concepts included in the neighborhood traffic policies of other local governments.

The primary source of the City's traffic control policies is the Manual on Uniform Traffic Control Devices (MUTCD), and engineering practices as outlined by the Institute of Transportation Engineers (ITE), the national standard for determining the selection and use of various traffic controls. Federal and State law requires City compliance with the mandatory aspects of the MUTCD, and the Manual's advisory aspects were adopted as City policy in 1989 in Mayor and Council Resolution 3-89. This resolution allows some flexibility in modifying the MUTCD's advisory standards, but is not intended to allow individual exceptions to these standards.

The MUTCD is silent on the subject of diversionary traffic controls to protect neighborhoods, and hence the need for these guidelines. The policies contained herein therefore supplement the MUTCD standards and replace traffic control policies previously established by the City (1991 Neighborhood Traffic Management Policy and Speed Hump Policy).

Available neighborhood traffic management strategies fall into two major categories:

1) Passive Controls (signs)

   a. Turn prohibitions (peak hour, daytime, 24 hour)
   b. Entry prohibitions (peak hour, daytime, 24 hour)
   c. One-way streets (24 hour only)
   d. Doubling fines (in school zones)
   e. Variable speed sign
   f. Warning signs

2) Physical Controls

   a. Diagonal diverters - barriers placed diagonally across a (4-way) intersection to prevent through movements and force turns
   b. Semi-diverters - barriers placed at one corner of an intersection to create a one-way entrance or exit. These can be used to augment entry prohibitions (i.e., DO NOT ENTER) or one-way streets
   c. Other intersection channelization - right turn only "plugs", median closures, "pork chops", etc. that discourage particular turning movements
   d. Traffic Circles

e. Speed Humps/Raised Crosswalks
f. Chicanes - “bump-out” of the curb that narrows the road, forcing cars to slow down
g. Road Narrowings/Chokers, Intersection Narrowings
h. Additional controls focusing on reducing vehicle speeds, in contrast to controls that address traffic volume

Physical controls are generally capital in nature, and are included in the Neighborhood Traffic Control Capital Improvements Program approved by the Mayor and Council. Projects that are large in nature and cost may require specific funding and approval by the Mayor and Council. Approval of funding, establishment of priority, and the design and construction of physical controls may involve considerable time in implementation, but ensures the best use of city funds.

Because these guidelines supplement other established policies, it follows that certain neighborhood traffic control elements are beyond the scope of this document. For example, the use of devices such as STOP signs and traffic signals are subject to MUTCD standards. Many other traffic controls typically used in neighborhoods, such as speed limit signs, are also the subject of existing standards beyond the scope of these guidelines.

Full street closures and/or abandonments require a special hearing process, including review by the Planning Commission and final approval by the Mayor and Council. This process is described in Chapter 21 of the Rockville City Code.

With the exception of abandonments, policies for traffic control on all city streets are administered by the Traffic and Transportation Division of the Department of Public Works. The Division is headed by the City's Chief of Traffic and Transportation, with general oversight from the Director of Public Works. Final authority for all traffic regulations on city streets, including those proposed under these guidelines, rests with the City Manager (Section 23-3, Rockville City Code). In addition, any traffic project requiring capital expenditure must be approved by the Mayor and Council. The City's Traffic and Transportation Commission develops and recommends traffic policies and standards for approval by the Mayor and Council, and for use by the Traffic and Transportation Division.

Eligibility for Traffic Diversion Plans

A particular street or group of streets can be considered for ***a traffic diversion plan*** when any of the minimum requirements contained in **Table A** are met. Only primary class II and secondary residential streets are eligible (a listing of these streets is available from the Traffic and Transportation Division).

TABLE A

Eligibility Criteria for Residential Traffic Diversion Plans

For secondary residential streets, any one of the following:

A minimum of:
a. 2,000 vehicles per day in both directions, or
b. 200 vehicles in any hour in both directions, or
c. 150 vehicles in any hour in one direction

For primary residential class II streets, any one of the following:

A minimum of:
a. 5,000 vehicles per day in both directions, or,
b. 500 vehicles in any hour in both directions, or,
c. 375 vehicles in any hour in one direction

Streets are ineligible for traffic diversion plans if:

a. Street is classified other than primary residential class II or secondary residential, including arterial streets passing through residential areas
b. Part of the residential street provides the primary access to commercial properties and alternate access is inadequate or infeasible
c. Street where a traffic diversion plan is already in effect
d. Street precluded by Master Plan, or other overriding City policy
e. Request for traffic diversion plan submitted within the last three years and did not meet City criteria or final plans were denied for implementation

Eligibility for Speed Control Plans

A particular residential street may be considered for ***speed-oriented controls*** if the requirements in **Table B** are met.

TABLE B

Eligibility Criteria for Residential Speed Control Plans

Streets will be considered for speed control only after passive controls or directed enforcement have been applied. Assuming that all other reasonable speed control strategies have been considered or exhausted, streets are eligible for physical speed control if the requirements below are met.

For secondary residential streets:

a. A minimum of 500 vehicles per day
b. 85th percentile speed exceeding the speed limit by 7 mph
c. Minimum segment length of 600 feet

For primary residential class II streets:

a. A minimum of 1,500 vehicles per day
b. 85th percentile speed exceeding the speed limit by 9 mph
c. Minimum segment length of 600 feet

For primary residential class I streets:

a. A minimum of 2000 vehicles per day
b. 85th percentile speed exceed the speed limit by 14 mph
c. Minimum segment length of 600'

Streets are ineligible for speed control devices if:

a. Street is classified other than primary or secondary residential, including arterial streets passing through residential areas
b. Street has a posted speed limit of less than 25 mph.
c. The street is used as a routine emergency service route or a major public transit route
d. The street is scheduled for resurfacing within the next two budget years. If all other criteria are met, street would immediately become eligible for speed control devices following the completion of resurfacing
e. Excessive traffic volume would be diverted to other residential streets
f. Request for speed control plan submitted within the last three years and did not meet City criteria or final plans were denied for implementation

Other considerations to be taken into account by the Traffic and Transportation Division include:

a. Curbs and gutters
b. Grade
c. Curvature of street
d. School bus route/transit routes
e. Adjacent arterials
f. Previous traffic engineering
g. Residences fronting on street
h. On-street parking
i. Sight distances
j. Safety considerations

Priority for Speed Control

Because funding for speed control devices is limited by an annual capital budget, it may not be possible for the City to construct all eligible projects. Candidate speed control projects must have their eligibility established by May 1 of each year for consideration in the annual program. In order for City staff to establish eligibility, formal citizen requests must be received by April 1. Requests received after April 1 will be considered for the following fiscal year. The City will rank eligible projects by descending order of the recorded 85th percentile speed, adjusted by adding the following factors:

Secondary residential streets:

$$\frac{V - 500}{100}$$ where V is the recorded average daily weekday traffic

Primary residential streets:

$$\frac{V - 1500}{100}$$ where V is the recorded average daily weekday traffic

[The adjustments above recognize higher traffic volumes as a secondary factor in determining project priority.]

The highest-ranking projects, up to the annual funding limit, will be funded during the budget year beginning July 1. Projects that were ranked as eligible for a fiscal year but not completed will remain at the top of the list for the next fiscal year. Staff may recommend priority adjustment to the Mayor and Council in order to move up new projects based on the severity of the problem. A project may be a candidate for no more than three years before its eligibility must be re-established. The City reserves the right to modify priorities

on the basis of factors such as the lack of pedestrian facilities or the presence of irresolvable visibility restrictions.

Should a request for a ranked project fail or, if agreement among City, local representatives, and neighborhood association (as appropriate) cannot be achieved, then the project will be dropped from the program and replaced by the next highest ranking project on the eligibility list. A project that fails for any reason may not re-apply for three years.

Implementation for Traffic Diversion Plans and Speed Control Plans

a) Request

A preliminary request containing signatures from at least ten households or 50% of the residences on the street, whichever is less, shall be required for the City to begin consideration of a traffic diversion or speed control plan. The City's Chief of Traffic and Transportation will acknowledge all requests in writing and will indicate the further eligibility of the street(s) under discussion.

The local civic association or citizen making the initial contact/request to the City, will serve as the point of contact for correspondence between the residents and City staff. For proposals having a major impact on area traffic patterns, the City Manager may also direct the participation of the City's Neighborhood Coordinators.

b) Traffic Studies

City staff will consult with other City departments to determine the affected area of the project. The Traffic and Transportation Division will define the affected area, and conduct studies including traffic volume counts and speed data collection on residential streets as needed. If eligibility criteria are satisfied for traffic diversion or speed control, the Traffic and Transportation Division may proceed with development of a preliminary concept plan. This development shall be performed in consultation with the applicant group's representatives and, where appropriate, the neighborhood civic association. Residents will be notified if the project does not meet the City criteria for traffic calming.

c) Concept

The Traffic and Transportation Division will develop a concept plan for neighborhood traffic calming to best fit the specific needs of the street and the surrounding neighborhood based on the data collected and considering other factors including:

- Curbs and gutters
- Grade
- Curvature of street
- School bus route/transit routes
- Adjacent arterials
- Previous traffic engineering

- Impacts to emergency services
- Residences fronting on street
- Sight distances
- Safety considerations

The Traffic and Transportation Division will also solicit input from area Fire and Rescue Services for proposed projects.

d) Impact of Traffic Diversion Plan or Speed Control Plan on Adjacent Streets
The Traffic and Transportation Division will take a comprehensive approach to the proposed project to determine the potential impacts of the proposed traffic calming plan upon streets adjacent to the neighborhood. The Traffic and Transportation Division will develop a comprehensive plan to address the needs of the entire affected area (as defined in step b). The Division may chose to incorporate additional elements to the plan if it is found that the plan will have an adverse affect on adjacent streets and neighborhoods.

If the diversion plan would require the installation of controls on State or County highways, the Traffic and Transportation Division will solicit the views of the State Highway Administration (SHA) and/or Montgomery County at this stage.

e) Public Process
The purpose of the public process described below is to get citizen feedback on a particular diversion or speed control plan at the concept plan stage. The outcome of the public process in no way obligates the City to proceed with, or discard the plan in question. It should be recognized that final authority for all traffic controls on City streets rests with the City Manager, and that the public process is therefore advisory to that authority.

The City shall select one of the following methods for soliciting public comment:

1. An informational notice outlining the traffic diversion or speed control concept plan shall be mailed by the City to all households within the affected area as defined in step b), soliciting input and requesting comments from residents. City staff and the City Manager will consider citizen comments before making a final decision on the traffic diversion or speed control plan.

2. A Public Meeting to solicit public opinion and comments on the traffic diversion or speed control plan.

Under both methods, notice shall be given to the neighborhood civic association, and the City Manager may consider comments from the association and any other interested parties before taking final action on the plan. All comments and opinions expressed during the public process will be considered advisory and final decisions will be made by

the City Manager. From the date that the public is notified of a final design, the official record will remain open for not less than 14 days and not to exceed 30 days.

For primary residential streets, a public meeting will generally be required to solicit public opinion and comment for a traffic diversion or speed control plan. Notice shall be provided to the local civic association, and any input from that group will be weighted in the City's determination as to whether to proceed with a particular traffic diversion or speed control plan. Notice shall also be given to adjacent civic associations, and the City Manager may consider comments from these associations and all other interested parties before taking final action on the plan. Wherever possible, the City encourages residents to discuss their concerns with their local civic association and have the association act as a point of contact.

f) Report

The Traffic and Transportation Division shall submit a report to the City Manager and the applicant group, and neighborhood civic association, where appropriate, summarizing the analysis and conclusions of steps b) through e) above.

g) Final Approval and Implementation

Following approval of the concept plan by the City Manager, the Mayor and Council shall be informed of the analysis and conclusions of the traffic management plan and the scope of the project. Staff will determine the budget and funding source for the project, either an existing CIP or a new CIP will be created to fund the project.

At the City Manager's direction, the Traffic Engineer shall prepare the necessary legal documentation ("Traffic Order") for approval. Plans controlling traffic movements to and from State or County highways also require approval from the State Highway Administration (SHA) and/or Montgomery County. Should the City Manager and SHA or Montgomery County (if applicable) approve, and if no capital authorization is involved, the Traffic and Transportation Division shall implement the plan.

If capital funding is required, implementation shall follow the Mayor and Council's authorization schedule, allowing time for engineering design as needed. SHA approval is also required where appropriate.

h) Revisions to Implemented Plans

An approved and installed traffic management plan may be considered for modification at the request of the affected residents, the neighborhood civic association, or as directed by the City Manager. Decisions on modifications shall be made in accordance with the implementation process outlined above. To prevent excessive use of its resources, however, removal or major modification of a diversion plan within two years of original implementation will be strongly discouraged by the City.

Appendix B:

Pedestrian Policies

City of Rockville

Pedestrian Policies

CITY OF ROCKVILLE PEDESTRIAN POLICIES

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PURPOSE AND BACKGROUND

A community is characterized by its attitude toward pedestrians. To many, the term "pedestrian-friendly" suggests neighborliness, a variety of transportation options, and certain levels of convenience, comfort and safety. In other words, the community's accommodation of pedestrians is a reflection of its quality of life. Even with the best of attractions to offer its citizens, a community is incomplete unless one can walk to those attractions.

Nearly everyone is a pedestrian. Even for automobile and transit users, walking is a part of travel to the workplace and the market. For some, walking is a legitimate option for the entire commuting or shopping trip, reducing automobile trip generation. Increasing pedestrian options can therefore be a part of traffic demand management. Above the subsistence level, the purposes of walking can include attending community and social functions, visiting neighbors, and simple leisure-time pleasure. In a well-balanced community, the pursuit of these endeavors is not constrained by a lack of safe pedestrian facilities, or limited to those having access to the automobile. The lack of such constraints maximizes freedom of action for groups such as children, the elderly, those with disabilities, and transit users.

Walking is not just a means of travel between an origin and a destination, but it is also healthy exercise, along with related activities like jogging. Health issues will become more significant as the general population ages, and walking has been identified as being beneficial to the maintenance of health and in the prevention and treatment of certain illnesses. From a health standpoint alone, public support for pedestrian facilities can and should be encouraged.

It cannot be said that Rockville has always been pedestrian-friendly. The City's formative years in the 1950's and 60's were spent as an automobile-oriented commuter suburb. Consistent with that "suburban" background, the attention given in those decades to pedestrian mobility was slight. With the 1970's, two energy crises and a new environmental sensitivity began to change the picture. The City's mix of employment and residents became more balanced, and the City began to focus on transportation alternatives other than the automobile. The City has since developed a greater awareness of the need to provide for pedestrian mobility-- new laws have been enacted, new standards have been set, and millions of dollars have been spent in expanding, improving, and maintaining pedestrian facilities.

The physical and policy barriers created in earlier years, however, have slowed progress and/or led to the use of compromise solutions. There has been a coincident lack of cohesion in the City's overall efforts, primarily because pedestrian considerations have so often been handled as an adjunct to some "greater" effort. Pedestrian planning and design need to be regarded more comprehensively, and their intentions accorded greater weight in the choice among competing public objectives. The Mayor and Council have recognized these needs and have directed that they be addressed through the development of a unified pedestrian policy.

SCOPE

The "unified" policy proposed herein is composed of a series of individual policy statements. Intended to be a "living" document, it is subject to change as policies are formulated, amended, or deleted. The policy statements are written mainly from the viewpoint of what the citizen can expect from the City. Each policy statement has been assigned to one of nine topical areas, with each topic introduced by a brief section of background commentary. Most of the material contained herein is not new; rather it is largely a codification of existing policies.

One of the chief criteria in the development of these policies is consistency with established City goals. These goals have been derived from the 2002 Comprehensive Master Plan, the Mayor and Council's Vision of Rockville in 2020, and the 2004 Bikeway Master Plan. The Pedestrian Policies is a formal statement of principles to guide decisions and achieve safer outcomes for pedestrians. Sources of specific legal requirements are provided in legal documents such as the Rockville City Code and Maryland Vehicle Law.

DEFINITIONS

In this document, the words "shall," "should," and "may" imply a specific level of application for individual policies. These words are defined as follows:

SHALL - A mandatory condition. Policies so described are required to be carried out on an ongoing basis or brought to completion as soon as possible.

SHOULD - An advisory condition, typically in the pursuit of longer-term goals and frequently in recognition of restraints or other public objectives.

MAY - A permissive condition typically associated with applications that are desirable or useful in certain situations.

Wherever the word "walk" is used as a verb in this document, it is intended to refer to the movement of all those who use pedestrian facilities.

1. SIDEWALKS

Sidewalks parallel to public streets are central to any system of urban pedestrian access. The City's Subdivision Regulations (Chapter 25, Rockville City Code) and Street Construction Standards (Chapter 21, Rockville City Code) provide the legal basis for Rockville's sidewalk system. These laws require that sidewalks be constructed on both sides of the street in most new subdivisions with specific requirements for sidewalks as prescribed by the Mayor and Council. The City also installs sidewalks on its own roadway projects. On arterial streets like Wootton Parkway, practice has been to provide an extra-wide sidewalk/bike path combination on at least one side of the street.

In general, the State Highway Administration (SHA) does not provide for sidewalks, thus installation adjacent to State highways in Rockville is almost always the responsibility of the City. Since the mid-1980's, the SHA has been installing some sidewalks in conjunction with new roadway construction, but, similar to other sidewalks along State highways, maintenance remains a City responsibility.

Some streets in Rockville remain without sidewalks, particularly in older neighborhoods. Construction in these areas is made more difficult by such factors as insufficient right-of-way, poorly defined road edge, adverse grading, or private landscaping within the right-of-way. Projects can also be hampered by a lack of support from owners of properties directly adjacent to the proposed sidewalk.

Because of the large amount of missing sidewalks in the City and the costs associated with constructing sidewalks, the City has created a Sidewalk Prioritization Policy. The Rockville Sidewalk Prioritization Policy helps determine in what order the City should construct sidewalks, which is a helpful tool for including sidewalks in the Citywide Capital Improvements Program. The order, or prioritization, will be based on the total score; the sum of the utility score, a measure of predicted pedestrian trips and the traffic conditions score, a measure of the safety risks as a result of the missing sidewalk.

Sidewalks will be grouped into one of five groups, A through E, with A being the highest range of scores and E being the lowest range of scores. In addition to the missing link's total score, information about available City right-of-way, public support for the construction of the sidewalk, and the potential environmental impacts of constructing the sidewalk will be taken into consideration when determining the timeline for planning, design, and construction of the sidewalk.

As important as the expansion of the sidewalk system is the quality of maintenance for existing sidewalks. Repair or replacement of sidewalks is accomplished both by City forces and by private enterprise under annual City contract. For example, in 2008 the City committed approximately $400,000 to sidewalk repair.

A. Sidewalk Construction – General

The Rockville Sidewalk Prioritization Policy will provide primary guidance for the order in which sidewalks are constructed.

1. All sidewalks shall be a minimum of 4 feet in width, but a 5-foot wide sidewalk is preferred. To comply with SHA policies, all sidewalks adjacent to state roadways or sidewalks funded through state grants shall be a minimum of 5 feet in width. An 8-foot width is preferred in non-residential streets wherever feasible. Concrete is to be preferred in residential and business areas generally, with brick being reserved for use in areas of institutional or historical significance. Asphalt should be limited to use in combined pedestrian/bicycle facilities and for sidewalks of a temporary nature. Asphalt may also be used in place of concrete for pedestrian pathways not

adjacent to public streets (see Section 2, Pedestrian Paths) Pervious concrete should also be considered.

2. Sidewalks should be separated from the adjacent roadway by a buffer strip at least three (3) feet wide. This is especially important along high-speed, high-volume streets on which vehicle travel occurs adjacent to the curb. Separation can take the form of a grass strip, a protective berm, or a wider sidewalk section that effectively provides a buffer while also supporting traffic control devices, street lighting, and landscaping. Every feasible effort shall be made to ensure that the buffer strip design is sufficient to prevent snow plowed from the street from being placed on the sidewalk.

3. In both new and existing developments, raised pedestrian refuge areas may be provided at intersections and other street crossing points. These refuges can take the form of islands or peninsular curb extensions ("chokers"). In coordination with sidewalks, chokers are to be particularly encouraged at intersections where both vehicle and pedestrian movements are heavy and where on-street parking may be desirable. Such refuges shall be considered in accordance with supplemental warrants to be adopted by the City. Island refuges are especially encouraged in the vicinity of bus stops.

B. New Development and Road Construction

1. In new subdivisions, sidewalks shall be constructed on both sides of each street.

2. In the Town Center, sidewalks shall be provided on both sides of each street, and shall be constructed in compliance with the design criteria contained in the Town Center Urban Design Plan.

3. In conjunction with new roadway construction or major reconstruction, the City should construct sidewalks on both sides of the street.

4. Parallel to arterial streets and in other locations listed in the City's Bikeway Master Plan, the City may provide a wider hard-surface pathway to accommodate bicycles as well as pedestrians. The width of such facilities shall be at least eight (8) feet, and preferably ten (10) feet.

5. In reviewing plans for construction or reconstruction of State highways, the City should encourage the construction and/or improvement of sidewalks and other pedestrian amenities by the State, consistent with these policies.

6. The appropriate standards of the Rockville Pike Plan and the Town Center Urban Design Plan shall be followed in the sizing and buffering of sidewalks. Protective berms are to be especially encouraged as sidewalk buffers along Rockville Pike and Hungerford Drive, Rockville's busiest and most hazardous streets.

C. Existing Streets and Establishing Connectivity between Separated Neighborhoods

1. The City shall actively pursue the installation of sidewalks along existing streets without sidewalks, following the prioritization established by the City's Sidewalk Prioritization Method.

2. The SHA should be encouraged to increase its participation in the funding and construction of sidewalks within the City. In the absence of State participation, the City shall construct (or have developers construct) and maintain sidewalks along State highways.

3. New sidewalks on existing streets may be constructed at public expense on the basis of established priorities and available funding. Private funding opportunities should also be sought, especially for locations adjacent to undeveloped properties, for special-purpose projects, and to accelerate projects with low public priority. Adjacent property owners should be assessed for their specific design requests that exceed normal sidewalk standards.

4. The City shall identify impediments, obstacles, and unsafe conditions that impede connectivity between neighborhoods, activity centers, and transportation facilities, including parks, playgrounds, and bus stops, and shall consider appropriate improvements to sidewalks, lighting, signage, crosswalks, and other systems that enhance pedestrian mobility and safety. The City shall work with other governments and jurisdictions to improve pedestrian connectivity from Rockville to adjacent areas, especially as a part of overall traffic mitigation efforts and in conjunction with developments in Transit-Oriented Areas (TOAs). TOAs are areas where viable non-auto options exist and include areas within 7/10^{ths} of a mile accessible walking distance from existing and programmed Metro stations and fixed-guideway transit stations on dedicated transit rights-of-way and may also include major access routes to these areas.

D. Reconstruction, Repair, and Maintenance

1. Reconstruction and repair of all public sidewalks may be accomplished at the City's expense, with the exception of the few segments of sidewalk owned and maintained by the SHA. The cycle of reconstruction and the need for repairs shall be determined by the Department of Public Works.

2. The City shall identify and take action to relocate or remove obstructions to sidewalk accessibility, including but not limited to utility poles, fire hydrants, newspaper vending machines, mailboxes, and overhanging tree branches. Standards for accessibility shall be in accordance with the Americans with Disabilities Act (ADA).

3. Owners of abutting properties shall be responsible for snow removal, grass strip cutting, weed control and other sidewalk maintenance of a less capital-intensive nature. For "reverse frontage" situations, where the sidewalk is generally inaccessible from the adjacent property, the City may provide maintenance when and where resources permit. All sidewalks fronting City owned properties shall be maintained by the City.

2. PEDESTRIAN PATHS

Pedestrian paths refer to all public pedestrian facilities other than sidewalks. Examples include public pathways within exclusive rights-of-way or easements, vehicle-free pedestrian zones, and pedestrian grade separations. The category could also be extended to include pathways through parks or other public properties that serve as through pedestrian and bicycle routes.

1. In the design of subdivisions, and major commercial developments, public easements and pathways shall be encouraged through and between properties to shorten walking paths for pedestrians generated within the site, as well as for those desiring to pass through the site. The need to provide convenient pedestrian access should be balanced against the occasional "nuisance value" of these pathways to the particular site.

2. Pathways shall be hard-surfaced, paved in either concrete or asphalt. The latter material is preferred if joint use with bicycle traffic is intended. Brick or other hard-surface treatment may be used to maintain aesthetic compatibility with the developed site.

3. Where pedestrian paths traverse private property, the owners should be encouraged to provide amenities such as lighting and landscaping that enhance the safety, utility, and attractiveness of these walkways.

4. Further opportunities to provide vehicle-free zones should be explored, particularly within the Town Center.

5. Further opportunities to provide bridges and underpasses for pedestrians should be explored and should be identified both in the Master Plan and in major development proposals.

6. Within the Town Center, design and operational features favoring safe and convenient pedestrian travel at street level shall be encouraged. Complementary grade-separated facilities, however, should be considered to eliminate conflicts for pedestrians crossing major roadways such as Hungerford Drive (MD Route 355).

7. Walking surfaces of pedestrian grade separations should be slip-resistant, and should continue to exhibit adequate friction characteristics when wet.

8. Commercial buildings shall be connected to public sidewalks through pedestrian paths.

3. ACCESSIBILITY

A long-standing City objective has been to make all street crossings accessible to those with disabilities. This is accomplished by providing curb ramps at street corners and other designated crossing points. A secondary rationale for providing curb ramps is improving accessibility and safety for those walking with carts, baby strollers and the like.

The Americans with Disabilities Act (ADA) has provided an additional impetus for improving accessibility. Not only does the ADA have requirements for curb ramp improvements but also suggests new areas for improved disabled accessibility, such as at bus stops and provision for barrier-free driveway apron designs.

1. Curb ramps meeting ADA requirements (specifically, the Uniform Federal Accessibility Standards (UFAS)) shall be constructed to provide access to every legally defined crosswalk, both marked and unmarked.

2. Curb ramps shall be installed in conjunction with sidewalk construction in all new land developments and public roadway projects.

3. City standards for bus stop pads and barrier-free driveway aprons shall be developed, employed, and updated periodically to meet the most recent ADA requirements.

4. The City should construct wheelchair-accessible pads at bus stops, eliminate barriers at driveways, and replace older curb ramps not meeting UFAS standards. Curb ramps with detectable warning devices conforming to the Americans with Disabilities Act Accessibility Guidelines (ADAAG) shall be installed.

5. Highest priority in City programs for curb ramps (both standard and enhanced), bus stop pads, and level driveway aprons should be given to specific requests from the disabled community.

6. Traffic signal pushbuttons and pedestrian informational signs shall be placed to be readily accessible to the disabled. Where appropriate, audible pedestrian signals are encouraged.

4. DEVELOPMENT DESIGN

While pedestrian circulation has usually been considered in the internal planning of residential neighborhoods and business areas like the Town Center, there has been a tendency to view the pedestrian aspects of new developments in isolation. In automobile-oriented commercial areas like research parks, pedestrian considerations have been neglected more often than not. As a result, a large number of discontinuities have developed in the City's pedestrian network. New

development of all kinds should be viewed as an opportunity to enhance the extent and continuity of the City's pedestrian facilities. New buildings and redevelopment should be pedestrian oriented.

1. In considering new commercial development or redevelopment, the City shall require that sidewalks be constructed parallel to all streets in accordance with (as applicable) the Rockville City Code, the Town Center Urban Design Plan, the Rockville Pike Plan, and these Pedestrian Policies.

2. Proprietors should be encouraged to provide facilities that enhance pedestrian circulation and accessibility on previously developed sites. The City's encouragement of such on-site improvements should be well publicized in the business community.

3. All commercial buildings, as well as public facilities not located directly on streets, shall be linked to the public sidewalk network with conveniently placed and reasonably direct pedestrian facilities. Pedestrians shall not be required to walk within driveways or parking aisles to reach external streets and sidewalks.

4. Connecting walkways and easements between adjacent commercial properties and residential developments are encouraged and should be provided.

5. For large office and retail developments located adjacent to major streets (or other potential impediments to pedestrian movement), opportunities to provide grade-separated pedestrian facilities should be explored and, if possible, implemented. Such opportunities need not be specifically identified in the Master Plan.

6. Pedestrian access within all development sites and to all buildings shall comply with ADA requirements.

7. The need to assure acceptable pedestrian crossing times at key intersections shall be considered in traffic impact studies for new developments.

8. For major developments, pedestrian demands should be quantitatively modeled to help determine the optimal location and size of pedestrian facilities. Such analyses would examine the mutual impact between pedestrian and vehicular flows.

5. CROSSWALKS

Maryland Law defines a crosswalk as any marked crossing or that part of a roadway intersection that is the prolongation or connection of sidewalks, whether marked or unmarked. Under this definition, a great majority of the City's crosswalks are unmarked. While marking all crosswalks is both unnecessary and cost-prohibitive, there should be a consistent method of determining crosswalks to be marked and available resources to install and maintain them.

1. Crosswalks shall be marked within school zones, at all signalized intersections, adjacent to Metro stations, and at all locations with at least a moderate concentration of pedestrian activity, especially in commercial areas.

2. A marked crosswalk should be designated by the presence of two parallel white lines 12" wide, spaced at least 6' apart.

3. The standard width of marked crosswalks shall be 8' in residential areas and 10' in business areas. Crosswalks of 6' width should only be used where restrained by geometrics. Crosswalks greater than 10' wide can and should be used at locations where pedestrian demand is heavy.

4. Away from intersections, "mid-block" crosswalks should only be designated at locations where justified by pedestrian demand and where the safety of the crosswalk location can be reasonably verified by the City. The crosswalk should be visually distinctive to a level exceeding City standards for the appropriate street class.

5. All crosswalks, especially those unprotected by signal or STOP sign control, should be monitored for sight distance obstructions. If identified, such obstructions should be removed.

6. Crosswalks shall be distinctively marked at the following locations:

a. Streets where the speed limit is greater than 35 mph.
b. Within school zones.
c. Mid-block locations.
d. Where the presence of a crosswalk may be otherwise unexpected.

7. Visually distinctive crosswalks should be used at any other location where special emphasis on the location of the crosswalk is needed.

8. For higher classifications of streets with heavier traffic, highly durable materials should be used to ensure the sustained visibility and long service life of crosswalk markings.

9. In the acquisition of durable crosswalk materials, the City should seek out and specify materials that minimize polishing and the slippery surface that can result. This consideration is especially important for visually distinctive crosswalks.

10. Crosswalks at school zones, near metro stations, or other locations with heavy pedestrian activities should be marked with "Stop for Pedestrians" paddle signs in accordance with supplemental warrants to be adopted by the City.

6. TRAFFIC SIGNALS AND SIGNS

City owned-traffic signals have been equipped with an appropriate complement of pedestrian signals and many have pedestrian countdown signal heads at signalized intersections.

Pedestrian countdown signals shall be installed and maintained at all signalized crosswalks that: a.) cross the "main street" signal movement, and b.) where pedestrian movements potentially conflict with an exclusive (green arrow) turning movement.

2. Accessible Pedestrian Signals (APS) should be considered for all new and modified traffic signals where warranted by the Maryland MUTCD.

3. At individual locations, pedestrian signals may also be desirable for crossing "side" streets, where there is no conflict with exclusive turn movements.

4. All pedestrian signals shall be of an oversized (15") single-section design. Existing signals (12") of two-section design may continue in use until the end of their useful service lives.

5. Pedestrian signals shall be designed and maintained to be free from obstructions.

6. The City should adopt and employ warrants included in the Manual on Uniform Traffic Control Devices (MUTCD) for traffic signal justification based on pedestrian usage. Special weighting should be assigned to the elderly, the disabled, and school children.

7. At signalized intersections, the City should seek opportunities to employ exclusive pedestrian intervals during which conflicting movements are stopped, consistent with sound congestion management practice, signal coordination requirements, and intersection capacity restraints. Exclusive pedestrian intervals may be applied to single crosswalk movements only, or, to the entire intersection.

8. The standard walking speed used to determine the flashing DON'T WALK interval for pedestrian signals shall be 3.5 feet per second. Speeds as low as 2.5 feet per second should be employed at signals where a large number of elderly and/or disabled concentrate or where otherwise identified in supplemental warrants.

9. Signals should be timed taking into consideration pedestrian convenience and safety. In no case should cycle lengths of greater than 120 seconds be employed.

10. Pedestrian timing at intersections shall be considered in developmental traffic impact studies.

11. At locations where conflicts between pedestrians and turning traffic on a shared green signal are common, a sign directing motorists to "YIELD TO PEDESTRIANS WHEN TURNING" may be employed. For left turn control, this sign would

supplement the overhead "LEFT TURN YIELD ON GREEN " signs customarily used at many intersections. Choice of sign should be based on the apparent greater conflict: turning vehicles versus pedestrians, or, turning vehicles versus opposing traffic.

12. At locations where conflicts between pedestrians and right turns on red signal are common, right turns on red should be prohibited using the MUTCD standard NO TURN ON RED sign. For ease of comprehension, time-of-day NO TURN ON RED restrictions are generally discouraged, but can be used with productive effect at locations where pedestrian demand is intermittent.

13. Where employed, traffic signal pushbuttons shall be conspicuously located and readily accessible to all pedestrians, including the disabled. Pushbuttons should be designed with minimum resistance to activation, and therefore, be placed such that pedestrians can activate pushbuttons without leaving the sidewalk or sidewalk ramp.

14. At locations with consistently heavy pedestrian demand, automatic activation ("recall") of pedestrian signals should be employed, thereby eliminating the need for pushbuttons.

15. At every traffic signal, with or without pushbuttons, educational signs demonstrating the proper use of pedestrian signals shall be installed and maintained.

16. School crossing signs complying with the MUTCD shall be posted at every marked crosswalk in a school zone not otherwise controlled by a traffic signal or STOP sign.

17. Pedestrian Crossing signs complying with the MUTCD shall be posted at all-mid-block and otherwise unexpected crosswalk locations not within school zones and not otherwise controlled by a traffic signal or a STOP sign.

18. At locations where safety experience or field observation indicate, School Crossing and Pedestrian Crossing signs may be accompanied by a special STOP FOR PEDESTRIANS IN CROSSWALK sign.

19. On streets where pedestrian demand is high but crossing activity is not or cannot be concentrated (apartment complexes, office parks), a special Pedestrian Area warning sign similar to the standard MUTCD Pedestrian Crossing sign may be employed.

20. The City shall maintain a list of innovative pedestrian safety traffic signals and signs and shall consider implementing them where appropriate. In selecting fonts for signs, the City should comply, to the extent possible, with general traffic engineering standards.

7. ENFORCEMENT AND SECURITY

Enforcement of laws, for both traffic control and public security, are an important component in sustaining safe and efficient pedestrian activity. The law also provides the means to insure that property owners keep sidewalks free from hazard and obstruction.

Revenues generated from speed camera enforcement programs shall be a source for new pedestrian safety measures and projects.

As needed, new legislation can and should be considered to further protect pedestrian interests and to remedy problems that might be identified.

1. Police agencies shall actively enforce laws that encourage the safety of pedestrians. Conflicts instigated by motorists should be vigorously addressed in accordance with Maryland and City laws. Among the most common of these conflicts are:

   a. Violation of the pedestrian's right-of-way on the "common green" at traffic signals by motorists turning left or right.

   b. Failure to yield to the pedestrian's right-of-way at unsignalized crosswalks.

   c. Failure of motorists to stop before turning right on red, and failure to detect conflicting pedestrians, especially those approaching from the motorist's right.

   d. Violation of red signals.

   e. Blockage of sidewalks by parked vehicles.

2. The Police shall also focus efforts on safety violations by pedestrians, such as proceeding against DON'T WALK signals, and discourage practices such as walking/running in the street where an adjacent sidewalk is readily available.

3. Unsafe pedestrian-based advertising and soliciting on public streets and sidewalks shall be discouraged.

4. Bicycle and scooter patrols should be applied to the enforcement of traffic laws affecting pedestrians.

5. Uniformed crossing guards should continue to provide directed traffic movement around schools during key hours.

6. Police traffic control of intersections may be exercised during periods of high pedestrian movement in business areas, during special events, and in the event of the planned or unplanned shutdown of traffic signals. As an option, traffic may be directed by trained and uniformed (or similarly designated) civilians, under Police supervision. For planned non-public events, the City shall establish and charge a fee to provide traffic control either by sworn officers or designated civilians.

7. The personal security of pedestrians, both day and night, should be a high Police priority. Stress should be placed on enclosed facilities and on sidewalks where street furniture or adjacent buildings may provide easy concealment. To further enhance pedestrian security, Neighborhood Watch and Business Watch programs should be publicized and encouraged.

8. City Police shall review all development and major construction plans to help assure that pedestrian security is maximized.

9. In the interest of providing a safe walking environment at night, lighting shall be provided on all sidewalks consistent with respective City standards for each classification of street. Non-sidewalk pedestrian facilities such as grade separations and subdivision pathways shall be illuminated to a reasonable standard where there is a particular public safety concern. In areas where there has been a pattern of endangerment to pedestrians, or where the Police believe such a potential exists, illumination greater than that suggested by the normal street lighting standards should be provided.

10. The City's Division of Inspection Services shall take an active role in insuring that snow and ice are expeditiously removed from sidewalks, and that sidewalks are kept clear of overhanging branches and other overgrowth.

11. The City’s Police Department shall provide weekly pedestrian and bicycle accident reports to the Traffic and Transportation Division, including fatality reconstruction reports.

8. EDUCATION

In any aspect of traffic movement and control, programs of engineering and enforcement are ineffective without the third "E" -- education. This is especially the case where pedestrians are concerned.

1. Driver education should stress pedestrian prerogatives and pedestrians should also receive education about vehicle law concerning pedestrians. Driver education should also be targeted to non-English speakers.

2. Both in the process of and in addition to normal enforcement activities, the Police should educate motorists and pedestrians in the meaning of traffic laws and in the respective courtesy that motorists and pedestrians owe each other.

3. The City should encourage new initiatives in educational traffic signs consistent with the need to minimize sign clutter. City programs to install and maintain special educational push button signs, YIELD TO PEDESTRIANS WHEN TURNING signs, and STOP FOR PEDESTRIANS IN CROSSWALK signs should continue. SHA's sign program to reaffirm the pedestrian right-of-way in crosswalks should also be continued. Where appropriate the City should consider use of signage to educate pedestrians on the existence of pedestrian facilities and intended routes. Non-English language newspapers and radio programs should be included to reach the broadest spectrum of Rockville residents.

4. The City should solicit public input on pedestrian problems and needs at least twice a year through "Rockville Reports" and take initiatives to publicize pedestrian programs through Cable TV, the City web site and the commercial media.

5. The City should regularly publicize the names of officials who can address maintenance problems, inquiries about new or existing traffic control, and matters of enforcement.

6. City staff should initiate and participate in outreach programs to schools and civic/community groups. These programs should educate the public about pedestrian safety, inform the public about City programs, and seek input on pedestrian concerns.

7. Whenever possible, the Police should educate the walking public about appropriate measures for personal security.

8. To help ensure that pedestrian needs are recognized in all City traffic planning and operational activities; tallies of pedestrian movement shall be included in all intersection counts made either by the City or by private consultants performing City-mandated traffic impact studies.

9. PHYSICAL FITNESS AND HEALTH

Walking facilities should be promoted not only as improvements to pedestrian safety but also as facilities that can be used to improve the physical fitness and health of Rockville citizens.

1. The City should have walking and bicycling encouragement events and programs, emphasizing their benefits to physical fitness.

2. Walking promotion and encouragement programs should help to increase the use of the walking and bicycling facilities as proposed in this policy.

Appendix C:

Sidewalk Prioritization Policy

Rockville Sidewalk Prioritization Policy

Introduction

Rockville has long been committed to the goal of improving pedestrian safety, and an integral step toward achieving that goal is to construct sidewalks in the City where they are missing. Not only do sidewalks improve pedestrian safety, but also they provide non-motorized routes for reaching desired destinations. Because of the large amount of missing sidewalks in the City and the costs associated with constructing sidewalks, the City has created a sidewalk prioritization policy. A missing sidewalk is any existing or potential pathway that, were it hard surfaced, would be used by pedestrians in their routine educational, recreational, business, shopping, working, civic and social pursuits. Missing sidewalks are along streets and are typically built within City right-of-way. With the Rockville Sidewalk Prioritization Policy, missing sidewalks are given two numerical scores and then a series of qualitative considerations are addressed.

The Rockville Sidewalk Prioritization Policy helps determine in what order the City should construct sidewalks, which is a helpful tool for including sidewalks in the Citywide Capital Improvements Program. The order, or prioritization, will be based on the total score; the sum of the utility score and the traffic conditions score. Sidewalks will be grouped into one of five groups, A through E, with A being the highest range of scores and E being the lowest range of scores. In addition to the missing link's total score, information about available City right-of-way, public support for the construction of the sidewalk, and the potential environmental impacts of constructing the sidewalk will be taken into consideration when determining the timeline for planning, design, and construction of the sidewalk.

<u>Sidewalk Prioritization Method</u>

I. Utility Score

A. Is the missing sidewalk within walking distance of a school?
- 0-5 minutes: 3 pts
- 5-10 minutes: 2 pts

B. Does the missing sidewalk have a bus stop on it or perpendicular to it?
- Yes: 1 pt
- No: 0 pts

C. If the missing sidewalk has a bus stop on or perpendicular to it, does the bus stop have more than 25 riders per day?
- Yes: 1 pt
- No: 0 pts

D. Is the missing sidewalk within a 10-minute walking distance of a public recreational facility? Points are given for each category that applies.
- Park: 1 pt
- Recreational center: 1 pt

Rockville Sidewalk Prioritization Policy

E. Is the missing sidewalk within one of the following zones of presumed high volume pedestrian activity? Points are given for each category that applies.

- Residential areas zoned R-30, R-20, and R-H: 1 pt
- Comprehensive Planned Development: 1 pt
- Town Planning Area Boundary: 1 pt
- Rockville Pike Corridor Boundary: 1 pt
- Twinbrook Metro Performance District Boundary: 1 pt

F. Is the missing sidewalk within walking distance of a Metro Rail station?

- 0-5 minutes: 2 pts
- 5-10 minutes: 1 pt

G. Is there a sidewalk on the opposite side of the street?

- No: 1 pt
- Yes: 0 pts

H. To what degree will hard-surfacing the missing sidewalk increase pedestrian network connectivity?

- Provides a link to a shared-use path: 2 pts
- Fills a gap between two existing sidewalks: 1 pt

II. Traffic Conditions Score

A. What is the posted speed limit on the street adjacent to the missing sidewalk?

- 45 mph or greater: 3 pts
- 26 mph to 44 mph: 2 pts
- 25 mph or less: 1 pt

B. What is the street classification for the street adjacent to the missing sidewalk?

- **Major:** 5 pts

  Description - Carries through traffic. Lanes are divided by a median. Access points are generally limited.
  Typical volumes - Greater than 25,000 vehicles per day
- **Arterial**: 4 pts

  Description - Carries through traffic. Design is more limited than on major streets. Access is less limited.
  Typical volumes - 10,000 to 30,000 vehicles per day
- **Major Collector:** 3 pts

  Description - Includes Primary Residential Class I, Business District, and Primary Industrial roads. Distributes traffic between adjacent business land uses, between adjacent industrial and office land uses, and between neighborhoods and arterial streets. Typically has two to four travel lanes.
  Typical volumes - 5,000 to 20,000 vehicles per day

- **Minor Collector:** 2 pts

Description – Includes Primary Residential Class II and Secondary Industrial roads. Distributes traffic between adjacent industrial and office land uses and between neighborhoods and arterial streets. Typically has two travel lanes.

Typical volumes - Secondary Industrial roads have up to 2,000 vehicles per day. Primary Residential Class II roads have less than 5,000 vehicles per day.

- **Secondary Residential**: 1 pt

Description - Provides local access to residential properties. All non-primary streets are classified as secondary.

Typical volumes - Up to 2,000 vehicles per day.

III. Other Important Considerations

A. If the sidewalk is constructed, is an easement required?

- Yes
- No

B. Was a resident petition submitted in support of constructing the sidewalk?

- Yes
- No

C. Would this project likely result in: tree removal, vegetation impacts due to a change in storm water drainage, irrigation impacts, installation of a retaining wall, installation of curb and gutter, relocation of utilities, fences, retaining walls, fire hydrants, landscaping, mailboxes, or steps?

- Yes, it is likely there will be environmental impacts.
- No, it is unlikely there will be environmental impacts.

D. Has a developer been required to construct the sidewalk as a part of the conditions of approval for a development?

- Yes
- No

Appendix D:

Bikeway Master Plan

Bikeway Master Plan

City of Rockville, Maryland

Bikeway Master Plan

Adopted April 26, 2004

www.rockvillemd.gov

City of Rockville Bikeway Master Plan
Adopted: April 26, 2004

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1. INTRODUCTION

1.A. Purpose of the Plan Update

Since the adoption of the first Bikeway Master Plan in 1998, Rockville has developed from a city with a few unconnected bicycle trails into one of Maryland's leading communities for bicycling, with an extensive network of signed bike routes, bike lanes, and shared-use paths. In addition, Rockville has implemented far-reaching programs to promote bicycling to all residents and employees, provide recycled bicycles to children, and educate children on how to ride safely. Interested and energized citizens, responsive elected officials, and City staff have worked together over the past five years to create a more livable community in which people have a range of safe and convenient travel choices, including bicycling. Much has been accomplished, and yet more needs to be done to ensure that all residents have access to the bikeway network and to programs that support safe bicycling.

This Bikeway Master Plan Update was developed for the citizens of Rockville and supersedes the Bikeway Master Plan adopted by Mayor and Council on October 12, 1998. Implementation of recommendations in the 1998 Plan, changes in local conditions, updated national guidelines, and a continued increased interest in bicycling, both as a form of recreation and mode of transportation, warrant an update of the 1998 Plan at this time.

This Plan Update outlines a vision for improving bicycling in Rockville over the next 10 years and beyond. It is designed to be used by citizens, public policymakers and City staff. It introduces broad issues in bicycle planning and applies these concepts to the physical environment within the City of Rockville. It also provides information, guidance, and prioritized recommendations for improvements.

1.B. Vision

A bicycle plan vision provides a framework for the City's efforts regarding bicycle improvements. The vision statement has been clarified and strengthened since 1998. It is:

Bicycling in Rockville is for all types of trips; for all types of people; for all parts of the City.

This vision directs the City of Rockville to create safer opportunities for bicycling in the City for both transportation and recreation for all types of bicyclists. To accomplish this vision, Rockville citizens should be able to meet most of their daily needs by bicycle, if they so choose. The vision also guides decisions on what facilities and programs are needed to give bicyclists of all ages and experience levels convenient and comfortable access to public services and recreational, cultural, commercial, and employment destinations in the City.

1.C. Accomplishments of the 1998 Bikeway Master Plan

Following adoption of the 1998 Plan, the City began work to implement the Plan's recommendations. Significant progress has been made, and Rockville has become a more bicycle-friendly city. A key to this progress has been the strong support of the Mayor, City

Council, City staff and citizens to undertake bicycle-related projects and to provide adequate funding to see projects through to completion.

The 1998 Plan identified the following priorities for physical improvements:

- Improve access to critical areas such as the Rockville Town Center, including municipal, cultural, and shopping locations;
- Improve access to local and regional recreation opportunities;
- Provide for the safe crossing of major highways and interstates; and
- Provide access to key inter-modal transit centers.

In the five years since the 1998 Plan was adopted, the City has secured $5.5 million in federal funds for bicycle projects. With this money and additional state and local funding, the City has completed over 20 miles of multi-use paths (including nearly all of the 10-mile Millennium Trail), signed nearly 20 miles of bicycle routes, and striped more than two miles of bike lanes. The City is preparing to construct a bicycle and pedestrian bridge across I-270 at MD 28, works closely with developers to implement portions of the bike network, and continues to construct safer street crossings for bicyclists. Bicycle racks have been installed in many parts of the City, including at Metro stations and in the Town Center area. Bicycle access to recreation areas has been improved, including paths in City parks and bike lockers at all City-owned recreation facilities.

In addition to physical improvements, several programmatic recommendations were noted in the 1998 Plan:

- Development and implementation of bicycle and motor vehicle operator education programs;
- Inclusion of the needs of bicyclists in regular maintenance programs and new developments; and
- Promotion of opportunities for bicycling in the City.

The City has created many bicycle programs since the adoption of the 1998 Bikeway Master Plan. Rockville is the first city in Maryland to develop and implement a comprehensive Kindergarten through 5th Grade Pedestrian and Bicycle Safety Education Program—a program that will serve as a model for the entire state. The City has also encouraged bicycling through programs such as Ride for Rockville, Bike to Work Day, Bicycle Recycling, providing free bicycles to children through the "Character Counts" program, and commuter assistance. Developers are including bicycle facilities in new developments: bicycle issues have been incorporated into the Fallsgrove and Town Center Master Plans. Rockville has been designated a "Bicycle Friendly Community" by the League of American Bicyclists.

Over the past five years, Rockville has had the continuous service of its Citizens Bike Advisory Committee (CBAC). The guidance of this group has been essential for implementing many of the recommendations in the 1998 Plan. The development of the Bikeway Master Plan Update is a further demonstration of this group's and the City's commitment to bicycle facilities and programs.

1.D. Opportunities Remaining from the 1998 Plan

Though many accomplishments have been made in the last five years, more work is needed in order to make Rockville a place where all citizens can bicycle to all parts of the City for all types of trips. A primary purpose of this Plan Update is to review the status of the 1998 Plan implementation and to reevaluate future priorities. A number of recommendations from the 1998 Plan still need to be implemented. These include:

- Complete on- and off-road connections designated as bikeways;
- Improve bicycle connections to multi-modal facilities such as Metrorail stations and local bus stops;
- Provide better East-West connections through the City, including crossings of MD 355;
- Provide better North-South connections through the City, including crossings of MD 28, and access to commercial and office buildings along the MD 355 corridor; and
- Improve bike path maintenance.

1.E. Implementing the 2003 Master Plan Update

In addition to completing the remaining recommendations in the 1998 Plan, the City seeks to implement new recommendations for bicycle facilities and programs through this Plan Update. The recommendations of this Plan Update are provided in Section 4, and include two maps (a City-wide map and a Town Center map) that illustrate the locations of existing and proposed bikeways.

1.E.1. Flexibility

The recommendations of this Plan Update are flexible. In many cases the recommended facility is what will ultimately be constructed. Yet, opportunities may arise in some locations that will require the proposed solution to be re-evaluated. Often, these opportunities will result in a facility that is safer, more comfortable, and/or more cost-effective than what was originally envisioned.

There are recommendations in this Plan Update that can be implemented easily in the short-term. Others may require many years to be realized. There will also be locations where both on-road and off-road facilities should be provided. In cases where the ultimate bicycle facility cannot be constructed immediately, short-term solutions may be used.

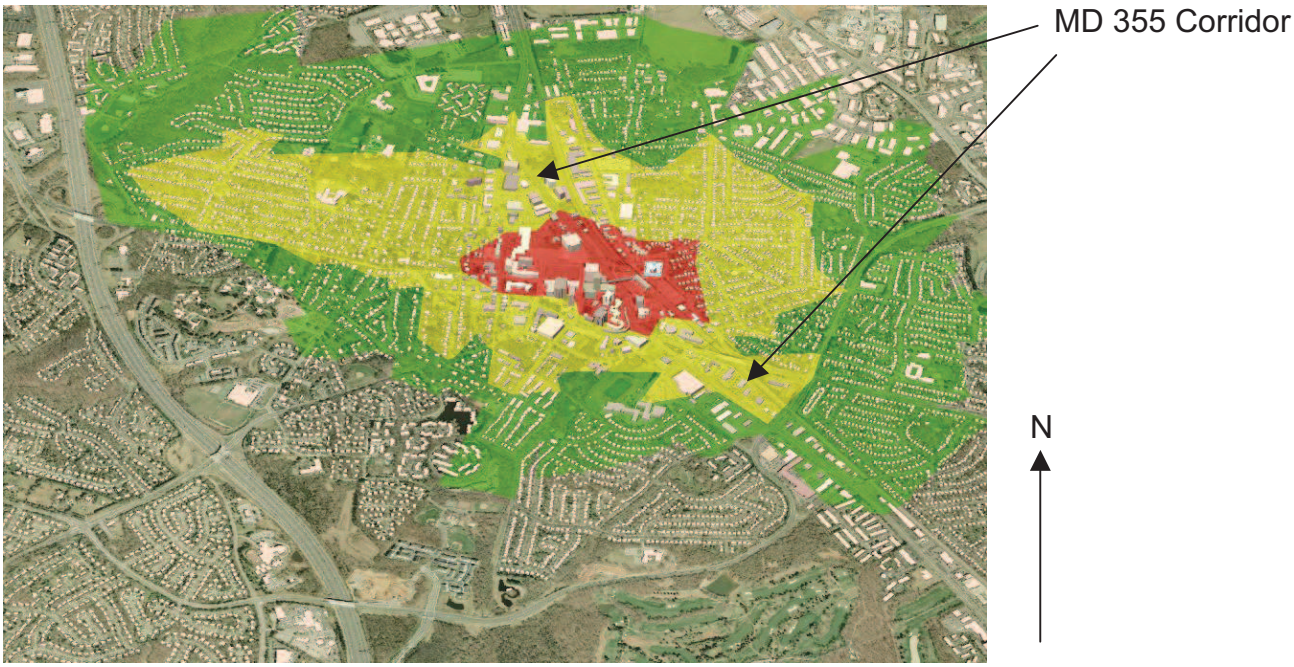
In this manner, the City of Rockville will take a flexible approach to achieving the optimum conditions for bicycling given all of the constraints of site conditions, development locations, construction costs, and time.

1.E.2. Improving Bike Travel Time

By improving its bikeway network, Rockville will make it easier for all residents to make trips to all parts of the City by bicycle. New facilities will make it safer and more comfortable to ride,

and they will also help reduce the amount of time it takes to get between destinations in the City. Figure 1 estimates how long it takes to bicycle to Town Center using the existing bicycle network, assuming that people can ride faster on bikeways with shared-use paths, bike lanes, and signed bike routes than on roadways with no special bike accommodations. Figure 1 shows current bike travel times to the Rockville Metro station and Town Center (each ring is a 5-minute interval). One of the reasons that the travel times are longer for the eastern half of the City is the lack of east-west connectivity across the MD 355 and CSX/Metrorail corridor. Bikeway improvements will equalize and expand the rings of this map so that it is more convenient in terms of time and comfort to reach Town Center from all parts of Rockville.

Figure 1. Bike Travel Time to Rockville Metro Station



Travel Time:
5 minutes
10 minutes
15 minutes

1.F. Accommodating Bicyclists in Town Center

Bicycling must be integrated with all modes of the City's transportation system. It should be encouraged in Rockville's Town Center, which continues to develop into a daytime, evening, and weekend activity center with a mix of land uses and activities. Residents of nearby neighborhoods, new residents, and visitors to Town Center should be able to bike comfortably to reach offices, cafes, restaurants, the movie theater, and other destinations. Bike parking should be provided at each destination. As more buildings and activities are added to Town Center, it will be even more critical to provide bike facilities so that there is a comfortable alternative to driving automobiles and parking. Figure 3 in Section 4 shows where bicycle facilities (signed-shared roadways, bike lanes, and shared-use paths) are recommended in Town Center.

1.G. Changes in Bikeway Classification and Evaluation

1.G.1. Bikeway Classification System

This Plan Update recommends a change in how bikeways are classified so that the Plan is consistent with the 1999 *American Association of State Highway and Transportation Officials Guide for the Development of Bicycle Facilities* (AASHTO Guide). The AASHTO Guide defines four types of bikeways. These bikeway types will replace the Bikeway Classification system used in the 1998 Plan. The four types of bikeways are:

<u>Shared Roadway:</u> A roadway which is open to both bicycle and motor vehicle travel. This may be an existing roadway, street with wide curb lanes or road with paved shoulders.

<u>Signed-Shared Roadway:</u> A shared roadway which has been designated by signing as a preferred route for bicycle use.

<u>Bike Lane:</u> A portion of a roadway that has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists.

<u>Shared-Use Path:</u> A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the roadway right-of-way or within an independent right-of-way. Shared-use paths may also be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users.

More detail on types of bicyclists and bikeways is provided in the AASHTO guide and in Section 5, Design Standards. Section 4, Goals, Objectives, and Recommendations describes how each type of bikeway should be used in Rockville.

1.G.2. Bicycle Level of Service

The 1998 Plan did not take measurements of roadway characteristics to determine bikeway locations or the types of facilities that were appropriate for each route. During the plan update process, Bicycle Level of Service (LOS) analysis was used to fill in this gap. The Bicycle LOS method uses a scientifically calibrated model to evaluate bicycling conditions and bicyclist

comfort levels based on standard roadway features, including speed and volume of traffic, width of traffic lanes, and pavement condition. The method makes it possible to evaluate alternative roadway designs, which allows some flexibility in determining the most appropriate bikeway for given corridors. A more detailed description of Bicycle LOS is included in Section 5. Design Standards.

1.H. Changes in Policies and Orientation

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) marked a significant shift in the focus of federal transportation policy. Flexible funding and increased public involvement in the transportation planning process have created greater opportunities to improve conditions for bicyclists in cities such as Rockville. The Transportation Equity Act for the 21st Century (TEA-21), adopted in 1998, continued and strengthened the programs and policies created in ISTEA to secure greater funding availability for bicycle facilities and programs.

As a national leader in the development of smart growth policies, Maryland is beginning to address the needs of bicyclists and pedestrians at the state level. The new position of Director of Bicycle and Pedestrian Access was created in 2000 to coordinate the efforts of various agencies within the Maryland Department of Transportation (MDOT), and MDOT completed the Statewide Bicycle and Pedestrian Master Plan in 2001. All MDOT agencies are working to include bicycle and pedestrian facilities in new projects and new funding sources have been created to allow retrofitting of bicycle and pedestrian facilities on state highways, such as MD 28, MD 189, MD 355, and MD 586 in Rockville.

Montgomery County has also been pursuing bicycle improvements. The Countywide Park Trails Plan was adopted in July 1998, and an update of the Master Plan of Bikeways for Montgomery County is underway and should be completed by the end of 2003. Bikeways in Rockville have been identified as part of both of these county plans.

1.I. Benefits of Bicycling for Transportation and Recreation

Regardless of the purpose of a bicycle trip, every cyclist needs a safe and comfortable route to reach his or her destination. To meet this need, the City should continue to develop a mix of facilities (bike lanes, paths, etc.), that provide bicyclists with a variety of options to reach their destinations, depending upon their skill level.

According to the Nationwide Personal Transportation Survey (NPTS), bicycling produces multiple potential benefits, both for the individual and their community, and there is a great potential to increase the number of trips taken by bicycle. Approximately 69 percent of all daily trips are less than five miles, 50 percent are less than three miles, and 25 percent are less than one mile (NPTS 1995); well within the range of an average cyclist. Rockville's compact scale, traditional development pattern and activity-filled downtown make bicycling an attractive travel option.

By taking advantage of the opportunity to convert short automobile trips to the bicycle, the City can reap enormous benefits in terms of health, environmental benefits, and reduced traffic

congestion. A National Bicycle and Pedestrian Clearinghouse technical brief (1995) notes that the American public saves from 3 to 14 cents for every automobile kilometer (5 to 22 cents per mile) displaced by walking and bicycling due to reduced pollution, oil import costs and costs due to congestion, such as lost wages and lost time on the job.

The physical built environment can create opportunities for, or barriers against, travel by bicycle. It is unpleasant and dangerous for bicyclists to ride along multi-lane, high-speed arterial roadways that have no bike lane, shoulder, or shared-use path. Even when bicycle facilities are provided, these roadways are difficult to cross. According to Census 2000 data, approximately 69 percent of people commuting to work from Rockville drove alone. Some of these trips could potentially be accomplished on a bicycle if it were more convenient and comfortable.

It is also important to recognize that only 20 percent of all trips are taken between home and work. The remaining 80 percent are trips to school, for recreation and errands (NPTS 1995). The potential for increasing the use of bicycles for these types of trips may be even greater than for commuting, since these trips tend to be shorter distances and can be done in casual clothing. Therefore, it is critical to develop or retrofit public roadways and provide local and regional shared-use paths that access all types of land uses (i.e., not just employment centers).

Providing Rockville with transportation choices allows citizens the option of biking or driving, putting the "livability" of Rockville in the hands of its citizens. Bicycling and walking are environmentally clean modes of transportation, requiring no fossil fuels. Errands around town often consist of several short trips within a few blocks of each other, requiring an automobile to be turned on and off, emitting excess exhaust. Bicycle trips produce no air pollution, reduce road congestion, and often take less time, especially if convenient bike parking is provided.

Biking to the store, school or work also provides a time-efficient way of attaining the United States Surgeon General's recommended daily allowance of physical exercise. By taking a 15-minute ride to work or school and then riding home each weekday, a person will get 30 minutes of exercise five days per week. Children and adults who do take this simple action will experience less heart disease, diabetes, and fewer problems with obesity. In addition to the health benefits, personal benefits may include improved productivity, self-image, greater sense of independence, and improved social relationships (U.S. Department of Health and Human Services 1996).

Traffic calming measures can benefit bicyclists. Features such as narrow motor vehicle lanes, raised medians, and tight turning radii reduce vehicle speeds, which reduce the severity of automobile, pedestrian and bicycle crashes. In addition, slower automobile speeds make the roadway more comfortable for pedestrians and bicyclists.

According to a National Bicycle and Pedestrian Clearinghouse Brief (1995), trails and greenways can have a positive effect on the value of nearby properties. Recent studies of the preferences of new homebuyers indicate that there is a demand for more livable communities and, specifically, better bicycle and pedestrian facilities in the vicinity. A Maryland Department of Natural Resources study of the North Central Rail-Trail in Baltimore County found that the

tax revenue generated from trail-related business and increased property values near the trail in 1993 ($303,750) greatly exceeded the cost of the trail ($191,893).

In conclusion, a multitude of reasons exist for continuing to enhance the bikeway network in the City—environmental, health, traffic congestion relief, recreation, and quality of life. Rockville continues to maintain a reputation for being at the forefront of bicycling in Maryland. As the City continues to develop and enhance its transportation network, bicycling will remain a core component of the City's strategy.

2. THE PLANNING PROCESS

The process of updating the Rockville Bikeway Master Plan has involved Rockville citizens, the Mayor and Council, the Citizens Bicycle Advisory Committee, and the Bikeway Master Plan Committee and the cooperation of the Rockville Recreation and Parks Department and several other City of Rockville departments. Their work has built upon the 1998 Plan and defined new priorities for improving bicycling in Rockville the next 10 years.

2.A. Participants

2.A.1. Mayor and Council

The Mayor and Council approved work for this Plan Update as part of the Capital Improvements Program (CIP). They will be responsible for adopting the Plan Update and its recommendations.

2.A.2. Citizens Bicycle Advisory Committee (CBAC)

In May of 1999 the Rockville Citizens Bicycle Advisory Committee (CBAC) was created by the Mayor and Council. The Committee's mandate for action includes the following tasks:

- Assist in the development of the City's bicycle and pedestrian specific policies, as well as other policies that affect the conditions for bicycling in the City;
- Oversee the implementation of the City's Bikeway Master Plan Update and report progress toward completion to the Mayor and Council;
- Review current and proposed CIP projects to ensure bicycle needs are incorporated into design and construction when appropriate; and
- Deliver updates on the needs and desires of bicyclists in the community, with recommendations for action to the Mayor and Council.

The City Bikeway Specialist is assigned as the City staff liaison to the committee to provide communication between agency staff and the committee. The committee has up to ten members, representing a broad range of bicyclist types. Since its creation, the CBAC has held regularly scheduled meetings throughout the year, carried out its mandated tasks, and has become an important and valuable resource to the City on bicycling issues. The active participation of the CBAC is vital to Rockville's continued success in implementing the Bikeway Master Plan Update and in improving conditions for bicycling in the City.

2.A.3. Bikeway Master Plan Committee

Several members of the CBAC worked closely with the City to develop the final recommendations for this Plan Update. This committee provided input on the facility and programmatic improvements that are needed over the next 10 years, commented on the new Rockville Bicycle map, and served as liaisons to the full CBAC and other interested citizens.

2.A.4. Department of Recreation and Parks

The Department of Recreation and Parks manages over fifty parks within the City. The Department also provides support and encouragement for these facilities, including public information and special events, and has a long-standing policy of promoting bicycling within the City. Their responsibilities will focus on off-road bicycle facilities, including trail construction and maintenance. They will work with the Department of Public Works and other City departments to implement this Plan Update.

2.A.5. Department of Public Works

The Department of Public Works (DPW) is responsible for engineering and operational services within Rockville. Within the DPW, the Traffic and Transportation Division plans and installs roadway, sidewalk, and traffic control improvements. This division also manages the Transportation Demand Management program, which includes the promotion of bicycle facilities throughout the City. The Traffic and Transportation Division will be responsible for installing and maintaining on-road bicycle facilities, while optimizing the accessibility, safety and mobility of bicyclists who use them.

2.A.6. Other Departments

One reason for the success Rockville has experienced in implementing bikeways has been the strong level of cooperation between the Department of Recreation and Parks, the Department of Public Works, and other City departments, such as Police and Community Planning and Development Services. Continuing these partnerships during implementation of this Plan Update is essential to its success and to providing an outstanding network of bikeways for the citizens of Rockville.

