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- A GUIDE FOR RESIDENTIAL DESIGN REVIEW

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A GUIDE FOR RESIDENTIAL DESIGN REVIEW

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September, 1976

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A GUIDE FOR RESIDENTIAL DESIGN REVIEW

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FOREWORD

The Local Planning Assistance Unit is pleased to present this publication on Residential Design Review. We feel it will become a valuable guide to professional and lay planners in New Jersey. This manual is offered as another in a continuing series of technical planning reports known as the Local Planning Advisory Series. These publications are aimed at providing members of local planning boards and boards of adjustment as well as interested citizens with practical technical information on basic community planning and development topics.

Acknowledgements should be extended to Local Planning Assistance Unit's staff members Karen Heffner, Senior Planner for her editorial activities; Nelson S. Silver, Assistant Administrator for his efforts with respect to publication of the manual; Robert H. McGuirk, Administrator for his assistance in the overall production of the manual; and to Carl Chance of the Office of Community Services, Gloucester County College for his assistance in the completion of this project.

INTRODUCTION

Congratulations! The mayor has just called to inform you that you've been appointed to your local planning board. You're pleased, of course, since you've always been interested in planning and even attented a couple of planning board meetings. Now you'll have an opportunity to participate and help make the decisions affecting land use, drainage, traffic, community facilities and the other elements of planning mandated to the planning board.

But now you wonder. The only map you've read recently is the one you studied just before you went on a vacation. Drainage is pretty technical, and you still haven't quite cleared up that wet spot in your own back yard. You keep complaining about the bad traffic problem at the apartments down the road, but now you realize you don't know what to do about it.

About this time you realize it might be a good idea to read some material before the first meeting so you have some idea of what to do when subdivisions or site plans are submitted for review. The purpose of this manual is to provide the members of local planning boards, such as yourself, with a "how to do it" book to assist in the design review of large scale residential development.

Why It Is Needed

The need for a publication of this type stems primarily from two sources. The State enabling legislation provides that municipal planning boards shall have a majority of citizen or lay members who cannot hold any other municipal office.(1) No other qualifications for appointment are specified. As a result, most citizens appointed to local boards have no formal background, education, or association with planning. Although most planning boards have the benefit of staff or consultant experts, the board members must make the official decision to approve or deny applications. As most board members will attest, it calls for more than casual knowledge of the various elements which constitute a subdivision or site plan.

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(1) On a nine member planning board both a zoning board of adjustment and board of education member may serve as a citizen member. If both serve, the required environmental commission member serves as an official of the municipality. On a seven member board or where one or neither of the above serve, the environmental commission member serves as a citizen member (N.J.S.A. 40:55D-23).

Even experienced planning board members face the need for periodic updating of review skills and the need to stay abreast of new techniques of development. In recent years there has been an increase in the number of larger residential developments, multi-family developments, and mixed projects such as planned unit developments and planned residential developments. Cluster or density zoning, zero lot line, condominiums, and town houses are terms describing developments which are becoming increasingly more common. Planning board members must acquire the new expertise to review these latest development approaches.

What Is It?

This manual for local officials is basically designed to equip planning board members with the necessary technical knowledge required to intelligently and systematically review major residential developments coming before their boards.

The manual will not, obviously, make professional planners or professional engineers out of lay citizens. It will, however, give planning boards greater understanding of the entire planning process and the key determinants affecting land use and layout.

Those reading the manual will understand the reasons for exhibits submitted with applications and what they are intended to show and demonstrate. The manual discusses good planning practice as it relates to environmental considerations, drainage, circulation and parking, landscaping, site characteristics, building relationships, open space and recreation, lighting and utilities, signs, and street furniture.

Chapters 4 through 12 contain basic information, design review techniques, review tips, etc., on the many specific elements that go into the design of a subdivision layout or site plan. All of the data in these chapters are related to a New Jersey application. For example, the landscaping section has recommended tree species appropriate for this area.

These chapters also contain standards and design principles. This manual was designed to provide, in one volume, all of the design standards that would be useful to local planning boards in their required review of major residential subdivisions and site plans. However, a cautionary note about the use of such standards is appropriate here. Standards are important in establishing desirable development design optimums or in establishing acceptable development techniques. The danger is in how we use such standards. They are useful as general guides to measure the performance characteristics of a plan; if applied arbitrarily, we may destroy any potential for design innovation (and thus the potential for new standards of measurement).

The manual attempts to outline a fairly specific review procedure, from the broad or concept plan down to the lot or siting plan. It pinpoints the items that should be discussed, the problems that should be solved, and the questions that have to be answered. The manual contains check lists that ensure that all the pertinent and significant items are covered as part of the review procedure. It also contains a bibliography to allow interested planning board members to find additional information on any particular aspect of land planning. The manual lists agencies to whom planning boards can turn for assistance.

As noted earlier, the manual will not transform lay planning board members into professionals. However, it is interesting to note that State enabling legislation gives the planning board the sole authority to act on subdivisions. Court cases have reaffirmed this principle -- no planning board, no subdivision authority. This impressive grant of authority bespeaks of the urgent need for planning board members to acquire the necessary expertise and knowledge to evaluate matters coming before their board upon which they may be required to vote.

Obviously, planning boards should continue to rely on the advice and recommendation of their experts; planners, engineers, and attorneys. However, the manual will also permit planning board members to more intelligently evaluate their experts' recommendations and reconcile conflicting opinions between experts for applicants and the board.

The manual is primarily concerned with larger residential developments of 50 or more units. This cut-off point is somewhat arbitrary, and it should be emphasized that the principles and procedures discussed in the manual are also appropriate to smaller projects. The 50 unit minimum coincides with the State's Realty Improvement Sewerage and Facilities Act (1954)[2] as amended, which requires Department of Environmental Protection approval of water supply and sewerage facilities prior to preliminary subdivision approval where 50 or more realty improvements are involved. In addition, many of the problems of circulation, siting, environment, drainage, etc., are compounded in the larger residential developments, including those using planned unit development, planned residential development and clustering.

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(2) N.J.S.A. 58:11-23.

Benefits of Design Review

Proper design review, systematically and carefully applied, ca produce many benefits for municipalities. By diligently applying appropriate design standards, the design review process can produce efficient and pleasant developments, minimize adverse impacts on ou environment, reduce traffic hazards, and eliminate much of the adverse impact that development has on surrounding areas.

The design process should ensure that critical elements are at least considered. These elements include water runoff, soil erosion and sedimentation, circulation, recreation, lighting, landscaping, building arrangements, and provisions for parking. In addition, the applicant's knowledge that his plans are going to get a competent an complete review means he will probably give full consideration at the design stage to many factors that might otherwise not be fully considered until the development stage.

Design review is not the panacea for all the problems associate with building. Governing bodies will still be addressed by irate residents on flooding, bad roads, falling water pressure, and malfunctioning septic disposal units. But the design review process can provent many of these problems, or at the least, alert the municipality that these problems may arise. Necessary corrective action can then be anticipated.

Chapter 1

THE APPLICATION

The first step in the design review process is concerned with the application for subdivision or site plan approval, the various steps in the process, information and data required, and environmental considerations.

Subdivisions and Site Plans

If local site plan or subdivision ordinances are adopted, large scale residential developments must be submitted to the planning board for action. In developments with a variety of housing types -- single-family detached, town houses or attached housing, and garden apartments -- both subdivision and site plan approvals may be involved. The detached and attached housing may be constructed for sale on individual lots, requiring subdivision approval, while apartments are usually retained or sold in their entirety on a single parcel and require site plan approval.

Subdivision, according to the new Municipal Land Use Law, (P.L. 1975, Chapter 291) is defined as follows:

> "Subdivision" means the division of a lot, tract or parcel of land into two or more lots, tracts, parcels or other divisions of land for sale or development. The following shall not be considered subdivisions within the meaning of this act, if no new streets are created: (1) divisions of land formed by the planning board or subdivision committee thereof appointed by the chairman to be for agricultural purposes where all resulting parcels are 5 acres or larger in size, (2) divisions of property by testamentary or intestate provisions, (3) divisions of property upon court order and (4) conveyances so as to combine existing lots by deed or other instrument. The term "subdivision" shall also include the term "resubdivision".

A site plan is defined as follows in the act:

> "Site plan" means a development plan of one or more lots on which is shown (1) the existing and proposed conditions of the lot, including but not necessarily limited to topography, vegetation drainage, flood plains, marshes and waterways, (2) the location of all existing and proposed buildings, drives, parking spaces, walkways, means of ingress and egress, drainage facilities, utility services, landscaping, structures and signs, lighting, screening devices, and (3) any other information that may be reasonably required in order to make an informed determination pursuant to an ordinance requiring review and approval of site plans by the planning board adopted pursuant to article 6 of this act (the Municipal Land Use Law)."

If a land owner wished to sell off 50 acres of a 100 acre tr subdivision approval would be required (unless it falls within th exceptions listed in the definition). If the new owner wished to develop the 50 acre tract with rental apartments, no subsequent subdivision approval would be needed but site plan approval would required for building arrangements, circulation, parking, etc. Despite the difference, the items required to be reviewed by a pla board, procedures to be followed, and design principles to be empl can be and usually are similar for both processes.

Submitting the Application

The review process may begin in any of a number of ways. Man communities are now utilizing an optional pre-submission conferenc the beginning of the review procedure. At this conference the appl meets informally with a subdivision committee or site plan review advisory board and/or with certain technical personnel of the comm prior to submitting a formal proposal to the board. These technica personnel -- municipal engineer, director of public works, planner, health officer, attorney, etc. -- review ideas and concept plans wi the applicant and point out any obvious problems and make suggestio as to revisions. They may also review the subdivision or site plan ordinance requirements with the applicant to ensure that all applic provisions are understood and will be met. In short, the purpose of this meeting is to save time and money on the part of the planning board and applicant. While the applicant always has the right to fo mally submit an application to the planning board, the pre-submissio procedure can substantially reduce the processing time for the applicant.

Many planning boards carry out the pre-submission phase in a mor formal manner as part of an optional sketch plat stage of a subdivisi application.(3) The purpose is essentially the same -- to permit maximum flexibility in getting changes to ensure proper, attractive, and efficient development.

Who Checks What

After the informal review, if one is held, the applicant makes a formal submission to a designated individual along with the necessary and required exhibits. This person might be the municipal clerk, planning board secretary or clerk, if one is appointed, or another

(3) A plat is a map of the proposed subdivision and a sketch plat is, as the name implies, a somewhat informally drawn, reasonably accurate, map containing sufficient data and information to permit the planning board and applicant to exchange ideas and permit classification of the proposed subdivision.

usually full-time municipal employee with an office at a central location, preferably at the municipal building.

At this point, someone from the planning board familiar with the process and procedures should check the application and exhibits to ensure that all required material is submitted in proper form. If not, the applicant should be notified of what is missing and requested to submit these documents.

The pre-screening eliminates the possibility of the planning board beginning a formal review at a meeting and then discovering that certain required exhibits are not available. Incomplete submissions can mean delays for the applicant and/or incomplete reviews. If the documents are submitted far enough in advance, any deficiencies could be corrected prior to the meeting and the applicant need not lose the time.

As indicated earlier, the first submission, whether as part of an informal pre-submission conference or after a formal submission, should involve a minimum of exhibits without the necessity of finished or precise drawings. Information on existing conditions, however, should be complete. This phase is designed to encourage the applicant to make changes. There is, understandably, greater reluctance to make changes if large expenditures have been made for finished and detailed drawings of any proposed development.

Other Referrals

The local planning board is not the only agency which has approval or review authority over subdivisions or site plans. As Table 1 indicates, a large number of applications must be referred to adjacent municipalities, counties, and various state agencies for information or approval.

In some cases, review and approval is required if the application is in a certain geographic area, such as within the area covered by the Coastal Area Facilities Review Act or in a flood plain. In other situations, review is required if it is on a state highway or within 200 feet of adjacent municipal boundaries. Other referrals may be required because of size (50 or more realty units for Department of Environmental Protection approval of water and sewer) or impact on county facilities, such as roads or county land.

The most common question raised is at what stage should these agencies get copies of the exhibits. In most cases the law states simply that before the municipality can approve the subdivision or site plan, the county or state agency must review or approve those items under their jurisdiction. This could mean that the community could complete its review, hold any required public hearings, and then approve the subdivision or plat subject to the requirements of the other agencies.

TABLE 1

REQUIRED REFERRALS FOR SUBDIVISION AND SITE PLAN APPLICATIONS

Subject	Agency	Authority	Time Limit for response	Matters Covered
1. Water supply and sewerage facilities	State Department of Environmental Protection	Water supply and sewerage systems in realty improvements NJSA 13:9A-1 to 10	State DEP has 15 days from date of local board of health approval to revoke approval	Review and approval of all developments with 50 or more realty units for compliance with DEP regulations
2. Any construction, draining, dredging, excavation, soil removal, dumping or discharging in tidal wetlands	State Department of Environmental Protection	Coastal Area Facilities Act NJSA 13:9A-1 to 10	90 days	Reviews and issues permits for all construction, filling, dredging, etc., in mapped coastal areas
3. Any development, filling, dredging, etc, in flood hazard areas	State Department of Environmental Protection (unless municipality has adopted more stringent regulations)	Flood Control-Flood Hazard Law NJSA 58:16A-50 to 66	None specified	Defines flood plains & establishes standards for construction, filling, etc., in flood hazard areas.
4. Subdivisions or Site Plans of 150 acres or 500 dwelling units	Department of Community Affairs	Municipal Land Use Law NJSA 40:55D-12	None specified	For information purposes.
5. Subdivisions	County Planning Board	County and Regional Planning Enabling	30 days	Review & approve

TABLE 1 (Continued)

Subject	Agency	Authority	Time Limit for Response	Matters Covered
6. Site plans	County Planning Board	County and Regional Planning Enabling Act NJSA 40:27-6.7	30 days	Review of site plans to assure a safe and efficient county road
7. Hearings on planning or zoning (variances) matters within 200 feet of municipal boundary	Adjacent Municipality	Municipal Land Use Law NJSA 40:55D-12	None Specified	For information purposes
8. Subdivisions & site plans adjacent to state highways	Commissioner of Transportation	Municipal Land Use Law NJSA 40:55D-12	None Specified	For information purposes; however, applicants must secure curb cut and drainage approval from Department of Transportation
9. Subdivisions, site plans of more than 5,000 square feet	Soil Conservation District(4)	Soil Erosion and Sedimentation Control Act NJSA 4:24-39 et seq.	30 days	Approve plan for soil erosion and sediment control
10. Applications for development (subdivisions and site plans)	Local environmental commission	Municipal Land Use Law NJSA 40:55D-27B	None Specified	If environmental commission has prepared a natural resources inventory, they review copies of all plans. Advisory review only.

(4) If local municipality adopts an approved soil erosion and sediment control ordinance, it can retain jurisdiction.

This often raises problems since the action of the county, example, may require extensive revision of the plat which in tu necessitate new public hearings on the local level.

On the other hand, referrals at too early a stage, such as sketch plat, could result in several submissions since the commu own experts and board have not reviewed the plat nor does it ref what the town may be seeking. The county may proceed on its rev only to find that the municipality has required certain changes affect the county review.

The most appropriate time for review by the county or State prior to the public hearing required for preliminary approval.(5) referred to all reviewing agencies 30 days or more prior to the h these other reports could be read and considered at the hearing. this point all of the community's experts should have made their r and presumably the plat or site plan reflects what the municipalit wants.

Stages of Approval

Any major residential development can have essentially three stages: sketch, preliminary, and final. The new Municipal Land Us Act imparts specific meaning to the preliminary and final approval phases of both subdivisions and site plans. While sketch plats or sketch plans are not specifically discussed in the act, many plannin boards will continue to request them. A brief discussion of each phase and what should be required follows:

Sketch plat stage. As noted earlier, the word plat means a map of the subdivision and a sketch plat is the applicant's initial propo for the subdivision of a specific piece of land. (A sketch plan is a initial plan for the development of a parcel of land.) It should be specific enough to permit intelligent review of circulation, building siting and layout, and environmental considerations. It should be carefully prepared but exact, mechanically drawn, highly accurate exhibits should be discouraged. Possibly the best description of a sketch plat is that it is a hand-drawn, reasonably accurate concept plan. An example of a sketch plat is shown on the following page.

Sketch plats or plans may be prepared by the applicant, project engineer, planner, land surveyor, or architect and should contain the following information:

(5) Preliminary approval freezes the general terms and conditions (layout, zoning, dimensions, etc.) for a three year period during which the applicant may file for final approval. This may be extended under certain conditions (see NJSA 40:55D-49).

1. Survey of the site upon which the proposed development is proposed, with dimensions;

2. Significant horticultural or physical site characteristics including streams, stands of trees, swampy or high water table areas, ravines, rocks, etc.;

3. Location and use of existing structures on site and on adjacent property within 200 feet of boundaries, with dimensions;

4. Location and use of proposed structures on the site, with distances to lot lines, buildings, and other site features indicated;

5. Existing vehicular and pedestrian circulation systems in the immediate area of the site;

6. Existing and proposed vehicular and pedestrian circulation systems on the site including streets, parking areas, driveways, walks, etc., with street names and dimensions;

7. Topography of the site - where slope of site is less than five percent use two foot contours, where greater use ten foot intervals;

8. Existing and proposed storm drainage system and structures, such as swales, culverts, etc.;

9. Proposed method of sanitary waste disposal and water supply;

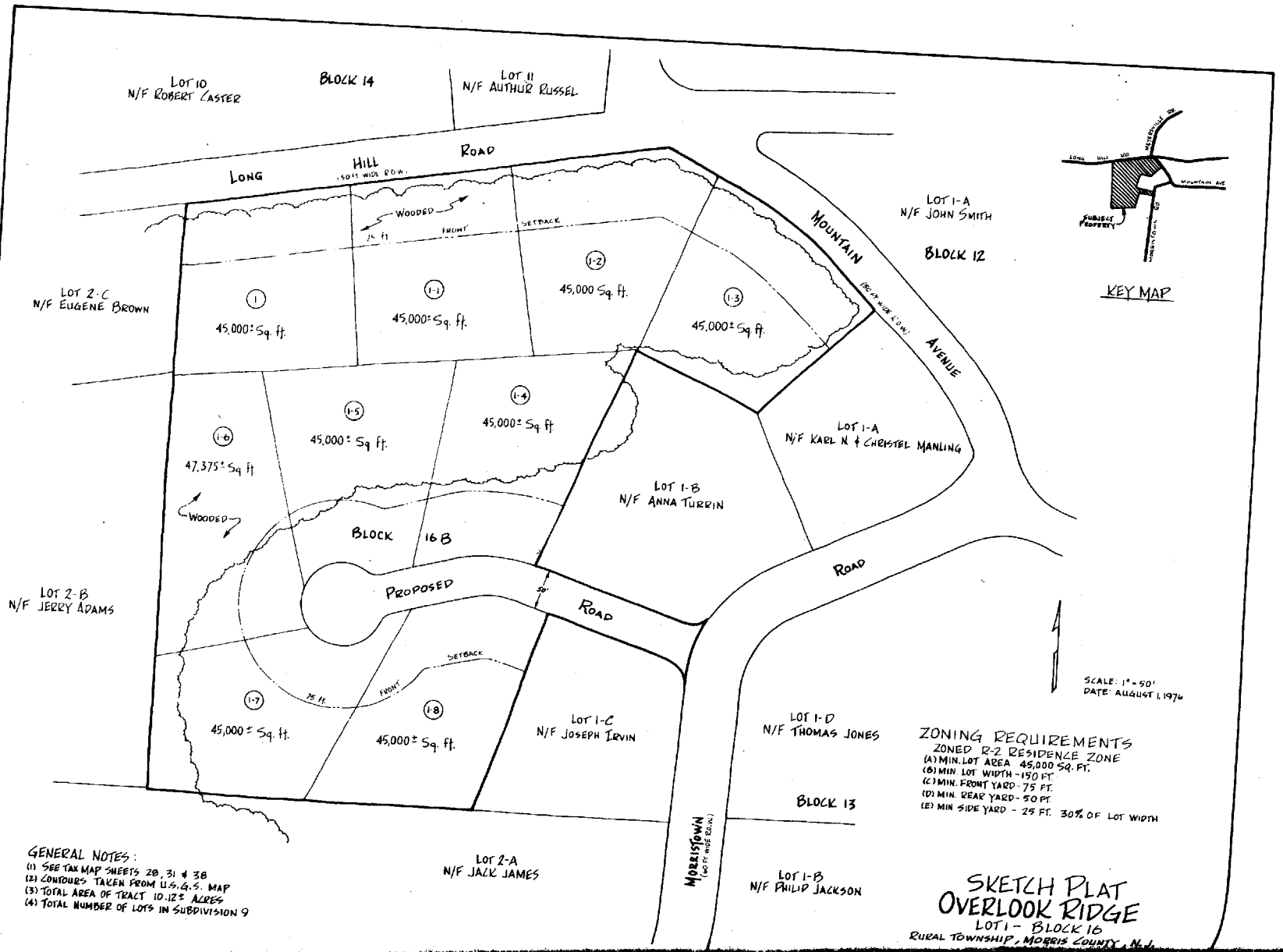
10. A key map showing the property in relation to the general area of the community; and

11. The names of the municipality, the county, the project and the person who prepared the sketch plat, date of preparation, north arrow, scale, zoning district where located, and appropriate tax, block and lot numbers.

Some municipalities require the names and tax block and lot numbers of all adjoining properties. The plat or plan should also indicate, at least conceptually, how storm water management is proposed to be handled.

The number of copies of the exhibits vary. At least three copies of the application form and eight copies of the sketch plat appear to be the norm.

Again, the emphasis for sketch plats should be on concepts rather than minute details. Culverts (pipes carrying storm water) should be indicated but exact sizes need not be computed at this stage of the procedure.


LOT 10
N/F ROBERT CASTER
BLOCK 14
LOT 11
N/F AUTHUR RUSSEL
LONG HILL ROAD
(50 FT WIDE R.O.W.)
WOODED
75 ft. FRONT SETBACK
LOT 2-C
N/F EUGENE BROWN
1
45,000± Sq. ft.
1-1
45,000± Sq. ft.
1-2
45,000 Sq. ft.
1-3
45,000± Sq ft.
MOUNTAIN AVENUE
(50 FT WIDE R.O.W.)
LOT 1-A
N/F JOHN SMITH
BLOCK 12
KEY MAP
SUBJECT PROPERTY
MORRISTOWN
MOUNTAIN AVE
1-6
47,375± Sq ft
1-5
45,000± Sq ft.
1-4
45,000± Sq ft
LOT 1-B
N/F ANNA TURRIN
LOT 1-A
N/F KARL N & CHRISTEL MANLING
WOODED
BLOCK 16 B
PROPOSED 50' ROAD
ROAD
LOT 2-B
N/F JERRY ADAMS
75 ft. FRONT SETBACK
1-7
45,000± Sq. ft.
1-8
45,000± Sq. ft.
LOT 1-C
N/F JOSEPH IRVIN
LOT 1-D
N/F THOMAS JONES
BLOCK 13
SCALE: 1" = 50'
DATE: AUGUST 1, 1976
ZONING REQUIREMENTS
ZONED R-2 RESIDENCE ZONE
(A) MIN. LOT AREA 45,000 SQ. FT.
(B) MIN. LOT WIDTH - 150 FT.
(C) MIN. FRONT YARD - 75 FT.
(D) MIN. REAR YARD - 50 FT.
(E) MIN SIDE YARD - 25 FT. 30% OF LOT WIDTH
GENERAL NOTES:
(1) SEE TAX MAP SHEETS 28, 31 & 38
(2) CONTOURS TAKEN FROM U.S.G.S. MAP
(3) TOTAL AREA OF TRACT 10.12± ACRES
(4) TOTAL NUMBER OF LOTS IN SUBDIVISION 9
LOT 2-A
N/F JACK JAMES
(60 FT WIDE R.O.W.)
LOT 1-B
N/F PHILIP JACKSON
SKETCH PLAT
OVERLOOK RIDGE
LOT 1 - BLOCK 16
RURAL TOWNSHIP, MORRIS COUNTY, N.J.

During this initial phase of review some problems may appear and additional information may be required. For example, the sketch may indicate an area of low ground, and a logical question if septic systems are proposed for sanitary sewerage disposal is whether adequate percolation can be secured.(6) The planning board could request test holes to be drilled or soil logs dug to determine whether this area could be developed using septics.

At this sketch stage the planning board should address itself to water supply, particularly if previous developments in the area experienced any difficulties with respect to water pressure, quantity, or quality of supply.

By and large, the sketch stage is where the major changes can be negotiated. The general layout of blocks, streets, building placements, siting, drainage and utilities, and circulation should be carefully examined and reviewed, changes suggested if appropriate, and the applicant requested to present alternatives.

Conflicts -- What happens, for example, if the applicant and planning board cannot agree on a particular item? An applicant may reject a board's recommendation on drainage and claim that the board's suggestions are unnecessary and too expensive.

It would be important if such an impasse develops that all formal procedures set forth in the subdivision ordinance, zoning ordinance, or site plan ordinance, including a public hearing, be followed.

The purpose of the formal procedures and hearing is to hear all the evidence relating to the proposal, including the applicant's experts. The planning board should be prepared to counter with its own experts. Written reports are imperative and if the issues still cannot be resolved, the planning board presumably would reject the subdivision or site plan. The reasons for rejecting the application must be carefully spelled out in the resolution of denial by the planning board. Such resolutions should be drafted by the planning board attorney to insure that a proper record is established. The applicant may then appeal the decision to the governing body or the Courts if the denial was by the governing body.

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(6) Percolation is the rate water is absorbed in the soil. The State Health Code requires the water level to drop at least 1 inch in 40 minutes as a minimum for septic treatment. It is a broad, somewhat imprecise indication as to the suitability of a particular area to utilize septic systems as a method of effluent disposal and treatment. (See Chapter 7.)

Preliminary plat stage. If an optional sketch plat has been r and revised, the applicant is ready to move into the preliminary ap phase of subdivision or site plan approval. Many applicants will c to apply directly for preliminary approval.

The new Municipal Land Use Law provides that, "The plat and an other engineering documents to be submitted shall be required in te form for discussion purposes for preliminary approval."(7)

The following information should be indicated on plans submitte part of this phase. (See example of preliminary plan on following p

1. Names of project, municipality and county, name, title and a of applicant, owner, and person preparing the plan or maps, date of preparation, north arrow, scale, zoning district, t block and lot number, revision dates

2. Survey of the site upon which the development is proposed, dimensions

3. Significant horticulatural and physical site characteristics including soil types, water courses and streams, stands of trees, swamp areas, ravines, rock, flood plains

4. Location and use of existing structures on site and on adjac property within 200 feet of boundaries, with dimensions

5. Location and use of proposed structures including number of units, occupants, and employees

6. All proposed setbacks

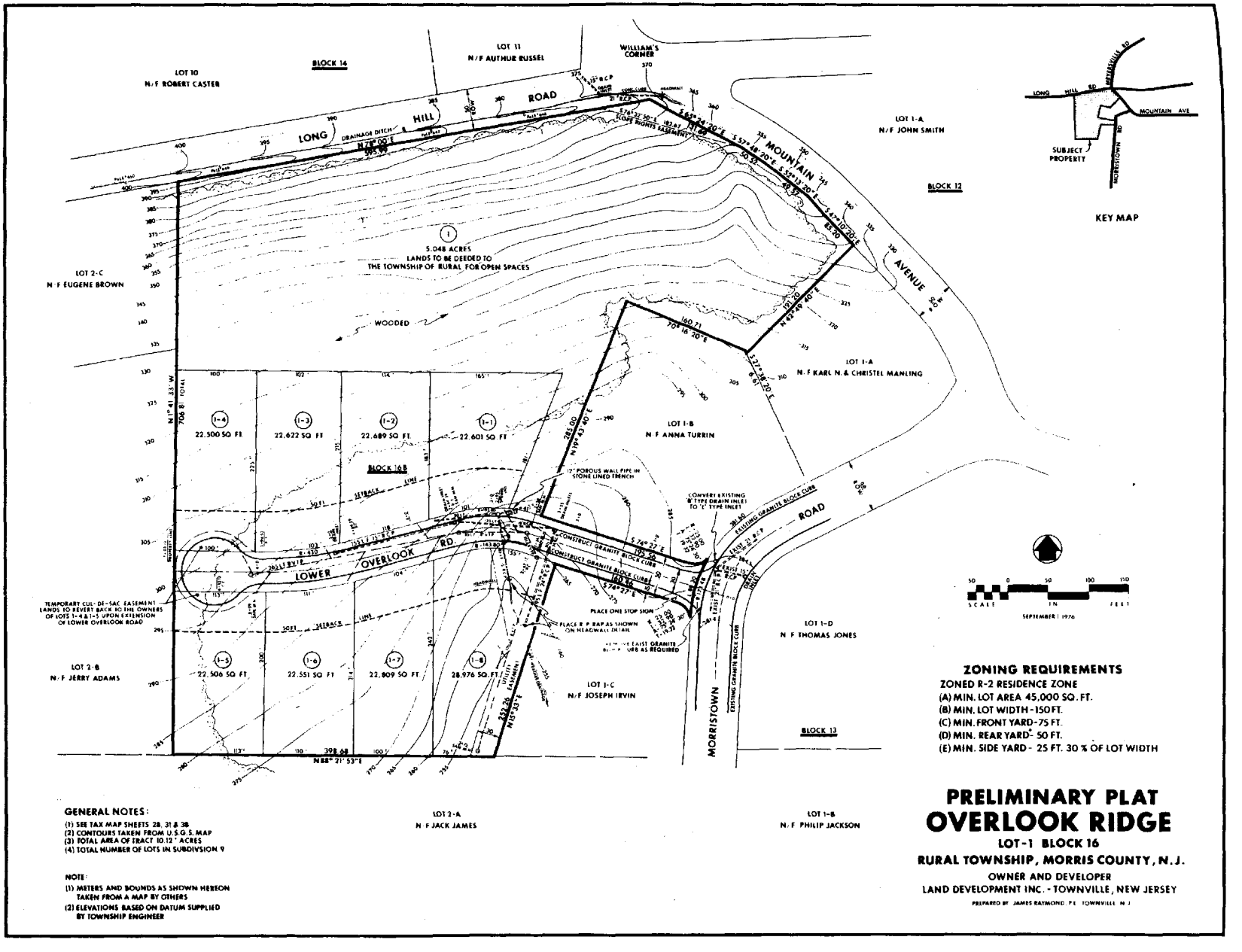
7. Existing vehicular and pedestrian circulation systems showing drives, streets, walks, easements, etc., in the immediate vicinity of the site

8. Existing and proposed vehicular and pedestrian vehicular and pedestrian circulation systems on the site showing streets, parking areas, driveways, walks, all properly dimensioned

9. Topography of the site - where slope of site is less than five percent use two foot contours; where greater use ten foot intervals

10. Existing and proposed storm drainage systems and structures

(7)NJSA 40:55D-48.



ZONING REQUIREMENTS

ZONED R-2 RESIDENCE ZONE
(A) MIN. LOT AREA 45,000 SQ. FT.
(B) MIN. LOT WIDTH - 150 FT.
(C) MIN. FRONT YARD - 75 FT.
(D) MIN. REAR YARD - 50 FT.
(E) MIN. SIDE YARD - 25 FT. 30 % OF LOT WIDTH

GENERAL NOTES:

(1) SEE TAX MAP SHEETS 28, 31 & 38
(2) CONTOURS TAKEN FROM U.S.G.S. MAP
(3) TOTAL AREA OF TRACT 10.12 ± ACRES
(4) TOTAL NUMBER OF LOTS IN SUBDIVISION 9

NOTE:

(1) METERS AND BOUNDS AS SHOWN HEREON TAKEN FROM A MAP BY OTHERS
(2) ELEVATIONS BASED ON DATUM SUPPLIED BY TOWNSHIP ENGINEER

PRELIMINARY PLAT
OVERLOOK RIDGE

LOT - 1 BLOCK 16

RURAL TOWNSHIP, MORRIS COUNTY, N.J.

OWNER AND DEVELOPER
LAND DEVELOPMENT INC. - TOWNVILLE, NEW JERSEY

PREPARED BY JAMES RAYMOND, P.E. TOWNVILLE, N.J.

11. Key map showing property in relation to neighborhood

12. Names, block and lot numbers of all adjacent properties

13. Location, size and nature of easements, community areas, buffer zones along with copies of covenanta or deed rest

14. Existing and proposed potable water system

15. Plans for solid waste disposal

16. Plans for fire protection including hydrant location

The maps submitted in this phase should be accompanied by per tests if septic systems are proposed or letters from the applicabl utility that the amount and type of effluent can be accommodated. of the availability of water is also needed and can be in the form letter from suppliers or proof of well capacity.

Water runoff calculations should also be submitted in order t check and substantiate the proposed drainage system.

Review of plans and hearing. The preliminary plans are detail and carefully drawn plans. They now must be reviewed by the planni board, and the board's engineers, planners and other experts. Othe agencies on the county and state level may also be involved. (See Table 1.)

Changes may result from the hearing and reviews. Unless the c are major, no new public hearing is required. However, approval sho be based on new maps which contain the changes. In other words, onl sign those maps showing the required changes.

Cautions -- Plans should not include, for obvious reasons, cert information which applicants often attempt to include. For example, boards should not approve any plans which show "future expansion" or "future parking" unless the planning board is prepared to approve th item at this time. Applicants will use an approved plan showing not of this type as a basis for pressuring planning boards at some future date. They will claim that the item has been approved when, in fact, the planning board may have had no intention of approving an expansio or new street connection.

A good rule is to not approve a subdivision or site plan for residential development with items proposed to be constructed later t five years from the date of preliminary approval. The only exception this is when a carefully detailed schedule of construction is included such as one that usually accompanies planned unit developments.

Although it seems obvious, the resolution of approval should carefully spell out what plans and plats are being approved. This means that any changes resulting from the hearings should be shown on amended drawings with new revision dates. The resolution should note the date of the drawing or plan that is being approved.

Final Plat Approval. The final approval stage should be almost automatic, provided that the applicant has made the necessary changes required under preliminary approval. What is required is a careful check that the final maps do not differ from the maps and exhibits that received preliminary approval and the installation of improvements (streets, curbs, pipes, etc.) or the posting of bonds to guarantee their installation has been accomplished.

In subdivisions, the plat that received final approval must be filed with the county recording office. It must meet the requirements of the Map Filing Law Act.[8] This law establishes that all maps to be filed must be of a standard size, on specified material, and contain the following information:

> Graphic scale; dimensions, bearings and curve data, block and lot numbers; reference meridian; municipal boundary lines; natural and artificial watercourses, streams, shorelines, water boundaries, and encroachment lines; monuments;[9] name of map, municipality and county; date of survey; endorsements (land surveyor or municipal clerk,[10] municipal engineer); and affidavit of owners of land to file map.