2.A.7. Other Agencies

The Maryland-National Capital Park and Planning Commission (M-NCPPC) has adopted a Countywide Park Trails Plan, and is working on an update of the Master Plan of Bikeways for Montgomery County. The City has met with M-NCPPC staff to ensure that the recommendations in this Plan Update are consistent with the both the trails and bikeways plans.

The Montgomery County Department of Public Works and Transportation holds monthly "Bicycle Action Group" meetings and works closely with M-NCPPC to implement planned bicycle routes. They are the coordinating agency for the Bethesda Trolley Trail, which is being constructed from North Bethesda to the Twinbrook Metrorail station, including crossings over I-495 and I-270.

The Maryland State Highway Administration manages projects on state highways within the City limits. Coordination between the City and the State has been occurring to ensure that bicycle facilities recommended in this Plan Update are included on state highway projects. Safe intersection crossings of State highways are paramount to the safety of cyclists.

2.B. Public Input Process

Public involvement has been an important part of the bikeway planning process from the outset and was integral in the preparation of this update. Input was gained through meetings with the Bikeway Master Plan Committee, whose members served as liaisons to the Citizens Bicycle Advisory Committee, helped generate goals and objectives for the Plan Update, reviewed the text, and recommended locations where new bike paths, lanes and signs are needed. In addition, a public open house was held to present a draft plan and receive feedback from citizens on the Plan Update. Public comments were also encouraged through the City's website and collected by the Department of Recreation and Parks. The Plan Update was approved by the Mayor and Council.

2.B.1. Regular Public Involvement/Outreach

Programs to encourage and facilitate citizen participation in Plan implementation are critical and should be continued. Ideas from a wide variety of citizens and support from the community will ensure that the Bikeway Master Plan Update continues the success of the 1998 Bikeway Master Plan.

The Department of Recreation and Parks can encourage citizen input as a part of providing educational and public information campaigns. It is recommended that the Department should institute a regular channel of communication for receiving comments and ideas for change in the Bikeway Master Plan Update. This might take the form of brochure/questionnaires as used for the plan development process, informal meetings, etc. In addition, the Department is encouraged to conduct an annual Open House on bicycling in the City. This could coincide with the development of the annual Progress Report by the Citizens Bicycle Advisory Committee.

Another way the Department can receive public input is through the Facility Improvement Request Form that was created in 1999. The form provides citizens with a convenient means of informing City agencies about existing conditions affecting bicycling or of more general concerns or suggestions regarding bicycling in the City. The requests are submitted to the Bikeway Specialist who then refers the request to the appropriate City agency.

Citizens can become involved with bicycling issues in the City by taking advantage of the Department's outreach efforts. By attending future Open House meetings on bicycling in Rockville, submitting Facility Improvement Request Forms with suggestions for bicycle improvements or joining the Citizens Bicycle Advisory Committee, citizens can help implement the recommendations of this Plan Update.

2.B.2. Input on Specific Projects

While there is strong public support for the 1998 Bikeway Master Plan and its update, implementation of individual projects included in the recommendations can raise concerns in affected neighborhoods. To address these concerns the following actions will be taken by the City to help guarantee that impacted residents are aware of proposed bikeway projects and have an opportunity to learn the details of project implementation.

Prior to the implementation of any bikeway project, the following actions are taken:

1. All residents and businesses along the route are notified via direct mailing, which includes:
    - A description and schedule of the project and how it fits into the City bicycle network;
    - A map of the route indicating where parking may be affected;
    - Name and number for a staff contact; and
    - Date, time and location of any meetings scheduled to discuss the bikeway.
2. Local citizen association representatives are notified by mail and invited to any meetings scheduled to discuss the bikeway.
3. A public meeting or open house is held to receive input and answer questions about the project. Aside from direct mailing, the date and location of the public meeting or open house is published in Rockville Reports and on Rockville Municipal Cable.
4. Staff prepares a recommendation to the Mayor and Council, including a summary of public comment.
5. Residents, local citizens associations and other interested parties are notified by mail of the final project design.

2.C. Data Collection

Existing on-road bicycle facility conditions were evaluated and used to develop the recommendations of this Plan Update. This section describes the field data that was collected for the Bicycle Level of Service (LOS) Model, which is a scientific model used to estimate the comfort level of bicyclists on different parts of the Rockville Bikeway Network. It also describes how the model was used to help determine which sections of the bikeway network should have signs, bike lanes, and shared-use paths.

2.C.1. Bicycle Level of Service Model

The Bicycle LOS model was used in Rockville to determine the most appropriate cross-section for roadways where bicycle facilities are being considered. This model is identical to the Bicycle Level of Comfort Model used by the Maryland Department of Transportation to measure bicycling suitability on state-owned roadways in the *Twenty Year Bicycle and Pedestrian Access Master Plan* (2002). The following is a basic explanation of what Bicycle LOS measures and how it has been used to determine the appropriate cross-section for Rockville roadways. For a more detailed explanation of the Bicycle LOS model, refer to Appendix A.

<u>Bicycle LOS Measures</u>
The Bicycle LOS Model is a scientifically-calibrated method of evaluating the comfort level of bicyclists on a roadway segment given existing bicycling conditions. It is used only for on-road bikeways, not shared-use paths. The model uses the same measurable traffic and roadway characteristics that transportation planners and engineers use for other travel modes. The Bicycle LOS Model is based on standard roadway factors such as:

- Lateral separation between bicyclists and adjacent motor vehicle traffic (measured by the width of the right-most lane);

- Presence and width of a paved shoulder/bike lane;
- Volume and speed of motor vehicle traffic;
- Percentage of heavy trucks;
- Number of travel lanes; and
- Pavement condition.

Using the Bicycle LOS Model

Like a motor vehicle level of service model, the Bicycle LOS Model uses score ranges to assign one of six letter grades to describe existing conditions. The grades "A, B, C, D, E, and F" are used as surrogates for users' perception of the road segments for bicycle travel. Level "A" reflects the best conditions for bicyclists; Level "F" represents the worst conditions.

Level of Service	**Bicycle Level of Comfort Score**
A	<= 1.5
B	>1.5 and <=2.5
C	>2.5 and <=3.5
D	>3.5 and <=4.5
E	>4.5 and <=5.5
F	>5.5

2.C.2. Bicycle Level of Service Examples

The ultimate goal of the Plan Update is to provide safe and comfortable bicycling conditions for all residents in all parts of the City. The Bicycle LOS Model considers many different factors that affect the comfort of bicyclists and shows that there are many ways to improve overall cycling conditions. Slowing traffic, improving pavement condition, increasing shoulder width, striping narrower travel lanes, and providing bike lanes all improve Bicycle LOS. Rockville seeks to find practical ways to improve the level of service for cyclists using a combination of these strategies.

Bicycle conditions have been improved in Rockville by changing lane striping and reducing motor vehicle speeds. Table 1 shows how bicycling conditions improved from Bicycle LOS "D" to Bicycle LOS "C" on Nelson Street when travel lanes were narrowed to add bike lanes in 1999. Field measurements showed that 85th percentile speeds decreased from 39 m.p.h. to 34 m.p.h. after the changes were made.

Table 1: Bicycle Level of Service Before and After Bike lanes on Nelson Street

					Pavement Width (ft)			Parking				
Nelson Street from Anderson Ave. to College Pkwy.	Length (Miles)	Lanes	Volume (ADWT)	85th Pct. Spd.	W_t	W_l	W_{ps}	% N/E	% S/W	Pvmt. Cond.	BLOS Score	BLOS Grade
Before (without bike lane)	0.78	2U	11,000	39	16.5	0.0	0.0	50	50	3.5	4.33	D
After (with bike lane)	0.78	2U	11,000	34	20.5	10.5	6.0	50	50	3.5	2.69	C

U = Undivided configuration
85th Pct. Spd. = 85th percentile motor vehicle speed
W_t = total width of pavement between the centerline and the gutter
W_l = total width of pavement between outside lane stripe and the gutter

W_{ps} = total width of pavement between the parking line and the gutter (only recorded if bike lane is marked)
Parking = percentage of segment with occupied on-street parking (N/E = North or East side; S/W = South or West side)
Pvmt. Cond. = pavement condition using Federal Highway Administration 5 (best) to 1 (worst) scale

2.C.3. Bicycle Level of Service and Bikeway Accommodations in the Rockville Bikeway Network

Bicycle LOS scores and grades were calculated for over 100 roadway segments in the Rockville Bikeway Network. The results indicate that a number of roadways in the proposed bikeway network are comfortable for typical bicyclists without "special" facilities (such as designated bike lanes or shared-use paths beside the road). Signs designating these low-volume residential streets as bicycle routes are the only accommodations necessary. Many of the neighborhood streets in the bikeway network already have bike route signs, but a few do not.

In locations where they result in slower vehicle speeds, traffic calming measures improve bicycling conditions on roadways. Research has shown that bicyclist comfort improves when travel lanes are narrowed to provide additional space along the edge of the road. Lane narrowing also has the effect of visually narrowing the street, often resulting in decreased motor vehicle speeds (see Nelson Street example). When travel lane narrowing achieves sufficient additional space to stripe a five-foot wide bike lane, the City of Rockville may elect to provide this type of facility. However, it is important to consider that any additional space has a positive effect on bicyclist comfort. Indeed, the AASHTO *Guide for the Development of Bicycle Facilities* (1999) states, "…where four-foot [paved shoulder] widths cannot be achieved, any additional shoulder width is better than none at all" (p. 16).

Finally, shared-use paths may be needed on some roadways in the bikeway network due to high-speed, high-volume traffic. In these situations, Bicycle LOS may be poor, even if bike lanes are added or motor vehicle lanes are narrowed. A shared-use path would allow bicyclists to have full separation from automobiles. However, when shared-use paths are installed, safety problems occur at driveways and roadway intersections because bicyclists are usually not expected by drivers. The most common type of bicycle crash at intersections occur when cyclists are riding on a sidewalk or shared-use path in the opposite direction of adjacent traffic and are struck by a motorist turning right out of a side street or driveway (motorists turning right typically only look to their left and do not see bicyclists approaching from the right). For this reason, the City has developed trail/roadway intersection guidelines to improve visibility and warn motorists of potential hazards in these locations.

Shared-use paths are most appropriate on roadways where there are fewer intersecting roadways and driveways. These facilities are less costly to construct when the roadside is flat with no obstructions, such as trees, guardrails, buildings, utility poles and ditches. These paths are often recommended on roadways with high-volume, high-speed traffic. In Rockville, many of these roadways are not owned and maintained by the City. Therefore, the City supports construction and maintenance of these paths by Montgomery County and the State Highway Administration. These pathways are important links in the City's bikeway network.

3. GOALS AND OBJECTIVES

3.A. Conceptual Framework

In January 2002, the City of Rockville Planning Commission approved the *Comprehensive Master Plan for the City of Rockville*, which sets goals, policies and recommendations to guide capital improvement projects and development in the City. The *Comprehensive Master Plan* defines these three terms as:

- **Goals** are conceptual, broad, and long range.
- **Objectives** are the guides to the achievement of the goals.
- **Recommendations** define the specific actions needed to accomplish the overall goal as well as the policies.

The 1998 Bikeway Master Plan did not define goals for bicycling in Rockville; instead it provided a list of prioritized recommendations to be implemented. This Plan Update will make the Bikeway Master Plan consistent with other planning documents in the City by defining a set of goals. A prioritized list of recommendations provided in Section 4 outlines means to accomplish each goal. The prioritized recommendations of the Plan Update should be integrated with the *Comprehensive Master Plan* and should be evaluated concurrently.

3.B. Goals and Objectives

This Plan Update sets five goals to improve bicycling in Rockville over the next 10 years. The following are goals and the objectives that have been adopted to make Rockville a city where one can meet all their daily needs by bicycle. The five goals in this Plan Update have been developed to support the overall vision that is outlined in the 2002 Comprehensive Master Plan for the City of Rockville. Each goal listed below corresponds to a goal in the in the Transportation Section of the *Comprehensive Master Plan*.

GOAL 1: Enhance the mobility of bicyclists by improving the bicycle facility network
(Corresponds to Transportation Goal 1: Enhance the mobility of people, goods and services)

Objective 1.1. Install the bike paths, lanes, signs, crossings, signals and other facilities recommended on the Rockville Bicycle Facilities Recommendations map.
Objective 1.2. Remove significant barriers to bicycling.
Objective 1.3. Continue to maintain existing facilities.
Objective 1.4. Continue to gather public input and other data to determine where new facilities and improved maintenance are needed.

<u>Performance Measure</u>: Number of residential units within 5, 10, and 15 minute bike travel time to activity center(s)

GOAL 2: Provide bicycle facilities during development and redevelopment to improve the continuity of the bikeway network
(Corresponds to Transportation Goal 6: Minimize the separation effects of major transportation facilities)

Objective 2.1. Add bicycle facilities during roadway construction, reconstruction, or resurfacing.
Objective 2.2. Require developers to provide bicycle facilities in new developments.
Objective 2.3. Ensure that Rockville's Roadway Design Standards are bicycle-compatible.

Performance Measure: Percent of Master Plan facilities that exist, by planning area
Performance Measure: Percent of new developments and road projects that adhere to the Bikeway Master Plan recommendations
Performance Measure: Percent of new developments and road projects that go through Comprehensive Transportation Review and are consistent with the City's Adequate Public Facilities Ordinance.

GOAL 3: Improve the safety of children bicycling to school
(Corresponds to Transportation Goal 5: Foster a safe and maintainable transportation network that encourages the observance of traffic laws)

Objective 3.1. Expand the City's Pedestrian and Bicycle Safety Education Program to all Rockville elementary schools.
Objective 3.2. Develop a Safe Routes to Schools Program and use it to generate interest in and ideas for improving bicycle facilities near Rockville schools and on routes children use to access these schools.

Performance Measure: Percent of students wearing bicycle helmets, riding on the correct side of the roadway, and stopping at stop signs
Performance Measure: Number of Rockville schools conducting a Safe Routes to Schools Program

GOAL 4: Protect the environment
(Corresponds to Transportation Goal 4: Protect the environment)

Objective 4.1. Develop media packets on the environmental benefits of bicycling and walking and present them to the Mayor and Council, television, radio, and newspaper media, and the general public.
Objective 4.2. Continue to evaluate the environmental impacts of all proposed bikeway facilities.

Performance Measure: Amount of positive information disseminated about the environmental benefits of bicycling.
Performance Measure: Percent of new bikeways constructed in accord with environmental guidelines

GOAL 5: Promote a transportation system that facilitates bicycling and develop community pride in bicycling

(Corresponds to Transportation Goal 2: Promote a transportation system that is multi-modal, accessible and friendly to all users)

Objective 5.1. Create a user-friendly bicycle map and distribute it at public libraries, bicycle shops, and government buildings throughout the City.
Objective 5.2. Promote the Rockville Bikeway Network by designing a distinctive system of signs, maps and markings.
Objective 5.3. Establish incentive programs to encourage citizens to bicycle.
Objective 5.4. Expand Bicycle Recycling Program to offer more free and reduced price bicycles to low-income families.
Objective 5.5. Work with the local bicycle advocacy groups and a diverse group of citizens to implement the Bikeway Master Plan Update.

Performance Measure: Percent of residents who commute to work by bicycle

4. RECOMMENDATIONS

This section lists the actions that should be taken to achieve the goals and objectives listed in Section 3. Two maps have been provided in this section to support the written recommendations of this Plan Update: the Rockville Bikeway Recommendations Map (a City-wide map) shown in Figure 2; and the Rockville Town Center Bikeway Recommendations Map shown in Figure 3. The recommendations fall into two major categories: bike facilities and bike programs. They are based on conditions and programs in place at this time. Opportunities may arise, such as street resurfacing, which allow for completion of a project more quickly and cost efficiently then originally envisioned. These opportunities are important and should be pursued.

Many factors were considered when developing the recommendations of this Plan Update. Projects and programs that are recommended in this Plan Update have many or all of the following characteristics:

- Achieves an original goal set in the 1998 Bikeway Master Plan;
- Overcomes obstacles and barriers identified in this Plan Update;
- Connects key destinations (schools, recreation areas, employment areas, civic and cultural centers, retail services and transit centers) with existing bicycle facilities;
- Takes advantage of an opportunity to provide bicycle facilities during reconstruction of roadways identified in the City's Master Transportation Plan;
- Is recommended by the Bikeway Master Plan Committee, Citizens Bicycle Advisory Committee or other public comments;
- Improves bicycling safety;
- Improves Bicycle Level of Service;
- Increases the visibility of bicycling as a form of transportation and recreational activity;
- Increases the overall number of people who bicycle in Rockville; and
- Better connects underserved neighborhoods to other destinations.

4.A. How Bikeway Facilities should be used in Rockville

This section provides an overview of how signed-shared roadways, bike lanes, and shared-use paths should be used in Rockville. It also includes a discussion of intersection treatments to make crossings easier for bicyclists. These issues are discussed in more detail in Section 5. Design Standards.

4.A.1. Signed-Shared Roadways

Bike route signs should be posted on all routes in the bikeway network to indicate to bicyclists that particular advantages exist to using these routes compared with alternative routes. Roadways in the Rockville Bikeway Network that are designated as signed-shared roadways should incorporate traffic calming measures and channelize traffic, where possible (see description in Section 5. Design Standards). The City should study the roadway width and parking characteristics to determine feasibility for slowing motor vehicle speeds and defining automobile space on all signed-shared roadways. Often, this can be accomplished by adding edgelines to a roadway. Edgelines help to slow motor vehicle speeds by visually narrowing the

travel lanes for automobiles. In addition, edgelines provide some additional space outside the travel lanes that can be used by bicyclists, therefore improving the Bicycle LOS of the road.

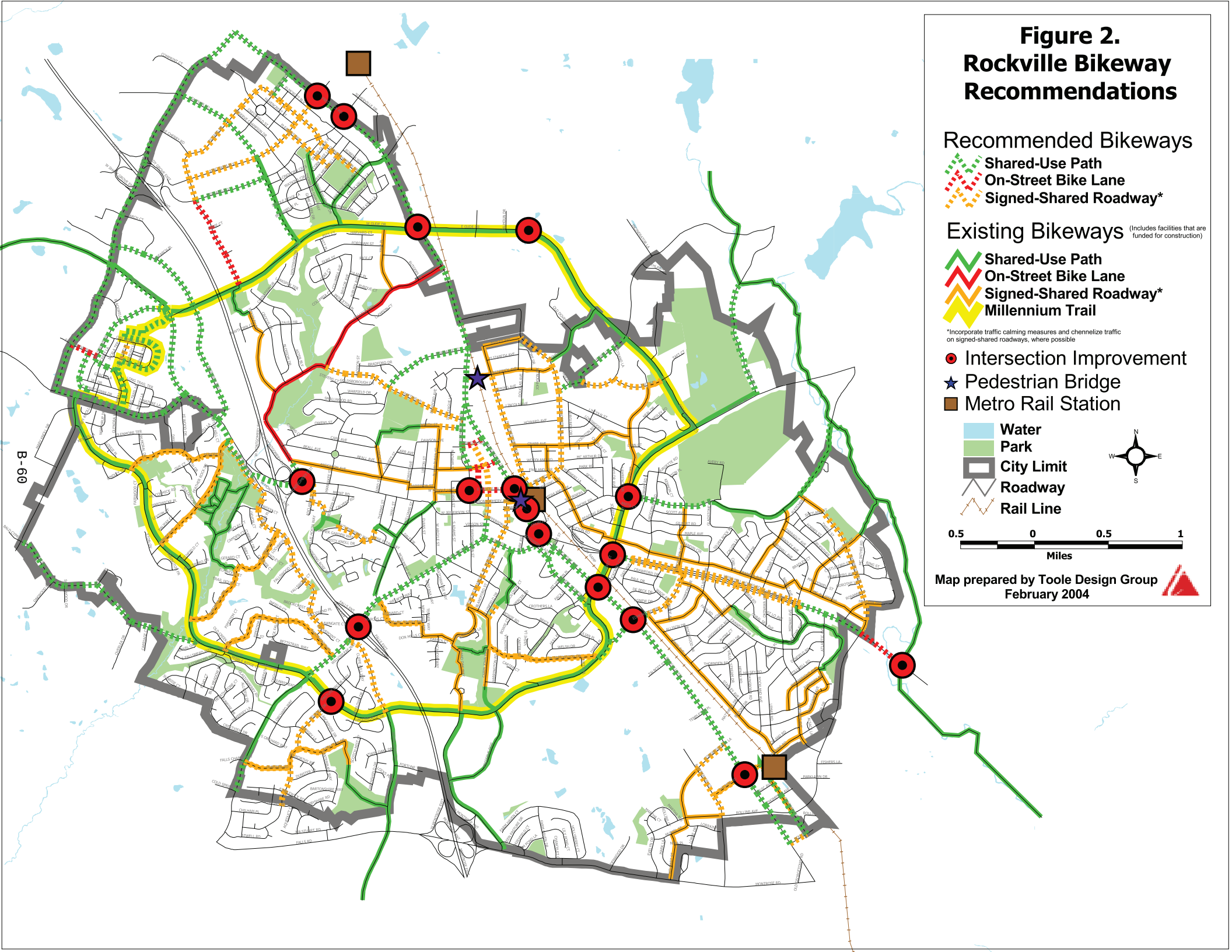


Figure 2.
Rockville Bikeway
Recommendations
Recommended Bikeways
Shared-Use Path
On-Street Bike Lane
Signed-Shared Roadway*
Existing Bikeways
(Includes facilities that are funded for construction)
Shared-Use Path
On-Street Bike Lane
Signed-Shared Roadway*
Millennium Trail
*Incorporate traffic calming measures and chennelize traffic on signed-shared roadways, where possible
Intersection Improvement
Pedestrian Bridge
Metro Rail Station
Water
Park
City Limit
Roadway
Rail Line
N
W
E
S
0.5
0
0.5
1
Miles
Map prepared by Toole Design Group
February 2004

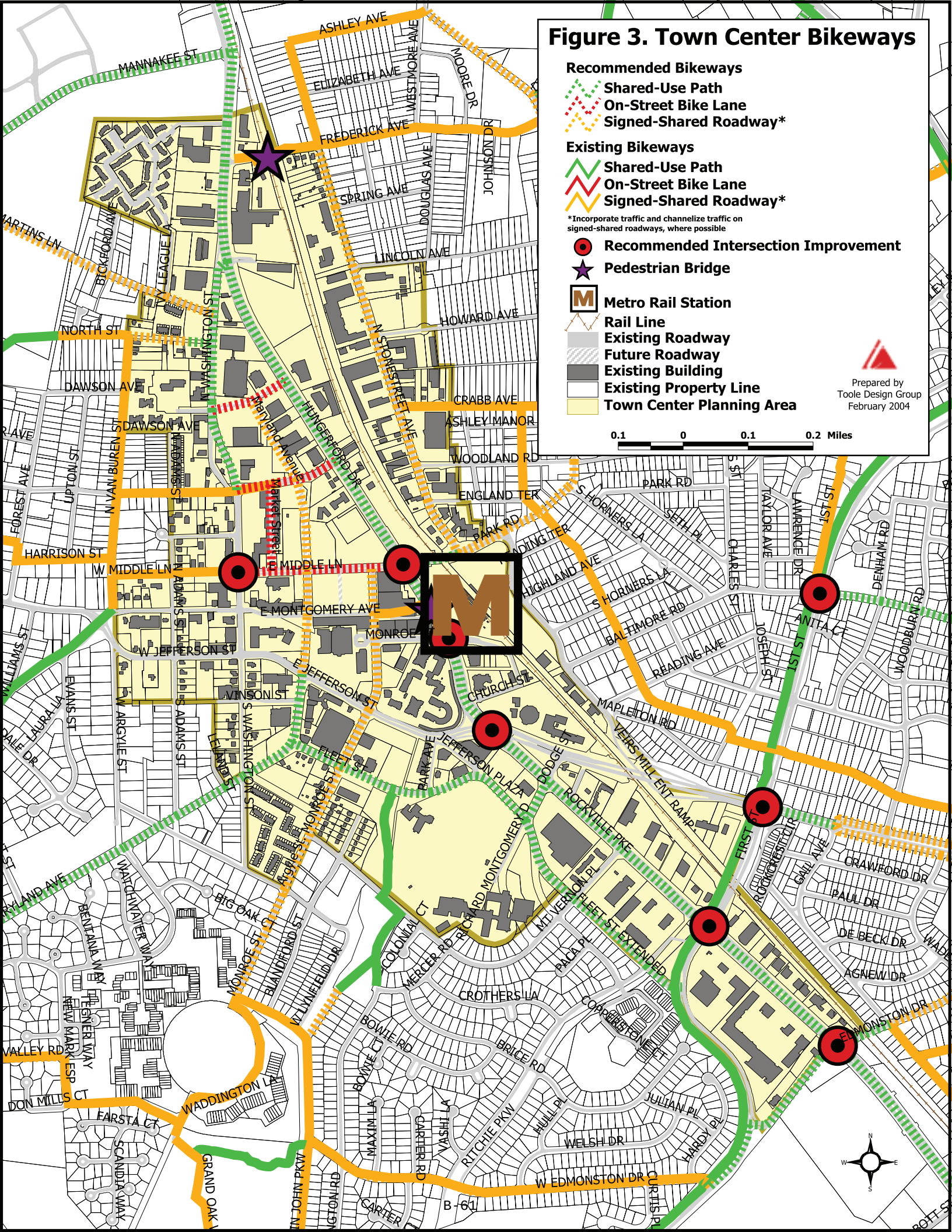


Figure 3. Town Center Bikeways
Recommended Bikeways
Shared-Use Path
On-Street Bike Lane
Signed-Shared Roadway*
Existing Bikeways
Shared-Use Path
On-Street Bike Lane
Signed-Shared Roadway*
*Incorporate traffic and channelize traffic on signed-shared roadways, where possible
Recommended Intersection Improvement
Pedestrian Bridge
Metro Rail Station
Rail Line
Existing Roadway
Future Roadway
Existing Building
Existing Property Line
Town Center Planning Area
Prepared by
Toole Design Group
February 2004
0.1
0
0.1
0.2 Miles
ASHLEY AVE
MANNAKEE ST
ELIZABETH AVE
WESTMORE AVE
MOORE DR
FREDERICK AVE
JOHNSON DR
SPRING AVE
DOUGLAS AVE
LINCOLN AVE
HOWARD AVE
NORTH ST
DAWSON AVE
CRABB AVE
ASHLEY MANOR
WOODLAND RD
ENGLAND TER
PARK RD
HARRISON ST
W MIDDLE LN
E MIDDLE LN
E MONTGOMERY AVE
MONROE
W JEFFERSON ST
E JEFFERSON ST
VINSON ST
CHURCH ST
JEFFERSON PLAZA
FLEET ST
PARK AVE
DODGE ST
ROCKVILLE PIKE
MAPLETON RD
VEIRS MILL ENT RAMP
READING AVE
BALTIMORE RD
HIGHLAND AVE
S HORNERS LA
SETH PL
CHARLES ST
TAYLOR AVE
LAWRENCE DR
1ST ST
ANITA CT
DENHAM RD
WOODBURN RD
JOSEPH ST
FIRST CT
ROCKCREST DR
GAIL AVE
CRAWFORD DR
PAUL DR
DE BECK DR
AGNEW DR
EDMONSTON DR
W EDMONSTON DR
FLEET ST EXTENDED
MT VERNON PL
RICHARD MONTGOMERY RD
COLONIAL CT
MERCER RD
PACA PL
CROTHERS LA
CORPORATION CT
BRICE RD
BOWIE RD
BOWIE CT
JULIAN PL
HARDY PL
WELSH DR
HULL PL
RITCHIE PKW
VASHTI LA
CARTER RD
MIXMAN LA
CARTER
BIG OAK
BLANDFORD ST
WILLMFIELD DR
WATCHWATER WAY
BENTANA WAY
PEGNER WAY
NEW MARK ESP
VALLEY RD
DON MILLS CT
WADDINGTON LP
FARSTA CT
SCANDIA WAY
GRAND OAK
JOHN PKW
WASHINGTON RD
S WASHINGTON ST
S ADAMS ST
W ARGYLE ST
EVANS ST
LAURA LA
PALE DR
WILLIAMS ST
FOREST AVE
UPTON ST
N VAN BUREN ST
N WASHINGTON ST
BICKFORD AVE
IVY LEAGUE LA
MARTINS LN
MANNAKEE ST
N STONESTREET AVE
HUNGERFORD DR
Maryland Avenue
Wilkinson Street
B-61

4.A.2. Bike Lanes

Striped bike lanes on roadways with moderate traffic provide significant increases in comfort for bicyclists. Bike lanes can also give a special designation to routes that lead to important destinations in the City and serve as a visible sign of the bikeway network, encouraging more people to bicycle in Rockville.

4.A.3. Shared-Use Paths

Rockville should provide shared-use paths in parts of the bikeway network where there are heavy and fast volumes of traffic. In some cases, there is a need for shared-use paths *in addition to* bike lanes on busy streets. Shared-use paths that are adjacent to roadways can provide separation from heavy, fast-moving traffic and create more comfortable riding conditions, especially for less experienced cyclists. They can also be used to provide space for pedestrians and to serve schools. Shared-use paths should not be used to preclude on-road bicycling but rather to supplement a system of on-road bicycle facilities. They are most appropriate in corridors with few driveways and intersections because conflicts between turning motorists and bicyclists are less of a problem.

4.A.4. Dual Facilities

As the Rockville Bikeway system develops, the City will strive to provide both on- and off-road facilities when a road is reconstructed. Some bicyclists feel more comfortable riding on the roadway surface, while others feel more comfortable separated from traffic on a shared-use path. A wider variety of bicyclists can use a busy roadway if both bike lanes or shoulders and shared-use paths are provided. In some locations, bike route signs may be provided on dual-facility roadways.

Many roads with heavy, fast traffic, such as MD 355, Gude Drive, and Maryland Avenue use all or nearly all of the available pavement width for automobile travel lanes. Therefore, this Plan Update recommends off-road shared-use paths as the primary bicycle facility within these corridors. Because it is desirable to have both on- and off-road accommodations along these significant arteries in the City, bike lanes or paved shoulders should be provided in the long-term when major improvements are made to these roadways.

4.A.5. Intersections

Rockville should provide pedestrian/bicycle warning signs, high-visibility crosswalks, pedestrian/bicycle push-buttons and signals and median refuges and use tight turning radii to improve the safety and comfort of bicyclists at intersections. Due to the conflicts between motor vehicles and bicycles at intersections, special care and treatment must be provided at these locations.

4.B. Top Priority Bikeway Projects

The following is a list of bikeway projects that Rockville should pursue soon after the adoption of this Plan Update. Most of the projects can have a large positive impact on the bikeway network in the short-term by completing connections between existing facilities. Others are large projects that will benefit bicycling in the City and the region in the long term, but should be started right away. More detail is given in the following section. Order does not indicate importance.

1. Complete the Millennium Trail

2. Make the following Town Center bikeway improvements:
   - Bike route signs on Maryland Avenue north of Jefferson Street and Monroe Street
   - Bike lanes on Dawson Avenue, Beall Street, East Middle Lane, and Market Street
   - Shared-use paths on Hungerford Drive and Rockville Pike (MD 355), North Washington Street, Maryland Avenue between Jefferson Street and Great Falls Road (MD 189), and Fleet Street and the Fleet Street Extension

3. Begin construction of the following shared-use paths and install wayfinding signs along the MD 355corridor:
   - Shared-use paths on Hungerford Drive, Frederick Avenue, and Rockville Pike (MD 355), Fleet Street and Edmonston Drive between Wootton Parkway and Rockville Pike
   - Wayfinding signs along entire route, including signs directing bicyclists through Town Center

4. Make the following bikeway connections with new or improved facilities:

Signed-Shared Roadways
- Martins Lane
- Monroe Street
- North Horners Lane
- North Stonestreet Avenue
- Taft Street
- Loftstrand Lane
- East Jefferson Street between Woodmont Country Club and the southern City limit
- Congressional Lane between East Jefferson Street and Rockville Pike (MD 355)
- Edmonston Drive between Rockville Pike (MD 355) and Veirs Mill Road (MD 586)
- Watts Branch Parkway
- King Farm Boulevard
- Pleasant Drive between Redland Boulevard and Deer Meadow Lane
- Grand Champion Boulevard
- Seven Locks Road north of Wootton Parkway

Bike Lanes
- Fallsgrove Boulevard
- Piccard Drive between Redland Boulevard and West Gude Drive

Shared-Use Paths

- Gaither Road between Redland Boulevard and Shady Grove Road
- Mannakee Street between Martins Lane and Hungerford Drive (MD 355)
- West Montgomery Avenue (MD 28) between Darnestown Road and Shady Grove Road
- Darnestown Road between West Montgomery Avenue (MD 28) and Shady Grove Road
- Shady Grove Road between Frederick Road (MD 355) and Darnestown Road
- Falls Road (MD 189) between Wootton Parkway and Great Falls Road
- Veirs Mill Road (MD 586) between Bradley Avenue and Twinbrook Parkway

5. Improve the following intersections:

- Connection to Unity Bridge from west of MD 355
- Gude Drive and Frederick Road (MD 355)
- Hungerford Drive (MD 355) and Middle Lane
- Edmonston Drive and Rockville Pike (MD 355)
- First Street/Wootton Parkway and Rockville Pike (MD 355)
- Veirs Mill Road (MD 586) at First Street (MD 28)
- Shady Grove Road and I-270 interchange

4.C. Top Priority Bicycle Programs

In addition to improving bikeway facilities, Rockville should implement the following programs soon after the adoption of this Plan Update:

1. Expand the Pedestrian and Bicycle Safety Education Program;
2. Strengthen the role of the Citizens Bicycle Advisory Committee in the transportation decision-making process;
3. Develop a Safe Routes to Schools Program;
4. Develop, distribute, post and promote a user-friendly bicycle map;
5. Create distinct bicycle signs, maps and markings for the bikeway network;
6. Adopt the Maintenance Program and detailed Maintenance Schedule (see Section 6);
7. Provide dedicated staff support in order to implement the recommendations in this Plan Update.

4.D. Detailed Recommendations by Goal

This section provides a list of recommendations for each of the five goals of the Bikeway Master Plan Update. Each recommendation has a short description of how it will contribute to improving bicycling in Rockville. These recommendations should be implemented within the next 10 years.

GOAL 1: Improve the bicycle facility network.
(Corresponds to Transportation Goal 1: Enhance the mobility of people, goods and services)

Objective 1.1. Install the bike paths, lanes, signs, crossings, signals and other facilities recommended on the Rockville Bicycle Facilities Recommendations map.

The City has already constructed many miles of shared-use paths, striped bike lanes and signed bicycle routes that provide bicycle access around Rockville. Developers are required to build bike facilities through the Adequate Public Facilities Ordinance. The core of the Rockville Bikeway Network is taking shape, and a number of facilities should be constructed to increase the density and connectivity of the network. These projects are shown on the Rockville Bikeway Recommendations map (Figure 2). Several of the following projects are under construction or have received funding for design and construction and are considered complete.

A. Completion of the Millennium Trail

Originally referred to as the "Bicycle Beltway", the Millennium Trail continues to be a high priority project for the City. Significant progress has been made toward completion of the trail since the 1998 Plan was adopted. The only section of trail that remains to be completed is between Gude Drive and Edmonston Drive (across MD 355 and MD 586). The City received funding to design this section of trail in November 2002. When complete, this trail connection will provide a safe, convenient crossing of two major highways and will help facilitate east-west access across the City.

The City should continue to support the efforts of Montgomery County to improve and maintain the section of the Millennium Trail on East Gude Drive. This part of the 10-mile loop trail serves as an east-west connection on the north side of Rockville, but it is outside the City limits.

B. Development of a Regional Bikeway Network within the MD 355 Corridor

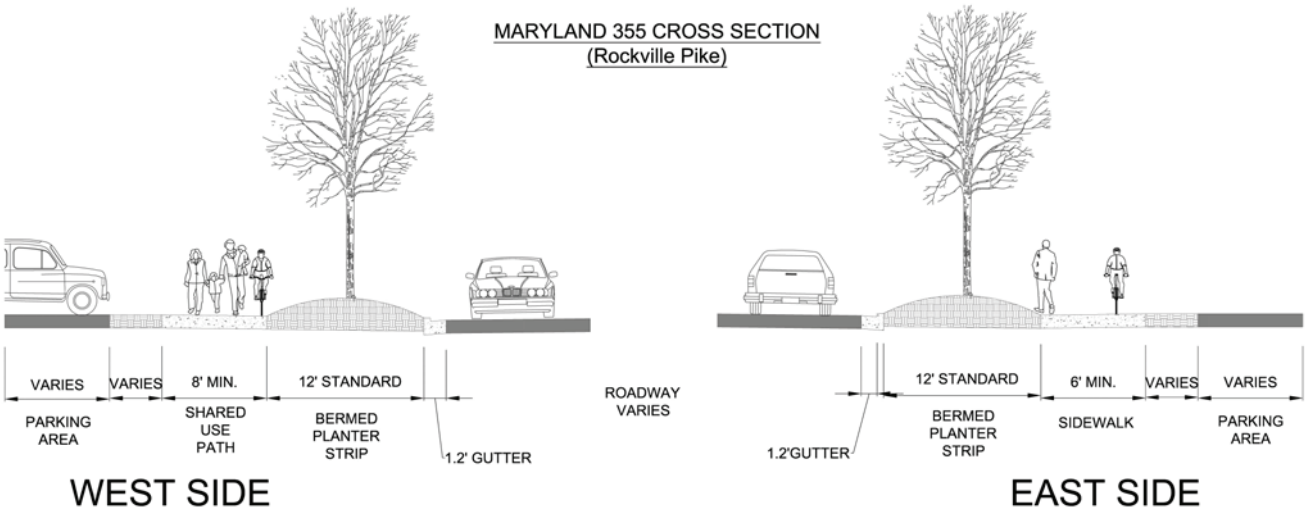
Rockville should provide bicycle access throughout the MD 355 corridor. Ultimately, an 8-foot-wide shared-use path (wide concrete sidewalk) should be constructed on the west side of MD 355 (Rockville Pike, Hungerford Drive and Frederick Road) to serve both pedestrians and bicyclists. The east side of the road should have a 6-foot sidewalk. In many ways, MD 355 operates as Rockville's "Main Street". It is also in important route for providing regional connectivity through Rockville. Numerous commercial and retail establishments are located along the street and could be accessed more safely and conveniently by bicycle if better accommodations were in place. The current configuration of MD 355 serves high-speed, high-volume automobile traffic with very little shoulder space and narrow sidewalks. The City should conduct a special analysis to determine the appropriate shared-use path design for each part of the corridor and develop a set of standards for future roadway and land use development in the corridor.

MD 355 can be improved by replacing the existing sidewalks with wider sidewalks that are separated from the roadway and parking lots (see Figure 4). This bikeway would serve Montgomery College, Town Center, Metro, the Convention Center, East Rockville and numerous shopping clusters and office buildings. It would also be within ½ mile of two high schools. Safe, convenient road crossings should be provided to access the Rockville and Twinbrook Metro stations. It is likely that the regional bikeway network would be in the MD

355 right-of-way on the north side of the City, but signs would direct bicyclists interested in Town Center to bike lanes on the new section of Dawson Avenue and a signed-shared route on Maryland Avenue. Bicyclists could continue south on new shared-use paths on Maryland Avenue south of Jefferson Street and on Fleet Street and Edmonston Drive before returning to Rockville Pike. This regional bikeway network would connect to a new shared-use path on the west side of MD 355 in Gaithersburg and the North Bethesda Trail on the south side of Rockville.

Alternative regional bikeway routes parallel to MD 355 have been explored, and they are not feasible at this time. In the future, any redevelopment projects in the corridor should consider accommodating bikes to help provide a clear and direct north/south connection along MD 355.

Figure 4. Proposed Cross Section of MD 355



C. Provision of bicycle access within Town Center

New streets in the Town Center area will improve bicycle access for residents and visitors to downtown Rockville (Figure 3). The City should proceed with plans to provide bike lanes on the new sections of Dawson Avenue and on the reconstructed Beall Avenue and Middle Lane. The City should also provide bike lanes on Market Street when it is constructed. In addition, a shared-use path is recommended on the east side of North Washington Street to increase the comfort of bicyclists riding between the Post Office and Giant Food Store area and Town Center. Widening the sidewalk along the roadway to serve two-way bicycle traffic could provide an alternative connection between the MD 355 corridor regional network bikeway and Town Center. Both Maryland Avenue and Monroe Street should be designated as signed-shared roadways. Maryland Avenue should have special signs showing bicyclists in the MD 355 corridor to use the street to access destinations in Town Center.

In the long-term, the City should explore the possibility of providing a major trail through Town Center, similar to the Georgetown Branch and Capitol Crescent Trails through downtown Bethesda.

D. Study of the provision of shared-use paths on both sides of Maryland Avenue between East Jefferson Street and Great Falls Road (MD 189)

The City should study the impacts of providing shared-use paths on both sides of Maryland Avenue between Jefferson Street (MD 28) and Great Falls Road (MD 189). Because it would serve as part of a regional bikeway network, the section between Jefferson Street (MD 28) and Fleet Street should be constructed first. In this section the shared-use paths would also improve bicycle access to Rockville City Hall, the Rockville Library, and the Montgomery County Council Office Building. These paths could be created by widening the existing sidewalks to 10 feet. Though there are no walls or steep slopes preventing this expansion, the City should consider impacts on existing signs and light poles. If additional space is needed to create the shared-use paths, the City should study narrowing the total roadway width by three to four feet, and striping 10 foot motor vehicle lanes. This would have the additional benefit of slowing both through and turning traffic in this pedestrian-oriented area of the City.

The section between Fleet Street and Great Falls Road (MD 189) should also be served by a shared-use path due to the heavy, fast traffic. The sidewalk in this section may be more difficult to expand because of utility poles, landscaping, and steep slopes close to the sidewalk. Further study will be needed to determine if this solution is feasible.

E. Study of bicycle facility alternatives along Veirs Mill Road (MD 586)

The City should provide bicycle facilities on both sides of Veirs Mill Road (MD 586). Like MD 355, the current configuration of MD 586 serves high volumes of motor vehicle traffic with little or no separation for bicyclists. Bike route signs should be added along the service roads between Gail Avenue and Bradley Avenue to encourage bicyclists to use these low-volume, low-speed streets as an alternative to Veirs Mill Road. Shared-use paths should be constructed on both sides of the roadway from the ends of the service roads to extend the bikeway west to First Street Trail and east to Twinbrook Parkway. The section of Veirs Mill Road east of Twinbrook Parkway should have shoulder bike lanes to connect the City's shared use paths to the Rock Creek Park bike trail. In the long-term, shared-use paths should be extended east from Twinbrook Parkway beyond the City limit. In the future, the City should explore the possibility of constructing a shared-use path between the intersection of Veirs Mill Road and First Street and the Rockville Metro Station.

Sections of these shared-use paths and bike lanes can be added as redevelopment occurs. A bikeway along this route will provide residents on the east side of the City with a direct route to Town Center.

F. Completion of the Baltimore Road bicycle path between the Millennium Trail and Rock Creek Regional Park

Rockville should complete the Baltimore Road shared-use path so bicyclists can ride between the Millennium Trail and the eastern edge of the City. To do this, a shared-use path should be constructed along Baltimore Road between the First Street section of the Millennium Trail and the western terminus of the existing Baltimore Road shared-use path (at Gladstone Drive). This section is a critical connection because it completes a connection between the center of the City and Civic Center Park, Rockville High School, Meadow Hall Elementary School and Rock Creek Regional Park. The completed Baltimore Road bicycle path will also serve neighborhoods on the east side of Rockville.

The City should also support the construction of a new path at the east end of Baltimore Road that connects Norbeck Road (MD 28) with the existing trail near Rock Creek. This section of path is immediately outside the City limits. Though there is an existing path in this area, the current facility is substandard and should be widened to 10 feet. Sections of trail that pass through environmentally-sensitive lands, such as the Rock Creek floodplain should undergo special study before widening.

Rockville should designate Twinbrook Parkway as a signed-shared roadway and possibly include bike lanes to direct bicyclists from Veirs Mill Road (MD 586) to the shared-use path on Baltimore Road. In addition, a shared-use path should be added to Avery Road to connect to the existing path on Norbeck Road (MD 28) and provide access to Rock Creek Park.

G. Connection of Northeast Rockville to the Rockville Metro Station and Town Center

All of Lincoln Park and Northeast Rockville are within easy bicycling distance of the Metro station and the Town Center. North Stonestreet Avenue, North Horners Lane, Loftstrand Lane, Taft Street and Southlawn Lane should be designated as signed-shared roadways. The east-west connection under the railroad tracks at Park Road is critical for bicyclists. In the short-term, the City should also install new curb ramps leading to the 7.5-foot sidewalks directly below the railroad bridge. Ultimately, shared-use paths should be added to both sides of the road between Hungerford Drive (MD 355) and Stonestreet Avenue. These improvements will make bicycling to destinations in downtown Rockville more attractive to neighborhood residents.

H. Provision of Connections within Hungerford, Stoneridge and New Mark Commons

Bikeway linkages are needed to improve access to destinations such as Dogwood Park and Richard Montgomery High School in the Hungerford, Stoneridge and New Mark Commons neighborhoods south of Town Center. A shared-use path should be constructed along the south side of Fleet Street to provide access to the high school. In addition, a shared-use path should be included when Fleet Street is extended from Mount Vernon Place to Ritchie Parkway. In the future, the City should provide a shared-use path on the south side of the section of West Edmonston Drive between Wootton Parkway and MD 355. In the interim, the roadway should be designated as a signed-shared bike route. These improvements would be part of a potential

regional bikeway network within the MD 355 corridor. Bike route signs should be posted on Monroe Street, West Edmonston Drive, East Lynfield Drive, and Potomac Valley Road.

I. Connection of Town Center to Orchard Ridge, Potomac Woods and Fallsridge

The City should provide bicycle facilities to connect Town Center to Orchard Ridge, Potomac Woods and Fallsridge on the southwest side of the City. Shared-use paths should be constructed on both sides of Falls Road (MD 189), where conditions permit. This includes extending the existing bicycle path on Falls Road between Dunster Road and Wootton Parkway north through the I-270 interchange to provide better bicycle access to the many destinations in the center of the City. It is difficult for drivers see bicyclists and pedestrians on the shared-use path on the east side of Falls Road at the I-270 interchange. This sight-distance issue must be addressed. The shared-use path on the northwest side of the road should connect to the shared-use path on Great Falls Road (this includes constructing a section of path in front of Julius West Middle School). The MD 189 path should also be extended south from Dunster Road to the south City limit. A curb ramp should be added to the sidewalk and future sidepath on the west side of Falls Road at the Fallsmead Way intersection so that cyclists can easily cross to Fallsmead from the path when these improvements are made.

When Seven Locks Road is reconstructed, it should include shared-use paths and bike lanes on both sides of the road. The section of Seven Locks Road north of Wootton Parkway comes to a dead end for motorists, but cyclists can connect through to Falls Road. This connection should be signed as a bike route.

Dunster Road and Stratton Drive should still be signed-shared roadways to provide access to the nearby Millennium Trail and the Falls Road Bikeway that runs along the west side of these neighborhoods. Milboro Drive should have bicycle route signs because there is a short sidewalk at the end of the street that connects the neighborhood to Wootton Parkway. An enhanced pedestrian and bicycle crossing should be provided on Wootton Parkway at this location to make it easer for neighborhood pedestrians and bicyclists to access the Millennium Trail on the opposite side of the road.

Opportunities for on-road cycling are limited along Wootton Parkway. The City should provide a paved shoulder for bicyclists' use when reconstruction of Wootton Parkway occurs. This facility will complement the Millennium Trail that is in the Wootton Parkway corridor.

J. Provision of Connections within Rockshire and Fallsmead

The western portion of the Millennium Trail runs along the western edge of both the Rockshire and Fallsmead neighborhoods. Watts Branch Parkway should be designated as a bicycle route because it is an important connection that runs parallel to I-270 and provides access to Hurley Avenue and MD 28. The designation of this street as a signed-shared roadway would complement existing traffic circles and speed humps. Greenplace Terrace, Gerard Street, Hurley Avenue and Fallsmead Way should also be signed-shared roadways. These improvements will provide better access to the Woottons Mill Park and to the new I-270 Pedestrian and Bicycle Bridge near MD 28.

K. Connection of the I-270 Pedestrian and Bicycle Bridge to the bike route on Anderson Avenue

The City should provide a safe and convenient way for bicyclists to travel between the I-270 Pedestrian and Bicycle Bridge and reconstructed Nelson Street/West Montgomery Avenue intersection and the Anderson Street Bikeway. In the short-term, the City should provide bike route signs on Nelson Street to guide bicyclists from the new bridge and reconstructed intersection to Anderson Street. Ultimately, shared-use paths should be provided on both sides of Nelson Street between MD 28 and Anderson Street.

L. Designation of an east-west bicycle route through the Rose Hill area between the I-270 Pedestrian and Bicycle Bridge and the Great Falls Road (MD 189) shared-use path

Rockville should provide signs to direct bicyclists to a path through Rockmead Park between Roxboro Road and Tall Grass Court. This connection is part of a bikeway that would link the new I-270 Pedestrian and Bicycle Bridge and the Great Falls Road shared-use path (MD 189). Sections of Adclare Road, Roxboro Road, Tall Grass Court and Autumn Wind Way should be designated as signed-shared roadways to help direct bicyclists along these streets find this trail connection.

M. Connection of Woodley Gardens and College Gardens with Montgomery College and Town Center

The City should connect the Woodley Gardens and College Gardens neighborhoods on the north side of Rockville with Montgomery College, the Rockville Swim Center, the Post Office and Town Center by constructing a shared-use path on Mannakee Street and designating the entire length of Martins Lane as a signed-shared roadway. These bicycle facilities would connect to the existing bike lanes on Nelson Street. Improving these connections should make bicycling a more attractive and viable option for neighborhood residents.

N. Connection of Rockshire, Fallsmead and Horizon Hill with Robert Frost Middle School and Glen Mill Road

The City should widen the existing sidewalk on the north side of Veirs Drive to 10 feet. Bike route signs should be posted on Scott Drive in the short-term; a shared-use path should be provided along this segment in the future when the bridge across Watts Branch is reconstructed. This shared-use path will make bicycling a more comfortable option for some students at Robert Frost Middle School. These new facilities will help improve the connection from the Millennium Trail and Rockshire, Fallsmead and Horizon Hill neighborhoods to Glen Mill Road.

O. Connection of Montrose Area to Twinbrook Metro Station and the North Bethesda Trail

East Jefferson Street and Congressional Lane, should be designated as signed-shared roadways to complement the existing bike routes in the area of the Twinbrook Metro station. The City of Rockville and Montgomery County share responsibilities for the implementation of bikeway connections in the Montrose/Twinbrook area. Bikeways in this area will provide connections between the Twinbrook Metro station and the Tower Oaks commercial area. North of Twinbrook, bike route signs should be added to Edmonston Drive to help designate a bikeway leading from the Millennium Trail across Rockville Pike (MD 355) and Veirs Mill Road (MD 589) to Baltimore Road.

The City of Rockville should work with the Washington Area Metropolitan Transit Authority (WAMTA) to widen the sidewalk connecting Lewis Avenue to the Twinbrook Metro station to at least 8 feet. It should also provide a curb ramp for bicycle and pedestrian access to this sidewalk. This connection would allow people to bicycle from Lewis Avenue through the Metro Station to Parklawn Drive or Fishers Lane. The City and WAMTA should also consider including a bridge over the railroad tracks to connect Halpine Road over MD 355. This improvement can be made during redevelopment of the Twinbrook Metro station area.

The North Bethesda Trail is planned to connect to the Rockville Bikeway Network near the intersection of Montrose Road and Rockville Pike. The City should construct a shared-use path along the entire length of Chapman Avenue to improve connectivity in the area between this Trail and the Twinbrook Metro. The City also encourages Montgomery County construct a shared-use path on Bou Avenue just outside of the Rockville City Limits to connect between MD 355 and Chapman Avenue. The North Bethesda Trail is the beginning of Montgomery County's I-270 Corridor Bikeway that will continue north using Rockville's bikeways and connect to the Great Seneca Highway Bikeway north of Rockville. Montgomery County and the City of Rockville should conduct a joint study of the corridor between the Twinbrook Metro station and Montrose Road to determine the best alignment for this connecting bikeway facility. This bikeway will also serve as part of the regional bikeway network in the MD 355 corridor.

P. Connections to the major employment centers in the area of Research Boulevard and Piccard Drive.

The City should study the possibility of striping bike lanes on Piccard Drive. Preliminary field work showed that this street is wide enough to accommodate parking and bike lanes. As an alternative, there is adequate space at the sides of Piccard Drive to widen the sidewalks so that they serve as shared-use paths.

The City should also study the potential to construct shared-use paths on both sides of Research Boulevard.

The Millennium Trail provides good bicycle access to the entrances of both Piccard Drive and Research Boulevard. Bikeways within these areas would aide employees who want to bike to work and/or bicycle and walk during their lunch breaks.

Q. Connections between the shared-use paths on the west side of the City

Rockville should improve bicycle access to the office parks and neighborhoods on the west side of the City by connecting the shared-use path that will be completed on West Montgomery Avenue (MD 28) between the I-270 Pedestrian/Bicycle Bridge and Darnestown Road to the shared-use paths shown in the Fallsgrove Bikeway Network Plan. Darnestown Road is a Montgomery County roadway. The City and County should provide shared-use paths on the north side of Darnestown Road and look for opportunities to provide on-road accommodation for bikes. For example, it may be possible to add a paved shoulder or bike lanes when reconstruction of Darnestown Road occurs.

R. Addition of bikeways within the Fallsgrove development

The City should ensure that all of the bikeways shown in the Fallsgrove Concept Plan Bikeway and Pedestrian Network are constructed as the Fallsgrove development is completed. This includes shared-use paths within the development on Fallsgrove Drive and Oak Knoll Drive and bike lanes on Fallsgrove Boulevard and an important section of the Millennium Trail between West Gude Drive and Glen Mill Road. Shared-use paths should be provided around the development on Shady Grove Road, Darnestown Road and West Montgomery Avenue (MD 28) In the future, Rockville should stripe bike lanes on Shady Grove Road, Darnestown Road, and West Montgomery Avenue (MD 28) so that they can accommodate bicycles both on and off the road. Goodland Place should be marked as a signed-shared roadway. The City should also include bicycle and pedestrian facilities along the Corridor Cities Transitway (CCT). Fallsgrove and other developments along the corridor should have bike facility connections to the CCT. The intersection of the CCT and Shady Grove Road must accommodate bicycles and pedestrians.

S. Addition of bikeways connecting to (and within) the King Farm development

The City should add new bicycle facilities in the King Farm area. Redland Boulevard should provide bicycle access between the neighborhood and the Shady Grove Metro station. Shared-use paths should be added to the entire length of Shady Grove Road and Gaither Road, Redland Boulevard between Piccard Drive and Gaither Road, and to the east end of Ridgemont Avenue. The section of Piccard Drive south of Redland Drive should have bike lanes (see recommendation above) and the boulevard section to the north should be designated as a signed-shared roadway. Other roads that should have bike route signs include King Farm Boulevard, Pleasant Drive, Crooked Creek Drive and Grand Champion Boulevard. Improving the intersections of Frederick Road (MD 355) with Redland Boulevard and King Farm Boulevard is essential for making bicycling to the transit station safe and convenient. These roadway and intersection improvements will make it easier for neighborhood residents to access the Metro station and the Millennium Trail on West Gude Drive.

The City should also include bicycle and pedestrian facilities along the Corridor Cities Transitway (CCT). King Farm and other developments along the corridor should have bike facility connections to the CCT. The intersections of the CCT and MD 355 and the CCT and I-270 must accommodate bicycles and pedestrians. King Farm and the Shady Grove Metro are key areas for CCT development in Rockville.

T. Provision of directional signs in Woottons Mill Park and in Twinbrook Park

Signs should be posted in Woottons Mill Park to direct bicyclists through the existing network of trails. Signage should indicate the most direct route between Watts Branch Parkway and Greenplace Terrace and should also show the name of the street to which each trail branch connects. Signs should also emphasize how to get between the Woottons Mill Park and the Millennium Trail. A trail map could also be installed in the center of the park at a prominent trail intersection to help orient bicyclists. Similar signage should be provided on the trail through Twinbrook Park.

Objective 1.2. Remove significant barriers to bicycling.

The 1998 Plan identified a number of barriers and obstacles to bicycling in Rockville. The following broad or general barriers to bicycling were identified in the 1998 Plan and are still pertinent today:

- Crossings along I-270, Rockville Pike (MD 355), and the Metro/MARC/CSX railroad corridor;
- Access to downtown;
- Access to Rock Creek bike path; and
- East-west access throughout the City.

The City's Adequate Public Facilities Ordinance requires developers to fix any condition related to their development that creates or aggravates a safety hazard for bicyclists at an intersection. Though the City is making progress in addressing these barriers, it is challenging to design and construct facilities to overcome these barriers. A new Pedestrian and Bicycle Bridge over I-270 at MD 28 has been designed and funded, and funding has been received to implement improvements to intersections on MD 355 in the Town Center. Continued attention to addressing roadway barriers is critical to the success of this Plan Update.

Although it is not the intent of this Plan Update to provide a bike path or lane for each and every road and highway, it is intended to provide a safe, efficient bikeway network that would allow access to each part of the City. The barriers or problem routes identified above will either need to be improved or alternate routes will need to be designated. By providing the bike lanes and paths along key roadways and improving key intersections throughout the City, Rockville residents will be able to meet all their daily needs by bicycle.

Specific recommendations to eliminate barriers to bicycling include:

A. Improve the Gude Drive/Frederick Road (MD 355) Intersection

The intersection of Gude Drive and Frederick Road (MD 355) is a key Millennium Trail roadway crossing. New pedestrian signal heads with countdown timers are needed at this location. The median should be extended north so that it reaches beyond the crosswalk and provides a refuge in the middle of MD 355. High-visibility crosswalks should be installed and tighter right-turn radii are needed for traffic turning south from West Gude Drive onto MD 355 and for traffic turning east from MD 355 onto East Gude. This will slow the turning traffic and reduce the total crossing distance for pedestrians and bicyclists. Currently, heavy through traffic and fast turning automobiles make it difficult for bicyclists and pedestrians to cross, creating a barrier to many potential Millennium Trail users. The existing crossing is confusing for pedestrians and bicyclists. There is no pedestrian signal head, so it is difficult to tell when vehicles are allowed to turn across the crosswalk and how much time is available to complete the crossing. In addition, the MD 355 median does not extend to the crosswalk, so pedestrians and bicyclists who start crossing late in the green phase can be stuck in the middle of the six-lane highway with no refuge.

The City is working with the Maryland State Highway Administration regarding modifications to the intersection that would better accommodate bicyclists and pedestrians. The City should continue to pursue solutions with the State for this critical safety issue. Completion of this project will address two objectives identified in this Plan Update: crossing MD 355 and improving east-west access across the City.

B. Provide better access through the Falls Road (MD 189)/I-270 Interchange and Shady Grove Road/I-270 Interchange

The City should install high-visibility crosswalks across the on- and off-ramps at the Falls Road (MD 189) and I-270 interchange and reduce the turning radii of these ramps to slow traffic. This path should be constructed on the west side of the bridge so that it avoids crossing the I-270 exit ramps at locations with limited sight-distance. The new path should be created when the interchange is reconstructed. For residents of the southwest part of Rockville, crossing I-270 on Falls Road to connect to destinations east of I-270 is difficult. Making this connection is key to providing residents in this area with a safe and convenient bicycle route to Town Center and throughout the City.

Like Falls Road, I-270 creates a barrier for bicyclists riding on Shady Grove Road. High-visibility crossings and warning signs should be provided across these ramps when new shared-use paths are constructed on Shady Grove Road.

C. Improve Downtown Crossings

Hungerford Drive (MD 355) is a major barrier between downtown Rockville and places such as East Rockville, Lincoln Park, and the Rockville Metro Station. Current crossing conditions at MD 355 intersections are extremely bad for pedestrians and bicyclists. Crossing exposure time is long because the road has six lanes and there are no median islands to serve as refuges. Signals do not provide sufficient time for slower pedestrians to finish crossing. Traffic speeds are fast, which reduces the drivers' awareness of pedestrians. Therefore, higher visibility

crosswalks and median crossing islands should be provided; turning radii should be reduced; and the pedestrian signal phase should be increased at the intersections of MD 355 and Middle Lane, Church Street and Veirs Mill Road (MD 28). The City has received funding through the Maryland Bicycle and Pedestrian Access 2000 program to make improvements at several intersections near the Metro station.

D. Improve access across East Gude Drive to a Future Trail between the Millennium Trail and Needwood Park

Rockville should work closely with the Maryland-National Capitol Park and Planning Commission (M-NCPPC) to improve access to a future trail that will connect the Millennium Trail with Needwood Park. The new trail project is programmed by M-NCPPC to be constructed in 2004. Access to the future trail should be improved by creating a bicycle- and pedestrian-friendly mid-block crossing of East Gude Drive. The crossing should be staggered through the median so that the crosswalk across the south lanes of Gude Drive is 50 to 100 feet west of the crosswalk across the north lanes. This will help pedestrians and bicyclists view oncoming traffic before they cross and provide a staging area for bicyclists. The crossing should be studied to determine if a bicyclist/pedestrian-activated signal is warranted. If so, the signal system should include push-buttons on both sides of the roadway and in the median.

E. Eliminate barriers at other intersections

Many of the following intersection barriers were noted in the 1998 Plan, and they should be addressed during this next phase of work. Concept designs should be created for each intersection to show appropriate locations for safety improvements, such as new median crossing islands, high visibility crosswalks, pedestrian/bicycle warning signs, pedestrian signal heads and push buttons and tighter turning radii. These intersection barriers include:

- West Middle Lane at Washington Street;
- Edmonston Drive at Rockville Pike (MD 355);
- Redland Boulevard at Frederick Road (MD 355);
- King Farm Boulevard at Frederick Road (MD 355);
- Baltimore Road at First Street;
- Halpine Road at Rockville Pike (MD 355);
- First Street/Wootton Parkway at Rockville Pike (will be improved when the Millennium Trail is completed); and
- Veirs Mill Road at First Street (will be improved when the Millennium Trail is completed).

F. Evaluate potential locations for a bike box pilot project.

The City should explore the possibility of doing a bike box (advanced stop bar) pilot project. The intersection of MD 355 and Middle Lane and several other locations are potential candidates that should be evaluated. A bike box would allow bicyclists to move in front of cars waiting at an intersection to increase their visibility and reduce conflicts with turning vehicles. A bike box is a design technique that is typically used at intersections with left-turning cyclists. It employs an advanced stop bar at a signalized intersection, creating a 10-foot to 15-foot long area between

the crosswalk and the stop bar. During a red signal phase, bicyclists are able to better position themselves for a left turn by moving left across the bike box. This device is profiled in the Institute of Transportation Engineers *Innovative Bicycle Treatments* report, and has been tested in several cities around the country.

Objective 1.3. Continue to maintain existing bicycle facilities.

The City should continue to maintain all bikeways, including trails, bike lanes and signs on a regular basis. The Department of Public Works should maintain all bikeways in roadway rights-of-way, and the Department of Recreation and Parks should maintain trails that are not adjacent to existing roadways. Maintenance responsibilities include fixing pavement cracks and potholes, restriping lanes, ensuring adequate drainage, clearing branches that encroach on the bikeway and removing leaves, snow, and other debris (see Section 6). The City should also explore the possibility of working with bike vendors or civic group volunteers to clean up trash on bikeways.

The City should ensure that there is adequate accommodation for bicyclists during roadway construction projects. This may include striping temporary shoulder space, providing a temporary pathway for cyclists around the construction, or signing a detour route.

Rockville should also provide adequate lighting along shared use paths and sidewalks. Light can make trails feel more secure and also make trails more attractive to bicyclists. Though cyclists should always ride with a light at night, roadway lighting makes bicyclists more visible to automobile drivers.

Although the City of Rockville is not directly responsible for maintenance on State Highway Administration and Montgomery County roadways within the City, such as Norbeck Road, Rockville Pike, Gude Drive, and Darnestown Road, City staff should notify the County and State of maintenance needs in a timely manner to ensure that bikeways in these corridors are in good repair and free of debris.

Objective 1.4. Continue to gather public input and other data to determine where new facilities and improved maintenance are needed.

The City of Rockville does extensive public outreach when planning new bicycle facilities. Input should continue to be taken from the Citizens Bicycle Advisory Committee, general comments on Facility Improvement Request Forms and through public meetings. People living near where a new facility will be constructed should continue to be notified.

Implementation of this Plan Update will require strong public support. The City should seek input and support from school representatives, public health groups, neighborhood organizations, and other groups that have an interest in bicycling issues. The City must continue to solicit public feedback about the importance of the recommendations in this Plan Update and receive new ideas to improve bicycling for all people, for all types of trips and for all parts of the City.

In implementing this Plan Update, it is recommended that the City conduct periodic follow-up data collection. A detailed survey of bicyclists should be distributed biennially. This survey

would gather information about how often people ride, origins and destinations, trip purposes and their recommendations for new and improved bicycle facilities and programs in the City. Other data collection may include reviewing census travel information (every ten years), counting bicyclists at Metro stations, public schools and parks (annually) and counting and interviewing people attending special bicycle-oriented events, such as Ride for Rockville and Bike to Work Day (annually). These forums provide an excellent opportunity to talk to citizens and visitors about current conditions and future plans for bicycling in Rockville.

GOAL 2: Provide bicycle facilities during development and redevelopment.
(Corresponds to Transportation Goal 6: Minimize the separation effects of major transportation facilities)

Objective 2.1. Add bicycle facilities during roadway construction, reconstruction or resurfacing.

The addition of a bikeway to a roadway is most easily accomplished when new construction or reconstruction of the road is planned. The bicycle facility requirements of the City's Adequate Public Facilities Ordinance are followed in each development project. Projects that are currently in the City's CIP and are recommended for bikeways in this Plan Update should be identified and appropriate bicycle improvements should be incorporated into their design. Decisions regarding what type of bikeway to construct on a roadway should be determined during the planning phase of each project, using the Bicycle LOS model described in Appendix A to determine the appropriate roadway cross-section. The City of Rockville should work with the County and State to ensure new roads and retrofitted roads under their jurisdiction, adjacent to or within the City accommodate bicycles.

The City's goal for the bikeway network is to maintain a Bicycle LOS of "A" or "B" (for segments with on-road facilities) and/or to provide off-road trails to accommodate bicyclists on streets noted on the bikeway map. Achieving this goal is particularly important during new road construction or road reconstruction projects. These Bicycle LOS targets should be incorporated into the City's Adequate Public Facilities Ordinance.

Implementation involving retrofitting existing roadways to accommodate bicycle use may make projects more complex. Existing streets built with a curb and gutter section will often be viewed as having a fixed width and improvements will likely be limited to "moving paint," that is, restriping the existing lanes. When Bicycle LOS can not be improved to "A" or "B" by changing roadway lane striping, slowing traffic and improving pavement conditions, the City should study shared-use paths or multi-use trail alternatives to separate bicyclists from moving automobiles. These options may not always be available, so the City should provide the best condition possible, given constraints. For example, raising Bicycle LOS from "F" to "D" provides a significant benefit to bicyclists.

Objective 2.2. Require developers to include bicycle facilities in all new developments.

Through the redevelopment process, the City has successfully gained bikeway mileage and has coordinated the locations of proposed trails in new subdivisions to connect to the bikeway

network. Routes that are in the bikeway network will continue to be identified during the site plan development process. Developers are required to construct the required facilities and ensure that additional bikeways in their developments connect to the main bikeway network.

The MD 355 corridor is a key location where development is likely to occur. As commercial establishments redevelop, the recommended MD 355 corridor regional bikeway network should be constructed. For example, the signed bikeway on East Jefferson Street can be connected to the Millennium Trail at Edmonston Drive to complete a part of the bikeway on the west side of MD 355 as properties are redeveloped. Other opportunities to incorporate bicycle facilities are the new developments occurring in Town Center, Fallsmead, Fallsgrove, King Farms and Tower Oaks.

Objective 2.3. Ensure that Rockville's Roadway Design Standards are bicycle-compatible.

The City should continue to require that future updates of its Roadway Design Standards are bicycle-compatible. These standards should include on-road accommodations for bicyclists and provide guidance on the design of shared-use paths and trails. This will make it easier for developers, who are required to follow these standards, to provide shared-use paths and space on roadways for bicycle travel.

Bicycle-friendly design standards include features such as bike lanes, striped shoulders, and tight turning radii, high-visibility crosswalks and median refuges at intersections (See Section 5, Design Standards). They should also allow 10-foot motor vehicle lanes to be striped on critical links in the bikeway network. If installed in appropriate locations, this encourages slower travel speeds (as demonstrated by reductions in speed on Nelson Street) and provides more space for bicyclists. Motor vehicles on West Jefferson Street, Nelson Street, and Hurley Avenue already operate effectively with 10-foot lanes.

Objective 2.4. Strengthen the role of the Citizens Bicycle Advisory Committee in the transportation decision-making process.

The CBAC has been an important resource to the City of Rockville due to its knowledge of bicycling issues, and the group's long-standing commitment to serving as advisors to the Mayor and Council and City staff. Members of the CBAC have provided hundreds of volunteer hours for a variety of bicycling events and programs sponsored by the City, including the implementation of the Bicycle and Pedestrian Safety Education Program.

The CBAC should continue to serve the City, and should be strengthened in its role as an advisory body in the transportation decision-making process. This can be achieved in a variety of ways. One way to provide a stronger role for the CBAC would be to place a CBAC member on the Traffic and Transportation Commission and vise versa. Strategic involvement of the CBAC will help facilitate implementation of this Plan Update in the years to come.

Objective 2.5. Provide dedicated staff support in order to implement the recommendations in this Plan Update.

Dedicated staff support will be critical to the City's ability to implement this Plan Update. The initial success achieved in the five years since the 1998 Plan was adopted was due in a large part to the availability of staff that were dedicated to carrying out the Plan, and who were able to pursue grant opportunities that provided funding for implementation. In order to carry out the recommendations in this Plan Update, it is therefore important that the City maintain a full time bicycle coordinator.

GOAL 3: Improve the safety of children bicycling to school.
(Corresponds to Transportation Goal 5: Foster a safe and maintainable transportation network that encourages the observance of traffic laws)

Objective 3.1. Expand the City's Pedestrian and Bicycle Safety Education Program to all Rockville elementary schools.

As the City's network of bicycle facilities expands, it is essential for children to understand how to ride safely on streets, in bike lanes and on bicycle paths. The City of Rockville is currently serving as the pilot community for the Maryland Pedestrian and Bicycle Safety Education Program. The Department of Recreation and Parks developed and implemented Pedestrian and Bicycle safety lessons that were taught at six of the City's elementary schools during the 2002-2003 school year. The program's success has already led to the Montgomery County Public Schools Pedestrian Safety Task Force to recommend the adoption of the program to the County Board. The City should offer the Pedestrian and Bicycle Safety Education Program to all City elementary schools on a consistent basis and continue to support staffing for the program. Rockville should also consider offering bicycle safety instruction to middle and high school students.

Objective 3.2. Develop a Safe Routes to Schools Program and use it to generate interest in and ideas for improving bicycle facilities near Rockville schools and on routes children use to access these schools.

The City should build upon the interest and enthusiasm generated by the Pedestrian and Bicycle Safety Education Program to encourage parents to participate in a Safe Routes to Schools Program. Rockville should use the Safe Routes to Schools guidebook, developed by the Maryland Department of Transportation, to help parents, students, school representatives and City representatives come together to make pedestrian and bicycle improvements at one or two schools in the first year and to eventually expand to more City schools. The program would examine school access routes in the neighborhoods surrounding the school and implement improvements to intersections, add traffic calming features and provide better bike paths and sidewalks. Rolling Terrace Elementary School in Montgomery County piloted a Safe Routes to Schools Program sponsored by the Maryland Department of Transportation in 2001-2002.

By making improvements that decrease the risk of traveling along and crossing busy streets, it will be easier for students to walk and bicycle to school, reducing the number of parents who choose to drive so that they can drop off and pick up their children at Rockville schools.

GOAL 4: Protect the environment.

(Corresponds to Transportation Goal 4: Protect the environment)

Objective 4.1. Develop a media packet on the environmental benefits of bicycling and walking and present it to the Mayor and Council, television, radio, and newspaper media, and the general public.

Rockville should produce a media packet for wide distribution that highlights the environmental benefits of bicycling. The packet could be entitled, "How Can Bicycling and Walking in Rockville Help the Environment?", and its materials should focus on benefits to both the physical environment and the social environment in Rockville. Physical environmental benefits of bicycling include no air pollution and minimal noise impacts. Social environmental benefits include increased interaction between residents and inexpensive recreational opportunity. Benefits to personal fitness and public health will be a particularly strong focus of the materials. The media packet can also encourage residents to do their part to improve air quality and to get to know their neighbors by bicycling and walking instead of driving. The packet should stress the importance of establishing a multi-modal transportation system, in order to be prepared for future levels of traffic congestion, diminishing air quality, and the need for people to get exercise as a part of their daily lives.

The City should distribute the media packet to convey environmental benefits to the general public through television and radio spots, newsletters, and newspaper articles and advertisements. Brochures summarizing the environmental benefits of bicycling and walking can be created and distributed in the same manner as the bicycle map. The City should also use future public transportation hubs, such as Metro stations and future Multimodal centers, to disseminate information on the benefits of bicycling.

Objective 4.2. Continue to evaluate the environmental impacts of all proposed bikeway facilities.

The City should review bikeway proposals to ensure they follow the City of Rockville's Environmental Guidelines. The City should also encourage the creation of bikeways that allow people to enjoy significant views and vistas and to be close to plants, birds, and animals.

GOAL 5: Create and support programs to facilitate bicycling and develop community pride in bicycling.
(Corresponds to Transportation Goal 2: Promote a transportation system that is multi-modal, accessible, and friendly to all users)

Objective 5.1. Create a user-friendly bicycle map and distribute it at public libraries, bicycle shops, and government buildings throughout the City.

The City of Rockville should create a full-color bicycle map to show existing bikeways and bicycle suitability throughout the City. The map should also show bicycling destinations, such as parks, transit stations, civic attractions and commercial areas. Rockville should regularly distribute this map to bicycle shops, recreation centers and through other outlets. In addition to showing bicycle routes and destinations, the map can be used to generate public interest in

bicycling. Mass distribution of a user-friendly bicycle map will raise awareness of bicycling in Rockville among residents and visitors.

Objective 5.2. Promote the Rockville Bikeway Network by designing a distinctive system of signs, maps, and markings.

The City should highlight the Millennium Trial with specially designed "Millennium Trail" signs and unique crosswalk markings each time the trail crosses a roadway. It should also give names to other significant bikeways, such as the continuous bikeway designated with bike lanes on Nelson Street and College Parkway and the future regional bikeway network in the MD 355 corridor. Each of these significant bikeways can be marked with distinctive signs that will give bicyclists the sense of being on a unique route and will also help advertise bicycling in the City. The signs should provide safety messages, basic rules and responsibilities of bicyclists, contact information for bikeway suggestions and volunteering to help Rockville's bicycling program, directions to nearby destinations and be difficult to vandalize.

Wayfinding signs should be posted at the entrances to City parks with shared-use paths. This will make it easier to follow a main trail through the park and find destinations on the other side of the park.

The City should also post a simple map of the entire bikeway network at transportation hubs, such as the Metro stations and future Multi-modal centers, and other key bikeway intersections throughout Rockville. The map would be similar to the Washington Metrorail System map, showing the significant bikeways and a few key destinations in the City, such as Town Center, the Metrorail stations, City Hall, Montgomery College and other schools, major retail centers and City parks. Posting bicycle network maps will tell residents what street or path they are bicycling on, help them navigate to destinations throughout the City and make them aware that they can bicycle to destinations that they have not considered traveling to by bicycle before. In addition, attractive maps can help advertise the Rockville Bikeway Network. If signs are posted near major roadway intersections, all City residents will see that they can use the bicycle network for transportation and recreation, and some may choose to bicycle more often.

Objective 5.3. Establish incentive programs to encourage citizens to bicycle.

To promote using the City's bicycle facilities, Rockville should establish programs that give incentives to bicyclists. There are a number of groups with which the City can partner in order to generate resources to make these programs successful. They include the Washington Metropolitan Area Transit Authority (WMATA), Commuter Connections, corporate sponsors and the Washington Area Bicyclist Association (WABA). For example, programs could offer small monetary incentives to Rockville citizens who bicycle to work or Metrorail on a specific day of the week, such as Friday. The "Bike Friday" program would promote bicycling on a regular basis in Rockville. Benefits of this type of program would be increased use of the City's bicycle facilities, reduced automobile trips, increased transit trips, reduced air pollution, more active citizens, and information circulated about bicycle use in Rockville on a weekly basis.

The City of Rockville is researching other ways to actively encourage bicycling for transportation. In order to deal with congestion and predicted local and regional growth, the City has chosen to look to alternative modes of transportation, and is crediting developers who implement bicycle facilities through its Transportation Demand Management (TDM) program. Incentives that have been offered in other parts of the United States include cash rewards, free bicycle storage, free showers and free movie tickets (Podjer 2003).

Objective 5.4. Expand Bicycle Recycling Program to offer more free and reduced price bicycles to low-income families.

Some families do not have the resources to buy bicycles, which prevents them from receiving the recreation and transportation benefits of Rockville's bikeway network. Residents who do not own a bicycle will not be able take full advantage of the City's new bicycle paths and lanes, Pedestrian and Bicycle Safety Education Program and potential "Bike Friday" program. Children experience the greatest negative impact: those who do not have bicycles and are often dependent on their parents to drive them to visit parks and friends, participate in sports and access other destinations in the City.

To make it easier for all residents of Rockville to have the opportunity to meet their daily needs by bicycle, the City should continue to offer free or reduced price bicycles to children without bicycles. The City currently fixes donated and unclaimed lost bicycles through the Bicycle Recycling Program. Bicycles are given to children who perform community service and accumulate a certain number of "Character Counts" points. This program should be expanded by looking for other opportunities and programs to get all children in Rockville on bikes. The City should explore opportunities to obtain more bikes for the program at the trash transfer station.

There may also be the potential to offer free or reduced-price bicycles to low-income families through bicycle donations programs and police auctions throughout the region. The City should also explore programs that make it easy for families to purchase and repair used bikes.

Objective 5.5. Work with local bicycle advocacy groups and a diverse group of citizens to implement the Bikeway Master Plan Update.

The City should work with local bicycle advocates to gather input on future bikeway plans and projects and to gain public support for bikeway initiatives. Advocates and other citizens can help Rockville implement this Plan Update.

5. DESIGN STANDARDS

5.A. Overview

National standards and guidelines for bikeway design are derived from the AASHTO Guide and the Manuel on Uniform Traffic Control Devices (MUTCD), both of which have been recently updated. The revised AASHTO Guide contains expanded guidance on the design of all types of bikeways, while the MUTCD includes updated standards and guidelines regarding signing and markings for bikeways. These documents are the State Highway Administration's (SHA) and the City's design standards and guidelines, therefore all bikeway designs should conform to them. This section of the Plan Update addresses basic concepts of bicyclist types and facility types. Designers should refer to the AASHTO Guide and the MUTCD for more detailed design guidance.

To allow greater flexibility in determining what type of bikeway is best for corridors identified in this Plan Update, the Bicycle Level of Service (Bicycle LOS) model has been for this Plan Update and should be used in the future to determine the most appropriate bikeway cross-section for each corridor, on a case-by-case basis. This is a change from the 1998 Plan that recommended a specific bikeway for each road or corridor included in the Plan. Bicycle LOS is a scientifically calibrated model that evaluates existing and future bicycling conditions based on standard roadway features including speed and volume of traffic and the width of travel lanes.

5.B. Types of Facilities

The 1999 AASHTO Guide defines four types of bikeways and presents design guidance for each. To be consistent with the recommendations in the AASHTO Guide, this Plan Update deletes the previous classification system for bikeways used in the 1998 Plan (Class I, II, and III) and adopts the bikeway definitions included in the AASHTO Guide.

The AASHTO Guide defines a **bikeway** as:

A generic term for any road, street, path or way which in some manner is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use or bicycles or are to be shared with other transportation modes.

The following descriptions provide an overview of the four bikeway types included in the AASHTO Guide, with local examples of each type. Use of all four types of bikeways is recommended to create an integrated and accessible network of bikeways that meets the needs of all types of bicyclists in the City.

5.B.1. Shared Roadway (No Bikeway Designation)

Most bicycle travel occurs on streets and highways without bikeway designation, and this is expected to continue into the future. Most of these streets are low volume neighborhood streets that provide a comfortable travel environment for most cyclists. Shared roadways are a primary

means of access to the network of designated bikeways for most bicyclists. The majority of streets in Rockville fall into this category of bikeway.

5.B.2. Signed-Shared Roadway

Signed-shared roadways are those that have been identified by signing as preferred bike routes. There are several reasons for designating signed bike routes, including:

- Providing continuity to other bicycle facilities, usually bike lanes;
- Designating preferred routes through high-demand corridors; or
- Identifying routes leading to destinations within a neighborhood such as a park, school or commercial district.

Roadways in the Rockville Bikeway Network that are designated as signed-shared roadways should incorporate traffic calming measures to slow vehicle speeds.
The City should consider street width and parking when deciding the feasibility of traffic calming measures. Often, signed-shared roadways are recommended on residential roadways that are 36-feet wide from curb to curb. Traffic calming measures, such as traffic circles and narrowing motor vehicle lanes will benefit bicyclists on these roadways by helping to lower vehicle speeds and by providing additional space for bicycles along the edge of roads.

If a roadway in the Rockville Bikeway Network does not have a bike lane or shared-use path and has adequate width, narrower motor vehicle lanes can be considered as one method of slowing vehicle speeds and improving Bicycle LOS. Edgelines are used to narrow the travel lanes to 10- or 11-feet wide and provide a wide striped parking lane. This defines the space for automobiles, slows traffic and results in a marginal increase in Bicycle LOS. While this treatment is not an official bikeway type, it is supported by the AASHTO Guide for the Development of Bicycle Facilities (1999), which states, "…where four-foot [paved shoulder] widths cannot be achieved, any additional shoulder width is better than none at all" (p. 16).

Many of Rockville's streets were constructed to be 36-feet wide from curb to curb. Since parking is permitted on both sides of these streets, there is insufficient room to provide bike lanes. Removing parking to create bicycle lanes is rarely an option in these circumstances, unless the parking lanes are not used (such as alongside a park or other undeveloped property). Therefore, edgelines are an alternative that benefits bicyclists and benefits neighborhood residents by calming traffic.

Edgelines and shoulder space are useful even for cyclists who prefer not to ride on the shoulders, since they provide a buffer between the curb lanes and the curb, gutter, or edge of the roadway.

Signing of shared roadways should indicate to bicyclists that particular advantages exist to using these routes compared with alternative routes. Any route that is to be signed should be analyzed (via the Bicycle LOS model) to assure that it is suitable to be designated as a shared route, and if not, improvements should be implemented prior to installation of bike route signs. The route should have good riding conditions (i.e. Bicycle LOS "A" or "B"). If current riding conditions

are not suitable, steps should be taken to improve the Bicycle LOS, including reducing motor vehicle travel speeds, providing striped shoulders, etc.

5.B.3. Bike Lane

Bike lanes are established with appropriate pavement markings and signage. The purpose of a bike lane should be to improve conditions for bicyclists and motorists on the street and to indicate the proper position of each vehicle in the right-of-way. Bike lane markings can provide for more predictable movements by motorists and bicyclists. Nelson Street is an example of a street with bike lanes in place in Rockville.

The AASHTO Guide includes extensive information about the design of bike lanes.

Bike Lane Considerations

Bike lanes should be striped on roadways with moderate traffic to provide significant increases in comfort for bicyclists. Bike lanes can also give a special designation to routes that lead to important destinations in the City and serve as a visible sign of the bikeway network, encouraging more people to bicycle in Rockville. They also make it easier for drivers to see bicyclists at driveway crossings and require bicyclists to ride in the same direction as automobile traffic. It is easiest to provide bike lanes during roadway construction or reconstruction. Most of the bike lanes recommended in this Plan Update should be added as Town Center is developed. Many of the roadways in Rockville's Bikeway Network are low-volume, low-speed residential streets that are comfortable for bicyclists without bike lanes or shared-use paths.

Where bicycle lanes are striped next to parallel parking, the lanes should be designed to provide adequate space between the riding area and parked vehicles, particularly in commercial areas with high parking turnover. Bicyclists should use caution and should not ride in the area where car doors could potentially swing open.

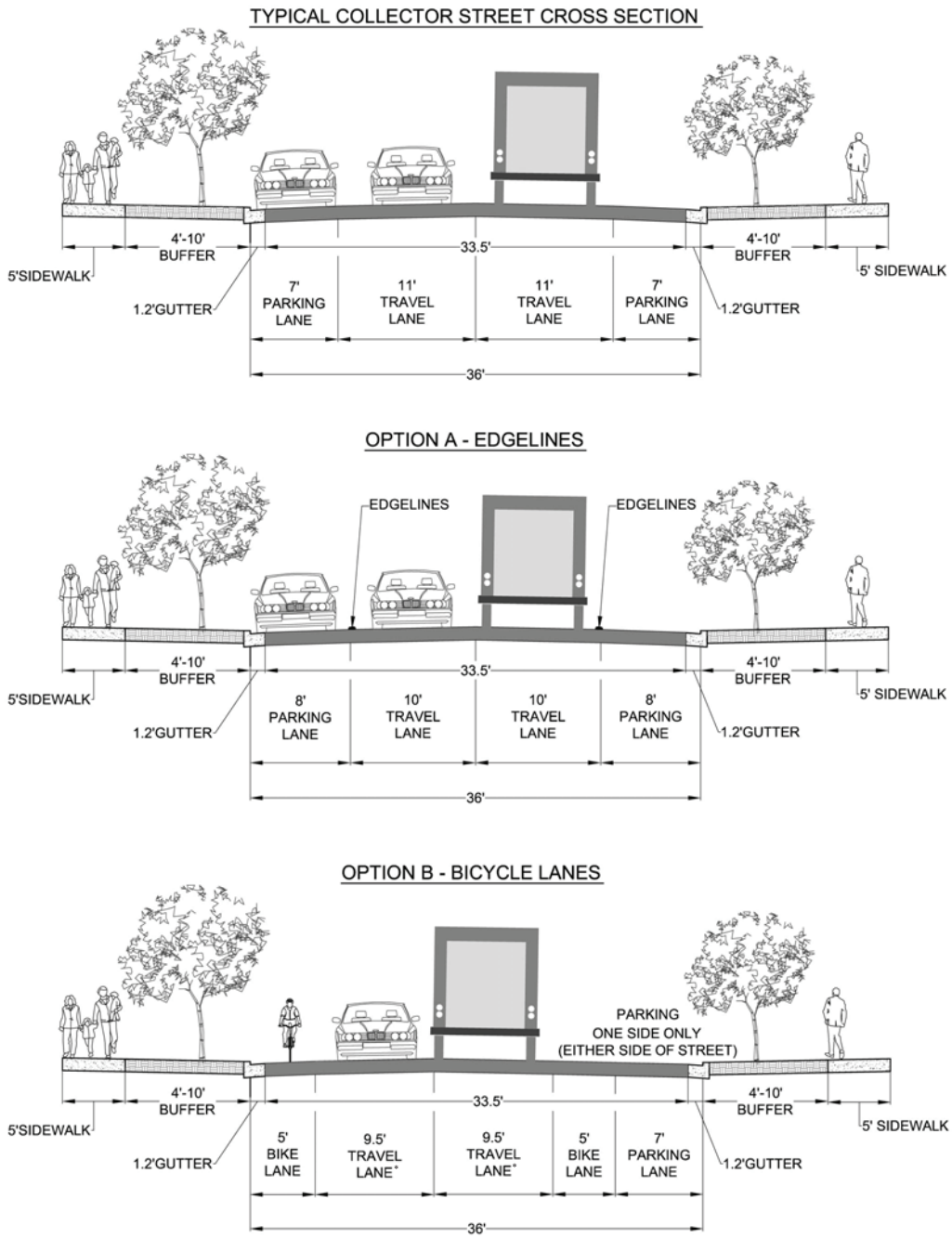
Providing Roadway Space for Bicyclists

Bike lanes can be created and automobile travel lanes can be narrowed when a road is repaved. This can be done by restriping an existing road. Space exists on many streets to accommodate striping changes without impacting existing or future traffic patterns or requiring acquisition of right-of-way. Figure 5 shows how a typical 36-foot Rockville collector street can be restriped with edgelines or bike lanes. When determining the appropriate roadway cross-section, Bicycle Level of Service, Motor Vehicle Level of Service and parking needs should be considered in an effort to balance the needs of all roadway users.

It also is possible to add space for bicyclists by increasing the total pavement width when roads are reconstructed or repaved. Other options to consider when reconstructing or restriping a street include:

- Reducing the number of travel lanes; or
- Narrowing the parking lanes.

Figure 5. Alternative 36-foot Cross-Sections



*An engineering study should be done to determine the feasibility of providing narrow (9.5') travel lanes. This solution is generally appropriate on streets with slower speeds

5.B.4. Shared-Use Path

Shared-use paths are facilities on exclusive right-of-way with minimal cross flow of motor vehicles. Often referred to as trails, shared-use paths are intended to accommodate various non-motorized users including bicyclists, in-line skaters, walkers, runners, people with strollers, wheelchair users and dog walkers. These facilities are most commonly designed for two-way travel. The recommended minimum width for a shared-use path is 10 feet. In Rockville, there are many opportunities to widen sidewalks to 10 feet so that they serve as shared-use paths. Right-of-way constraints, such as utility poles, trees, ditches, and buildings and environmental constraints, such as wetlands and stream buffers, should be considered at potential sidepath locations. Where space is constrained, an 8-foot path width may be acceptable. Ideally, some buffer space is provided between the road and the sidepath, but right-of-way constraints may force the shared-use path to be constructed next to the curb. In these cases, the full shared-use path width is more important than the buffer.

Rockville should provide shared-use paths in parts of the bikeway network where there is heavy, fast traffic. Shared-use paths should not be used to preclude on-road bicycling but rather to supplement a system of on-road bicycle facilities. Shared-use paths that are adjacent to roadways can provide separation from heavy, fast-moving traffic and create more comfortable riding conditions, especially for less experienced cyclists. They can also be used to provide space for pedestrians and to serve schools. However, shared-use paths in the roadway right-of-way are less desirable when the roadway corridor has many driveways and intersections. Cyclists riding in the opposite direction of motor vehicle traffic and approaching from the right side of right-turning vehicles from intersecting streets and driveways (drivers look left) often come in conflict with these vehicles. In corridors with fewer driveways and intersections, these conflicts are less of a problem. For information on other design elements of shared-use paths, designers should refer to the AASHTO Guide.

5.B.5. Intersection Accommodation

Rockville should provide crosswalks, pedestrian/bicycle push-buttons and signals, median refuges and use tight turning radii to improve the safety and comfort of bicyclists at intersections. Due to the conflicts between motor vehicles and bicycles at intersections, special care and treatment must be provided at these locations. The AASHTO Guide and the MUTCD have recommendations on how to sign and stripe bike lanes at various types of intersections.

6. MAINTENANCE PROGRAM

6.A. Introduction

Bicyclists are very sensitive to maintenance problems on bikeway facilities. A new bicyclist who encounters frequent or recurring maintenance issues on their regular route, may find biking too difficult or hazardous and, consequently, may give up riding. Whether it is debris on a bikeway or problems with the pavement surface in a bike lane or shared-use path, a system should be established to address both regular and remedial maintenance on both the on-street and off-street bikeway networks. It is recommended that the City follow the Bicycle Facility Maintenance Practices and Bikeway Maintenance Schedules below.

The first step in developing a maintenance program is to identify what tasks need to be undertaken and who is responsible for each task. The Bikeways Maintenance Schedule (see Tables 2 and 3) lays out maintenance tasks and identifies the Department that should have lead responsibility for each task. The Bikeway Specialist should be responsible for coordinating the execution of the Maintenance Schedule and should be the point of contact for citizens with questions regarding maintenance. Funding for an ongoing maintenance program should be included in the City's operating budget or Capital Improvements Program.

The Facility Improvement Request Form gives citizens an easy means of reporting maintenance concerns. The form allows citizens to notify City agencies about existing conditions affecting bicycling or of more general concerns or suggestions regarding bicycling in the City. The requests are submitted to the Bikeway Specialist who then refers the request to the appropriate City agency. The forms are should be made available at locations throughout the City and on the City's web page.

6.B. Bicycle Facility Maintenance Practices

The following description of maintenance practices was adapted from the 1996 Oregon Bicycle and Pedestrian Plan. The descriptions serve as guidelines for the City Departments that are responsible for performing bikeway maintenance tasks.

6.B.1. Sweeping

Bicyclists often avoid bike lanes filled with sand, gravel, broken glass and other debris; they will ride in the roadway to avoid these hazards, causing conflicts with motorists. Debris from the roadway should not be swept onto sidewalks (pedestrians need a clean walking surface); nor should debris be swept from the sidewalk onto the roadway.

A regularly scheduled inspection and maintenance program helps ensure that travelway litter is regularly picked up or swept. During extended icy conditions, it may not be cost-effective to frequently remove sanding materials; however, they should be swept after major storms in high-use areas and after the winter season ends.

Recommendations

- Establish a seasonal sweeping schedule;
- Sweep bikeways whenever there is an accumulation of debris on the facility; and
- Provide extra sweeping in the fall in areas where leaves and cones accumulate in bike lanes.

6.B.2. Surface Repairs

A smooth surface, free of cracks, potholes, bumps and other physical problems should be provided and maintained.

Recommendations

- Inspect bikeways regularly for surface irregularities;
- Respond to citizen complaints in a timely manner;
- Repair potentially hazardous conditions as soon as possible;
- Prevent the edge of a repair from running through a bike lane; and
- Sweep a project area after repairs.

6.B.3. Pavement Overlays

Pavement overlays are good opportunities to improve conditions for cyclists if done carefully: a ridge should not be left in the area where cyclists ride (this occurs where an overlay extends part-way into a bike lane). Overlay projects offer opportunities to widen the roadway or to restripe the roadway with bike lanes.

Recommendations

- Extend the overlay over the entire roadway surface to avoid leaving an abrupt edge;
- If this is not possible, and there is adequate bike lane width, it may be appropriate to stop at the bike lane stripe, provided no abrupt ridge remains;
- Raise inlet grates, manhole and valve covers to within 6 mm (1/4") of the new pavement surface; and
- Sweep the project area after overlay.

6.B.4. Vegetation

Vegetation encroaching into bikeways is both a nuisance and a problem. Roots should be controlled to prevent break-up of the surface. Adequate clearances and sight-distances should be maintained at driveways and intersections: pedestrians and bicyclists must be visible to approaching motorists, rather than hidden by overgrown shrubs or low-hanging branches, which can also obscure signs.

Recommendations

- Cut back vegetation to prevent encroachment; and

- Perform preventative operations such as cutting back intrusive tree roots.

6.B.5. Signs, Stripes & Legends

New bikeway signs and legends are highly visible, but, over time, signs may fall into disrepair and legends may become hard to see, especially at night. Signs and legends should be kept in a readable condition, including those directed at motorists. Pedestrians and bicyclists rely on motorists observing the signs and legends that regulate their movements.

Recommendations

- Inspect signs and legends regularly, including reflectivity at night;
- Replace defective signs as soon as possible; and
- Retrace legends, crosswalks and other pavement markings in the spring; in high-use areas, these may require another paint application in the fall.

6.B.6. Drainage Improvements

New drainage facilities function well but may sink and deteriorate over time. Catch basins may need to be adjusted or replaced to improve drainage. A bike-safe drainage grate at the proper height improves bicycle safety. At intersections, there should be no puddles in pedestrian crosswalks.

Recommendations

- Raise catch basin grates flush with pavement;
- Modify or replace deficient drainage grates with bicycle-safe grates; and
- Repair or relocate faulty drains at intersections where water backs up onto the curb cut or into the crosswalk.

6.B.7. Utility Cuts

Utility cuts can leave a rough surface for cyclists if not back-filled carefully.

Recommendations

- Wherever possible, place cut line in an area that will not interfere with bicycle travel;
- Back fill cuts in bikeways flush with the surface (humps will not get packed down by bicycle traffic); and
- Ensure that cuts parallel to bicycle traffic do not leave a ridge or groove in the bicycle wheel track.

6.B.8. Snow Removal

Snow stored on bike lanes or shared-use paths impedes bicycling and walking in winter.

Recommendations

- On streets with bike lanes, remove all snow from street surface; and
- Clear snow from shared-use paths and make sure that snow banks do not block paths where they cross plowed roads.

6.C. Bikeway Maintenance Schedules

The following Tables 2 and 3 provide a schedule for maintaining on-road and off-road bikeways, respectively. On-road bikeway maintenance is the responsibility of the Department of Public Works; off-road bikeway maintenance is the responsibility of the Department of Recreation and Parks.

Table 2: On-Road Bikeways

Department of Public Works

Task	Frequency	Comments
Regular inspection	32 times per year	Includes all on-road bikeways, identify needed repairs of pavement, signs, marking, etc.
Street sweeping	4 times per year	All streets with bike lanes, extra attention in the fall
Street repairs	As needed	Repair of streets with bikeways including potholes, cracks or other problems
Bike lane snow removal	As needed	Clear snow completely from streets with bike lanes
Debris removal from on-street bikeways	As needed	Remove debris from on-street bikeways such as gravel and broken glass
Signs and markings	As needed	Repair or replace signs and markings identified during inspections
Markings	As needed, at least every 2 years	Includes all bike lane markings and symbols and crosswalks

Table 3: Off-Road Bikeways

Department of Recreation & Parks

Task	Frequency	Comments
Regular inspection	2 times per year	Includes all off-road bikeways, identify needed repairs of pavement signs, marking, etc.
Trail sweeping	2 times per year	All paved trails
Trail snow removal	As needed	Clear snow from identified priority trails
Trail repairs	As needed	Repair of trails including potholes, cracks or other problems on shared-use paths, and benches, trash cans, and other trail amenities
Trail resurfacing	10-12 years	Applies to all asphalt trails
Debris removal from trails	As needed	Remove debris from trails such as limbs, slit and broken glass
Signs and markings	As needed	Repair or replace signs and markings identified during inspections
Vegetation control	As needed, at least 2 times per year	Trim limbs and shrubs 2 feet back from trail edge, trim grass from trail edges
Litter removal	6 times per year	Could be done with volunteers

7. TYPICAL BIKEWAY FACILITY COSTS

This section describes the typical cost of adding pavement stripes, constructing shoulders, adding shared-use paths and providing bicycle racks and lockers.

- Restriping lanes costs between $3,200 and $25,000 per mile.

This cost depends on whether the lanes are restriped during reconstruction or repaving of the roadway. If done in conjunction with another project, any extra restriping cost is for lane marking material (for a six-inch line, the cost is about $0.80 per foot, or $4,200). However, if exiting lanes need to be scraped off or the road needs to be regraded to ensure proper drainage, the cost will be much higher. These costs do not include the cost of maintenance of traffic during construction, engineering and design, right-of-way acquisition, utility relocation, grading, labor, administration or future maintenance.

- Including a 5-foot shoulder or wide curb lanes in a project costs approximately $100,000 per mile per side. Retrofitting shoulders or wide curb lanes into an existing condition costs approximately $250,000 per mile per side.

These costs would include paving, base, earthwork, drainage structures, etc. They would not include right-of-way or any necessary utility relocations or adjustments.

- Constructing a 10-foot sidepath (minimal earthwork and paving) costs approximately $100,000 per mile.

This cost includes contingencies for grading, drainage, landscaping, erosion and sediment control, etc. However, it does not include right-of-way of utility relocations or adjustments.

- Constructing a separate trail system on its own right-of-way would cost approximately $250,000 per mile.

This cost includes contingencies for grading, drainage, landscaping, erosion and sediment control, etc. However, it does not include right-of-way of utility relocations or adjustments, and the $250,000 per mile does not include any structures such as bridges, box culverts or pipes (large enough to carry a trail). Bridge structures can be generally estimated at $100 per square foot.

- The cost of a bicycle rack that can hold 10 to 12 bikes ranges from $200 to $600.

This cost varies dramatically based on design and material and does not include labor, administration or future maintenance.

- The cost of a bicycle locker that can fit two bicycles ranges from $350 to $700.

The cost varies depending on the type of bicycle locker and does not include labor, administration or future maintenance.

8. SUPPLEMENTAL FACILITIES AND POLICIES

8.A. Bicycle Parking

Cyclists must have safe and secure parking available at likely destination points for the Rockville Bikeway Network to be used to its full potential. Bicycle parking (or the lack of) can make the difference between a trip that is taken by bicycle and one that is not. A survey conducted by *BICYCLING* Magazine revealed that 43.5 percent of adults who had ridden a bike in the last year but not to work in the past month said they would bicycle to work if there were showers and secure bicycle storage.

One type of bicycle parking does not meet all needs, rather a combination of facilities should be investigated to accommodate the needs of bicyclists. The biggest fear is theft. A bike rack placed close to building entrances, visible to others, offers adequate security for short-term parking, while lockers are preferred for long-term storage. Local legislation can be used to develop a comprehensive parking program. An example can be found in San Francisco, where local law requires the City to provide its employees the equivalent of a locker, "sheltered and access restricted" while visitors to municipal buildings have the more appropriate bike rack outdoors for short-term use.

8.A.1. Ordinances

A proven method to increase the amount of bicycle parking in a City is the adoption of or amendment to local ordinances and/or building codes to require bike parking with new developments. The City has discussed this issue as part of the development of the Adequate Public Facilities Ordinance.

Jurisdictions throughout the United States have adopted such ordinances, including Montgomery County, Maryland. Montgomery County's Zoning Ordinance 59-E2.3 Standards for Bicycle and Motorcycle Parking require:

1.All (owners of) parking facilities containing more than [50] fifty parking spaces shall provide one bicycle parking space or locker for each twenty automobile parking spaces in the facility. Not more than twenty bicycle parking stalls or lockers shall be required [on] in any one [lot] facility.

2. Bicycle parking facilities shall be so located as to be safe from motor vehicle traffic and secure from theft. Interior storage and lockers are encouraged. They shall be properly repaired and maintained. Facilities that are used for overnight parking must be protected from the weather, when they are part of an enclosed parking facility.

The City should adopt a bicycle parking ordinance.

8.A.2. Location

The location of bicycle parking facilities might be considered the most important element of creating an effective bicycle parking system. Facilities should be located with the user in mind. Bicyclists, more than motorists and pedestrians, enjoy a freedom of mobility that allow them to travel within feet of their final destination. Facility site location should consider this element heavily. Bicyclists will find another option to secure their bicycles if the provisions provided are not near the final destination.

Good location for parking facilities is dependent on several items. Several bicycle-friendly cities have adopted standards that ensure good placement of bicycle parking facilities.

8.A.3. Types of Parking

There are three basic types or levels of parking available for bicycles, based on the level of security provided for the bike and the needs of the intended users. The first level of parking generally serves the needs of short-term users, such as shoppers and college students, and is often called low-security parking and is the least expensive. Standard bike racks fall into this category. Racks should be designed to support the bike by its frame and allow for the use of various types of locks. Medium-security racks allow the frame and both wheels of the bike to be secured using various types of locks. These racks serve longer-term users, such as people accessing transit stations, and usually involve moving parts. The highest level of security is provided by bicycle lockers. Lockers not only provide protection for the bike from theft, but also provide protection from the elements and a security for the bicycle's components, lights, and other gear.

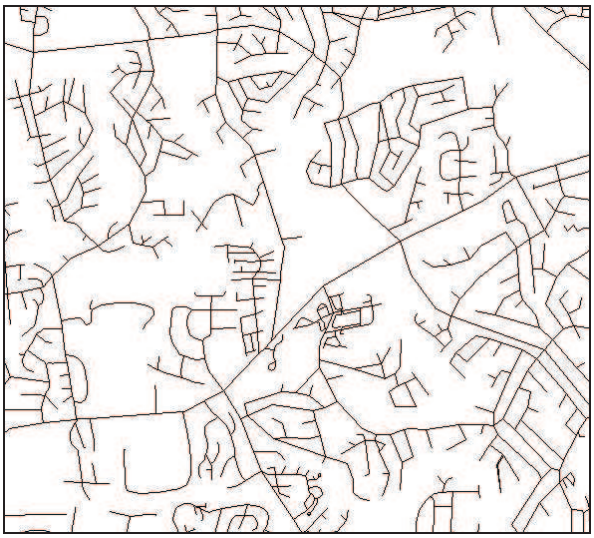
8.B. New Development Policies

Although Rockville is, for the most part, a developed community, proposals for new development and redevelopment (as a part of downtown revitalization) will be submitted to the City. It is important that accommodation of bicycles be addressed in the planning and design of these projects. Policies and ordinances should be reviewed to ensure that appropriate accommodations are provided, both as specific facilities (e.g. bicycle parking racks) and as a part of street configuration and access control.

In the case of new development, careful consideration should be given to bicycle circulation within the development area and to connections with the local and regional bikeway networks with particular attention to intersection accommodations adjacent to existing roadways. Grid street patterns and the provision of pedestrian and bicycle connections between cul-de-sacs and/or long block faces are examples of development patterns that provide options to bicyclists and encourage bicycling as a part of people's everyday lives (Figure 6).

Figure 6. Example Street Patterns

Traditional Grid



Disconnected Suburban Streets

Land use and zoning patterns can also encourage bicycling. Providing people with convenient and close access to shopping, schools, and churches increases the potential that people will choose to bicycle to these locations as opposed to driving a car. Mixed-use zoning districts or provisions within the zoning ordinance that allow small scale, neighborhood-oriented commercial development within residential zones can create neighborhoods where people will choose to walk and ride their bikes.

Right-of-way should also be dedicated, which will allow bicycle connections between adjacent development and land uses.

8.C. Funding Opportunities

8.C.1. Introduction

Funding sources for bicycle and pedestrian facilities and programs can be found at all levels of government as well as in the private sector. Prior to the 1990's only a few million dollars a year of federal funds were being invested in bicycle or pedestrian facilities. Starting with the passage of ISTEA (the Intermodal Surface Transportation Efficiency Act) in 1992, hundreds of millions of dollars are now being spent annually on bicycle, pedestrian and trail facility development. Millions more are spent regularly on planning, safety and promotion programs.

In Maryland, funding opportunities for bicycle and pedestrian facilities and programs exist from a variety of sources within MDOT and other state agencies, including:

- Neighborhood Conservation/Urban Reconstruction Program
- Sidewalk Retrofit Program
- Retrofit Bicycle Program

- Transportation Enhancement Program
- National Recreational Trails Program
- Maryland Scenic Byways Program
- Highway Safety Grant Program (Section 402)
- Program Open Space
- Rural Legacy Program

In addition, there are several new programs currently under consideration that could offer significant sources of funding for trails and bikeways:

- GreenPrint Program
- Community Parks and Playgrounds Program
- MDOT CMAQ Fund

These, and other federal, local and private funding opportunities are described in this section.

8.C.2. Government Funding Sources

Federal—Transportation (ISTEA and TEA-21)

Leading the way in government funding sources is federal funding through the Transportation Equity Act for the 21st Century or "TEA-21." This six-year funding bill (FY 1998 - FY 2003) authorizes $217 billion in federal gas-tax revenue and other federal funds for all modes of surface transportation, including highways, bus and rail transit, bicycling and walking. More than half of these funds are made available through programs for which bicycling and walking activities are eligible expenditures, however, none of these funds are dedicated solely for bicycle or pedestrian facilities or programs.

TEA-21 is the successor to "ISTEA," the Intermodal Surface Transportation Efficiency Act, which provided federal funding for the years 1992-1997. ISTEA is now viewed as the federal act that initiated a major policy shift in federal funding priorities making federal funds much more accessible for state and local bicycling and walking facilities and programs. TEA-21 continues and strengthens this new emphasis on improving conditions for bicycling and walking. TEA-21 funds are administered by the State of Maryland, through the Maryland Department of Transportation (see below).

The Transportation and Community and System Preservation Pilot Program is a comprehensive initiative of research and grants to investigate the relationship between transportation and land use, in partnership with private sector-based initiatives. States, local governments and metropolitan planning organizations are eligible for discretionary grants to plan and implement strategies that improve the efficiency of the transportation system.

State agencies, MPOs, tribal governments and units of local governments recognized by a state are eligible recipients of TCSP grant funds. This includes towns, cities, public transit agencies, air resources boards, school boards and park districts but not neighborhood groups or developers. While non-governmental organizations are not eligible to receive TCSP funds, these

organizations are encouraged to form partnerships with an eligible recipient as the project sponsor.

Federal—Non-Transportation

Outside of the federal transportation programs there are a wide range of other federal funds that can be used for bicycling and walking facilities. Some of the most common include funds through the federal land agencies such as the National Forest Service, National Park Service or Bureau of Land Management; however, these funds are primarily for trails and must be on federal lands. Community Development Block Grants through the Department of Housing and Urban Development (HUD) are a likely source of funds for community-based projects, such as commercial district streetscape improvements, sidewalk improvements, safe routes to school or other neighborhood-based bicycling and walking facilities that improve local transportation options or help revitalize neighborhoods. The National Transportation Enhancements Clearinghouse has prepared a useful technical brief, *Financing and Funding for Trails*, that sites over thirty federal and national funding sources that could be used to help fund bicycling and walking facilities and/or programs, especially trails: www.enhancements.org.

Clean Air Transportation Communities: Innovative Projects to Improve Air Quality and Reduce Greenhouse Gases: The Environmental Protection Agency (EPA) recently announced the availability of funds for projects that involve climate change and transportation/air quality issues or pilot programs that have a high potential to encourage innovations in the reduction of transportation-related emissions and vehicle miles traveled (VMT's) at the local level and throughout the United States. The EPA is particularly interested in projects that incorporate at least one of the following: smart growth efforts that reduce transportation-related emissions, commuter choice, cleaner vehicles and clean, renewable fuels.

State—Transportation

Neighborhood Conservation/Urban Reconstruction Program

This program began in 1996 to assist in the revitalization of neighborhoods through roadway improvements to state highways and urban state highways. Three phases of funding are available: 1) concept development, 2) design, and 3) construction. Some of the eligible projects funded by this program include adding or upgrading drainage, curb and gutter construction/reconstruction, conventional sidewalks, bus shelters and transit station access improvements, landscaping and specialized signage. Counties or municipalities can send concept development or design proposals to SHA District Engineer's anytime during the year. Construction projects, however, are accepted semi-annually (spring and fall). The proposal will then be submitted to the Chief Engineer's Office for review and selection.

Funding Cycle: Year Round
Contact: SHA District Engineer

Sidewalk Retrofit Program

This program was established in 1995 to provide funding for the construction of new and the reconstruction of existing sidewalks and pathways. In the first three years of the Retrofit Sidewalk Program, 170 communities received a total of $4.1 million for sidewalk construction. The program receives $3 million annually and allocates funds to counties based on a distribution formula. Counties can spend the funding directly or distribute them to local municipalities. Proposals are accepted on an ongoing basis. The Chief Engineer's Office will review and select projects.

Funding Cycle: Year Round
Contact: SHA Program Coordinator (410) 545-8900

Bicycle Retrofit Program

This program was initiated by the State Highway Administration (SHA) in 2000. The purpose of the program is to fund minimal on-road improvements on state highways that would benefit bicycling. Eligible improvements include projects that can be completed quickly and without the need for permits or right-of-way. One million dollars is allocated annually to the Bicycle Retrofit Program. Individuals and local jurisdictions can submit project requests to SHA's Bicycle and Pedestrian Coordinator on an on-going basis.

Funding Cycle: On-going
Contact: Maryland Bicycle and Pedestrian Coordinator (410) 545-5656

Transportation Enhancement Program

This program is administered by SHA and uses Federal appropriations (Federal Surface Transportation Program funds) to fund transportation-related facilities. Projects such as bicycle and pedestrian facilities and education programs, acquisition of scenic easements and preservation of abandoned railways are examples of projects funded each year; approximately 70% of the program funds have gone toward bicycle and pedestrian education programs and trail projects. Up to 50% of each project's cost is eligible for funding; the other 50% must be matched by the project sponsor.

Funding Cycle: Twice per year
Contact: Enhancement Program Manager (410) 545-5670

National Recreational Trails Program

This program, administered by SHA, matches federal funds up to 50% with local funds to implement trail projects. Eligible activities include trail construction, reconstruction, maintenance, restoration and easement or property acquisition. Counties or municipal governments are eligible to apply for these funds and must submit an application to SHA's Office of Environmental Design. Applications are distributed in September for a mid-November deadline. Typically, funds are awarded in January or February of each year.

Funding Cycle: Mid-November Deadline
Contact: Recreational Trails Coordinator (410) 545-8637

TEA-21 Congestion Mitigation and Air Quality Improvement Program (CMAQ)

This program provides over $8.1 billion dollars in funds to State Departments of Transportation, Metropolitan Planning Organizations and transit agencies to invest in projects that reduce transportation-related emissions. Each State is qualified for an apportioned amount of funding each year based on county populations residing within ozone and carbon monoxide (CO) non-attainment and maintenance areas and the severity of the areas air quality problems. Departments of Transportation or Metropolitan Planning Agencies must submit projects to FHWA for approval before funds are actually received. Once projects have been identified, SHA applies for the funding directly to FHWA. SHA typically seeks CMAQ funding for HOV lanes; however, it is possible to submit an application for a bicycle and pedestrian project.

Funding Cycle: On-Going
Contact: MD SHA (410) 865-1296

Federal Highway Safety (Section 402) Grant Program

This program is administered by SHA's Office of Traffic and Safety. Federal 402 funds are used for pedestrian and bicycle public information and education programs. Funds are distributed to states annually from the National Highway Traffic Safety Administration (NHTSA) according to a formula based on population and road mileage. Every county in the State and the City of Baltimore is assigned a Community Traffic Safety Program Coordinator who organizes local task forces that identify and prioritize traffic safety issues and develop appropriate countermeasures. Projects are then communicated to the Traffic Safety Division through the local coordinator. Projects are reviewed and approved on a continual basis. 402 funds are awarded to SHA sometime after October 1 each year.

Other Potential Sources of State Funding

The following programs are currently under review for implementation in Maryland:

MDOT CMAQ Fund – The Maryland Office of the Secretary of Transportation is considering a new program that would enable local governments to request CMAQ funding through an MPO or other governmental process. The submittal and selection of applications would be separate from the current CMAQ process. The amount of funding potentially available, eligible projects and the application process for this program are currently under development.

The Community Parks and Playgrounds Program – This program is proposed in the current budget as a 3-year, $45 million initiative that will provide funding to restore and create parks and playgrounds in communities all across the State. While this initiative is not specifically written to fund bicycle and pedestrian facilities, such plans could be proposed as enhancements to existing parks.

Maryland's GreenPrint Program - This program would act as a compliment to existing land conservation programs. The purpose of this new land preservation initiative is to acquire ecologically sensitive lands. A network of green infrastructure has been identified by the Department of Natural Resources with assistance from local governments, scientists and conservation organizations. While GreenPrint program funds would not be competitive, counties would be encouraged to approach DNR with significant projects.

State – Non-Transportation

Program Open Space's (POS)

The primary focus of this program is to acquire outdoor recreation and open space areas for public use. POS is administered by Maryland's Department of Natural Resources (DNR) and is funded through the state real estate transfer tax. The money set aside for this program is divided equally between local and state projects. Half of the money is used by the state for direct land acquisitions, while the other half is granted to local governments. In order to receive these funds, counties are required to create Land Preservation and Recreation Plans that outline acquisition and development goals, of which bicycle and pedestrian facilities may be included.

Funding Cycle: July 1 Fiscal Year
Contact: Program Open Space Coordinator (410) 260-8426

Local

Examples of local communities taking action on their own to create revenue streams for improving conditions for bicycling and walking are not hard to come by. Three common approaches include: special bond issues, dedications of a portion of local sales taxes or a voter-approved sales tax increase and use of the annual capital improvement budgets of Public Works and/or Parks agencies. Some examples follow:

- San Diego County residents voted to impose a ½-cent sales tax for transportation purposes. Out of those funds ($171 million in year 2000), $1 million is set aside for bicycle projects. The tax is administered by the San Diego Association of Governments and is scheduled to expire in 2008.

- The City of Albuquerque, New Mexico, and Bernalillo County, both have a 5% set-aside of street bond funds which go to trails and bikeways. For the City, this has amounted to approximately $1.2 million every two years for these facilities. The City voters last year passed a ¼ cent gross receipts tax for transportation which includes approximately $1 million per year for the next ten years for trail development. In addition, many of the on-street facilities are being developed as a part of other road projects and are incorporating the bike facilities in the roadway budget for new roads or when a resurfacing project is planned.

- Pinellas County, Florida built much of the Pinellas Trail system with a portion of a one cent sales tax increase voted for by county residents.

- Seattle, Washington, and King County voters approved a $100 million bond issue to protect open space in the urban area; $33 million was set-aside for trail development. The Seattle Department of Public Works used about $6 million per annum for the City's bike program.

- Denver, Colorado also invested $5 million in its emerging trail network with a bond issue, which also funded the City's bike planner for a number of years.

- In Eagle County, Colorado (which includes Vail) voters passed a transportation tax that earmarks 10% for trails, about $300,000 a year.

- In Colorado Springs, Colorado, 20 percent of the new open space sales tax is designated for trail acquisition and development, about $5-6 million per year.

8.C.3. Private Sector Funding Sources

Just as the use of public transportation funding for bicycle and pedestrian projects has been on the increase throughout the 1990's, private sector funding has become more plentiful. For example, the environmental land trust movement has mushroomed in the past twenty years and many of these organizations have raised funds for purchase of land where trails are built, especially rail-trails. In recent years, local corporations and businesses from the bicycling and outdoor recreation industry have joined in financial support of local projects and programs.

Community Fundraising and Creative Partnerships

In Prince George's County, local funds were used for the development, construction and maintenance of the WB&A Trail. The trail project was primarily funded by the Maryland-National Capital Park and Planning Commission (M-NCPPC). Additional funding was provided by the Maryland's Program Open Space and ISTEA dollars. While the M-NCPPC continues to support the trail financially, trail advocates are in the process of establishing a citizen-based organization, similar to the existing group called the Friends of the B&A Trail, that will organize fundraising events and partake in trail beautification and enhancement projects.

In Ashtabula, Ohio the local trail organization raised one-third of the money they needed to buy the land for the trail by forming a "300 Club." Three hundred acres were needed for the trail and they set a goal of finding 300 folks who would finance one acre each. The land price was $400 per acre, and they found just over 100 people to buy an honorary acre, raising over $40,000.

In Jackson County, Oregon they had a "Yard Sale." The Bear Creek Greenway Foundation sold symbolic "yards" of the trail and placed donor's names on permanent markers that are located at each trailhead. At $40 a yard, they raised enough in private cash donations to help match their $690,000 Transportation Enhancements program award for the 18-mile Bear Creek trail linking Medford, Talent, Phoenix and Ashland.

Selling bricks for local sidewalk projects, especially those in historic areas or on downtown Main Streets, is increasingly common. Donor names are engraved in each brick, and a tremendous

amount of publicity and community support is purchased along with basic construction materials. Portland, Oregon's downtown Pioneer Square is a good example of such a project.

In Colorado Springs, the Rock Island Rail-Trail is being partly funded by the Rustic Hills Improvement Association, a group of local home-owners living adjacent to the trail. Also, ten miles of the trail was cleared of railroad ties by a local boy scout troop.

A pivotal 40-acre section of the Ice Age Trail between the cities of Madison and Verona, Wisconsin, was acquired with the help of the Madison Area Youth Soccer Association. The soccer association agreed to a 50 year lease of 30 acres of the parcel for a soccer complex, providing a substantial part of the $600,000 acquisition price.

Corporate and Business Community

- In Evansville, Indiana a boardwalk is being built with Corporate donations from Indiana Power and Light Co. and the Wal-Mart Foundation.

- In Arizona, trail directional and interpretive signs are being provided by the Salt River Project a local utility. Other corporate sponsors of the Arizona Trail are the Hughes Missile Systems, BHP Cooper and Pace American, Inc.

- Recreational Equipment, Inc. has long been a financial supporter of local trail and conservation projects.

- The Kodak Company now supports the American Greenways Awards program of The Conservation Fund, which was started in partnership with the Dupont company. This annual awards program provides grants of up to $2500 to local greenway projects for any activities related to greenway advocacy, planning, design or development.

For further details and tips for accessing the corporate and business community contact the Trails and Greenways Clearinghouse at the Rails-to-Trails Conservancy: 1-877-GRNWAYS (476-9297), or on the web at: www.trailsandgreenways.org.

Foundations

A wide range of foundations have provided funding for bicycling and walking. A few national and large regional foundations have supported the national organizations involved in bicycle and pedestrian policy advocacy. One example is the Robert Wood Johnson Foundation, which seeks to achieve its public health goals by encouraging physical activity in local communities. Their web site can be found at: www.rwjf.org. However it is usually regional and local foundations that get involved in funding particular bicycle, pedestrian or trail projects. These same foundations may also fund statewide and local advocacy efforts as well. The best way to find such foundations is through the research and information services provided by the national Foundation Center. They maintain a huge store of information including the guidelines and application procedures for most foundations and their past funding records. They can be reached on the world wide web at: www.fdncenter.org.

The Bicycle Industry—Bikes Belong Coalition

The Bikes Belong Coalition is sponsored by member companies of the American bicycle industry. The Coalition's stated goal is to put more people on bikes more often through the implementation of TEA-21. One of the Coalition's primary activities is the funding of local bicycle advocacy organizations that are trying to ensure that TEA-21-funded bicycle or trail facilities get built. Grants are awarded for up to $10,000 on a rolling basis. By June 2000, almost $200,000 has been awarded to advocacy organizations in the District of Columbia; Marin County, CA; Milwaukee, WI; Dallas, TX; Los Angeles, CA; New York City, NY; Portland, Maine and others. Information about the Coalition, including grant applications and related information, is on the web at: www.bikesbelong.org.

9. SUMMARY

In the five years since Rockville began planning and implementing bicycle facilities the City has made significant progress toward creating a truly bicycle-friendly city. The 1998 Bikeway Master Plan has been an instrumental guide to decision makers in this progress and has aided the City in securing funding for bicycle projects from sources outside the City. This update of the Master Plan is not a major departure from the recommendations of the 1998 Plan but rather more of a fine tuning of the 1998 Plan.

The City should continue its current policies and procedures for implementing this Plan Update. City staff should continue working to identify funding sources to design and construct high priority projects, while at the same time taking advantage of opportunities to implement other bikeway improvements as they arise. The Bikeway Specialist position should be retained and consideration should be given to making the position full-time. Also, the practice of retaining consultants to provide assistance on planning and design issues should be continued.

The 1998 Bikeway Master Plan was successful for several reasons, including

- Extensive public involvement in planning the types of facilities and programs to implement;
- Implementation of Plan recommendations through the cooperation of City departments;
- Active pursuit of federal and state funding for projects and programs;
- Requirements for developers to provide bicycle facilities;
- Facilities added by the State Highway Administration as part of regular roadway improvements; and
- Support from the Mayor and Council and other stakeholders.

These elements are essential for the continued success of this updated Bikeway Master Plan. If they are achieved, they will help make bicycling in Rockville an activity for all types of trips, for all types of people and for all parts of the City.

10. REFERENCES

National Bicycle and Pedestrian Clearinghouse. *The Economic and Social Benefits of Off-Road Bicycle and Pedestrian Facilities*, NBPC Technical Brief, Technical Assistance Series, Number 2, September 1995. Online: http://www.imba.com/resources/science/econsoc_benefits.html.

PKF Consulting. *Analysis of Economic Impacts of the Northern Central Rail Trail*, Prepared for Maryland Greenways Commission and Maryland Department of Natural Resources, June 1994, Online: http://ntl.bts.gov/DOCS/430.html.

Podjer, Pamela J. "Free ride to movies in Santa Rosa: Bike commuters given cinema tickets," San Francisco Chronicle, Online: http://sfgate.com/cgi-bin/article.cgi?f=/c/a/2003/02/19/BA219398.DTL, February 19, 2003.

United States Bureau of Transportation Statistics. *1995 Nationwide Personal Transportation Survey*.

United States Census Bureau. *Census 2000*.

United States Department of Health and Human Services. Physical Activity and Health: A Report of the Surgeon General. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, 1996. Online: http://www.cdc.gov/nccdphp/sgr/summ.htm.

United States Department of Transportation, Federal Highway Administration. *Pedestrian Facilities Users Guide: Providing Safety and Mobility*, FHWA-RD-01-102, March 2002.

Appendix E:

Standards and Details for Construction

STANDARDS AND DETAILS FOR CONSTRUCTION

City of Rockville
Department of Public Works
111 Maryland Avenue
Rockville, MD 20850
240-314-8500

STANDARDS AND DETAILS FOR CONSTRUCTION

To Be Used as a Supplementary Guide in Conjunction with Other Approved Agency Standards and Details

City of Rockville, Maryland

JANUARY 1998

APPROVED: _____ 28 JAN 98
Eugene H. Cranor, Director of Public Works — Date
Department of Public Works
City of Rockville

_____ 1-27-98
Susan Straus, Chief Engineer/ Environment — Date
Department of Public Works
City of Rockville

_____ 1/27/98
Joseph Cutro, Chief Engineer/Transportation — Date
Department of Public Works
City of Rockville

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GENERAL WATER AND SEWER NOTES

1. All water and sewer construction shall be in accordance with the latest General Specifications and Standard Details of the WSSC and/or the City of Rockville unless otherwise noted.

2. The contractor must contact the following prior to beginning work: **City Utilities Section** at **309-3093**, **Contract Manager** at **309-3229**, **Transportaton Division** at **309-3228**, and **Miss Utility** at **1-800-257-7777,** 48 hours before excavating.

3. Information concerning existing underground utilities was obtained from available records. The contractor must determine the exact location and elevation of existing utilities by digging test pits by hand at all utility crossings well in advance of trenching.

4. Maintain minimum 1 foot vertical clearance between all water and sewer crossings and other utilities. If clearance is less than shown on this plan, contact the Engineer before proceeding.

5. Trench backfill shall be compacted to 95% per AASHTO T-99 and compacted with correct moisture content per WSSC Standard Specifications, Section 02200.

6. All trenches shall be backfilled at the end of the day, all equipment secured and the area left in a safe condition.

7. The public road utility patch is to be in accordance with City Standard Detail #60. All trenches in public streets are to be filled with compacted CR-6 or recycled concrete to subgrade.

8. The contractor must maintain all sediment control devices and see that all points of construction ingress and egress are protected as directed by the City Inspector to prevent tracking of mud and dust onto public ways or affecting adjacent areas.

9. Traffic must be maintained on all roadways within the construction area unless otherwise permitted by the engineer. No lane closure shall be permitted between 7-9 am or 3:30-6 pm, Monday through Friday. Deployment and design of all traffic control devices shall be in accordance with the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD).

10. Valves located on the existing public system shall not be operated by the contractor.

11. The applicant is required to obtain permits from all Federal, State and/or local permit authority having jurisdiction over any phase of construction associated with the installation of this system.

12. The applicant shall provide "as built" drawings on a (24" x 36" Mylar original) to the City of Rockville, certified by a Professional Engineer, prior to the release of the permit.

WATER AND SEWER SPECIFICATIONS

Connection to Existing Water System: The connection shall be made at hours determined by the Engineer in order to cause the least disturbance to existing customers. The contractor shall notify the Contract Manager in writing at least five (5) days prior to making the connection and submit for approval a schedule and method to complete the proposed connection. The contractor shall also notify the City Utilities Section at 309-3093 at least three (3) days in advance of scheduled shutdown to arrange for valve operation. The City must provide a minimum of 48 hours notice to affected properties. The connection will then be made at the designated time in accordance with the directions of the Contract Manager. Test pit information on existing crossings must be provided a minimum of 48 hours prior to construction.

Valves: Valves shall conform to the latest AWWA Specifications and shall be clockwise turn to close, mechanical joint. All valves 16 inches and over shall be butterfly type and all valves 14 inches and smaller shall be gate type. Valve boxes shall be screw adjustable type with heavy duty cover.

Fire Hydrants and Fire Hydrant Connections: Fire hydrants shall be set 2 feet behind the face of curb unless otherwise indicated on the drawing. Each hydrant shall be set exactly plumb, at the grade provided, and shall be jointed to the fire hydrant connection at the foot of the barrel. Care shall be taken to place the steamer outlet normal to the street line and any hydrants placed askew shall be reset as directed by the City Inspector.

Fire hydrants shall be firmly set in a bed of screened gravel, which shall extend one foot below the bottom of the hydrant and be filled in and around it. The total amount of gravel used shall be at least 1/3 of a cubic yard. Fire hydrants shall not be block

Fire hydrant connections of 6 inch cement lined ductile iron pipe shall be laid at the points shown on the drawings and shall be extended either to fire hydrants to which they shall be connected or to such points as shall be designated. Fire hydrant connections shall be laid in all particulars in a similar manner to the water mains themselves. All fire hydrant valves are to be tied to the main per WSSC Standard Details.

Fire hydrants shall be Traffic Model Types which consists of break away bolts, stand-pipe and couplings. All fire hydrants shall be strapped to the mains per WSSC Standards and shall be painted with two coats of rust-preventive paint, per City Standard colors. The fire hydrants shall be as listed in WSSC General Conditions and Standard Specifications, Section 02660.

Fire hydrants shall have 5, 1/4 inch, 3 way (2 hose nozzles and one pumper nozzle), 6 inch diameter mechanical joint inlet connection clockwise turn close, National Standard operating nut.

Water Mains: Materials for all water mains are to be ductile iron class 51. All pipes are to be cement lined, minimum of 1/8 inch thick. The joints are to be U.S. "Tyton Joint" or an approved

equal. Water pipe shall be installed in accordance with WSSC Standard Details and Standard Specifications, Section 02660.

Storage: The contractor shall store pipe and materials on site, so as not to damage the materials, and shall maintain such storage areas in a hazard free and safe condition at all times.

Lubricants: Lubricants shall be potable hydrogenated vegetable oil which is insoluble in cold water and does not impart taste or odor. The lubricant shall not contain detergents, soaps or organic solvent either aliphatic or aromatic and shall be certified as nontoxic to humans or other animals. The lubricant shall be of a semi-paste consistency, which will readily stick to the inside of the bell of the pipe when applied by hand. It shall remain in a usable state through the temperature in which water pipe is normally installed.

Water House Connections: Water house connections shall be 1 inch copper, Type "K". The connection between main and meter shall be one continuous length. No taps shall be allowed in the last 5 feet of a deadend main. Yoke angle valves shall be compatible with yokes, Ford #511, or approved equal, for 1 inch water service with 3/4 inch or 1 inch meters. Water meters shall be located 1 foot behind the property line.