Site plan maps are not filed. Applicants for final approval should be required to submit in final form all the data and exhibits submitted as part of preliminary approval. Occasionally, the applicant may find that some changes are required between preliminary and final. For example, engineering calculations may vary slightly. If so, then an affidavit should also be required indicating what differences exist.

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[8] R.S. 46:23-9.9 to 40:23-9.16.

[9] Monuments are at least four inches square, 30 inches long devices set in the ground at certain points specified in the law such as at lot and tract boundaries, curves, etc. They are physical reference points at a precise location and height.

[10] If monuments are set prior to final approval, the land surveyor signs the plat. If the monuments are bonded for later installation, the municipal clerk signs the plat stating the bond has been posted.

No hearings are required for final approval, but the action m taken at a public meeting of the planning board.

Natural Resources Inventory (NRI)

A natural resources inventory is a comprehensive compilation o community's natural resources, their benefits, and the implication their development. As a general rule all natural resources data i obtained from existing sources such as the Soil Conservation Distri Department of Agriculture, county and local engineering offices, et The material is usually mapped and includes:

> Climate (temperature ranges, air pollution); geology (foundati conditions, unique features); physiography (surface drainage, slope); hydrology (acquifers, acquifer recharge areas); pedolo (soil drainage, erosion); vegetation (forest, marshes, agricul wildlife (habitats, water species, forest species); land use (historic features, scenic features)

The natural resources inventory is an important input to local master plan preparation, and most useful in the review of subdivisi and other development plans. Although such studies can provide dir in the specific use of land, they are primarily an indication as to areas in the community are environmentally suitable for development which are not. Depending on study detail, they can also provide:

(1) Acceptable levels of development intensity;

(2) Background information for the preparation of environmenta impact statements;

(3) Disclosure of current imbalances between development and t environment; and

(4) Information to residents on the environmental impacts of development.

The NRI is a community-wide inventory and as such its data may n be sufficiently precise for use in the detailed review of minor proje For major developments, however, one of the initial steps in the desi review procedure is a check of the proposed plans against the finding the natural resources inventory. This check may provide some design direction, or at least alert the planning board of potential environm problems. This review may also trigger a request that the applicant prepare an environmental impact statement.

Environmental Impact Statements (EIS)

In 1970 Congress passed the National Environmental Protection Act (NEPA) requiring that all federal agencies prepare impact statements for all major projects that might significantly affect the quality of human environment. Such statements must include the following element

(1) The environmental impacts of the project;

(2) The unavoidable adverse environmental effects;

(3) Possible alternative courses of action;

(4) Determination of the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity; and

(5) Any irreversible and/or irretrievable commitments of resources.

In New Jersey (under Executive Order No. 53) any State supported project in excess of $1,000,000 or projects proposed for environmentally sensitive areas, must include an environmental impact statement approved by the State Department of Environmental Protection. State guidelines require that impact statements include the following sections:

(1) Project description;

(2) Environmental impacts;

(3) Adverse impacts which cannot be avoided;

(4) Methods proposed to reduce adverse impacts;

(5) Alternatives to the proposed projects;

(6) Relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity; and

(7) Irreversible and irretrievable commitments of resources.

State EIS requirements only affect State funded public projects. Recently, several municipalities have enacted ordinances requiring the preparation of impact statements for major local projects and for all projects proposed in environmentally critical areas. These ordinances have been made to apply to private projects on the theory that the approval itself is a major local action significantly affecting the environment. The required information to be included in most local environmental impact statements is similar to that listed in state guidelines for preparation of an EIS.

The recent phenomenon of local EIS ordinances is the result of a growing public awareness of the real costs of development. Although there is no specific State enabling legislation for local EIS ordinances, the EIS can be useful to both the planning board and developer in understanding the potential positive and negative environmental changes resulting from the implementation of a project. A local EIS should be prepared by developers of major projects and should be an objective analysis of the impact of such development on the natural, physical, social, and economic environment of the community. The EIS should be

part of the site plan, subdivision, or other development review following the standards and procedures of the applicable ordina

Unfortunately, as with many new regulatory devices, the loc requirement can be improperly applied. The EIS is a tool to pro community understanding of development impacts, and not a means rejecting unwanted projects. Not all of the adverse affects of projects can be avoided, but through the EIS they may be underst possibly reduced to an acceptable level.

Many impact statements are prepared after the fact to justi particular proposal. Obviously, the project should be developed result of the EIS findings. If the applicant has prepared his d plans with proper understanding of and respect for the environme obstructions based on vague "environmental" reasons could not be If the EIS reveals impacts or costs unacceptable to the community acquisition of the land may be an appropriate alternative.

The question of need for a local EIS ordinance will vary wit community. In communities where land use controls are based on a understanding of and a respect for the environment, an EIS may no necessary. In other communities with environmentally fragile are (i.e. wetlands, flood plains, etc.), the EIS may be an extremely important aid to project review.

Municipalities proposing to require environmental impact stat should first prepare a natural resources inventory (NRI). The ava of NRI date will greatly ease the task of EIS preparation and elim any duplication of effort in basic research on the part of those p an EIS.

More importantly, however, the NRI will provide a basis for evaluation of such of the data in an EIS and will also identify environmentally "critical" areas. In some communities, impact stat are only required by major developments proposed for such critical

For most communities, the proper place for impact statement re ments is under the local site plan review controls, with particular applicability to major projects, major subdivisions, and projects proposed for identified environmentally fragile areas. These requi can be mentioned by reference in the subdivision ordinance to avoid duplication.

The major problem with an EIS is what to do with it, particular with regard to the unavoidable impacts. Despite our concern over environmental degradation, very little remedial information is avail beyond good drainage design practices, soil erosion controls, and compliance with air pollution, traffic congestion, and noise control is doubtful that a community could legally block a subdivision based solely on environmental degradation if the proposal does not violate specific environmental statutes or standards.

It is recommended that impact statement requirements go beyond a listing of data to be documented and indicate what limits (surface water runoff, air pollution, etc.) might be allowed. Then when the EIS indicates impacts beyond such limits, the project might be revised to minimize environmental problems.

In the development of an EIS, one of the alternatives often required for consideration is that of "no project." If this alternative is the only one acceptable to the community, the community must be prepared to purchase the land at a fair price which may well turn out to be a value based on development somewhere between "no project" and what the applicant has proposed. Another form of compensation might be the ability to transfer the development rights to another tract.(11)

(11) Chavooshian, B. Budd, Thomas Norman and George H. Nieswand, Transfer of Development Rights: A New Concept in Land Use Management, Leaflet 492-A, Cooperative Extention Service, Cook College, Rutgers University, 1973.

Chapter 2

THE DESIGN REVIEW PROCESS

Recommended Design Review Process

As pointed out in Chapter 1, the planning board may be involved in the review process even prior to the sketch plat stage if a pre-submission conference technique is employed. At this point, or at sketch plat stage, the board members may be called upon to contribute to the discussion on the application. In order to do this intelligently, an organized and workable design review process is necessary.

Why a process? Well, efficiency is one very good reason. Unless we have developed some orderly procedure in our review, we might end up going over the same ground several times and unnecessarily taking more of our own time, as well as that of the applicant. A process also ensures a thorough and complete review. Unless the review is systematic, there is the danger that some review item may be overlooked, resulting in an incomplete and/or inadequate review. The result is a substandard subdivision or one that will create problems for the residents or municipality.

Finally, a systematic review process is needed to determine if a systematic process was followed in preparing the site design. It is just as inappropriate to begin a subdivision or site plan review with curbing design, or the merits of angle parking versus perpendicular parking before an appropriate circulation pattern is even determined, as it is to begin a site design in such a manner.

This chapter explains briefly and generally the technique or process of site and subdivision design review. That process involves beginning the review with major items and ending with minor ones -- going from concept to execution. In this manual we recommend that all reviews follow such a procedure -- whether for a 50 lot single-family subdivision or a 500-acre planned residential development.

The recommended systematic review steps include:

1. Design Concept
2. Use Relationships
3. Environmental Impact
4. Site Circulation
5. Design Details

As can be seen we move from the design concept in the first step to design details in the final step. However, even before the five-step process begins, a site inspection should be undertaken.

Site Inspection

The most important prerequisite in the review process is inspection. It is mandatory for members of the subdivision/s review committee and is highly recommended for all members of planning board. The site inspection trip should take place w plete application with all required data and maps has been re Even in smaller communities where board members may be famili every acre of land in town, such site visits are essential. enough to be familiar with a site for a competent review; one the site with a copy of the site development plans to truly un the relationship of such plans to site topography, wooded area streams, surrounding buildings and uses, sight distances, and impact, to name only a few.

In addition to planning board members, the site inspectio should include the engineer, the planner and a representative environmental commission. It might also be helpful for the tr specialist from the police department to be present.

All members of the site inspection party should have a co plans and a pad for taking notes. If the site is a large open landmarks, such as tree groupings, hills, etc., are lacking for site orientation, the applicant might be asked to stake out the street pattern. As you walk the site try to imagine driving al of the streets and turning into a driveway; try to visualize th from dwelling unit windows; locate the play areas and any caseme make notes of your comments and impressions.

After walking the site, discuss your findings with the othe of the site inspection team. The discussion will bring up point you may have overlooked or serve to spur other recommendations.

Unfortunately, too often you will find that the proposed pl indicates its major access on a dangerous curve; or that some of proposed building lots do not appear buildable; or that internal are indicated on 20-percent slopes. Obviously, the applicant's has not visited the site or the applicant has dictated impossible quirements to the designer. If the design errors are major and w require a complete redesign, the review committee should consider its review at this point and returning the plans to the applicant resubmission. This action will avoid unnecessary review time for the applicant and the committee. Together with the return of his the applicant should receive a report of the site inspection and t findings of the committee. Hopefully, the new submission will pr deal with site constraints.

For most applications, however, you should find that plan des bears some reasonable relationship to site conditions. For these applications, the administrative and data gathering phase of your is now completed and the design review may begin.

Step One: Review of the General Design Concept

The plan review begins with an analysis of the general design concept. The review only begins, however, after the plans have been accepted as complete and any additional data has been obtained.

The design concept should be examined in terms of five major elements: land use relationships, general planning proposals, utility considerations, circulation, and support facilities. Environmental considerations are extremely important, but have been listed as a separate step (#3) in the review process.

Land use relationship. This phase should determine whether the proposed development will be in harmony with adjacent activities and land uses. Will it be compatible or stick out like a sore thumb? Are uses on-site located next to or near similar or compatible uses off-site? Will existing off-site uses have any detrimental impact on proposed on-site uses?

For example, intensive recreation areas (those that attract many users and vehicles) should not be located too close to off-site residences. Similarly, do not locate low density uses on-site next to off-site high-density development without adequate buffers. (12) Parking areas on-site should, if at all possible, be located next to off-site parking areas. No one likes to have their house or apartment next to a shopping center parking area.

Perfect compatibility (if such a thing even exists) can never be secured because other factors must be considered. Site characteristics, for example, may dictate design changes which places on-site uses next to off-site uses which may generate nuisances. Traffic safety may call for locating an access road closer to residences than one would prefer.

The board review must carefully examine these elements of incompatibility to determine what proposals or protective measures the applicant will use to reduce adverse impacts. Fences, screening, deeper lots, larger setbacks, directional lights, berms, (13) etc., may be used.

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(12) Actually, the real problem is when the proposed use (on-site) is a higher density than existing off-site uses. When low density uses are proposed next to existing high density, the prospective purchasers at least buy knowing what exists.

(13) A landscaped earthen mound.

General planning proposals. The local master plan should examined to determine what proposals have been recommended for and general area. This might include recreation areas, school or other community facilities. The circulation plan may have s new roads, connections with existing roads, or pathways. The b should consider whether the proposed use is compatible with the plan recommendation for the site and adjacent areas.

In addition to the local master plan, do not overlook the c plan. It may contain some meaningful recommendations for the s area, particularly with respect to roads or drainage.

Utility considerations. Chapter 7 discusses the standards detailed review procedure used in assessing the utility impact- to need and capacity. This should include adequacy of potable w sewage treatment capability and storm water management.

Circulation involves the movement of people and goods wheth vehicles, on foot, on bikes, or some other means. The details o vital phase of review are spelled out in Chapter 5. In general the board must determine whether access to and from the site is Can the adjacent road system handle the proposed traffic load, p during peak hours, and if not, what corrective action must be ta might include street widenings, left turn lanes, traffic signals

Support facilities include the proximity and capacity of co facilities necessary to sustain the proposed development. These facilities include schools, shopping, medical and police and fir ments. A comprehensive review of these facilities for a retireme village would probably emphasize medical and health care. A plan residential development might place its emphasis on school and recreation facilities.

In addition to the five elements suggested above, the design might also include the entire question of regional and local need particularly where a zone change is requested as part of the appli This additional element may be necessary when the proposal is for certain type of housing (elderly or low income) or planned reside development.

The design concept review should also include a review of the degree of conformance or non-conformance with the local zoning ord While this is a responsibility of the zoning officer or building inspector, the degree of non-conformance and its impact on the zon ordinance or master plan may call for a recommendation to the boar adjustment.

Step Two: Review of Internal Use Relationship

In this step the board should consider the internal design and use relationship in much the same manner as we examined the external relationships under step one. The specific details of this phase of the review are spelled out in Chapter 4, including the compatibility and relationship of the various design elements such as building locations, parking areas, open spaces, circulation, etc., to one another.

This step requires more common sense than it does expertise, but you must be able to read a plan and know what to look for. Try and visualize the development in three-dimensional completed form -- not as lines on a plan. It is often helpful in visualizing the use relationships of a large project to have a model. At the least, have the applicant prepare a colored drawing of the proposal showing buildings in one color, paved areas in another, etc.

Step Three: Evaluation of Environmental Impact

In this step the board examines the impact of the proposed development on the environment. In other words, the board determines whether or not the developer has prepared the plan with due regard to such physical constraints of the site as topography, drainage, soil conditions, vegetation, etc. With the necessary data on existing site conditions, you should be able to critically review the impact of a development on the environment.

Are the drainage and soil erosion provisions adequate? Is there unnecessary loss of vegetation? Are there large amounts of soil proposed to be removed or added? Are any views blocked unnecessarily?

In addition to the environmental impact of the proposed development, the board should consider whether any existing uses in the surrounding area will have an adverse impact on the project. A quarry or auto race track may generate noise, dust and air pollution at sufficient levels to constitute a danger or severe discomfort to the residents of the proposed development.

This step and review steps 4 and 5 require some expertise, and subsequent chapters of this manual will provide the reviewer with some of that needed expertise. However, it also requires expert assistance. In these next steps, the advice and recommendations of your planner and and engineer should form the basis for the review. These recommendations are considerably more meaningful if the reviewer has some understanding of the elements to be considered.

Aerial photos are useful here to check vegetation and stream location. If your community or local environmental commission has prepared

a natural resources inventory, this is the place to use it.[14] If there is no inventory, perhaps you should consider developing one. In the meantime, you will have to refer to available environmental data such as soil survey information and related advice from your local soil conservation district (see Chapter 13).

It is at this step your site inspection notes are most useful, and you will know if the site designer has also visited the site.

Step Four: Analysis of Site Circulation

Site circulation includes an examination of the adequacy, safety, and efficiency of internal circulation for all users and vehicle types including:

a. Pedestrians
b. Bicycles
c. Automobiles
d. Delivery Vehicles
e. Taxis
f. Buses
g. Emergency Vehicles
h. Service Vehicles

This review might result in the recommendation that a pedestrian walkway pass under a major roadway; that bicycle paths be incorporated in the design; that cul-de-sacs (streets with one entrance and exit - dead end streets) be changed to loop roads; or that bus and taxi bays be included along major roads.

Circulation is one of the most important elements in your review, and Chapter 5 will give you the detailed standards upon which to base the review. For a major development the board might consider, in addition to your planner's comments, the review by a traffic consultant. Applications fees should cover this possible need.

Step Five: Design Details

We have now reached the consideration of specific design details as the final step in the review process. For example, now that we have agreed to the location of apartment parking lots, we can consider their layout design. Agreement on road locations allows us to consider curb types. Approved building locations will dictate garbage disposal locations. Once the location of open spaces are set, we can consider their detailed landscape design.

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(14) A natural resources inventory is a study of environmental factors (soils, vegetation, water and wildlife) for the entire community, and an inventory of the natural features of undeveloped land. (See Chapter 1.)

A partial listing of design details that should be considered here and the chapter in which they are discussed, includes:

Parking Lot Design	Chapter 6
Landscape Design	Chapter 8
Lighting Standards	Chapter 11
Signs and Street Furniture	Chapter 12

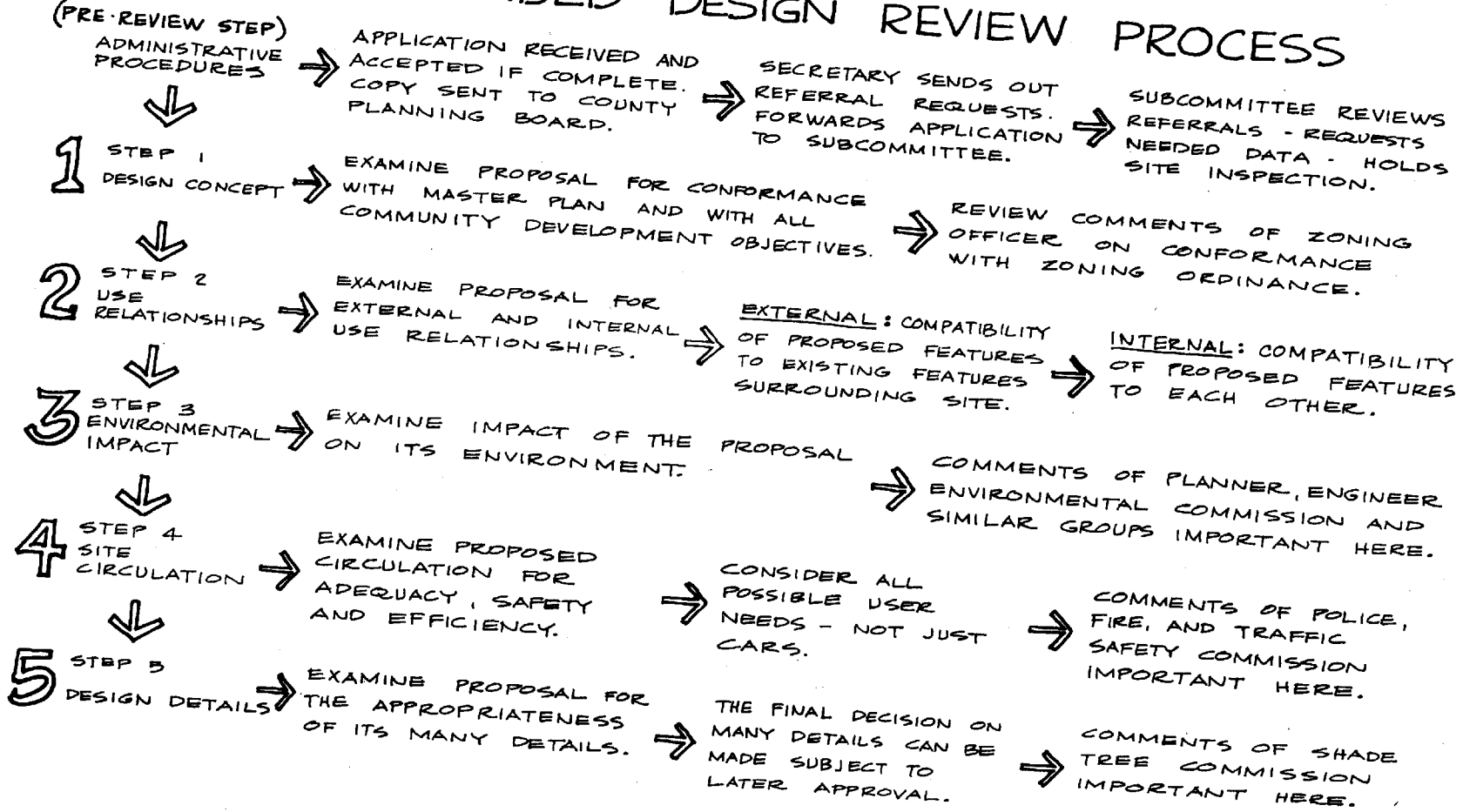
This step does not usually apply in the case of a subdivision involving only single-family dwelling lots. It is usually more applicable to projects which include common areas used for recretional purposes, parking areas, open space use, etc. However, even simple lot subdivisions require some detail design review. For example, some details that should be considered are street curbing type, landscaping of street center islands such as cul-de-sacs, and paving type in pedestrian walkways.

Such design details are important. In addition to functional efficiency, attention to detail creates the attractiveness that makes a development more desirable. This in turn increases demand for the units, which has a favorable impact on property values.

Summary of Methods

In summary, design review is a process. To be effective and to be expeditious this process must be systematic (see following page). The system recommended here is to take your review in logical steps, starting with design concept and ending with design details. Using this method for your subdivision and site plan review will greatly improve the efficiency and aesthetics and minimize any adverse impact on surrounding areas.

RECOMMENDED DESIGN REVIEW PROCESS



Chapter 3

THE SITE

Introduction

The site itself is the most important factor in determining specific subdivision and development design, and a site's physical constraints play the predominant role in such design. Every site is unique, and each development design requires a plan which respects that uniqueness. One of the tests of a good plan is how well that plan fits that site.

Each site does not stand alone but is part of a larger whole, and almost any development will have an impact, sometimes favorable but often undesirable, on its adjoining area. This adverse impact is often in the form of increased storm water runoff, added traffic, or air or water pollution. One of the primary concerns of the planning board is to minimize such adverse impact.

The purpose of this chapter is to assist in plan review by identifying some of the physical constraints found in almost every site; to outline how such constraints may be determined; and to describe some of the developmental restrictions of such constraints. It is not the purpose of this chapter to provide specific answers to specific site problems, but it should provide some advice on how to go about finding such answers. This chapter also includes some useful tips on how a subdivision can capitalize on good site features and how poor site features can be improved upon.

Site Constraints

To properly review a development plan we must have the same site data which, hopefully, the designer used in the development of his plan. Unfortunately, too many site designs are prepared without sufficient data on site constraints. If this is found to be the case, the applicant should be required to provide that data.

The following are some of the constraints to site development and the kinds of data needed to interpret those constraints.

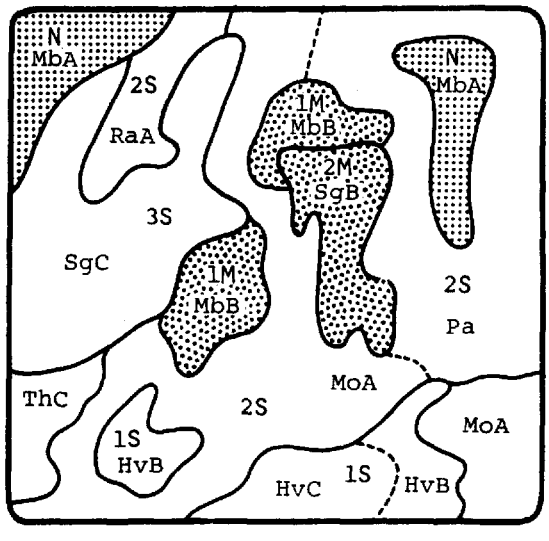
Soils

Proper soil suitability is a basic criterion for reviewing most land development. Some soils, such as muck and peat, are unsuited for almost all types of development, while others can support intensive building. In areas without public sewer, a critical factor is the soils ability to conduct septic effluent from individual sewage disposal

systems. Soil permeability (15) also affects the soil's ability to conduct precipitation and surface water. In flat areas where permeability is poor, water may remain on the surface almost continuously.

Rock outcrops and thin soils (16) are unsuitable for on-site septic systems; thick soils, silts, sand and gravel deposits are relatively good for development purposes. At the opposite end of the suitability spectrum are the soils usually located along streams and rivers called alluvial soils and the swamp and marsh areas, both of which are undesirable building areas because of the high water table or unsuitable foundation conditions.

Information on the types of soil in your community including maps and interpretive data are available from the nearest Soil Conservation Service Office (see Chapter 13). If your community has a Natural Resources Inventory, soil data will be found there.



SOIL LIMITATIONS FOR PLAY AREAS

NONE TO SLIGHT

N — LEVEL, WELL DRAINED SOILS

MODERATE

1M — SLOPING (2-8%) SOILS

2M — SLOPING (2-8%) GRAVELLY SOILS

SEVERE

1S — VERY STONY SLOPING (2-15%) SOILS

2S — WET SOILS

3S — STEEPLY SLOPING (8-25%) SOILS

(15) Permeability is a measure of the speed with which water can drain through a soil when the soil is wet. Sandy soil has a high permeability, clay has a low permeability.

(16) The term "thin soils" refers to a narrow layer of soil over clay or rock; "thick soils" refers to a deep layer of soil (in excess of 10 feet) over bedrock.

Although such data should not be used as the sole basis for judging developmental limitations of a particular soil type, they do provide useful guidelines particularly when used in association with other data as described in this chapter. The soil conditions described on soil survey maps are roughly three to five feet deep. If an analysis of deeper conditions is necessary, soil logs can be required. These involve digging test pits to a depth of 15 or more feet. Observing the walls of the pit and analyzing the soils extracted provides an accurate method of determining local soil conditions.

Engineering soils maps may also be useful. The Rutgers series of engineering soils maps can be obtained from Rutgers University, Bureau of Engineering Research, College of Engineering, for each county in New Jersey.

Wetlands

Wetlands are areas where water remains at or very near the surface for most of the year. They perform a number of environmental functions including ground water replenishment, runoff control, and wildlife habitat. They are unsuitable for almost all types of development without major filling operations and are of greatest value to the environment when left untouched. The State of New Jersey has recognized this value, and the Wetlands Act (NJSA 13:9A to 9A-10) restricts development in these areas.

Wetlands are biologically very productive. They are the starting point in many food chains and the focal point of complex ecosystems.[17] Preserving their relationship to the flow of surface water and ground water is a vital part of maintaining water quality. Drainage of septic or industrial wastes into wetlands can have far-reaching detrimental effects on wildlife and water supplies.

Wetlands can be identified by visual on-site inspection, from aerial photographs, or from soils information. Developments near such critical areas should be carefully reviewed for possible adverse impact. Perhaps an environemntal impact statement should be required (see Chapter 1).

Slope

Site slope can be determined from existing topographic maps. Contour lines[18] on such maps indicate the degree of slope. The closer

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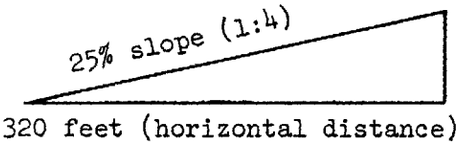
[17] An ecosystem is the interrelationship of living things and their surroundings bound together in a manner so as to perform work, or have the potential for power and activity.

[18] A contour line is a line on a map which connects all points of similar elevation.

the contour lines are to each other, the steeper the slope. Co
the farther apart the contour lines, the flatter the slope. The
lines represent a vertical interval. Therefore, in relatively
areas, a topographic map using a one or two foot contour interv
necessary for planning design and review purposes. For areas wi
slopes, a five or ten foot contour interval may be adequate.

Site slopes are often described in percentage terms. The p
of slope is a function of the amount of vertical change over a g
horizontal distance. For example, if the land rises 80 feet in a
zontal distance of 320 feet, the percentage of slope is 80/320, o
percent--a relatively steep slope. This slope can also be descri
a ratio. For example, the slope in our example is 80/320 or 1/4;
1:4.

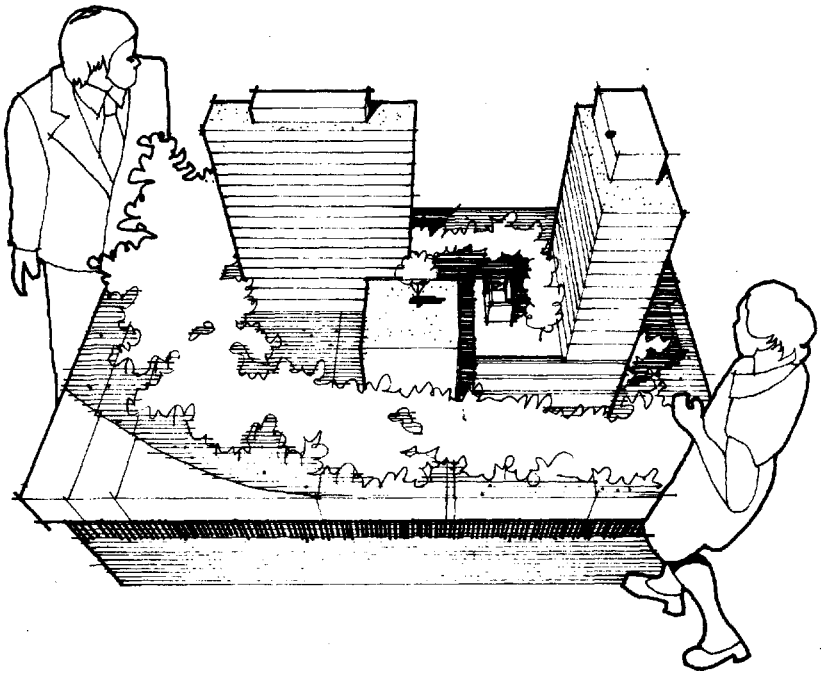


Steep slopes (over 15 percent) are susceptible to soil erosio
the vegetative soil cover has been removed. Often times the soil
steep slopes is thin or shallow. This provides a poor foundation f
structures and inadequate drainage area for septic waste disposal.
combination of steep slopes and thin soils is a severe limitation
construction.

Excessively flat areas can also be a problem when soils are imp
or the water table is high. In such areas, water pools at or near t
surface, flooding basements and backing up septic systems.

While contour maps are the standard way of representing ground
there are other methods. One is to record the spot elevations of ke
points on the ground; e.g., the crests, low areas, breaks in grade,
These techniques also can be used in combination with contour maps.
with these techniques in combination, some members of a planning boa
may have difficulty in "reading" or visualizing the physical characte
of a site. The site inspection will help particularly if the topogra
maps are used when walking the site.

The best means of visualizing the general form of large diverse
sites is the three-dimensional site model. Simple cardboard contour
models are easy to make, can be cut and patched, and relate directly t
the contour drawing. Many developers of large sites will prepare a mo
of their project as a sales tool, but often such models are not prepar
until the project is approved. For difficult sites the applicant migh
be encouraged to prepare a simple working model to aid in the planning
well as in the local design review.



Characteristics of Contours [19] (See diagram for clarification):

A. All points on a contour line have the same elevation. A contour line connects points of equal elevation.

B. Every contour closes on itself within or beyond the limits of the map. In the latter case, the contour will not end on the map but will run to the edges.

C. A contour which closes on itself within the limits of a map is either a summit or a depression. A depression is usually indicated by the elevation at the lowest point, a spot elevation, or the letter "d" placed there. A depression is also indicated by placing short hachure marks on the low side of the contour line (See C for depression and C_1 for summit).

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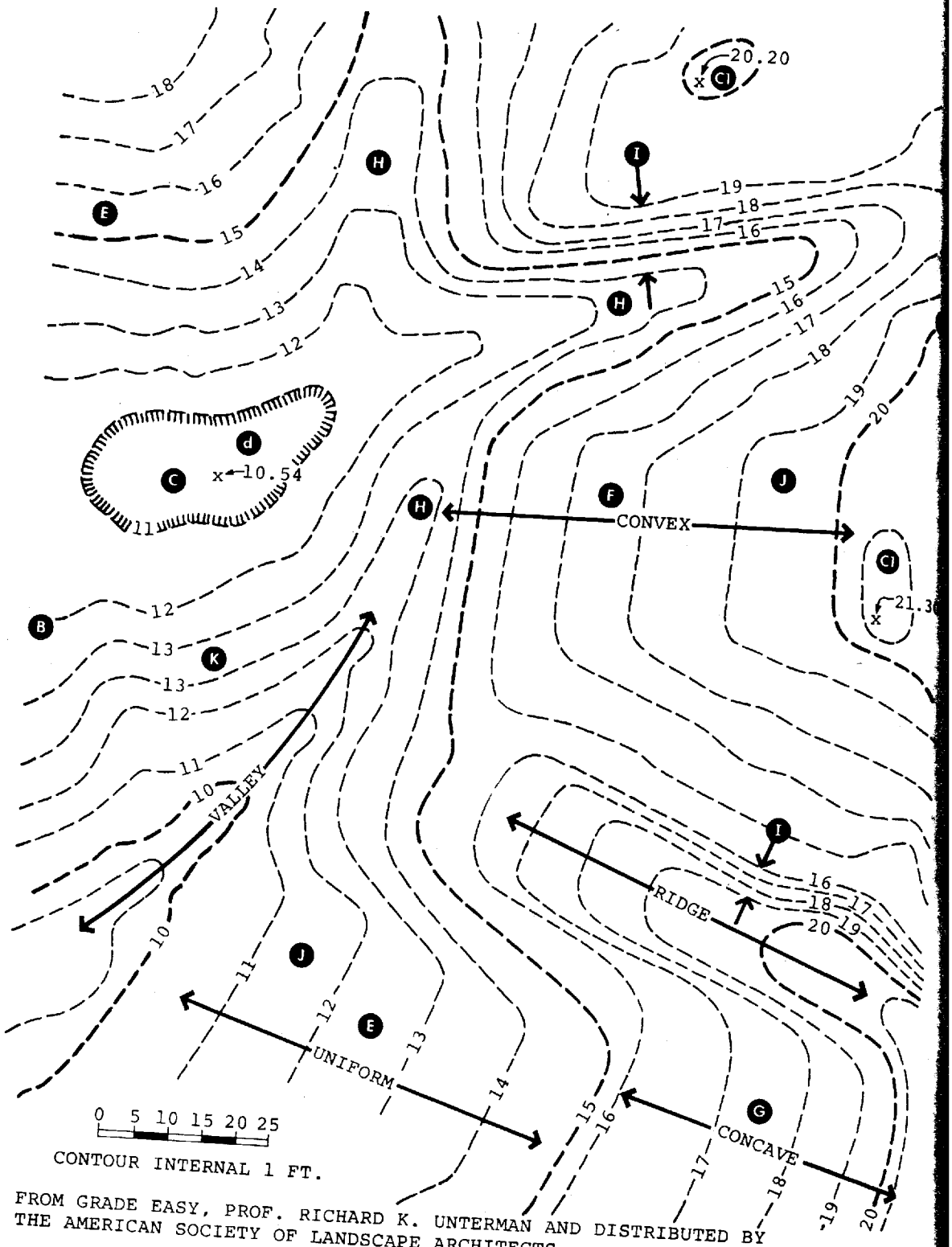
[19] Untermann, Richard K., Grade Easy, An Introductory Course in the Principles and Practices of Grading and Drainage, American Society of Landscape Architects Foundation.