Specifications: Unless otherwise authorized in writing by the Engineer or noted on the approved plans and/or noted in the specifications, all work and materials shall conform to the latest Washington Suburban Sanitary Commission General Conditions and Standard Specifications.

Cover: All water mains to be installed with minimum 3.5 feet of cover below finished grade or 3.0 feet of cover below finished subgrade.

Blocking: Block all fittings with concrete per plans and Standard WSSC Specifications and Standard Details.

Sewer and Water Main Pressure Tests: Pressure tests shall be accomplished by the contractor in accordance with City Standards and Specifications. Prior to connection to existing mains, the City will conduct a 24 hour bacterial test.

Material Requirements for Sewer: The City shall accept the following materials for the construction of the main line sewer, except as otherwise specified on the plans:

1. Concrete sewer main, extra strength with Tyton joints or approved equal.

2. Ductile iron, class 51, cement lined minimum 1/8 inch thick with Tyton joints or approved equal, or

3. Polyvinyl chloride pipe and fittings conforming to ASTM D3034-78, wall thickness SDR 35 with water tight elastomeric gasket joints.

Pipe for sewer house connections shall be 4 inch cast iron soil pipe or 4 inch polyvinyl chloride pipe and fittings as specified above, and shall be connected to the main line by the use of tees.

Flexible gaskets shall be used for connections to precast and existing manholes, and shall be A lock as manufactured by Atlantic Precast Concrete, Inc. or equal.

Mortar used in the installation of A Locks or the filling of any void in manholes walls, inside and out, shall be quick setting, non-shrink such as Octocrete, Speedcrete, Permacrete or equal.

Pipe Installation Requirements: Sewer pipe shall be installed in accordance with WSSC Standard Detail M-8.0 and Standard Specifications, Section 02730. Hydro-hammers may not be used within 3 feet of the top of pipe. Exercise care to insure adequate compaction around structures and prevent damage to pipe at connections to manholes. The contractor shall assist in the compaction testing operation as requested by the City Inspector.

Horizontal deflection of pipe shall be accomplished in accordance with manufacturer's specifications.

Cleanouts: Cleanouts are to be installed on each sewer house connection and be located at the property line. Cleanout caps shall be brass and have a recessed brass cap.

When drop connections from the building are to be used at the property line cleanout, the wye of the cleanout shall be encased per WSSC Standard Details and Standard Specifications.

K:\office\engineer\wat&sew.not
August 28, 1996

NOTES

1. All lines, fittings and test appurtenances shall be capable of withstanding maximum test pressure.

2. When test pressure is less than pressure range of meter, install meter at alternate location shown.

3. Provide adequate protection to all lines, fittings and test appurtenances when testing during freezing weather.

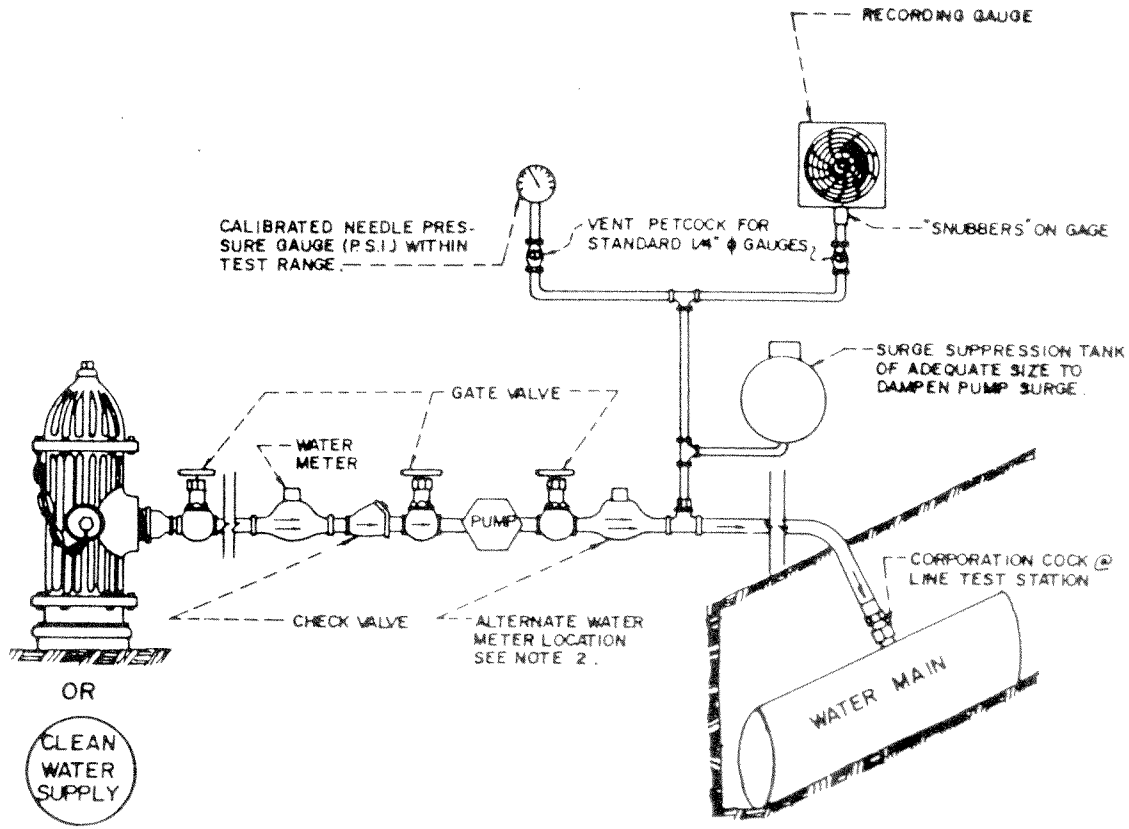
4. Pump must be capable of pressure within test range (provide for pressure relief on pump).

5. Completed sections of pipe lines shall be tested in lengths not to exceed 1,000 feet or as may be directed by the Engineer. The contractor shall furnish the necessary test plugs to close the ends of such section of the lines as are not closed by valves or plugs in order that the test can be made. The contractor shall provide the necessary pumping equipment adequate to maintain the connections and operating the pump, shall provide all small piping, valve gauges, and other materials necessary for making the tests.

6. After the pipe has been laid, water house connections installed and the trench backfilled, the Contractor shall subject it to the maximum sustained internal hydrostatic pressure plus water hammer (as shown on the plans) for a period of not less than two hours. Any parts which fail shall be replaced at the Contractor's expense.

7. In addition, the Contractor shall test the mains constructed under this contract for leakage at a sustained internal hydrostatic pressure of 150 pounds per square inch at the highest invert elevation for a period of twenty-four hours or longer, as directed by the Engineer. The diameter of water main, per mile, per twenty-four hours.

8. Elevation of test gauges must be known.



REVISION

DETAIL

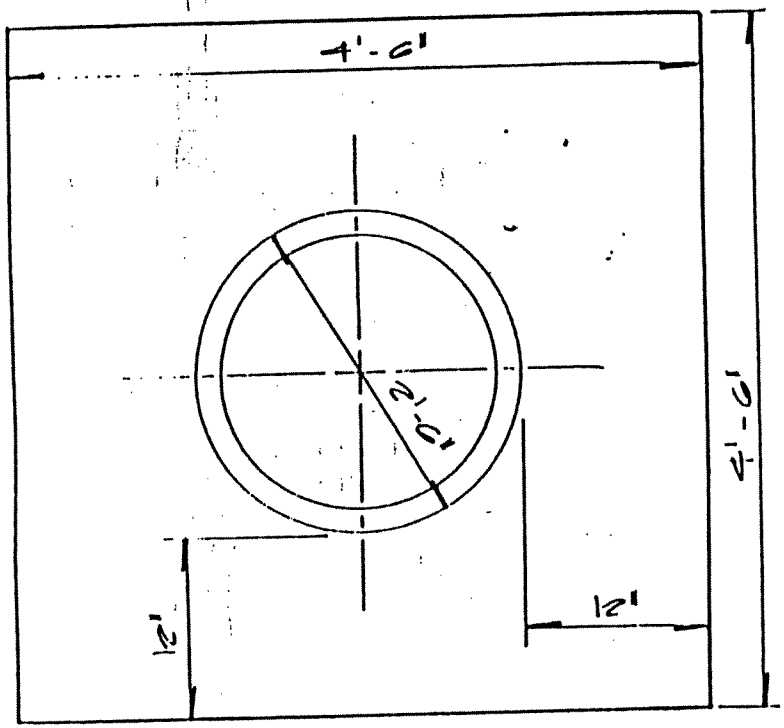
ROCKVILLE

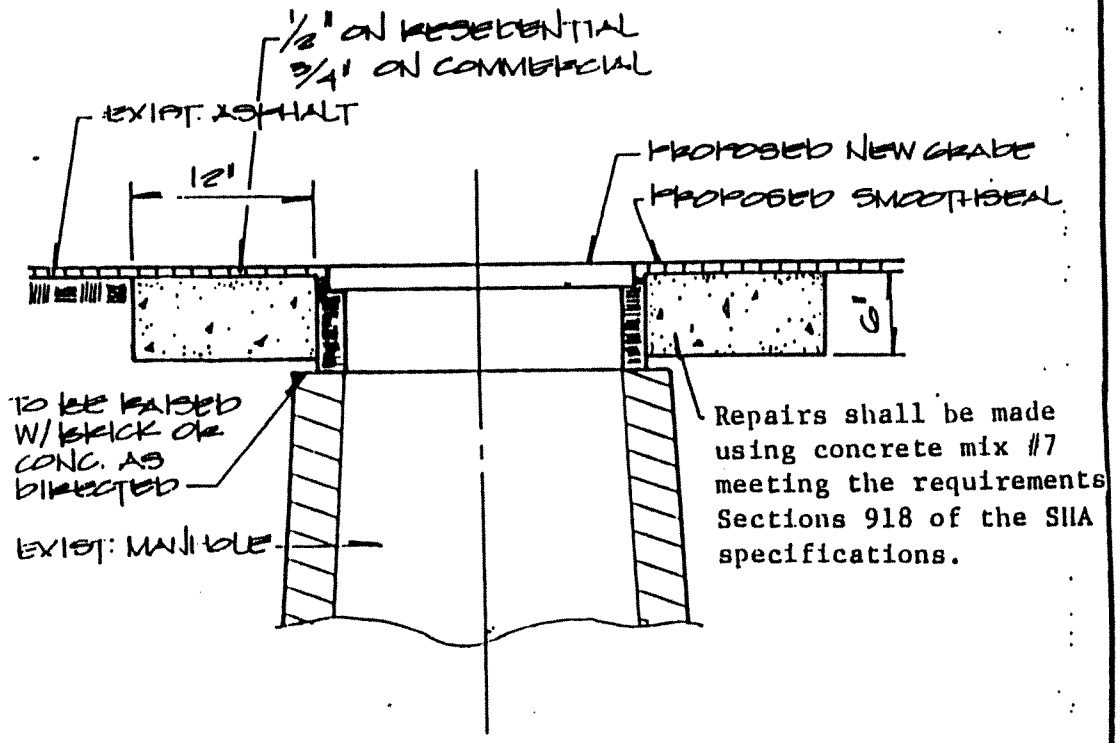
APPROVED BY Eugene H. Granor, Director of Public Works

DATE 7 Oct 96

METHOD OF WATER MAIN TESTING

7.65 CU. FT. CONC.



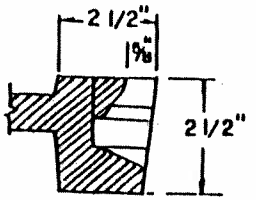


Repairs shall be made using concrete mix #7 meeting the requirements Sections 918 of the SHA specifications.

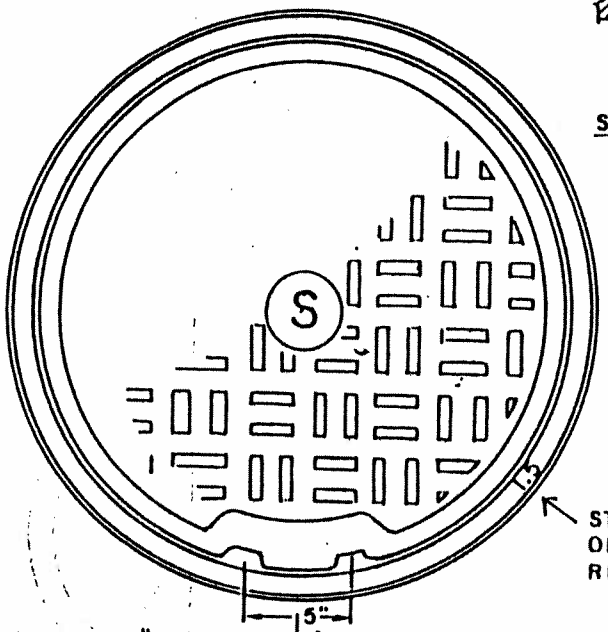
B-117

ROCKVILLE	APPROVED BY GERALD E. MORNINGSTAR DATE 11/20/91	SEWER MANHOLE VERTICAL ADJUST.	REVISION DETAIL SM-1

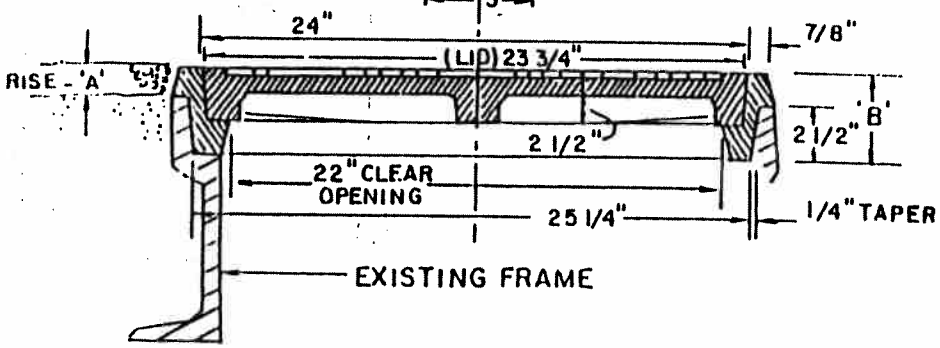
HEAVY DUTY EXTENSION RING



SECTION OF PICK SLOT



STAMP OR CASTING ON TOP RIM THE RISE 'A' (FOR EXAMPLE 1.5)



NO SCALE

NOTES:

1. This adaptor replaces a 25 3/4" tapered lid in a 26" upper rim opening.
2. Mark top rim with adjustment height.
3. Material - Cast Iron ASTM A-48 Class 30

RISE 'A'	HEIGHT 'B'
1 1/2"	4"
1 "	3 1/2"
3/4"	3 1/4"
2 "	4 1/2"

ROCKVILLE

APPROVED BY GERALD E. MORNINGSTAR

DATE 11/20/91

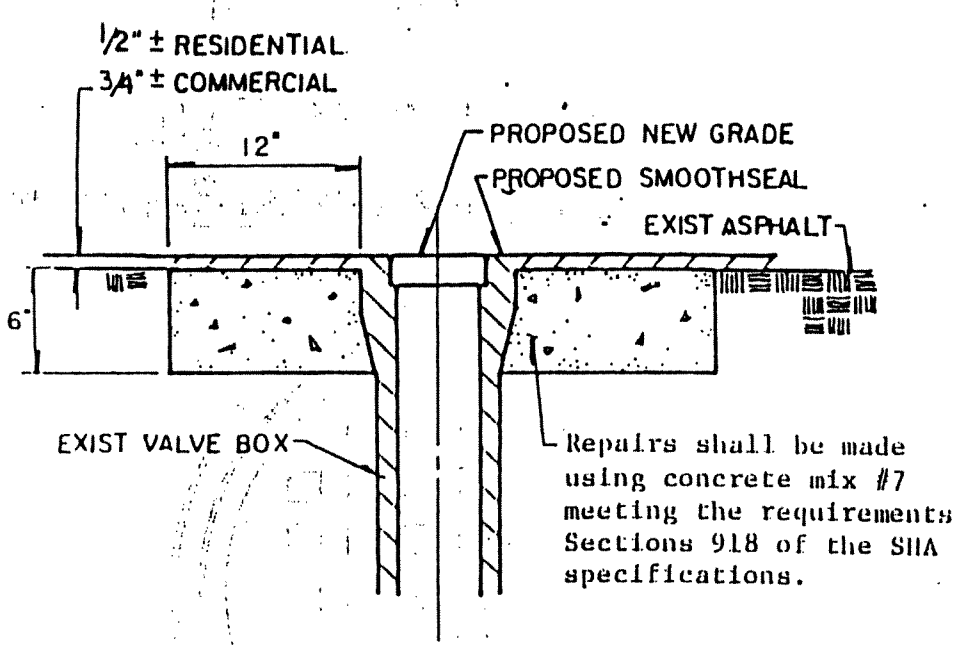
HEAVY DUTY EXTENSION RING

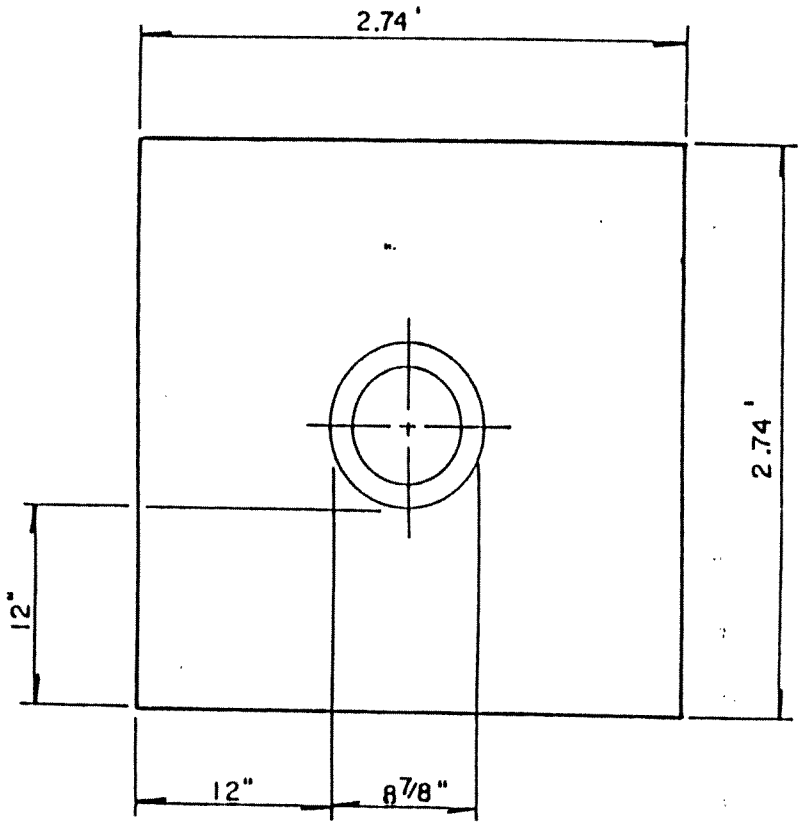
REVISION

DETAIL MHX-26

B-118

3.32 CU. FT. CONC.

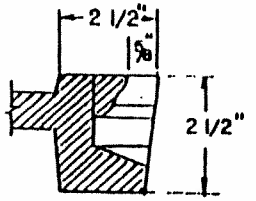




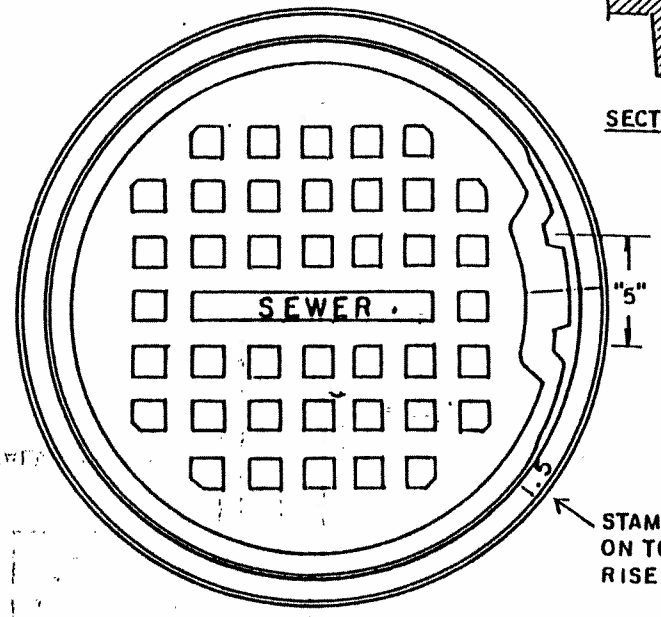
ROCKVILLE	APPROVED BY GERALD E. MORNINGSTAR DATE 11/20/91	WATER VALVE VERTICAL ADJUSTMENT	REVISION DETAIL WV-1

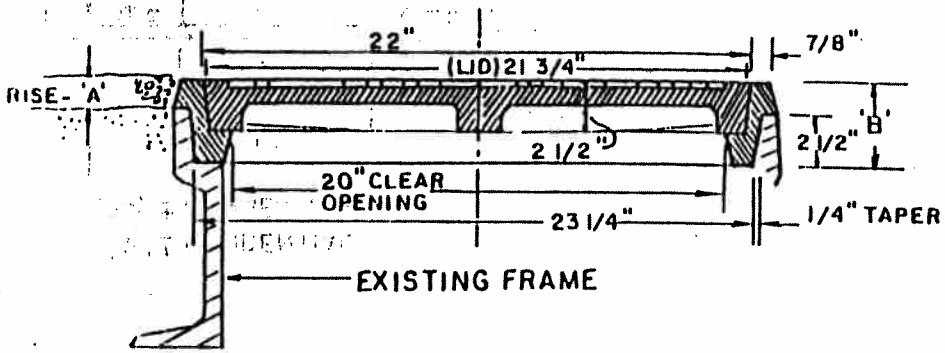
B-119

HEAVY DUTY EXTENSION RING



SECTION OF PICK SLOT





NO SCALE

NOTES:

1. This adaptor replaces a 23 3/4" tapered lid in a 24" upper rim opening.
2. Mark top rim with adjustment height.
3. Material - Cast Iron ASTM A-48 Class 30

RISE 'A'	HEIGHT 'B'
1 1/2"	4"
1"	3 1/2"
3/4"	3 1/4"
2"	4 1/2"

ROCKVILLE

APPROVED BY Gerald E. Morningstar
GERALD E. MORNINGSTAR

DATE 11/20/91

HEAVY DUTY EXTENSION RING

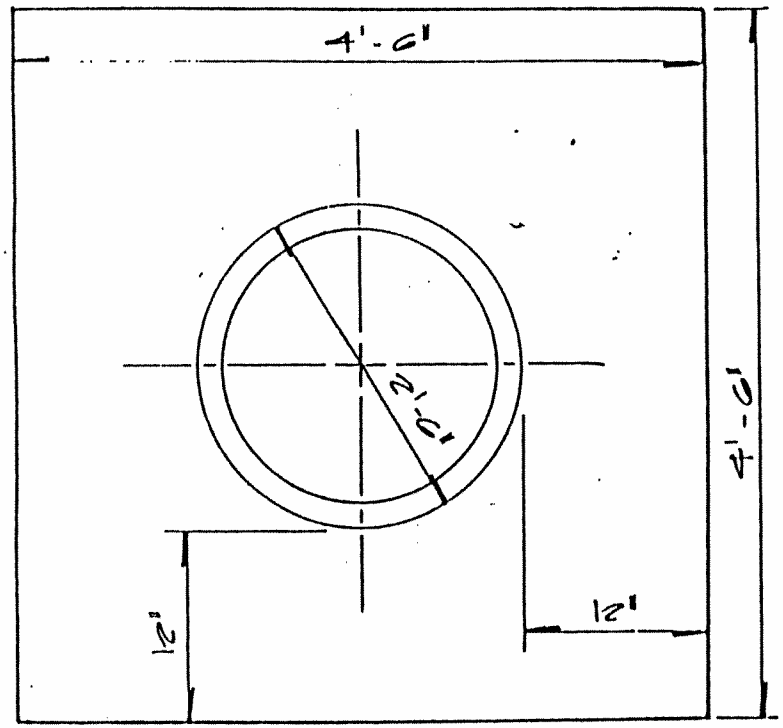
REVISION

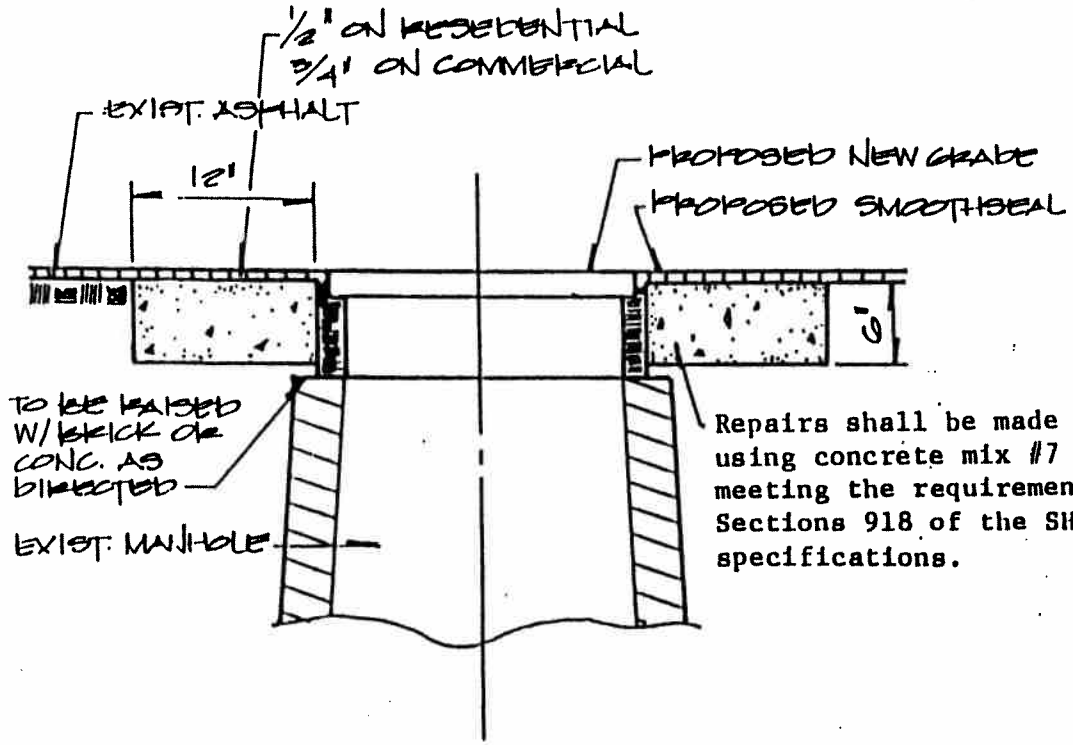
DETAIL

MHX-24

B-120

7.65 CU. FT. CONC.





Repairs shall be made using concrete mix #7 meeting the requirements Sections 918 of the SHA specifications.

ROCKVILLE	APPROVED BY GERALD E. MORNINGSTAR DATE 11/20/91	SEWER MANHOLE VERTICAL ADJUST.	REVISION DETAIL SM-1

Department of Public Works
111 Maryland Avenue, Rockville, MD 20850-2364

STORM DRAIN AND PAVING NOTES

1. The contractor must contact the following prior to beginning work: **City Department of Public Works at 240-314-8500, City Transportation Division at 240-314-8500 (traffic signal locates and streetlight locates), City Utilities Section at 240-314-8567 and Miss Utility at 1-800-257-7777, 48 hours before excavating.**

2. All storm drain and paving construction shall be in accordance with the latest General Specifications and Standard Details of the Maryland State Highway Administration, Montgomery County and the City of Rockville unless otherwise noted.

3. Information concerning existing underground utilities was obtained from available records. The Contractor must determine the exact location and elevation of existing utilities by digging test pits by hand at all utility crossings well in advance of trenching.

4. Maintain minimum one-foot vertical clearance between all storm drain crossings and other utilities. If clearance is less than shown on this plan, contact the City Department of Public Works Engineer before proceeding with construction.

5. Trench backfill shall be compacted to 95% per AASHTO T-99, Method C and compacted with correct moisture content. Contractor shall supply the City Inspector with certified compaction test results from an independent Geotechnical Engineer who is certified by Maryland.

6. Where any part of the storm drain system is located in a fill section, provide select fill material compacted to 95% AASHTO T-180, Method C with correct moisture content from existing ground to approved pipe subgrade. Contractor shall supply City Inspector with certified compaction test results from a Geotechnical Engineer who is certified by Maryland.

7. The public road utility patch shall be in accordance with City Standard Detail #60 or #60A. All trenches in public streets are to be filled with compacted CR-6 or recycled concrete to subgrade. Mill and overlay requirements (see City Standard Detail #50) at street cuts shall be determined by the Chief, Contract Management Division.

8. Unless otherwise specified, all storm drain pipes shall be installed with Montgomery County Standard "C" shaped subgrade bedding or better.

9. If springheads are encountered in any phase during construction, construction must be stopped until they are capped and piped to a storm drain or stream as directed by the City Inspector.

10. Provide positive drainage of all areas disturbed by construction. Minimum slope in paved areas is 1%. Minimum slope of graded areas is 2%. Maximum slope on earth banks is 3:1.

11. When tying into existing pavement, saw cut existing paving edge to provide a clean, straight and vertical joint. When removing existing curb or sidewalk, remove to the nearest joint.

12. Sheeting and shoring shall be the total responsibility of the Contractor. Drawings shall be certified by a Maryland professional engineer and submitted to the City Inspector for informational purposes only.

13. Paving Contractor is responsible for adjusting utility tops to furnished grade.

14. Handicap parking, signing, access, handrails and railings for the disabled shall conform to the "Americans with Disabilities Act," (ADA) requirements.

15. Contractor is responsible for installing all pavement markings and signage in accordance with the Final Pavement Marking and Signage Plan, which is approved by the Chief, Traffic and Transportation Division.

16. Traffic must be maintained on all roadways within the construction area as directed by the Chief, Contract Management Division. No major street closure shall be permitted between 7:00-9:00 a.m. or 3:30-6:00 p.m., Monday through Friday. Deployment and design of all traffic control devices shall be in accordance with the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD). If required, traffic control plans shall be reviewed and approved by the Chief, Traffic and Transportation Division.

17. Shop drawings must be reviewed and approved by a Maryland Professional Engineer prior to fabrication. Provide three (3) copies of approved shop drawings to the City prior to construction. Standard pre-cast structures previously approved by the Maryland State Highway Administration and Montgomery County are acceptable.

18. For pavement sections of private driveways and parking lots, refer to Zoning and Planning Ordinance, SEC 25-415 - Pavement Specifications.

19. Upon completion of construction, the applicant shall submit three (3) sets of red lined "as-built" prints for review and approval to Public Works Department, Attention: Engineering Division. Upon receipt of written approval and prior to release of the permit, the applicant shall provide to the City the original "as-built" mylar drawings (24" x 36") with original approval stamp, original PE seal, and As-Built Certification, certified by a Professional Engineer.

WebDoc 6/21/04

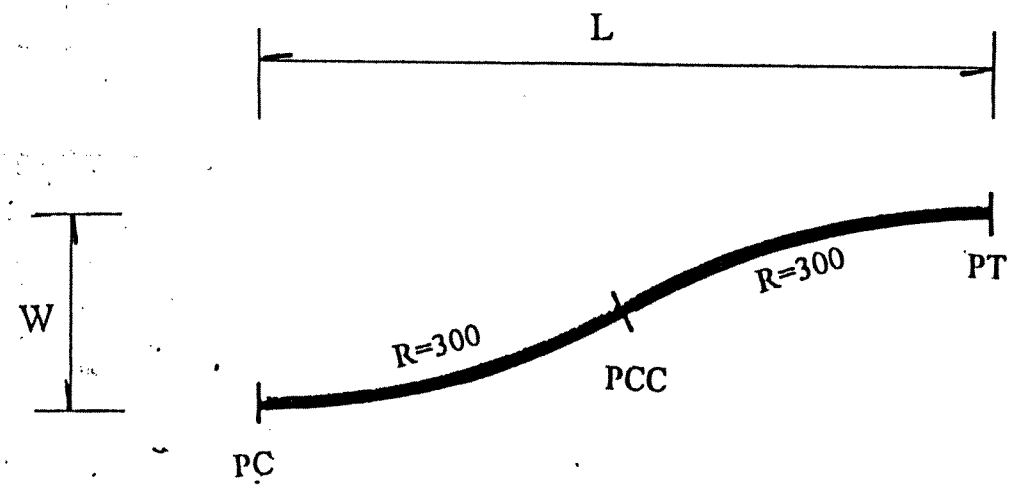
ALLOWABLE STREET GRADES

Street Classification	Maximum Longitudinal
Major	8%
Arterial	8%
Business District	5%
Primary Industrial	8%
Secondary Industrial	10%
Primary Residential	10%
Secondary Residential	12%
Private Streets	14%
Commercial/Industrial Driveways	10%
Residential Driveways*	14%

Notes: Minimum longitudinal grade for all street classifications is 1%.

Cross slopes: 3% unless otherwise directed by the Engineer

*Maximum grades for driveways do not apply to aprons and sidewalk crossings. See City standards 61, 62, 70, 71and 72



REVERSE CURVE TURNBAY USING 300' FIXED RADIUS

Width (W)	Length (L)
8'	95.65'
9'	103.53'
10'	109.09'
11'	114.36'
12'	119.40'

ROCKVILLE

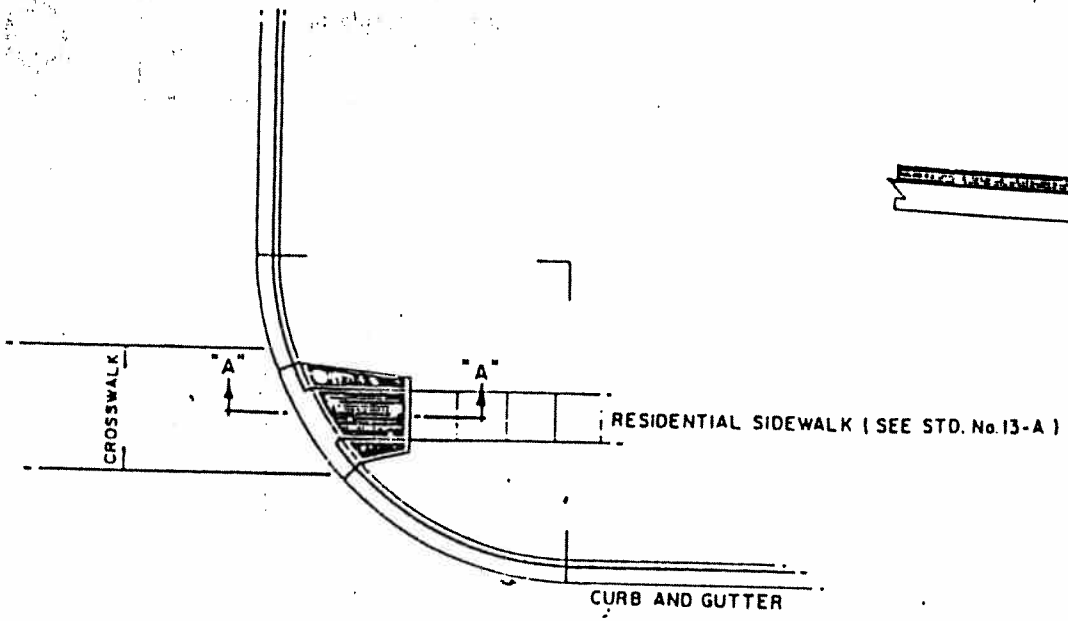
APPROVED BY: _____
Joseph Cutro - Chief Engineer/Transportation

DATE 1/21/98

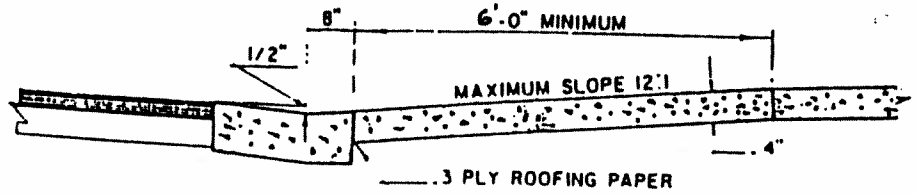
Reverse Curve for Turn Bay

REVISION

DETAIL 11



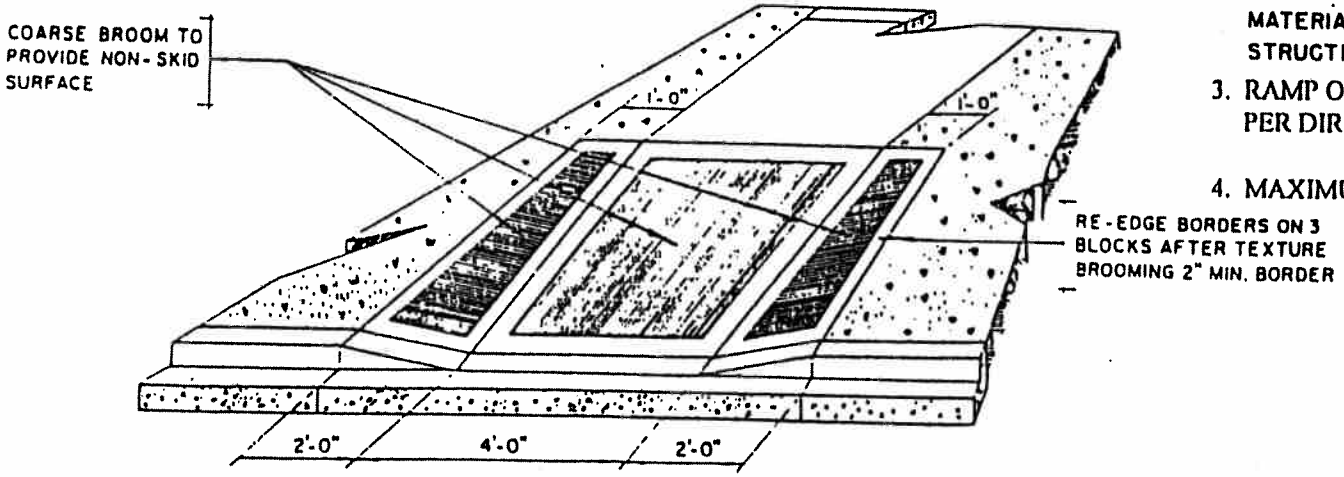
PLAN



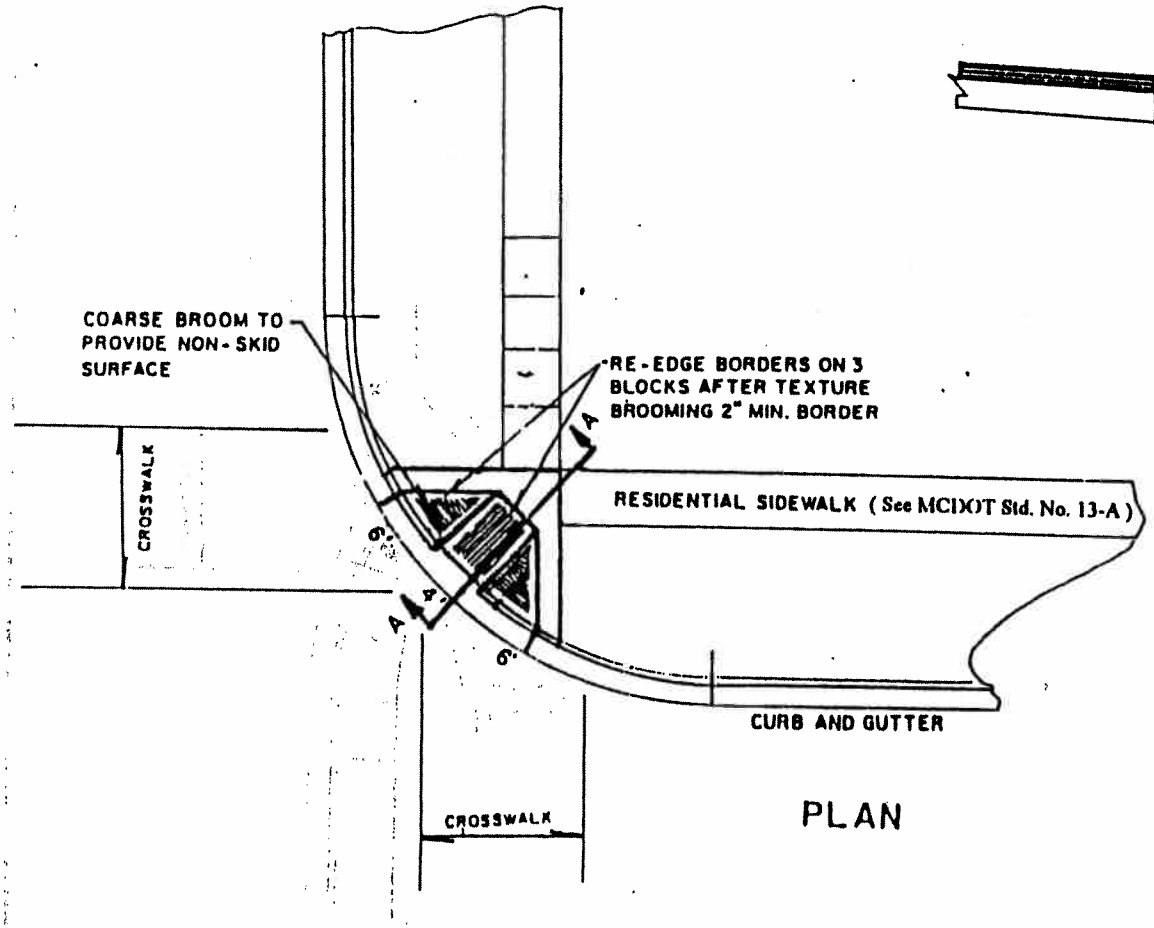
SECTION "A-A"

GENERAL NOTES

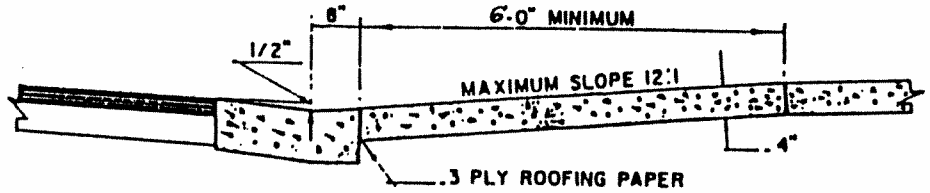
1. SIDEWALK RAMPS SHOULD BE LOCATED AS INDICATED, HOWEVER, EXISTING SURFACE UTILITIES MAY AFFECT PLACEMENT.
2. REFER TO MARYLAND STATE HIGHWAY ADMINISTRATION SPECIFICATIONS FOR MATERIALS AND METHODS OF CONSTRUCTION.
3. RAMP OPENING SIZE MAY BE INCREASED PER DIRECTION OF ENGINEER
4. MAXIMUM 12 : 1 SLOPE ON RAMP.



ROCKVILLE	APPROVED BY Joseph Cutro - Chief Engineer/Transportation DATE 4/29/96	STANDARD RESIDENTIAL SIDEWALK RAMP	REVISION DETAIL 20



PLAN

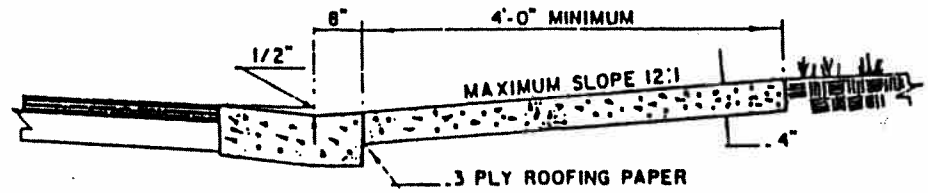


SECTION "A-A"

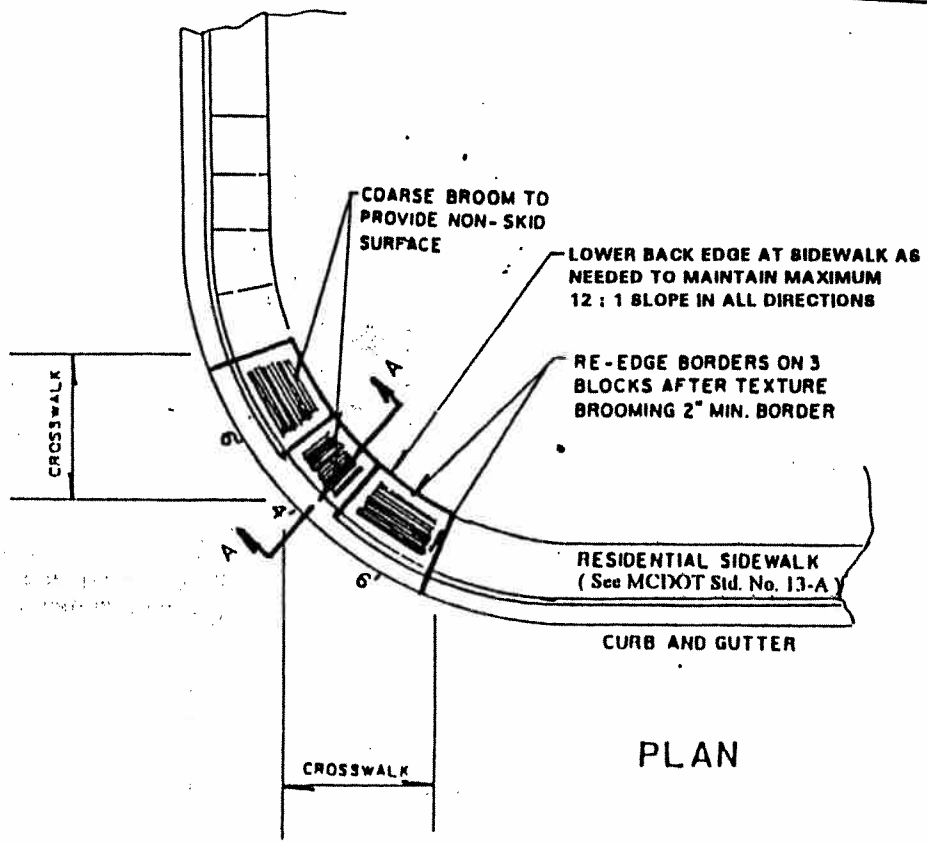
GENERAL NOTES

1. SIDEWALK RAMPS SHOULD BE LOCATED AS INDICATED, HOWEVER, EXISTING CONDITIONS (UTILITES, ETC.) MAY AFFECT PLACEMENT
2. REFER TO MARYLAND STATE HIGHWAY ADMINISTRATION SPECIFICATIONS FOR MATERIALS AND METHODS OF CONSTRUCTION
3. RAMP OPENING SIZE MAY BE INCREASED PER DIRECTION OF ENGINEER
4. MAXIMUM 12 : 1 SLOPE ON WINGS AND RAMP.

ROCKVILLE	APPROVED BY _____ Joseph Cutro - Chief Engineer/Transportation DATE _____	RESIDENTIAL 2 S/W W/BUFFER SIDEWALK RAMP	REVISION DETAIL 21



SECTION "A-A"

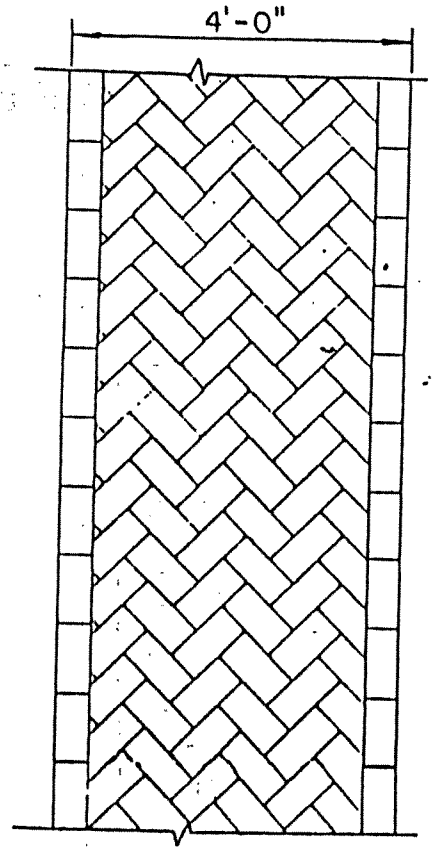


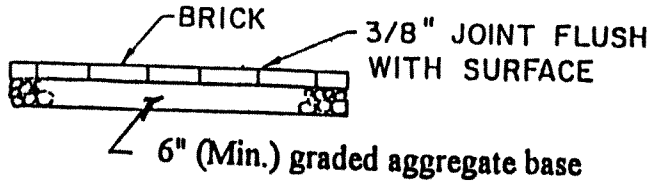
PLAN

GENERAL NOTES

1. SIDEWALK RAMPS SHOULD BE LOCATED AS INDICATED, HOWEVER, EXISTING CONDITIONS (UTILITES, ETC.) MAY AFFECT PLACEMENT.
2. REFER TO MARYLAND STATE HIGHWAY ADMINISTRATION SPECIFICATIONS FOR MATERIALS AND METHODS OF CONSTRUCTION
3. RAMP OPENING SIZE MAY BE INCREASED PER DIRECTION OF ENGINEER
4. MAXIMUM 12 : 1 SLOPE ON WINGS AND RAMP.

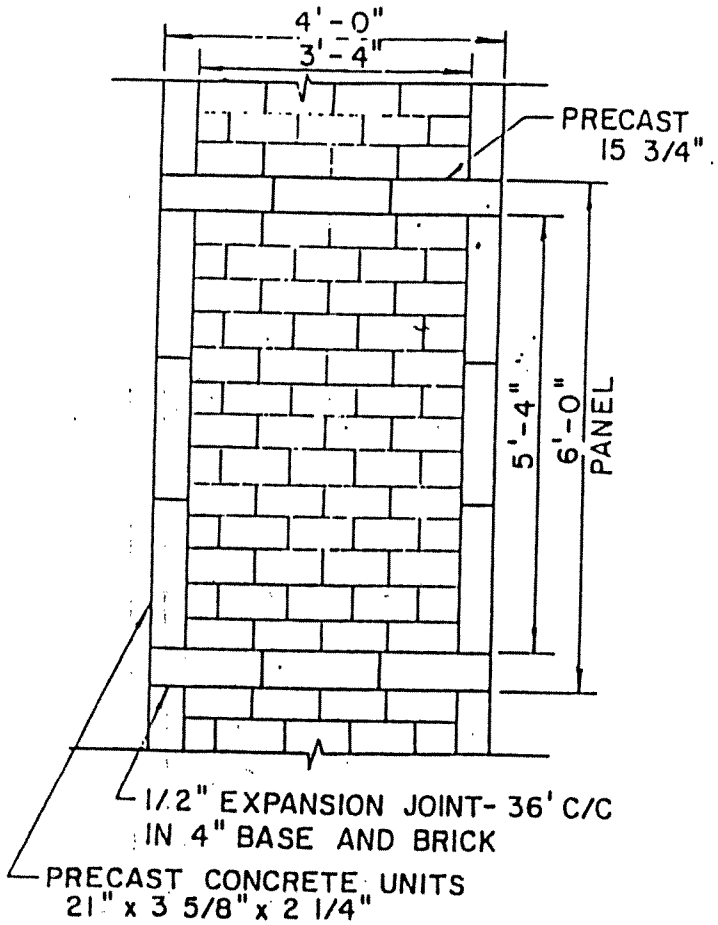
ROCKVILLE	APPROVED BY Joseph Cutro - Chief Engineer/Transportation DATE 4/24/90	RESIDENTIAL- 2 S/W- ADJ TO CURB SIDEWALK RAMP	REVISION DETAIL 22

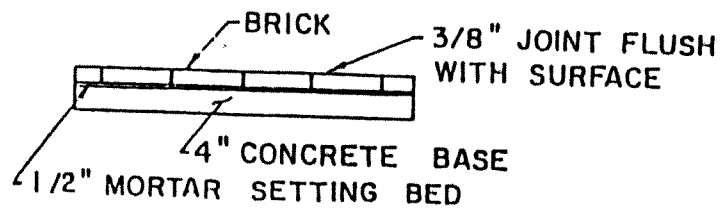




SECTION

ROCKVILLE	APPROVED BY: Joseph Cutro - Chief Engineer/Transportation DATE 1/21/98	**Brick Sidewalk - Historic District**	REVISION DETAIL 23





SECTION

ROCKVILLE

APPROVED BY: Joseph Cutro - Chief Engineer/Transportation

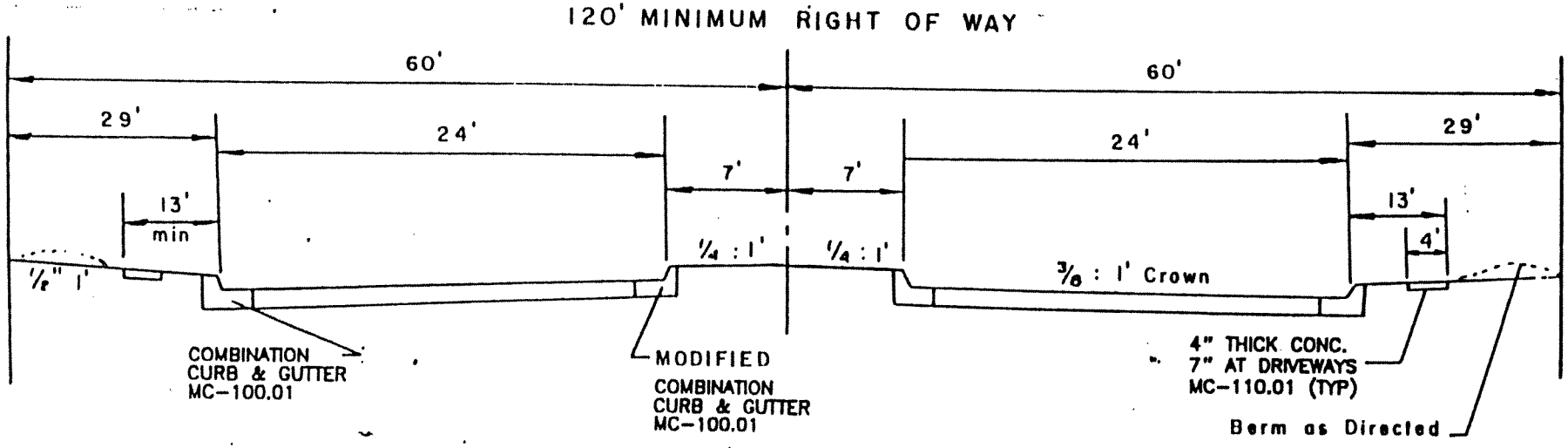
DATE 1/21/78

Brick Sidewalk - Town Center

REVISION

DETAIL

24



ALL DENUDED AREA WITHIN RIGHT OF WAY TO BE SODDED

3" BITUMINOUS CONCRETE SURFACE COURSE IN TWO 1 1/2" LAYERS
5" BITUMINOUS CONCRETE BASE COURSE
8" GRADED AGGREGATE BASE COURSE IN 2 – 4" LAYERS
APPROVED SUBGRADE

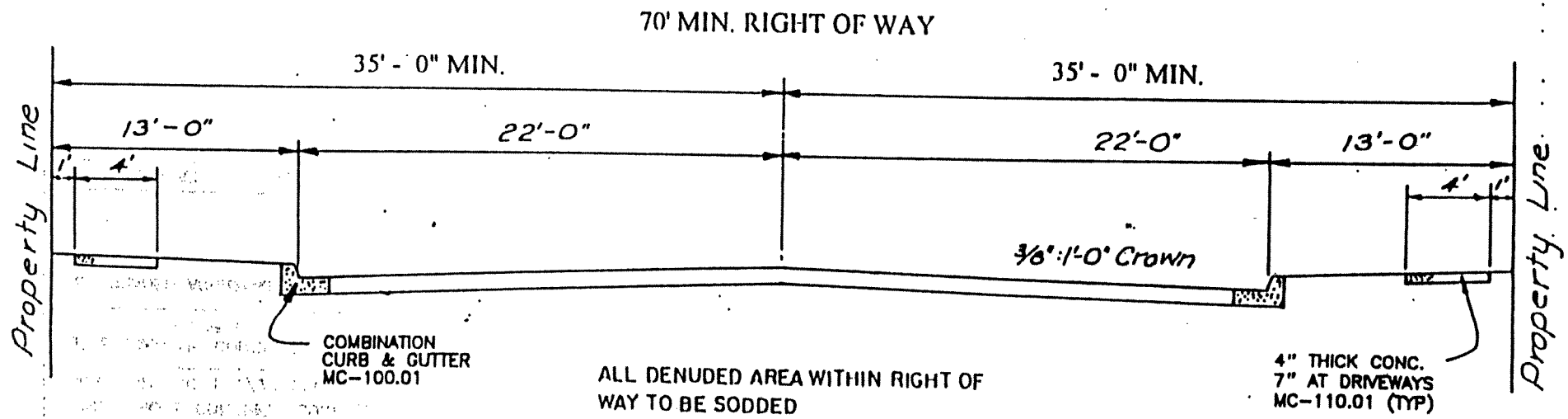
3" BITUMINOUS CONCRETE SURFACE COURSE IN TWO 1 1/2" LAYERS
9" BITUMINOUS CONCRETE BASE COURSE IN 2 – 4 1/2" LAYERS
APPROVED SUBGRADE

ALTERNATE PAVING SECTIONS

Note: Any asphalt course that exceeds 4" in thickness MUST be applied in two courses or layers.

NOTE: This typical section is subject to Review & Approval by the CITY OF ROCKVILLE PLANNING COMMISSION

ROCKVILLE	APPROVED BY: Joseph Cutro - Chief Engineer/Transportation Date 5/13/96	ARTERIAL ROAD	10/97 REVISION DETAIL 40



3" BITUMINOUS CONCRETE SURFACE COURSE IN 2 – 1 1/2" LAYERS
7" BITUMINOUS CONCRETE BASE COURSE
8" GRADED AGGREGATE BASE COURSE IN TWO LAYERS
APPROVED SUBGRADE

3" BITUMINOUS CONCRETE SURFACE COURSE IN 2 – 1 1/2" LAYERS
9" BITUMINOUS CONCRETE BASE COURSE IN TWO 4 1/2" LAYERS
4" GRADED AGGREGATE BASE COURSE
APPROVED SUBGRADE

ALTERNATE PAVING SECTIONS

Note: Any asphalt course that exceeds 4" in thickness MUST be applied in two courses or layers.

ROCKVILLE

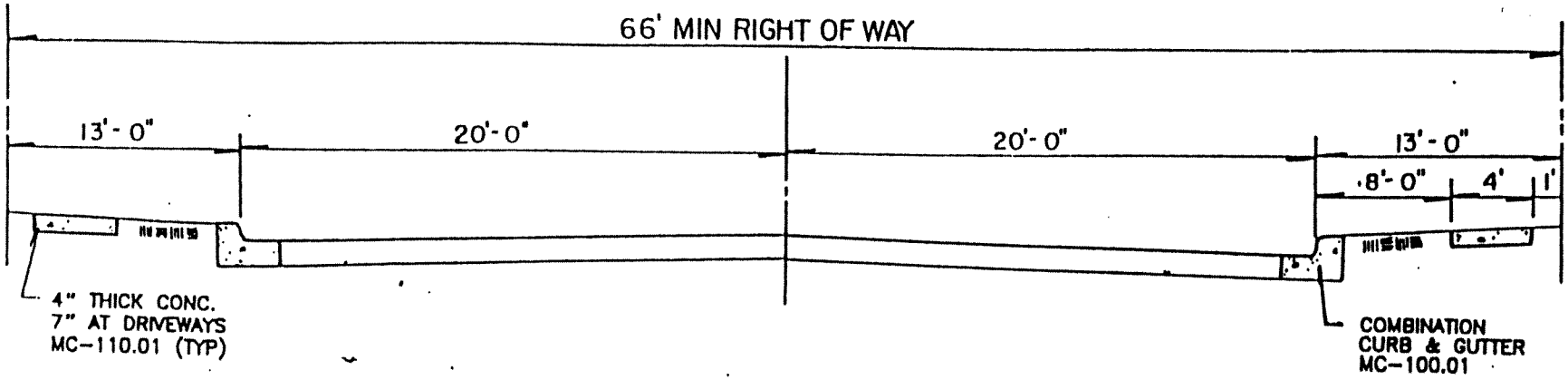
APPROVED BY: _____
Joseph Culro - Chief Engineer/Transportation

Date 8/13/91

PRIMARY INDUSTRIAL ROAD

10/97
REVISION

DETAIL
41



ALL DENUDED AREA WITHIN RIGHT OF WAY TO BE SODDED

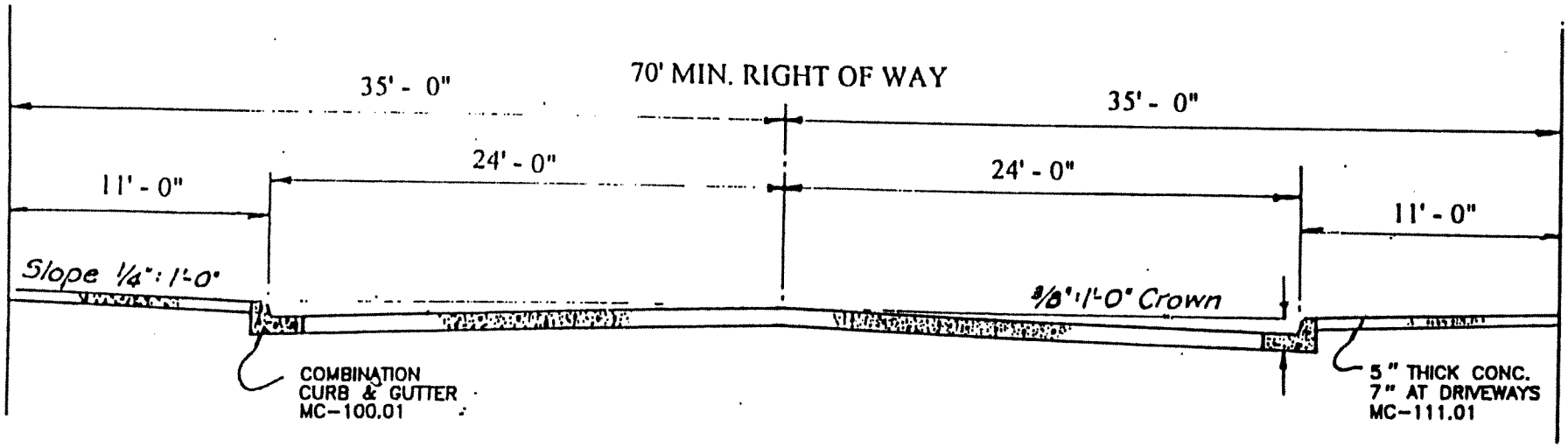
3" BITUMINOUS CONCRETE SURFACE COURSE IN TWO 1 1/2" LAYERS
7" BITUMINOUS CONCRETE BASE COURSE
8" GRADED AGGREGATE BASE COURSE IN TWO LAYERS
APPROVED SUBGRADE

3" BITUMINOUS CONCRETE SURFACE COURSE IN TWO 1 1/2" LAYERS
9" BITUMINOUS CONCRETE BASE COURSE IN TWO 4 1/2" LAYERS
4" GRADED AGGREGATE BASE COURSE
APPROVED SUBGRADE

ALTERNATE PAVING SECTIONS

Note: Any asphalt course that exceeds 4" in thickness MUST be applied in two courses or layers.

ROCKVILLE	APPROVED BY: Joseph Cutro - Chief Engineer/Transportation Date 5/13/96	SECONDARY INDUSTRIAL ROAD	10/97 REVISION DETAIL 42



See Also, Rockville City Code: Sec. 21-60
21-61

3" BITUMINOUS CONCRETE SURFACE COURSE IN TWO 1 1/2" LAYERS
7" BITUMINOUS CONCRETE BASE COURSE
8" GRADED AGGREGATE BASE COURSE IN TWO LAYERS
APPROVED SUBGRADE

3" BITUMINOUS CONCRETE SURFACE COURSE IN TWO 1 1/2" LAYERS
9" BITUMINOUS CONCRETE BASE COURSE IN TWO 4 1/2" LAYERS
4" GRADED AGGREGATE BASE COURSE
APPROVED SUBGRADE

ALTERNATE PAVING SECTIONS

Note: Any asphalt course that exceeds 4" in thickness MUST be applied in two courses or layers.