FROM GRADE EASY, PROF. RICHARD K. UNTERMAN AND DISTRIBUTED BY THE AMERICAN SOCIETY OF LANDSCAPE ARCHITECTS

D. Contour lines never cross other contours except where there is an overhanging cliff, natural bridge, or pierced or arched rock.

E. Contours which are equally spaced indicated a uniform sloping surface (See E).

F. On a convex slope (gentler slope at the summit), contours are spaced at increasing intervals going up a hill; the higher contours are spaced farther apart than the lower contour lines (See F).

G. On a concave slope (steeper slope at the summit), the contours are spaced at increasing intervals with the lower contour lines spaced farther apart than the higher ones (See G).

H. Valleys are indicated by contours pointing uphill (See H). In crossing a valley, the contour lines run up the valley on one side, turn at the stream and run back the other side.

I. Generally contours which are close together indicate a steep slope (See I).

J. Contours which are spaced far apart indicate a relatively level or slight grade (See J).

K. The steepest area of a slope runs perpendicular to the contours (water also drains this way).

Erosion and Sedimentation

Erosion and sedimentation are related problems. Erosion involves the wearing away of soil or rock by moving or falling water, and sedimentation involves the transportation of these eroded materials in suspension and their deposition in other areas. Erosion is more active in areas of high relief and steep slopes, especially where soil is concerned. In flatter areas, where the velocity of running water is less, only finer materials are subject to erosion.

Sedimentation problems usually pick up where erosion problems leave off. The transported material may be a source of contamination in streams, raising water treatment costs and even affecting public health. Siltation may occur in areas where it is undesirable or even a hazard. Sedimentation problems are a function of slope, relief, soil and rock type, the surface water regimen, and the water shed involved. Changes that affect the velocity of running water will affect the rate of sedimentation. Erosion and sedimentation are regional problems in that they affect areas far removed from where they begin.

Erosion and sedimentation can be controlled, both during construction and after project completion. To provide the necessary controls, the State Legislature recently passed the Soil Erosion and Sediment Control Act (Chapter 251, P.L. 1975; N.J.S.A. 4:24-39 et seq). This new law

effective January 1, 1976 requires that uniform soil erosion and sedim control standards be established and that all major land disturbances r quiring municipal permits shall have a plan for control of soil erosion and sedimentation certified by the local soil conservation district or the municipality with an ordinance conforming to this law. This act requires certification of an applicant's soil erosion and sedimentation control plans within 30 days. A single-family home and projects which will disturb less than 5,000 square feet are exempt. The State Soil Conservation Committee is responsible for supplying the standards[20] fo soil conservation district and municipal ordinances (see Chapter 7).

Vegetation[21]

Vegetation serves a variety of purposes in the natural system. It presence affects ground water, surface water runoff, erosion, soil content, and even the air we breathe. The importance of vegetation in the production of oxygen cannot be underestimated. Oxygen is a by-product of the life processes of vegetation.

Of all the precipitation that falls on a given vegetated area, an estimated one-third becomes either surface water runoff or ground water. The remaining two-thirds either evaporates directly back into the atmosphere or is used by vegetation and then re-enters the atmosphere as transpiration from the leaves. Cutting down trees or otherwise reducing the amount of vegetation increases the amount of surface water runoff. Transpiration is a particularly important function in areas where surface drainage and percolation are both very poor.

Vegetation plays a part in determining how much water runs off a site and how much soaks in to become ground water. It tends to reduce the speed with which water moves, giving it more chance to soak in. The natural mulch formed by fallen leaves and dead plants helps in this process, as do roots and plants. Because the amount and speed of runoff in a drainage area play essential parts in river flooding, vegetation also plays a part in flood control.

Vegetation also has an effect on local climate. It forms a windbreak. It shades the ground and makes it cooler. It slows the rate at which snow melts. Leaf transpiration can act as a natural air conditioner

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[20] A manual entitled Standards for Soil Erosion and Sediment Control in New Jersey contains the basis for the official standards and is available from the State Soil Conservation Committee of the Depart- of Agriculture.

[21] Much of the discussion on vegetation and that on water is taken from the Passaic Township, New Jersey, Natural Resources Inventory.

of noticeable proportions. Finally, vegetation provides shelter and, directly or indirectly, food for the majority of land animals. Without appropriate vegetation, they cannot survive.

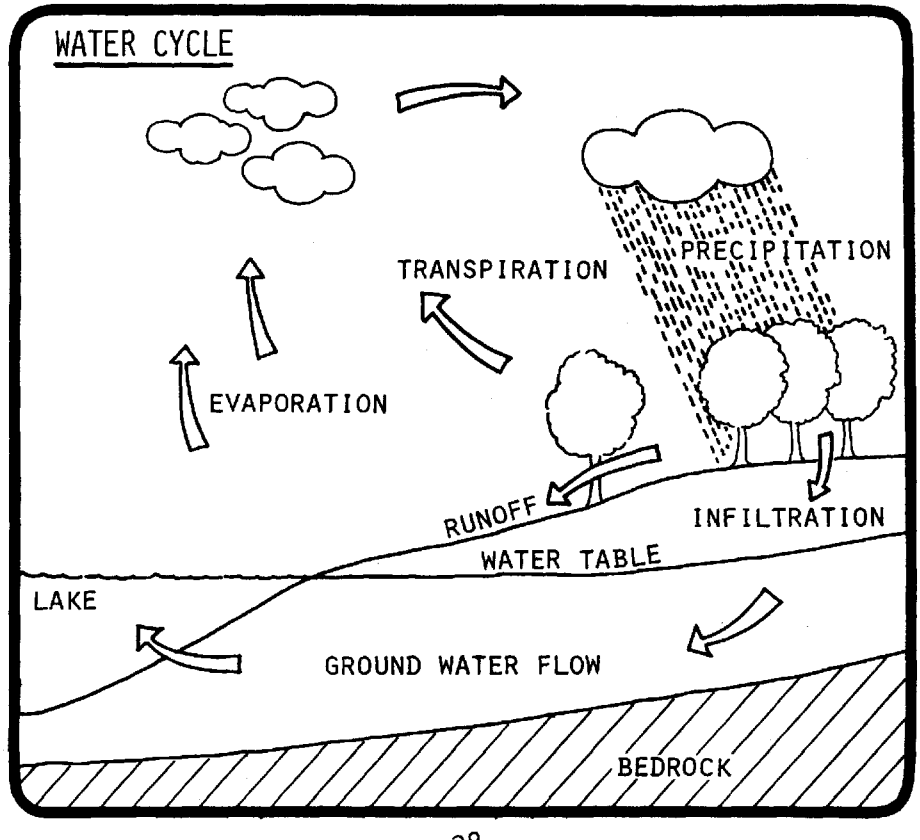
It is obvious that vegetation has more than an aesthetic purpose. The retention of as much of the existing vegetation as possible would be an important goal in reviewing large scale residential developments.

Water

All life depends on water. Where it comes from and how it gets there is therefore vitally important to man and animals alike.

Water falls on the earth as precipitation -- rain, sleet, hail, snow. Some of this water runs off the surface of the land directly into streams and rivers and eventually into lakes or the oceans. This is called surface water runoff; the rest soaks into the soil. Plants use some from the upper part of the soil; the rest percolates down to become groundwater. Groundwater moves very slowly through the soil, generally following the overall downward slope of the surface of the land until it is discharged into a river.

Water finds its way back into the atmosphere by evaporation from the soil and from the surface of lakes, rivers, oceans, etc., and by transpiration from trees and plants. It then condenses into clouds and is discharged to earth again as precipitation. The entire process is called the water cycle and is shown in the following sketch.



When water falls onto the land and is absorbed, most of it pe down through the pore spaces between the particles that make up th layers until it reaches a layer of soil which is completely satura with water. The water is prevented from going down further by a l of impervious material beneath the soil. This material is often b but can be a layer of clay. (When the clay forms the top layer th cannot penetrate at all and will remain on the surface.)

The saturated layer of soil above an impervious layer usually the same general shape as the topography of the area. The water s very slowly through the soil downhill until it reaches a stream or and then to the ocean. The upper surface of the saturated layer is as the water table.

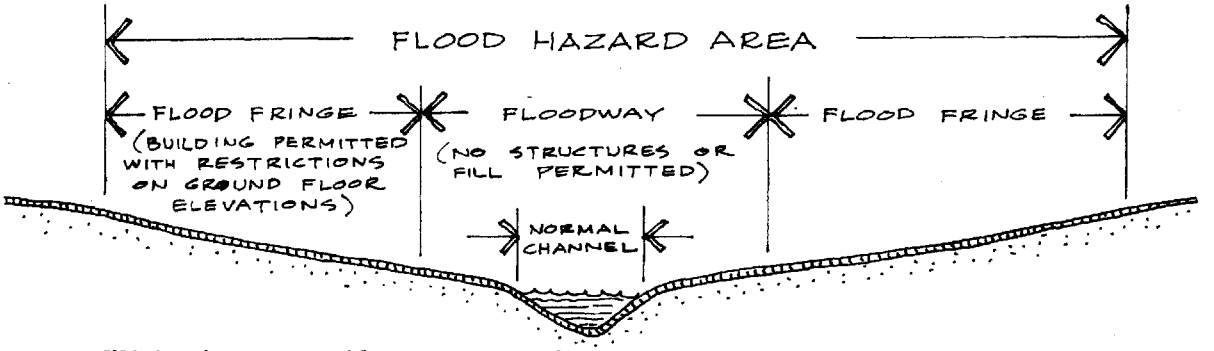
The amount of water a parcel of land can absorb depends on the nature of the soil and on the type of vegetation growing there. Wa that would drain swiftly through sand will remain on the surface or very slowly through clay. Forest and grass both slow down the pass of water across the ground, giving it more time to be absorbed into soil. It is estimated that more than two-thirds of the rainfall of heavy storm will soak into the ground when it is covered with fores grass.

As the amount of surface water runoff increases, the amount of groundwater decreases. Less groundwater lowers the water table, de- creases the amount of water available for vegetation, decreases the of water available for well supplies (and may dry up shallow wells altogether), and lowers the "normal" water level of rivers. People depend on the river for water supply and to carry away treated sewe and industrial effluent have to have a reliable "normal" flow suppli by a large reserve of groundwater.

One effect of increased development, as discussed above, is to the "normal" water level of a river. There is also the related effe of greatly increased water levels along the river in times of flood. less water is absorbed into the ground and more runs off quickly int the water courses, a greater volume of water is arriving in the rive a short span of time soon after a storm.

Rivers have always flooded. The flood plains they naturally de retain the extra amount of water in times of high water. The amount water a river must handle during a flood is increased by development When the development occurs in the flood plain, it restricts the siz the flood plain, prevents the water upstream from being able to come the river, and increases the height of the flood upstream. The deve ment often gets flooded too.

The dangers of building in the flood plain seem obvious, but co struction in such areas continues. Some communities have adopted ordinances regulating such development, and in 1972 New Jersey recog the need for State regulation and adopted RS 58:16A-50 which empower State to delineate flood hazard areas and to adopt land use regulati for such areas.



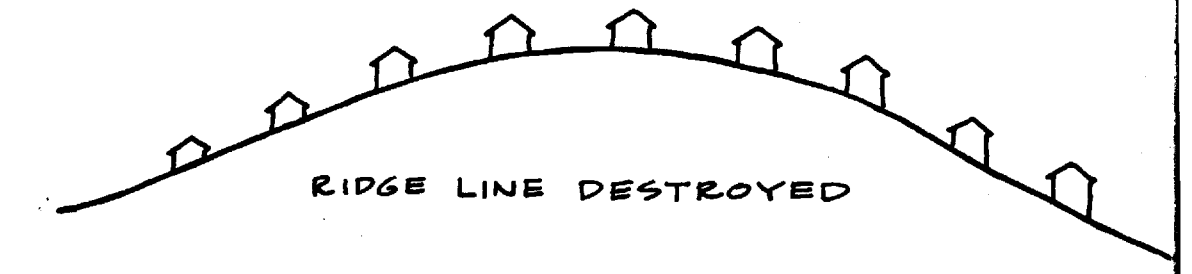
TYPICAL FLOOD PLAIN CROSS-SECTION AND FLOOD PLAIN ORDINANCE REGULATIONS

Development Guidelines

Topographical features, drainage patterns, vegetation, and soils are the most imporatant environmental considerations in locating residential uses. Of course, gently rolling, well-drained, thickly soiled lands would be the best for all uses from agriculture to industry, including residential. For housing, the steeper the slopes, the more expensive the construction, and the greater the dangers of erosion. As a general guide, where slope exceeds 15 percent only very low densities are tolerable, and each lot should be carefully evaluated in terms of drainage, erosion, and sewage capability. There should be no building on slopes over 25 percent.

Obviously there are exceptions to this general rule. One such exception is where separate home sites are combined into one multi-family structure, thereby preserving a maximum amount of steep slope without increasing density. The higher costs for more expensive construction are offset by high rentals or sales.

In areas of steep topography, excessive cuts and fills, often used to facilitate a forced street pattern, should be avoided. Housing and roads should be fitted into the natural pattern of the landscape, clustering the housing where necessary. Ridge lines should be lift in their natural state and wooded crests maintained to avoid their exposure to the wearing elements of wind, rain, and erosion, as well as for aesthetic reasons.



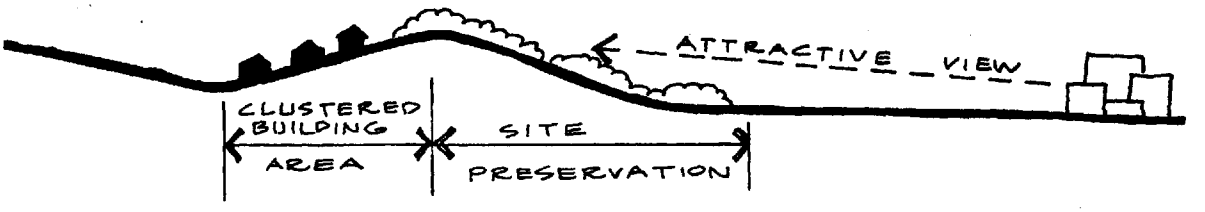
RIDGE LINE PRESERVED

Natural drainage patterns must be thoroughly understood before any housing is sited on the land. The standard should be that there will be no increase in water runoff or velocity after development and that the cross section of any new drainageway will be sufficient to handle all projected flows. The amount of land coverage by buildings and paving at different densities would have to be measured against the absorptive qualities of the remaining soil and the existing drainage patterns. Flood prone areas should be identified and kept free from development. Buffer zones should be established around lakes and streams. A reasonable set-back distance should be established along all waterways.

One final comment on development guidelines. It is only common sense that a proposed subdivision lot layout must be so designed that all lots are in fact developable. Nevertheless, in an effort to maximize lot production, an applicant may try and squeeze in some questionable lot configurations. While the lot requirements of the zoning ordinance are met, the design standards of the subdivision ordinance may not be met.

Many applicants assume that if they can meet the lot requirements of the zoning ordinance they are entitled to that number of lots. To avoid any confusion in this matter some subdivision ordinances include the following paragraph as part of their design standards section:

> "Where there is a question as to the suitability of a lot or lots for their intended use due to factors such as rock formations, unstable soil conditions, flooding, inadequate access, improper lot platting, or other circumstances, the planning board may withhold approval of such lots."



How to Capitalize on Special Site Features

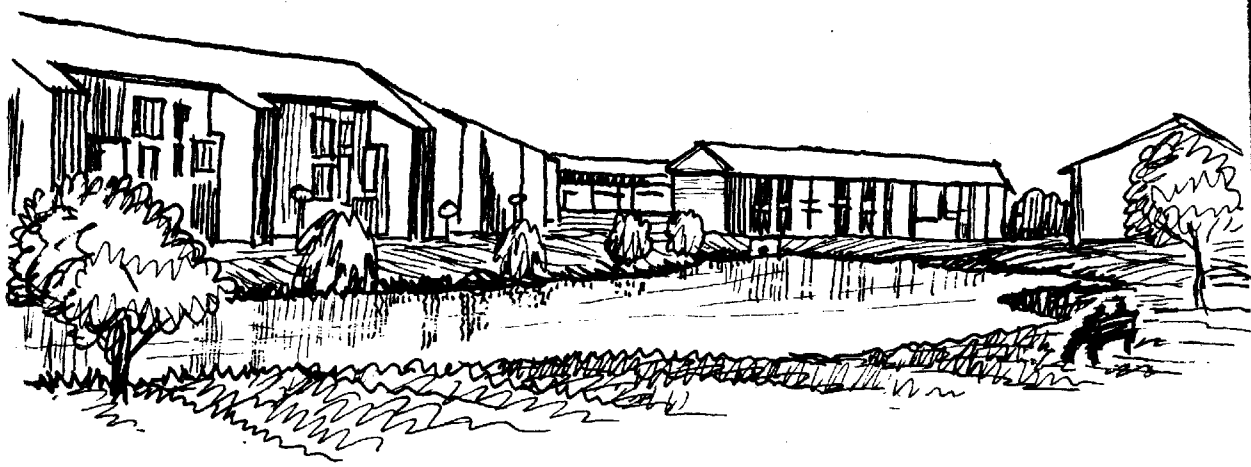
After reviewing the site for physical constraints, the reviewing agency might examine the plan to see if the developer has considered the site's aesthetic features. One of the most important aesthetic features of any site would be its views or vistas. These could include panoramic views from an approach road, or it could be a short vista through a grove of trees to another section of the same site.

If indeed the site does have panoramic views, the development plan should provide that all or most of the units are oriented to those views. If the site itself provides a lovely view from a distance, the development plan should take this into consideration and conceal its dwelling units in such a way that this view of the site from a distance is not destroyed or harmed in any way.

Water is another feature that can be used to improve a development; if the site has a stream going through it, the plan should capitalize on this feature. Unfortunately, many developments fight the stream and bury it.

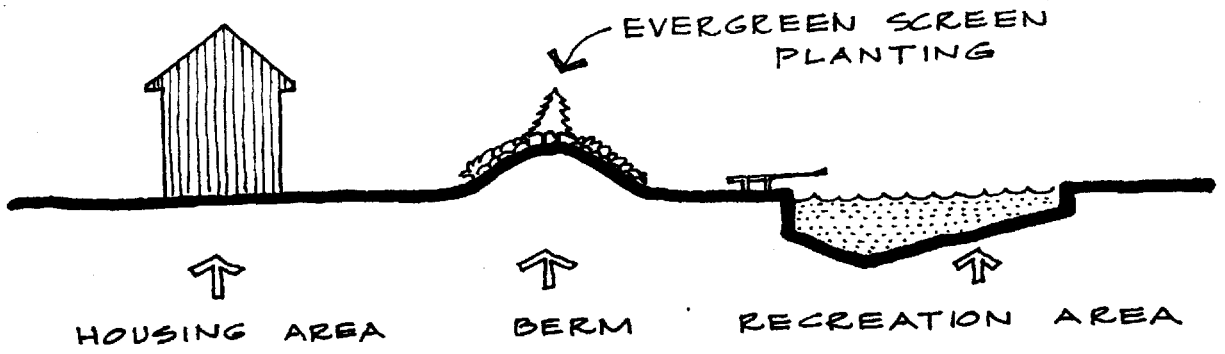
Perhaps the stream could be widened at one point and double as a drainage retention or detention basin (22) and recreation area, or if too small for recreation, it can be used simply as an amenity feature with the dwelling units grouped around the pond with sitting and picnic areas.

(22) Retention basins retain water and are usually wet for most of the year. Detention basins temporarily hold water and are usually dry for most of the time.



How to Improve Poor Site Characteristics

We have discussed how to capitalize on good site characteristics, but how does one capitalize on poor site characteristics? For example, a gently rolling site offers interest, good drainage, vistas, etc., but a dead flat site, while easy to develop in terms of construction, can produce a very uninteresting plan, particularly if it has no vegetation, no views, or no water interest. One of the ways to handle this problem would be to create site interest or characteristics by mounding selected areas. This mounding might be around multi-family parking areas to screen them from other areas, it might be around some of the cluster housing if that technique is used. Mounding or berms may also be used between groups of buildings and around a recreation area such as tennis courts to screen those areas from noise and view. The earth for such berms could come from the excavation of proposed buildings or from a pond that might be built to create additional interest to an otherwise flat site.



Review Checklist of Key Items

1. Does the proposed layout work with the site topography or against it?

2. Does the proposed layout recognize and preserve the site's desirable natural features?

3. Are the soil conditions suitable for the proposed development?

4. Are the dwelling units oriented to site views?

5. Do any proposed structures block site vistas?

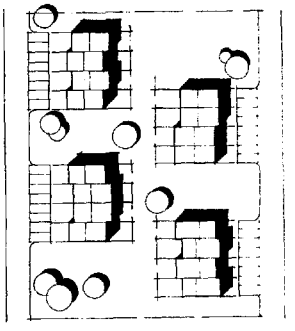
6. Is existing vegetation preserved where possible?

7. Will the proposed development adversely affect the area water table?

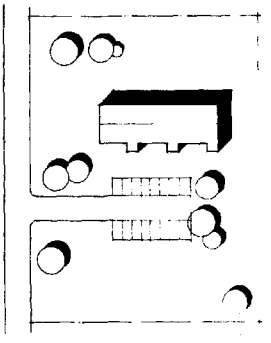
8. Is surface water runoff adequately accommodated?

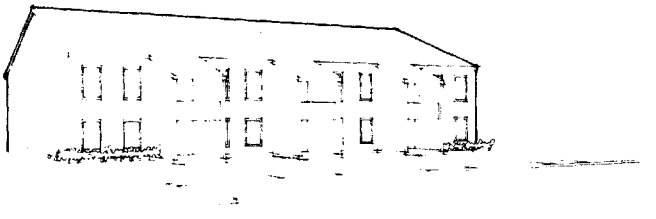
9. Is there adequate setback from rivers and streams?

Town House (or row house): One dwelling unit in a line of at least three dwelling units, in which each unit has its own front and rear access, no unit is located over another unit, each unit is separated from others by a fire wall, and each unit has its own independent utilities.



Garden Apartment: A building of no more than three stories containing at least three dwelling units in which one dwelling unit may be located over another unit, access to such units be via a common entrance, and utilities may be shared.





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Chapter 4

PHYSICAL DESIGN RELATIONSHIPS

Introduction

One of the most difficult aspects of design review deals with the problems and potential of physical design relationships. It may be of some comfort to planning board members to realize that even professionals -- architects, planners, engineers -- experience difficulty in dealing with meaningful design concepts for building arrangements, building setbacks, open space, and distances between structures.

Part of the difficulty is due to the fact that locating buildings on the site is the final synthesis of the design process. They must be located to avoid problem areas such as flood plains or steep slopes. Building locations must be considered in terms of proximity to parking, recreation, and the circulation system. They must also be sited to ensure that adequate light and air are available to adjacent buildings and that one group of residents does not have as its primary view the refuse storage area.

Buildings define open spaces, and only in very recent years have we begun to realize that the desirability and attractiveness of a particular development depends on how effective this space is in meeting residents' needs.

Some of the problems arising in reviewing building relationships are caused by attempting to visualize the three dimensional result based on a two dimensional presentation. It is difficult to imagine how the completed project will look from the plans. For this reason, applicants should be encouraged to produce models of the proposed developments to permit planning board members an opportunity to visualize how they will look "on the ground." This is particularly true of multi-family PUD or PRD developments.

There are no hard and fast rules to follow with respect to densities, distances between buildings, size of structures, setbacks, or any of the other physical relationships. Indeed, it is important to remain as flexible as possible to allow the designer to take advantage of favorable site characteristics and to supply his own design imagination.

Having made that point, planning boards should keep in mind some general guidelines as they relate to design review. At the very least the guidelines can prevent overcrowding, ensure adequate light and air, and minimize internal and external adverse impacts.

This chapter will discuss appropriate densities for different building types, building separations, and dimension standards.

Density

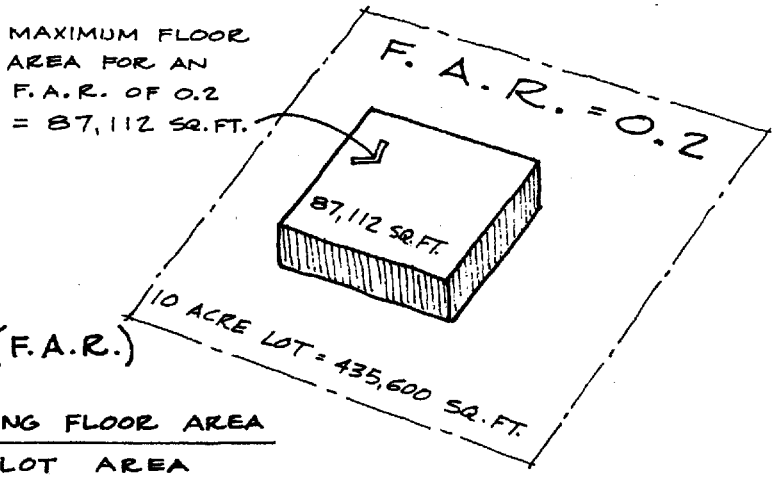
"Density," as it is commonly used in planning, is a measurement of the number of housing units for a specific area of land -- usually an acre. Thus we have the term "units per acre." But this terminolog is not always accurate enough to properly describe density. If we are concerned about population density, we should use the term "persons per acre" as in England, or "families per acre" as is used in other countries.

When you consider that a dwelling unit may range from an "efficiency unit" for senior citizens averaging only 1.5 persons per unit, to a four bedroom single-family detached home with four and five persons per unit, you can see the need for a more definitive standard for density than units per acre.

Bedrooms/acre. One standard that has come into use recently is that of "bedrooms per acre." If we specify, 14 bedrooms per acre instead of 10 units to the acre when dealing with garden apartment type density, it does not matter if the developer puts up 7 two bedroom units or 14 one bedroom units, the end result, at least in terms of total persons per acre, is similar.

Floor area ratio. Another standard deals with floor area ratio (FAR) which expresses the amount of building space as a ratio of site area. Thus an FAR of 0.2 for a particular tract means that the total square footage of building space that could be constructed could not exceed one-fifth of the tract area. On a ten acre tract, the builder could build 87,120 square feet of building space.(23) If the builder decided to build garden apartments averaging 750 square feet per apartment, a total of 116 apartments could be constructed for a per unit density of 11.6 per acre. This would be considered an appropriate density for that use in many suburban locations.

(23) 43,560 sq. ft./acre X 10 acres X 0.2 = 87,120 square feet.



FLOOR AREA RATIO (F.A.R.)

$$F.A.R. = \frac{\text{TOTAL BUILDING FLOOR AREA}}{\text{TOTAL LOT AREA}}$$

Land use intensity. In 1963, the Federal Housing Administration promulgated a comprehensive development index called the land use intensity ration (LUI). Designed primarily for larger multi-family and PUD/PRD developments, the LUI relates six physical relationships as follows:

1. total floor area to land area (FAR);
2. total open space to total floor area (OSR);
3. open space for people and open space for cars (LSR);
4. recreation space (RSR);
5. occupant car ratio (OCR); and
6. total car ration (occupants and guests) TCR.

The six relationships have been arranged in the following table prepared by the FHA.[24]

TABLE 2

LUI RATIO TABLE

LUI	FAR	OSR	LSR	RSR	OCR	TCR	LUI
3.0	.100	8.00	6.50	.25	2.00	2.20	3.0
3.5	.141	5.50	3.80	.21	1.70	1.90	3.5
4.0	.200	3.80	2.60	.18	1.40	1.60	4.0
4.5	.283	2.60	1.70	.15	1.20	1.40	4.5
5.0	.400	1.80	1.10	.13	1.10	1.20	5.0
5.5	.566	1.30	.71	.11	.93	1.10	5.5
6.0	.800	.85	.50	.10	.79	.93	6.0
6.5	1.130	.60	.36	.08	.68	.81	6.5
7.0	1.600	.43	.27	.07	.58	.71	7.0
7.5	2.260	.32	.22	.06	.50	.61	7.5
8.0	3.200	.27	.19	.05	.44	.54	8.0

The use of the LUI table replaces the more conventional density, lot coverage, open space, and parking requirements usually set forth in zoning ordiances. In praction, the F.H.A. will assign an appropriate LUI for a particular tract based on the site characteristics, surrounding development, location, etc. Once the LUI is set, the other requirements can be determined.

(24) McKeever, J. Ross, ed., Community Builders Handbook, Urban Land Institute, Washington, D.C. 1968, p. 110.

For example, if a particular tract of land has an LUI of 3.5, the FAR cannot exceed .141. Using a 10 acre tract, it would mean that the gross floor area to be constructed could not exceed 61,414 square feet. At 750 square feet per apartment, 82 units could be constructed. The minimum open space (OSR) would be 5.5 times the FAR figure or 337,777 square feet or 7.7 acres of the site. This would be further divided into recreation space and parking in accordance with the remaining columns.

The use of the LUI system requires a fairly high degree of planning sophistication by a local board and a thorough knowledge of the community to assign a realistic LUI figure for various land areas. It is presented here merely to illustrate the potential range of controls available.

Density Standards

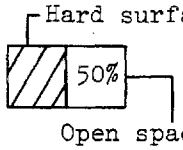
There is no ideal density. For New Jersey there is a possible range of from less than one unit per three acres in rural farm areas to over 100 units per acre in urban areas. What is appropriate for one community or one section of a community, may not be appropriate for another. Suitability of density varies with the constraints of the site, development costs, the character of the area, and the requirements of the community. However, in the accompanying chart, each dwelling unit type has an appropriate density range. As density increases, the available open space decreases to the point where a change in building type is necessary to provide adequate open space, light, air, circulation, and provide improved spacing between buildings (see chart).

The chart is limited to the four major residential building types; other building types, some of which are discussed later, can be located on this chart in the appropriate location. For example, a duplex unit would be appropriate at the upper end of the single-family density scale, and the quadruplex would be appropriate at the lower end of the town house density scale.

Suggested Residential Density Standards

Density In Dwelling Units Per Acre	Approximate Density In Bedrooms Per Acre	Building Type and Related Open Space* (Minimum Site Size of 5 Acres)			
		Single Family 2½ Stories	Town House 2½ Stories	Garden Apartment 2-3 Stories	Mid-Rise High Rise 4-10 Stories
½ - 2	2 - 8	65% (cluster)	--	--	--
			**		
3 - 5	9 - 14	45%	60%	--	--
6 - 8	15 - 19	***	40%	--	--
9 - 12	20	--	20%	2 60%	--
12 - 15	20	--	--	2 55%	--
15 - 20	25	--	--	3 50%	4 60%
20 - 30	30	--	--	3 40%	5 60%
30 - 40	40	--	--	--	7 50%
40 - 50	60 - 70	--	--	--	10 30%
		2 Car Spaces/Unit			1½ Car Spaces/Unit

KEY:



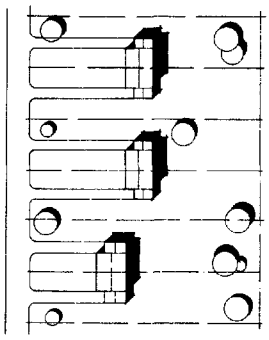
*Useable open space, i.e.: exclusive of buffer areas, roads & parking areas, walkways & amenity areas.

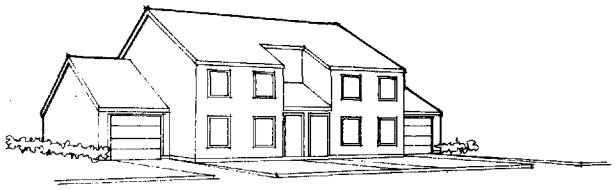
**Quadraplex units possible here.

***Zero lot line and duplex units are more appropriate here.

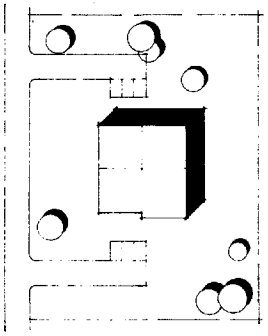
****All impervious surfaces on the site.

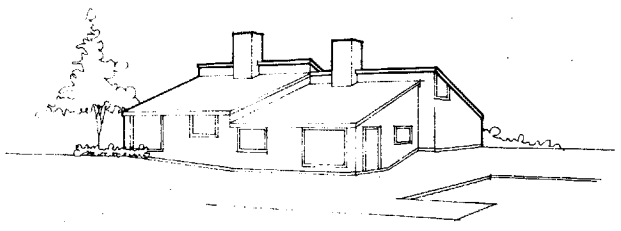
Duplex (Semi-detached): Two dwelling units, each on separate lots and sharing a common wall.





Quadraplex: Four attached dwelling units in one structure in which each unit has two open space exposures and shares one or two walls with adjoining unit or units.

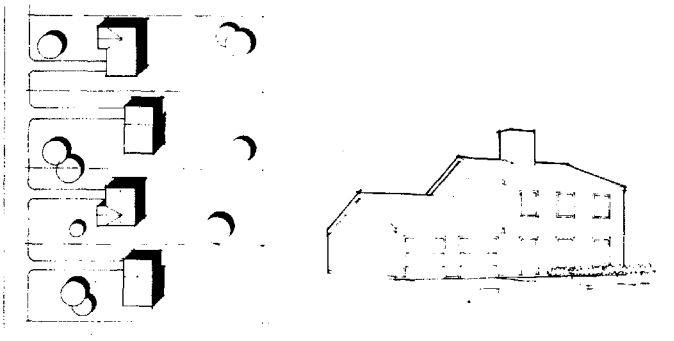




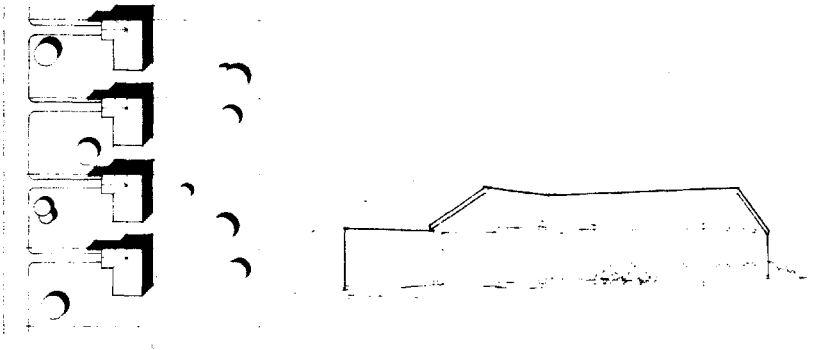
Dwelling Unit Types

The following list with definitions covers all of the popular residential building types currently in use. The accompanying sketches provide a visual definition of each type.

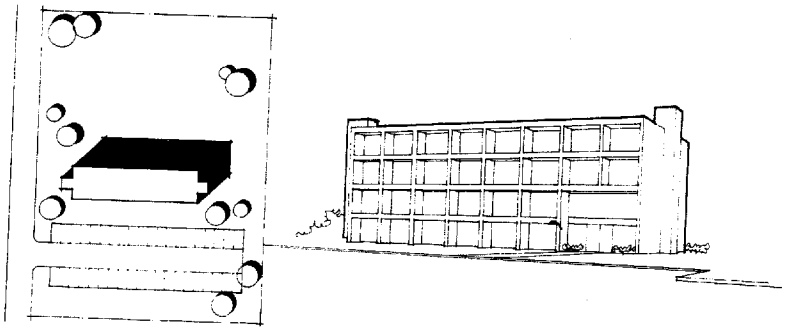
Single-Family Detached: One free-standing dwelling unit on a separate lot with open space (setbacks) on all sides.



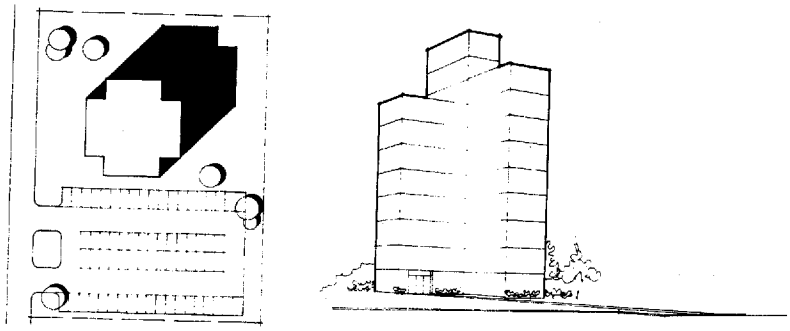
Patio House (Zero lot line): One free-standing dwelling unit on a separate lot with open space (setbacks) on three sides.



Mid-Rise: An apartment building containing from four to seven stories.



High-Rise: An apartment building of eight or more stories.



The table provides the planning board with some indication as to whether an applicant is attempting to overcrowd a site or using an inappropriate housing type for a particular density. It provides some indication as to whether the zoning ordinance provisions are reasonable appropriate in terms of the densities allowed.

TABLE 3

OPTIMUM DENSITY RANGES FOR VARIOUS TYPES OF HOUSING

Type of Unit	Optimum Density Range (per gross acre)
Single-family detached	1-5 units
Two-family	6-10 "
Town house	6-8 "
Garden apartments	10-18 "
Mid-rise	25-30 "
High-rise	40-70 "

Obviously, an applicant with 18 town houses per acre on a proposed development plan will overcrowd the site, have insufficient open space, and seriously affect the availability of light and air to each dwelling unit.

Density Computations

Most zoning ordinances are vague on how to compute the permitted density except for single-family development. Single-family requirements usually call for a minimum lot size which is obviously exclusive of streets and therefore represents a net density figure.

However, even with single-family developments some confusion often exists. Easements for walkways, power lines, sewer lines, etc., often cross private property. Most boards permit the easement area to be included as part of the minimum lot area so long as a house can be located on the lot within the prescribed setback lines.

Overhead power lines are another matter. Generally, power companies will allow the area under the lines to be used for most open uses such as lawns, open recreation without structures, parking, or agriculture. Most planning boards will allow those portions of the lot under the overhead power lines to be included as part of the lot area. We are of the opinion, however, that the zoning ordinance should exclude the areas under the power lines as part of the required lot area. The power line areas should be kept as a form of open space and might even be used for walkways or bike trails. By excluding them, additional setbacks are provided from the towers and lines.

Computation of densities for garden apartments or PUD/PRD projects is much more complex. Many ordinances just state the maximum gross density. Thus, a garden apartment project may be allowed at a density of 15 units per acre or 150 units on a ten acre tract.

This approach raises some questions. Should flood plain areas be included? What about easement? Are steep slopes computed as part of gross density? What about storm retention basins that take up a considerable part of the required open space?

Some general rules are suggested as follows:

1. Areas where development is banned should not be included as part of the gross areas upon which the density is computed. These should include the channel and floodway portions of the flood plain and steep slopes in excess of 20 percent.(25)

2. Existing easements through the property should not be included as part of the gross acreage for density computation purposes. The rationale is that the development rights have been purchased and the owner should not be compensated twice. (Proposed easements should be included in the gross area calculations.)

3. Areas where development is normally banned (floodways, etc.) may be included as part of any required open space providing these areas do not constitute too great a percentage of the open space. The ordinance may require 25 percent of the gross tract area (no exceptions) to be in common open space. Of this total, a reasonable amount such as two-fifths of the required 25 percent may be in areas where development is normally prohibited.

4. Easements may be included as part of any required common open space providing they are used for that purpose.

5. Required detention or retention basins are also part of the open space system but here again, they may occupy too high a percentage of the common open space. We suggest that if they occupy more than one-fifth of the common open space, the excess may not be counted as open space.

In summary, the density and open space requirements for a typical 50 acre garden apartment development may look like this:

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(25) We would suggest that prohibitions on building in these areas be universally applied throughout the municipality.

Tract Size: 50 Acres	Density permitted by zoning:	10 dwelling units/acre
Required Common Open Space: 25 percent		
If there are 8 acres of the tract in stream channel floodways, topography in excess of 20 percent slope and existing easements, the net acreage figure would be reduced to:		42 acres
Number of units allowed:		420 units
Required Common Open Space (25% of 50 acres):		12.5 acres
Maximum open space allowed in areas in which development is banned (2/5 of 12/5 acres):		5.0 acres

Thus, the applicant would have to provide 7.5 acres in common open space in areas other than channels, floodways, steep slopes or easements. The applicant could only use five of the eight acres of land where development is normally prohibited, as part of the required common open space. When the development is completed, it would have 15.5 acres in common open space.

If, in our example, a series of retention or detention basins occupied four acres of land and were proposed to be counted as open space, this would exceed our maximum of 20 percent of the common open space permitted in retention or detention basins (20 percent X 15.5 = 3.1 acres). The applicant would have to add an additional 0.9 acre of common open space on the tract.

The purpose of these requirements is to ensure that an applicant has a sufficient quantity of useable open space to serve the residents and that the maximum number of units allowed in the zoning ordinance can be built on land capable of supporting development without overcrowding.

Attached Housing

The "rediscover" of attached housing in the form of town houses, duplexes, quadruplexes, etc., is in part the result of high land and building costs. These units are particularly attractive to young families and mature families, for different reasons. Young families cannot afford single-family detached homes on large lots and are attracted to the compromise of a single-family attached home on a small lot. The mature family has reduced space needs and is no longer interested in large lot maintenance.

One of the amenities possible in the town house or attached unit is the provision of an "outdoor room," or patio. The ground level patio off each unit is, in effect, a private back yard. Unfortunately, in some developments the outdoor patio has become a liability due to poor design.

In many such cases the developer does provide patio fencing and each owner does his "own thing" to the detriment of good design. In other cases, the patio orientation is poor and instead of an outdoor "living" room they became outdoor storage rooms, much to the dismay of adjoining residents.

Town house patio design should include complete fencing with controls on painting, etc.; suitable landscaping; proper orientation for outdoor use; and preferable some connection to a walkway system. These considerations should be part of the design review.

Building Relationships

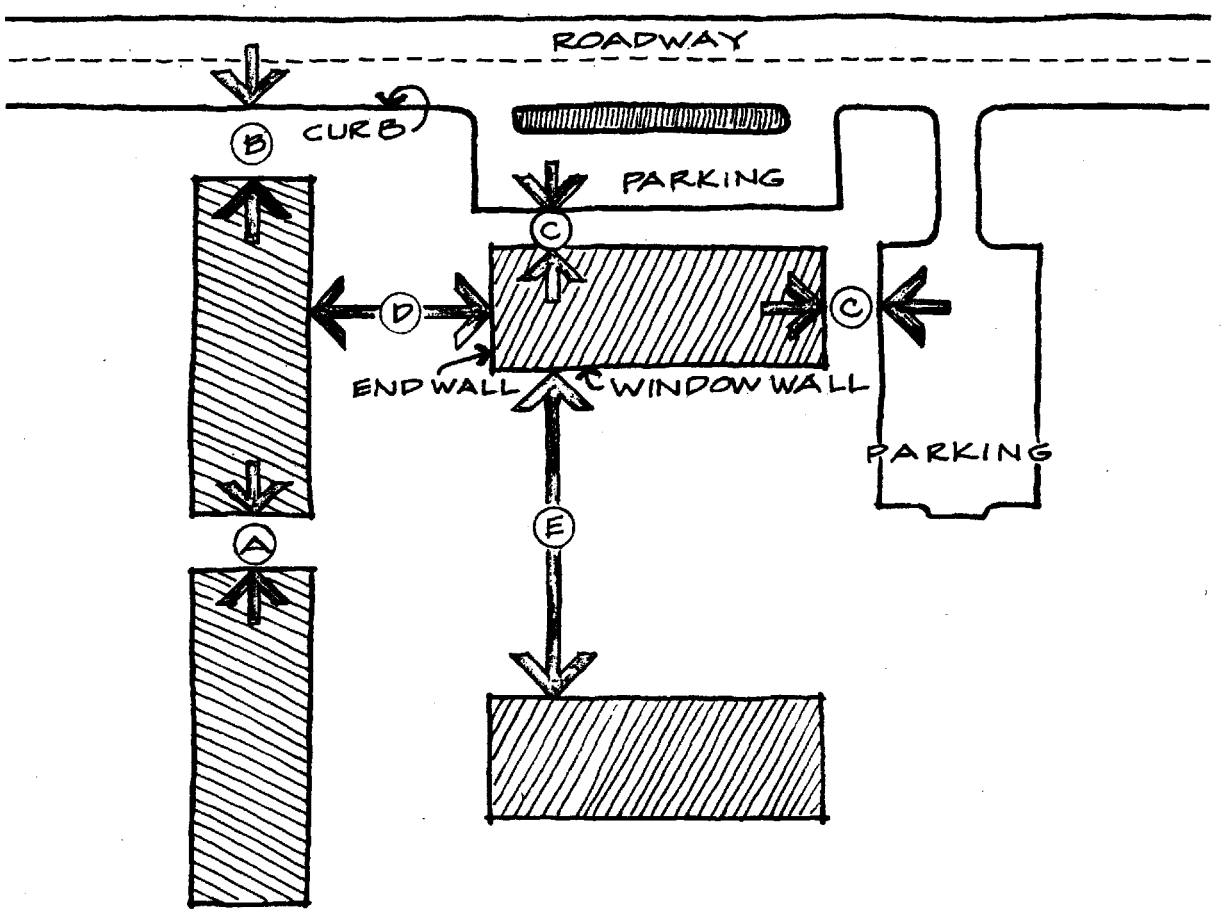
The spacing between buildings of the same type in a residential development, as determined by the site designer or architect, should be based on such factors as privacy, building height, orientation, daylight needs, site topography, aesthetics, etc. Some zoning ordinances reduce all these factors to a simple requirement of a minimum of 50 feet between buildings. Unfortunately such arbitrary requirements do not allow for instances where 20 or 30 feet would be appropriate, and may be accepted as a standard in instances where 70 or 100 feet is preferable.

As a general guide, however, some arbitrary building distances are suggested for consideration in your design review. These distances should vary with building height and wall surface type. For example, where two end walls with no openings face each other, the minimum spacing suggested is equal to half the building height. Face to face buildings of the same type should be separated by at least three times the building height and end walls to face walls should be at least one and one-hald times the building height.

The spacing between residential buildings of different types, such as between single-family units and garden apartments, requires a somewhat different set of standards or design principles.

The first principle is to provide a transition in the location of different building types. Unless this transition can be provided by an appropriate buffer in the form of a park, or other natural features, it should be provided by a gradual density change. For example, a town house area might be located between a single-family area and a garden apartment area; a garden apartment section might be located between a town house section and a high rise building.

SUGGESTED BUILDING SPACING BETWEEN RESIDENTIAL STRUCTURES OF SIMILAR TYPE



BUILDING SPACING:

A End Wall to End Wall = 1/2 height of highest wall (Minimum 12 feet)

B Any Building Face to Street Curb = height of highest wall (Minumum 20 feet)

C Any Building Face to Parking Area = 1/2 height of highest wall (Minimum 12 feet)

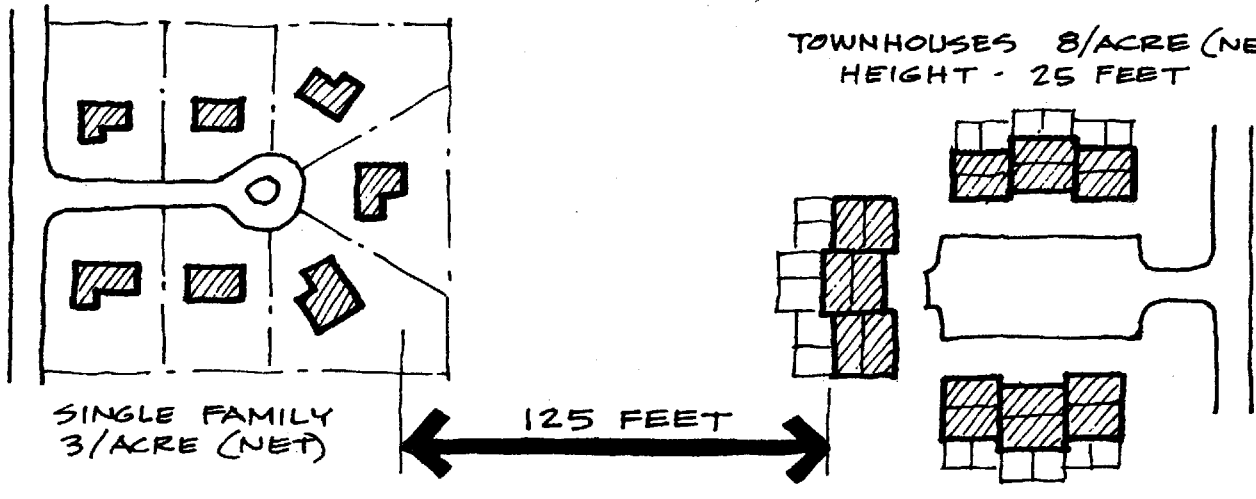
D End Wall to Window Wall = 1-1/2 height of highest wall (Minimum 30 feet)

E Window Wall to Window Wall = 3 x height of highest wall (Minimum 75 feet)

SUGGESTED BUILDING SPACING BETWEEN RESIDENTIAL STRUCTURES OF DIFFERING TYPE

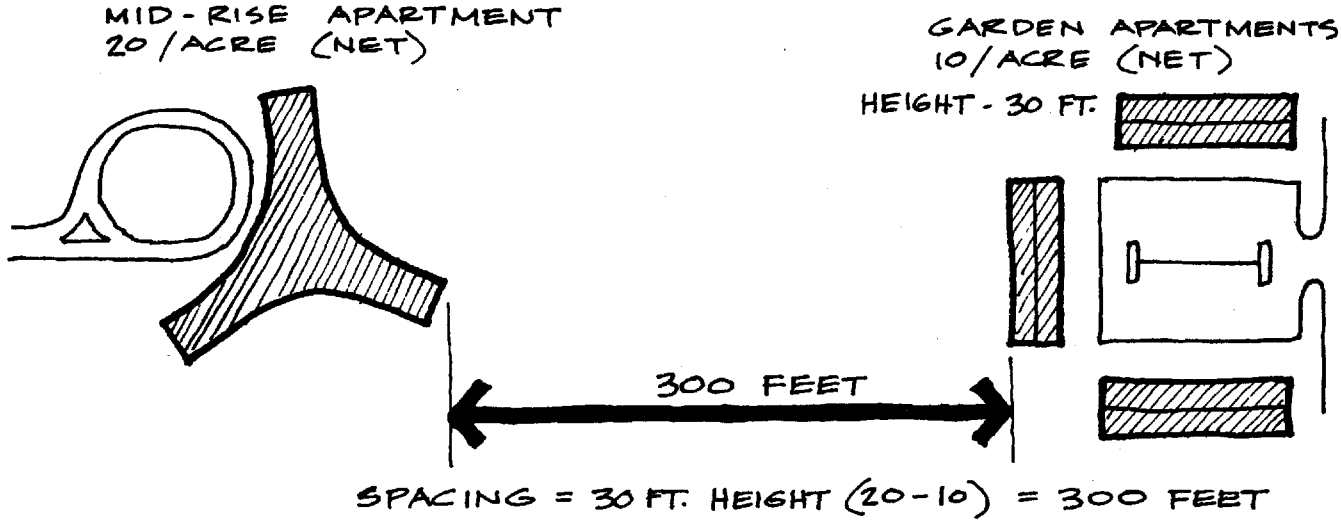
SPACING = (HEIGHT OF LOWER DENSITY) X (NET DENSITY DIFFERENCE).

EXAMPLE ONE:



SPACING = 25 FT. HEIGHT (8-3) = 125 FEET

EXAMPLE TWO:



SPACING = 30 FT. HEIGHT (20-10) = 300 FEET

DRAWINGS NOT TO SCALE.

The second principle is that of actual building spacing. The spacing should, as a minimum be equal to the height of the lower density use times the difference in net density between the two building types. For example, the spacing between a mid-rise unit, net density 25 units per acre, and a garden apartment unit, net density 12 units per acre, height 30 feet, would be 390 (30 times the difference in net density or 30 times 13).

Building Design Considerations

All multi-family dwelling structures should be arranged in small identifiable groups or clusters, particularly where such structures adjoin public areas or open space. By giving some architectural expression to each grouping it will take on even greater identity and provide a sense of belonging to the inhabitants. The defining of "territory" can actually reduce crime by permitting increased visual surveillance by the occupants; it should encourage greater social relationships between residents; and it will provide a "sense of place" for both visitor and resident.

The two most common multi-family structure types are town houses and garden apartments. The following are a few design considerations for such uses. These are not meant as arbitrary design requirements, but only as general guidelines.

Town houses. About eight town house units in one row or structure is considered a desirable maximum. If each unit is only 20 feet wide, units would require a structure 160 feet long. To break up the long building facade off-sets of four feet should be required after every two units.

Town houses should be grouped in clusters (maximum of 30 per cluster) with the private parking area near the entrances and the outdoor living or patio area adjoining an open space or pathway leading to a recreation area. No units should front on a through street.

Garden apartments. With the usual exceptions for superior design, garden apartment structures should be limited to 14 or 16 units per building and a maximum length of 150 to 180 feet. Most such structures with more units tend to look far too massive. Each garden apartment unit should have two means of access, in case of fire and one should be directly to the unit from outside.

To avoid a building facade made up of entry doors, require a four foot building offset for every two or four doors. Second floor unit entries are one solution and can be reached via a roofed outside upper level. These improvements may avoid the brick barracks look of many garden apartment developments.

Garden apartment structures should be provided with master television antennas. Required active recreation sites, particularly tennis courts, and pools, should be at least 100 feet from the nearest dwelling unit. No parking lot should contain more than 60 spaces.

Review Checklist of Key Items

1. Are the buildings located with due regard for privacy of the occupants, daylighting, and site topography?

2. Are the buildings arranged as indicated for some apparent purpose (to accomodate site topography for example), or do they appear scattered about the site for no apparent design purpose?

3. If outdoor patios are used, are they fenced and do they have access to a walkway system?

4. Can the buildings be grouped more compactly to provide more useable open space?

5. Is the site too crowded for the dwelling unit type proposed?

6. Is there some transition provided between different residential building types?

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Chapter 5

CIRCULATION

Introduction

The movement of people and vehicles is an important element in subdivision and site plan review. This movement includes access to and from the site and movement of persons, whether on foot, bikes, or in vehicles, within the subdivision or development.

In New Jersey, as elsewhere, getting to and from home, work, shopping, or recreation involves primarily the private automobile. The dominance of the car will no doubt remain, although continuing concern with energy conservation and air pollution may have an impact on the size and propulsion systems of automobiles.

The purpose of this chapter is to provide the planning board with the necessary expertise to review a subdivision or site plan to ensure that the circulation system works efficiently, safely, aesthetically, and with a minimum impact on homes and surrounding areas.

While this chapter will provide useful planning standards in the review of the circulation aspects of a subdivision or site plan, it will not provide specific engineering details. Engineering details are subject to local needs and should be determined by the municipal engineer. The planning board should properly determine how wide the paving of the road should be, but the specific type of paving to be used is a function of the engineer. Usually, these standards are incorporated in road specification details set forth in adopted ordinances.

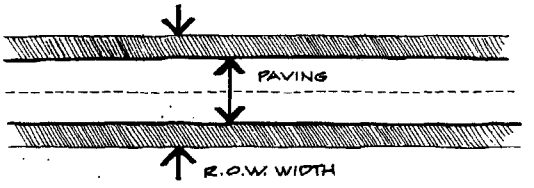
Many terms discussed in this chapter will be new to many planning board members. A graphic description of useful terms follows.

Site Access

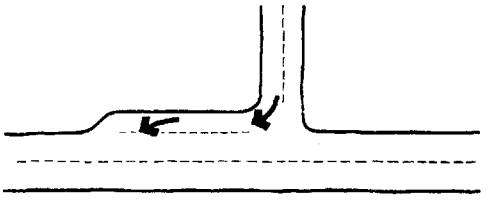
The planning board review for circulation is a logical process and largely involves the individual's own experience in driving, walking, or bicycling. In driving to work, for example, one leaves a garage or parking space, proceeds down a local street and along with others from the local street enters a collector road, which, as the name implies, collects traffic from several local streets.

This traffic proceeds to another type of road called an arterial, which serves to gather and distribute traffic from several collectors. From the arterial, traffic may move to a major highway, expressway, or freeway.

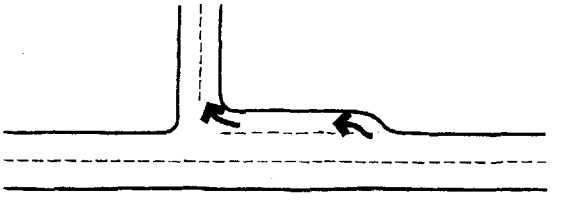
At some point the process may be reversed and the driver would proceed to the place of employment. More than likely, the office or plant would be located on an arterial road because of the amount of



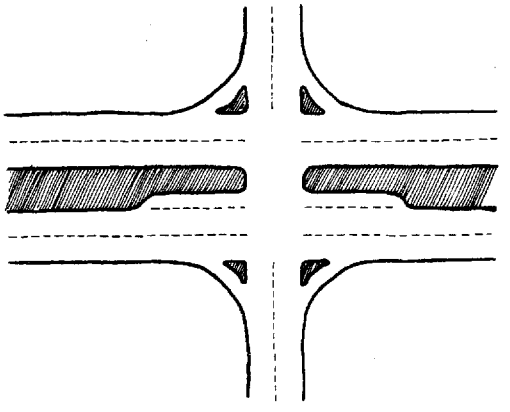
RIGHT OF WAY (R·O·W) WIDTH



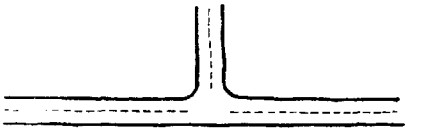
ACCELERATION LANE



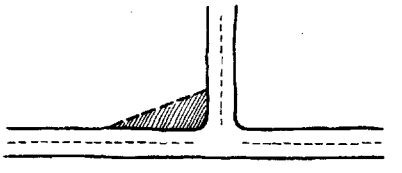
DECELERATION LANE



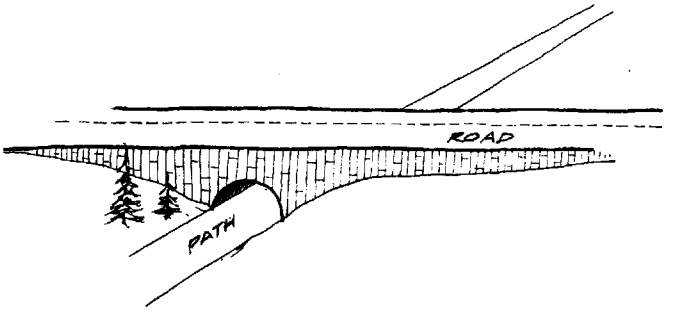
CHANNELIZATION



RIGHT ANGLE INTERSECTION



SIGHT TRIANGLE



GRADE SEPARATION

OBLIQUE INTERSECTION

of traffic generated and its concentration in a relatively short period of time, specifically during the morning and evening starting and quitting hours.

The trip to work requires a number of decisions on the part of the driver, and these usually involve which roads to take to get to the destination. Studies have shown that most drivers are willing to take a more circuitous route if it avoids congestion and the difference in time enroute is about the same. In other words, time and absence of congestion are the critical parameters.

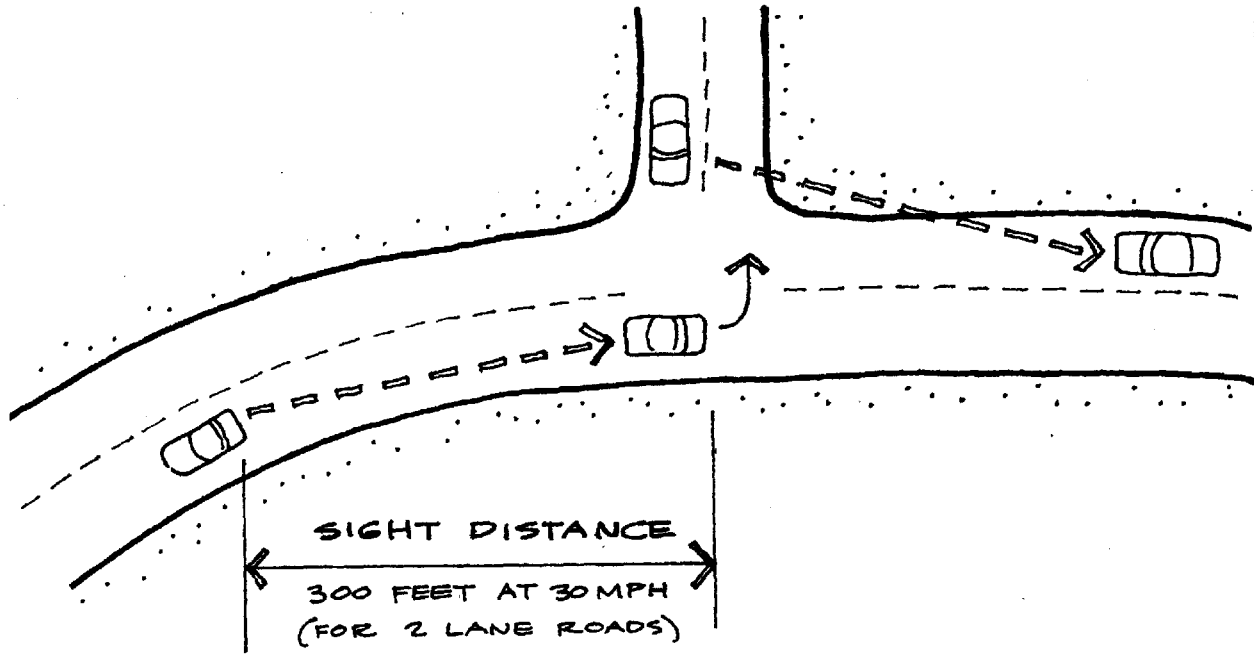
This knowledge is important to the planning board in reviewing the circulation plan of the subdivision. It means making a judgment on where the bulk of the people in the subdivision will work and how they will proceed to their places of employment. This is not as difficult as it first appears.

For one thing, major employment centers are usually grouped in specific geographic areas or along major highways. Secondly, most drivers will head for a freeway or interstate route to get to work and can only enter these roads at interchanges.

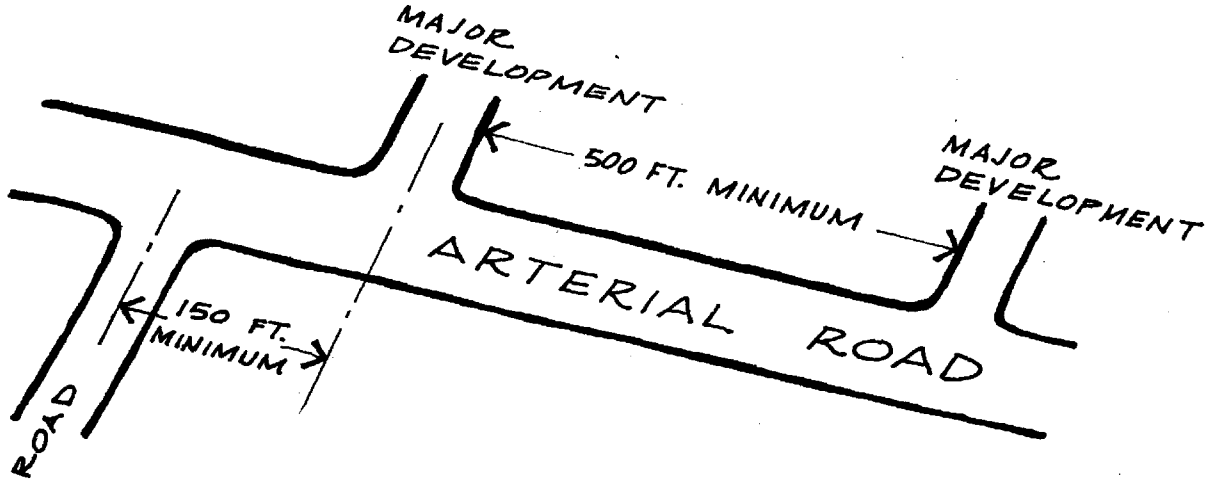
The circulation plan of the subdivision should provide for this obvious driver preference. The major access to the development should be on the arterial which provides the most direct route to the major highway, freeway, or interstate, or if industry is located relatively close by, on the road providing a direct route to these employment areas.

The major site access must be appropriately located in accordance with good engineering design principles. It should be at a location with good sight distance, depending on the speed limit of the arterial as follows:

Speed Limit on Arterial (two-lane road) in mph	Required Sight Distance in Feet for a Stopped Passenger Car
30	300
35	350
40	400
45	450
50	500



The access road should not exit on a ramp or within 50 feet of the beginning of a ramp or any other interchange. It should intersect with the main arterial at an angle as close to 90 degrees as possible, but in no event less than 60 degrees. If at all possible, it should not be too close to parallel roads intersecting the same arterial. A minimum distance of 500 feet is suggested. If there is a road intersecting on the other side of the arterial, the centerlines should be at least 150 feet apart.



The radius of the curbs of the access road should be at least 35 feet to allow for safe ingress and egress to the major arterial. It is also desirable to provide for acceleration/deceleration lanes.

The grades at the intersection should be level and remain so for at least 50 feet back from the intersection.

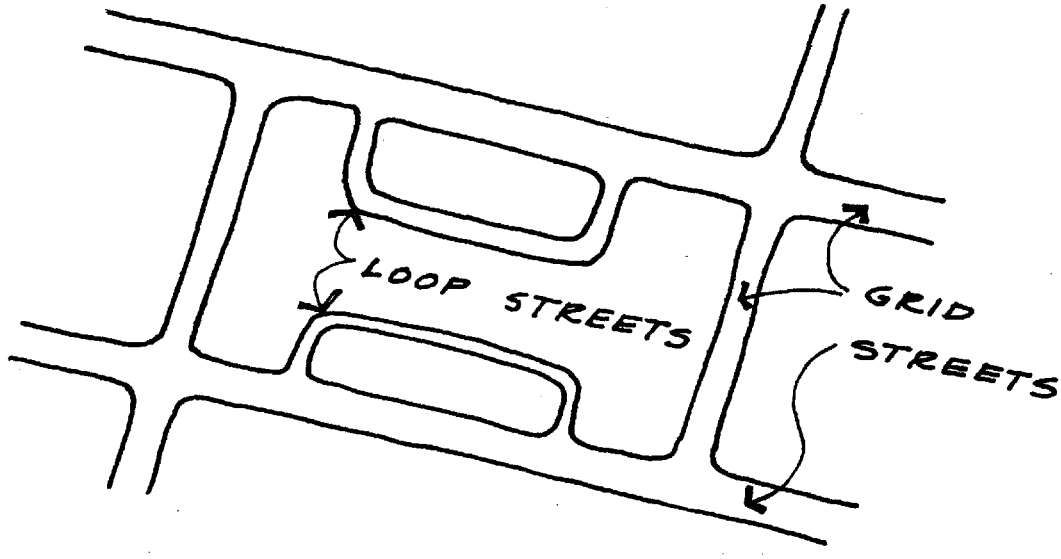
In major residential systems of the size considered in this manual, there should be at least two means of site ingress and egress served by an interconnected road system within the development. This second ingress and egress might be on a collector or arterial which leads to major shopping areas serving the development; or, it could be located on the same road as the first entrance if the development is located in the center of two or more employment centers.

While the primary purpose of an interconnected system of two means of ingress and egress is to distribute traffic safely and efficiently throughout the site and to adjacent streets, an important secondary purpose is to insure adequate access by emergency vehicles.