ROCKVILLE

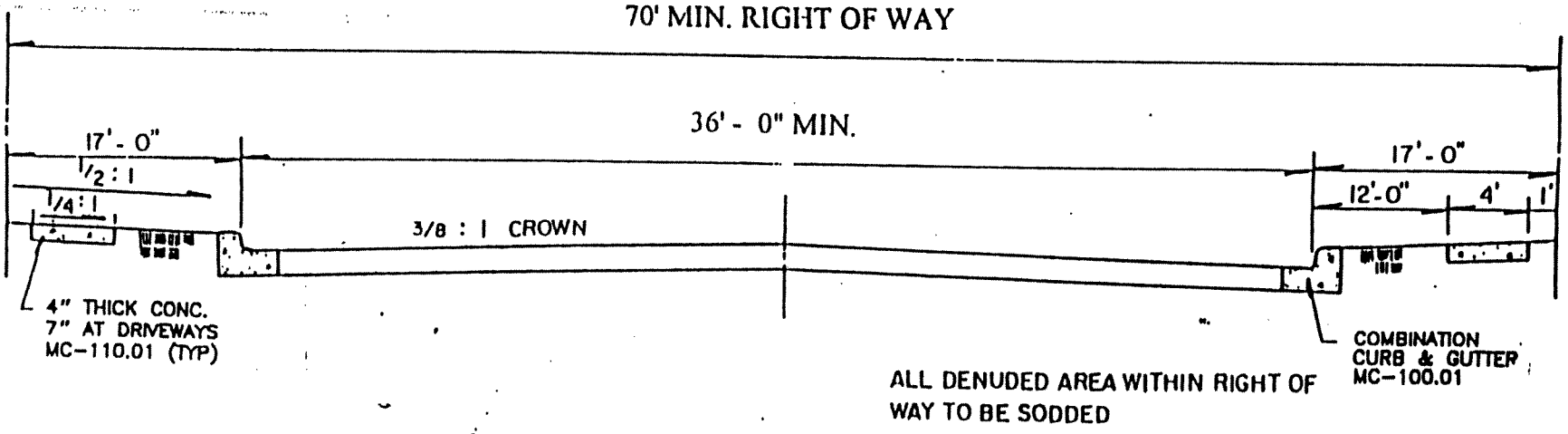
APPROVED BY: Joseph Cutro - Chief Engineer/Transportation

Date 8/13/86

BUSINESS DISTRICT ROAD

10/97
REVISION

DETAIL 43



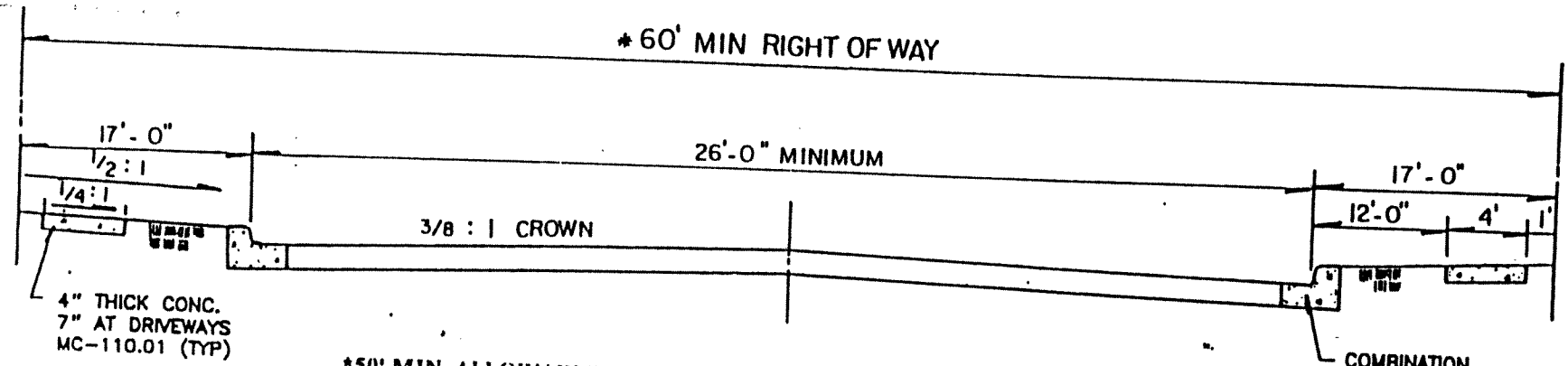
1 1/2 " BITUMINOUS CONCRETE SURFACE COURSE
1 1/2 " BITUMINOUS CONCRETE SURFACE COURSE
3" BITUMINOUS CONCRETE BASE COURSE
4" GRADED AGGREGATE BASE COURSE
APPROVED SUBGRADE

1 1/2" BITUMINOUS CONCRETE SURFACE COURSE
1 1/2" BITUMINOUS CONCRETE SURFACE COURSE
5" BITUMINOUS CONCRETE BASE COURSE
APPROVED SUBGRADE

ALTERNATE PAVING SECTIONS

Note: Any asphalt course that exceeds 4" in thickness MUST be applied in two courses or layers.

ROCKVILLE	APPROVED BY: Joseph Cutro - Chief Engineer/Transportation Date 8/13/96	PRIMARY RESIDENTIAL ROAD	10/97 REVISION DETAIL 44



*50' MIN. ALLOWABLE
FOR CUL-DE-SAC STREETS.
REDUCE BUFFER STRIP WIDTH TO 7'

ALL DENUDED AREA WITHIN RIGHT OF WAY TO BE SODDED

1 1/2" BITUMINOUS CONCRETE SURFACE COURSE
1 1/2" BITUMINOUS CONCRETE SURFACE COURSE
3" BITUMINOUS CONCRETE BASE COURSE
4" GRADED AGGREGATE BASE COURSE
APPROVED SUBGRADE

1 1/2" BITUMINOUS CONCRETE SURFACE COURSE
1 1/2" BITUMINOUS CONCRETE SURFACE COURSE
5" BITUMINOUS CONCRETE BASE COURSE
APPROVED SUBGRADE

Note: Any asphalt course that exceeds 4" in thickness MUST be applied in two courses or layers.

ALTERNATE PAVING SECTIONS

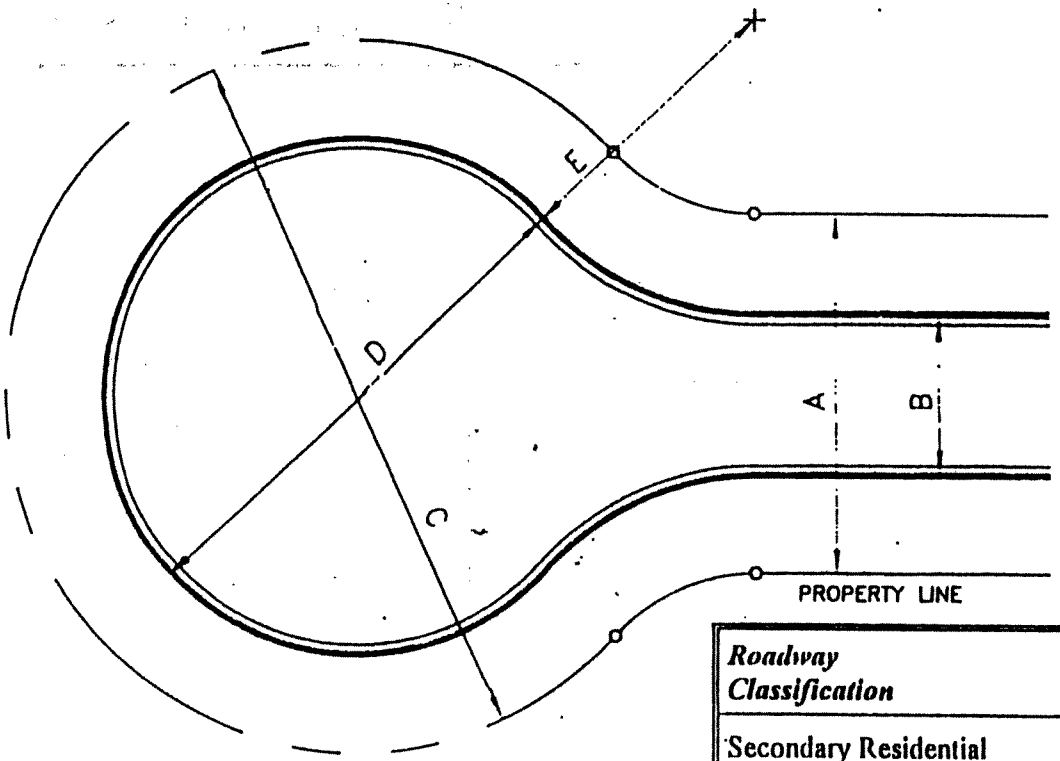
ROCKVILLE

APPROVED BY: Joseph Cutro
Joseph Cutro - Chief Engineer/Transportation
Date 8/13/96

SECONDARY RESIDENTIAL ROAD

10/97
REVISION

DETAIL
45



Roadway Classification	A	B	C	D	E
Secondary Residential	50'	26'	110'	93'	50'
Secondary Residential	60'	26'	120'	93'	50'
Sencondary Industrial	66'	40'	150'	110'	50'
Business District	70'	48'	150'	110'	50'

Note: Dimensions to curb are at flowline

General Notes

1. Provide 1% minimum flowline grade. Top of curb elevations are required for all curb intervals not to exceed 50 feet.
2. Pave to provide smooth grade and positive drainage.
3. Sidewalks shall be located in accordance with applicable roadway standards.
4. Center islands are NOT acceptable

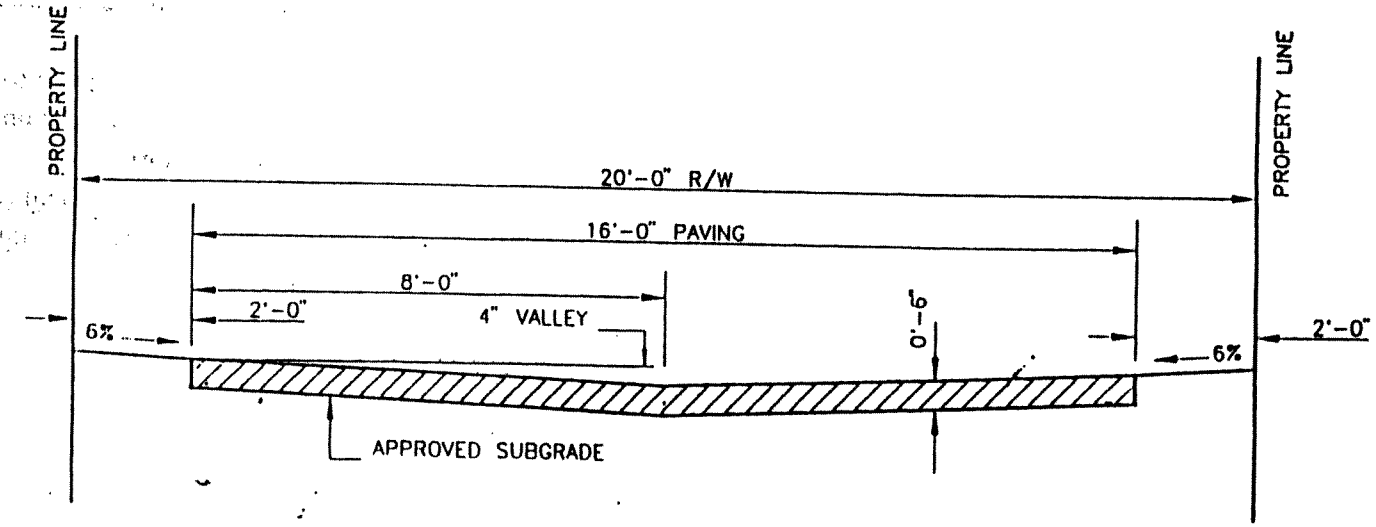
10/97
REVISION

ROCKVILLE

APPROVED BY: _____
Joseph Cutro - Chief Engineer/Transportation
Date 8/13/96

CUL - DE - SAC

DETAIL 46



1 1/2 " BITUMINOUS CONCRETE SURFACE COURSE
1 1/2 " BITUMINOUS CONCRETE SURFACE COURSE
3" BITUMINOUS CONCRETE BASE COURSE
4" GRADED AGGREGATE BASE COURSE
APPROVED SUBGRADE

1 1/2" BITUMINOUS CONCRETE SURFACE COURSE
1 1/2" BITUMINOUS CONCRETE SURFACE COURSE
5" BITUMINOUS CONCRETE BASE COURSE
APPROVED SUBGRADE

ALTERNATE PAVING SECTIONS

Note: Any asphalt course that exceeds 4" in thickness MUST be applied in two courses or layers.

ROCKVILLE

APPROVED BY: Joseph Cutro - Chief Engineer/Transportation

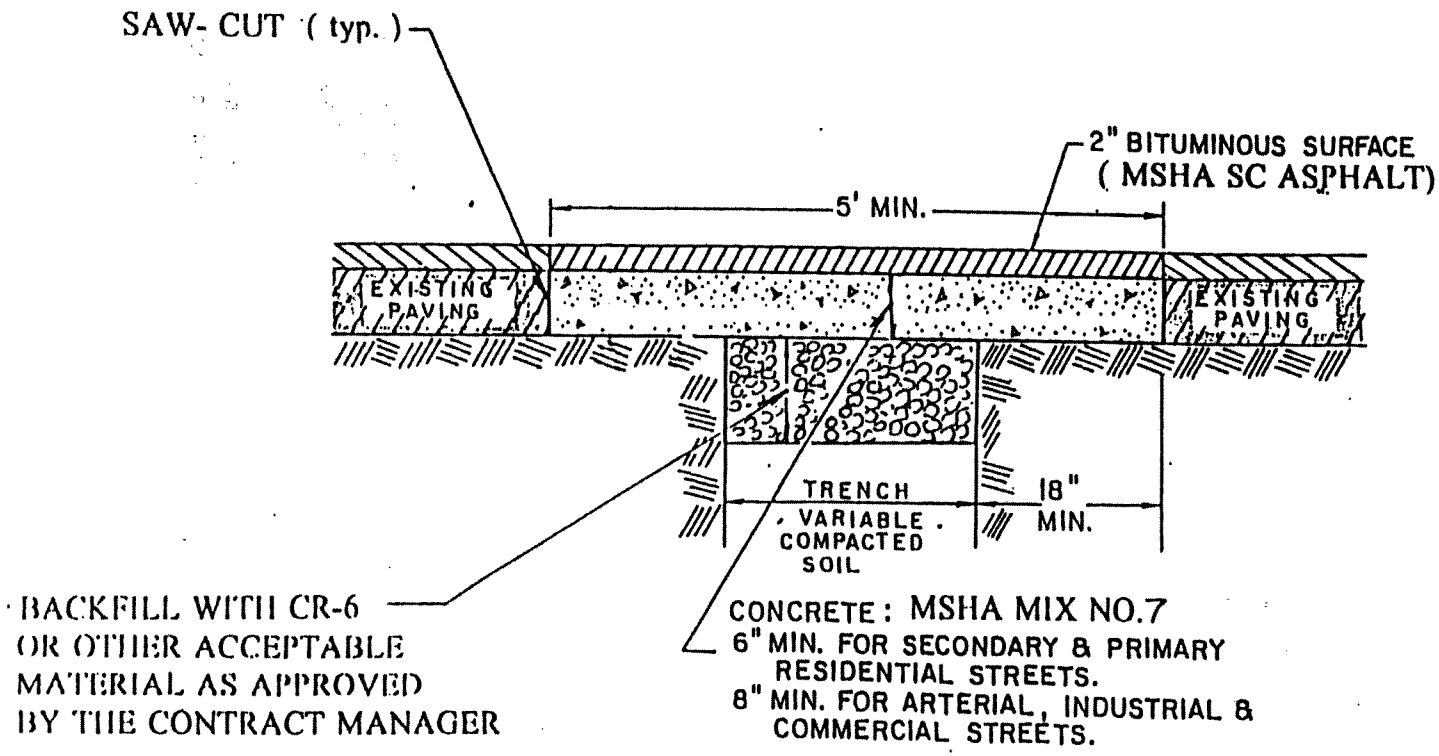
Date 8/13/96

RESIDENTIAL ALLEY

10/97

REVISION

DETAIL 47



ROCKVILLE	APPROVED BY: Joseph Citro - Chief Engineer/Transportation DATE 4/29/96	PERMANENT CITY ROADWAY REPAIR STANDARD	4-96 REVISION DETAIL 60

CITY OF ROCKVILLE, MARYLAND
DEPARTMENT OF PUBLIC WORKS
DESIGN STANDARD NO. 60

SPECIFICATION FOR PAVEMENT PATCHING
REFERENCE: SECTION 7-1.09 LAWS OF ROCKVILLE

240-314-8500

1. The permittee wishing to cut into any street, road, alley or sidewalk on public property shall notify the Department of Public Works at ~~301-309-3022~~, 48 hours in advance, of the day, time and extent of all work to be performed. An unpaved right-of-way is considered a "street" in these specifications.

2. Inspection of cuts, backfill, and surface repairs shall be made by a Department of Public Works City Inspector.

3. Before opening a trench in any roadway, procedures for traffic control shall be resolved, including the use and installation of steel plates, and method of barricading the work area.

4. All roadway trench openings shall be saw-cut.

5. Street closures shall not be permitted except where special permission has been granted by the Chief Engineer. If permission is granted, it is the responsibility of the permittee to notify the Fire Department and Police Departments (County and City of Rockville), at least 48 hours, in advance, of any work.

6. The Contractor shall take all necessary precaution to prevent damage to property and injury to the public. The Contractor shall be governed by all requirements covering protection of the public an shall comply with all local, state and federal laws and regulations. The Contractor shall save the City of Rockville harmless from all liability for damages arising from or due to this work.

7. Equipment and excavated materials shall be placed so as not to obstruct traffic or drainage.

8. All trenches shall be backfilled with CR-6 or other acceptable material as approved by the Contract Manager and shall be mechanically tamped in 6 inch maximum spread layers to a density of 95% per AASHTO. T-99 with correct moisture content.

9. Tunneling shall not be permitted and all cave-ins shall be opened to the limits of the cave-in and replaced per paragraph (8). Machine bored or pushing of pipes and conduit shall be permitted in select situations.

10. When using equipment with metal blade outriggers or other devices which may damage the street, precaution shall be taken to protect the street.

11. All damaged street areas shall be removed in an area sufficient to make a uniform patch and then resurfaced with Maryland State Highway SC asphalt mix.

12. Temporary bituminous patches of 4 inch minimum thickness and a maximum of 1 inch above the existing grade shall be placed immediately after backfilling trenches.

13. Temporary patches shall be maintained and regularly inspected by the permittee and left in place for a minimum of two (2) weeks or longer, if advised by the Contract Manager of Public Works.

14. MSHA air entrained Portland cement concrete mix No. 7 shall be used in all patches.

15. All utilities must be set to final pavement grade before pouring concrete.

16. All disturbed or damaged sidewalk, curb, gutter and aprons shall be replaced in complete sections on a compacted base.

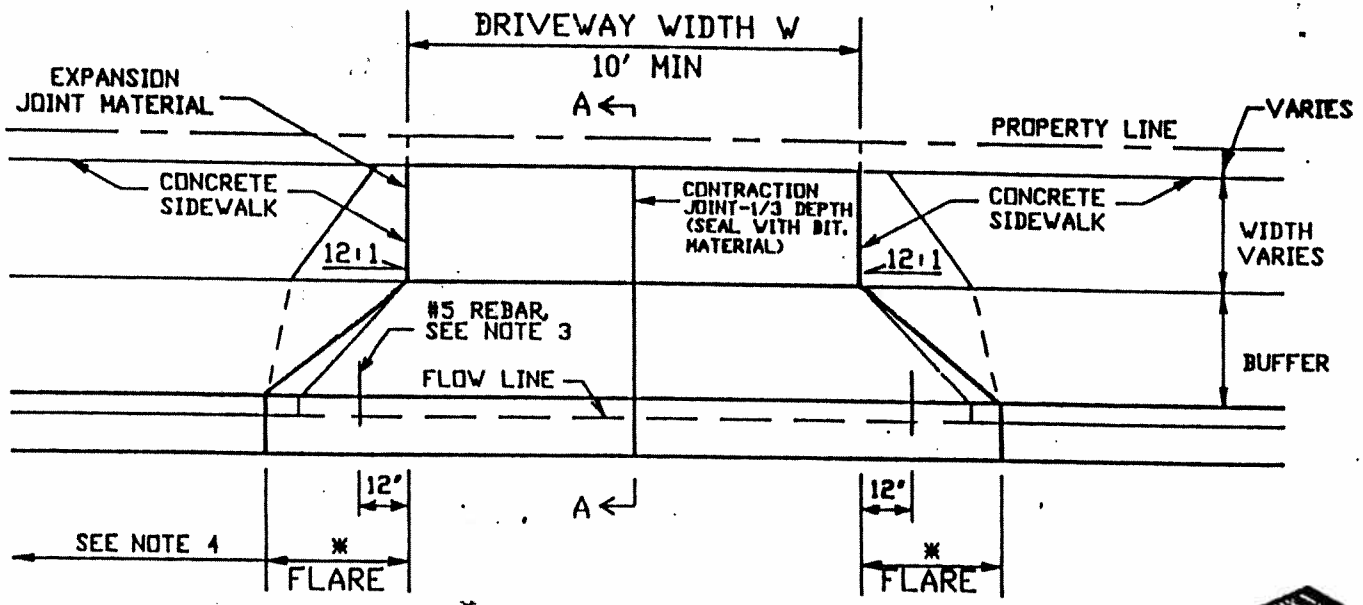
17. The bituminous surface course shall be placed, at least, 48 hours after the concrete base has been placed. Barricades, signs, and plates shall be maintained at the patch until the surface course has been installed.

18. The bituminous surface shall be MSHA. Type SC. All asphalt edges and concrete surface shall be tack coated.

19. All disturbed shoulders, side slopes, sodding and side ditches shall be restored to original grade and section. Portland Cement concrete or asphalt shall be placed in badly disturbed side ditches as directed.

20. The City of Rockville reserves the right to require improper work be immediately removed and replaced. If proper repairs are not made within a reasonable time, the City reserves the right to make all necessary repairs to restore property to a condition satisfactory to the City. All costs incidental thereto shall be charged to the permittee.

21. All cuts in State highways shall be repaired per applicable State standards with State permit requirements.



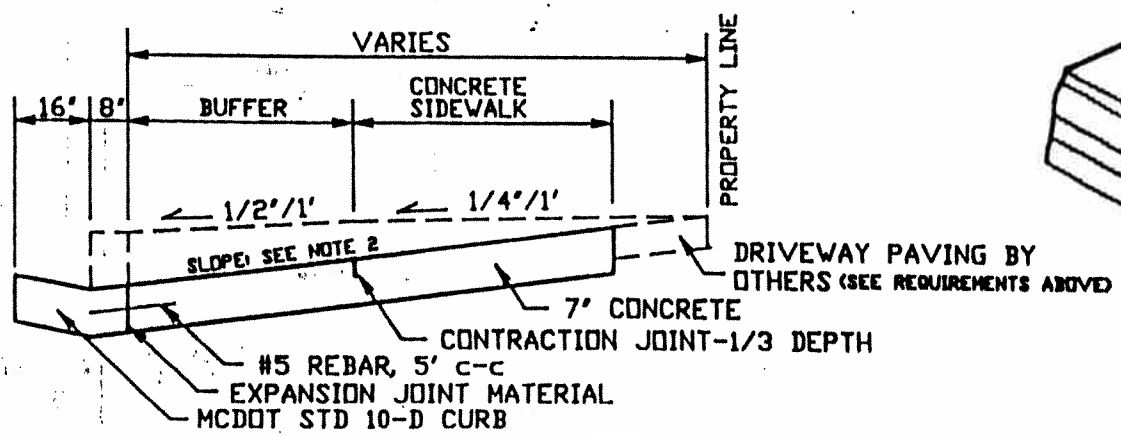
CITY CODE SEC. 25-415. PAVING SPECIFICATIONS

ALL OFF-STREET PARKING AREAS SHALL BE DRAINED AS TO PREVENT DAMAGE TO ABUTTING PROPERTIES OR PUBLIC STREETS AND SHALL BE PAVED WITH A MINIMUM OF:

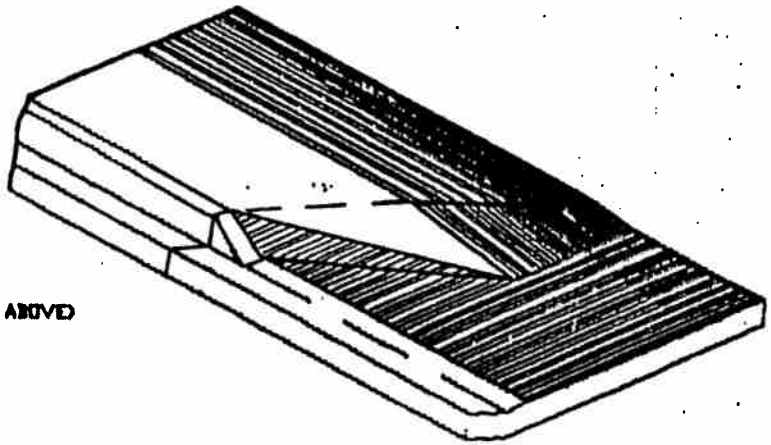
1. SIX (6) INCHES OF CONCRETE; OR
2. SIX (6) INCHES OF BITUMINOUS ASPHALT; OR
3. SIX (6) INCHES OF COMPACTED GRAVEL AND TWO (2) INCHES OF BITUMINOUS ASPHALT; OR
4. OTHER PAVING AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS.

* TO DETERMINE FLARE WIDTH:

1. FOR BUFFER STRIP 3 FEET OR LESS, THE FLARE WIDTH SHALL BE 3 FEET.
2. FOR BUFFER STRIP BETWEEN 3 AND 5 FEET, FLARE WIDTH EQUALS BUFFER WIDTH.
3. FOR BUFFER STRIP 5 FEET OR GREATER, FLARE WIDTH SHALL BE 5 FEET.



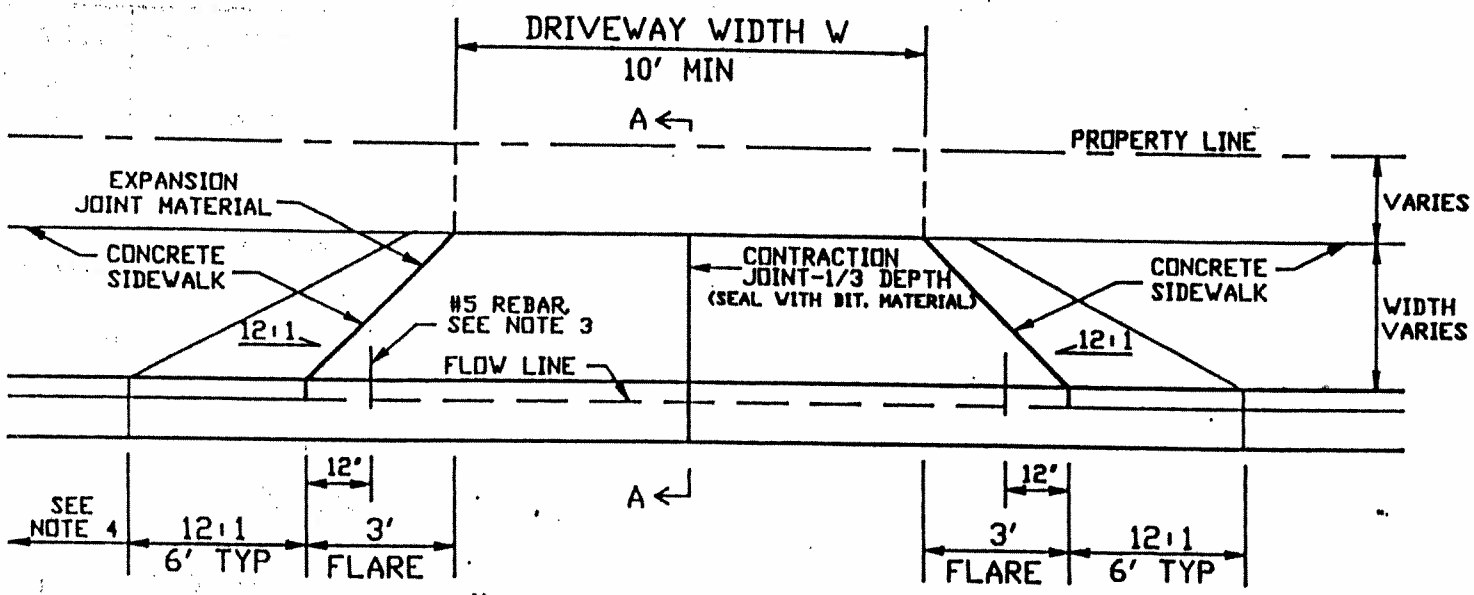
SECTION A-A



NOTES:

1. ALL CONCRETE TO BE MSHA MIX NO 2, AIR ENTRAINED. REFER TO MSHA SPECIFICATIONS FOR MATERIAL AND METHODS OF CONSTRUCTION.
2. NO GRADES SHALL EXCEED 12:1 WITHOUT SPECIFIC AUTHORIZATION OF THE CITY INSPECTOR.
3. JOINT AT GUTTER EDGE IS OPTIONAL. WHERE USED, APRON IS TO BE TIED TO GUTTER WITH MINIMUM 18" LENGTH #5 REBAR AT 5' c-c.
4. CURB AND GUTTER REMOVAL CAN NOT RESULT IN A REMAINDER LENGTH (JOINT TO JOINT) OF LESS THAN FIVE FEET.
5. THE PERMITTEE IS RESPONSIBLE TO ENSURE NO PORTION OF THE FINISHED APRON CROSSES A TANGENT EXTENSION OF THE SIDE PROPERTY LINE.
6. PERMITTEE IS RESPONSIBLE FOR GRADING, SODDING DISTURBED AREAS AND MISCELLANEOUS RELATED WORK.
7. SUBGRADE TO BE COMPACTED TO 95% AASHTO T-99.
8. LOCATION AND TYPE APRON ARE SUBJECT TO APPROVAL OF THE CITY ENGINEER.

			10-7-93
			REVISION
ROCKVILLE	APPROVED BY Gerald E. Morningstar GERALD E. MORNINGSTAR DATE 11/20/91	BUFFER/SIDEWALK COMBINATION RESIDENTIAL DRIVE	DETAIL 61



CITY CODE SEC. 25-415.
PAVING SPECIFICATIONS

ALL OFF-STREET PARKING AREAS SHALL BE DRAINED AS TO PREVENT DAMAGE TO ABUTTING PROPERTIES OR PUBLIC STREETS AND SHALL BE PAVED WITH A MINIMUM OF:
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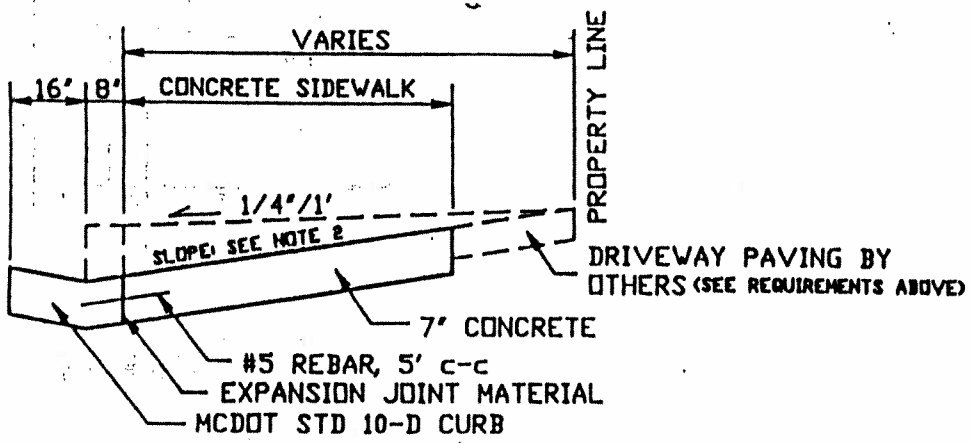
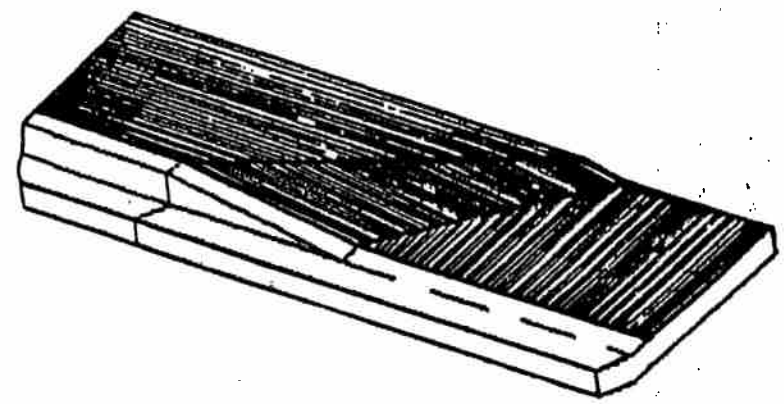
2. SIX (6) INCHES OF BITUMINOUS ASPHALT; OR
3. SIX (6) INCHES OF COMPACTED GRAVEL AND TWO (2) INCHES OF BITUMINOUS ASPHALT; OR
4. OTHER PAVING AS APPROVED BY THE DIR. OF PUBLIC WORKS.



SECTION A-A



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5. THE PERMITTEE IS RESPONSIBLE TO ENSURE NO PORTION OF THE FINISHED APRON CROSSES A TANGENT EXTENSION OF THE SIDE PROPERTY LINE.
6. PERMITTEE IS RESPONSIBLE FOR GRADING, SODDING DISTURBED AREAS AND MISCELLANEOUS RELATED WORK.
7. SUBGRADE TO BE COMPACTED TO 95% AASHTO T-99.
8. LOCATION AND TYPE APRON ARE SUBJECT TO APPROVAL OF THE CITY ENGINEER.

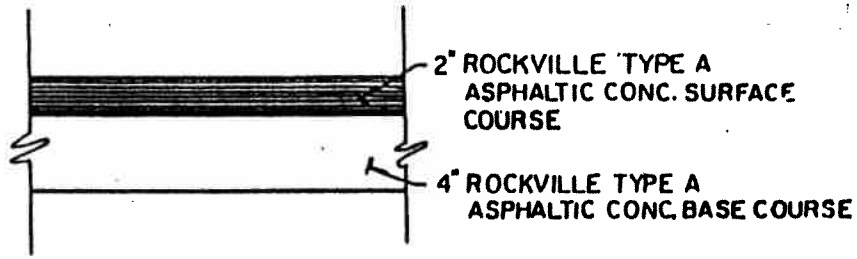
ROCKVILLE	APPROVED BY GERALD E. MORNINGSTAR DATE 11/20/91	SIDEWALK ADJACENT TO CURB RESIDENTIAL DRIVE	10-7-93 REVISION DETAIL 62

NOTES:

1. All culvert pipe and asphalt to be in accordance with City of Rockville Standard Construction Specifications.

2. If culvert is required, ditch on both sides of driveway apron to be graded and sodded to insure proper drainage as directed.

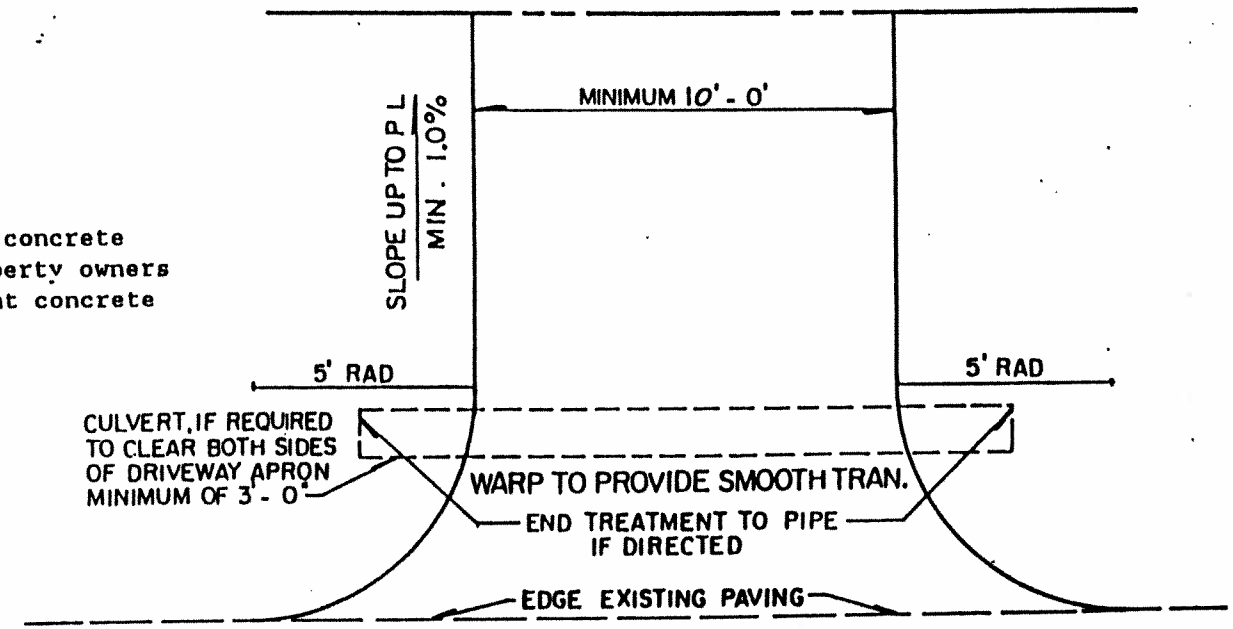
3. Size of culvert shall be as directed.



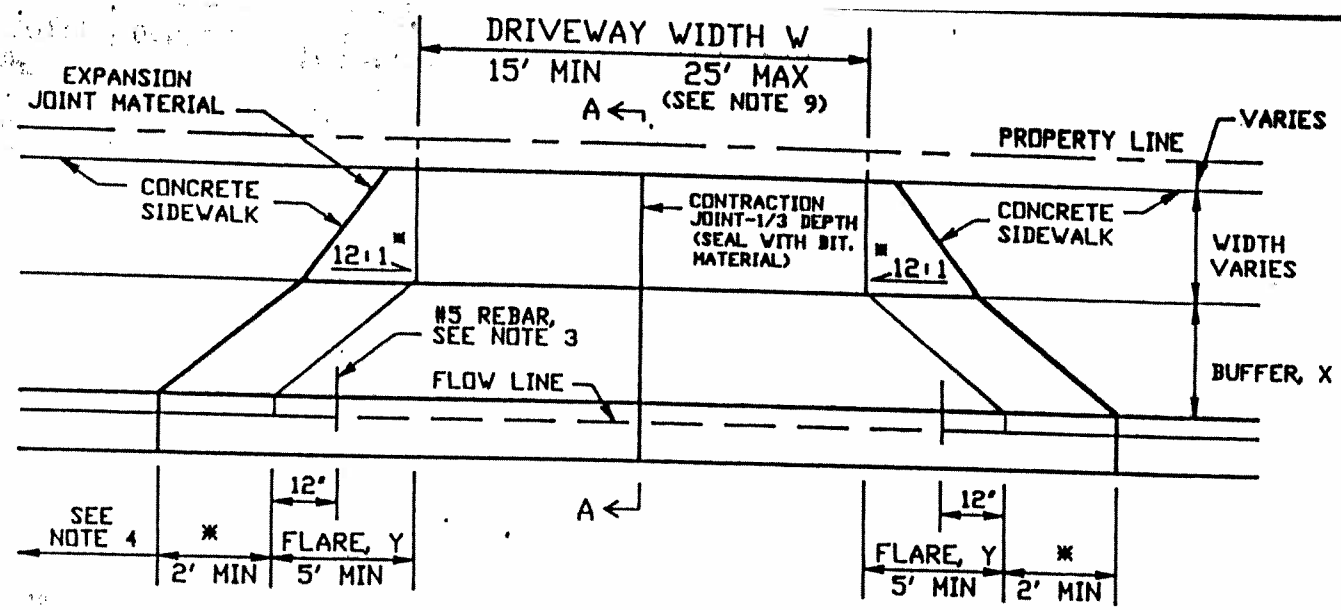
TYP. SECTION.

NOTE:

At the time of installation of concrete Curb and Gutter, it will be the property owners responsibility to install a permanent concrete driveway.



ROCKVILLE	APPROVED BY GERALD E. MORNINGSTAR DATE 11/20/91	ASPHALT RESIDENTIAL DRIVEWAY APRON	4-96 REVISION DETAIL 70



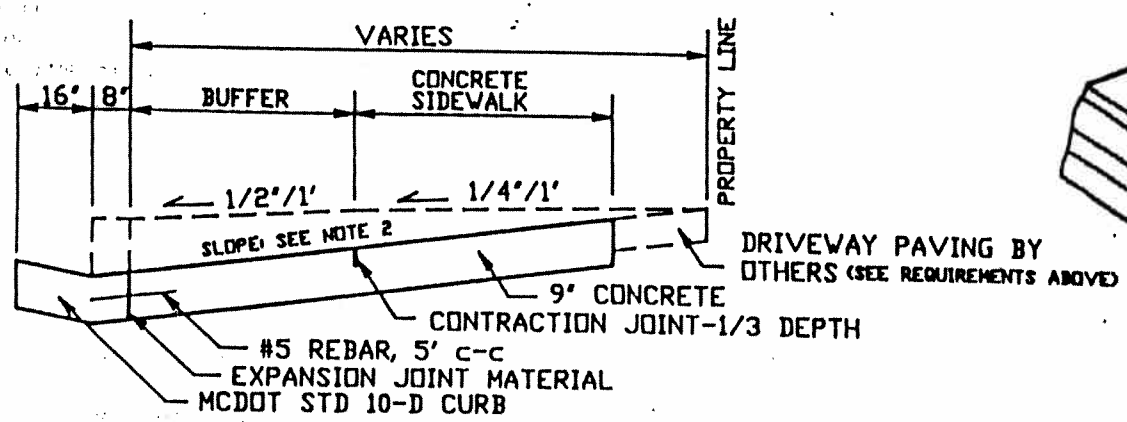
CITY CODE SEC. 25-415. PAVING SPECIFICATIONS

ALL OFF-STREET PARKING AREAS SHALL BE DRAINED AS TO PREVENT DAMAGE TO ABUTTING PROPERTIES OR PUBLIC STREETS AND SHALL BE PAVED WITH A MINIMUM OF:

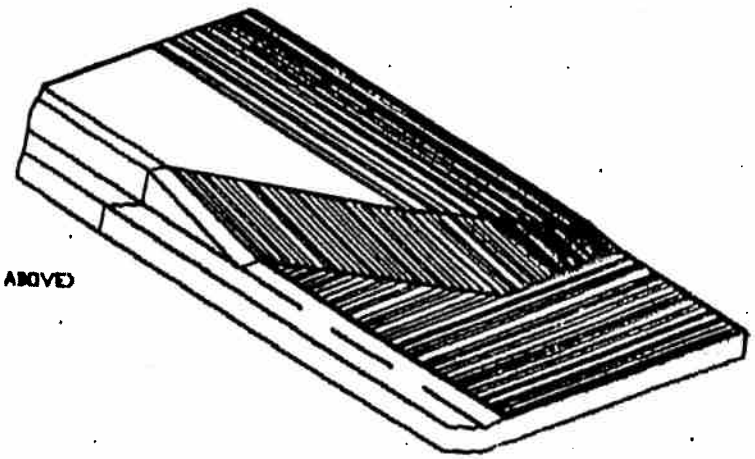
1. SIX (6) INCHES OF CONCRETE; OR
2. SIX (6) INCHES OF BITUMINOUS ASPHALT; OR
3. SIX (6) INCHES OF COMPACTED GRAVEL AND TWO (2) INCHES OF BITUMINOUS ASPHALT; OR
4. OTHER PAVING AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS.

BUFFER, X	FLARE, Y
X < 5'	Y = 5'
X > 5'	Y = X

* PROVIDE 12 : 1 TAPER AT FRONT OF SIDEWALK. EQUAL TAPER LENGTH TO BE PROVIDED AT CURB LINE, WITH MINIMUM OF 2'.



SECTION A-A



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9. WIDTH CAN NOT EXCEED 25 FEET UNLESS SPECIFICALLY AUTHORIZED IN WRITING BY THE CITY ENGINEER.

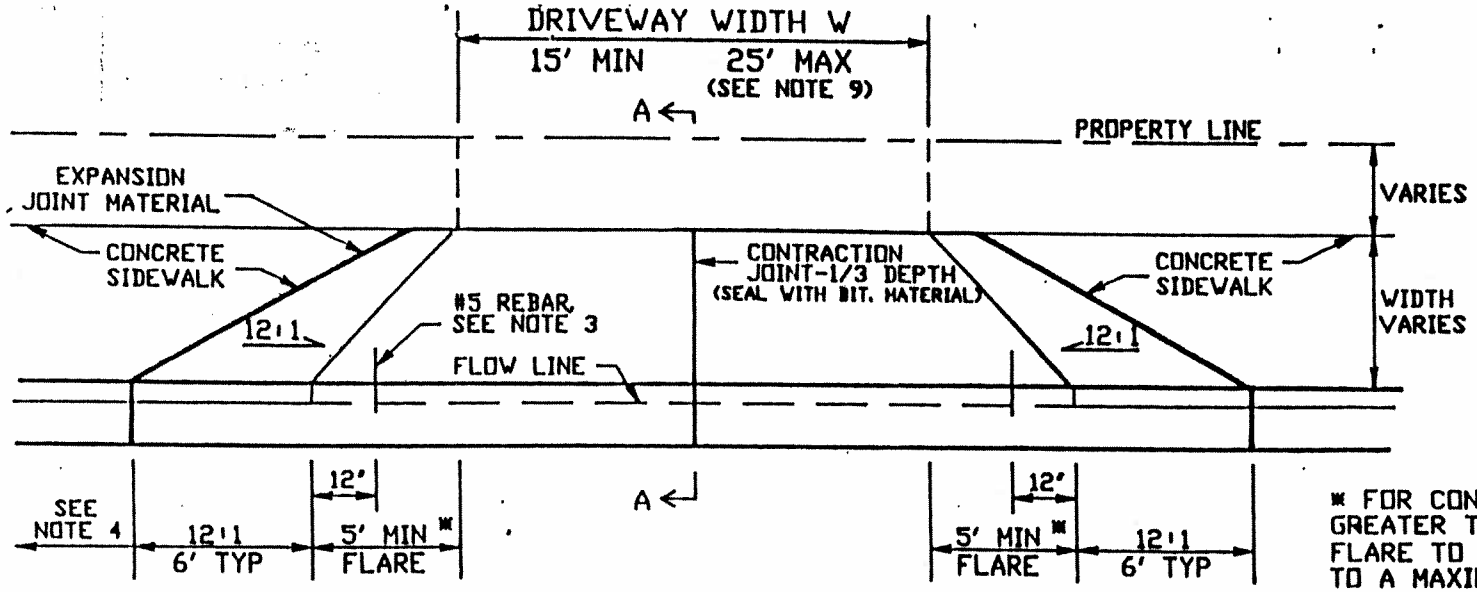
10-7-93
REVISION

ROCKVILLE

APPROVED BY Gerald E. Morningstar
GERALD E. MORNINGSTAR
DATE 11/20/91

BUFFER/SIDEWALK COMBINATION
COMMERCIAL DRIVE

DETAIL
71



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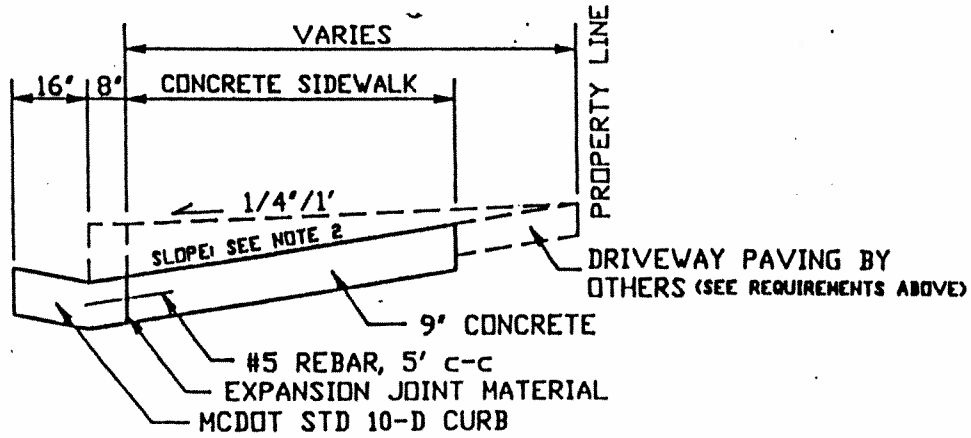
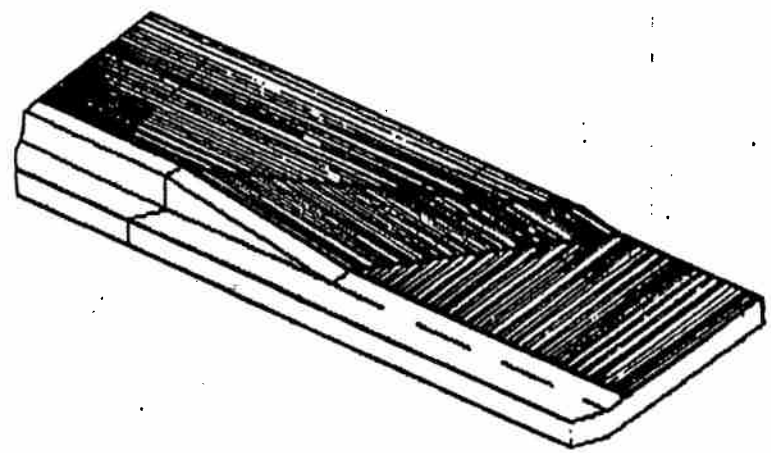
4. OTHER PAVING AS APPROVED BY THE DIR. OF PUBLIC WORKS.

* FOR CONCRETE SIDEWALKS GREATER THAN 5' WIDTH, DRIVEWAY FLARE TO MATCH SIDEWALK WIDTH TO A MAXIMUM OF 10'.



SECTION A-A



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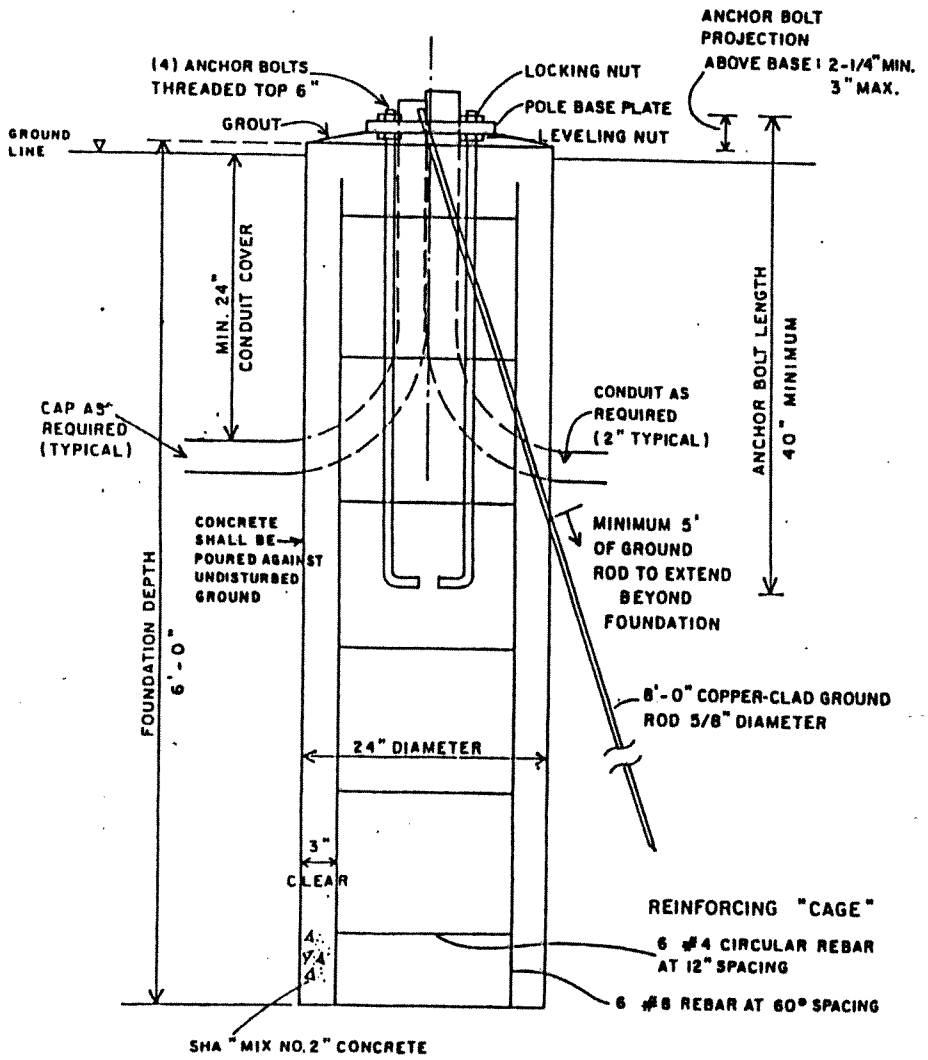
10-7-93
REVISION

ROCKVILLE

APPROVED BY Gerald E. Morningstar
GERALD E. MORNINGSTAR
DATE 11/20/91

SIDEWALK ADJACENT TO CURB
COMMERCIAL DRIVE

DETAIL
72



DRAWING NOT TO SCALE

FOR ALL DIMENSIONS NOT SHOWN REFER TO SPECIAL PROVISIONS OR MANUFACTURER'S SPECS.

ROCKVILLE

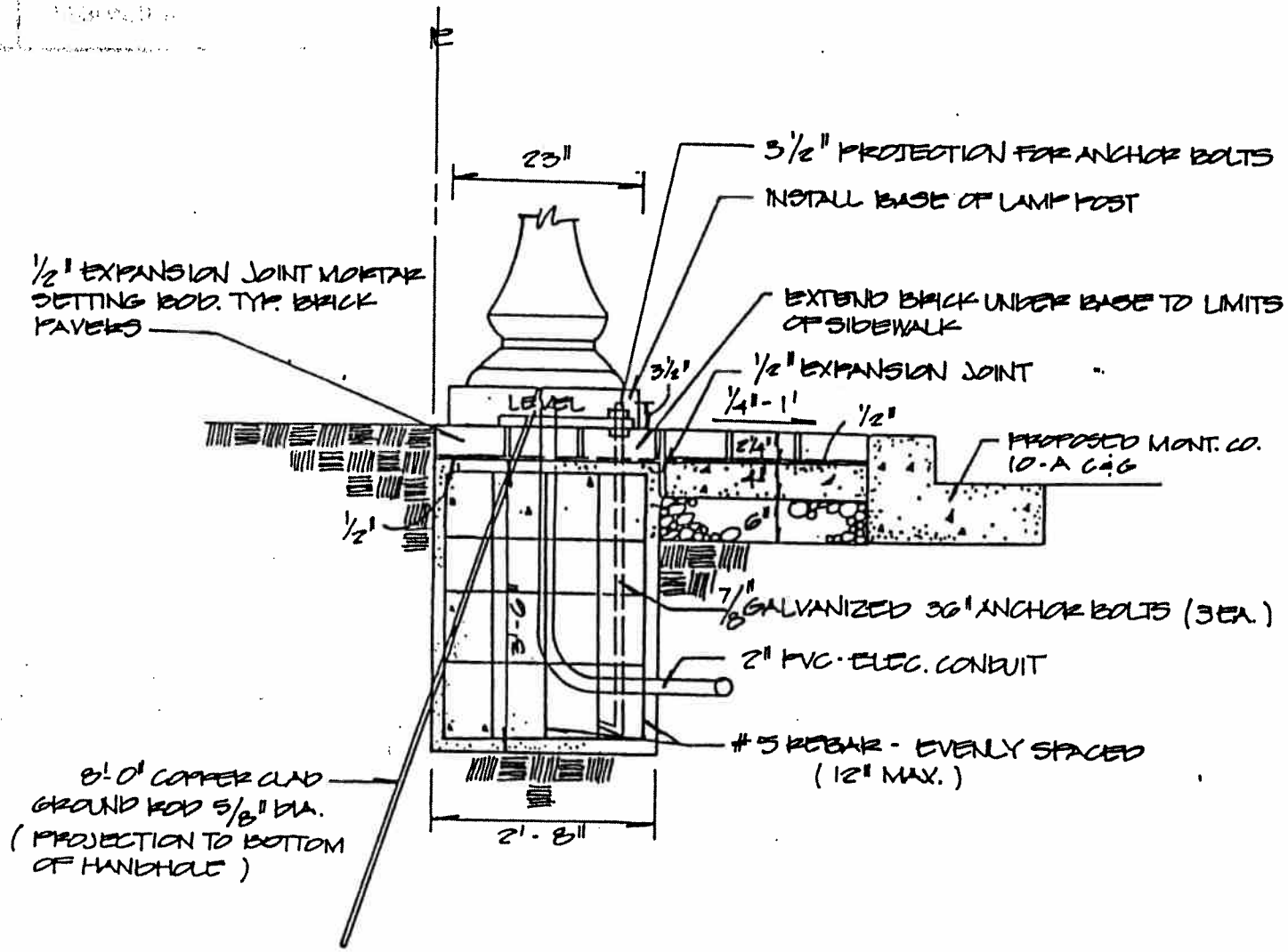
APPROVED BY: Joseph Cutro - Chief Engineer/Transportation

DATE 4/21/92

Typical Street Light Foundation

REVISION

DETAIL 80



ROCKVILLE

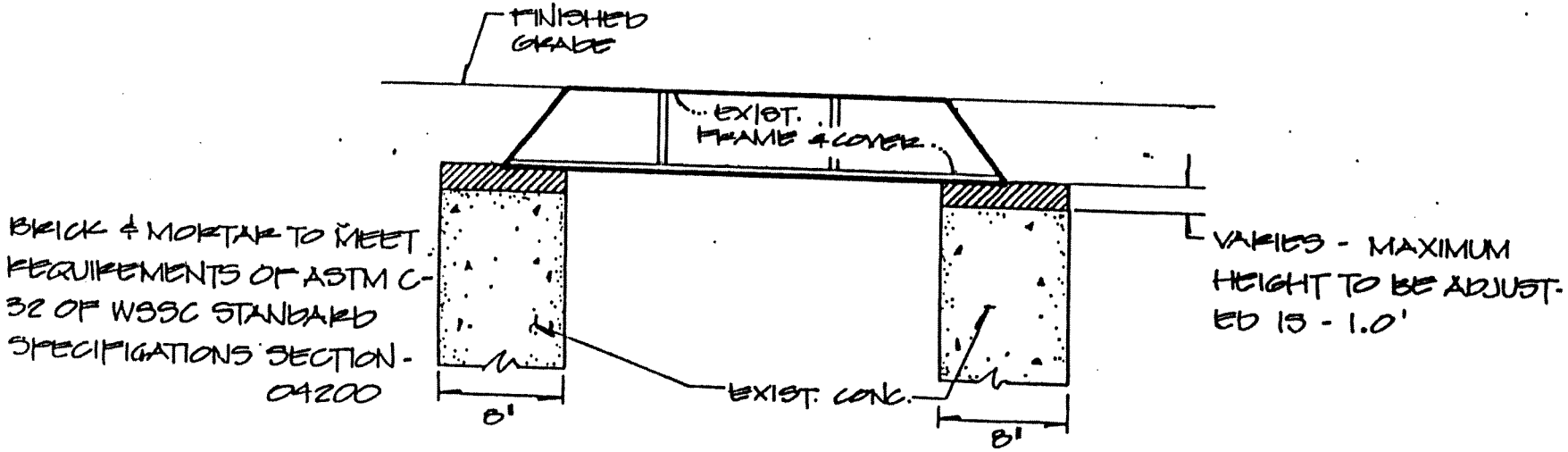
APPROVED BY _____
Joseph Cutro - Chief Engineer/Transportation

DATE 12/21/91

Decorative (Post-Top) Street Light Foundation

REVISION

DETAIL 81



NOTE: RAISE GRADE OF BOX TOP TO MATCH NEW SIDEWALK GRADE AS DIRECTED BY ENGINEER

ROCKVILLE

APPROVED BY _____
Joeseph Cutro - Chief Engineer/Transportation

DATE 1/21/98

Handbox Adjustment Detail

REVISION

DETAIL 82

CITY OF ROCKVILLE -
LIST OF APPROVED TREES

Per Section 25-748 of Rockville City Code

Common Name	Botanical Name	Variety or Cultivar	Min. Spacing
Hedge Maple	*Acer campestre*	species	25'
Paperbark Maple	*Acer griseum*	species	25'
Norway Maple	*Acer platanoides*	species	40'
		'Cleveland'	40'
		'Emerald Queen'	40'
		'Emerald Lustre'	40'
		'Olmsted'	40'
		'Summershade'	40'
Red Maple	*Acer rubrum*	species	40'
		'Armstrong' (columnar)	30'
		'Bowhall' (columnar)	30'
		'October Glory'	40'
		'Red Sunset'	40'
Sugar Maple	*Acer saccharum*	species	40'
		'Commemoration'	40'
		'Goldspire' (columnar)	30'
		'Green Mountain'	40'
		'Legacy'	40'
		'Seneca Chief'	40'
Horsechestnut	*Aesculus hippocastanum*	species	35'
		'Baumann'	35'
Ruby Red Horsechestnut	*Aesculus x carnea 'Erictii'*	species	30'
European Hornbeam	*Carpinus betulus*	species	35'
American Hornbeam	*Carpinus caroliniana*	species	35'
Katsuratree	*Cercidiphyllum japonicum*	species	35'
Yellowood	*Cladrastis lutea*	species	35'
Thornless Washington Hawthorn	*Crataegus phaenopyrum*	'inermis'	30'

Common Name	Botanical Name	Variety or Cultivar	Min. Spacing
Thornless Winterking Hawthorn	*Crataegus viridis 'inermis'*	'Winterking'	30'
White Ash	*Fraxinus americana*	species 'Autumn Applause' 'Autumn Purple' 'Rosehill'	40' 40' 40' 40'
Green Ash	*Fraxinus pennsylvanica*	species 'Marshall Seedless'	40' 40'
Ginkgo	*Ginkgo biloba*	species (male only)	35'
Honeylocust	*Gleditsia triacanthos 'inermis'*	species 'Imperial' 'Moraine' 'Shademaster' 'Skyline'	40' 40' 40' 40' 40'
Kentucky Coffeetree	*Gymnocladus dioicus*	species	40'
Goldenrain Tree	*Koelreuteria paniculata*	species	30'
Sweet Gum	*Liquidambar styraciflua*	species	40'
Crabapples	*Malus* species	various cultivars	25'
Dawn Redwood	*Metasequoia glyptostroboides*	species	30'
Sour Gum	*Nyssa sylvatica.*	species	35'
Ironwood	*Ostrya virginiana*	species	30'
Sourwood	*Oxydendron arboreum*	species	25'
Amur Corktree	*Phellodendron amurensis*	'Macho'	30'
London Planetree	*Platanus x acerifolia*	'Columbia' 'Liberty'	50'
Sargent Cherry	*Prunus sargentii*	species	40'

Common Name	Botanical Name	Variety or Cultivar	Min. Spacing
Kwanzan Cherry	*Prunus serrulata*	'Kwanzan'	30'
Swamp White Oak	*Quercus bicolor*	species	40'
Pin Oak	*Quercus palustris*	species	40'
Willow Oak	*Quercus phellos*	species	40'
English Oak	*Quercus robur*	species	40'
Red Oak	*Quercus rubra*	species	40'
Shumard Oak	*Quercus shumardi*	species	40'
Scholartree	*Sophora japonica*	species	30'
		'Princeton Upright'	30'
		'Regent'	30'
Japanese Tree Lilac	*Syringa reticulata*	'Ivory Silk'	25'
		'Summer Snow'	25'
Baldcypress	*Taxodium distichum*	'Shawnee Brave'	30'
		'Prairie Sentinel'	30'
		'Monarch of Illinois'	30'
American Linden	*Tilia americana*	species	40'
		'Redmond'	40'
Littleleaf Linden	*Tilia cordata*	species	40'
		'Greenspire'	40'
Silver Linden	*Tilia tomentosa*	species	40'
Chinese Elm	*Ulmus parviflora*	species	40'
Zelkova	*Zelkova serrata*	'Green Vase'	35'
		'Village Green'	35'

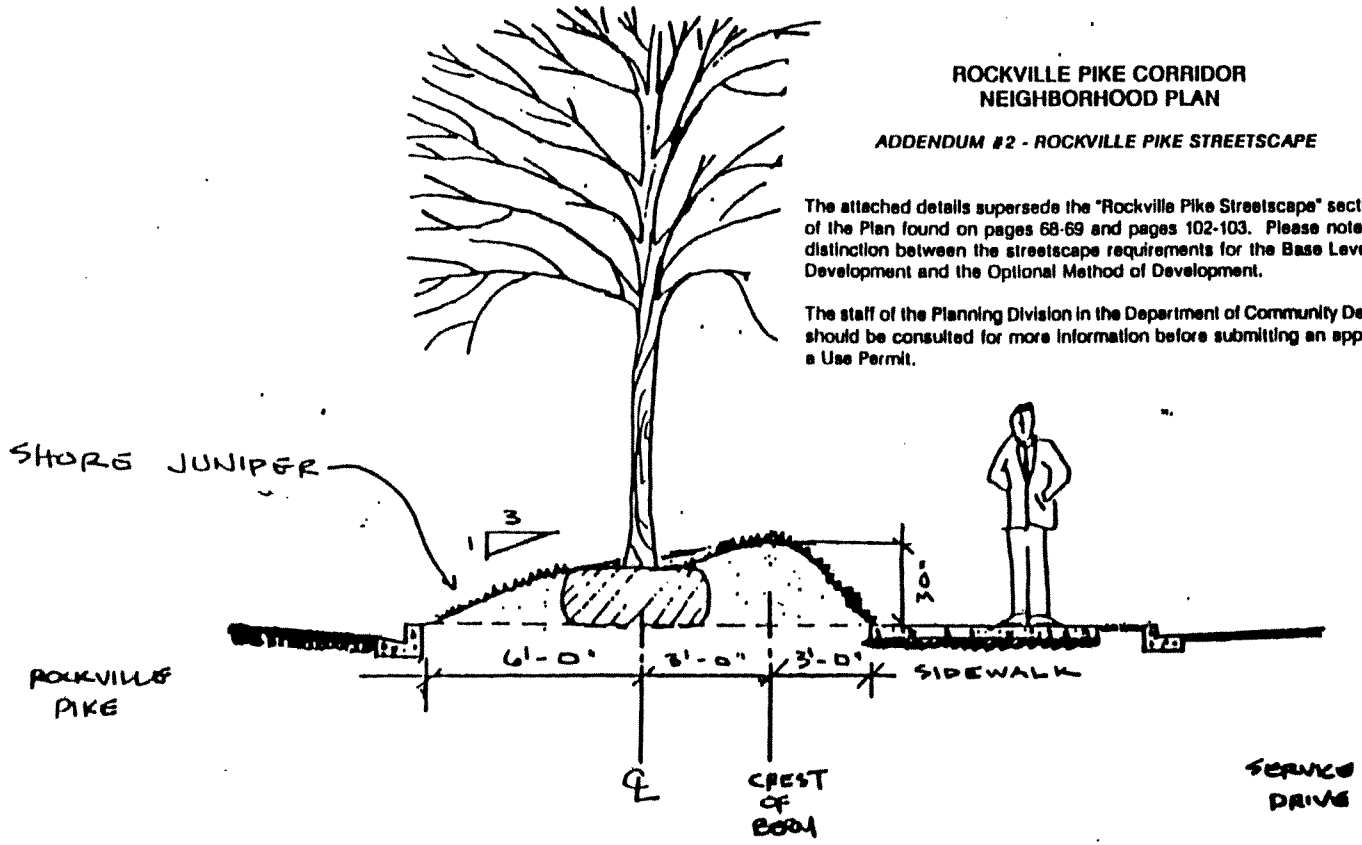
(Revised June 1, 1993)

ROCKVILLE PIKE CORRIDOR NEIGHBORHOOD PLAN

ADDENDUM #2 - ROCKVILLE PIKE STREETSCAPE

The attached details supersede the "Rockville Pike Streetscape" sections of the Plan found on pages 68-69 and pages 102-103. Please note the distinction between the streetscape requirements for the Base Level of Development and the Optional Method of Development.