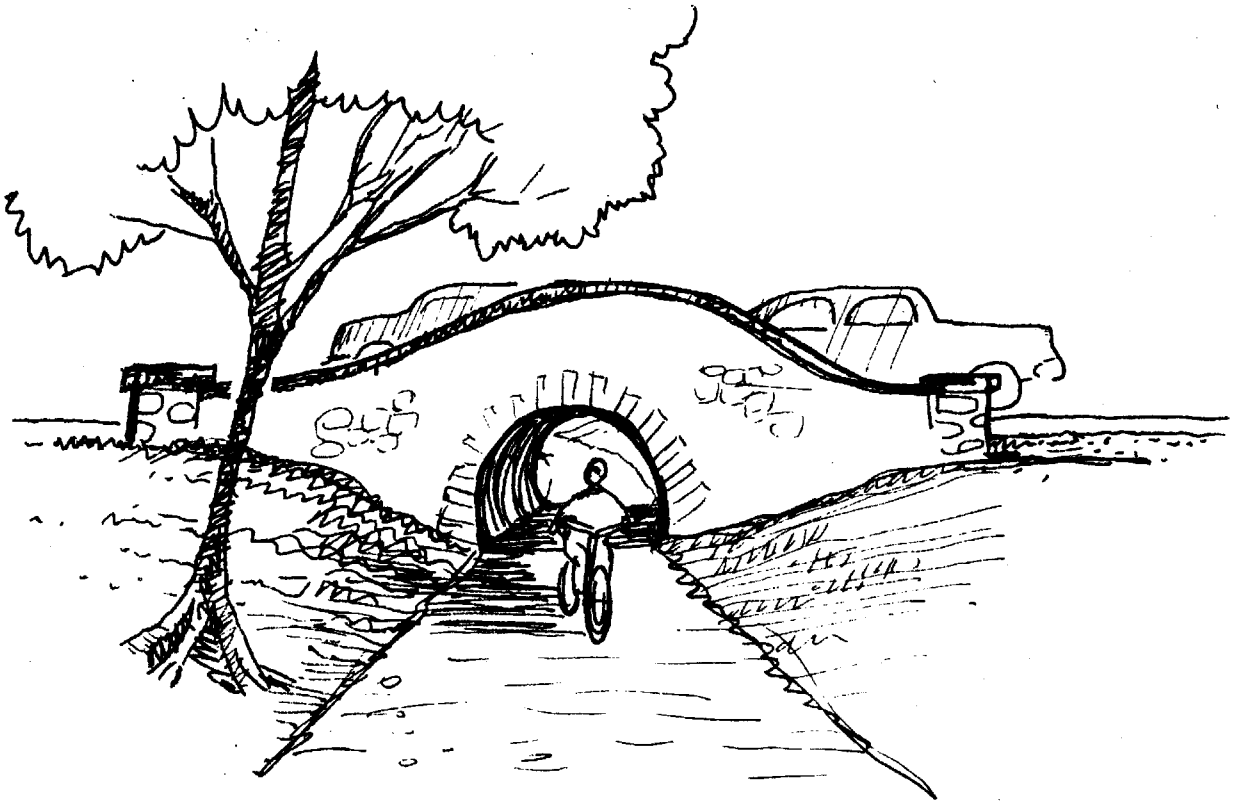
Circulation Systems

Circulation systems may take the form of loops, grids, radials, or linear systems or several of these in combination. Whichever system is adopted, it should be determined by the demands of the site and the needs of traffic generated by the housing units. In the case of a very large project, one circulation system may be incorporated within another system--

for example, a loop system within a grid system (see diagram). This mixing permits the assignment of fast or through traffic to the grid streets, separate from the slow local traffic on the loop streets.

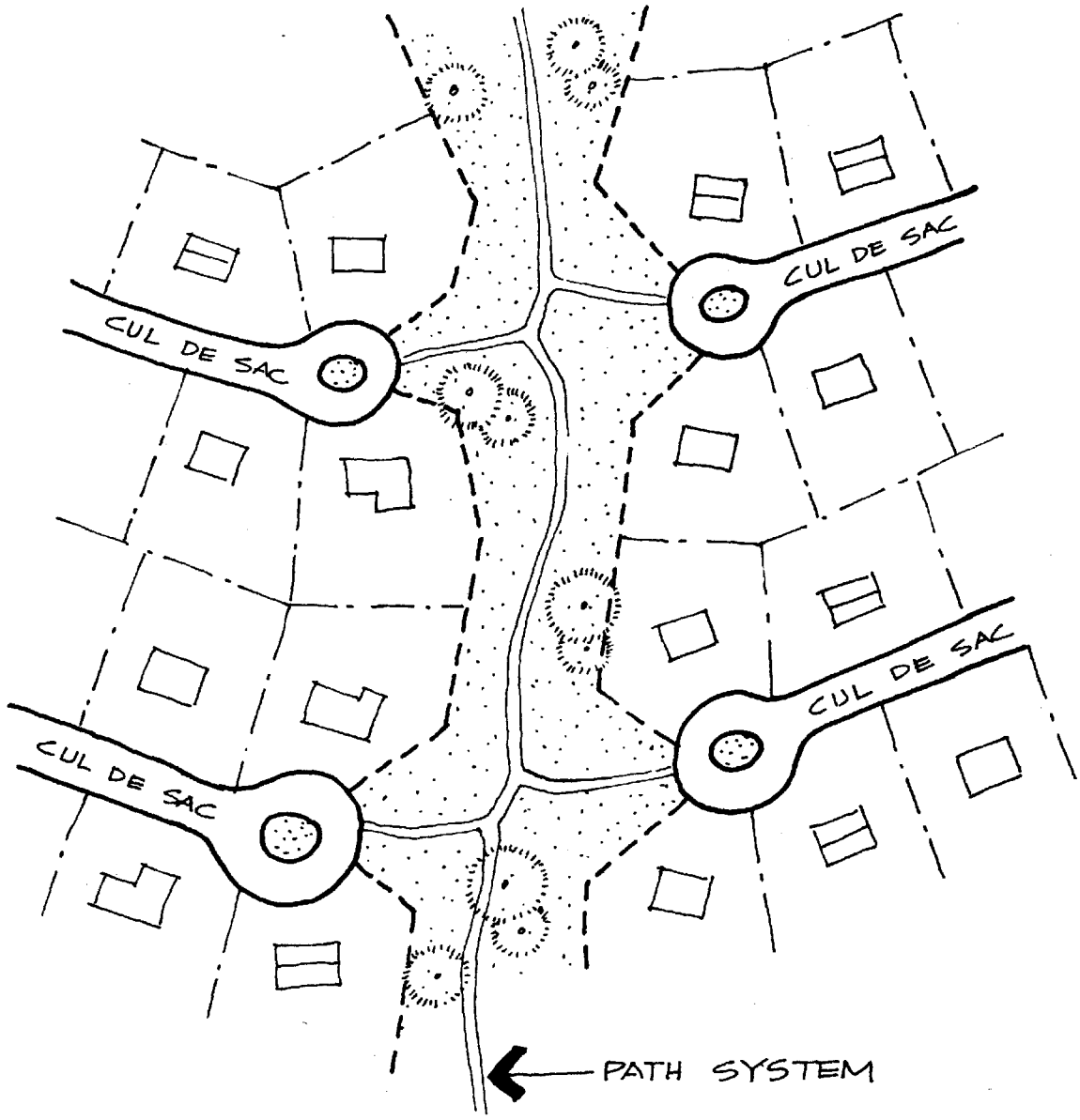


Separate pedestrian and bicycle path systems are becoming more common in large projects and should be encouraged. They increase the total amenity and provide alternative modes of circulation. They are most important design consideration for pedestrian and bicycle paths is segregation from vehicular traffic. Street crossings of paths shoud be held to a minimum and pedestrian over- and underpasses should be encouraged, especially near schools and playgrounds where potential conflicts are great.



Common area paths or walks generally should be wide enough to provide either two pedestrian lanes or one pedestrian and one bicycle lane. A four foot width is tight for pedestrians and bicycles; a four and one-half foot width is much more comfortable; and a five foot width is optimum. The above widths assume no side obstructions or walls.

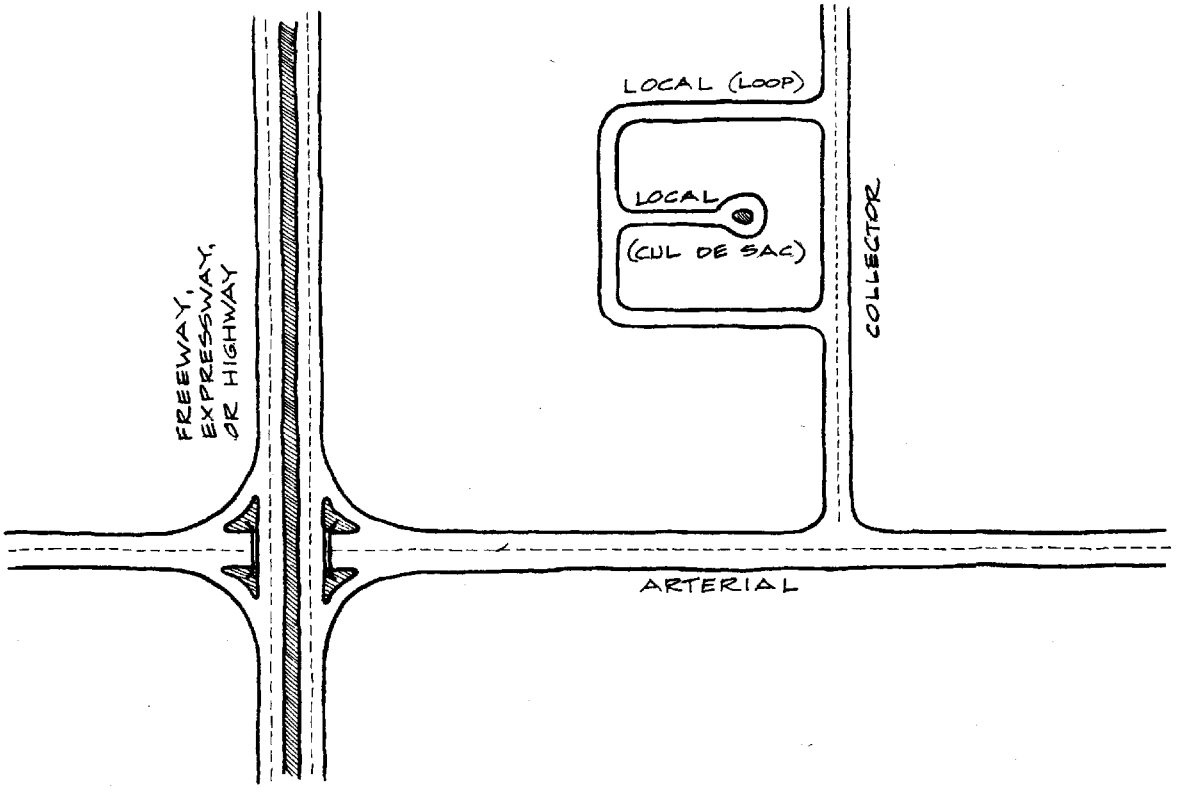
A path exclusively for bicycles should be at least four feet wide and would be acceptable for all but the major elements of a bicycle path system. The major elements of a two-lane bicycle path should be approximately five feet wide.



Street Classification and Standards

The classification of streets within a circulation system begins with the local street which provides access to abutting homes. If at all possible, the local road should be a cul-de-sac, or a street with only one ingress and egress and a turnaround at the end. They offer maximum privacy and safety and do not permit shortcuts by through traffic. Also acceptable as local streets are loop streets or sub-collectors, which may collect traffic from one or two cul-de-sacs before feeding them to a standard collector.

As pointed out before, the local streets lead to collector roads. The collector street is designed to accommodate greater traffic flows and provides fewer access points to higher density uses. The collector street ties into the arterial, which is designed for even heavier flows, has intersections at longer intervals, and intersects with expressways or interchanges with freeways.



Street standards are determined by the function the street serves. Most local subdivision ordinances contain such functional classifications for streets and separate design standards for each street classification.

Table 4 illustrates the relationship between function classifications and design standards. Since needs vary from one area to another, each community should prepare its own standards. The standards indicated are designed for an urban, traffic-intensive area. For low density suburban areas, more flexible standards for the "local" street classification may be desirable, as suggested in Table 5.

TABLE 4

TYPICAL STREET CLASSIFICATION DESIGN STANDARDS FOR URBAN AREAS

Street Type	Design Features	Widths		Desirable Maximum Grades	Speed
		R.O.W.	Pavement		
Freeways	Limited access; no grade crossings; parking is prohibited.	200-300'	Varies; 12' per lane; 8'-10' shoulders both sides of each roadway 8'-60' median strip.	3%	55 MPH
Expressways	Limited access; some channelized grade crossings and signals at major intersections; parking is prohibited.	200-250'	Varies; 12' per lane; 8'-10' shoulders; 8'-30' median strip.	4%	50 MPH
Major Roads (Major Arterials)	Minor access control; channelized intersections; parking is generally prohibited.	120-150'	Varies; 12' per lane; 8'-10' shoulders; median barrier.	4%	35-45 MPH
Secondary Roads (Minor Arterials)	Main feeder streets; with signals where needed; stop signs on the side streets.	84'	68' (4-12' traffic lanes; 2-10' parking lanes).	5%	35-40 MPH
Collector Streets	Main interior streets; stop signs on the side streets.	60'	40' (2-12' traffic lanes; 2-8' parking lanes).	6%	25-30 MPH
Local Streets	Local service streets; no through traffic.	50'	28'-30'	10%	25 MPH

Table 5

LOCAL STREET STANDARDS FOR SUBURBAN AREAS

	Cul-de-sac	Loop	Sub-Collector
Traffic Volume (number of cars during an average day)	0-150	200-400	500-1,000
Right-of-Way Width (feet)	40	44-50	50
Paved Width (feet)	18-24	24-30	30
Sidewalks	None	One side	One or both
Desirable Maximum Grade (%)	10	8	6
Speed Limit (MPH)	15	20	25

Road Capacities

Very often the question will arise as to the traffic impact of a proposed development on the surrounding road system. Can the system take the traffic load during peak travel times (usually 7 to 9 AM and 4 to 6 PM, and if not, what kind of improvements are necessary to prevent congestion on the system?

The problem is a complex one because it involves policy as well as engineering. Presumably, the governing body has zoned land for a variety of uses based in part on the traffic handling capability of the surrounding road system. An area adjacent to an interchange of an interstate highway is capable of handling the impact of industry or high density housing. The same is not so when the only access to the property is by means of narrow two-lane roads.

However, communities do zone property for uses that will generate traffic loads in excess of the capacity of the surrounding roads. Planning boards are then faced with the dilemma of approving the plans knowing that the result will cause congestion and inconvenience.

There is no easy solution to the problem. At the very least, applicants should be required to submit a traffic impact report including the following:

1. Traffic generation of the proposed project;

2. Existing traffic loads on surrounding roads;

3. Existing capacity of surrounding roads and level of service;

4. Probable impact of project on capacity and service levels; and

5. Possible improvements necessary to ease congestion and maintain levels of service.

To adequately assess the traffic report, the following information may be of value.

The theoretical capacity of one lane of traffic is 2,000 cars per hour (0.55 cars per second)--but this requires a completely steady, uninterrupted flow of optimum speed and spacing which is an impossible standard. However, a multi-lane freeway may carry up to 1,500 to 1,800 cars per hour per lane. At the opposite extreme, a congested street with frequent side friction due to cars parking and entering may carry only 200 to 300 cars per hour on the outside lane.

In surburban and urban areas the critical limit to capacity is the intersection. Even where total volume through an intersection is as low as 500 cars per hour in all directions, some treatment such as traffic signals, left turn periods, or channelization may be necessary. Here again, it must be emphasized that the design and analysis of high-capacity roads and intersections is a matter for traffic engineers.

A typical two-lane roadway can carry about 400 to 500 cars per hour per lane or an average daily range of about 5,000 to 12,500 vehicles. However, the physical capacity of a street will always exceed its optimum capacity. The desirable level of traffic volume for a residential street is generally less than its physical or optimum capacity. Table 6 provides some direction as to desirable traffic volumes for residential streets.

TABLE 6

DESIRABLE TRAFFIC VOLUMES FOR RESIDENTIAL STREETS

Street Type	Average Daily Traffic	Abutting Residential Use
Local Streets	0-2,000	Single-family detached units
Collector Streets	2,000-5,000	Limited or reverse frontage; single-family attached units and multi-family units
Arterial Streets	5,000 and over	Multi-family developments with limited access

Traffic volumes for suburban areas can be projected by assuming that each single-family detached dwelling unit will generate between 10 and 15 one-way vehicular trips per day. The high figure is applicable to high income low-density areas with two and three cars per family. All figures include delivery and service vehicles. Multi-family units will generate between four and eight one-way vehicular trips per day, depending on size of unit and proximity to public transportation. Senior citizen housing generates less than four trips per unit per day. Table 7 lists some sample trip generation figures for various dwelling types and for some nonresidential uses generally associated with larger-scale residential development.

When the report shows that the capacity of a particular intersection will be exceeded for a given level of service, the community may request certain improvements or may have to initiate changes to increase the capacity.

The improvements might include additional improved road widths or redesign of the access to the development to spread the load to other abutting streets. The municipality may have to secure permission to make certain streets one-way, ban left turns at intersections, or channelize intersections. The intersection itself may have to be widened or traffic signals installed.

TABLE 7

VEHICULAR TRIP GENERATION, BY USE

Land Use	Trip Generation Unit	Trip Volume/ Unit (24 hr.week day)	AM Peak (trips)	PM Peak (trips)
Single Family	Dwelling Unit	10-15	1.15	1.25
Town House	" "	6-8	.90	1.00
Garden Apartment	" "	4-6	.60	.70
High Rise	Dwelling Unit	4	.40	.50
Mobile Home Park	" "	5-6	.50	.60
Medical Clinic	Doctor	40-50	-	-
Regional Shopping Ctr.	1,000 sq.ft.of GFA*	30-40	2.00	12.00
Community Shopping Ctr.	1,000 sq.ft.of GFA*	50-60	3.00	10.00
Industrial Park or Large Office	Employee	3-4	1.00	1.00
Motel	Occupied Unit	10	-	-
Golf Course	Hole	5-6	-	-
Hospital	Bed	10-12	-	-
High School	Student	1.40	-	-
Elementary School	"	00.70	-	-

NOTE: In AM peak hours, 85 percent of all residential trips are expected to be out and 15 percent in. In the PM, 75 percent are expected to be in and 25 percent out. Office and industrial uses in the AM are expected to be 90 percent in and 10 percent out and just the opposite in the PM peak hour. Retail commercial is expected to be 55 percent in during the AM peak and 45 percent out, and during the PM peak, 70 percent out, 30 percent in.

*Gross Floor Area

Traffic Signals

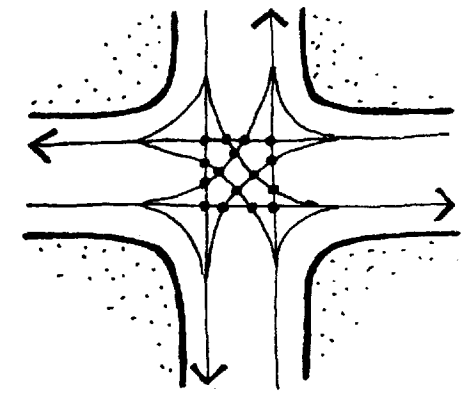
Signals may be justified when intersection volumes rise above 750 vehicles per hour, with at least one-fourth of the flow on the minor street. The capacity of a signalized intersection can be computed by assuming that as many as 1,000 vehicles can move through each lane during each hour of total green time. This is a high figure attainable under optimum conditions. Actual figures are closer to 300 to 600 vehicles where heavy trucks, left-turn or pedestrian conflicts, etc., are involved.

If you require specific information on signals, signs, and other traffic control devices you should consult the "Manual on Uniform Traffic Control Devices", referred to in the Bibliography. Caution: Unless such traffic control devices have State Department of Transportation approval, they are considered illegal.

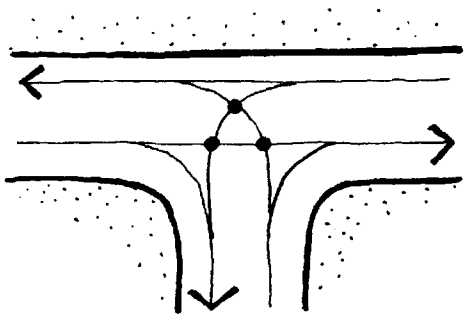
Design Considerations

In reviewing the circulation plan for a major residential development, there are a number of design rules which should be followed. These are:

1. Four-way intersections should be avoided. As the diagram shows, the number of potential collision points at a four-way intersection for all drivers is 16, while on a T-type intersection there are only three.



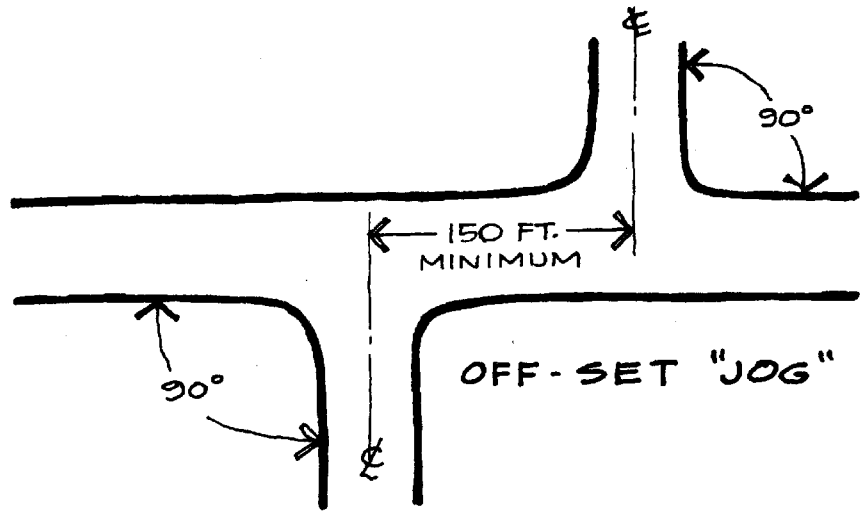
FOUR WAY INTERSECTION
16 COLLISION POINTS



THREE WAY INTERSECTION
3 COLLISION POINTS

2. Intersections should be as close to right angles as possible, have 25 foot radii, and have as flat a grade as possible.

3. Off-set jogs should be at least 150 feet, centerline to centerline.

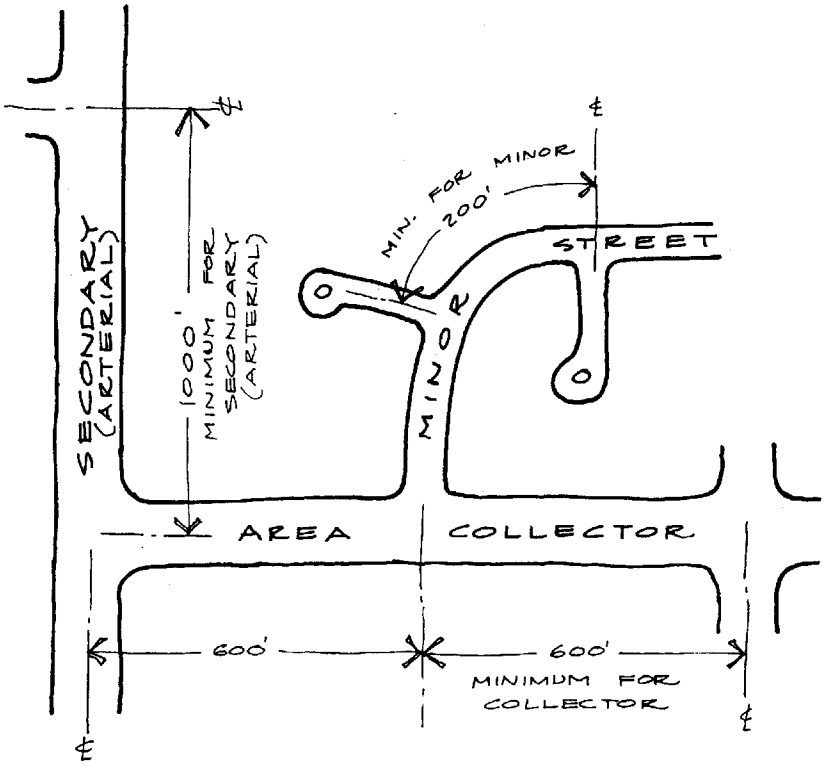


OFF-SET "JOG" STREETS

4. As the Intersection Spacing diagram indicates, minor roads should have at least 200 feet separation; collector and minors, 600 feet; and secondary and collectors, 1,000 feet.

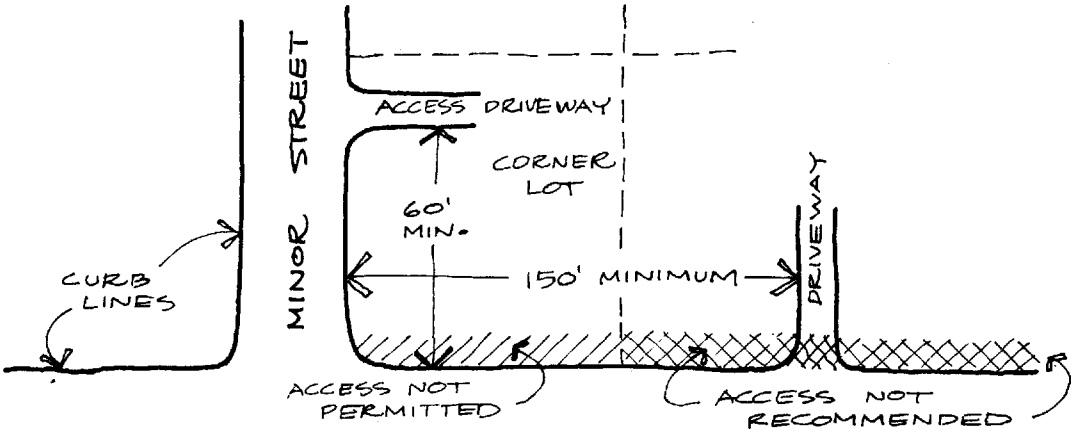
5. The block design should discourage driveways on collectors and arterial streets. The design which encourages this is one which places the longest part of the block perpendicular to the arterial. The end lots can be required to exit on the side streets, and only the middle lot(s) need have driveways on the arterial as shown on the following page. (Actually in terms of good residential design and aside from the problem of driveways, lots along these major roads should be required to be deeper to permit houses to be setback further than usual to minimize the noise, dust, odor, lights, etc., of traffic. In fact, the houses might be required to front on a parallel minor road with their backs to the major street.)

INTERSECTION SPACING

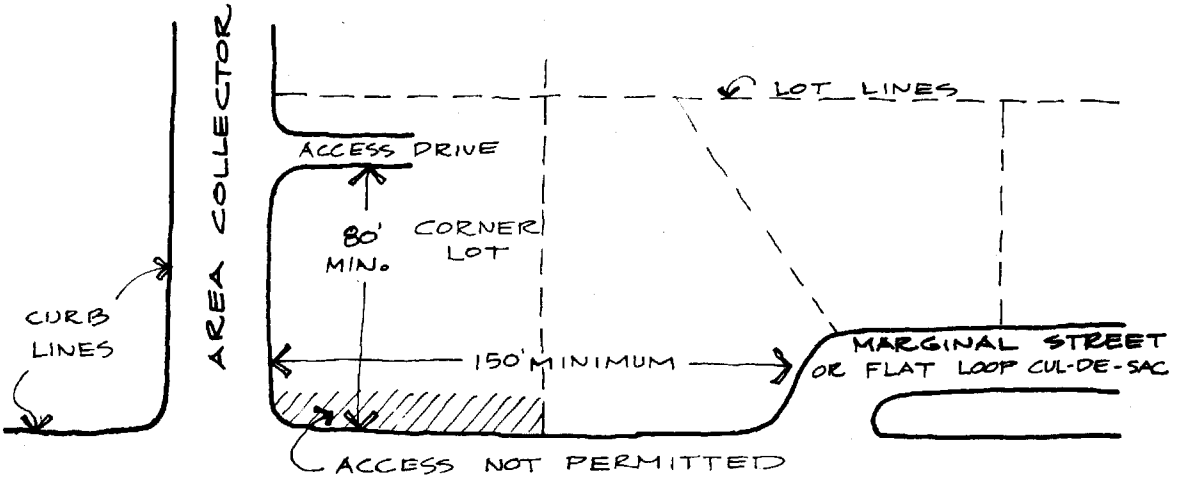


NOT DRAWN TO SCALE

DRIVEWAY ACCESS



AREA COLLECTOR OR SECONDARY



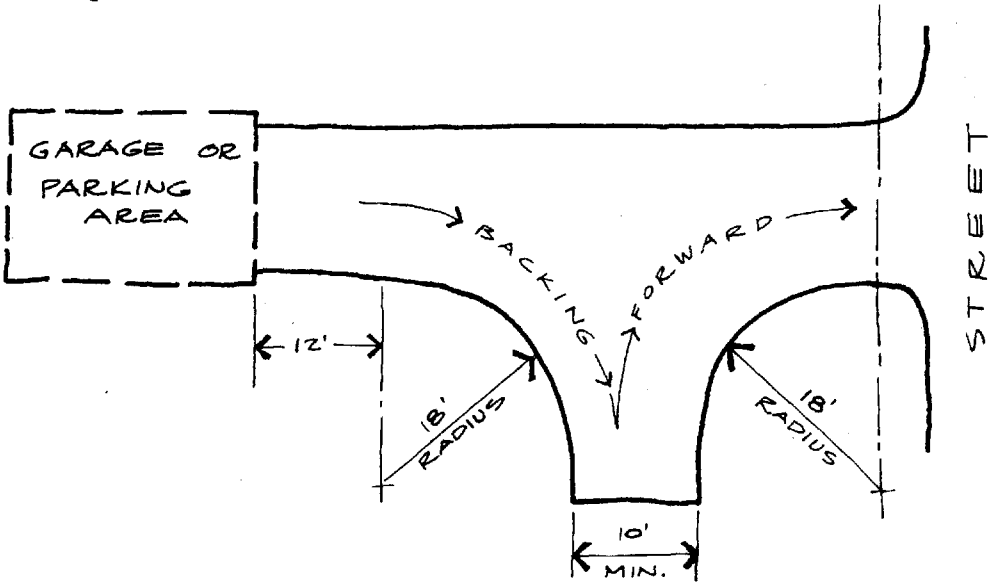
AREA COLLECTOR OR SECONDARY

DRIVEWAY DESIGN

NOT DRAWN TO SCALE

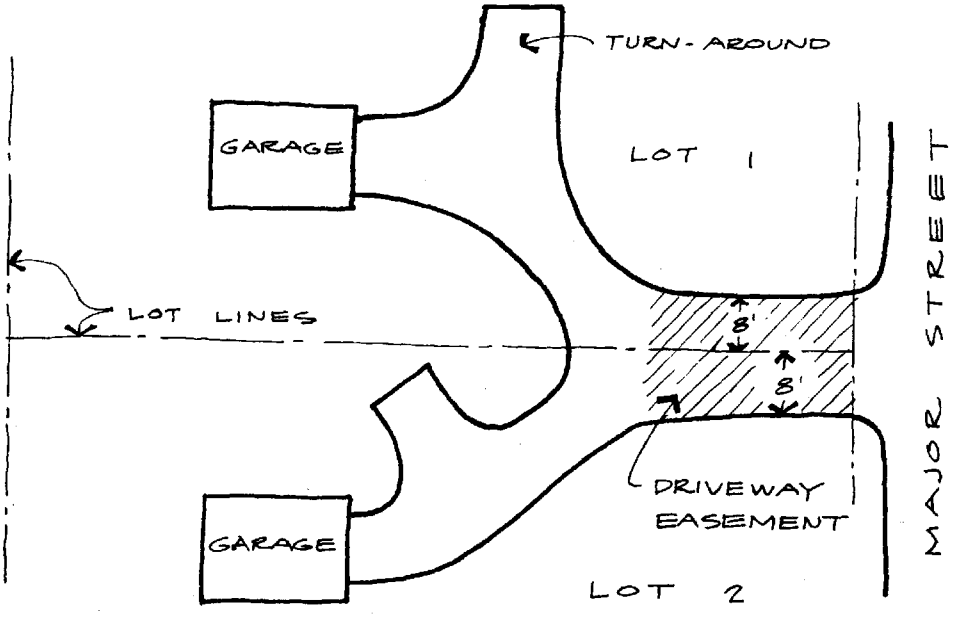
STANDARD DESIGN FOR ALL DRIVEWAYS

(WITH TURN-AROUND TO AVOID BACKING INTO STREET)

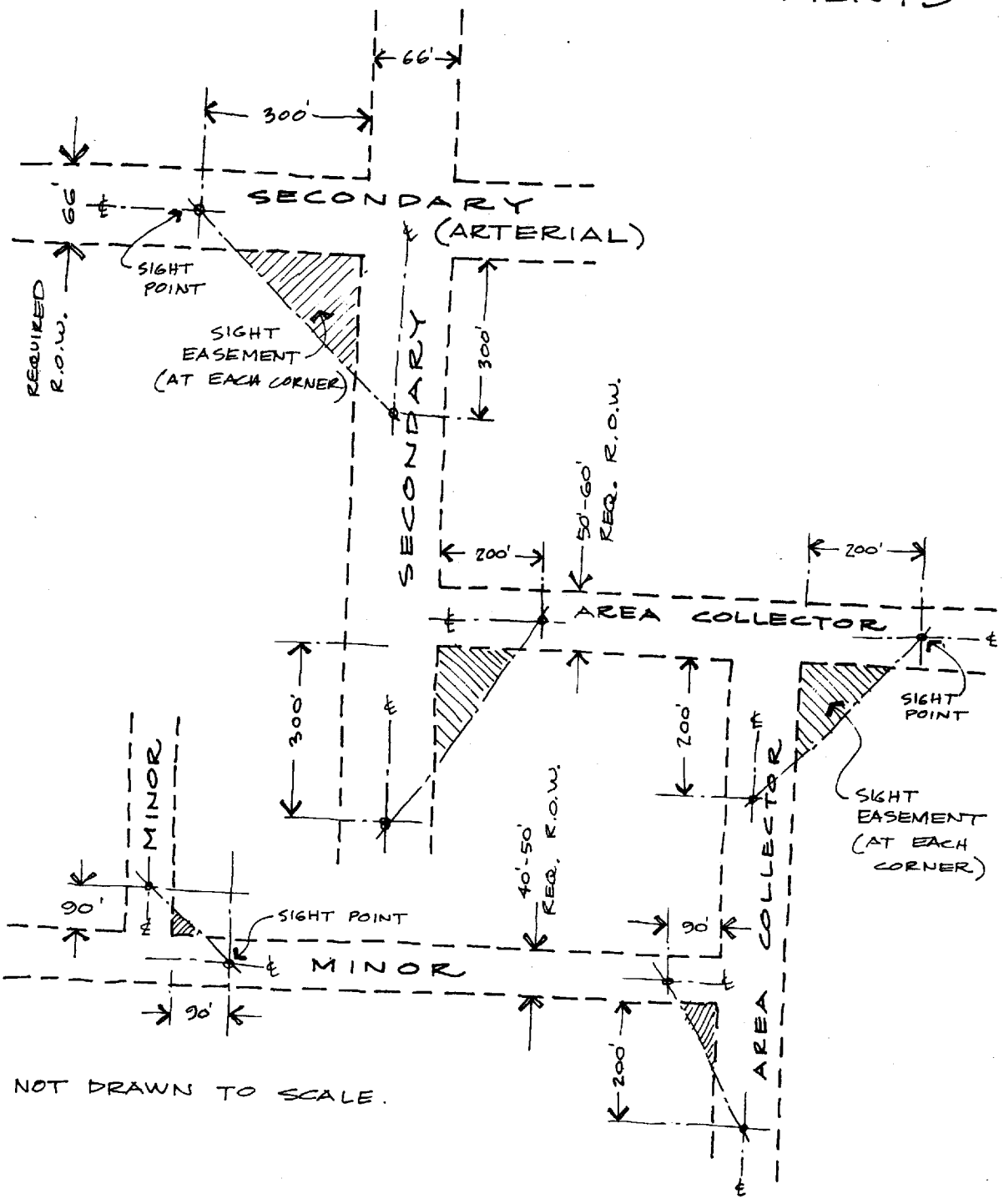


JOINT DRIVEWAY DESIGN

(TO REDUCE ACCESS POINTS ON MAJOR STREETS)



INTERSECTION SIGHT EASEMENTS



NOT DRAWN TO SCALE.

6. If driveways are necessary on collector or arterial roads, joint use of a driveway by two adjacent lots should be encouraged. Developers will always argue against this since it divides the responsibility of maintenance, snow removal, etc., and unless the development is well designed it could make the homes more difficult to sell.

   On the other hand, joint driveways are safer since they reduce the possible number of collision points on a road and do not interfere as much with traffic flow on the arterial road. It also reduces the amount of paved surface on each lot since it is obvious that the width of the driveway does not have to be doubled even if it serves two lots. In any event, turnarounds should be provided on each lot fronting on major collector or arterial roads. See Driveway Design drawing.

7. Sight easements are necessary at all intersections. They are designed to insure that critical sighting directions remain clear of obstructions. The dimensions will vary depending on the type of road as indicated on the Intersection Sight Easement Drawing.

Private Streets

Developers will often propose private streets in large multi-family development projects. The main incentive is usually the development costs saved by building such streets to lower standards than those required for public streets. In some communities there may be no standards for private streets. A secondary reason for proposing private streets may be the desire for some design innovation not possible under conventional public street standards.

Many communities encourage or even require private streets in multi-family developments to avoid increased maintenance costs, while other communities require that all streets be public. While there is no right or wrong, some points are worth noting.

There is seldom any justification for a private street to be built to less than required municipal standards. Street standards are purely a question of physical design and should be based upon sound design criteria relating to anticipated traffic demands to the type of development the streets serve regardless of whether they are public or private. Further, the planning board is not bound by the street design standards found in the subdivision ordinance and may consider variations from ordinance standards if they find that an alternative design is more appropriate.

Secondly, the question of legal ownership of streets carries with it the responsibility of perpetual maintenance. In the case of multi-family developments, internal private streets are owned by the developer (rental projects) or the homeowners association. The planning board should seek legal advise on the status of ownership and maintenance responsibilities

of sewers and other utilities under private roads. In many such developments, not only street maintenance but other services, such as garbage collection, are provided by the developer or the homeowners association.

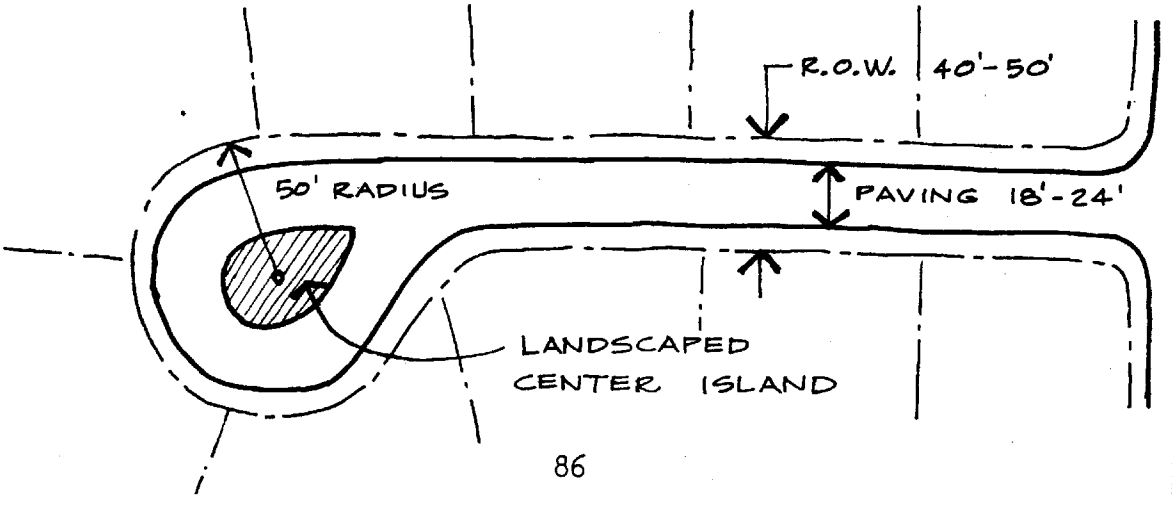
It has been the experience of many communities that the maintenance cost savings of private streets are no bargain. One street looks like any other and when private streets are not maintained the project residents call Town Hall. The community must then pressure the owner/developer for needed improvements. Where a homeowners association is responsible the same problems occur. When faced with rising maintenance costs or when major work is required, the association may ask the municipality to bail them out by taking over the streets. Some associations have argued that they should not be taxed in full for street repair (or garbage collection) which they provide, in part, for themselves.

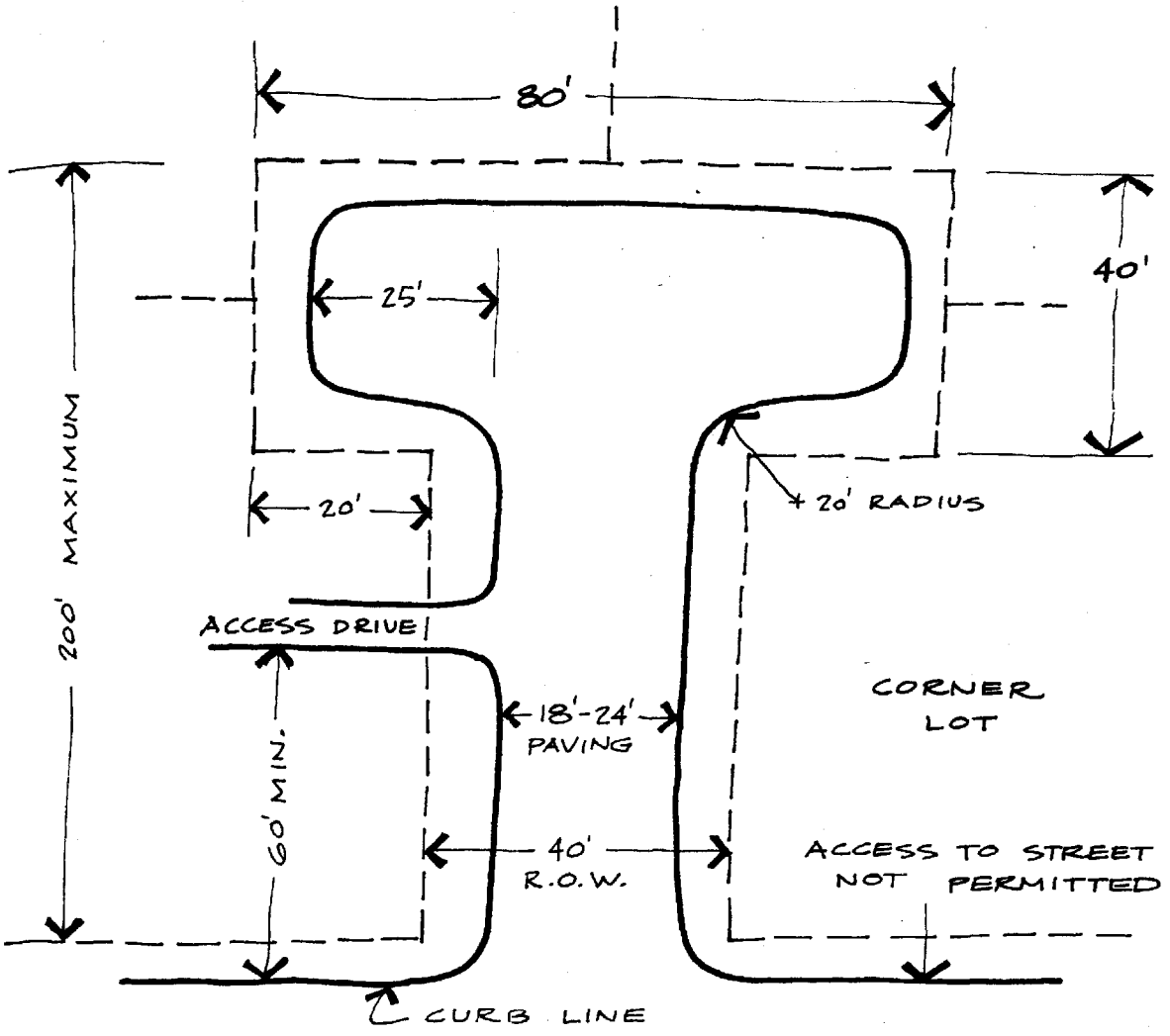
The simplest method to avoid such problems is to flatly forbid private streets. Where private streets are permitted, they should be constructed to the same standards required for public streets so that they will not be substandard if taken over by the municipality at some future date.

Cul-De-Sacs

Cul-de-sacs are dead end streets with turnarounds. While they have certain disadvantages in that they may limit access for emergency vehicle surveys show that people who live on cul-de-sacs welcome the privacy and freedom from through traffic. In order to maintain this, the street itself should not be longer than 1,000 feet. Otherwise, traffic volumes can become undesirably high, negating the advantages of the cul-de-sac. Excessive length encourages the use of private driveways as turnarounds. It also increases service vehicle trips and emergency vehicle access time Any blockage at the open end can impede access to interior lots.

If a round turnaround is used, the radious should be 50 feet with a landscaped island in the center. An alternate form is the hammerhead cul-de-sac, a drawing of which is shown on the next page.





HAMMERHEAD CUL-DE-SAC

MAXIMUM LOTS - 5
MAXIMUM STREET LENGTH - 200 FEET
NO WALKS REQUIRED

NOTES:
THE HAMMERHEAD TURN-AROUND USES ABOUT ONE-HALF THE LAND AREA OF A STANDARD CUL-DE-SAC. HOWEVER IT SHOULD ONLY BE USED IN VERY LOW TRAFFIC SITUATIONS BECAUSE OF THE UNDESIRABLE (HAZARDOUS) VEHICULAR BACKING MOVEMENTS REQUIRED FOR TURNING.

Review Checklist of Key Items

1. Street and pedestrian circulation pattern should be designed to meet projected traffic demand.
2. Separate pedestrian, bike, and vehicular traffic.
3. Avoid through traffic on minor residential streets.
4. Avoid driveway entrances on major streets.
5. Horizontal and vertical alignments should minimize grading requirements.
6. Avoid four-way intersections.
7. Avoid oblique intersections.
8. Provide turning lanes at major intersections.
9. Minimize street intersections.
10. Parking areas should be separate from street area.

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Chapter 6

PARKING

Introduction

In 1969, New Jersey had 3,068,076 registered passenger vehicles. By 1971, this figure had increased to 3,159,546 and in 1974, according to the N.J. Division of Motor vehicles, passenger vehicle registrations had in creased to 3,629,502. This 18 percent increase between 1969 and 1974 made New Jersey highest among the 50 states in terms of passenger vehicle density per square mile.

One of the most significant impacts of the over 3.6 million registered cars is the prodigious amount of land needed to store them when they are not in use. Assuming an average of 400 square feet per vehicle for parking and accessways, the 3.6 million passenger cars require over 51 square miles of parking space! If they were all parked in one central location, the parking area would more than cover all of Hudson County (45 square miles) or half of Union County (103 square miles).

The importance of parking review in residential developments can be further ascertained by the fact that each household in New Jersey has an average of 1.3 passenger vehicles. The arrangement, design, and location of parking facilities becomes critical in terms of aesthetics, safety, convenience, and environmental considerations. Initially it may be appropriate to review the standards for the number of parking spaces required by zoning ordinances for various types of uses.

How Many

The most common standard expressed for numbers of off-street parking is two off-street spaces for each dwelling unit, although many communities call for 1.5 to 1.75 off-street spaces for town houses and 1.5 for garden apartments. As a rule of thumb, these standards are also reasonable if additional visitor parking is provided in town house and garden apartment areas and other factors discussed below are taken into consideration.

The actual number of off-street parking spaces that are needed depends on a number of variables. In single-family detached neighborhoods, the price of the houses is probably the most important indication of how many cars will be registered to a household. High price houses are a fairly reliable indicator of higher income, which means there is greater likelihood of more cars. The children, upon reaching driving age, often receive their own vehicles. The adults might have "personal" cars in addition to the "family" car. Despite this difference between single-family areas, there is usually no problem in providing off-street parking since the driveway running from the street to the house

or garage can store a considerable number of vehicles.

To ensure that the vehicles are brought in off the street, communities often post "no parking" hours for a certain period of time during each 24 hours. This might be from 2 a.m. to 4 a.m., for example. Other ways to encourage off-street parking are to require paved driveways with reasonable grades.

Town houses or single-family attached housing are a little more difficult to predict in terms of car ownership. Here it appears that the type of occupancy is the key determinant. If oriented toward senior citizen or retirement couples, it will probably average out to single car households. If it has a normal distribution of occupants -- couples (young and old), single-householders, and couples with children, the average will be somewhere around the 1.75 cars per household. As the occupancy approaches the more conventional single-family detached -- and this may occur with units of three or more bedrooms -- the average number of vehicles will be two or more.

There are several additional complicating factors in trying to determine what constitutes an adequate number of parking spaces for attached housing. The first is that the densities are higher than detached single-family units; five to eight units per acre as opposed to two to four units per acre. As a result, the sheer number of cars can tend to visually impact an area.

The second factor is the physical design of town houses. They are usually on lots varying from 18 to 25 feet wide and are often set back no more than 25 feet from the street right-of-way.[26] This makes it quite difficult to design for off-street parking without cars overhanging sidewalk areas and using up valuable, limited private open space.

A further complication occurs when visitors arrive. If the driveway curb cuts of the various lots are too close together, it may preclude using the streets for parking without blocking a driveway. Therefore, provisions for off-street visitor parking must also be considered.

In summary, town houses or attached single-family units should be required to provide at least one off-street parking space for one and two bedroom units and two spaces for three or more bedroom units. In

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[26] Right-of-way includes the pavement, curbs, and adjacent sidewalks. On a local street, the 50 foot right-of-way is a common standard, and this would provide for a 30 foot pavement with 10 feet on both sides for curbs, sidewalks (usually three or four feet) utilities, trees, or landscaping.

addition, it is recommended that the total number of spaces required be not less than two per unit, and the difference between what is provided on individual lots and the total minimum requirement be located in off-street parking bays to accomodate visitor parking.

Even if each lot provides for two off-street parking spaces, a visitor lot should also be provided to provide one off-street parking space for every five to seven dwelling units.

Garden apartments often follow the same car ownership patterns as town houses. Those designed only for the elderly or senior citizens are probably one-car households. The same is obviously true of single person households. Since most apartments are constructed predominantly with one bedroom and only a small percentage with two or more, the number of two-car households will probably be limited. Since the parking is almost always in common bays, visitor parking usually is no problem.

We recommend that a standard of 1.5 spaces per apartment be established except if the number of two and three bedroom units exceeds 40 percent of the total. Then a standard of 1.75 off-street spaces per apartment should be established.

Other Considerations

The requirement for off-street parking can be seriously altered by a number of factors. If any home occupation or professional offices are permitted, the required parking should be increased. A doctor with only a single nonresident employee, for example, can generate a considerable number patient parking depending on the specialty. Pediatricians or general practitioners with open office hours will often have as many as ten or more patients waiting.

On the other hand, the availability of mass transit such as buses or close-by commuter trains could cut down on the number of cars in a particular household.

These are factors which should be considered in establishing the standards for the number of required off-street spaces.

Common Terms

A discussion of parking for a typical multi-family development might sound something like this:

> "The bays look O.K., but the stalls are a little narrow. Maybe we should get hairpin marking. I don't like the bumpers and the overhang cuts off the sidewalk. The aisles are too narrow and the islands are too tight. The ramp grades are too high at the curb cut and the curb return is too small."

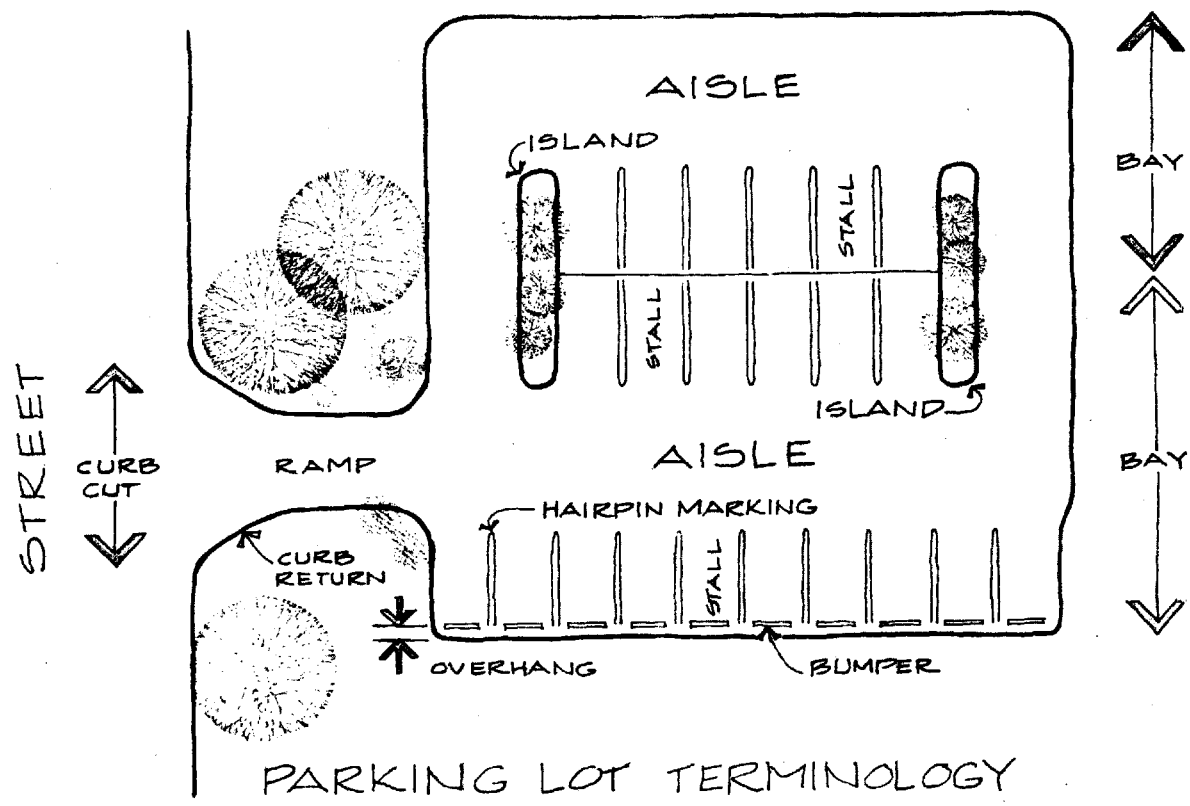
As one might imagine, the particular parking area was not very well designed, with some critical elements not up to good parking standards. In the illustration, the reviewer discussed ten of the critical elements comprising a parking system. What they mean and the usual standards a community should seek are discussed and illustrated below.

Bay. The parking bay is the parking module usually consisting of two rows of parking and the aisle from which cars enter and leave the parking space. Many times the bay may consist of one row of parking served by a single aisle.

Stall. The parking space into which vehicles park is called a stall.

Hairpin marking. Stalls are set off from each other by painted lines. A double-painted line is called a hairpin marking. Their advantage is that they usually assist the driver in centering the car in the stall.

Bumpers. These are the permanent devices in each stall which block the front wheel and prevent further travel by the vehicle past a certain point. Occasionally bumpers are omitted and fences substituted.



PARKING LOT TERMINOLOGY

Overhang. The overhand is the portion of the car extending beyond the wheel bumpers. The average car has about a two to three foot overhang, and this becomes important when curbing is used as wheel bumpers and the overhang interferes with sidewalk travel.

Aisles. The travelled way from which cars enter and depart stalls.

Islands. These are built-up structures, usually curbed, placed at the end of parking rows. They guide traffic and establish turning patterns, clearly mark the end of the parking row, and hopefully prevent illegal parking in critical areas. They are also utilized for landscaping, signs and lighting.

Ramps. Ramps are the driveways leading to the aisles. For safety reasons the grades (steepness) must be controlled.

Curb cut. The curb cut is the opening along the street line at which point cars enter the parking area.

Curb return. The curb connecting the ramp curbing to the street curb.

Other terms used less frequently in parking design include ramp breakover angle, angle of approach and angle of departure. These relate to ramp and driveway grades. Turning diameter refers to the circle transcribed by the outside front, wall to wall travel of the vehicle. The largest standard American car has a 49 foot turning diameter.

Standards for Critical Elements

The current shift to compacts and smaller vehicles does not appear to have any significant impact on dimensional standards for parking areas except in certain highly specialized situations. The majority of cars on the road in the United States are full-size cars, and industry projections do not expect this figure to drop substantially below the 50 percent figure. Because of this, planners must design parking areas capable of handling the 80 inch width and close to 230 inch length of the larger cars.

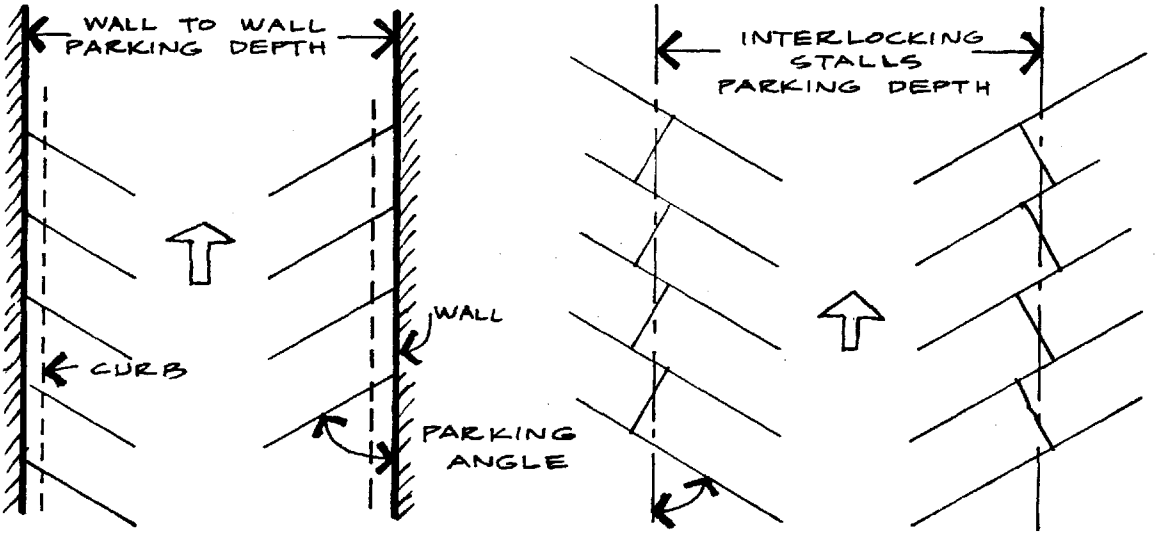
Stall dimension. Most residential parking is considered long-term parking and consequently, a somewhat narrower width can be employed. Ten foot stall widths are usually preferred, but nine foot widths are not uncommon.

The depth of the stall depends on whether wheel bumpers are employed or whether vehicles abut curbs delineating sidewalks. In most cases a 20 foot depth is recommended. If curbs are used as wheel bumpers, then a somewhat lesser depth can be specified. Up to two feet of each vehicle will overhang the curb so that in this situation, the stalls need only be 18 feet deep.

Parallel curb parking requires a somewhat longer but narrower stall. The car itself will fit in a 6.5 foot wide space providing the driver and passenger have at least two feet on either side of the car to open the doors. The stall should be at least 23 feet long to permit proper ingress and egress.

In areas where there is a sufficient number of compact cars to warrant setting aside special areas, such as in colleges, then a 7 by 17 foot stall is sufficient.

Parking bay dimensions. The overall width of a parking bay will depend on a number of variables. These include the type of wheel bumpers, one- or two-sided parking, angle of parking, and actual lot design.



A parking bay with perpendicular or 90-degree parking using wheel bumpers which do not permit any overhang beyond the bay should be between 64 and 65 feet wide. This will provide two 20-foot deep parking stalls and a 24- or 25-foot aisle from which cars enter and leave the stalls. If the curb acts as the wheel stops, the overall width can be reduced by at least four feet to 60 to 61 feet.

Cars parked perpendicular on one side still require a 24- or 25-foot aisle plus the normal 20-foot (or 18 feet with curbs) stall.

For cars parked at various angles the following key dimensions are suggested for wall-to-wall parking. For interlocking stalls, slightly less width is needed except for 90-degree parking which requires the same width as wall-to-wall.

TABLE 8

PARKING DIMENSION STANDARDS

Parking Angle	Stall Width	Unit Parking Depth	
		Wall-to-Wall	Interlocking Stalls
45°	8'6"-10'0"	48'0"-52'0"	42'0"-45'0"
60°	8'6"-9'0"	57'0"-60'0"	53'0"-56'0"
	9'6"-10'0"	55'0"-58'0"	51'0"-54'0"
75°	8'6"-9'0"	60'0"-62'0"	56'0"-58'0"
	9'6"-10'0"	58'0"-60'0"	54'0"-56'0"
90°	8'6"-9'0"	62'0"-66'0"	62'0"-66'0"
	9'6"-10'0"	62'0"-64'0"	62'0"-64'0"

Source: Eno Foundation, Zoning, Parking and Traffic, 1972, Saugatuck, Conn.

Since the aisles are used interchangeably by each row of cars, their dimensions remain the same. These should be set as follows:

Parking Angle	Aisle Width
0°	12'
30°	12'
45°	13'
60°	18'
90°	24-25'

Only the 90-degree arrangement can be used for two-way operation; the others are automatically one-way.

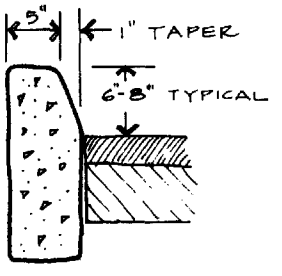
Access ramps. The ramps or driveways leading from the street to parking areas should be at least 24 feet wide for two-way traffic and 12 feet to 15 feet wide for one-way traffic. It is often a good idea to widen the entrance at the street curb line by at least five feet for a car length or more. This is a critical area and can prevent accidents when persons leaving or entering misjudge the available width.

Curbs. Curbs are an important part of the parking plan for a variety of reasons. They clearly mark the travelled right-of-way, channel storm water to catch basins, and prevent the edges of the parking areas and driveways from breaking up from cars or because of water freezing along the edges. They also stop runaway vehicles and prevent adjacent properties from encroaching across property lines.

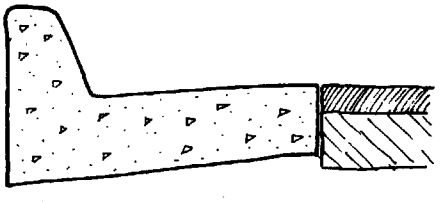
Curbs should be made of granite block or poured concrete because of durability and appearance. Asphalt curbing is easily damaged by snow plows, although conversely, they are considerably easier to repair than concrete or granite block.

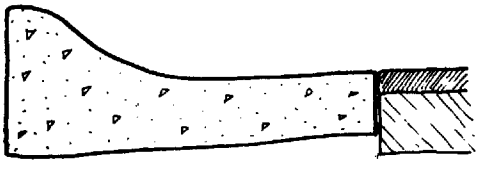
Experience with railroad ties as curbing has not been good. They are easily shifted by vehicles and when this happens, they give a disorderly and unattractive appearance. Their one advantage is that they permit storm water runoff to flow from the driveway uniformly along its entire length.

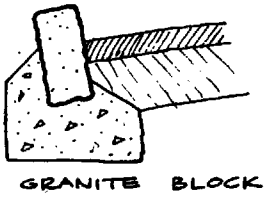
Standard curb heights should be between six inches and eight inches above the elevation of the road and at least 18 inches below the surface of the fill area. Overall width should be at least seven inches. In areas where driveways are longer than usual or narrower than the suggested standard, mountable curbs may be in order.



CEMENT (CONCRETE) CURB


CEMENT (CONCRETE) CURB AND GUTTER

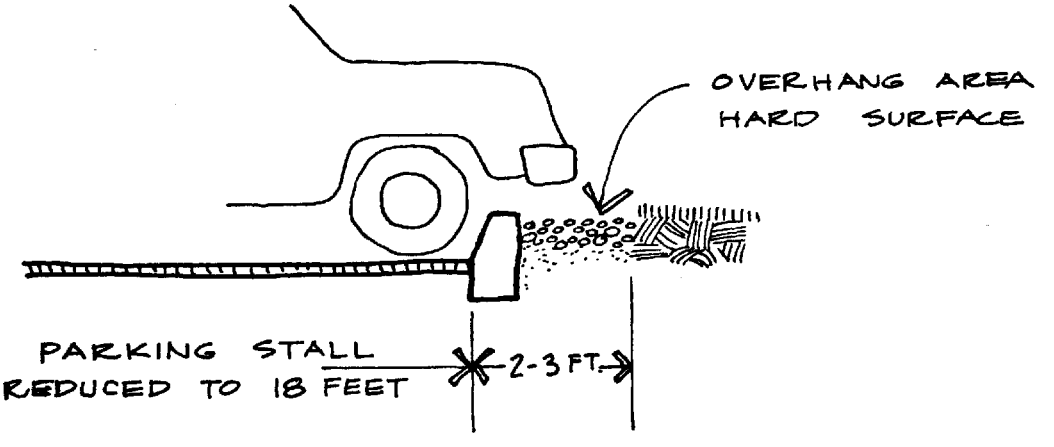

CEMENT (CONCRETE) MOUNTABLE CURB AND GUTTER


GRANITE BLOCK CURB (SET IN CONCRETE)

Bumpers. Wheel bumpers clearly define the end of the parking stall and prevent cars from protruding into adjacent areas. They may be precast concrete blocks securely anchored by long pins into the pavement and designed to butt against the front wheels. This type of bumper has the advantage of being relatively inexpensive and easily replaceable. However, they often get pushed out of place easily and make snow plowing or cleaning more difficult.

Other types of bumpers include guard rail types along the edges of the lot at approximately bumper height. These are not particularly attractive and often do violence to cars with drivers with poor depth perception.

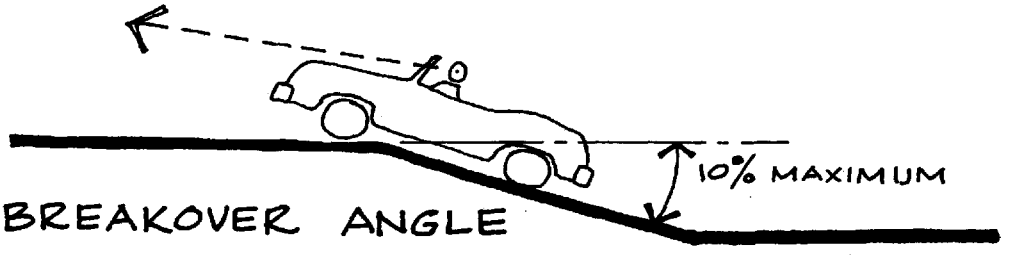
The best arrangement is to use the curbs around the parking area as wheel blocks. This cuts down on the stall depth by at least two feet, reduces costs since curbing will be required anyway, and makes snow removal and cleaning easier. This technique requires caution in the treatment employed adjacent to the curbing under the car overhang. Grass or plantings should be avoided since it will be difficult to cut and will probably die from grease or radiator over-run. The sidewalk area can be extended to this area or a three-foot strip of decorative stone or wood chips can be employed. One word of warning, old telephone poles laid on the ground are not bumpers!



Ramp grades. Grades refer to the steepness of a ramp or driveway and when expressed in percent, means the amount of fall or rise in 100 feet. Thus, a driveway with a 10-percent grade rises or falls 10 feet over a horizontal distance of 100 feet.

Steep ramps are a problem particularly in inclement weather. A maximum of 12 percent is suggested although for short distances (65 feet or less) 15 percent may be tolerated. Breakover angles (where an incline meets a flat area) should not exceed 10 percent or cars will scrape their bottoms and drivers will not be able to see over the top of the hood.

Angles of approach and departure, from streets to ramps, should also be kept to a minimum, possibly not more than 8 percent.

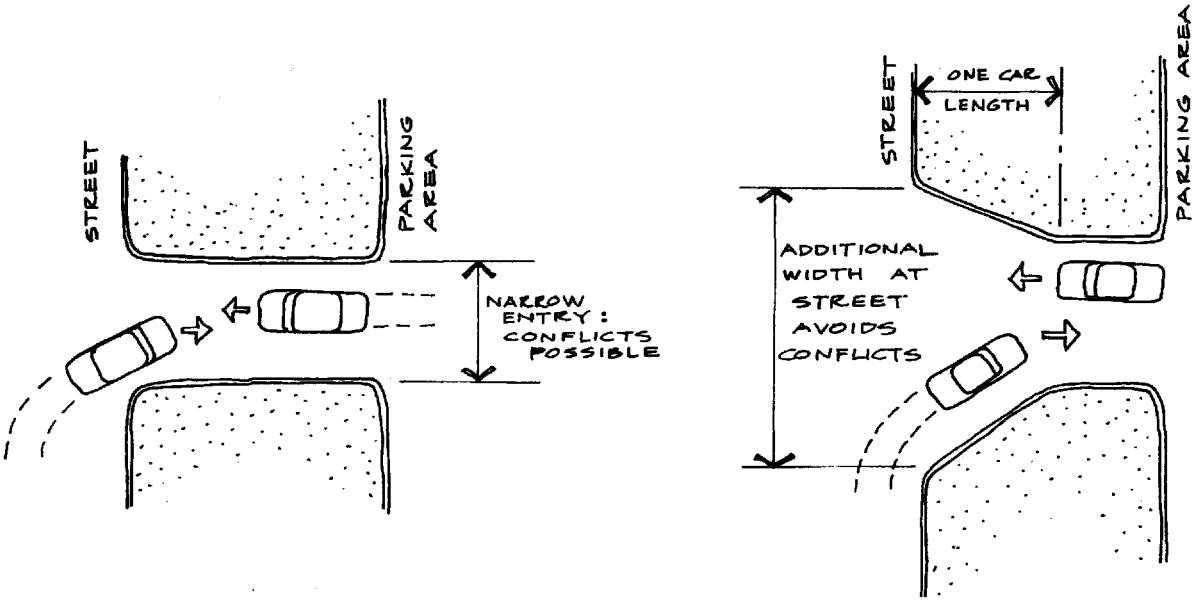


The grade of the ramps or driveway area should not exceed three percent for a distance of at least one car length from the street.