The staff of the Planning Division in the Department of Community Development should be consulted for more information before submitting an application for a Use Permit.



SECTION OF BERM -
AT TREE LOCATION
NOT TO SCALE

BASE LEVEL OF DEVELOPMENT AND OPTIONAL METHOD OF DEVELOPMENT

ROCKVILLE PIKE STREETSCAPE
REVISED DETAILS

ROCKVILLE

SHEET 1

ROCKVILLE PIKE CORRIDOR
NEIGHBORHOOD PLAN

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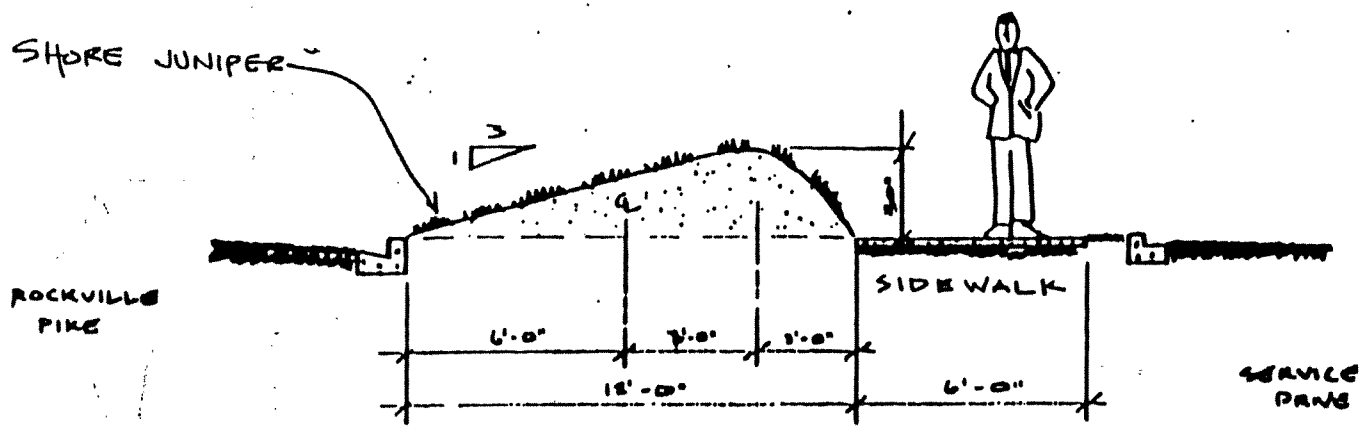


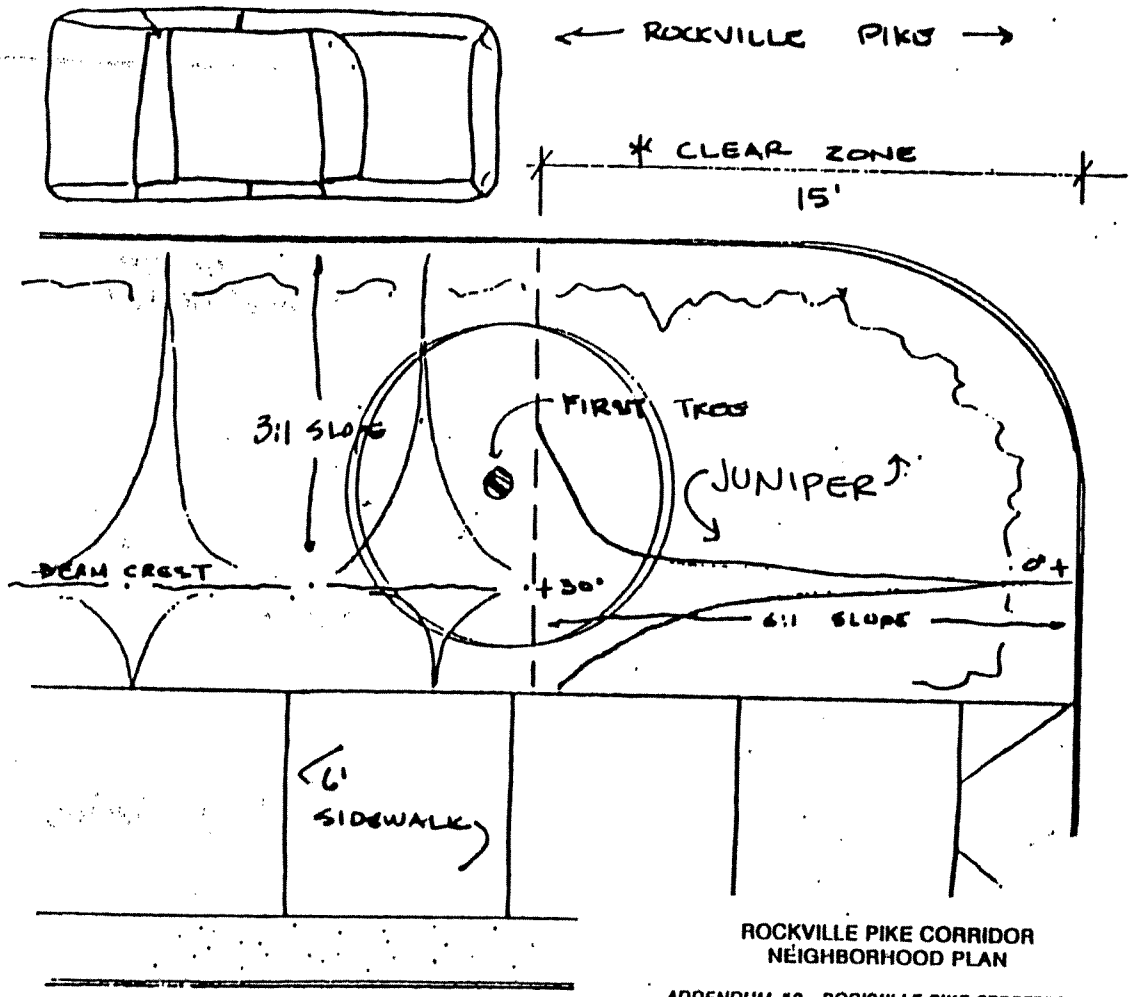
SECTION OF BERM
NOT TO SCALE

BASE LEVEL OF DEVELOPMENT AND OPTIONAL METHOD OF DEVELOPMENT

ROCKVILLE PIKE STREETSCAPE
REVISED DETAILS

ROCKVILLE

SHEET 2



TWO - WAY DRIVEWAY

ROCKVILLE PIKE CORRIDOR
NEIGHBORHOOD PLAN

ADDENDUM #2 - ROCKVILLE PIKE STREETSCAPE

PLAN AT ENTRANCE DRIVEWAY
NOT TO SCALE

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CLEAR ZONE:

- **NO TREES**
- **EVEN 6:1 SLOPE**

ROCKVILLE PIKE STREETSCAPE
REVISED DETAILS

ROCKVILLE

BASE LEVEL OF DEVELOPMENT AND
OPTIONAL METHOD OF DEVELOPMENT

SHEET 3

ROCKVILLE PIKE CORRIDOR NEIGHBORHOOD PLAN

ADDENDUM #2 - ROCKVILLE PIKE STREETSCAPE

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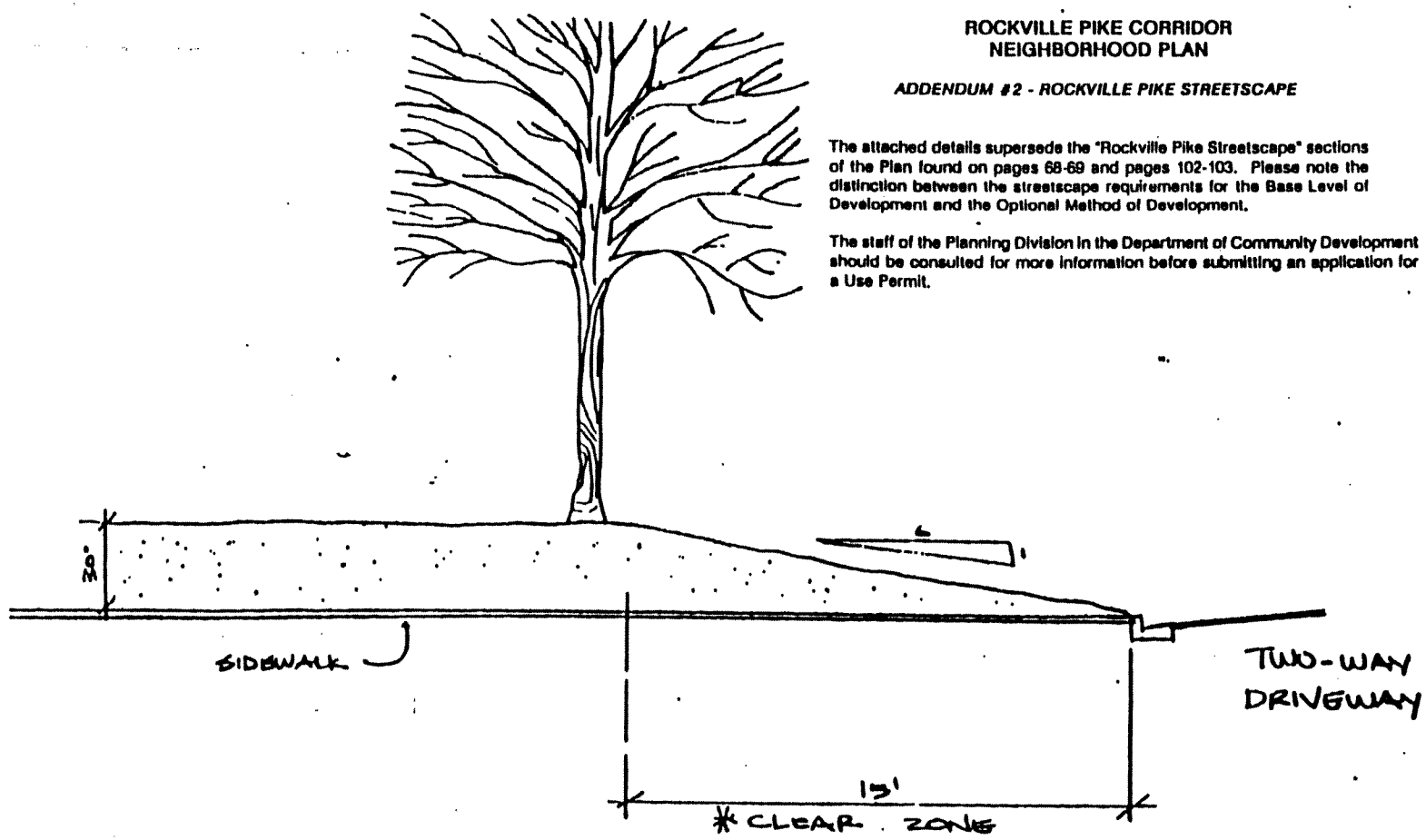


LONGITUDINAL SECTION -
FROM SERVICE DRIVE
NOT TO SCALE

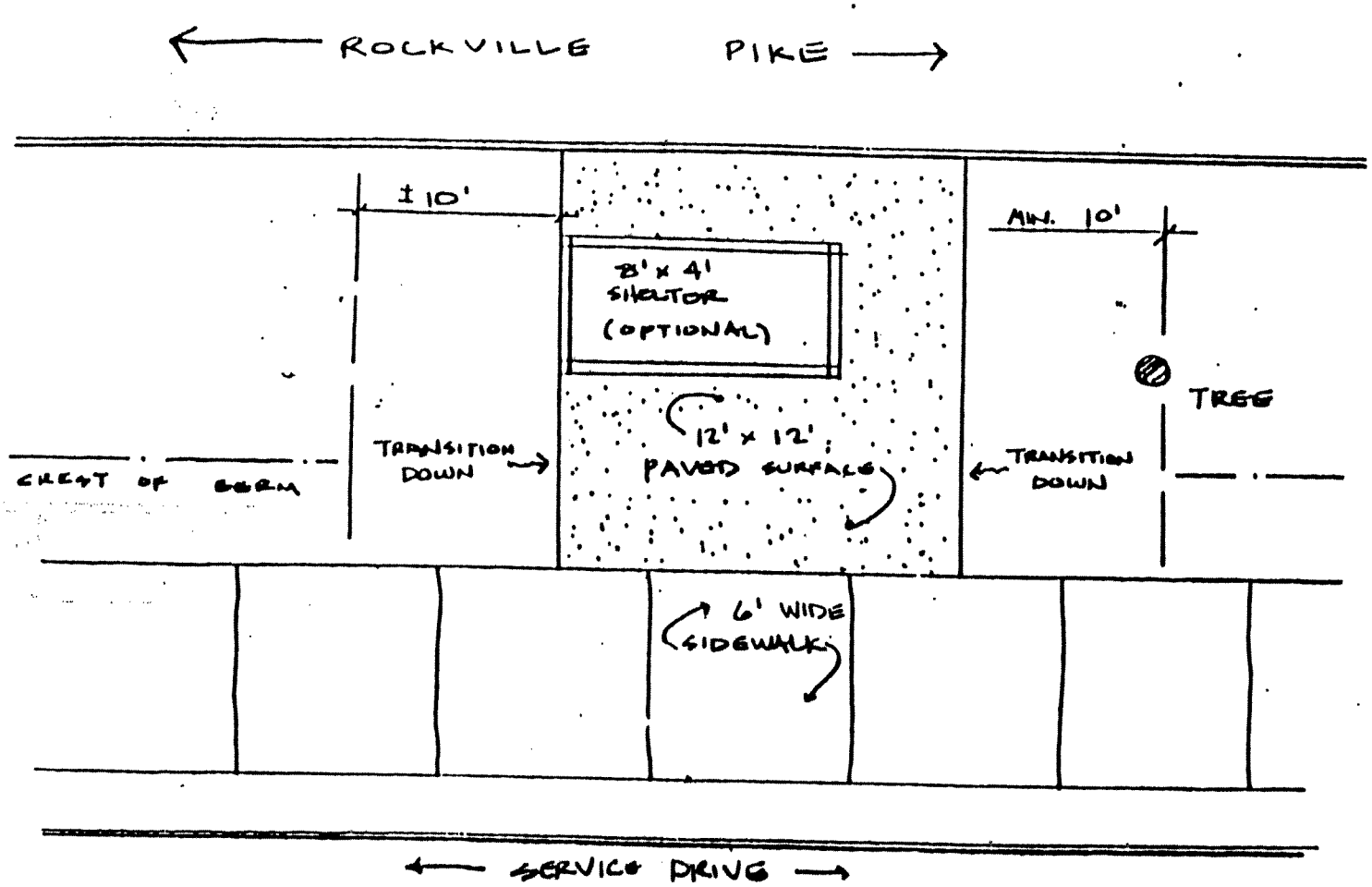
* **CLEAR ZONE:**
- **NO TREES**
- **EVEN 6:1 SLOPE**

ROCKVILLE PIKE STREETSCAPE
REVISED DETAILS

ROCKVILLE

BASE LEVEL OF DEVELOPMENT AND OPTIONAL METHOD OF DEVELOPMENT

SHEET 4



PLAN AT BUS STOP
NOT TO SCALE

ROCKVILLE PIKE CORRIDOR
NEIGHBORHOOD PLAN

ADDENDUM #2 - ROCKVILLE PIKE STREETSCAPE

BASE LEVEL OF DEVELOPMENT AND OPTIONAL METHOD OF DEVELOPMENT

ROCKVILLE PIKE STREETSCAPE
REVISED DETAILS

ROCKVILLE

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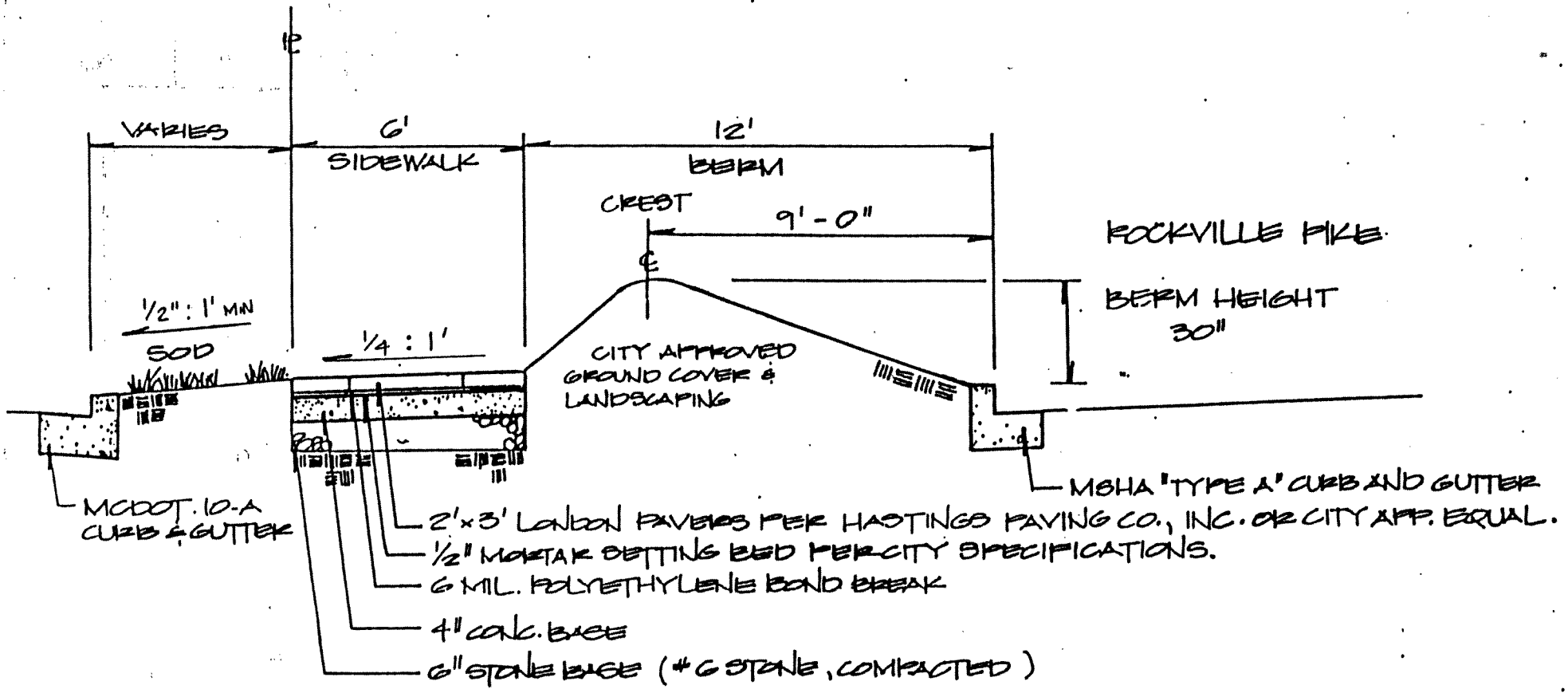
SHEET 5

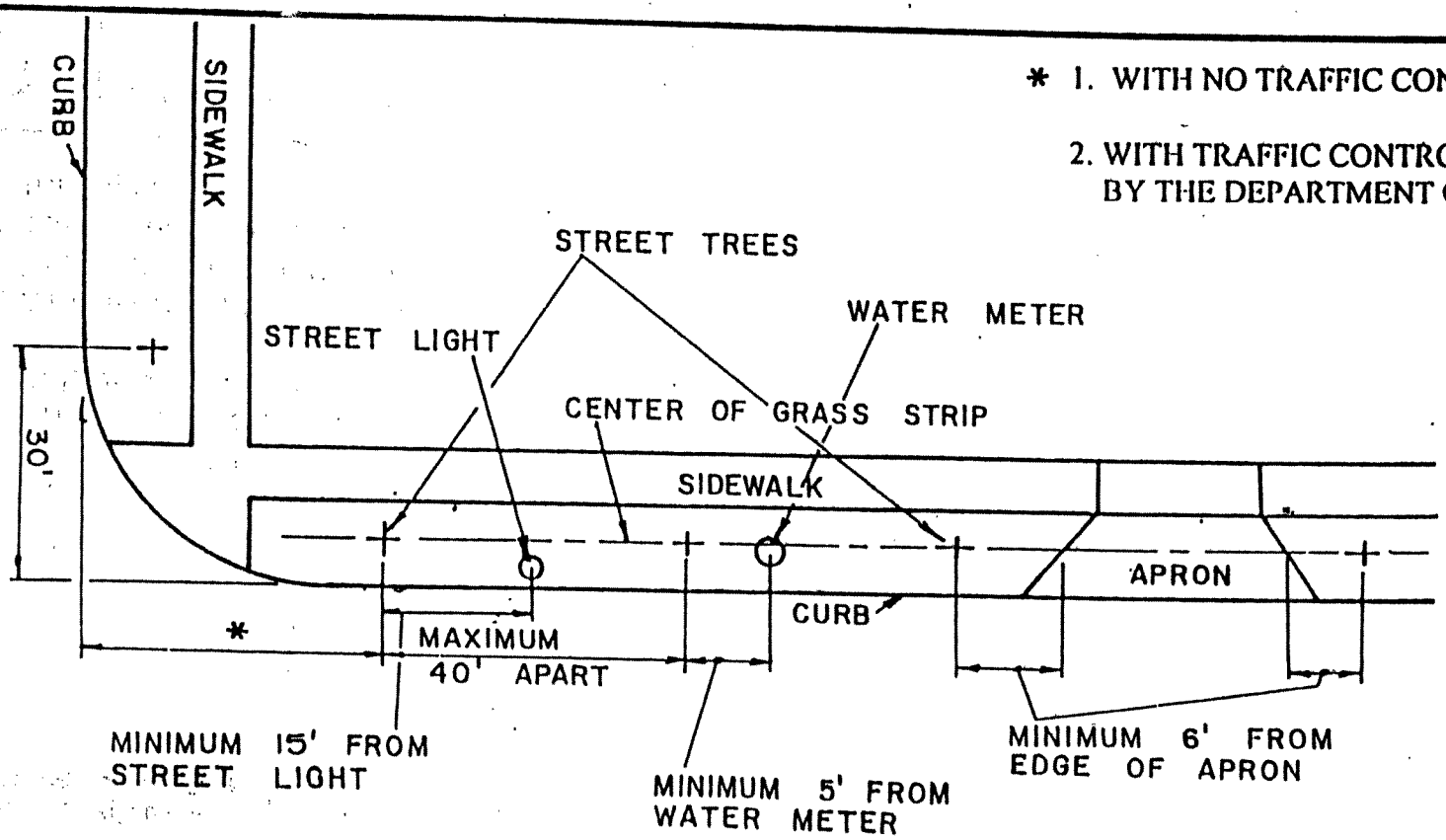


NOTES:

1. Detail provided is subject to MSHA approval, permit and bond requirements.
2. Refer to MSHA specifications for materials and methods of construction.
3. Provide 1/2" expansion joint 36' c-c in 4" concrete base and pavers.
4. Sidewalk ramps shall be 4" plain cement concrete set to finished grade per MSHA Standard Detail MD 655.11. Eliminate pavers from ramps.
5. At driveways, berm shall taper from full height to meet driveway in 15'.
6. The permittee shall adjust all utilities as directed by the utility owner.
7. The permittee is responsible for grading, sodding and providing positive drainage.

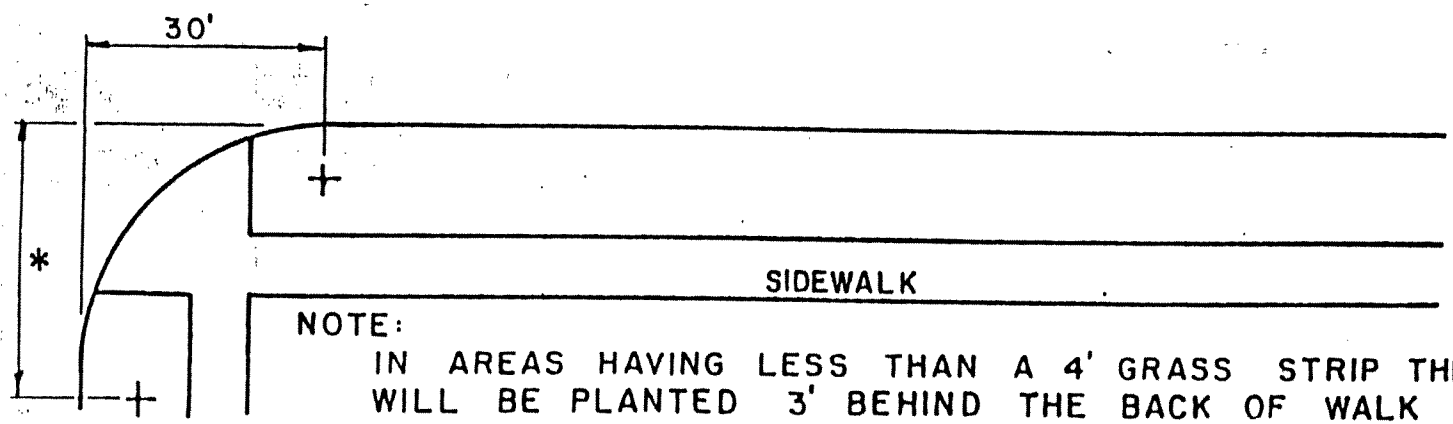
ROCKVILLE	APPROVED BY [signature] DATE 2/4/94	DETAIL OF LONDON WALK SIDEWALK ROCKVILLE PIKE STREETSCAPE	REVISION DETAIL

SHEET 6



* 1. WITH NO TRAFFIC CONTROL 30'

2. WITH TRAFFIC CONTROL, 50' OR AS DIRECTED BY THE DEPARTMENT OF PUBLIC WORKS.

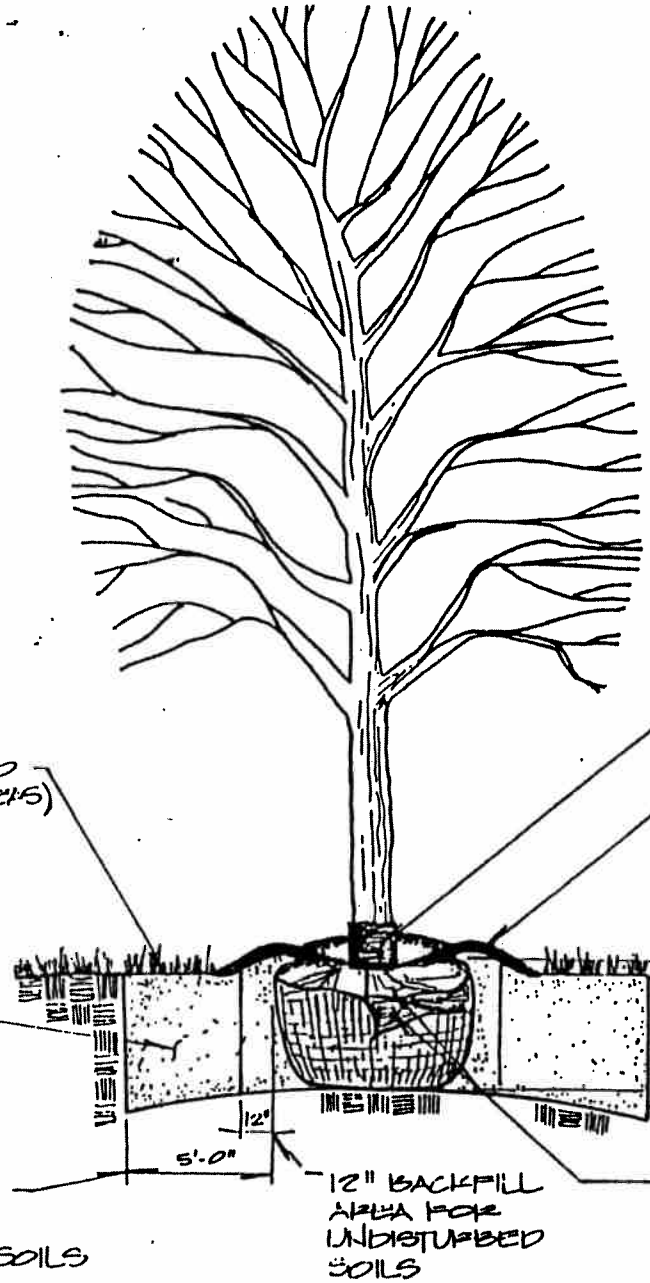


NOTE:
IN AREAS HAVING LESS THAN A 4' GRASS STRIP THE TREES WILL BE PLANTED 3' BEHIND THE BACK OF WALK USING THE SAME SPACING AS SHOWN ABOVE.

ROCKVILLE	APPROVED BY GERALD E. MORNINGSTAR DATE 11/20/91	TREE PLANTING STANDARD NO. 70A	6·93 REVISION DETAIL 200

NOTE: WATER @ PLANTING WHEN SOIL PIT IS 1/2 BACK FILLED

PRUNE ONLY DEAD, BROKEN OR CROSSING BRANCHES (NO HEADING BACK)



8" BLACK PLASTIC DRAIN PIPE: CUT ONE SIDE

2'-3' FT. MIN OF SOD (EXCEPT WOODED AREAS)

2" HARDWOOD MULCH TO COVER ENTIRE PLANTING AREA - EXCEPT 3" CLEAR AROUND TRUNK

2"-4" ABOVE GRADE

BACKFILL MIX (EXISTING SOIL)

UNDISTURBED CROWN WITH 3% SLOPE

5 FOOT BACKFILL AREA FOR HIGHLY DISTURBED URBAN SOILS

12" BACKFILL AREA FOR UNDISTURBED SOILS

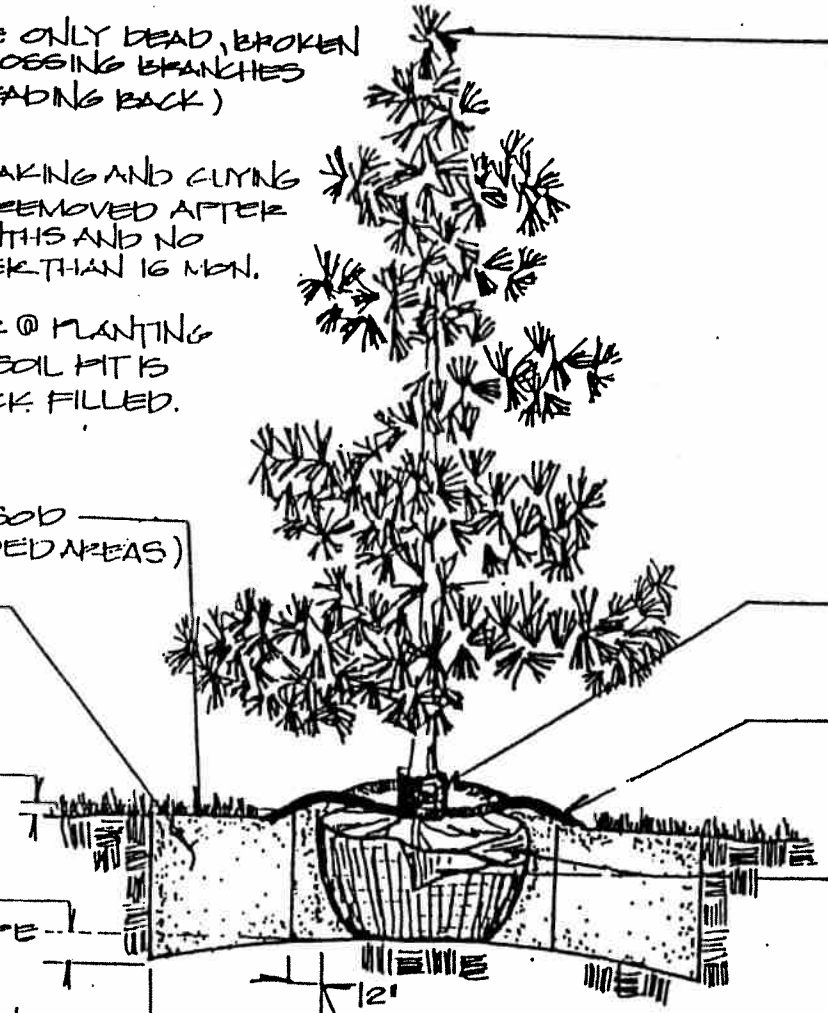
REMOVE BURLAP AND/OR WIRE BASKET FROM TOP 1/3 OF BALL.

ROCKVILLE	APPROVED BY [signature] DATE 7-8-94	DECIDUOUS TREE PLANTING DETAIL	REVISION DETAIL 201

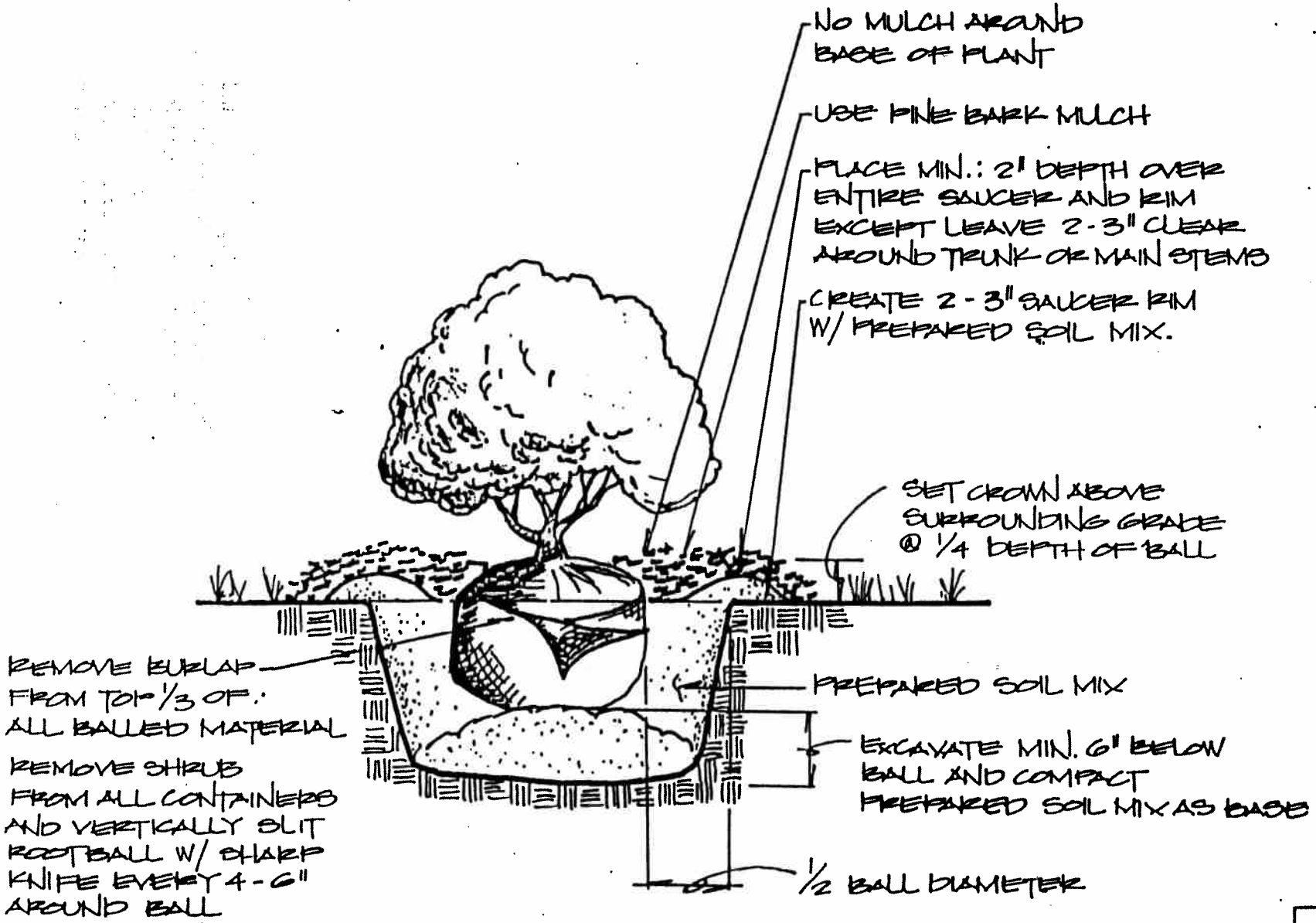
NOTE: PRUNE ONLY DEAD, BROKEN OR CROSSING BRANCHES (NO HEADING BACK)

ALL STAKING AND GUYING TO BE REMOVED AFTER 12 MONTHS AND NO LONGER THAN 16 MON.

WATER @ PLANTING WHEN SOIL PIT IS 1/2 BACK FILLED.



ROCKVILLE	APPROVED BY [signature] DATE 7-8-94	EVERGREEN TREE PLANTING AND STAKING DETAIL	12-'97 REVISION DETAIL 202



ROCKVILLE	APPROVED BY [signature] – DIRECTOR OF PUBLIC WORKS DATE 1-3-95	SHRUB PLANTING DETAIL	REVISION DETAIL 203

Revised 5/94

CITY OF ROCKVILLE

Specifications for

Stone Filled Wire Gabion Baskets

1. Description

Under this item, the Contractor shall furnish, assemble, fill with approved stones and lace hexagonal open mesh wire baskets, constructed in accordance with these specifications and placed in conformity with the lines, grades and dimensions shown on the Plans or as required by the Engineer. These gabion units shall be manufactured by Maccaferri Gabions, Inc., Terra Aqua Corporation, or approved equal. Also the contractor shall furnish, install and anchor a filter cloth to the limits and lines as shown on the Plans or as required by the Engineer. The filter cloth shall be Mirafi 140N or approved equal. The Contractor shall furnish and install anchoring plates where shown and detailed on the contract drawings.

2. Materials

A. Gabions

(1) Dimensions

The Gabion units shall be supplied as specified, in various lengths and thicknesses. The lengths shall be multiples (2, 3, or 4) of the horizontal width. The horizontal width shall be not less than 36 inches, but may be measured in standard English or metric units. However, all gabions furnished by a manufacturer shall be of uniform width. The thickness shall conform to the dimensions shown on the contract drawings. Dimensions for lengths, widths and thicknesses shall be subject to a ± 5% tolerance limit of the manufacturer's stated sizes.

The maximum linear dimensions of the mesh opening shall be three and one-quarter (3 1/4) by four and one-half (4 1/2) inches in size.

(2) Fabrication

Gabion units shall be made of heavily galvanized steel wire (and sheathed in (PVC) polyvinyl chloride) then weaved into a double twisted hexagonal mesh and fabricated in such a manner that the base, sides (front and back), ends, diaphragms and lids can be assembled at the construction site into a rectangular unit of the specified size. Gabion ends shall be of a single unit construction - the base, sides, and lid shall be woven into a single unit and the ends shall be connected to the base section of the gabion in such a manner that the strength and flexibility at the point of connection is at least equal to that of the mesh.

Specifications for Stone Filled Wire Gabion Baskets

Where the length of the gabion exceeds five feet the gabion shall be divided by diaphragm(s), of the same mesh and gauge as the body of the gabions, into cells of equal length and width. The gabion shall be furnished with the necessary diaphragm(s) secured in the proper position on the base in such a manner that no additional lacing at this junction will be necessary.

All perimeter edges of the mesh forming the gabion units shall be securely selvaged so that the joints formed by tying the selvages have at least the same strength as the body of the mesh. Lacing wire shall be used in sufficient quantity for securely fastening all sides, ends and diaphragm(s) of the body as well as the lid to all sides, ends and diaphragm(s) of the gabion units and to provide for the necessary internal connecting wires in each cell.

(B). Wire PVC Gabions

(a) The gabions shall be fabricated from heavily galvanized steel wire mesh core, U.S. gauge No. 12, having a minimum diameter of 0.1055 inches after galvanizing, and an overall diameter (core wire plus plastic coating) of not less than 0.1465 inches. Tensile strength to be 55,000 to 80,000 psi.

(b) The selvage wire running through all the edges (perimeter wire) shall be made of steel wire core, U.S. gauge No. 10, having a minimum diameter not less than 0.1338 inches and where PVC coating is used, an overall diameter (core wire plus plastic coating) of not less than 0.1735 inches.

(c) The lacing wire necessary for binding the gabion units together shall be core wire, U.S. gauge No. 13, having a minimum diameter not less than 0.0866 inches and where PVC coating is used an overall diameter (core wire plus plastic coating) of not less than 0.1270 and supplied in an amount corresponding to at least 7% (seven per cent) of the weight of the gabion.

(d) The minimum zinc coating of the wire shall be 0.80 oz, per sq. ft. as determined by tests conducted in accordance with ASTM Designation A-90.

(e) Use PVC coated wire.

(f) Tests

(1) Elongation

The wire mesh shall have sufficient elasticity to permit elongation of the mesh equivalent to a minimum of 10% of the length of the section under test without

reducing the gauge or tensile strength of individual wires less than those for similar wire one gauge smaller in diameter.

(2) Load Test

An uncut section of the mesh not less than six feet long and not less than three feet wide, after first being subjected to the elongation test described above, shall withstand a load test of 6,000 pounds applied to an area of one square foot located approximately in the center of the section under test. The details of the test are as follows:

An uncut section of the mesh not less than six feet long, not less than three feet wide and including all selvage bindings shall have the ends securely clamped for three feet along the width of the sample. When the width of the section under test exceeds three feet, the clamps shall be placed in the middle portion of the width and the excess width shall be allowed to fall free on each side of the clamped section. The sample shall withstand without rupture of any wire or opening of any mesh fastening an actual load so applied equaling or exceeding 6,000 pounds. The ram head used in the test shall be circular with its edges bevelled or rounded to prevent cutting of the wires.

(3) Single Wire Cut

The wire mesh shall be fabricated in such a manner as to be nonraveling. This is defined as the ability to resist pulling part at any of the twists or connections forming the mesh when a single wire in a section of mesh is cut and the section mesh then subjected to the load test described above.

(4) Zinc Coating

The test shall be conducted in accordance with the details described in ASTM Designation A-90.

(5) Tensile Strength

The test shall be conducted in accordance with the details described in ASTM Designation A-392, except that the strength shall be listed under "B. Wire" of this specification.

(6) Certification

Each shipment of wire mesh gabions to a job site shall be accompanied by a certification which states that the material conforms to the requirements of these

specifications. A shipment shall consist of all material arriving at the job site at approximately the same time. The certification shall be on Company letterhead and shall be signed by an officer of the Company having legal authority to bind the Company.

C. PVC Plastic Coating

(a) The color of the PVC coating shall be black or green as approved by the Engineer.

(b) The protective covering must be resistant to the air and seawater and must meet the following tests:

(1) Immersion of the wire for 20 hours in Hydrochloric acid (solution composed 50% H_2O and 50% HCL concentration 21 Baume-Test temperature 15° C) without noticeable loss of weight due to corrosion of the covering material and without any reduction of the wire's diameter.

(2) After immersion of a length of the covered wire in a 3.5% solution of Potassium Permanganate (KMO_4) for a continuous period of fifty hours at an ambient temperature, the maximum penetration between the covering and the core wire from a square cut end shall be 12 millimeters (0.475 inches).

(3) The protective covering shall not be altered or deformed by the temperature ranging between + 158.0° F and -40° F.

D. Fill

Gabions shall be filled with hard, durable, clean stone from four (4) to eight (8) inches, both measured in the greatest dimension or as approved by the Engineer. Stone shall be dark in color and of igneous origin.

The Engineer reserves the right to reject any source failing the following tests:

Freeze-Thaw Test - A maximum 10 per cent loss, by weight after 25 cycles of freezing and thawing.

Magnesium Sulfate Soundness Test - A maximum 10 per cent loss, by weight after 10 cycles of the magnesium sulfate soundness test.

Specifications for Stone Filled Wire Gabion Baskets

E. Filter Cloth

(a) The filter cloth shall consist of polypropylene monofilament yards woven into sheets of approximately 16 mils thickness. the tensile strength of the cloth shall be as determined by ASTM Designation P-1682-64, entitled "Breaking Load and Elongation of Textile Fabrics," Designated test shall be 350 lbs./inch in warp and 190 lbs./inch in fill or greater.

(b) The weave of the filter cloth shall be dense and tight such that in plain view the openings can only barely be seen. Test results of the material to be used must be submitted to the Engineer for his approval prior to its use. These results must show that the filter cloth can effectively retain particles coarser than the opening of US sieve mesh 140 (0.1mm) for all conditions of flow employed in investigation and can retain much smaller particles when employed with soils subjected to laminar flow. These shall demonstrate that the Filter permeability is between 3.3 and 3.8 X 10-2 cm./sec.

3. Construction Methods

The Contractor shall assemble each gabion unit by tying all untied edges with lacing wire. The lacing procedure consists of cutting a length of lacing wire (approximately 1 1/2 times the distance to be laced - not to exceed five feet). Secure the wire terminal at the corner by looping and twisting and then proceed to lace with single and double loops at approximately five (5) inch intervals. Securely fasten the other lace terminal.

Where the gabion netting is being cut, the reinforcing wire shall be wired into the mesh. The strength at this point shall be the same as the mesh itself. Each corner of the gabion shall be delineated by reinforcing wire woven into the mesh.

The Contractor shall place empty gabion units to line and grade as shown on the Plans and use lacing wire to securely tie each unit to the adjoining one along the perimeter of all contact surfaces in the same manner described above for assembling.

Once the empty gabion units are fastened together they shall be stretched to effective alignment. This operation shall be carried out after several empty gabions have been installed. The first gabion in the line shall be partially filled to provide the necessary anchorage. Any stretching method (come-a-long, block and tackle, etc.) shall be used for this purpose.

Specifications for Stone Filled Wire Gabion Baskets

The base of the empty gabion units placed on top of a filled line of gabions shall be tightly laced to the latter.

The Contractor shall fill the gabion units, using mechanical means or by hand, and insert, in each cell, connecting wire. If mechanical means are used, the maximum height from which stone may be dropped into units shall be three feet. Extreme care shall be exercised to preclude damaging any wires. Any wires damaged shall be replaced by the Contractor at no additional expense to the Owner. The connecting wire shall be inserted in the following manner.

1. Each empty cell shall be filled to a depth of twelve inches (nine inches for a gabion 1.5 feet thick, completely for one foot gabions).

2. Two parallel connecting wires shall be uniformly spaced and securely fastened in each outside face of the cell - a height of twelve inches above the base.

3. Cells shall be filled to a further depth of twelve inches completely for a 1.5 foot thick gabion), and another two connecting wires shall be similarly tied at this level.

The cells in any row shall be filled in stages so that local deformations can be avoided. This is, at no time shall any cell be filled to a depth exceeding one foot more than the adjoining cell. ALONG ALL VISIBLE FACES OF THE COMPLETED STRUCTURE THE STONE SHALL BE CAREFULLY PLACED AND PACKED BY HAND FOR A DEPTH OF APPROXIMATELY EIGHT TO TEN INCHES IN ORDER TO ENSURE PROPER ALIGNMENT, A NEW, COMPACT SQUARE APPEARANCE, AND ALL VERTICAL FACES ARE IN FACT PLUMB.. When the gabion has been filled the lid shall be bent and stretched over until it meet the perimeter edges of the front and end panels. To assist in closing and lacing, a pinch bar or gabion closer may be used. The cells shall not be over filled so as to avoid excessive extension on the lacing wire joining the lid and perimeter edges.

The Contractor shall install the gabions used for bank protection with the long dimension of the compartments paralleling the stream (i.e. the short dimension is installed directed up the slope). When gabions are required for outlet protection, they shall have a minimum depth of three feet around the perimeter of the apron, 1 foot minimum depth elsewhere, and shall be designed in accordance with A-38.08 & A-38.09 USDA-SCS-Md. Standards and Specifications.

Department of Public Works
111 Maryland Avenue, Rockville, MD 20850-2364

STORMWATER MANAGEMENT CONSTRUCTION NOTES

General

1. The Contractor must contact the following prior to beginning work: **City Department of Public Works Inspector as listed on permit; City Utilities Section at 240-314-8567; City Transportation Division (traffic signal and streetlight locates) at 240-314-8500; and Miss Utility at 1-800-257-7777, 48 hours before excavating.**

2. Information concerning existing underground utilities was obtained from available records. The Contractor must determine the exact location and elevation of existing utilities by digging test pits, by hand, at all utility crossings well in advance of trenching. If clearance is less than shown on this plan, contact the Design Engineer before proceeding with construction.

3. All work and materials for construction shall be in accordance with the latest general specifications and standard details of the Maryland State Highway Administration, Montgomery County, Maryland Department of the Environment Stormwater Design Manual and NRCS-MD No. 378 Pond Standards/Specifications. All sand used in SWM facilities must be washed silica sand. Limestone sand is unacceptable.

4. Shop drawings must be reviewed and approved by a Maryland Professional Engineer prior to fabrication. Provide three (3) copies of approved shop drawings to the City at least 48 hours prior to construction. Standard pre-cast structures previously approved by the Maryland State Highway Administration and Montgomery County are acceptable without engineer approval.

5. Use actual field soils data for design of pipes and structures. In absence of geotechnical information, use a minimum soil bearing pressure of 2,000-lb./sq. ft. All pipes and structures in paved areas shall be designed for H-20 vehicle loading.

6. The City Inspector and soils engineer must approve all backfill material prior to placement. Fill material shall be placed in layers not to exceed 8 inches and compacted to 95% AASHTO T-99, Method C with correct moisture content. The material must completely fill all spaces under and adjacent to the structure or pipe. For SWM embankments, the Contractor shall scarify each lift with a sheepsfoot roller or claw to a minimum depth of 2" prior to placing the next lift. Contractor shall scarify embankments parallel with the centerline of the dam core and perpendicular to the principal spillway. Bedding to be provided in accordance with details indicated on the construction drawings. Contractor shall supply the City Inspector with certified compaction test results from an independent tester.

7. At no time during the backfilling operation shall driven equipment be allowed to operate closer than four feet, measured horizontally, to any part of a structure. Under no circumstances shall the Contractor drive equipment over any part of a corrugated metal pipe unless there is a compacted fill of 24 inches or greater over the structure or pipe.

8. Sheeting and shoring and compliance with OSHA standards shall be the responsibility of the Contractor. Drawings shall be certified by a Maryland professional engineer and submitted to the City Inspector for informational purposes only.

9. Care of Water During Construction – All work on permanent structures shall be carried out in areas free from water. The contractor shall construct and maintain all temporary dikes, levees, cofferdams, drainage channels, and stream diversions necessary to protect the areas to be occupied by the permanent work. The Contractor shall also furnish, install, operate, and maintain all necessary pumping and other equipment required for removal of water from the various parts of the work and for maintaining the excavations, foundation, and other parts of the work free from water as required or directed by the engineer for constructing each part of the work. After having served its purpose, all temporary protective work shall be removed or leveled and graded to the extent required to prevent obstruction in any degree whatsoever of the flow of water to the spillway or outlet and so as not to interfere, in any way, with the operation or maintenance of the structure. Stream diversions shall be maintained until the full flow can be passed through the permanent work.

   The removal of water from the required excavation and/or foundation shall be accomplished in a manner and to the extent that will maintain stability of the excavated slopes and bottom of required excavation and will allow satisfactory performance of all construction operations. During the placing and compacting of material in required excavations, the water level at the locations being refilled shall be maintained below the bottom of the excavation at such locations, which may require draining the water to sumps from which the water shall be pumped. An exception to this will be made when compacting a filter diaphragm under a SWM structure barrel; it is acceptable to flood the sand diaphragm with water to enhance compaction.

10. Silt and debris shall not be allowed to enter any SWM storage or control structure. Runoff shall not enter structures until the contributing drainage areas have been stabilized. All openings shall be protected with appropriate sediment control measures during construction. Where storm drain pipes convey construction runoff to sediment control traps or basins, the pipes shall be flushed clean at the end of construction prior to the removal of the sediment control trap/basin. Under no circumstances should water be discharged without using proper dewatering procedures.

11. Upon completion of construction, the applicant shall provide 3 sets of red lined As-Built prints for review and approval by DPW Engineering Division. The drawings must contain the original approval signatures and Professional Engineer's seal and signature, but may be noted as 'for design only' if desired. Upon receipt of written approval, applicant shall provide approved As-Built mylar drawings to the City of Rockville, certified by a Professional Engineer, prior to the release of the permit. The approved As-Built plan shall be submitted as mylars (24" x 36") with the As-Built Certification completed and sealed by a Maryland Professional Engineer.

Concrete

1. Concrete shall conform to the specifications of the Maryland State Highway Administration Mix No. 3, f'c = 3,500 lb./sq. inch at 28 days. Concrete construction shall conform to MSHA specifications, Section 305. No admixtures containing calcium chloride are permitted. Contractor shall supply the City Inspector with certified concrete strength results from an independent tester.

2. Reinforcing steel to be ASTM A615, Grade 60. Epoxy coated reinforcing shall conform to ASTM A775. Minimum steel spacing requirement to be ACI 350, $A_S = 0.003$ bh at maximum rebar spacing of 12". Minimum concrete cover over steel is 2" for walls or slabs; 3" for base slabs cast against earth or mud mat. Wall thickness and clear distance to reinforcing shall be as shown on the drawings. All bars to be lapped 30 bar diameters unless noted otherwise. Top slab steel shall be lapped over a support wall. Walls greater than 10" in thickness shall have reinforcement on both faces.

3. Construction joints on structures, including SWM risers and weir walls, shall be located as shown or as directed by the City Inspector. All construction joints shall have a 2" x 4"keyway with rubber, neoprene or silicone water stop. Bentonite water stops are not acceptable.

4. The City must approve any changes to the SWM riser structure in advance at least 48 hours prior to ordering of the pre-cast structure. If a pre-cast structure is substituted for a designed cast-in-place structure, the City must approve new anti-flotation computations for the pre-cast structure if the structure has smaller dimensions than the original structure.

Corrugated Metal Pipe used for Stormwater Management storage

1. Corrugated metal pipe shall be aluminized corrugated steel pipe. The pipe and its appurtenances shall conform to AASHTO M-36, delete sheet M-128 and add sheet M-274 using Type II steel with coupling bands. Pipe over 60" shall be 12 gauge with 5" x 1" corrugations. All pipe 60" and less shall be 14 gauge with 2-2/3" x 1/2" corrugations.

2. Aluminized steel pipe that comes in contact with concrete shall be coated with zinc chromate primer.

3. Coupling bands, anti-seep collars, end sections, etc., must be composed of the same material as the pipe. Metals must be insulated from dissimilar materials with use of rubber or plastic insulating materials at least 24 ml. in thickness.

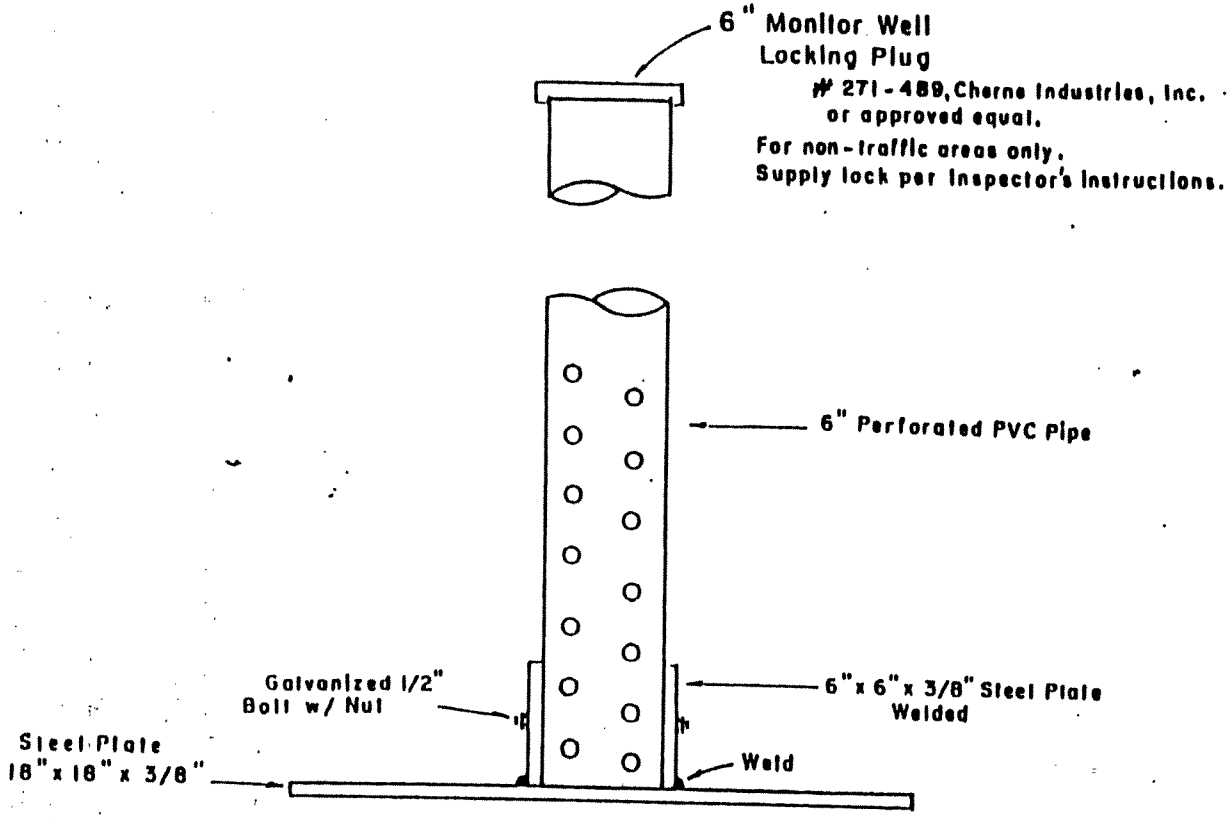
4. All connections with pipes must be completely watertight. The drain pipe or barrel connection to the riser shall be welded all around when the pipe and riser are metal. Anti-seep collars and risers shall be connected to the pipe in such a manner as to be completely watertight. Dimple bands are not considered to be watertight.

   All connections shall use a rubber or neoprene gasket when joining pipe sections. The end of each pipe shall be re-rolled with an adequate number of corrugations to accommodate the bandwidth. The following type connections are acceptable for pipes less than 24" in diameter: flanges on both ends of the pipe, a 12" wide standard lap type band with 12" wide by 3/8" thick closed cell circular neoprene gasket; and a 12" wide hugger type band with 0-ring gaskets having a minimum diameter of 1/2" greater than the corrugation depth. Pipes 24" in diameter and larger shall be connected by a 24" long annular corrugated band using rods and lugs (two on each side of the

lugs). A 12" wide by 3/8" thick closed cell circular neoprene gasket will be installed on the end of each pipe for a total of 24". Gaskets shall be pre-stressed in accordance with manufacturer's installation specifications.

5. Corrugated metal pipe shall be constructed in accordance with MSHA specifications, Sections 303 and 304. Pipe over 60" shall have a minimum 2 feet of cover.

6. All pipe shall be firmly and uniformly bedded throughout its entire length. Where rock or soft, spongy or other unstable soil is encountered, all such material shall be removed and replaced with suitable earth compacted to provide adequate support to a minimum depth of 6" below sub-grade.



OBSERVATION WELL
FOOT PLATE

No Scale

SWM - Infiltration Facilities

ROCKVILLE

APPROVED BY: Susan Straus
Susan Straus, Chief Engineer / Environment

Date July 22, 1996

OBSERVATION WELL
FOOT PLATE

REVISION

DETAIL
300

Department of Public Works
111 Maryland Avenue, Rockville, MD 20850-2364

STANDARD EROSION AND SEDIMENT CONTROL NOTES

1. The Permittee must contact the **City Department of Public Works at 240-314-8500, City Utilities section at 240-314-8567, Miss Utility at 1-800-257-7777 and the Assistant City Forester at 240-314-8710 at least 48 hours before commencing any land disturbing activity.** The Permittee shall be required to hold a preconstruction meeting with authorized representatives of the Department of Public Works, and the City Forester.

2. The Permittee must obtain inspection and approval by the Department of Public Works (DPW) at the following points:

   a. At the required preconstruction meetings.

   b. Following installation of sediment control measures and prior to any other land disturbing activity.

   c. During the installation of a sediment basin or stormwater management structure at the required inspection points (see Inspection Checklist on plan). Notification prior to commencing construction is mandatory.

   d. Prior to removal or modification of any sediment control devices

   e. Prior to final acceptance.

3. All erosion control measures are to be constructed and maintained in accordance with applicable published standards and specifications and the most current "Maryland Standards and Specifications for Soil Erosion and Sediment Control."

4. The Permittee shall construct all erosion and sediment control measures per the approved plan and construction sequence, shall have them inspected and approved by DPW prior to beginning any other land disturbances, shall ensure that all runoff from disturbed areas is directed to the sediment control devices, and shall not remove any erosion or sediment control measures without prior permission from DPW.

5. Any request for changes to the approved sediment control plan or sequence of construction must be submitted to the Sediment Control Inspector and approved before implementing changes. Major changes will require a plan revision.

6. The Permittee shall protect all points of construction ingress and egress to prevent the deposition of materials onto traversed public thoroughfare(s). All materials deposited onto public thoroughfare(s) shall be removed immediately.

7. The Permittee shall inspect daily and maintain continuously in effective operating condition all erosion and sediment control measures until such time as they are removed with prior permission from the Department of Public Works Sediment Control Inspector.

8. All sediment basins, trap embankments, swales, perimeter dikes, and permanent slopes steeper or equal to 3:1 shall be stabilized with sod, seed and anchored straw mulch or other approved stabilization measures, within seven (7) calendar days of establishment. All areas disturbed outside of the perimeter sediment control system must be minimized and stabilized immediately. Maintenance must be performed as necessary to ensure continued stabilization. Restabilization or overseeding will be required, if necessary.

9. The Permittee shall apply sod, seed and anchored straw mulch, or other approved stabilization measures to all disturbed areas within 14 calendar days after stripping and grading activities have ceased on that area. Maintenance shall be performed as necessary to ensure continued stabilization. Active construction areas, such as borrow or stockpile areas, roadway improvements, and areas within 50 feet of a building under construction may be exempted from this requirement, provided that erosion and sediment control measures are installed and maintained to protect those areas. Stockpiles which have not been used for 14 calendar days, shall be stabilized through the application of sod, seed and anchored straw mulch, or other approved stabilization measures.

10. Prior to removal of sediment control measures the Permittee shall stabilize all contributory disturbed areas using sod or an approved permanent seed mixture with required soil amendments and an approved anchored mulch. Wood fiber mulch may only be used in seeding season to promote sheet flow drainage. Areas brought to finished grade during the seeding season shall be permanently stabilized within 14 calendar days of establishment. When property is brought to finished grade during the months of November through February, and permanent stabilization is found to be impractical, an approved temporary seed and straw anchored mulch shall be applied to disturbed areas. The final permanent stabilization of such property shall be completed prior to the following April 15.

11. The site work, materials, approved SC and SWM plans and any required test reports shall be available, at the site for inspection by duly authorized officials of the City of Rockville.

12. Surface drainage flows over unstabilized cut and fill slopes shall be controlled by either preventing drainage flows from traversing the slopes or by installing mechanical devices to lower the water downslope without causing erosion. Dikes shall be installed and maintained at the top of cut or fill slopes until the slope and drainage area to it are fully stabilized, at which time they must be removed and final grading done to promote sheet flow drainage. Mechanical devices must be provided at points of concentrated flow where erosion is likely to occur.

13. Permanent swales or other points of concentrated water flow shall be stabilized with sod or seed with an approved erosion control matting or by other approved stabilization measures.

14. Temporary sediment control devices shall be removed, with permission of DPW, within (30) calendar days following establishment of permanent stabilization in all contributory drainage areas. If establishment is not full and uniform as determined by the Sediment Control Inspector, overseeding will be required. Stormwater management structures used temporarily for sediment control shall be converted to the permanent configuration within this time period as well.

15. No permanent cut or fill slope with a gradient steeper than 3: 1 will be permitted in lawn maintenance areas. A slope gradient of up to 2:1 will be permitted in areas that are not to be maintained provided that those areas are indicated on the erosion and sediment control plan with a low-maintenance ground cover specified for permanent stabilization. Slope gradient steeper than 2:1 will not be permitted with vegetative stabilization.

16. The Permittee shall install a splash block at the bottom of each downspout unless the downspout is connected by a drain line to an acceptable outlet.

17. All water pumped from an excavation during construction shall be pumped either to sediment tanks and/or sediment traps. With the City Inspector's approval, clean ground water may be pumped directly to the storm drain system or swale. De-watering shall be performed in accordance with the most current Maryland Standards and Specifications for Soil Erosion and Sediment Control.

18. For finished grading, the Permittee shall provide adequate gradients so as to: (1) prevent water from standing on the surface of lawns more than 24 hours after the end of a rainfall, except in designated drainage courses and swale flow areas which may drain as long as 48 hours after the end of a rainfall, and (2) provide positive drainage away from all building foundations or openings.

19. Sediment traps or basins are not permitted within 20 feet of a building which exists or is under construction. No building may be constructed within 20 feet of a sediment trap or basin.

20. All inlets in non-sump areas shall have asphalt berms installed at the time of base paving to direct runoff to inlets.

21. The sediment control inspector has the option of requiring additional sediment control measures, if deemed necessary.

22. All trap elevations are relative to the outlet elevation, which must be on existing undisturbed ground.

23. Vegetative stabilization shall be performed in accordance with the most current Maryland Standards and Specifications for Soil Erosion and Sediment Control.

24. Temporary sediment trap(s) shall be cleaned out and restored to the original dimensions when sediment has accumulated to a point one half (1/2) the depth between the outlet crest and the bottom of the trap.

25. Sediment removed from traps shall be placed and stabilized in approved areas in such a manner that it does not foul existing or proposed storm drainage systems or areas already stabilized. Sediment shall not be placed within a flood plain or wetland.

26. All sediment basins and traps must be surrounded with a welded wire safety fence. The fence must be at least 42 inches high, have posts spaced no farther apart than 8 feet, have mesh openings no greater than 2 inches in width and 4 inches in height with a minimum of 14 gauge wire. Safety fence must be maintained in good condition at all times.

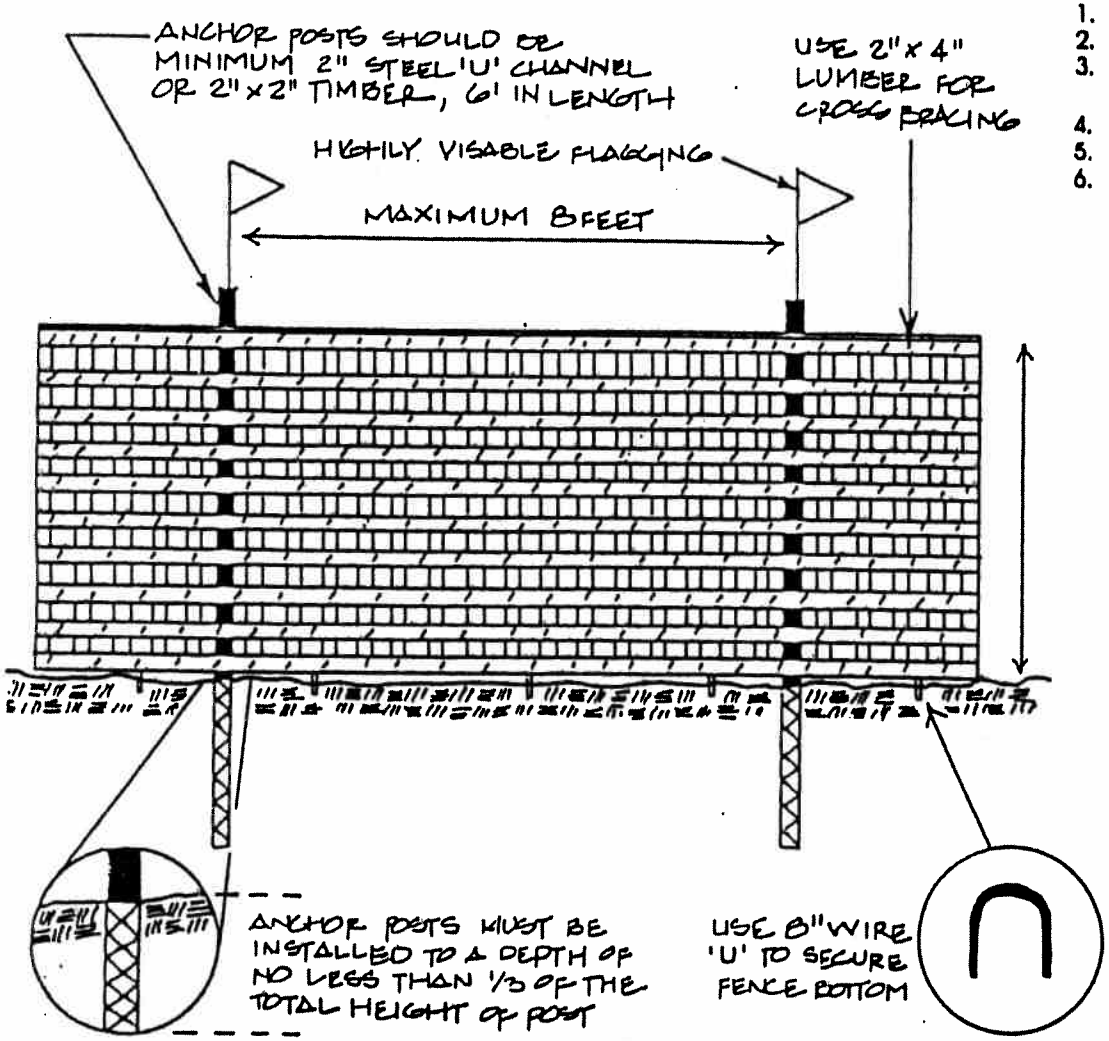
27. Off-site spoil or borrow areas must have approved sediment control plans.

28. Protect all trees to be preserved during construction in accordance with the approved Forest Conservation Plan.

29. Permittee is responsible for all actions of contractor and subcontractors, including repairing damage to sediment control devices and existing infrastructure.

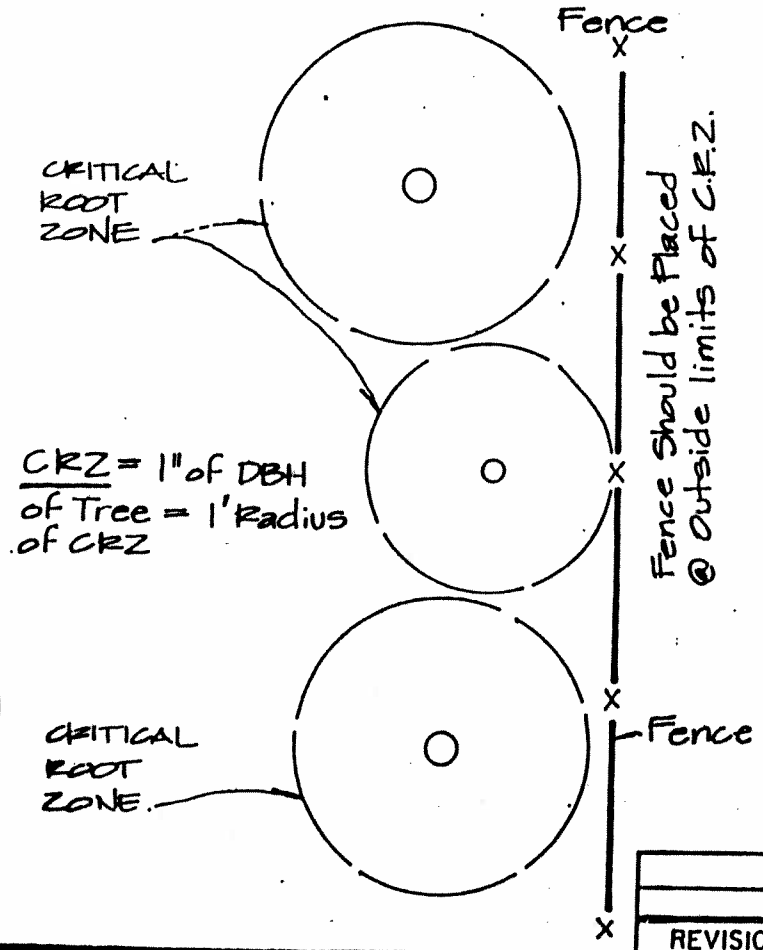
WebDoc 6/21/04

Blaze Orange Plastic Mesh

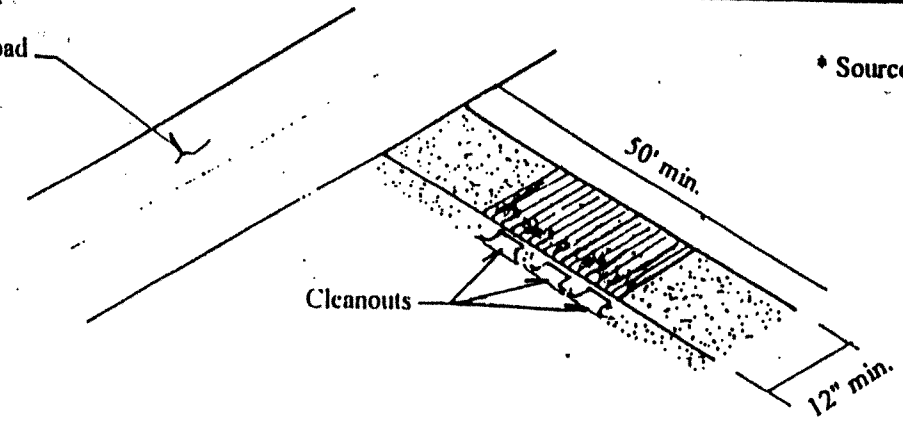


Notes

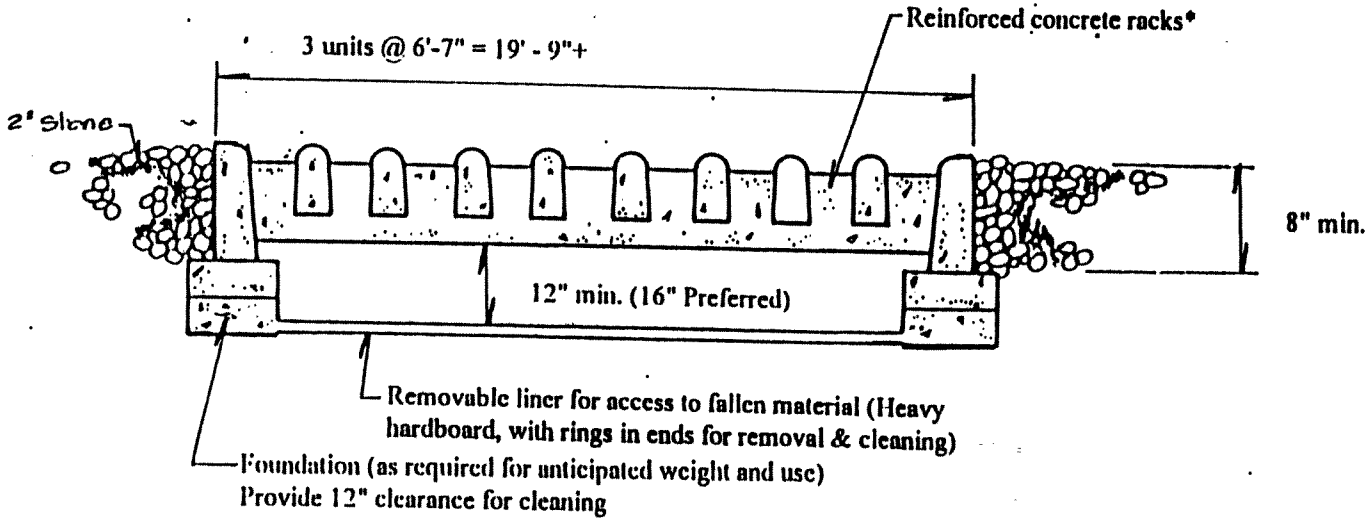
1. Forest protection device only.
2. Retention Area will be set as part of the review process.
3. Boundaries of Retention Area should be staked and flagged prior to installing device.
4. Root damage should be avoided.
5. Protective signage may also be used.
6. Device should be maintained throughout construction.



ROCKVILLE	APPROVED BY: Susan Straus Susan Straus, Chief Engineer / Environment Date July 22, 1996	TREE PROTECTION FENCE	REVISION DETAIL 400



* Source: Smith Cattleguard Company, Midland Virginia or equal



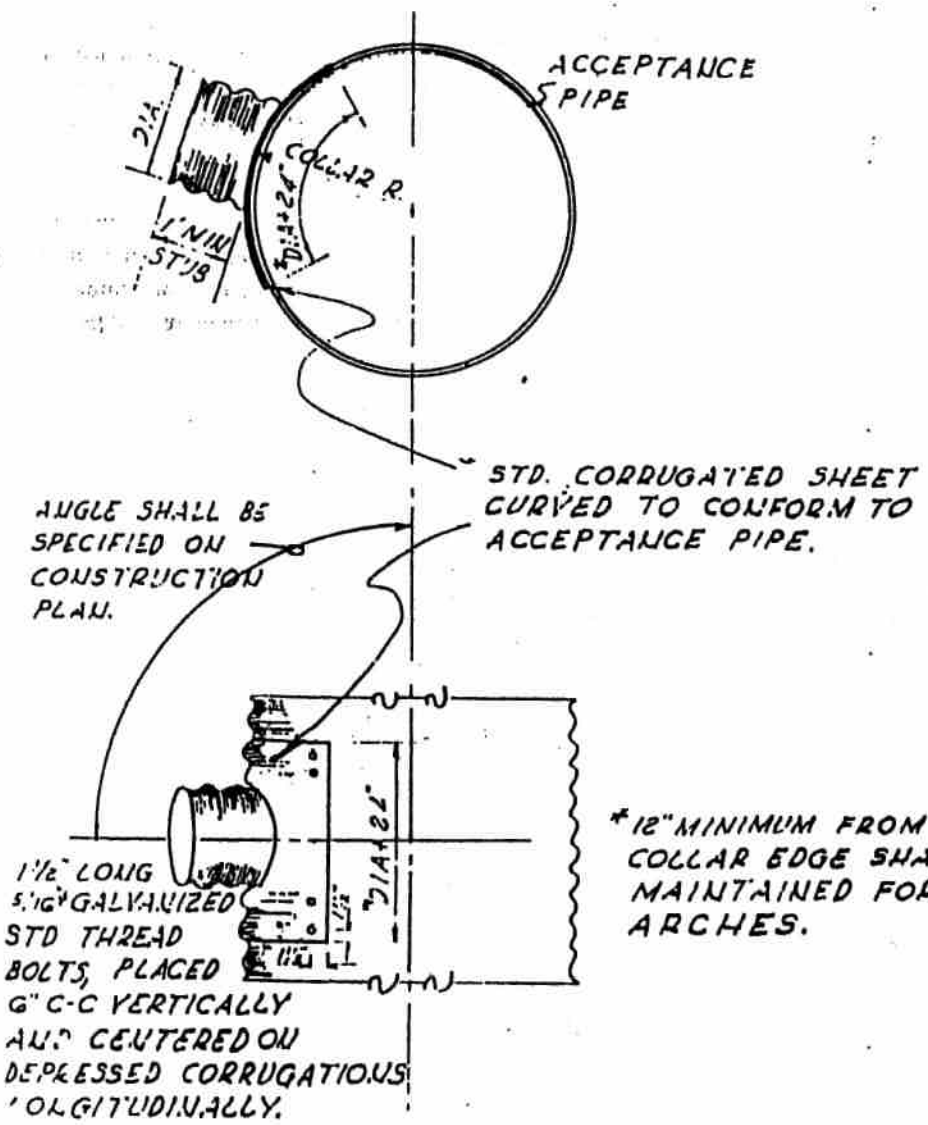
MAINTENANCE

The exit shall be maintained in a condition which will prevent tracking or flow of mud onto public rights of way. This may require periodic top dressing with 2-inch stone, as conditions demand; and repair and/or cleanout of the structures used to collect fallen material. All materials spilled, dropped, washed, or tracked from vehicles onto roadways shall be removed immediately.

USE

On sites where excessive hauling (300 loads or more) is anticipated. For dry use provide cleanouts as shown and maintained as directed. When used for washing mud from vehicles before leaving site, modify and lead runoff to a sediment basin or device as directed. NOTE: Tracks on equipment may damage racks if not protected.

ROCKVILLE	APPROVED BY: Susan Straus Susan Straus, Chief Engineer / Environment DATE October 4, 1996	CONSTRUCTION EXIT WITH CLEAN OUT RACKS	REVISION DETAIL 401



*12" MINIMUM FROM STUB TO COLLAR EDGE SHALL BE MAINTAINED FOR PIPE ARCHES.

NOTES

1. SADDLE BRANCH SHALL BE USED AS TEMPLATE FOR CUTTING ACCEPTANCE PIPE, TOLERANCE RANGE SHALL BE ¼" TO 3" LARGER THAN STUB DIAMETER.
2. SADDLE BRANCH GAGE SHALL BE AS SPECIFIED ON CONSTRUCTION PLANS
3. METHOD OF CUTTING ACCEPTANCE PIPE: ASPHALT COATED AND/OR PAVED CMP SHALL BE BY SLOW SPEED SAW ONLY. PLAIN GALVANIZED CMP SHALL BE BY SAW OR TORCH.
4. ALL BOLT HOLES SHALL BE DRILLED.
5. THE SADDLE BRANCH SHALL BE FABRICATED BY APPROVED PIPE MANUFACTURER ONLY.
6. STUB DIAMETER SHALL BE OF SUFFICIENT DIAMETER TO PERMIT INSERTION OF OTHER THAN C.M.P.
7. ALL COLLAR CORNERS SHALL BE 90°.
8. UNIT OF PAYMENT SHALL BE EACH IN PLACE PER SIZE.
9. IF NOT OTHERWISE SPECIFIED STUB COATING AND/OR PAVING TO BE SAME AS FEEDER PIPE.
10. MAXIMUM HORIZONTAL SPAN OF HOLE CUT INTO WALL OF ACCEPTANCE PIPE SHALL BE NOT GREATER THAN 36 INCHES.

ROCKVILLE	APPROVED BY GERALD E. MORNINGSTAR DATE 11/20/91	PIPE & PIPE ARCH SADDLE BRANCH	REVISION DETAIL 501

As-Built Plan Requirements

1. As-Built information (horizontal and vertical) shall be provided for all new facilities including utilities, structures, roadways and ponds. A bench mark elevation and location shall be provided on each plan sheet.

2. All As-Built elevations shall be to the nearest 0.1'. All bench marks shall be to the nearest 0.01'.

3. As-Built plans for a SWM pond shall include the following additional information.

   a) Length, width, and depth or contours (1' intervals) of the pond area so that volume can be verified;

   b) A bench mark on the riser, inlet headwall, or other approved location.

   NOTE: As-Built data which shows that the constructed facility varies from the original design storage elevations by greater than or equal to 10% will have to be corrected prior to submission for review unless storage is verified. All constructed features not previously approved on the original construction drawings may have to be modified at the City's discretion.

4. All As-Built information shall be blocked in and shown on the original construction drawings and shall be blocked in as thus [386.25]

5. The As-Built Certificate shall be signed and sealed by a MD professional engineer, or a professional land surveyor and shall appear on the As-Built Plan.

6. After approval of the As-Built information by the City, the original construction drawing or other approved reproduction of the As-Built Plan shall be submitted. No paper prints, paper or mylar sepias will be accepted.

AS BUILT CERTIFICATE

I hereby certify that the information shown on this record drawing is an accurate and complete representation of data established from field information obtained under the direction of a Professional Land Surveyoror, or a Professional Engineer, and that the physical dimensions shown thus [37.55'] are as-built information and the facility was constructed according to the approved plans, except as otherwise noted hereon.

Name _____ License # _____

Appendix F:

Bus Shelter Policy

City of Rockville Bus Shelter Policy

As written in the City's Comprehensive Transportation Review Methodology, for development applicants, minimum standards for transit facilities consist of ensuring that bus shelters, benches, or concrete pads are provided at all existing and programmed bus stops along a site frontage as approved by the Department of Public Works, in coordination with the Montgomery County Department of Transportation (MCDOT) or Washington Metropolitan Area Transit Authority (WMATA). The type of facility required is based on projected daily ridership volumes (provided by Department of Public Works), as defined in Table 1. If there are no existing or programmed transit stops along a site frontage for a development applicant, bus shelters, benches or concrete pads must be provided at the nearest existing or programmed bus stop to the site, as determined by the Traffic and Transportation Division, within the non-auto study area, as defined in Section III.D.1 of the Comprehensive Transportation Review Methodology.

Table 1: Minimum Transit Standards

Projected Daily Ridership*	Required Facility
0-10 persons	Concrete bus stop pad
11-25 persons	Concrete bus stop pad plus bus stop bench
More than 25 persons	Bus shelter plus bus bench plus bus stop pad

**Based on existing ridership data provided by MCDOT and WMATA plus additional ridership projected from the new development*

Appendix G:

Street Light Policy

Street Light Standards for Residential Streets

1. Overhead Areas

a. Major primary streets:

- 100 watt high pressure sodium or 175 watt mercury vapor at intersections and every other utility pole between intersections.

b. Minor primary streets:

- 100 watt high pressure sodium or 175 watt mercury vapor at intersections, 70 watt high pressure sodium or 100 watt mercury vapor on every other utility pole between intersections.

c. Secondary streets:

- 70 watt high pressure sodium or 100 watt mercury vapor at intersections, and every other utility pole between intersections.

d. All residential streets (overhead areas only):

- Street light spacing shall not exceed 400', pole spacing notwithstanding.
- Requirement above is reduced to 250' if the configuration of one of the street lights is aligned at 90 degrees to the street under study (based on Illuminating Engineering Society Type III lighting distribution).
- Requirement above is reduced to 325' if the configuration of one of the street lights is aligned at 45 degrees to the street under study (based on Illuminating Engineering Society Type III lighting distribution).
- No point on the public right-of-way to be more than 200' from the nearest street light, as measured along the centerline of street.

2. Underground Areas

a. Major primary streets:

- 100 watt high pressure sodium post-tops at typical 120' to 180' spacing.

b. Minor primary streets:

- 100 watt high pressure sodium post-tops at intersections, 70 watt high pressure sodium post-tops at typical 120' to 180' spacing between intersections.

c. Secondary streets:

- 70 watt post-tops at typical 120' to 180' spacing.

d. All streets (underground areas only):

- Street light spacing shall not exceed 200'.
- No point on the public right-of-way to be more than 120' from the nearest street light.

Security waiver: The Chief of Police may recommend that lighting be upgraded to a level exceeding these standards on the basis of a documented security or other public safety problem in a given location or area.

Appendix H:

Comprehensive Transportation Review Methodology

CITY OF ROCKVILLE
COMPREHENSIVE TRANSPORTATION REVIEW METHODOLOGY

SEPTEMBER 29, 2004

TRAFFIC AND TRANSPORTATION DIVISION

COMPREHENSIVE TRANSPORTATION REVIEW METHODOLOGY

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COMPREHENSIVE TRANSPORTATION REVIEW METHODOLOGY

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CITY OF ROCKVILLE
COMPREHENSIVE TRANSPORTATION REVIEW METHODOLOGY

I. Introduction

This Comprehensive Transportation Review Methodology (hereafter referred to as "**CTR**"), approved by the Mayor and Council of the City of Rockville, Maryland on October 4, 2004, and applicable to all new development or redevelopment applications filed on or after September 29, 2004, describes the transportation subset of the development review process. Principles and methodologies explained herein guide the City in evaluating the transportation impacts of development applications on:

- site access and circulation;
- bicycle, pedestrian, and transit facilities (hereafter collectively referred to as "**non-auto facilities**"); and
- automobile traffic.

This document also addresses mitigation measures to alleviate negative impacts on the transportation system due to increased automobile traffic generated by new development. The CTR replaces the City's Standard Traffic Methodology (hereafter referred to as "**STM**"). A list of acronyms and key definitions are available in Appendix A and Appendix B, respectively. Appendix C outlines key differences between the STM and the CTR.

I.A. Relationship to City Development Plans and Policies

The CTR is an integral tool in evaluating the adequacy of the overall transportation system and fostering a system that accommodates anticipated local and regional demands. Consequently, it is fundamentally linked to the goals and objectives in City plans and policies. The CTR delineates detailed steps that must be performed with each new development application to measure transportation impacts and mitigate such impacts as warranted. Table 1 outlines what is required of the applicant at each stage in the transportation development review process:

TABLE 1: APPROVAL TYPES AND TRANSPORTATION REVIEW*

Type of Approval	Type of Development Application	Scope of Review Required for Submission to City by Applicants
Initial	Concept Plans for Comprehensive Plan Developments (CPD)	Transportation Report (may exclude some site-specific design review that requires more detailed design).
	Planned Residential Units (PRU)	
	Some Special Exceptions (SPX)	
	Residential Town Houses (RTH)	
	Preliminary Development Plans (PDP)	
	Cluster Development Applications	
	Variable Lot Size Developments	
Detailed	Use Permits (USE)	Requirements of Initial Approval (if not previously approved) plus transportation analyses that require detailed site-specific design.
	Use Permit Amendments (USA), as applicable	
	Some Special Exceptions (SPX)	
	Preliminary Subdivision Plans with 10 or more lots	

** A Transportation Report under the CTR is not required in connection with any application implementing a development approved prior to the adoption of the CTR, unless said implementing application increases the amount of traffic estimated in the original traffic analysis for the entire development by 30 or more automobile trips. Subsequent implementing development applications are subject to a site-specific transportation analysis.*

Transportation goals set forth in the City Master Plan form the basis for the methodology, standards, and impact thresholds outlined in the CTR. These goals are to 1) enhance mobility and accessibility; 2) protect neighborhoods from regional and cut-through traffic; and 3) increase safety for all transportation modes.

The requirements outlined in Table 1 in conjunction with the CTR process ensure that development applications comply with the transportation standards established in the City policies, national standards and all other applicable laws listed in Table 2:

TABLE 2: RELEVANT CITY POLICIES AND NATIONAL STANDARDS		
∉ Zoning Ordinance ∉ Master Plan ∉ Neighborhood Plans ∉ Transportation Demand Management Policy ∉ Pedestrian Policy ∉ Bicycle Master Plan	∉ Standards and Details for Construction ∉ Basic Transportation Engineering Policy ∉ Guidelines for Neighborhood Traffic Management	∉ Uniform Federal Accessibility Standards (UFAS) ∉ Manual on Uniform Traffic Control Devices (MUTCD) ∉ National best practices ∉ Other relevant policies as adopted

Failure to give notice of required compliance with these and other applicable policies by City staff does not constitute a waiver of these requirements for development applicants.

I.B. Comprehensive, Multimodal Approach

Analyses to determine whether a development application adequately supports City policies and plans and provides adequate public facilities are based on four major factors; 1) levels of service (LOS), 2) orientation toward transit, 3) transportation demand management, and 4) accessibility.

1. Levels of Service

Typical LOS measures focus on automobile traffic. To address alternate modes of transportation, the CTR also provides standards to determine the quality and scope of services for bicycle, pedestrian, and transit modes.

2. Orientation Toward Transit (Transit-Oriented Areas)

Transit-Oriented Areas (hereafter referred to as "**TOAs**") and non Transit-Oriented Areas (**non-TOAs**) have been identified within Rockville City limits (see Appendix D). TOAs are areas where viable non-auto options exist and include areas within 7/10^{ths} of a mile accessible walking distance from existing and programmed Metro stations and fixed-guideway transit stations on dedicated transit rights-of-way. In addition, TOAs may also include major access routes to these areas, as approved by the Mayor and Council and shown on the TOA Map.

Transit-Oriented Areas (TOAs) and non-Transit-Oriented Areas (non-TOAs) have different LOS thresholds. More congestion is acceptable in TOAs, where viable multi-modal options exist. Stricter congestion thresholds are applied in non-TOAs where less congestion is acceptable. This policy supports the Mayor and Council Smart Growth initiative to focus development in areas close to major transit facilities.

3. Transportation Demand Management

The City's Transportation Demand Management (hereafter referred to as "**TDM**") Program also is designed to address the negative impacts of increased auto congestion due to single-occupancy vehicles

(SOVs). It is distinct from capacity (supply) management, as it aims to reduce the number of vehicles using road facilities by providing a wide variety of mobility options. Section III.E.2.c details how the City's TDM Program relates to the CTR.

4. On and Off-Site Accessibility

The CTR requires that all development applicants submit a Site Access and Circulation Analysis, which deals exclusively with **on-site** issues.

Furthermore, the CTR requires that development applications that generate 30 or more total peak hour site trips submit **off-site** analyses for each mode of transportation. These analyses include an assessment of major intersections that are impacted by the development and non-auto facilities that lead to the development. The goal of the off-site analyses is to ensure that the site can be accessed safely and efficiently through various modes and that adequate transportation facilities are in place to support the subject development without detriment to the overall transportation system.

II. CTR Process

The following section outlines the process of the CTR, which is established to ensure proper review of transportation impacts during the development application and approval stages, as well as compliance with City plans and policies.

II.A. Overview

The following is the sequential process of the CTR, which is discussed in further detail in Sections II.B. - II.D. below. Appendix E contains a flowchart outlining this process.

Step 1:	Potential applicant inquires in the Planning Division about development and receives Scoping Intake Form (see Appendix F) and CTR guidelines sheet from the Planning Division. An optional pre-submission Development Review Committee (hereafter referred to as "**DRC**") meeting may be held.
Step 2:	Applicant submits Scoping Intake Form to Traffic & Transportation Division and schedules Scoping Meeting.
Step 3:	Traffic & Transportation Division notifies community associations in potentially impacted area for input on scope of off-site analyses. The location and size of the development will be included.
Step 4:	Traffic & Transportation Division holds Scoping Meeting with applicant. Representatives of community associations in potentially impacted area may submit written commentary on the study areas in advance of Scoping Meeting.
Step 5:	Traffic & Transportation Division prepares Scoping Summary. Traffic & Transportation Division notifies community associations in potentially impacted area of Scoping Summary.
Step 6:	Applicant submits Transportation Report (hereafter referred to as "**TR**") and development application to the Planning Division. It is recommended that the TR be submitted in advance of the development application.
Step 7:	Traffic & Transportation Division reviews TR for compliance with CTR methodology.
Step 8:	Traffic & Transportation Division reviews development application.
Step 9:	Traffic & Transportation Division reviews TR for compliance with on-site standards and for transportation impacts.
Step 10:	Traffic & Transportation Division identifies impacts and mitigation measures in conjunction with other City staff and applicant. A public meeting, announced via mail and e-mail notification to HOA and Civic Association leaders, will be coordinated by staff to present the proposed study area and development impacts, and solicit comments prior to preparation of the Transportation Staff Report. This meeting will take place one time per month, as part of the regularly-scheduled Traffic & Transportation Commission meetings. If the timing of a development application is such that a meeting would need to be convened prior to the Traffic & Transportation Commission meeting, staff will send out special notifications.
Step 11:	Traffic & Transportation Division prepares Transportation Staff Report (hereafter referred to as "**TSR**") for submittal to the Planning Division. Traffic & Transportation Division notifies community associations in potentially impacted area of TSR.
Step 12:	Approving body reviews and issues action on the development application.

II.B. Inquiry and Scoping Meeting

When an inquiry for a development application is received, the Planning Division will give the applicant a Scoping Intake Form and a CTR guidelines sheet (**Step 1**). The CTR guidelines sheet gives the applicant an overview on the transportation subset of the development review process. All applicants identified in Table 1 must complete the Scoping Intake Form (see Appendix F), submit it to the Traffic & Transportation Division, and schedule a Scoping Meeting (**Step 2**).

Upon review of the Scoping Intake Form, the Traffic & Transportation Division will notify community associations in the potentially impacted area for input on the study areas for the Transportation Report (TR). The notification will include the location and size of the proposed development. (**Step 3**).

All applicants must attend a Scoping Meeting (**Step 4)** with the Traffic & Transportation Division *prior to* the preparation of the applicant's **TR**. Community associations in the potentially impacted area will be notified in advance of the Scoping Meeting. Community associations may opt to provide written commentary in advance of the Scoping Meeting on the study areas to be examined in the Transportation Report.

The Scoping Meeting will provide the applicant and the Traffic & Transportation Division the opportunity to discuss detailed CTR requirements as they apply to the development site, including:

- Determination as to whether the Subject Development is within a TOA, based on the TOA Map in Appendix D;
- Automobile Traffic Study Area;
- Auto Trip Generation, Trip Distribution, and Mode Share;
- Traffic Counts from Existing and Already Approved Developments;
- Accident and Count Data (where available);
- Potential Trip Reductions and Credits;
- Additional Special Traffic Studies to be Conducted (see Section III.C.7. for detailed description);
- Non-Auto Study Area to Analyze Transit, and Pedestrian, and Bicycle Access and Facilities;
- Activity Center Locations and Access Routes;
- Intersections to Analyze for Safety Ratings; and
- Number of TR Copies to be Submitted.

At this meeting, it will also be determined whether the development exceeds the off-site threshold discussed in Section II.C. for completing TR *Component C—Automobile Traffic Analysis* and *Component D— Non-Auto Off-Site Analysis*.

Following the Scoping Meeting, the Traffic & Transportation Division will prepare a Scoping Summary (**Step 5**). This Summary will include all details of the TR agreed upon in the Scoping Meeting. The Traffic & Transportation Division will inform community associations in potentially impacted area of the Scoping Summary.

II.C. Off-Site Analyses Threshold and Completion of the TR

After the Traffic & Transportation Division approves the Scoping Summary, the applicant must prepare a TR, the content and format of which is described in detail in Section III and outlined in Appendix G. The applicant must prepare the TR in accordance with the approved Scoping Summary. The TR consists of five (5) components:

1. TR Components

Component A—Introduction and Existing Conditions:

Project description (see Section III.A.).

Component B—Site Access & Circulation:

Analysis of internal circulation, entrance configurations, vehicular access and other relevant access and on-site features; the Proposed Site Access and Circulation Transportation Statement; and the Proposed Conditions Site Plan (see Section III.B.).

Component C—Automobile Traffic Analysis (Off-Site):

Analysis of auto traffic using the technical guidelines for traffic analysis in the traffic study area (see Section III.C.).

Component D—Non-Auto Off-Site Analysis:

Analysis of access to the development from activity centers via alternative modes of transportation using the guidelines (see Section III.B.2.b) for creating an inventory of pedestrian, bicycle, and transit facilities in the non-auto study area and for analyzing intersection safety ratings for these modes of transportation (see Section III.D.).

Component E—Summary, Mitigation, and Credits:

Summary of the report findings and impacts; recommended mitigation plans. (see Section III.E.).

2. TR Off-Site Analyses Threshold

Developments that generate 30 or more total peak hour site trips have a measurable traffic impact and meet the TR off-site analyses threshold. These developments are required to complete all components of the TR, including the following off-site analyses, TR *Component C—Automobile Traffic Analysis* and TR *Component D—Non-Auto Off-Site Analysis*. Developments that generate less than 30 total peak hour site trips do not warrant the detailed off-site study, as their impact on the transportation system is typically minimal. These developments are not required to complete the off-site analyses, TR *Component C—Automobile Traffic Analysis* and TR *Component D—Non-Auto Off-Site Analysis*.

The intent of the off-site threshold may not be circumvented through the submission of piecemeal development and permit applications or other approval requests. Upon submitting a preliminary plan of subdivision that generates less than 30 total peak hour site trips, the applicant m agree in writing that if future applications or approval requests result in 30 or more total peak hour site trips generated at one location, then the applicant will be required to complete and submit all TR components for the cumulative development package. TR *Component C—Automobile Traffic Analysis* and TR *Component D—Non-Auto Off-Site Analysis* will be required to assess the impact of the total number of peak hour site trips generated.

Table 3 summarizes which TR components a development must complete based on total peak hour site trips.

TABLE 3: COMPLETION OF TR COMPONENTS*	
Total Peak Hour Site Trips*	**Required TR Components**
Less than 30	*Component A—Introduction,* *Component B—Site Access and Circulation,* *Component E—Summary, Mitigation, and Credits*
30 or more	All Components Required

** Peak hour site trips are calculated using the trip generation rates referenced in Section III.C.5.*
** **Note**: Not all types of development applications are subject to CTR standards.* ***Refer to Table 1*** *to determine* ***types of development applications*** *that must comply with CTR standards.*

Before submitting the completed development application to the Planning Division, the applicant may opt to schedule a pre-submission Development Review Committee (DRC) meeting to further discuss the details of the development application, including the TR. For all elements of the TR that require approval of methodology, use of data, assumptions, and other techniques or factors, approval must be requested and received from the Traffic & Transportation Division, taking into consideration the input of affected communities as represented by HOA/Civic Associations, the City's Traffic & Transportation Commission, Planning Commission, and Mayor & Council, as appropriate, before the completed TR is submitted. Traffic & Transportation Division reviews are based on nationally recognized standards, best practices, and methodologies.

It is recommended that the TR be submitted in advance of the development application so that compliance with the methodology can be evaluated without delays to the development review process. The applicant must submit both the TR and the development application to the Planning Division (**Step 6**).

II.D. Transportation Report Review and Transportation Staff Report

The Traffic & Transportation Division will first review the TR to ensure compliance with CTR methodology (**Step 7**). In the event that a TR is not accepted at this first review stage (i.e., it is incomplete or does not comply with the CTR methodology), the applicant must revise or submit a new TR for consideration (**Step 6)**. The development application will be considered incomplete until an acceptable TR is approved by the Traffic & Transportation Division. Revisions to the TR, if necessary, must be submitted at least 21 days prior to the scheduled meeting date of the approving body.

Once a TR has been accepted by the Traffic & Transportation Division, a new TR will not need to be submitted at subsequent phases of the development approval process provided that:

- The elapsed time from initial acceptance of the original TR to the latest development application does not exceed the horizon year. If this time limit is exceeded, an updated or revised TR must be prepared in consultation with the Traffic & Transportation Division; and

- There are no significant changes in site characteristics (e.g., development size, land use mix, access configuration). The Traffic & Transportation Division will determine if site characteristics have been changed sufficiently to warrant a revised TR.

Once the Traffic & Transportation Division has accepted the TR, the development application will then be reviewed (**Step 8**). The TR will be reviewed for compliance with on-site standards (refer to Appendix H) and for transportation impacts (**Step 9**). The Traffic & Transportation Division will also examine and evaluate the development application's transportation impacts and mitigation measures. A public meeting, announced via mail and e-mail notification to HOA and Civic Association leaders, will be coordinated by staff to present the proposed study area and development impacts, and solicit comments prior to preparation of the Transportation Staff Report. This meeting will take place one time per month,

as part of the regularly-scheduled Traffic & Transportation Commission meetings. If the timing of a development application is such that a meeting would need to be convened prior to the Traffic & Transportation Commission meeting, staff will send out special notifications. Staff-only DRC and Staff-with-Applicant DRC meetings will be held following the public meeting (**Step 10)**.

Following DRC meetings, the Traffic & Transportation Division will prepare a Transportation Staff Report (TSR) that reports transportation impacts and addresses any outstanding issues with the development application. The TSR will identify the traffic study area as an informational item for the approving body. The TSR will also provide details about required mitigations due to the negative impact of auto trips generated by the development, and conditions of approval (**Step 11**). The TSR will be sent to community associations in potentially impacted area and the approving body. Developments that generate over 150 new automobile trips will require additional review and comment from the Traffic & Transportation Commission. These comments will be forwarded to the approving body. The approving body will then review the development application, in conjunction with the TSR, Traffic & Transportation Commission comments (when applicable) and approve or deny the application (**Step 12**). Interested parties will have the opportunity to provide public comment prior to action of the approving body as outlined in the Planning Division's *Development Review Process*.

II.E. Coordination with Other Jurisdictions

Auto and non-auto improvements that are within the study area(s) of the development but are outside of City boundaries, or are not controlled by the City, will require coordination with other jurisdictions. If commitment is not guaranteed during the development review process, then a City of Rockville decision-making body (i.e. Planning Commission and/or Mayor and Council) may or may not grant approval for the development, may approve the development with conditions, or may waive the requirement with full and informed consent. For developments that generate over 150 new automobile trips, Traffic & Transportation Commission comments to the Planning Commission will include information that states whether or not commitment is required according to standards outlined in the CTR.

III. Format of the Transportation Report (TR)

The Transportation Report, as outlined in Section II.C. must document analyses, procedures, and assumptions for the required TR components. The report should be printed on 8-1/2 x 11 pages. The City will provide the applicant guidance during the scoping meeting on the required number of report copies (minimum 3, minimum 5 if County or State roads are impacted). All traffic-related data utilized in the analyses must be included in appendices to the TR. A detailed outline of the information required in the completed TR may be found in Appendix G.

III.A. TR Component A—Introduction & Existing Conditions

The purpose of the TR introduction is to give City staff a clear overview of the development application. The introduction of the TR must include a development project description, which outlines a general description of the project, the development schedule (including key stage points, phasing and timing, build-out schedule), proposed land use, TOA designation, hours of operation, and hours and a description of employment and commercial activity, size of development, and number and type of units, if applicable. In addition to the project description, the existing land use must be discussed in the TR introduction. An area/location map of the development project must also be included. Finally, the trip generation total should be identified in tabular format.

III.B. TR Component B—Site Access & Circulation Analysis

1. Proposed Site Access and Circulation Transportation Statement

All applicants must complete a Proposed Site Access and Circulation Transportation Statement as a requirement of TR *Component B*. This transportation statement must identify all planned site features that do not comply with City policies and accepted standards and codes, some of which are outlined in Appendix H, and provide justification for any deviations. Hours of deliveries, pick-ups and other services must be documented. This transportation statement must also discuss the proposed number of driveways versus auto access demand, accommodation of design vehicle, and parking supply. Finally, this transportation statement must document the following features of internal and abutting roadways: ownership, road classification, average daily traffic **(ADT)** volumes, traffic speeds, and speed limits.

2. Proposed Conditions Site Plan

The applicant must submit a Proposed Conditions Site Plan as a requirement of TR *Component B*. The site plan must address auto and truck access, non-auto access, internal circulation and parking, and other general site features. Subsequent changes to land use, density, and other site-specific characteristics may require modifications to the TR and reevaluation of the development application. The applicant must notify the Traffic & Transportation Division of any changes. The following are site access and circulation elements that must be included in TR *Component B:*

a. Auto Site Access

Auto site access is mainly provided by at-grade intersections of a private driveway and a public street. The Traffic & Transportation Division will review the site access points for appropriate design and location, based on functional area of abutting intersections, median cuts, and access points across the street, as described in detail in Appendix H, which outlines relevant City policies and standards. The TR must describe auto site access compliance with these policies and standards or discuss the justification for any deviation, as inappropriate design and/or location may adversely affect LOS and capacity of public streets.

b. Non-Auto Site Access

i. Pedestrian Connectivity to Street Network

Minimum standards for *connectivity* of pedestrian facilities consist of ensuring the availability of sidewalks on the site frontage, and in some cases, through the site. Sidewalks must be constructed according to the City Standards and Details for Construction. Further policies and standards for pedestrian site access are outlined in Appendix H.

ii. Transit—Availability of Bus Stops and Their Amenities

Minimum standards for transit facilities consist of ensuring that bus shelters, benches, or concrete pads are provided at all existing and programmed bus stops along the site frontage, as approved by Department of Public Works, in coordination with Montgomery County Department of Public Works and Transportation (DPW&T) or Washington Metropolitan Area Transit Authority (WMATA). The type of facility required is based on projected daily ridership volumes (provided by Department of Public Works), as defined in Table 4. If there are no existing or programmed transit stops along the site frontage, bus shelters, benches, or concrete pads must be provided at the nearest existing or programmed bus stop to the site, as determined by the Traffic & Transportation Division, within the non-auto study area, as defined in Section III.D.1.

TABLE 4: MINIMUM TRANSIT STANDARDS

Projected Daily Ridership*	Required Facility
0-10 persons	Concrete Bus Stop Pad
11-25 persons	Concrete Bus Pad plus Bus Stop Bench
More than 25 persons	Bus Shelter plus Bus Bench and Bus Stop Pad

** Based on existing ridership data provided by DPW&T and WMATA plus additional ridership projected from the new development.*

iii. Bicycle—Compliance with Bicycle Master Plan

Minimum standards for connectivity of bicycle facilities consist of ensuring the availability of bicycle facilities on the site frontage, or in some cases, through the site, as identified in the Bicycle Master Plan.

Non-Auto Site Access Exceptions: If a non-auto facility to be installed by a developer would be subject to removal due to an existing CIP project, the developer may instead contribute an equivalent amount toward that facility being built as a future project to be incorporated into the CIP, as approved by the City.

c. Site Circulation

The TR must describe site circulation compliance with City policies and standards or discuss the justification for any deviation.

III.C. *TR Component C—Automobile Traffic Analysis*

The automobile traffic description must include brief descriptions (text and maps) of the land parcel (size, general terrain features and location within the City), the roadway network (both existing and programmed) within the defined traffic study area, and existing and proposed land uses within the traffic study area. Elements of TR *Component C*, as outlined below, must be approved by the Traffic & Transportation Division before the completed TR is submitted to the Planning Division.

1. Traffic Study Area Definition

TR *Component C* must include an initial assessment of the area subject to impacts from the proposed development project. The size of the traffic study area affected by the subject development application

will depend upon the size of the development, trip generation, the configuration of the roadway system, traffic volumes, natural or man-made barriers, and the adjacent existing and proposed land uses. The traffic study area may not be limited to City boundaries. National standards and methodologies will be used to determine the traffic study area. Final determination will be made by the Traffic & Transportation Division, taking into consideration the input of affected communities, the City's Traffic & Transportation Commission, Planning Commission, and Mayor & Council, as appropriate. As the analysis proceeds, it may be necessary to modify the size of the traffic study area.

Table 5 below offers general guidance on defining the traffic study area. The minimum number of intersections that need to be included in the Automobile Traffic Analysis is based on the number of new peak hour site trips generated by the subject development (total trip generation – pass-by trips, as defined in Table 6). The number of intersections analyzed may be adjusted to reflect development-specific features, the overall level of congestion, and critical flow paths.

TABLE 5: AUTO TRAFFIC STUDY AREAS

TRIPS	Minimum No. of Intersections or all Intersections within Radii*	LAND USE/DEVELOPMENT SIZE[1,2]					
New peak hour site trips[3]		Retail (SF of GFA)	Office (SF of GFA)	Residential (Units)			
				SF	TH	GA	HR
30 - 150	4	5,000-20,000	20,000-90,000	30-160	40-240	65-325	65-425
151 - 350	8	20,001-45,000	90,001-220,000	161-425	241-700	326-700	426-900
351 - 700	12 or .45 Mile	45,001-95,000	220,001-400,000	426-700	701-1,250	700-1,250	901-1,300
> 700	16 or .50 Mile	>95,000	>400,000	>700	>1,250	>1,250	>1,300

* *The number of signalized intersections or all signalized intersections within the radii (or major portals to the site), whichever is greater.*

2. Roadway System Characteristics

All roads within the traffic study area must be shown on a map. The scale of the map(s) must be appropriate to the size of the site and of the traffic study area and be acceptable to the Traffic & Transportation Division. Roadway projects programmed and funded for completion at the time of development occupancy (according to City, County and State Capital Improvement Programs) must be included, if applicable. The number of lanes of each roadway must be indicated and, on the same or separate sketch, the movements permitted by lane for all intersections identified within the traffic study area. Types of intersection controls in place must be noted; as must median openings, vertical and horizontal alignment (if irregular), and location of existing access points if they have a direct effect on roadway capacity or traffic flow.

[1] Data are based on the Maryland-National Capital Park and Planning Commission, Montgomery County Department of Park and Planning Local Area Transportation Review guidelines, July 2004, and correspond roughly to trips generated during peak hours that generate the highest number of trips (A.M. or P.M.). Other land uses (schools, auto filling stations, day care centers, e.g.) shall be determined during the scoping meeting.
[2] Mixed-use developments must account for generations based on the different land uses.
[3] The study area is based on net new trips generated **before credits** are applied.

3. Traffic Counts

Recent traffic counts must be shown for all roadways in the traffic study area. Traffic counts may not be used if more than three years old, and the use of counts older than one year old must be approved by the City. In the event recent traffic counts are not available, the applicant will be responsible for data collection.

Counts of turning movements at intersections must be included for all intersections abutting the site and all identified intersections in the traffic study area. These counts must be reported in 15-minute intervals through each peak period. Typically, peak periods are defined as weekday hours from 7-9 AM and 4-6 PM. When necessary for a particular site, the Traffic & Transportation Division may expand the peak periods to include midday weekday or Saturday hours or to cover three (3) AM and PM peak hours. Peak periods may be adjusted in accordance with nationally accepted standards and practices to take into account development-specific features that generate traffic and/or study area congestion. Adjustments may be made based on factors such as the area of congestion or if site impact is expected to be outside typical peak periods.

Traffic counts may be obtained from the City, Montgomery County, and the State Highway Administration. Traffic counts should be adjusted using seasonal adjustment factors. Traffic counts collected during the months of August, the last two weeks of December, and the first two weeks of January and September will not be accepted due to wide variations in traffic patterns during these time periods. Conflicts between differing traffic count sources will be settled by the Chief of Traffic & Transportation or designee. Historical traffic data (more than three years old) must be adjusted to reflect current year traffic volumes and patterns.

4. Background Traffic

Background traffic consists of the following three elements:

- all existing traffic in the traffic study area,
- traffic generated by approved-but-unoccupied and approved-but-not-built development or concurrent development applications in the traffic study area, and
- all growth in traffic generated solely by land uses outside the traffic study area (i.e., through traffic).

Growth in background traffic must be estimated *before the impact of traffic from the subject development application is evaluated.* Growth in traffic may be calculated by either extrapolation techniques or use of data obtained from area wide forecasting models. The technique utilized must be approved by the Traffic & Transportation Division prior to the completion of the TR. City staff may be able to provide data from previous TRs or area wide travel forecast models.

It is the policy of the City to reserve capacity for approved-but-unoccupied and approved-but-not-built development; therefore, the TR must be prepared to reflect the reserved capacity. Reserved capacity within the traffic study area does not take into account the growth in through traffic. This must also be addressed in the TR.

A list of background development will be provided by Community Planning and Development Services (**CPDS**). The basis for the traffic forecasts in this stage will be the TR *Component C—Automobile Traffic Analysis* (or comparable) prepared for the background development sites in the specific traffic study area. It will be the responsibility of the Traffic & Transportation Division to provide these forecasts to the applicant upon request for development projects within the City limits. It will be the responsibility of the applicant to obtain information on approved-but-unoccupied and approved-but-not-built development or concurrent development applications in Montgomery County and/or the City of Gaithersburg.

Background traffic estimates will need to be prepared for all time frames for which a traffic analysis will be conducted. Refer to Section III.C.5. for a discussion of the appropriate analysis time frames.

5. Site Traffic Estimation

In order to develop an estimate of the traffic generated by the site being assessed, a four-step process involving trip generation, modal split, trip distribution, and traffic assignment must be followed. If the development schedule commitment is less than five years, then the projected year of site build-out must be used. If the site is anticipated to be developed in major phases or over a greater than five-year time frame, multiple traffic estimates (and therefore multiple analyses) will be required.[4]

a. Trip Generation

The latest editions of the Maryland-National Capital Park and Planning Commission (hereafter referred to as "**M-NCPPC**") Local Area Transportation Review Guidelines[5] (hereafter referred to as "**LATR**") and the Institute of Transportation Engineers (hereafter referred to as "**ITE**") Trip Generation[6] will be used as the primary sources of trip generation factors for all land uses. Trip generation rates for any uses not cited in these references may be estimated using other available sources of information and must be approved by the Traffic & Transportation Division. The Traffic & Transportation Division will provide the appropriate source of information to the applicant during the Scoping Meeting. Table 6 outlines key terminology in calculating trip generation:

TABLE 6: TRIP GENERATION TERMINOLOGY AND STEPS		
A	Calculate **Total Trip Generation (Total Peak Hour Site Trips)**	Use this figure for Off-site Threshold Test in Section II.C.2. (*Determines if **Transportation Report** is required, i.e. >30 trips).*
B	Determine **Pass-by Trip Reduction**	Determined in Section III.C.5.b.ii.
C	Subtract **Pass-by Reduction** from **Total Peak Hour Site Trips** *(A-B)*	Determines **Pass-by Reduced Trip Generation**
D	Calculate **Existing Trips**	Determined in Section III.D.
E	Calculate **New Peak Hour Site Trips** by subtracting **Existing Trips** from **Pass-by Reduced Trip Generation** *(C-D)*	∉# Use this figure to determine appropriate **study areas** ∉# All trip reduction and credits are deducted from this figure
F	Deduct **all other trip reductions,** including Modal Split and Mixed Use**,** from **New Peak Hour Site Trips** *(E-F)*	Use this figure to complete the automobile traffic analysis in TR Component D
G	Calculate **Non-Auto and TDM Credits** (only if modal split has not been applied).	Determined in Section III.E.2.b.

All traffic analyses will consider peak hour trips. See Section III.C.3. for a description of peak periods. When the peak hour of the generator occurs at a time differing from the peak hour of the adjacent street, site-generated traffic volumes will be computed separately for both the peak-hour of the generator and for the peak-hour of the adjacent street. A computation of daily traffic generation should also be made and included in the applicant's report.

[4] Approved and unbuilt development traffic is applied to phased development by assuming full-build out for all horizon years.

[5] The Maryland-National Capital Park and Planning Commission, Montgomery County Department of Park and Planning. Local Area Transportation Review Guidelines.

[6] Trip Generation, Sixth Edition, Institute of Transportation Engineers, 2003.

b. Trip Reduction

Total trip generation may be reduced by considering significant on-site existing land use activities that are to be eliminated via redevelopment. Such reductions may be incorporated into the total generated traffic volume. To be eligible for this reduction, the existing land use must be active at the time that traffic counts are performed in the area. Other trip reductions may apply based on the characteristics of the development application.

The potential to use public transit or other non-auto transportation modes for site-generated trips should be considered during this stage of the process. Potential reductions in trip generation for pass-by trips and mixed-use development should also be computed at this stage in the Automobile Traffic Analysis.

i. Pass-By Trip Reduction

For commercial retail development only, the applicant may make reasonable assumptions regarding pass-by traffic, consistent with guidance provided by ITE. Pass-by trips are those that would have otherwise traveled on a street adjacent to the subject development even if the subject development had not been constructed. Pass-by reductions of up to 50% may be selected after consultation and approval by the Traffic & Transportation Division. Pass-by volumes may be used to reduce the gross generated traffic volume. However, gross traffic volumes must be considered in further traffic analysis stages for evaluating driveway design and other circulation elements. Pass-by percentages may <u>not</u> be used to reduce parking or other on-site requirements.

ii. Modal Split and Mixed-Use Trip Generation Reduction

Assumptions regarding modal split, the amount of transit use and/or ridesharing to and from the subject development, must be documented in all traffic analyses submitted. Modal split reductions are based on regional and census data and will only be applied in TOAs and in consultation with the Traffic & Transportation Division. No modal split reductions will be applied without participation in the City's TDM Program. Development applications that are granted modal split reductions are ineligible for TDM trip credit, as outlined in Section III.E.2.

Reduction in trip generation within mixed-use developments should be computed at this stage as approved by the Traffic & Transportation Division. Table 7 outlines the maximum trip reduction allowed for modal split and mixed use development:

TABLE 7: TRIP REDUCTIONS

Type of Trip Reduction	Maximum Reductions Allowed	
	TOA	Non-TOA
Modal Split	15%	N/A
Mixed Use	10%	5%

Note: The off-site analyses threshold outlined in Section II.C.2. is based on total trip generation without any trip generation reductions or credits (Section III.E.). The **maximum total amount of trip reductions and credits** allowed per development application is 30% of new peak hour site trips generated in a TOA and 20% of new peak hour site trips generated in a non-TOA after pass-by trip reduction is applied and before any other trip reductions or credits are applied.

c. Trip Distribution

Regional trip tables produced by the M-NCPPC are the preferred source for the distribution of trips. Copies of these tables can be found in the latest edition of the LATR guidelines. The Traffic & Transportation Division may approve or require the applicant to use an alternative methodology as deemed necessary. City staff will assist the applicant or designee in obtaining this information, as may be available and applicable to the site.

d. Traffic Assignment

Site-generated traffic volumes should be assigned to the roadway network within the traffic study area using the distribution factors previously developed. Assignments should initially be made according to "shortest path" methods. Reassignment using multiple routings to balance traffic flows may be used with the approval of the Traffic & Transportation Division.

6. Intersection Capacity Analysis

During this stage of the traffic analysis, evaluations of existing traffic conditions and of forecast year traffic conditions with the subject development project are conducted. The results of these evaluations will be reported in terms of facility critical lane volume (**CLV**), volume to capacity (hereafter referred to as **v/c**) ratios, and LOS. These concepts are described in more detail in Appendix J.

In Rockville, system capacity is generally governed by the capacity of individual intersections. Levels of service must therefore be determined for all identified intersections in the traffic study area, using the Critical Lane Analysis technique described further in Appendix J.

The Lane Use Factors are based on typical conditions. In instances where favorable or unfavorable conditions are present, the factors may be modified as approved by the Traffic & Transportation Division. Such modifications must be noted in the TR.

Application of Critical Lane Analysis techniques generally requires professional assistance (consultant traffic engineer, planner, or Transportation and Traffic Division). Further guidance may be obtained from Transportation and Traffic Engineering Handbook[7] and other transportation reference books.

7. Other Studies

As part of the evaluation stage of the traffic analysis, it may be necessary to perform additional special studies, as determined the Traffic & Transportation Division, in order to identify roadway deficiencies not directly evident from the level of service calculations. All studies must be noted in the TSR.

a. Neighborhood Impact Studies

Special studies may be required as a part of TR *Component C* if neighborhoods are affected by a proposed development project due to cut-through traffic or other potential impacts.

i. Average Daily Traffic (ADT) Study

If residential streets are affected by the subject development project, an ADT analysis may be required. Proper methodology will be determined by the Traffic & Transportation Division.

ii. Traffic Calming Study

A traffic calming study will be required when subject development could potentially impact surrounding communities. Proper methodology will be determined by the Traffic & Transportation Division.

b. Accident Studies

Accident studies may be necessary at locations with a history or expectancy of safety problems, as identified by the Traffic & Transportation Division. The applicant will be expected to identify suitable counter-measures to deal with potential safety problems.

[7] Transportation and Traffic Engineering Handbook (4th Edition), Institute of Transportation Engineers, 1999.

c. Traffic Signal Study

The purpose of a traffic signal study will be to determine the need for a traffic signal at access points or other nearby non-signalized locations.[8] This requires a 12-hour turning movement count or estimate (for the forecast year and including site-related traffic), collection of other related data and analysis in accordance with the Manual on Uniform Traffic Control Devices (MUTCD).[9] At access points where a traffic signal already exists, the applicant will be responsible for determining all necessary modifications to the existing signal due to site-generated traffic so that it operates in a safe and efficient manner.

d. Turning Lane Study

Exclusive turning lane studies may be necessary to determine the need and/or adequacy of turning lanes for handling forecasted traffic volumes without interference to adjacent travel lanes. For signalized and unsignalized intersections, the length of left turn lane(s), in feet (not including taper), must equal or exceed the equivalent car length for the number of left turns per peak hour per lane, with a minimum turn lane length of 100 feet. The need for right turn lanes may also be reviewed.

e. Interchange Capacity Study

If an interchange capacity study is required, proper methodology will be determined by the Traffic & Transportation Division.

f. Other

Other special traffic studies may be necessary in order to address potential traffic problems.

8. Evaluation of Impacts

a. Analysis of Existing Conditions

The inventory traffic data collected in Sections III.C.3 and III.C.4 and evaluated in accordance with Sections III.C.5 and III.C.6 must be reported in TR *Component C*. The TR should illustrate on a traffic study area map the existing daily traffic volumes within the traffic study area and the peak hour turn movement volumes at identified intersections within the traffic study area. The analysis of existing conditions (i.e., LOS analyses) should likewise be presented graphically as well as documented in TR appendix worksheets.

b. Analysis of Forecasted Conditions

TR *Component C* must present the traffic forecasting conducted in Sections III.C.5 and III.C.6 and the evaluation of forecasted conditions performed in accordance with Sections III.C.7 and III.C.8. Trip generation, inclusive of trip reductions, outlined in Section III.C.5.b, but not potential trip credits, outlined in Section III.E, must be used for the total trip analysis in TR *Component C*. Included in this component of the TR must be figures that illustrate, at the minimum, the following information:

- The assumed distribution and assignment of automobile trips generated by the subject development (daily, AM peak and PM peak hour or Saturday midday peak hour, where applicable);
- The forecasted intersection turn movements within the traffic study area divided into existing, background, site, total, and total with mitigations; and
- The assumed lane geometry and number of signal phases for intersections analyzed as well as the computed CLV, v/c ratio, and LOS.

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[8] This requirement may change if the State of Maryland adopts new signal warrants.

[9] Manual on Uniform Traffic Control Devices for Streets and Highways, U.S. Department of Transportation, Federal Highway Administration, 2003 or as revised.

All steps within the forecasting process must be fully documented in the text and related tables. At the minimum, this information must include descriptions of the background traffic growth, approved-but-unoccupied development or concurrent development forecast assignments, proposed site trip generation assumptions, proposed site modal split, and procedures used to distribute and assign site-generated vehicle trips. The locations with deficiencies at the forecast year(s) must be so noted in map form.

c. Analysis of Capacity

Auto capacity will be considered inadequate if a subject development application's forecasted traffic when added to background traffic in the defined traffic study area (Table 5) exceeds any of the intersection v/c ratios outlined in Table 8 for development applications in non-TOAs and Table 9 for applications within TOAs. (See Appendix I for a description of road classifications).

Any conditions exceeding the following LOS thresholds, as determined for all locations within the defined traffic study area, constitute significant and notable impacts:

TABLE 8: NON-TOA INTERSECTION AUTO LOS THRESHOLDS BY ROAD CLASSIFICATION

Road Classification*	Volume/Capacity (v/c) Ratio	LOS
Primary Residential – Class II (Minor Collector), Secondary Residential	Less than 0.80	C
Major Arterials (Except where two Major Arterials connect), Minor Arterials, Primary Residential – Class I (Major Collector), Primary Industrial, Secondary Industrial	Less than 0.90	D
Business District roads, freeway ramps, and for locations where two Major Arterials intersect	Less than 1.0	E

**At intersections where two or more roads with different road classifications meet, the LOS threshold will be established based on the higher roadway classification (the classification where more congestion is acceptable).*

Within TOAs and their major access routes, any conditions exceeding the following LOS thresholds, as determined for all locations within the defined traffic study area, constitute significant and notable impacts:

TABLE 9: TOA INTERSECTION AUTO LOS THRESHOLDS BY ROAD CLASSIFICATION

Road Classification*	Volume/Capacity (v/c) Ratio	LOS
Primary Residential – Class II (Minor Collector), Secondary Residential	Less than 0.90	D
Major Arterials, Minor Arterials, Primary Residential – Class I (Major Collector), Primary Industrial, Business District and Secondary Industrial	Less than 1.0	E

**At intersections where two or more roads with different road classifications meet, the LOS threshold will be established based on the higher roadway classification.*

The following circumstances also constitute an impact and may require mitigation:

- A deterioration in intersection LOS by one level (0.10 v/c) or greater;
- Additional auto trips that cause the City's criteria for acceptable traffic volumes on residential streets to be exceeded, as outlined in the Master Plan;
- Development applications that contribute significantly toward the need for, or modification of, a traffic signal or other traffic control devices as established in the Manual on Uniform Traffic Control Devices or determined by the Director of Public Works or designee;

- The capacity of a turning lane is exceeded as established in the Policy on Geometric Design of Highways and Streets (AASHTO) or determined by the Director of Public Works or designee;
- Any condition creating or aggravating a safety hazard for motorists, pedestrians, or bicyclists; and
- Contradiction of principles of proper design and location for driveways, medians and median openings, service drives, and similar facilities.

For any development activity whose impact is a v/c ratio increase of 0.01 or more at intersections where the LOS for "background" traffic conditions exceed acceptable congestion thresholds outlined in Tables 8 and 9, new development applications must:

- Mitigate at least half of the impact if their impact is 0.01-0.06.
- Mitigate their impact to 0.03 or less if the impact is greater than 0.06.

d. Residential Neighborhood Impacts

Rockville's Neighborhood Traffic Control Policy places limits on the daily traffic allowable on certain residential street classifications, above which traffic diversion or other mitigation is required.

The limits are as follows:

Primary Residential Class II	*5000 cars per day*
Secondary Residential	*2000 cars per day*

Any development activity that would cause these limits to be exceeded must be fully mitigated in the development application.

III.D. TR Component D—Non-Auto Off-Site Analysis

Non-auto transportation systems must be accessible and safe for all users in order to be attractive. The analysis provided in TR *Component D* is used to ensure that these objectives are met. For pedestrian, bicycle and transit modes, analysis of existing conditions, evaluation of impacts from the subject development, and proposed mitigations and improvements must be submitted with the non-auto off-site analysis.