Islands. It is difficult to suggest any specific standards for islands since it depends on the exact design of the parking areas. The turning radius (the circle at the ends of the island expressed in degrees) should be of a sufficient size to permit cars to navigate the turn and end up in a parking space or in the proper lane of a driveway or street. This radius may be between 10 and 20 feet.

Curb cuts and returns. The width of a curb cut for a longer residential parking area should be about five feet wider than the driveway width. This width should be maintained for at least one car length into the ramp or driveway. Thus, for a 24-foot ramp, the curb cut should be 29 or 30 feet. One-way drives of 12 to 15 feet should have curb cuts of at least 17 to 20 feet.

The curb cut is measured at the right-of-way line, and the extension of the curb from the existing curb to the ramp curb is called the curb return. It is expressed in feet as a radius of a circle. Too large a curb return widens out the mouth of the driveway making it hazardous for pedestrians to cross. It also encourages drivers to enter or exit at too high a speed.



On the other hand, too tight a curb return may cause some miscalculations on the part of drivers entering or exiting the lot. Unless a car stops completely, the driver will invariably encroach on another lane. A 20-foot radius is suggested, although 10 feet may be adequate for the curb on the driver's left.

Curb cut angles with streets should be as close to 90 degrees as possible. If one-way traffic only is to be allowed, the angles can be reduced to 60 degrees. The curb cut should be at least 50 feet from the right-of-way of the closest intersecting street.

Some Design Considerations

Single-family. Most of the problems relating to the location of off-street parking on single-family detached housing sites are caused by developers' or architects' insensitivity to the land. It is not uncommon to find split level or bi-level houses on flat lots when in fact this housing was specifically designed for sloping lots.

The result is a garage inappropriately located and driveways encroaching on side yards.

Another example is when development takes place on steep topography. Developers often attempt to take advantage of the topography and locate the garage on the "downside". In other words, let the slope form a one-half level and use this level for recreation and service areas as well as a garage.

This works well when the ground slopes toward the street. A short, direct driveway into the garage suffices. However, when the land slopes down from the street, the half level is toward the rear or side of the house. A long, very steep driveway results, sharp turns are required, and invariably the garage space is not utilized for its intended purpose.

The answer is to redesign the structure and build the garage as the top rather than the botton half story. At the very least, a pull-off from the driveway should be provided at the front. Otherwise, the steep driveway grades that result will dissuade persons from utilizing the off-street parking.

Another factor contributing to nonuse of off-street parking on single-family lots may be the lack of paved driveways. While runoff is increased from paved surfaces, the lack of a stabilized surface, particularly where grades are steep, actually increases siltation and sedimentation. In addition, in areas with any significant amounts of snow, people cannot effectively get rid of the accumulation without injuring the surface. They avoid parking in the driveway and use the streets or roads.

In areas of good drainage and flat terrain paved driveways may not be necessary.

In reviewing the parking arrangements for single-family houses, planning boards should require the applicant to indicate where the driveways will be located and have these areas staked out.(27) A planning board member charged with the review of the subdivision should physically inspect the lots and pay careful attention to the sight distance on either side of the driveway, as well as its proximity to intersections, other driveways, utility poles, general topography, etc.

The inspection should be done from the point of view of the driver seated in a vehicle. Driveways can be located on the outside of curves because sight distances in both directions are excellent.

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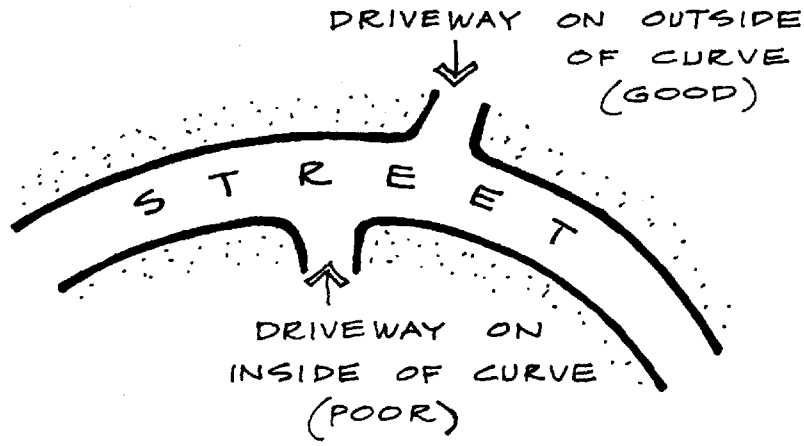
(27)Staked out means to have the surveyor actually locate the curb cut where the driveway intersects the street and mark them by stakes or some other appropriate method.

For the opposite reason -- lack of sight distance -- they should be avoided on the inside of curves.



Consider the design of a driveway and parking space or garage in terms of the ease of ingress and egress as well as maneuverability. Any impediment -- too narrow a drive, sharp turns, too close to the house -- means trouble and people will not make the effort to park off the street.

Finally, all lots on busy streets should have turnarounds. This permits cars to turn around on the lot and exit in a forward position. This is considerably safer than having cars back out even on minor or local streets with steady traffic flows.

Multi-family developments and PUDs. There are a number of general design principles which should be considered in reviewing parking arrangements for larger and higher density developments. These include:

a. Parking should be located as close as possible to the building or structure it is designed to serve. At the maximum, the parking space should not be more than 300 feet from the unit. Visitor parking can be somewhat further away, but 400 feet is still the effective maximum.

b. Cars should be grouped in small, off-street bays rather than allow on-street parking.

c. Parking areas should be required to be paved, landscaped,

drained, and lighted.

d. Parking areas should be landscaped and a good rule of thumb is to require between five and ten percent of the parking lot be landscaped.

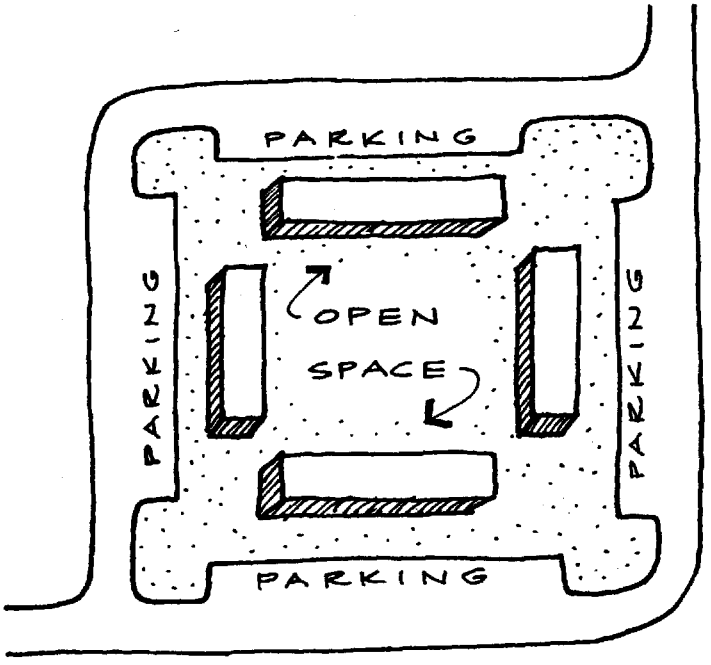
e. Sidewalks should be provided from parking areas to buildings.

f. Parking for town houses should be handled in separate parking areas on the perimeter of structures.

g. Slopes around parking areas should not exceed 2:1. Where excessive grading is required, parking should be terraced.

In reviewing a parking plan for a multi-family, higher density or large residential development, the planner should "drive and walk" the plan. By this we mean that the reviewer should imagine driving from the street into the parking area, parking, and walking from the car to an apartment or house. For added interest, imagine oneself burdened with several bags of groceries and two small preschool-aged children.

The most obvious requirement based upon this above scenario is that the parking should be close to the buildings they are intended to serve. The design of a project can facilitate this by arranging buildings in a square with parking on the outside of the square and leaving the interior of the square as open space and recreation.



Another satisfactory arrangement is to provide the parking in the interior of the courtyard and having the buildings look out over the green or open space.

The planner's dilemma is where a project is designed with parking in both the front and rear of the building, thus surrounding the building with asphalt. The problem is whether the convenience is more important than meeting the aesthetic and open space needs of the residents.

There is no easy or apparent answer. If there is sufficient open space generally and the "sea of asphalt" is not common with all buildings, then it can be tolerated. On the other hand, if all buildings are surrounded by parking, it may indicate that the overall density of the project is too high.

Parking should be avoided in the area between the front of the building and street. Again, if it is necessary to put parking in this area, it may be possible to drop the parking area several feet below grade so that the normal line of sight is carried over the cars. An earthen berm can also be used to shield the parking area.

Sidewalks should be required in parking areas. The arguments against them are universal -- people do not use them, they make snow plowing difficult, they are expensive, etc. They should be required, however, and people will use them to get from parking spaces to buildings.

In addition, sidewalks can be used as wheel bumpers, landscape strips, and locations for lights and signs. They should be at least eight feet wide to permit sufficient walking space between overhanging cars. (If cars overhang on one side only, the walks need only be six feet wide.)

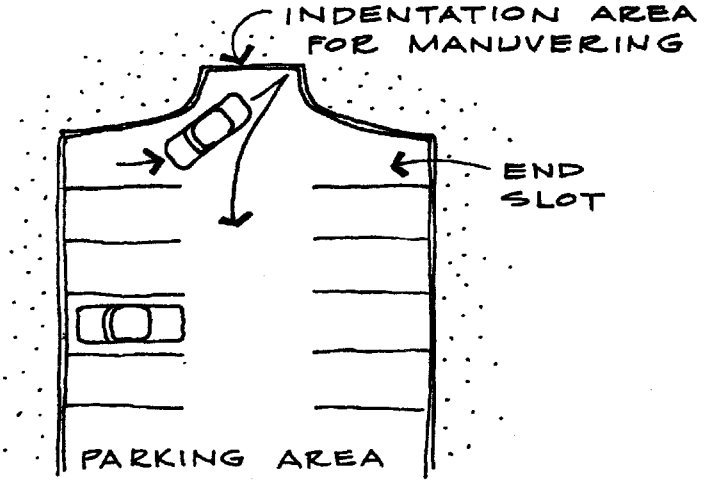
The sidewalks should be five inches above grade and where they cross driveways, they should be dropped to grade. However, a slight "bump" properly signed and cross hatched across the driveway can call drivers' attention to the crossing and serve to slow down traffic. A 32-inch wide area of the sidewalk should be gradually ramped to meet the driveway at grade to enable persons in wheelchairs to easily cross driveways.

Parking areas should be paved and adequately drained. This latter requirement may call for curbing which, in addition to channeling water to catch basins, also creates a favorable aesthetic impression. Curbs also clearly define the outer limits of the parking lot and prevent cars from encroaching on lawn and green areas.

The paving requirement for parking areas should be drafted by the municipal engineers. Unfortunately, there is a tendency to minimize parking lot paving requirements as opposed to, for example, road requirements. While it is true that the volume and speed of traffic is

considerably less than those on roads, the parking maneuvers that take place on the lots can be especially detrimental to the surface. As a minimum, the parking lot should have a nine inch quarry process stone sub-base, two inch stabilized base, and 1½-inch fine aggregate bituminous concrete top.

In considering the actual design or layout of the parking area, the planners should focus on the actual useability of the parking spaces. End slots are not useable unless the spaces are angled. If perpendicular, they should be made wider or an indentation placed at the end of the bay.



Spaces should not be placed too close to the entrance of the bay, particularly if the entrance drive is close to the street. Otherwise, cars pulling into or out of spaces can interfere with cars pulling into the lot.

Carefully examine the traffic flow in the parking area, particularly if any row is filled. Many times the parker must exit the lot and enter again from the street. This often occurs when one-way systems are imposed. It should be avoided by making ramps and driveways two way.

As indicated earlier, parking lots should be landscaped and lighted. Chapter 8 discusses landscaping and Chapter 11, lighting.

Review Checklist of Key Items

1. The number of parking spaces should meet the zoning ordinance requirements.
2. All spaces should be useable.
3. Use curbs rather than bumpers.
4. Car overhang should not block pedestrian walks.
5. Car overhang areas should be hard landscaped rather than planted.
6. Parking areas should be lighted and landscaped.
7. Double stall markings make parking easier.
8. Keep parking spaces at least 50 feet from driveway entrances.
9. Parking bays should provide for turnarounds to allow cars to leave if the bay is filled.
10. Use angle parking when directional flow is critical.

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Chapter 7

WATER

Introduction

In reviewing any major residential subdivision or development, the planning board should address itself to three questions relating to water.

1. Is there enough to serve the needs of the residents? (The drinkable supply)

2. How will it be disposed of once it is used? (Treatment of waste water)

3. How will storm water be handled? (Storm water management)

This chapter discusses the planning board's role in evaluating potable, waste, and storm water during the review process.

Potable Water

Applicants for subdivision or major residential development approval will usually indicate one of two sources of potable (drinkable) water. Where a private or public water company holds a franchise[28] for the area proposed to be developed, water will be supplied by the utility company.

The planning board's role is to determining that the applicant has appropriate guarantees from the utility that a sufficient quantity of potable water will be available when the homes are completed.

To insure that this is indeed the case, the applicant should supply appropriate evidence which is usually in the form of a letter from the water company to the planning board. At some point in the review process, usually the tentative approval of the preliminary plat stage, the utility should formally approve the applicant's distribution and storage system.

An important part of the review process should involve the location of fire hydrants. Most planning boards refer the water distribution plan to the local fire company for review. They will also indicate the type of hydrant that should be installed, as well as the minimum pressure needed for fire fighting purposes.

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(28) The right to distribute water within a given area.

Where an applicant proposes to supply the water by means of individual wells or by a central well, the planning board's role becomes considerably more difficult. Basically, the planning board must determine that the quantity, quality, and water pressure will be adequate to supply the proposed development. Where a central well is proposed, the treatment, storage and distribution must also be approved. In arriving at its decision, the board must rely on the advice of the municipal engineer and health officer.

As part of any major development proposal it would be entirely appropriate for the planning board to request from the applicant information relating to the geology of the area proposed for development. Based on this information and from data from the Department of Environmental Protection, Bureau of Geology, a determination could then be made as to the adequacy of water to supply the development.

If the water yield is not sufficient, the applicant should be asked to revise the plans to scale down the number of units.

Waste Water Treatment

Once the water is used it has to be treated and disposed of. The planning board's role is to determine whether the proposed sewage disposal system will be adequate, and here again, the role of the municipal engineer and health officer is paramount.

Central treatment. If the effluent is proposed to be treated at a regional treatment facility, the planning board should secure the necessary proofs that the plant has the capacity to handle the expected flows from the development. At an appropriate time during the review process, the detailed plans of the collection system -- laterals from the house to a collector and from there to trunks to the treatment plant -- will have to be approved by the utility.

Package plants. Very often developers of higher density housing will propose a package chemical treatment plant as a method of treatment, at least on an interim basis. The general experience with these plants has not been good. Whether the cause is due to inadequate design, lack of maintenance or improper operation, most municipality look with disfavor on these units. Before approving a package plant the Department of Environmental Protection will require the municipality to take over ownership, maintenance, and operation as a condition of State approval.

As part of the requirements for subdivision or development approval, planning boards should consider requiring the installation of dry sewer lines. These are sewer lines capped at both ends which are capable of being hooked up to trunk lines when the trunks are extended to the area. Obviously, some judgment should be exercised. If the plan is to extend the trunks within five or so years, such a requirement is reasonable. Anything beyond that time period may be too speculative to justify their installation.

Septic treatment. The septic system is a method of treating and disposing of sanitary effluent used by 18 percent of the State's population. It operates on the principle of biological activity, whereby microorganisms attach and digest household solid wastes and turns them into gases, water, and sludge products. The effluent from the tank, which is a watertight underground receptacle, then passes to a drainage field, which is usually made up of perforated or open-jointed pipes in shallow, gravel filled trenches. The effluent then seeps through the soil, which filters it (hopefully) before it is returned to the underground water source.

In most rural areas, the individual septic system is the principal method of waste treatment. The standards for septic tank construction are contained in Public Law 199, first passed in 1954 and amended in 1966. Presently the State Department of Environmental Protection is applying the law.

The suitability of an area for septic treatment is based on a percolation test. The test requires that the water level in an 8 to 12 inch diameter hole drops one inch within 40 minutes.

There has been much criticism of this test by health officials, engineers, and soil scientists. As a result, many communities are requiring two or more tests to be undertaken in the immediate area where the septic field is proposed to be constructed. In some municipalities the standards have been upgraded and soil logs are required. These logs are 15 to 18 foot deep pits which permit the engineer or health officer to "read" the soil in the area. They can detect layers of clay, for example, which would prevent the effluent from filtering down through the soil.

Major subdivision developments which will be designed with septic tanks should be very low density, preferably two units per acre or less, depending on soil conditions. In their review, planning boards should get copies of all percolation tests including those that failed. Locations should be indicated on a map and all tests should be witnessed by a qualified municipal official such as the engineer, health officer, or sanitarian.

It is a good practice to require soil logs (one per five acres) and a minimum of two percolation tests per lot. The applicant should be required to cover up all soil log pits since they can fill with water and become attractive nuisances.

At a very early stage of the review procedure, possibly at the sketch plat stage if it is used, the applicant should undertake some percolation tests to determine whether any potential problems exist. These should be equally scattered around the site. This requirement can save the applicant and planning board considerable time and money.(29) Formal approved percolation tests should be a requirement of preliminary subdivision approval.

Percolation tests should also be undertaken during the normally wet months. After two or three weeks without rain, most land will have areas where a passing test can be secured.

Finally, septic tank failure is often the result of the residents' unfamiliarity with the proper maintenance and operation of the system. Many people move from areas where central treatment facilities are available. The local board of health should consider distributing information brochures to new residents to assist them in learning about the system. Some examples are listed in the bibliography at the end of this chapter.

Storm Drain System

The proper control of storm water runoff is probably the major concern of the planning board in the review of major residential developments. Witness a typical governing body meeting and note the increasing numbers of problems relating to drainage, flooding, and soil erosion. Planning boards are realizing the importance of properly designed storm drain systems and are requiring not only plans for the system but calculations upon which the system was based.

As part of the exhibits required for approval, the applicant will submit a storm water drainage plan for review by the municipal engineer and approval by the planning board. The plan will be plotted on a map showing contour lines, and a typical storm water drainage plan is shown on the next page. (In case you have forgotten, contour lines are lines connecting all points on the map of the same elevation or the number of feet above sea level.)

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(29) The authors are personally familiar with one proposed subdivision of 90 acres where the percolation tests were not undertaken until the application for preliminary approval was submitted, as required by local ordinance. Not one passing test was noted! Had the applicant undertaken some sample tests early in the process, the problem would have been uncovered before the expenditure of considerable money for the detailed drawings and surveys required at preliminary approval stage.

The storm drainage system, designed to carry off surface water, consists of natural areas which absorb some water; swales, which are continuous depressions which direct and divert water; ditches which carry the water; and pipes which also carry the water. Curbs along roads are also part of the storm drainage system since they direct water into catch basins which are the conduit into the storm sewer pipes, and they provide for the trapping of sediment, garbage, trash, etc.

The ultimate destination of the storm water is a stream or river with sufficient capacity to handle the expected surface flow. In particularly porous soils, such as sand, a good part of the water will be absorbed directly into the ground through recharge basins by having the storm water directed to those basins.

The use of retention and detention basins[30] has increased significantly. Not only are they used to recharge ground aquafiers, but they are also important in reducing soil erosion and sedimentation. By controlling the flow from the basins by various control devices, water can be slowly released to prevent or reduce downstream flooding. Judiciously used, detention basins can be integrated into the recreation plan of a development.

The applicant's engineer will plan the storm drainage system by actually calculating the volume and velocity of water resulting from a certain intensity rainstorm. The water which will not be absorbed because of buildings and paved areas will be directed to swales, ditches, through pipes (usually), and finally into the watercourse.

In the design of the system, the engineer will try to follow some basic principles. The pipes, for example, will be placed below the frost line (approximately three feet) but not excessively deep (more than 15 feet) since this increases costs enormously. The pipes will have a sufficient slope to allow for water to run at a velocity that will keep debris from building up in the pipe. This is usually estimated at one-half percent or a drop of one-half foot in a horizontal distance of 100 feet. This will produce a velocity of two cubic feet per second, which is considered minimum.

On the other hand, too steep a slope means that the water will come through as velocities which would damage the pipe. Engineers usually estimate that this range is 8 to 12 cubic feet per second,

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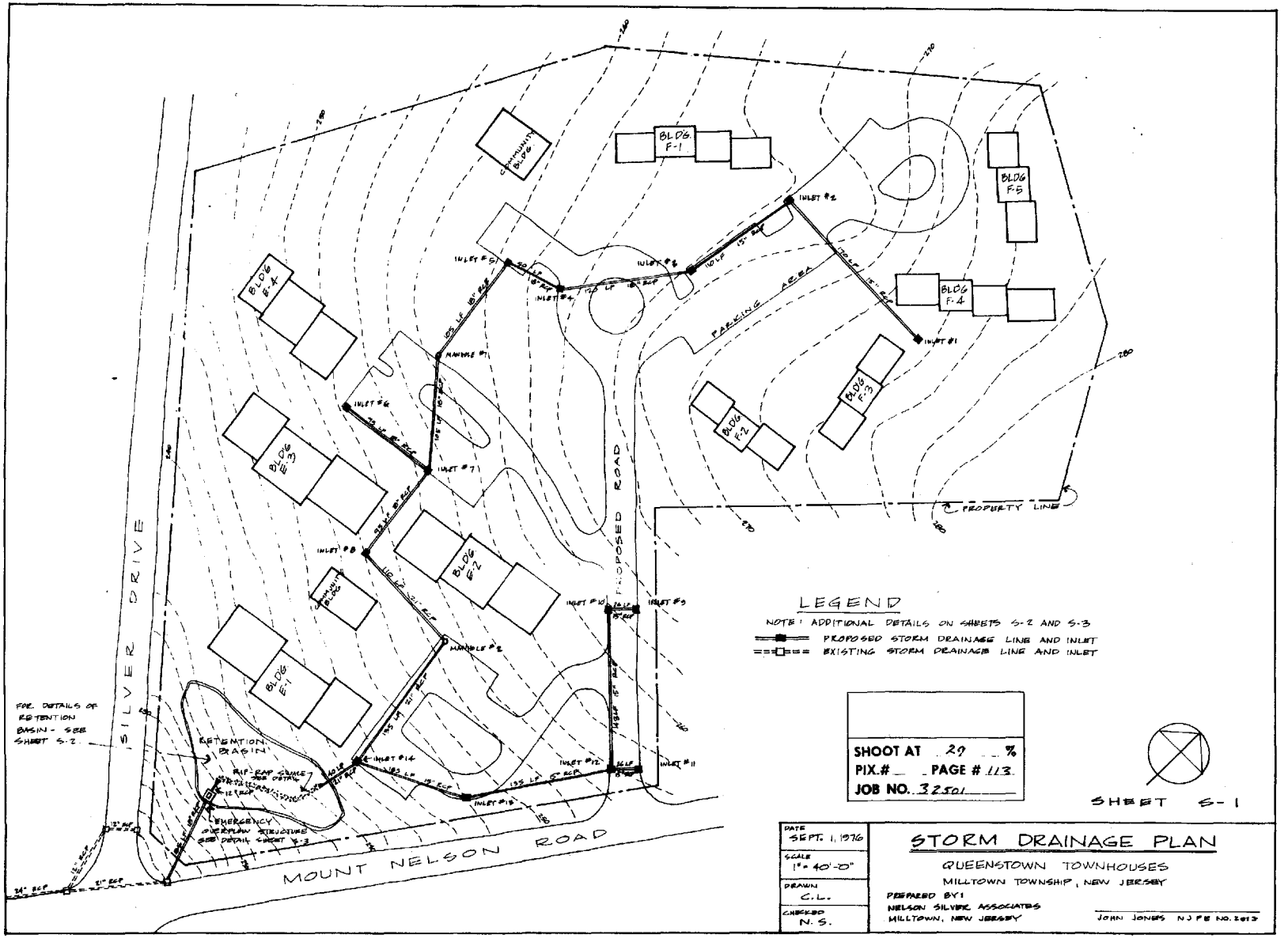
(30) The difference is that retention basins retain water more or less permanently. Detention basins only detain water temporarily.


SILVER DRIVE
MOUNT NELSON ROAD
PROPOSED ROAD
PARKING AREA
PROPERTY LINE
BLDG F-1
BLDG F-2
BLDG F-3
BLDG F-4
BLDG F-5
BLDG E-1
BLDG E-3
CLUBHOUSE BLDG
INLET #1
INLET #2
INLET #3
INLET #4
INLET #5
INLET #6
INLET #7
INLET #8
INLET #9
INLET #10
INLET #11
INLET #12
INLET #13
INLET #14
MANHOLE #1
MANHOLE #2
RETENTION BASIN
RIP-RAP SPILLWAY SEE DETAIL
EMERGENCY OVERFLOW SPILLWAY SEE DETAIL SHEET S-3
FOR DETAILS OF RETENTION BASIN - SEE SHEET S-2
LEGEND
NOTE: ADDITIONAL DETAILS ON SHEETS S-2 AND S-3
PROPOSED STORM DRAINAGE LINE AND INLET
EXISTING STORM DRAINAGE LINE AND INLET
SHOOT AT 29 %
PIX.# PAGE # 113
JOB NO. 32501
SHEET S-1
DATE SEPT. 1, 1976
SCALE 1" = 40'-0"
DRAWN C.L.
CHECKED N.S.
STORM DRAINAGE PLAN
QUEENSTOWN TOWNHOUSES
MILLTOWN TOWNSHIP, NEW JERSEY
PREPARED BY:
NELSON SILVER ASSOCIATES
MILLTOWN, NEW JERSEY
JOHN JONES NJ PE NO. 2013

Where it is not feasible to reduce the velocity at the outfall or end of the pipe, devices known as energy dissipators can be constructed or assembled. These may be no more than large boulders embedded in a concrete trough to break up the water flow when it leaves the pipe.

Catch basins are usually located at block corners. They should also be placed at the lowest elevation in mid-block. In any event, they should be placed no more than 600 feet apart.

Since the municipality will eventually take over the storm drain system, the length of the storm sewer lines should be kept short and the number of catch basins should be the fewest possible, consistent of course, with a workable system. Whenever possible the pipes should be located in the right-of-way of streets, as should all manholes. This greatly simplifies maintenance and cleaning operations.

In recent years there has been a shift back to the use of swales and open drainage for storm water where feasible. This method has certain advantages over pipes. It is obviously cheaper than pipe, easier to maintain and keep clean, and more in keeping with environmental goals and objectives. However, it can only be utilized if the areas adjacent to the ditches are kept clear of structures and can serve as flood plains when flows exceed the ditch capacity. Care must also be exercised to ensure that property owners do nothing to alter the capacity or direction of the ditch.

In addition, the ditch cannot be so deep as to require retaining walls on the adjacent banks. A maximum bank of three feet is suggested with slope ratios of not less than 1:2, or two feet horizontally for each foot vertically. The banks should be planted with ground cover such as English ivy, honeysuckle, or similar low maintenance plantings.

In any event, pipes and culverts will still be needed to carry the flow across roads and walks and past obstructions.

How large a pipe will be an important part of the engineer's work. The general formula used to determine pipe size is Q=CIA. "Q" is equal to the runoff in inches per hour, "C" is the coefficient of runoff depending on the kind of ground surface, "I" is the intensity of rainfall in inches per hour, and "A" is the drainage area in acres.

The formula is a logical one which simply states that the runoff of water will depend on (is equal to) the kind of ground surface times the rainfall times the area being drained, all expressed in compatible units. When a "Q" is determined, a table called Manning Formula Chart can be used to determine pipe size.

The coefficient of runoff, as was stated before, depends on the type of surface. The maximum is one for totally impervious surfaces[31] and as low as 0.1 for pasture land. Rubenstein [32] suggests the following ranges for "C".

TABLE 9

COEFFICIENT OF RUNOFF

	Minimum	Optimum	Maximum
Roofs	0.90	0.95	1.00
Paving - concrete or asphalt	0.90	0.95	1.00
Macadam roads	0.70	0.80	0.90
Gravel	0.30	0.70	0.70
Unpaved streets	0.30	0.60	0.75
Cultivated land	0.30	0.60	0.82
Lawns or grass areas	0.10	0.35	0.60
Woodland	0.10	0.20	0.60
Pasture	0.10	0.16	0.60

(31) Lynch in Site Planning notes a situation where warm rain falls on snow or ice to create a coefficient greater than one.

(32) Rubenstein, Harvey, A Guide to Site and Environmental Planning, John Wiley and Sons, Inc., New York, 1969, p. 112.

The question of which "I" or storm intensity to use in calculating pipe sizes is a subject of considerable debate. The value of "I" in inches per hour depends on the frequency of storm. A five-year storm is one of such intensity that it has a probability of 20 percent in any given year, and in New Jersey it will produce 1.75 inches of rain per hour. A ten-year storm will generate two inches of rain per hour, and a 25-year storm, close to 2.75 inches per hour.

The problem, of course, is that these are averages and an area may experience a string of severe storms each year without affecting the average over a 100- or 200-year period. It is interesting to note that many countries are switching from 10- to 25-year storms as a basis for calculating the "I", and the Federal Government uses a 100-year storm as a basis for determining flood plain areas for flood insurance purposes.

Soil Erosion and Sediment Control

Rain falling on the bare land dislodges minute particles of soil. The dislodged particles are picked up by rainwater and along with other particles carried in solution to streams and lakes. This process is known as erosion, and the particles, eventually deposited in streams and lakes, cause sedimentation. It is estimated that 25,000 tons of soil may be eroded from a square mile of developing area. The silt fills up ponds, lakes and reservoirs, decreasing capacity, clogging culverts and increasing the danger from flooding. It also destroys the the ecological balance and spreads pesticides and disease germs.

Because of its costly environmental impacts, a strong soil erosion and sediment control law has been enacted in New Jersey. Applicants for all but single family homes or projects disturbing less than 5,000 square feet are required to submit a plan to the Soil Conversation District or if the municipality has adopted an approved ordinance, to the municipal engineer. In addition to the specific requirements of submission, including the slope, location, and manner by which soil erosion and sedimentation control is proposed to be accomplished, the following practices should be part of any plan.

1. Disturb only the areas needed for construction; remove only those trees, shrubs, and grasses that must be removed for construction; and protect the rest to preserve their aesthetic and erosion-control values.

2. Stockpile topsoil and protect it with anchored straw mulch.

3. Install sediment basins and diversion dikes before disturbing the land that drains into them. Diversion dikes in the central part of the development may be constructed after streets are installed but before construction is started on the lots that drain into them.

4. Install streets, curbs, water mains, electric and telephone cables, storm drains, and sewers in advance of home construction.

5. Install erosion and sediment control practices as indicated in the plan and according to soil conservation district standards and specification. The practices are to be maintained in effective working condition during construction and until the drainage area has been permanently stabilized.

6. Temporarily stabilize each segment of graded or otherwise disturbed land, including the sediment-control devices not otherwise stabilized, by seeding and mulching or by mulching alone. As construction is completed, permanently stabilize each segment with perennial vegetation and structural measures. Both temporary and permanent stabilization practices are to be installed according to soil conservation district standards and specifications.

7. "Loose-pile" material that is excavated for home construction purposes. Keep it "loose-piled" until it is used for foundation backfill or until the lot is ready for final grading and permanent vegetati

8. Backfill, compact, seed, and mulch trenches within 15 days after they are opened.

9. Level diversion dikes, sediment basins, and silt traps after areas that drain into them are stabilized. Establish permanent vegetation on these areas. Sediment basins that are to be retained for storm water detention may be seeded to permanent vegetation soon after they are built.

10. Discharge water from outlet structures at nonerosive velocities.

11. Design and retain debris basins as detention reservoirs so that peak runoff from the development area is no greater than that before the development was established.

Review Checklist of Key Items

1. Does applicant have letters of approval from water and sewer utilities?

2. Will water yield per acre be sufficient for the proposed density?

3. Have all percolation tests been submitted and reviewed?

4. Do soil logs indicate any problems such as layers of clay?

5. Does the storm water management plan place too much emphasis on pipes rather than open drainage?

6. Is the runoff based on at least a ten-year storm and preferably longer?

7. Does the soil erosion and sedimentation plan show all necessary control items?

8. Have the soil erosion and sedimentation measures been approved by either the local soil conservation district or the municipal engineer?

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Chapter 8

LANDSCAPING

Introduction

Landscaping is the development and organization of outdoor space through the use of "soft surfaces" such as trees, shrubs, and ground cover and "hard surfaces" such as paving stones, gravel areas, street furniture, fencing, and sculpture.

Since landscaping is just as important and as complex a design element as the dwelling units themselves, preparation of the landscaping plan requires the services of a professional landscape architect. The purpose of this chapter is to provide planning board members with an understanding of the uses of landscaping and a suggested method of reviewing a landscaping plan.

Uses of Plants

Plants have inherent features that can become important in site design aside from their obvious screening and aesthetic roles. These uses are discussed below.

Architectural uses. Plants, singly or in groups, form walks, canopies, or floors of varying heights and densities; these are architectural characteristics. Plant walls can give privacy, plant canopies provide protection, and plant floors form textured rugs.

Engineering uses. Engineers are concerned with such items as glare, traffic, noise control, soil erosion, etc. When plants are well chosen and properly placed, they can control natural and man-made glare and reflection. They also may direct pedestrian traffic, reduce noise, and deter soil erosion.

Climate control uses. Shade trees, windbreak trees, and snowfence plants are examples of plants used for climate control. A vine-covered wall is cooler than a bare wall and most vines will not damage a well-built masonry wall. Evergreen trees planted close to a wall of a building will create a dead-air space and insulate the building from abrupt temperature changes.

Aesthetic uses. Aesthetics has generally been the prime factor in determining plant use. As our world becomes more crowded with objects, plants can be used to blend together various unrelated elements, such as buildings, utility structures, or inharmonious land uses. Landscaping can be very effectively used to improve a building design if only by screening it from view. However, it can be used more positively by complementing a building's design. For example, groupings of tall trees will help accentuate

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buildings that feature a long, low design. For taller buildings, lower plantings are more appropriate.