1. Non-Auto Study Area

The determination of non-auto study areas will be based on trip generation. In TR *Component D*, the applicant must inventory and evaluate non-auto facilities along routes to activity centers within a certain radii of the development site (see Table 10). Activity centers are areas with destinations such as schools, shopping, recreational facilities, and other points of attraction. The applicant will determine which activity center routes to evaluate in coordination with the Traffic and Transportation Division. All routes analyzed in *Component D* must be approved by the Traffic & Transportation Division. Selection of routes will be based on land uses surrounding the access route, volume of activity, and priority of the City to attract persons to the activity center(s).

Appendix K contains a map of activity centers identified by the Traffic & Transportation Division in November 2003. Locations of activity centers may be changed over time by the Traffic & Transportation Division based on new development activity. The radii for non-auto study areas are based on City analysis of walk sheds to non-auto facilities and national studies of how far individuals will travel to use non-auto facilities. **Note:** The non-auto study areas outlined in Table 10 are not the same as the study area defined for automobile traffic described in Section III.C.1.

TABLE 10: NON-AUTO STUDY AREAS						
New Peak Hour Site Trips	**30-350**		**351-500**		**500+**	
Minimum Activity Center Routes Evaluated	1		2		3	
Accessibility to Activity Centers	.25 mile radius	.35 mile radius	.35 mile radius	.45 mile radius	.45 mile radius	.5 mile radius
TOA Designation	TOA	Non-TOA	TOA	Non-TOA	TOA	Non-TOA

Note: The radii of a study area can be expanded up to .5 mile for developments in TOAs when considering installation of transit facilities. For example, if installation of bus facilities is planned within a TOA, the radii of the study area can be as large as .5 mile for all developments regardless of peak hour site trips generated.

2. Bicycle Facilities Analysis

Bicycle levels of service are based primarily on the levels of comfort that riders feel on designated facilities. The City's goal for the bikeway network is to maintain a Bicycle LOS (BLOS) of "C"[10]. This can be accomplished by providing facilities that connect and are accessible. Samples of BLOS at certain City intersections can be found in the Bicycle Master Plan Section 2.C.2.

Within the non-auto study area, bicycle facilities must be evaluated for connectivity to activity centers. Routes via bicycle facilities to activity centers will be determined by the Traffic & Transportation Division, based on the City's Bicycle Master Plan, and applicants will be responsible for compiling an inventory of bicycle facilities along those routes (bicycle facility maps can be provided by the Traffic & Transportation Division). All bicycle facilities, including shared roadways, signed-shared roadways, bike lanes, shared-use paths, or widened sidewalks as determined in the City's Bikeway Master Plan, that lie within the non-auto study area must be identified in TR *Component D*.

3. Pedestrian Facilities Analysis

Within the non-auto study area, selected sidewalks must be evaluated for connectivity from the site to activity centers. The Traffic & Transportation Division will determine which pedestrian routes to activity centers, as identified in the Scoping Meeting, must be evaluated in TR *Component D*. Applicants will be responsible for compiling an inventory of pedestrian facilities along these routes and must demonstrate compliance with the Pedestrian Policy.

4. Transit Facilities Analysis

An inventory of the availability of public and private transit service along selected activity center routes must be included in TR *Component D*. The location of bus routes, frequency of service, hours of operation, existing daily ridership levels, and bus stops and amenities (concrete pad, bench, bus shelter and connectivity to the sidewalk network) at existing and programmed bus stops in the non-auto study area must be noted where applicable. The transit inventory must also include lighting features (overhead streetlights) at transit stops and nearby parking areas, as well as availability (posting) of schedules or real-time transit information.

[10] As defined in the Bicycle LOS Model described in detail in the Bicycle Master Plan. In this model, Level "A" reflects the best conditions for bicyclists; Level "F" represents the worst conditions. BLOS is calculated based on volume of directional traffic, speed limit, lane width, pavement surface, percentage of heavy vehicles, and other roadway and sidewalk characteristics and conditions.

5. Intersection Safety Analysis

a. Standards

Safety of pedestrian, bicycle, and transit facilities is determined by **Intersection Safety Ratings**, as described below in Section III.D.5.c. Safety ratings take into account road classification, physical infrastructure at intersections, and pedestrian crossing times. Additionally, design guidelines provided in Appendices H and J, which include signage, marking standards, paved shoulders/physical separation from roads, curb cuts and ramps, crosswalks, lighting, and enhancements at intersections, must be implemented when warranted by the City.

Minimum standards for the safety of bicycle, pedestrian, and transit facilities consist of the following:

- At signalized intersections where the City controls signal timing, safety ratings for all intersections in the non-auto study area are rated at least adequate, as defined in Table 11.
- At signalized intersections in the non-auto study area where signals are not controlled by the City, the intersection safety rating is at least adequate, as defined in Table 11, *excluding the factor* of signal timing that allows for intersection crossing time[11].

b. Study Area for Safety Ratings

The intersections to be rated for intersection safety will be identified at the Scoping Meeting[12]. National standards and methodologies will be used to determine the safety ratings study area. Safety ratings will be determined for signalized intersections that lie within either the auto traffic study area defined in Table 5 or the non-auto study area defined in Table 10.

c. Data Collection and Steps to Determine Safety Ratings

The TR must include an inventory of bicycle, pedestrian, and transit safety ratings for *signalized* intersections as well as intersections determined by the Traffic & Transportation Division to be *major unsignalized intersections*. An objective of this process is to take into account road classifications and physical engineering of the intersection to determine the level of safety at the intersection. Identifying road classification is important in determining the safety rating, as traffic speed and volume vary with road class. Steps to determining and assigning intersection rating are as follows:

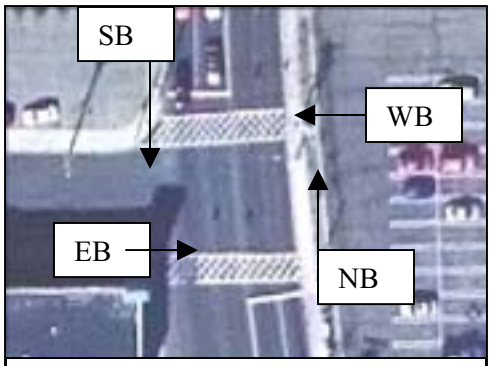


Figure 1: Intersection Approaches

i. Identify the street classification of intersection approaches at signalized and major unsignalized intersections (as determined during the scoping meeting) within the safety ratings study area. See Appendix I for a description of road classifications. A map of City road classifications can be found on the City's website, <www.rockvillemd.gov/residents/traffic>.

ii. Identify the infrastructure at each approach. Note that the infrastructure consists of what is available for a pedestrian or bicyclist traveling in the same direction as automobile

[11] Where operational aspects such as signal timing may not be directly controlled by the City, staff will work with the applicant to coordinate potential inter-jurisdictional agreements to implement new physical infrastructure to improve safety.

[12] The Traffic & Transportation Division may select key unsignalized intersections in addition to signalized intersections to be analyzed for intersection safety.

traffic. For example, in Figure 1, the southbound intersection (business district) has no infrastructure in place. The westbound and eastbound intersections have cross-hatched crosswalks. The northbound intersection is not applicable (n/a) because it is a through-sidewalk.

Refer to Table 11 to assign each approach an **infrastructure safety rating**. Note that in order for an intersection to attain a specific safety rating, it must possess all the elements outlined in the next lesser safety rating and at least one element of the safety rating in question. The intersection remains in this safety rating category until all the elements of that category are present and along with one element of the next better safety ratings category.

TABLE 11: INFRASTRUCTURE SAFETY RATINGS*

Intersection Rating	Safety Rating Indicators	
Poor	At least one of the following is present: ∉# Channelized Right Turn Lane (also referred to as a "Hot Right") ∉# Sight Distance Problems ∉# Inadequate Crossing Time	**Unacceptable**
Sub-Par	No "Poor" elements are present and at least one of the following is present: ∉# No Pedestrian Crossing Signals ∉# Hot Right Turn	
Adequate	No "Poor" or "Sub-Par" elements are present and there are at least one of the following: ∉# Pedestrian Crossing Signals ∉# Pedestrian Refuge Islands ∉# Marked Crosswalks *-Or-* Hot Right Turn is present but treated with at least one of the following: ∉# Cross-hatch Crosswalks ∉# Turn Restrictions ∉# Illuminate Crosswalk and is not at a Major or Arterial intersection.	**Acceptable**
Good	"Adequate" elements are present when warranted and there are least one of the following: ∉# "Yield to Pedestrian" Signs ∉# Turn Restrictions ∉# Cross-hatch Crosswalks	
Excellent	"Good" elements are present when warranted and there are innovative treatments such as ∉# Additional (advance) Pedestrian Crossing Time ∉# Countdown Signals ∉# Other Innovative Treatments as approved by Traffic & Transportation Division and in conformance with MUTCD	

**Intersections assigned an "N/A" rating do not lead to destinations or are "through" sidewalks (i.e., a "T" intersection).*

iv. Determine if the **intersection crossing time** is adequate based on City standards:

1. Determine the length of lanes that a pedestrian must cross. This measure is in feet and accounts for the full crossing length (i.e., curb to curb).

2. Determine the amount of time that the "Flashing Walk" signal appears. Note: do not count the "Steady Walk" (the white or steady red hand) time.
3. Divide the length of lanes to be crossed by 4 (i.e., Distance/4). If the flashing walk time is less than the length of the lanes divided by 4, then crossing time is inadequate.
4. When there is no crossing time data on one segment of a parallel intersection (i.e., if time is given for EB but not WB), then crossing time is assumed to be the same as the other segment of the parallel intersection.

Infrastructure safety ratings and determination of adequate or not adequate crossing time for all approaches within the safety ratings study area must be submitted with the TR. TR Component E—Summary, Mitigation, and Credits

6. Summary of Development Application Issues and Impacts

Upon completion of the required analysis of the impacts of the proposed development project, a summary of all impacts must be developed and included in the TR. Applicants must summarize all issues and impacts related to site access and circulation, automobile traffic, non-auto facilities and intersection safety. All impacts must be noted in *TR Component D* and should be organized in a chart listing impacts on the left with intended mitigating actions on the right.

7. Mitigation

If intersection LOS thresholds are not met and intersections fail, as defined in Section III.C.8.c. above, mitigation must be implemented to bring congestion to an acceptable LOS in order for the development to be approved. Trip credits for mitigation are applied against new peak hour site trips. Mitigation plans must be approved by the Traffic & Transportation Division.

Mitigation may consist of:

- Implementation of, or monetary contribution towards, proximate physical roadway modifications that increase auto capacity sufficiently to bring LOS to acceptable levels;
- Implementation of, or monetary contribution towards, physical non-auto improvements that appropriately address project-specific impacts through an alternative means, as approved by the Traffic & Transportation Division (Table 14); and
- Participation in the City's TDM Program or alternative TDM program, as approved by the Traffic & Transportation Division (Table 15). Note that no additional credit will be applied if modal split is used in traffic analyses.

Table 12 summarizes the types of mitigation an applicant can consider in developing mitigation plans:

TABLE 12: TYPES OF MITIGATION AND CREDITS*

Mitigation	Maximum Credits Allowed	
	TOA	Non-TOA
Off-site mitigations to roadway network that a developer offers to implement. Goal is to lessen the impact from trips generated by the development.	Variable Credit, Depending on Improvement	
Off-site mitigations to non-auto facilities that a developer offers to implement.	15% of Trips	10% of Trips
Implementation of a Transportation Demand Management Program	15% of Trips	10% of Trips

Note: **On-site mitigations (per minimum standards) for access, circulation, pedestrian, bicycle, and transit facilities are required and therefore **are not eligible for mitigation credits**.*

The **maximum total amount of trip reductions and credits**, as outlined in Table 13, allowed per development application is 30% of new peak hour site trips generated in a TOA and 20% of new peak hour site trips generated in a non-TOA after pass-by trip reduction is applied and before any other trip reduction or credit is applied. Trips are credited against the total trip generation for the site and not at specific intersections. However, mitigation will be targeted toward intersections that are impacted by the new development. Drive-through facilities are *not* eligible for modal split reductions, mixed use reductions, or trip credits but *may be* eligible for other trip reductions.

TABLE 13: MAXIMUM POTENTIAL TRIP REDUCTIONS AND CREDITS

Type of Trip Reduction or Credit	Maximum Credits Allowed	
	TOA	**Non-TOA**
Modal Split Reduction	15%	N/A
Mixed-Use Development Reduction	10%	5%
Non-Auto Improvements Credit	15%	10%
TDM Credit	15%	10%
Combined Trip Reductions and Credits Ceiling	**30%**	**20%**

a. Roadway Improvements

TR *Component E* must fully document and evaluate potential roadway mitigating actions for the development project. If applicable, a map illustrating potential mitigating actions should be included. This map should graphically depict proposed modifications to existing and programmed roadway configurations. The traffic analysis should be detailed enough to confirm the feasibility and establish the cost of proposed mitigating actions and should present the commitment of the applicant to provide these measures as appropriate. Final functional plans for roadway improvements should be submitted at the detailed engineering stage in the site development review process. The development application will receive trip credits for roadway mitigating actions as applicable.

b. Non-Auto Improvements

Applicants are encouraged to mitigate transportation impacts identified in TR *Components C & D* and bring their impact level to acceptable levels, as defined in Section III.C.8, by providing non-auto improvements and modifications to the transportation system. Applicants may receive trip credits only for non-auto improvements approved by the Traffic & Transportation Division that are *beyond* minimum requirements or otherwise required on-site. Trip credits will be applied as mitigation according to the rates outlined in Table 14 and may include a combination of facilities, recognizing that certain facilities and programs are more effective in reducing trips than others. Mitigation involving transit facilities must be done in coordination with DPW&T and WMATA, taking into account the effects such facilities may have on operational costs and transit planning. In addition, differential trip credit will be applied based on whether or not the development is within a TOA.

TABLE 14: MAXIMUM TRIP CREDIT RATES FOR NON-AUTO FACILITIES						
New Peak Hour Site Trips Generated	**30-100**		**101-200**		**More than 200**	
	TOA	**Non-TOA**	**TOA**	**Non-TOA**	**TOA**	**Non-TOA**
Facility[1]	*Credit per Facility*	*Credit per Facility*	*Credit per Facility*	*Credit per Facility*	*Credit per Facility*	*Credit per Facility*
Shared bicycle/ped. path at least 8' wide, 130' long	4	3	5	4	6	5
Sidewalk at least 4' wide, 130' long[2]	3	2	4	3	5	4
Bicycle lane at least 4' wide, 130' long [2,3,4]	3	2	4	3	5	4
Indoor shower for bike commuters	3	2	4	3	5	4
Curb extension at intersection[5]	1	1	1	1	1	1
Bike Locker (holds 2 bikes)	2	1	3	2	3	2
Bike Rack (>5 bike slots)	2	1	3	2	3	2
Concrete Pad at Bus Stop[6]	2	1	2	1	2	1
Bus Bench[6]	2	1	3	2	4	3
Bus Shelters[6]	5	3	6	4	7	5
Bus pull-off[7]	2	1	3	2	3	2
Multimodal Transit Center[9]						
Enclosed (Indoor)	N/A	N/A	25	20	30	20
Covered (Outdoor)	N/A	N/A	20	15	25	15
Transit Information Kiosk[10]	10	10	15	10	20	10
Transit Information Board[11]						
Real-Time	7	7	12	12	17	17
Static	1	1	2	2	2	2

[1] "Per facility" refers to the number of credits granted per installation of one facility of the indicated type. Credits are applied above and beyond minimum requirements for adequate public facilities or what is otherwise required on-site.
[2] When a sidewalk or bike facilities installed is not an exact multiple of 130' long, remaining fractions will be pro-rated.
[3] Facilities must link to existing or programmed portions of the bicycle network in the Bicycle Master Plan. Total width, length, and location will be determined by the Traffic & Transportation Division at time of development approval, based on development type and size.
[4] Bicycle lanes that require street lane widening will be credited the same amount as shared bicycle/pedestrian paths.
[5] This facility must decrease the distance pedestrians must travel to cross a street.
[6] Other than those required in the non-auto study area. Concrete pads must be installed before a bench or shelter is installed. Locations based on ridership numbers and by determination of the Traffic & Transportation Division.
[7] Bus pull-offs are not desirable along roads classified as arterial due to speed and volume of traffic. Installation of pull-offs will be determined by the Traffic & Transportation Division and in coordination with Montgomery County Department of Public Works & Transportation.
[8] Subsidization of a bus stop, portion of a bus route, or extension of service where service is scheduled to be eliminated by Montgomery County Department of Public Works & Transportation due to low ridership or other factors.
[9] A facility that is a dedicated space for transit information with a public waiting area. Commercial lobbies do not qualify. Must include no less than 1 seat for a transit resource person and no less than 5 seats in the public waiting area. Must be within .7 mile (3696 feet) of at least two bus stops and/or Metro stations.
[10] A facility with transit information and a resource person but no public waiting area.
[11] A facility that includes maps and schedules (when possible) of transit services.

*c. Transportation Demand Management (**TDM**) Program*

The City's TDM Program and TDM Policy aim to reduce single-occupancy auto (SOV) trips and implement demand management throughout the City. In a TOA, a maximum of **15% trip credit** may be applied for a developer's implementation of a TDM program (see Appendix L) and participation in the City's TDM Program. Credit will be applied to new peak hour site trips before any other trip credits or reductions (apart from pass-by reduction) are applied for the development application. Development in non-TOAs may be eligible for a maximum of 10% TDM trip credit to be applied to new peak hour site trips before any other trip credits or reductions, apart from pass-by reduction, are applied for the development application. TDM trip credit is summarized in Table 15 below.

TABLE 15: TDM TRIP CREDIT	
TOA Designation	**Maximum Credit Amount***
TOA	15%
Non-TOA	10%

**Applied to new peak hour trips before any other trip credits or reductions, apart from pass-by reduction, are applied for the development application.*

Note: When a development application is approved for trip reduction based on modal split, as described in Section III.C.5.b.ii., it is not eligible for TDM trip credit.

d. Summary of Mitigations and Potential Credits

Applicant should summarize mitigation plans in tabular format with corresponding credit rates.

Appendix A: Acronyms

Acronym	Definition
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
ADT volumes	Average Daily Traffic volumes
BLOS	Bicycle Level of Service
CLV	Critical Lane Volume
CPD	Comprehensive Plan Development Permit
CPDS	Community Planning and Development Services
CTR	Comprehensive Transportation Review
DPW&T	Montgomery County Department of Public Works and Transportation
DRC	Development Review Committee
ITE	Institute of Transportation Engineers
LATR	Local Area Transportation Review Guidelines
LOS	Level of Service
M-NCPPC	Maryland-National Capital Park and Planning Commission
MUTCD	Manual on Uniform Traffic Control Devices
PDP	Preliminary Development Plan Permit
PRU	Planned Residential Units Permit
RTH	Residential Town House Permit
SOV	Single-Occupancy Vehicle
SPX	Special Exception Permit
STM	Standard Traffic Methodology
TDM	Transportation Demand Management
TOA	Transit-Oriented Area
TR	Transportation Report
TSR	Transportation Staff Report
UFAS	Uniform Federal Accessibility Standards
USE	Use Permit
V/C Ratio	Volume to Capacity Ratio
WMATA	Washington Metropolitan Area Transit Authority

Appendix B: Definitions

Word or Acronym	Definition
Accessibility	Describes how destination points can be approached or entered by way of the transportation network
Activity centers	Areas with destinations such as schools, shopping, recreational facilities, and other points of attraction
Adequacy	Sufficiency to satisfy minimum transportation standards
Applicant	Any individual, association, firm, partnership, corporation, government agency, or duly authorized representative submitting a development application
Approving Body	The appropriate authority identified in the Zoning Ordinance
Capacity	Maximum number of vehicles that can pass a given point during one hour under prevailing network and traffic conditions
Connectivity	Ability to make and maintain a connection between two or more points in the transportation system
Crosswalk	A right-of-way within a block dedicated to public use, intended primarily for pedestrians and from which motor-propelled vehicles are generally excluded, and which is designed to improve access to adjacent roads or lots
Development	Any new development or significant redevelopment application presented to the City after date of CTR adoption; any activity, other than normal agricultural activity, which materially affects the existing condition or use of any land or structure
Development Review Committee	Group comprised of representatives of City departments who are involved the site plan review process; members review development applications and discuss issues relating to the proposed use and design in a comprehensive manner
Improvement	Any building, structure, road, driveway, parking or loading area, pedestrian path, landscaping, screening, fencing, or recreational facility
Improvement, public	Any or all of the following: roads and streets, alleys, grading, road pavement, curbs and gutters, sidewalks, crosswalks and pedestrian paths, water mains, sanitary sewer lines, water supply and sewage disposal, storm sewer lines and drainage structures, curb returns, sidewalk and driveway entrances in rights-of-way, guardrails, retaining walls, sodding, planting, monuments and streetlights
Intersection Capacity Analysis	Evaluation of existing background conditions, traffic conditions, and of forecast year traffic conditions with the subject development project
Intersection Safety Ratings	Indicators used to rate the intersection safety of pedestrian, bicycle, and transit facilities
Law	Any law, ordinance, resolution or regulation, whether enacted by the Federal, State, County, City or other unit of government or agency thereof
Level of Service	Level of performance of a public facility; a set of operating conditions describing the ability of a transportation network to handle traffic

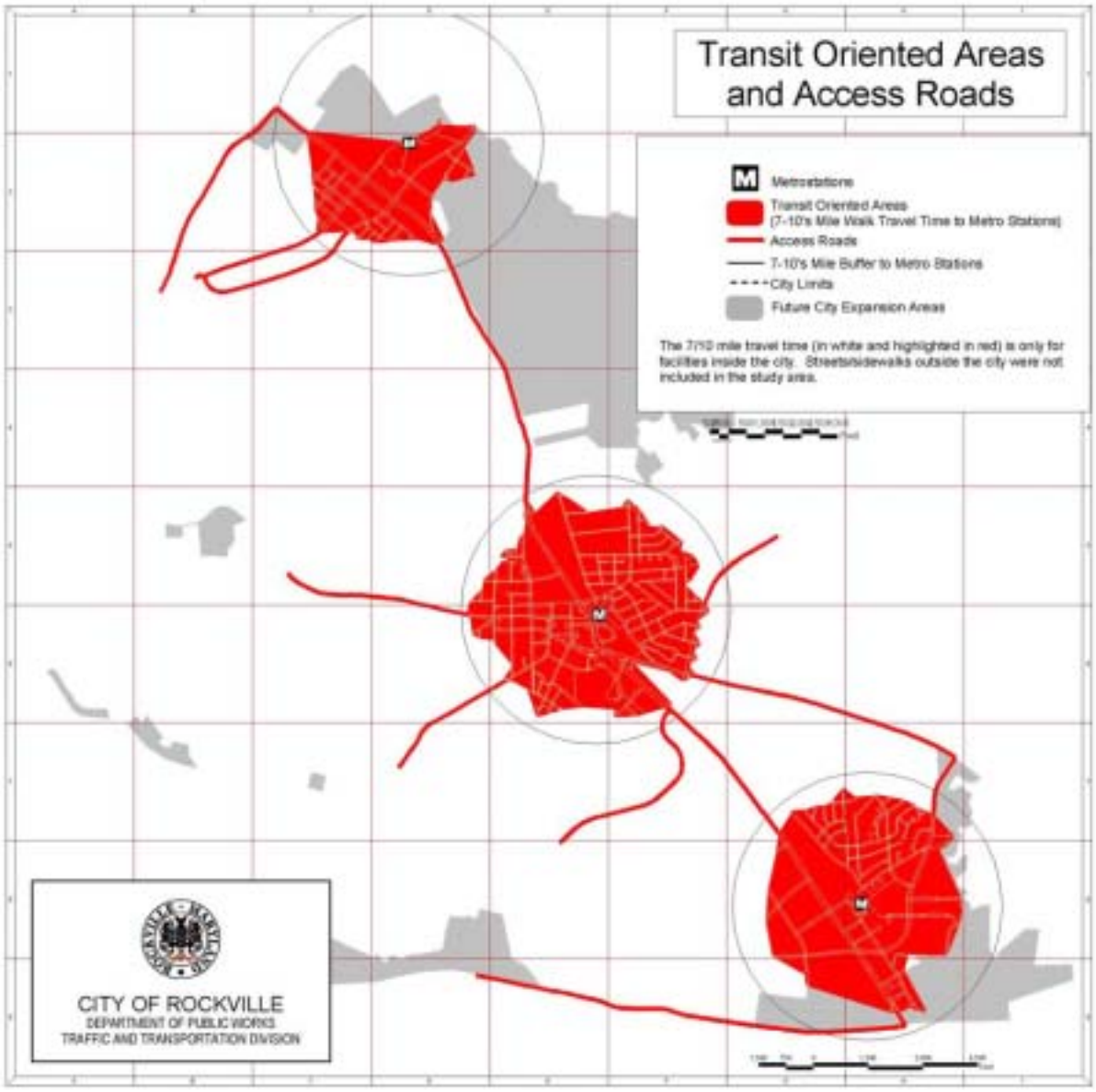
Metro Performance District	Area in close proximity to the Twinbrook Metro Station within which existence of the Metro Station has the greatest influence of pedestrian activity, types of uses and development densities (or other Metro Stations as may be amended in the Zoning Ordinance)
Mixed Use Development	A development containing any combination of office, commercial, and multifamily residential uses integrated vertically or horizontally
Modal Split	Amount of people using a certain means of transportation, including auto, transit, bicycle, or walking
Neighborhood Planning Area	The City is divided into 18 Neighborhood Planning Areas
Non-Auto Facility	Non-motorized networks or systems, including walkways, sidewalks, crosswalks, path, pedestrian plazas, bike lanes, and street shoulders
Off-site Threshold	The threshold that determines whether or not the TR must include Components C & D; the impact of development applications under this threshold is assumed to be so small that accounting for it is unreasonable or administratively impracticable
Pass-by Trips	Trips that would have traveled on a street adjacent to the subject development even if it had not be constructed; results in a reduction of new trip attributable to subject development
Peak Period	Typically, peak periods are defined as weekday hours from 7-9 AM and 4-6 PM. When necessary for a particular site, the Traffic & Transportation Division may select to expand the peak periods to include midday weekday or Saturday hours or to cover three (3) hours during the AM and PM peak periods. Peak periods, other than typical, will be used to take into account development-specific features as generators of traffic and/or study area congestion (i.e., the area congestion or site impact is expected to be outside typical peak period)
Scoping intake form	Form distributed when a planning inquiry is made; applicant must submit form to the Traffic & Transportation Division before the scoping meeting can take place
Scoping meeting	Meeting with applicant and Traffic & Transportation Division to discuss the detailed CTR requirements as they apply to the subject development
Scoping summary	Summary submitted by the applicant for the approval of the Traffic & Transportation Division, outlining the details of the TR agreed upon in the scoping meeting
Standard Traffic Methodology	The methodology used to analyze and evaluate the traffic impacts of development applications submitted to the City of Rockville prior to the adoption of the CTR
Road classification	The classification of a road as set forth in the transportation element of the Plan.
Subdivision	The creation of lots, either by dividing existing lots or parcels or combining existing lots, for the purpose of new development or redevelopment
Total Peak Hour Site Trip	Total number of trips (i.e., inbound plus outbound) generated by the development project during the busiest one-hour peak within the peak periods; calculated using the trip generation rates and methodology referenced in the CTR.
Traffic Control Device	Any sign, signal, marking or device placed or erected for the purpose of regulating, warning, or guiding vehicular traffic and/or pedestrians
Transit-Oriented	Areas where viable non-auto options exist and include areas within 7/10^{ths} of a mile accessible walking distance from

Area	existing and programmed Metro stations and fixed-guideway transit stations on dedicated transit rights-of-way; may also include major access routes to these areas
Transportation Demand Management	General term for strategies that promote alternatives to travel by single occupancy vehicle
Transportation Report	The report the CTR requires applicants to submit; consists of five components: Component A: Introduction and Existing Conditions Component B: Site Access & Circulation Component C: Automobile Traffic Analysis Component D: Non-Auto Off-site Analysis Component E: Summary, Mitigation and Credits
Transportation Staff Report	The report prepared and issued by the Traffic & Transportation Division after the submittal of the Transportation Report; addresses any issues with the development application and requires mitigations and conditions of approval
Trip	A one-way movement
Volume/Capacity Ratio	The ratio of an actual volume to the capacity at a given level of service

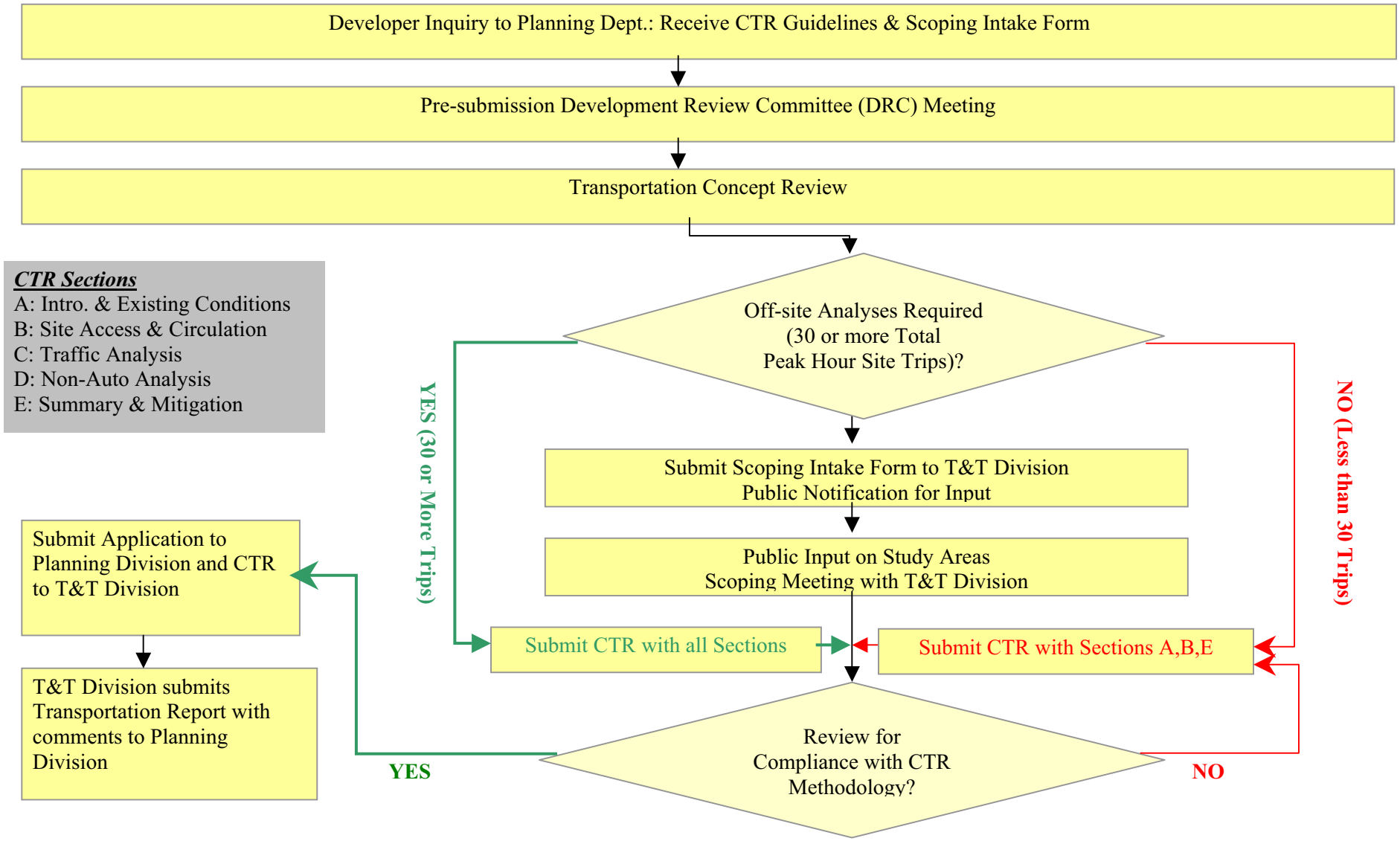
Appendix C: Comparison of STM and CTR

Current Standard Traffic Methodology (STM)	Proposed Replacement of STM, via CTR
Threshold for Traffic Impact Study: 100 total trips during the AM or PM weekday peak period	*Threshold for Off-Site Components of TR:* 30 total trips during one hour within the peak period. Typically, peak periods are defined as weekday hours from 7-9 AM and 4-6 PM. When necessary for a particular site, the Traffic & Transportation Division may expand the peak periods to include midday weekday or Saturday hours or to cover three (3) hours during the AM and PM peak periods. Peak periods may be adjusted in accordance with nationally accepted standards and practices to take into account development-specific features that generate traffic and/or study area congestion. Adjustments may be made based on factors such as the area of congestion or if site impact is expected to be outside typical peak periods.
Minimal analysis required for non-auto access	Separate analysis required for non-auto access
Focus on private passenger auto traffic	Multimodal focus
Traffic mitigation guidelines unclear	Clarification of traffic mitigation guidelines
No guidelines for non-auto mitigation	Guidelines for non-auto mitigation
Transportation Demand Management programs and policy not formalized, but offered as a form of mitigation	TDM policy formally established. TDM payments required. Additional TDM measures may be used as mitigation measures.
No clear guidelines for developing study area	Guidelines for developing non-auto study area and traffic study area
Uniform guidelines Citywide	Varying guidelines for Transit-Oriented and Non-Transit Oriented areas
	Guidance for development near activity centers (transit, bike/pedestrian facilities, schools, other public facilities)
	Guidance for compliance with City design standards and general policies
	Guidelines for contributions towards programmed transportation CIP regardless of their quantified impact

Appendix D: Map of Transit-Oriented Areas (TOAs)



Appendix E: CTR Methodology Flowchart



Appendix F: Scoping Intake Form

City of Rockville

Comprehensive Transportation Review
SCOPING INTAKE FORM

Project Name:				
Permit No. (if available):				
Subject Property Address:				
Contact Person:				
Contact Phone Number:				
Contact Email Address:				
Proposed Land Use Density:	**Use**		**Square Footage/ Dwelling Units**	
Trip Generation	**Peak Hour Site Trips**			
	Peak Period	IN	OUT	TOTAL
	AM			
	PM			
	SAT			
Proposed Study Area (Boundaries and Intersections)				
Proposed Access Points:				
Projected Horizon (Build Out) Date:				
Statement of Operations				

Additional pages may be submitted if more space is needed.

Appendix G: Outline of Transportation Report

I. Component A—Introduction and Existing Conditions

A. Proposed Project (text)
   1. Project Description/Overview
   2. Phasing and Timing of Planning and Build-out
   3. Proposed Land Use
   4. TOA Designation (from staff scoping)
   5. Hours of Operation
   6. Hours and Description of Employment Activity

B. Existing Land Use (text)

C. Area/Location (Map)

D. Trip Generation Total (Figure)

II. Component B—Site Access and Circulation *(See also Appendix H)*

A. Proposed Site Access and Circulation Transportation Statement
   1. Discussion of all planned site features that do not comply with City Codes/ Standards/ or Policies
   2. Hours of Deliveries, Pick-Ups, and Other Services
   3. Number of Driveways versus Auto Access Demand
   4. Accommodation and Circulation Plan for Largest Size Vehicles that will Access Site
   5. Parking Demand versus Parking Supply
   6. Internal and Abutting Roadways
      a. Ownership
      b. Road Classification
      c. ADT Volumes
      d. Traffic Speeds
   e. Speed Limits

B. Proposed Conditions Site Plan
   1. Traffic Immediate Access
      a. Abutting Roadways (Plan View of Both Sides of Roadways)
   b. Driveways
      - Location
      - Proximity to: a) Entrances; b) Intersections; c) Other Driveways
      - Alignment with Medians and Driveways across the Roadway
      - Traffic Control
      - Design
   2. Non-Auto Facilities
      a. Sidewalks and Walkways
         - Proximity
         - Location
         - Condition
      b. Bicycle Facilities
         - Bikeways: a) Proximity; b) Location; c) Road Classification
         - Bicycle Parking: Proximity and Location of a) Bike Racks and; b) Bike Lockers
      c. Adjacent Transit Stations (primarily bus stops)
         - Proximity
         - Location
         - Route

        - Amenities (concrete pad, bench, shelter)
    3. Internal Circulation and Parking
        a. Parking Lot Layout
        b. Carpool and Vanpool Spaces
        c. Location of Light Poles and Illumination
        d. Fire Lanes
        e. Loading/Unloading of Goods and Persons
        f. Handicapped Facilities
        g. Storage
        h. Dumpsters/Refuse Compactors
        i. Other Service Areas
        j. Truck Maneuvering Areas
        k. Signage and Pavement Markings
    4. General
        a. Easements
        b. Right of Way Lines
        c. Landscape Buffer Areas

II. Component C—Automobile Traffic Analysis

A. Existing Conditions
    1. Existing Road Network and Lane Use (Figures)
    2. Existing Peak Hour Traffic Volumes (Figures)
    3. Existing Peak Hour CLV Summary (Figures)
B. Background
    1. Background Development Projects and Land Use (Text)
    2. Yearly Growth (Text)
    3. Peak Hour Total Traffic Volumes (Existing, Background, Growth) (Figures)
    4. Background Peak Hour CLV Summary (Figures)
C. Site Trips
    1. Directional Distribution (Figures)
    2. Peak Hour Site Generation Trips Summary Table (Figures)
    3. Total Future Peak Hour Trips (Figures)
    4. Total Peak Hour CLV Summary (Figures)
    5. Peak Hour CLV Comparison Table (Figures)

III. Component D—Non-Auto Analysis

A. Existing Conditions
    1. Pedestrian Facilities
        a. Inventory of the following facilities en route to activity centers identified DPW (Map) within the non-auto study area:
            - Sidewalks
            - Curb Ramps
            - Street Lights
        b. Compliance with the Pedestrian Policy
    2. Bicycle Facilities
        a. Inventory of the following facilities within non-auto study area:
            - Signed-Shared Roadways
            - Shared-Use Paths
            - Bike Lanes
        b. Compliance with the Bike Master Plan
        c. Connection to Bikeway Network

3. Transit Facilities:
   a. Inventory of the following facilities within non-auto study area:
      - Bus Hubs
      - Bus and Shuttle Routes
      - Bus and Shuttle Shelters
      - Sidewalk Connection to Bus Shelter
      - Amenities and Technologies at Bus Shelter
      - Bus and Shuttle Ridership Volumes (provided by City when possible)
4. Intersection Inventory of the following facilities:

Chicane	Crosswalk
Cross-Hatch Crosswalk	Diverter
Hot Right	Illuminated Crosswalk
Median	Paddle
Pedestrian Head	Pedestrian Refuge
Raised Crosswalk	Speed Hump
Stop Sign	Traffic Circle
Turn Restriction	

5. Intersection Safety Ratings

IV. Component E—Summary, Mitigations, and Credits

A. Summary of Findings
B. Impacts
C. Proposed Mitigation
D. Transportation Demand Management
   1. Plan
   2. Contribution
   3. Final projected land use and density information for calculation

V. Appendices

A. Scope Agreement Letter
   If Applicable:
B. Signal Warrant Analysis
C. Accident Data Analysis
D. Sight Distance Analysis
E. Background Traffic by Project
F. CLV Worksheets by Intersections
G. Traffic Counts
H. Yearly Growth from Existing Traffic

Appendix H: Site Access and Circulation Summary

For a detailed discussion of the principles in this Appendix, please refer to the latest edition of *Transportation and Land Development* by Vergil G. Stover and Frank J. Koepke*; Institute of Transportation Engineers*.

I. Access

A. Location: Based on functional area of abutting intersections, median cuts, and access points across the street

- AASHTO specifically states that "Driveways should not be situated within the functional boundary of at-grade intersections. This boundary would include the longitudinal limits of auxiliary lanes" [1, p.793, 1994; p.841, 1990;p.888, 1984]
- Access and circulation design of the site must be designed so as to provide good access to the site from abutting roadway networks. Layout of the buildings develops from a good access and circulation plan. Footprint of the building depends on the access circulation plan.
- Minimum Corner Clearance:
  SEE *Transportation and Land Development* FIGURE 6-18:
  DEFINITION OF MARGINAL CORNER CLEARANCE (PAGE 6-26)
- Median Corner Clearance:
  SEE *Transportation and Land Development* FIGURE 6-19:
  DEFINITION OF MARGINAL CORNER CLEARANCE (PAGE6-26)
- Upstream Functional Intersection Area:
  SEE *Transportation and Land Development* FIGURE 5-20:
  UPSTREAM FUNCTIONAL INTERSECTION AREA (PAGE 5-42)

B. Design

- There are two basic design types of access points: Driveway Apron and Street Cut. Street cuts should be used whenever the access location coincides with two intersecting streets. Technically driveways are intersections. For all other locations, the appropriate Driveway Apron Design Standard should be selected. [SEE City of Rockville *Standards and Details for Construction*]
- Control design (e.g.; yield, stop, traffic signal): Must conform to MUTCD
- Sight distance: Minimum requirements as established by AASTHO must be applied through the design process. Except for single-family dwellings, the developer must present a Sight Distance Certification form with the detail application.
- Adequate throat distance must be provided to allow for queuing of outbound vehicles and proper transition of inbound vehicles.
- The adjacent road network may not be utilized for site circulation.
- Visibility and visual cues should be provided to identify access points

c. Pedestrian Site Access

Pedestrian access must comply with standards outlined in the City's Pedestrian Policy. The following are additional standards of compliance:

- Along major and arterial streets, sidewalks must be provided on both sides within residential and business areas, and on one side of the street in all other areas.

- Sidewalks must be provided on both sides of business streets, and on at least one side of industrial streets.
- In residential areas, sidewalks must be provided on both sides of primary streets, and on at least one side of secondary streets. Around schools, secondary streets must be provided with sidewalks on both sides.
- For all road classifications, sidewalks must be placed on both sides of the street on routes served by local mass transit.
- In new subdivisions, sidewalks must be constructed on both sides of each street.
- In PRU developments, sidewalks must be constructed on both sides of each street, with specific requirements for sidewalks and other walkways to be determined by the Mayor and Council.
- In the Town Center, sidewalks must be provided on both sides of each street and must be constructed in compliance with the design criteria contained in the Town Center Urban Design Plan.

Provision of Sidewalks Based on Street Type		
Street Type	**Area**	**Sidewalks**
Major	Residential	Both sides
Major	Business	Both sides
Major	All Other	One side
Arterial	Residential	Both sides
Arterial	Business	Both sides
Arterial	All Other	One side
Industrial	All	One side
Primary	Residential	Both
Secondary	Residential	One
All	Around schools	Both
All	Routes served by local mass transit	Both
All	New subdivisions	Both
All	PRU developments	Both
All	Town Center	Both

II. Circulation

a. Passenger Vehicles: Parking Design as outlined in the Chapter 25 of the Zoning Ordinance

b. Pedestrian/bike circulation and conflicts with vehicles

Pedestrian circulation must comply with standards outlined in the City's Pedestrian Policy. The following are additional standards of compliance:

- Sidewalks and shared-use paths must be at least 4 feet in width, and constructed from hard-surface materials such as concrete, asphalt, or brick.
- For development applications with sidewalks parallel to arterial streets, applicant will discuss with City staff whether a wider hard-surface pathway to accommodate bicycles as well as pedestrians is feasible. The width of such facilities must be at least eight (8) feet or ten (10) feet if a buffer is not feasible.
- Sidewalks should be separated from the adjacent roadway by a buffer strip at least three (3) feet wide.

- In both new and existing developments, raised pedestrian refuge areas may be provided at intersections and other street crossing points. These refuges can take the form of islands or peninsular curb extensions ("chokers"). In coordination with sidewalks, chokers are to be particularly encouraged at intersections where both vehicle and pedestrian movements are heavy and where on-street parking may be desirable.
- Curb ramps meeting ADA requirements (specifically, the **Uniform Federal Accessibility Standards** [UFAS]) must be constructed to provide access to every legally defined crosswalk, both marked and unmarked.
- Crosswalks must be marked within school zones, at all signalized intersections, *adjacent to Metro stations,* and at all locations with at least a moderate concentration of pedestrian activity, especially in commercial areas.
- In accordance with Maryland Law, marked crosswalks must also be hatched with diagonal or longitudinal (to the street) stripes at the following locations:
    i. Streets where the speed limit is greater than 35 mph.
    ii. Within school zones.
    iii. Mid-block locations.
    iv. Where the presence of a crosswalk may be otherwise unexpected.
- Pedestrian signals must be installed and maintained at all signalized crosswalks a.) that cross the "main street" signal movement, and b.) where pedestrian movements potentially conflict with an exclusive (green arrow) turning movement.

c. Bicycle parking facilities

- For non-residential locations, a ratio of one (1) bicycle parking space to 50 auto parking spaces must be installed.
- Commercial, multi-family residential, and retail uses must provide bicycle racks or lockers, as determined at the scoping meeting.

d. Proper Truck access (solid waster managements, deliveries, emergency vehicles?) loading areas

e. Proper Internal street layout design (if part of plans)

Appendix I: Road Classifications

Rockville Classification *(Standard Term)*	**Description**	**Typical Volumes**
Limited Access *(Freeway)*	Carries through traffic. Lanes are divided by a median. Access points are very limited.	50,000 to 250,000 vehicles per day
Major *(Major Arterial)*	Carries through traffic. Lanes are divided by a median. Access points are generally limited.	Greater than 25,000 vehicles per day
Arterial *(Minor Arterial)*	Carries through traffic. Design is more limited than on major streets. Access is less limited.	10,000 to 30,000 vehicles per day
Primary Residential – Class I *(Major Collector)* and Class II *(Minor Collector)*	Distributes traffic between neighborhoods and arterial streets. Typically has two traffic lanes.	Class I – In excess of 5,000 vehicles per day Class II – Less than 5,000 vehicles per day
Secondary Residential *(Access)*	Provides local access to residential properties. All non-primary streets are classified as secondary.	Up to 2,000 vehicles per day
Business District *(Major/Minor Collector)*	Serves adjacent business land use. Typically has four undivided traffic lanes.	5,000 to 20,000 vehicles per day
Primary Industrial *(Major Collector)*	Serves adjacent industrial and office land uses. Typically has four undivided traffic lanes.	5,000 to 20,000 vehicles per day
Secondary Industrial *(Minor Collector)*	Serves adjacent industrial and office land uses. Typically has two undivided traffic lanes.	Up to 2,000 vehicles per day

Appendix J: Intersection Capacity Analysis—Critical Lane Volume (CLV) Method

This Appendix describes the methodology used by the City of Rockville to analyze the capacity of intersections.[13] This Appendix should be sufficiently descriptive to enable the applicant to utilize the CLV method at both signalized and unsignalized intersections within the study area, as per City standards. For the latter, a two-phase operation with a 90 second cycle should be assumed. The CLV method will be appropriate for most intersection configurations and can be easily varied for special situations or unusual conditions. This method applies to isolated intersections or any other location where the operation is not radically affected by adjacent traffic signals. Conversely, modification to this procedure or use of methodology specific to arterial streets is necessary if intersection operation is affected by the development. Any variations from the procedures outlined below must be approved by the Chief of Traffic & Transportation Division and properly documented in Section III—Automobile Traffic Analysis of the Transportation Report.

PROCEDURE

Step 1. Determine/Collect the following information

- 4# Intersection Control Type
- 4# Cycle Length (Assume 90 seconds for stop sign control)
- 4# Signal Phasing (Assume 2 phases for stop sign control),
  Note the following features: right turn on red, split phasing, exclusive movements, total number of phases
- 4# Turning Movement Volumes
- 4# Intersection Geometries
- 4# Note the following features: free-flow right lanes

Step 2. Determine intersection capacity based on the following table:

Intersection Capacity (100% of capacity)			
Cycle Length (seconds)	**Number of Phases**		
	2	**3**	**4 or more**
89 or less	1500	1400	1300
90 – 119	1600	1500	1400
120 – 149	1650	1600	1500
150 or more	1700	1650	1550

Step 3. Determine the left turn movement equivalent: This equivalent is use in conjunction with through movements for shared lanes or in comparison to through movements for split phasing. Left turns as opposing movements are calculated in Step 6.

[13] A technical description of the critical lane volume (CLV) method was introduced in the January 1971 issue of *Traffic Engineering*. Since its introduction, the CLV method has evolved into a more sophisticated intersection capacity analysis. Different jurisdictions have adopted the CLV method with minor modifications. Although different versions of the CLV method have been developed, the same basic concepts have been embraced.

Shared Left Turn Lane	
Opposing Volume (Through+Right)	**Lane Use Factor**
<199	1.10
200 – 599	2.00
600 – 799	3.00
800 – 999	4.00
> 999	5.00

Exclusive Left Turn Lane	
Number of Lanes	**Lane Use Factor**
1	1.10
2	0.60
3	0.40

Step 4. Determine the right turn movement equivalent

a. Free-Flow Right Turns

A free-flow right turn is one that is not controlled by the traffic signal or stop sign. Normally the movement is isolated by a channelizing island and controlled by a yield sign. If the right turn movement is serviced by an exclusive right turn lane of sufficient length that right turning vehicles are not part of the queue of through vehicles, the right turning volumes can be excluded from the critical lane analysis. Documented data or evaluation of the intersection can be used to combine a sufficient number (percent) of the right turns with the through traffic to reflect actual peak hour operations. In the absence of such knowledge a queuing analysis could be done. As a rule-of-thumb 150 feet of exclusive right turn lane will permit excluding all right turns; less than 50 feet will require that all rights be included. Distances within that range suggest that a portion of the right turn volume be included.

b. Exclusive Right Turn Lanes

Where the right lane is devoted to the exclusive use of right turn vehicles, a maximum lane volume should be computed separately for through movements and right turn movements. If a right turn phase overlap is provided with a left turn phase on the cross street, subtract the overlapping left turn volume from the right turn volume. The highest of the through or right turn lane volumes should be added to the opposing left turn volume, except where significant right turns on red occur.

c. Right Turn on Red (RTOR)

The number of vehicles that can take advantage of the RTOR feature vary greatly based on site and traffic characteristics. At higher volume intersections, as the level of service (LOS) diminishes, few gaps are generally available for RTOR. Unless observations of the RTOR operations support excluding some right turns from the critical lane analysis, this feature will normally not be considered.

Right Turn Lane Use Factor	
Right Turn	**Lane Use Factor**
Shared Lane	1.00
Free-Flow	Zero
Exclusive	Right Turns - Overlapping Left Turns
Right Turn on Red	Case-by-case determination

Step 5. Determine the through movement equivalent: On multi-lane approaches with no separate left turn lane, the left turn volume will be adjusted using the lane factor (shared lane) of step 3. When the adjusted left turn volume is greater than the remaining volume being included in the analysis, the left most lane will be considered an exclusive left turn lane. The analysis will proceed with that assumption. For other cases, the resulting left turn volume will be added to the rest of the approach volume and the appropriate through lane use factor applied to the total. Similar consideration should be given to approaches with no separate right turn lane.

Through Lane Use Factor	
Number of Lanes	**Lane Use Factor**
1	1.00
2	0.53
3	0.37
4	0.30
5	0.25

Step 6. Determine the opposing movement equivalent: This step is not necessary for intersection approaches operating under split phasing. A shared left turn lane should be counted as one lane in addition to any other exclusive left turn lane(s).

Opposing Left Turn Lane Use Factor	
Number of Left Turn Lanes	**Lane Use Factor**
Split Phase Operation	Zero
1	1.10
2	0.60
3	0.40

Step 7. Determine the approach CLV by adding the highest of the through movement equivalent (Step 5) or the right turns minus overlapping left turns (Step 4) plus opposing movement equivalent (Step 6) unless the approach operates under a split phase. If the approach operates under split phase, select the highest left, right or movement equivalent (Steps 3, 4, and 5, respectively).

Step 8. Determine the East-West CLV by selecting the highest approach CLV (Step 7) of the two approaches unless they operate under a split phase. If the East and West approaches operated under split phase, add the two approach CLVs.

Step 9. Determine the North-South CLV by selecting the highest approach CLV of the two approaches unless they operate under a split phase. If the North and South approaches operated under split phase, add the two approach CLVs

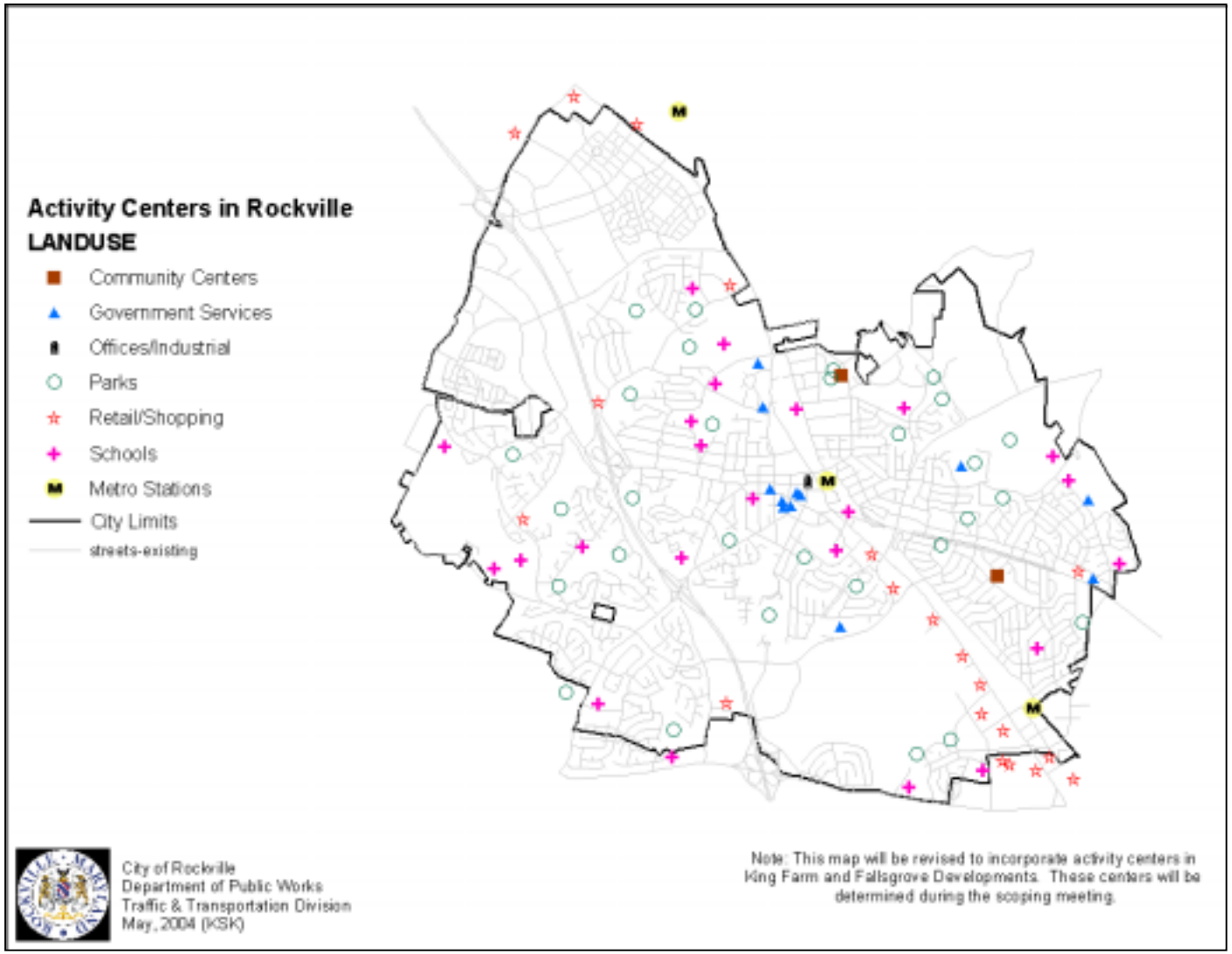
Step 10. Determine the intersection CLV by adding the East-West CLV (Step 8) and North-South CLV (Step 9).

Step 11. Determine the intersection volume/capacity (V/C) by dividing the intersection CLV (step 10) by the intersection capacity (step 2).

Step 12. Determine the intersection level of service (LOS) by comparing the intersection V/C obtained in Step 11 to the following table:

Level of Service (LOS)	
LOS	**Range (% of capacity)**
A	Less than 59%
B	60% to 69%
C	70% to 79%
D	80% to 89%
E	90% to 99%
F	Greater than 100%

Appendix K: Map of Activity Centers



Appendix L: TDM Programs

Acceptable uses for Transportation Demand Management funds include but are not limited to:

Alternative Work Schedules	*Land Use Zoning*
Flextime	Density Bonuses
Staggered Shifts	Transit-Friendly Design
Compressed Work Week	Reduced Parking Requirements
Alternative Modes	*Marketing and Surveys*
Biking Amenities	*Multimodal/Transit Centers*
Carpooling and Vanpooling	Construction and Operation
Electric Vehicle Project	*Parking Management*
Flexcar	Park and Ride Lots
Guaranteed Rides Home	Parking Charges
Pedestrian Facilities Improvements	*Staffing*
Shuttle or Subscription Buses	*Telecommunications*
Other Non-Motorized Travel Amenities	Telecommuting
Computer Matching Services	Teleconferencing
Employee Transportation Coordinator	Telework Centers
Pre-Trip Travel Information	*Transit*
Enhanced Information Systems	Concierge Centers
Financial Incentives	Intelligent Transportation Systems
Enhanced FARE SHARE Program	Paratransit Facilities
Tax Benefits	Real Time Transit Information
Transit or Bike Riding Subsidies	Service Improvements in Facilities, Routes, and Schedules
Transportation Allowances	Transit Stores
Other Innovative Financing Measures	Upgraded Transit Vehicle
Information Collection and Distribution	
Advertising Alternative Modes	
Master Plans/Policies in public places	
Data Collection/Counts	

Appendix M: Transportation Report Study Areas

TABLE 5: AUTO TRAFFIC STUDY AREAS							
TRIPS	**Minimum No. of Intersections or all Intersections within Radii***	**LAND USE/DEVELOPMENT SIZE[14],[15]**					
New peak hour site trips[16]		**Retail (SF of GFA)**	**Office (SF of GFA)**	**Residential (Units)**			
				SF	**TH**	**GA**	**HR**
30 - 150	4	5,000-20,000	20,000-90,000	30-160	40-240	65-325	65-425
151 - 350	8	20,001-45,000	90,001-220,000	161-425	241-700	326-700	426-900
351 - 700	12 or .45 Mile	45,001-95,000	220,001-400,000	426-700	701-1,250	700-1,250	901-1,300
> 700	16 or .50 Mile	>95,000	>400,000	>700	>1,250	>1,250	>1,300

* *The number of signalized intersections or all signalized intersections within the radii (or major portals to the site), whichever is greater.*

Table 10: Non-Auto Study Areas						
New Peak Hour Site Trips	**30-350**		**351-500**		**500+**	
Minimum Activity Center Routes Evaluated	1		2		3	
Accessibility to Activity Centers	.25 mile radius	.35 mile radius	.35 mile radius	.45 mile radius	.45 mile radius	.5 mile radius
TOA Designation	TOA	Non-TOA	TOA	Non-TOA	TOA	Non-TOA

[14] Data are based on the Maryland-National Capital Park and Planning Commission, Montgomery County Department of Park and Planning Local Area Transportation Review guidelines, July 2004, and correspond roughly to trips generated during peak hours that generate the highest number of trips (A.M. or P.M.). Other land uses (schools, auto filling stations, day care centers, e.g.) shall be determined during the scoping meeting.

[15] Mixed-use developments must account for generations based on the different land uses.

[16] The study area is based on net new trips generated **before credits** are applied.

Appendix I:

Administrative Procedures to Establish Permit Parking

ADMINISTRATIVE PROCEDURES
TO ESTABLISH PERMIT PARKING

1. Petitioning the City for a Permit Parking Area
   a. Petitions to implement permit parking are available from the Department of Public Works or the City Clerk's Office. A petition may also be downloaded from the website: http://www.rockvillemd.gov/residents/traffic/ttpermit.html.

   b. Before circulating the petition, citizens should consult with the Traffic and Transportation Division (240-314-8500) to discuss the proposed parking permit district.

   c. Only streets classified as "Primary Residential Class I", "Primary Residential Class II", or "Secondary Residential" are eligible for permit parking.

   d. Unless approved by the City Manager or the Traffic and Transportation Commission, effective hours for permit parking districts shall be from 8 a.m. to 5 p.m., Monday through Friday. Petitioners should discuss any requested diversion from these standards with Traffic and Transportation staff prior to submitting a petition.

   e. One resident must take the lead responsibility to circulate the permit parking petition within the proposed permit parking area. Any resident 18 years of age or older is eligible to sign the petition and will represent the approval of his/her respective household. To be declared valid, the petition must be signed by one resident of at least 51% of the households in the affected area.

   f. Applicants will submit completed petition(s) to Public Works' Traffic and Transportation Department.

2. Validation of Petitions
   a. Traffic and Transportation staff, in consultation with the Police Department, will validate the petition. Petitions proposing boundaries that have been either gerrymandered, or otherwise manipulated to make posting or enforcement difficult will be declared invalid. Signatures on the petition will be verified by the Police Department.

3. Procedure for Petitions Affecting fifteen (15) Homes or Fewer
   a. Once the petition is declared valid, Traffic and Transportation Division staff will provide written notice about the proposed permit parking to all residents or households directly contiguous to and within the proposed modification area. The notice will be sent via regular postal mail.

   b. From the date of notice, at least 15 days will be given for residents to provide comment on the proposed permit parking.

c. Following the comment period, Traffic and Transportation staff, in consultation with the Police Department, will recommend approval or disapproval of the modification.

d. Within sixty (60) days of receiving the petition, the City Manager will approve or disapprove the modification and as appropriate. If the proposed permit parking area is approved the City Manager will authorize the installation of regulatory Permit Parking signs via a Traffic Order.

e. The Police Department will notify affected residents on the procedures to acquire a permit parking tag.

4. Procedure for Petitions Affecting More than fifteen (15) Homes

a. Once the petition is declared valid, Traffic and Transportation Division staff will provide written notice about the proposed permit parking to all residents or owners of property located within, adjoining, or adjacent to the area under consideration. The notice will be sent via regular postal mail.

b. From the date of notice, at least 15 days will be given for residents to provide comment on the proposed permit parking.

c. Traffic and Transportation staff will schedule the matter for public hearing before the Traffic and Transportation Commission. The date of the hearing will be at least 16 days after the initial notice is sent and will be announced in that notice.

d. At the public hearing, Traffic and Transportation staff, in consultation with the Police Department, will make recommendations regarding the proposed district.

e. As a result of the public hearing and staff recommendations, the Traffic and Transportation Commission will approve or disapprove the establishment of the permit parking are. This decision will be made within 60 days following their regular monthly meeting.

f. The City Clerk will notify the Mayor and Council of the Traffic and Transportation Commission's decision. The Traffic and Transportation Commission's decision goes into effect if the Mayor and Council do not rescind or modify that decision within 30 business days of the City Clerk's notification.

g. If approved by the Traffic and Transportation Commission and not rescinded or modified by Mayor and Council, the City Manager will authorize the installation of appropriate regulatory signs via Traffic Order.

h. The Police Department will notify affected residents on the procedures to acquire a permit parking tag.

5. Preparation of the Permit Parking District

a. The City will install the required number of signs needed to achieve proper enforcement within the district. For zones in excess of 200 feet in length, additional signs with a double arrow will be placed at intermediate points.

b. Once a district is approved and signs are posted, the Police Department will issue a 30-day warning period from the time the signs are posted before fines are levied (in order to give sufficient time to residents to secure their permits).

6. Description, Distribution and Duration of Parking Permits
   a. Once the permit parking district has been approved, the Police Department will notify all residents within the newly established district and provide an application form for parking permits. This application form must be returned in person or by mail to the Police Department with information on residence, vehicle registration, and vehicle license number. The parking permit can then be directly issued to the citizen at a cost of $10 per permit.

   b. The City will use permits of different colors for fixed five-year periods. The permits sold later will be pro-rated for each year. For example, a permit sold during the third year would cost $6.00; one sold during the fifth year would cost $2.00.

   c. Files are maintained in the Police Department listing all appropriate information on valid permits. These lists are distributed to Police Officers for enforcement purposes.

   d. A valid parking permit must be displayed in the vehicle inside the lower left corner of the rear window (directly behind the driver). This sticker location inside the motor vehicle reduces theft potential. Convertibles and station wagons with adjustable back windows are not exempt from displaying the permit when parked in a permit-parking district.

   e. In the event that:
      i. a vehicle's license plate number changes; or
      ii. a new motor vehicle is purchased; or
      iii. the permit is lost, stolen or vandalized, or the vehicle is sold, the owner of the vehicle will be provided with a new permit, and the old permit will be voided.

7. Visitors
   a. Two visitor permits shall be issued to each household located within a permit-parking district, which may be used only on motor vehicles of persons visiting the household.

   b. Additional visitor permits are available, free of charge, for medical or other emergency services using unmarked vehicles. Requests for such additional permits must be made by the resident, and should be accompanied by appropriate documentation.

   c. The use of a visitor pass by any individual residing within a household of a parking permit district for any purpose beyond that for which the visitor pass is issued shall be subject to a $100.00 fine for the first offense, $100.00 for the second offense, and he/she will lose the right to have a parking permit for one full year for the third offense.

8. Marked service vehicles, which are engaged in business to a household, are exempt from needing a parking permit.

9. A $25.00 fine will be levied against the owner of any motor vehicle parked in a permit-parking district during the prohibited hours not displaying a valid parking permit or visitor pass.