Water as landscape. Water areas can be a handsome and often functional addition to a site design, and many larger cluster subdivisions and planned residential developments include small lakes. Water areas are attractive selling features in such projects and can also be made part of the proposed storm drainage system. The idea is to provide water storage (detention) in times of heavy rainfall and allow for a gradual, controlled runoff. Unfortunately, unless such lakes are properly engineered, they usually die within a few years of their completion.

The two major "killers" of such lakes are sedimentation and eutrophication. Sedimentation is discussed in Chapter 3, THE SITE, and can be avoided by not building the lake until most of the heavy earth work for the development is completed or providing proper erosion control during construction.

Eutrophication is the natural process of aging of a lake. This natural process is often greatly speeded up by any increased runoff from adjacent development. This runoff includes nutrients which greatly increase algae growth. When the growth of algae exceeds the natural balance, the lake rapidly dies.

Eutrophication can be controlled by providing for proper erosion control after project completion. These methods are discussed elsewhere. The point to be noted here is that runoff can be controlled by plants, and plants are likely to be more attractive than other permanent erosion control devices.

How to Review a Landscape Plan

The process to be followed in reviewing a landscape plan is not unlike the review process for any other element of a site design. First, determine if all of the required information has been submitted (as required in the subdivision and/or site plan ordinance); second, look at the overall use of landscaping in the plan (is it all concentrated in the "front yard" for effect or is it integrated into total site design); third, look into the details of the landscape plan: plant use, selection, location, height, and maintenance.

Step One: Check Submission Documents

The landscaping plan should show all existing major tree growths and existing natural features such as large boulders and rock outcroppings. It should indicate the number, type, and size of trees, shrubs, and ground cover to be planted and their locations. The plan should indicate how plants will be installed and what protection devices (padding, fences) will be used to protect existing trees.

In a large scale PRD project landscape requirements will likely be extensive. Landscaping will be required for public areas, parking lot screening, park and recreation areas, multi-family housing areas, etc. In a single-family subdivision the requirements will be less extensive. They might include type and number of foundation plantings, location and type of street trees, and preservation of existing tree stands. All cul-de-sacs should have landscaped center islands, for example, and in cluster subdivisions the landscaping of required open space may be necessary.

Step Two: Overall Landscape Design

As noted earlier, landscaping in most projects is just as important a site design element as are circulation proposals or engineering requirements. House and Home, the magazine of the building industry, suggests that developers budget a figure equal to two to three percent of gross project costs on landscaping. A typical 100 unit garden apartment development being constructed for $1,500,000 should have a landscaping budget of between $30,000 to $45,000.

The overall landscape design plan, as Lynch notes:

> ". . . must be conceived as a total pattern, continuous throughout the site. Lines of tall trees, visible from a distance, may mark major axes in the plan, clumps of special texture may make focal points, masses may define major spaces, homogeneous styles of planting may mark off important areas."(33)

Lynch also questions the continued emphasis on planting street trees in a monotonous line along both sides. Instead, he suggests tree masses at critical points, use of small trees along narrow streets with low structures, and a mixture of treatments along a single street.

The overall landscaping plan should accomplish something. On slopes, it should recommend plantings that prevent erosion; along a major road, the plantings should buffer from noise and lights; on north slopes, it should serve as a wind screen; and to the south, the landscaping should provide shade from the hot summer sun as noted on the following page.

The overall landscaping plan should "break up" long buildings and screen off parking, service, and utility areas. The plan should provide for a variety of different species to protect against disease attacking all the trees. A variety should be selected with consideration for various seasons and of different colors, textures, shapes, blossoms, and foliage.

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(33) Lynch, Kevin, Site Planning, The M.I.T. Press, Cambridge, Mass., 1969, p. 76.

Finally, the plan should be particularly sensitive to local soil conditions, lack of or overabundance of water, topography, and climatological factors.

Step Three: Landscape Details

The detailed review should include the specific kind of plants being proposed and their locations on the site. The following sections illustrate some specific design elements.

Plant selection. Two important considerations in plant selection are that plants grow and plants die.

Proposed plant types should have growth habits which fit the circumstances into which they will be placed. Foundation plantings often grow so high that in a few years they have hidden the house from view (not a bad idea for some houses). Driveway shrubs may block the driveway and hamper sight distances if not selected carefully or pruned constantly.

A landscape scheme can take several years to mature and the landscape plan should anticipate this in its selection of plant size and growth rate, as well as plant type.

In spite of the best intentions of all concerned, plants do die. To ensure replacement of dead specimens during the initial phases of any development, a landscape maintenance bond should be required. However, do not depend on the maintenance bond. Be sure that the developer puts the proper shrubs in the proper place; a plant should be selected, not just because it is within the budget and easily available, but because it will do well in that location and is appropriate for the particular function it is expected to serve.

Plant size. In reviewing a landscape plan, the size of the planting are as important as the type of plant. Most developers will put in the smallest (cheapest) plants possible, and plant size should be indicated on the plan.

The smaller the plant, the less its chance for survival, and at best it will be many years before the desired effect is reached. It would be preferable to have fewer larger specimens than more smaller ones. Planning boards should secure the advice of competent landscapers as to the optimum size of the various species.

Deciduous trees should have at least a 1-3/4 inch caliper at planting, and evergreen trees should be at least four feet tall. Shrubs should be at least two feet tall at planting.

Plant type. The type of tree, shrub, or ground cover selected for a particular site should be based on expert advice as to the most appropriate species for the particular weather, soil conditions,

and proposed function of the plant. As a very general guide, however, for plants that will do well under various weather conditions, the United States Department of Agriculture has prepared a map of "hardiness zones", referring to the temperature zones found throughout the United States and Canada.

For New Jersey, most of the state falls within zones 6 and 7. Zone 6 has a minimum temperature range of from 0 to -10 degrees (F) and includes Mercer and Middlesex Counties and those counties to the north. Zone 7 has a minimum temperature range of 10 to 0 degrees and includes Burlington and Monmouth Counties and all counties to the south. The table in the appendix lists those trees, shrubs, and ground covers that are expected to do well in Zones 6 and 7. This list is only intended as a general guide and only common plant names are listed. For a more complete listing for your particular area, contact your county agricultural agent.

The Street Tree

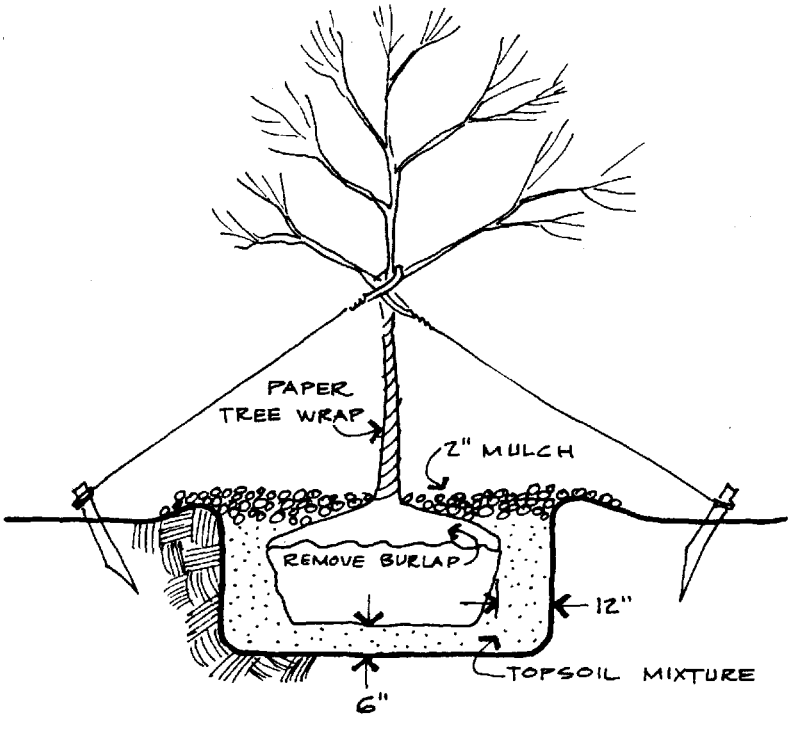
In the previous sections we have discussed many considerations in the review of a landscape plan including plant selection, the use of plants and water, the role of the landscape architect, and the plan review process. In your review of large scale residential developments, however, the street tree is the major planting and deserves special consideration here.

Tree location. Back in the dark ages, when overhead wires were permitted in new developments, street tree location was determined in part by the location of utility poles and wires. It is still a good idea not to place trees between the curb and sidewalk because of underground utility wires, potential damage from cars, and snow pile-ups. Place trees on the house side of the walk at least three feet from the walk so that the root structure will not be confined by paved surfaces.

Tree spacing. Proper spacing of street trees depends upon the spread of the branches. A good guide is to space trees so as to exceed somewhat the farthest extent of branch development at maturity. This would require about 50 to 70 feet for large trees; 40 to 50 feet for medium trees; and 40 to 50 feet for small trees. Small ornamental trees of low height can be spaced in between where the spacing interval exceeds 40 feet.

Tree type. Consideration should be given to the overall effect desired before selecting tree type. For example, one species might be used throughout an entire development; species might be changed according to neighborhood or with each street; or species may be alternated throughout the development in a formal or informal fashion. Also, the entrances may be given special treatment with ornamental species.

Tree planting. Specifications for tree planting are fairly standard. They should be balled and burlapped and properly staked. However, for tree survival, it does not matter how well these specifications are followed if there is no maintenance program. New trees should be watered weekly for two years after transplanting. The more concrete in sight, the more need to watch the tree. This is the most critical part of survival. One bad wilting can maim a young tree, and that is the most common cause of new tree failure.



Landscaping in Parking Areas

Landscaping should be required in all parking areas in large scale residential developments. Use natural topography and vegetation wherever possible.

An attempt should be made to save existing trees, but this is not as easy as it sounds. Forest or wild trees do not often survive when their natural habitat is drastically altered. They can survive if the planning

board is willing to carefully police the effort and require the developer to follow very stringent rules as follows:

1. Finished grade variations should not vary more than 6 to 12 inches unless tree wells or platforms are to be utilized.

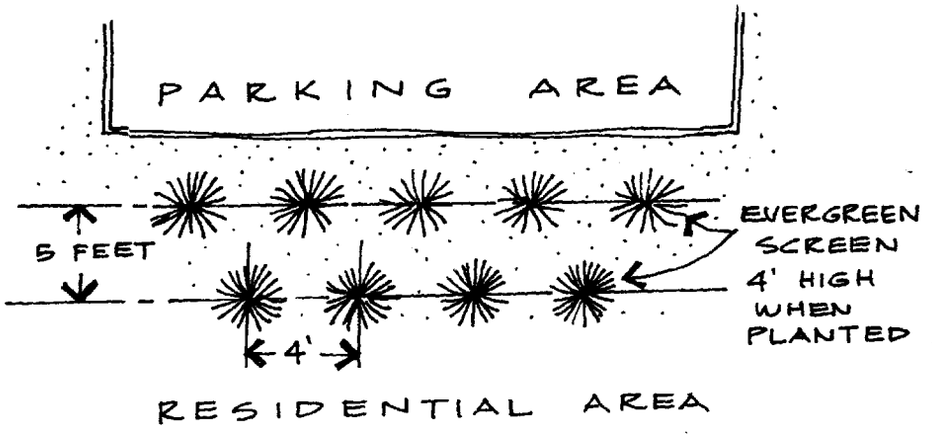
2. Roots and limbs should be carefully pruned over a two or three-year period.

3. Protective fences to be erected during construction.

Pick clumps of trees to be saved rather than single ones. Do not bother with very old trees past their prime. Use nursery grown stock rather than wild or forest grown.

As a rough rule of thumb, between five and ten percent of the parking lot area should be devoted to landscaping.

Evergreen shrubs may be used as visual buffers between parking areas and buildings to shield the cars from view and break up headlight glare. Various evergreens such as hemlocks or arborvitae grow quickly and can tolerate adverse growing conditions. To be effective screens they should be planted four feet on center and be at least four feet high when planted. If a more dense screen is desired such as when parking areas abut residences, plant two or even three staggered rows with a five-foot separation between rows.



Appropriate places for landscaping include the raised walkways or sidewalk areas, at the end of bays, and in specific planting islands established throughout the lots. In narrow islands, plant low, spreadind, low maintenance plants such as English ivy, creeping juniper, myrtly or pachysandra. Where more space is available use yews, juniper, or forsythia.

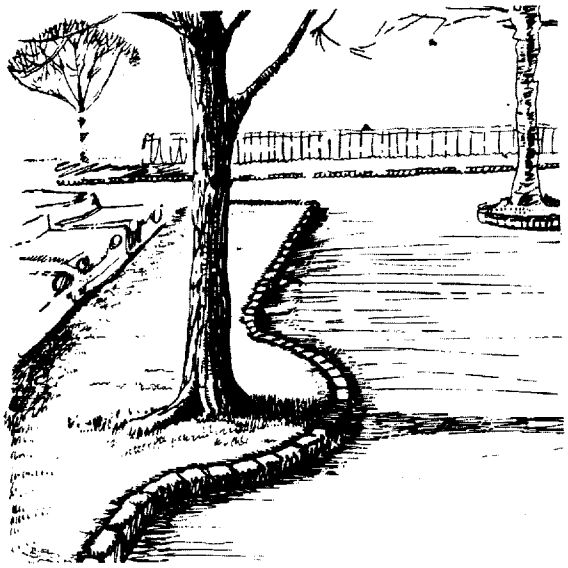
Trees should be a mixture of flowering and decorative trees, evergreens and deciduous. Trees in parking areas should be clumped at critical corners or areas to break up the mass of cars apparent to the eye. They should also be located with care so as not to obstruct the vision of the driver.

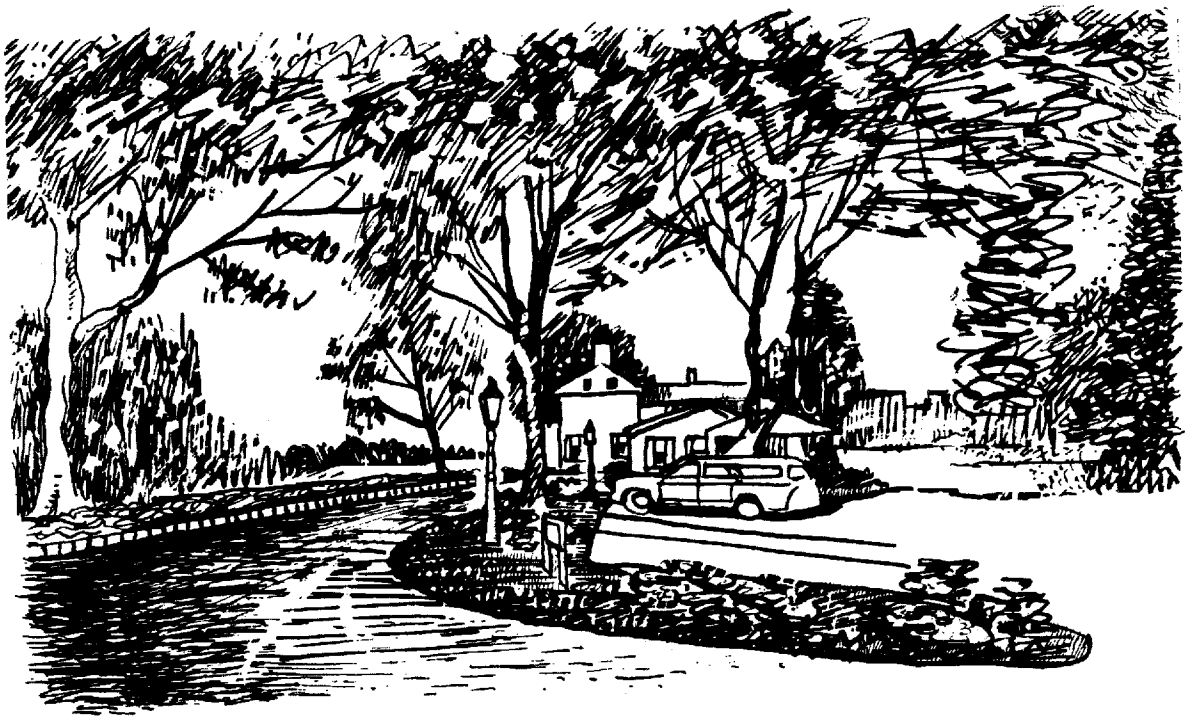
Certain trees should be avoided because of problems. Many types of deciduous trees shed large leaves which clog drains and make walking treacherous. Avoid maples for this reason. Others have messy fruit such as the female gingko. Still others have brittle limbs and branches such as poplars and Siberian elm. Others have greedy roots which disrupt paving and underground lines. These include maples and willows.

Trees also should be selected that can stand up to the environmental abuse they will receive in parking lots. The New York City Park Department reported that gingko and London plane tree varieties are particularly resistant to motor exhaust fumes, dirt, and soot. Also sweet gum, lindens, honey locusts, Norway maples, zelkovas, and oak are similarly endowed.

The U.S. Department of Agriculture reports that certain trees are more tolerant of salt and deicing compounds than others. The most tolerant include red oak, white oak, red cedar, and black cherry. Birches, aspen, ash, and locust are classified as tolerant. Intolerant trees include sugar maple, hemlock, white pine, red pine, and speckled alder.

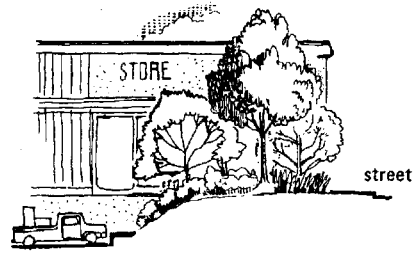
Other trees to avoid include those which are particularly susceptible to insects and disease, such as American elm, birch, hawthorn, evergreen forms of eunonymus, mountain ash, and Norway maple; those which are short-lived such as Lombardy poplar (canker), willow (wind damage), and mountain ash (borers); and those with pavement damaging root systems such as Norway maple, silver maple, and sycamore.



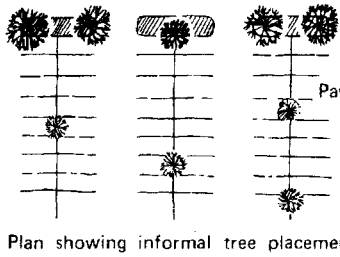


METHODS OF LANDSCAPING PARKING AREAS

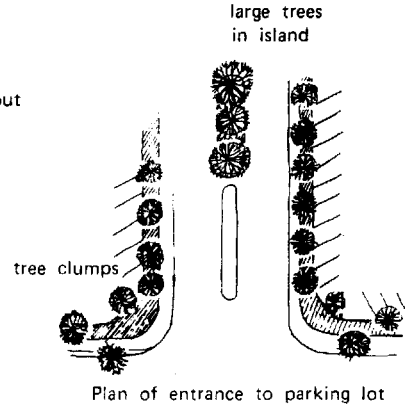
Mounds add to plant height, creates buffer between rows of cars



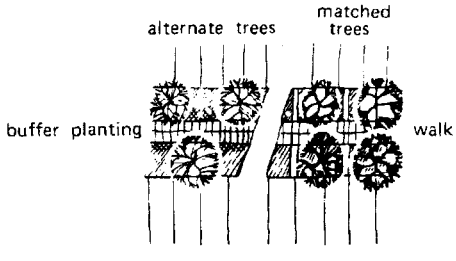
depressed level parking.

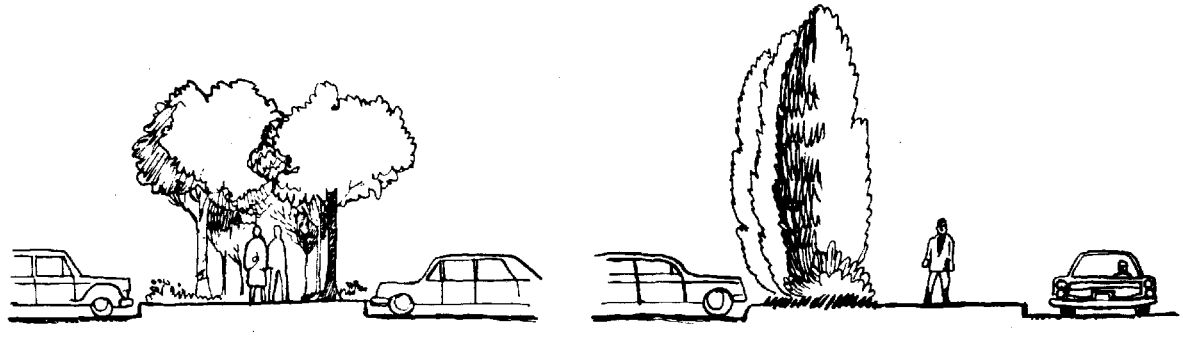


Plan showing informal tree placement 40' – 60' apart.



Plan of entrance to parking lot

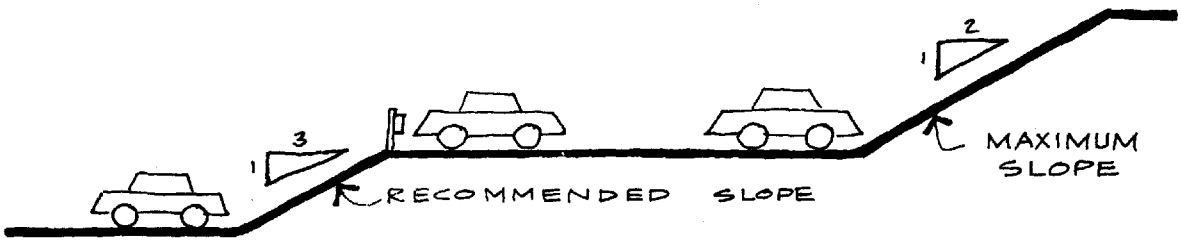




shaded mall through parking lot – low and tall screen on street side of parking area.

Source: "Trees for a More Liveable Environment".

Slopes around parking areas in excess of 2:1 should be avoided. A ratio of 3:1 is better and the slopes should have a ground cover such as Virginia creeper, crown vetch, ivy, or myrtle.



TERRACED PARKING

When excessive grading is required, parking should be terraced.

Parking lots which have to be located in front of buildings may be effectively shielded by requiring the lot to be depressed by four feet or by constructing a berm around the lot. Also, by requiring parking lots to be set back a minimum of ten feet from the right-of-way line and property line, additional landscaping area can be provided.

Fences and Walls

Fences and walls are important elements of the design plan but are often overlooked or ignored. They may be functional in defining or securing private from public areas, or as retaining walls on steep slopes. Lynch notes their use visually in forming and providing vertical texture. Certain types of fences or walls carry the viewers glance to a focal point.

Fences are important particularly in developments where densities are high. In town house designs, where lots are often 25 feet wide or less and private space is limited, fences are essential between units.

Some points to consider in approving fences or walls are that the material and design should complement the structural type and design of the principal structure. Chain link fences with plastic strips may be fine around an industrial plant, but they do nothing for any house design.

Picket, basket weave, split rail, and similiar types of fences can be used on various house designs. A solid structure should have a fence or wall projecting that impression. More contemporary designs may call for lighter, more open types of fences or walls.

Control of fences may be necessary in any planned development. Deed restrictions may be called for approval of the type and location of fences or walls may properly be a function of a homeowners association.

Review Checklist of Key Items

1. Is there a separate landscape plan?

2. Was the landscape plan prepared by a landscape architect?

3. Is a maintenance bond included?

4. Is all future planting bonded?

5. Are types and sizes of plant specimens shown on the plan?

6. Are the proposed plants appropriate to their proposed function?

7. Save the existing trees and plants. They have a head start over any new plantings, and a built-in value which the landscape plan should maximize.

8. Do not be fooled by a subdivision or site plan that makes a pretty picture with what appears to be masses of trees and shrubs. That vision may have no relationship to the reality of the landscape plan.

9. Outdoor carpet or green painted concrete is no substitute for grass. If grass is inappropriate for an area, why permit artificial grass? Require a textured hard surface material such as paving stones or light gravel interspersed with shrubs instead.

10. Raising planting surfaces (or depressing walks) can deter people from taking shortcuts.

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Chapter 9

OPEN SPACE

Introduction

Open space is an essential component of any well-designed residential development. It provides recreation areas, both active and passive; it increases project amenity by providing landscaped areas; it serves as buffer areas between uses and softens the change from one density pattern to another; and it functions as wildlife preserves, drainage retention areas, etc. Well designed open space is an important factor in providing quality residential environments of lasting value.

At one time open space would not have been a review consideration for a major subdivision application. It is, of course, still possible to have a major subdivision consisting only of streets and lots. However, with the creation of cluster subdivisions, flood plain and drainage retention requirements, and the development of mixed use projects such as planned residential developments, many of the applications that come before planning boards will include public or private open space. The purpose of this chapter is to provide some basic open space considerations in the review effort.

The important aspects of open space are type, ownership, use, and development standards. It is impossible to review an open space plan without understanding the nature of open space. For example, a planned residential project of detached homes, town houses, and garden apartments may indicate that 84 percent of the total site area is in open space. Excellent, is the first reaction since the local zoning ordinance only requires 30 percent of gross project area(34) in open space. On close inspection, however, you find that the developer has included streets, back yards, walkways, power easement, and isolated unuseable parcels in his calculation of open space. When these non-open space areas are removed from his total you may find that the project does not meet the 30 percent open space requirement.

The point here is that the requirements and definition of open space must be understood by both the developer and the reviewing agency. This chapter attempts to provide that understanding.

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(34) gross project area: total area of the site including streets, water areas, building sites, and open spaces.

Open Space Defined[35]

The term open space means what it says -- space devoid of buildings and other physical structures except for outdoor recreational facilities. Open space does not have streets, drives, pipelines or power easements, walkways or parking lots; it does not include school sites, club houses, or indoor recreational facilities. Public or common open space does not include rear yards or house lots or patios of town houses, or other such private spaces not available for general use by residents of the development.

Open Space Ownership

There are usually three broad types of open space ownership connected with residential development: private, common, and public.

Private Open Space has been the traditional back yard of the single-family detached home. Recently this definition has expanded to include all fee simple land adjacent to the dwelling unit -- and that unit may be a patio home, a quadraplex, or a town house.

Common Open Space is generally a larger parcel of land reserved for the use of the residents of a particular project, owned and maintained by them through a homeowners association or condominium arrangement.

Public Open Space is owned by a public agency, such as a municipality, and maintained by them for the use and enjoyment of the public at large.

Open Space Type

Open space may have many functions, from providing space for intensive recreational use to preservation of land subject to flooding. Basically open space lands fall into two broad categories -- developed and undeveloped. In the review of open space for major residential developments, the concern should be for the provision of adequate open space as well as with the type of open space to be provided.

Many ordinances that require open space in major residential developments will specify not only the minimum percentage of total open space, but will specify the minimum percentage to be provided in developed open space and the minimum to be provided in undeveloped open space. This simplifies the review task somewhat, although it must still be determined that the proposed open space is appropriate to its function.

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(35) NJSA 40:55D-3, 5, and 6.

No generally accepted standards are available to determine what quantity of total open space is appropriate for a particular development. Open space requirements of 50 percent of total site area are not unreasonable given appropriate density levels, the environmental aspects of some areas, and the wishes of a community. A well designed low density (nine units per acre) condominiums or garden apartment project could leave over 60 percent of a site in open space. However, if that generous 60 percent open space is all located on the side of a steep slope, the project may in fact be deficient in developed open space.

Developed open space. Fortunately, standards exist for the amount of developed open space that should be provided in each residential development. This type of open space has a recreational function (see Chapter 10 for recreational use standards), and therefore developed open space must conform to some functional and area standards as suggested here:

Area: 1,500 square feet of developed open space per dwelling unit, or about one acre for every 30 dwelling units, is roughly the equivalent of one acre per 100 persons, a standard of the National Recreation and Park Association (NRPA).

Dimension: The area of each developed open space parcel to be used for active recreational use should not be less than 6,000 square feet in area, nor less than 60 feet in its smallest dimension. (This area would accommodate one tennis court.)

Location: Developed open space should be distributed in relation to the dwelling units they are intended to serve. Developed open space should not be isolated in one corner of a project, and all developed open space should be linked to all other open spaces by walkways systems.

Undeveloped open space. One of the most important aspects of open space is that it permits greater flexibility in preserving a site's natural amenities. Sites which contain some unique natural assets such as ponds, attractive wooded areas, ravines, and stream beds can be greatly enhanced by retaining such natural features in an undisturbed state. Site plan review can assist in this function by requiring that these features be incorporated in the site's required open space and retained in an undisturbed state. Some other aspects of open space, particularly as they affect floodways, easements and detention basins, are discussed in Chapter 4.

Open Space Maintenance

The responsibilities for maintenance of open spaces in residential developments must be considered early in the review. Private open spaces are maintained by their owners. In rental projects they are maintained by the developer. Public open spaces which are dedicated to the municipality become its responsibility. Most of the concerns about maintenance center around common facilities held in undivided ownership by condominium residents.(36)

Common open space maintenance is usually provided by a homeowners association. Because of the important role such organizations play in maintaining a high quality residential environment, the review agency needs some basic assurances that the association has a reasonable chance of success and will be capable of performing its duties.

To insure the success of a homeowners association, many ordinances allowing for large scale residential development give the municipality approval powers over an association's by-laws and articles of incorporation. In addition, many ordinances permit the municipality the right to take over the functions of such associations at the residents' expense should the organization subsequently collapse.

There are several important principles which should guide the formation of a homeowners association.

1. The homeowners association should be organized as a nonprofit corporation before any homes are sold;

2. Membership should be mandatory for each home buyer and successive buyer;

3. Any open space restrictions should be permanent and not just for a few years;

4. The homeowners association should be responsible for liability insurance, local taxes, and the maintenance of recreational and other facilities;

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(36) For an excellent discussion of how the common ownership is achieved, see Mechanisms for Common Ownership in Planned Unit Development, N.J. Department of Community Affairs, Trenton, N.J., 1975.

5. Homeowners should pay their pro rata share of the costs and the assessment levied by the association should become a lien on the property if necessary; and

6. The association should be able to adjust their assessment to meet changing needs.

The developer is responsible for establishing the homeowners association -- setting it up and supplying the by-laws and articles of incorporation. As homes or lots are sold, control will gradualy be vested in the homeowners, but some provision should guarantee control by the homeowners by a certain time. Naturally, developers will want to retain control during the early stages of the project to protect their investment, but to retain control until the last house or lot is sold is unnecessary.

Cluster Zoning for Open Space (Density Modification)

Cluster development is a subdivision technique in which homes and their lots are grouped closer together and the remaining land is combined and used for open space and recreation. This concept is not new; it was the principle of the New England village and green.

The cluster concept uses the principle of density to achieve its goals. The overall density set for an area is maintained, but the minimum lot size is reduced -- the result is left-over land area which is maintained in open space.

New Jersey was a modern pioneer in the cluster development of house lots with the famous Radburn development in Fairlawn (Bergen County) in 1929. The depression halted this development before it was completed, and in the development boom of post World War II the cluster concept was ignored.

With the growing shortage of land area for both housing and open space in our metropolitan area, the advantages of clustering have been rediscovered. The growing awareness that open space has an ecological, as well as recreational, function has also been a factor.

Under the principle of cluster subdivision, an area zoned for single-family homes on 20,000 square foot lots has a density of about two units per acre. Under conventional subdivision design, a 100 acre parcel could accommodate 150 lots assuming 25 percent of the site is used for streets, utilities, etc.

Under a cluster plan, the developer would still be permitted to build only 150 homes. However, under cluster he would be permitted to build them on smaller lots, possibly 10,000 square foot, or a lot size reduction of 50 percent. The 10,000 square feet per lot saved would total 34 acres or 34 percent of the site to be left in open space.

The 34 acres would be available for open space, recreation, and, if necessary, a school site. Normally, this land would have to be purchased or condemned. The same number of houses are constructed so that the density and the number of families remain the same. Street area is reduced, sewer and water lines are shortened, and fewer street lights are required. These add up to developer installation savings and municipal maintenance savings.

The main advantage to the community, however, is the provision of open space. In some cases this open space may be a wooded area or other natural resource saved by cluster zoning. Cluster zoning is an excellent planning concept that has now proven itself in many communities. Like any planning concept, however, it can be poorly designed, and the following section points out some critical points to consider.

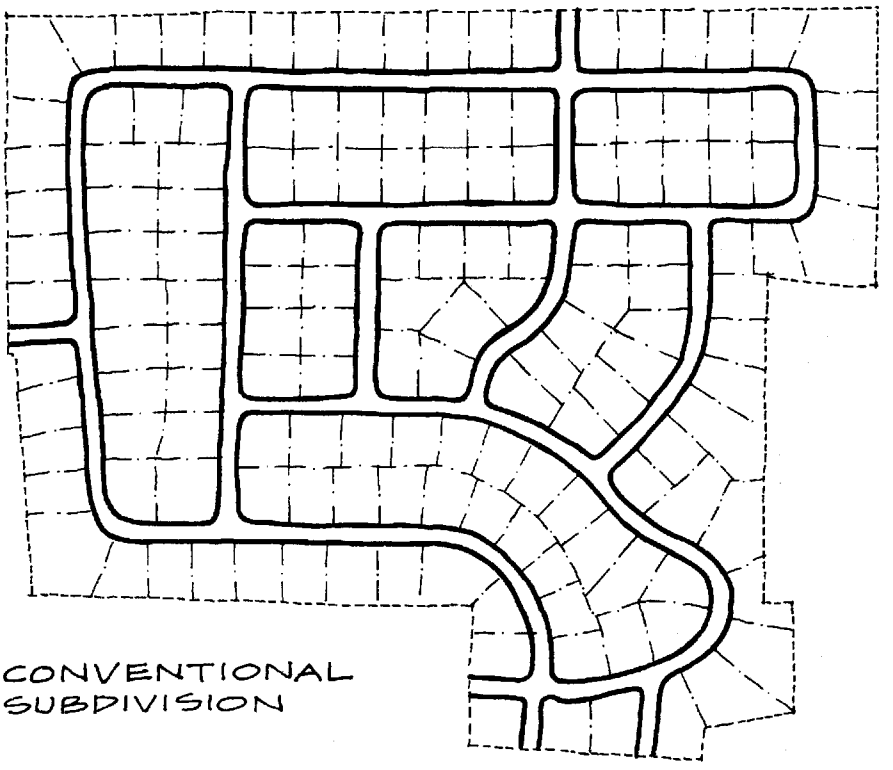
Cluster Zoning Review Considerations

1. It is not the purpose of cluster designs to help out a developer who happens to have an awkward parcel of land that is largely undevelopable. The basis for the permitted number of lots under cluster development should be a sketch plan under permitted conventional platting. This layout should be acceptable for development approval, i.e., it should meet subdivision ordinance design standards and all lots should be buildable. If 50 lots are all that can be incorporated in the conventional design, then 50 lots is the permitted maximum under cluster.

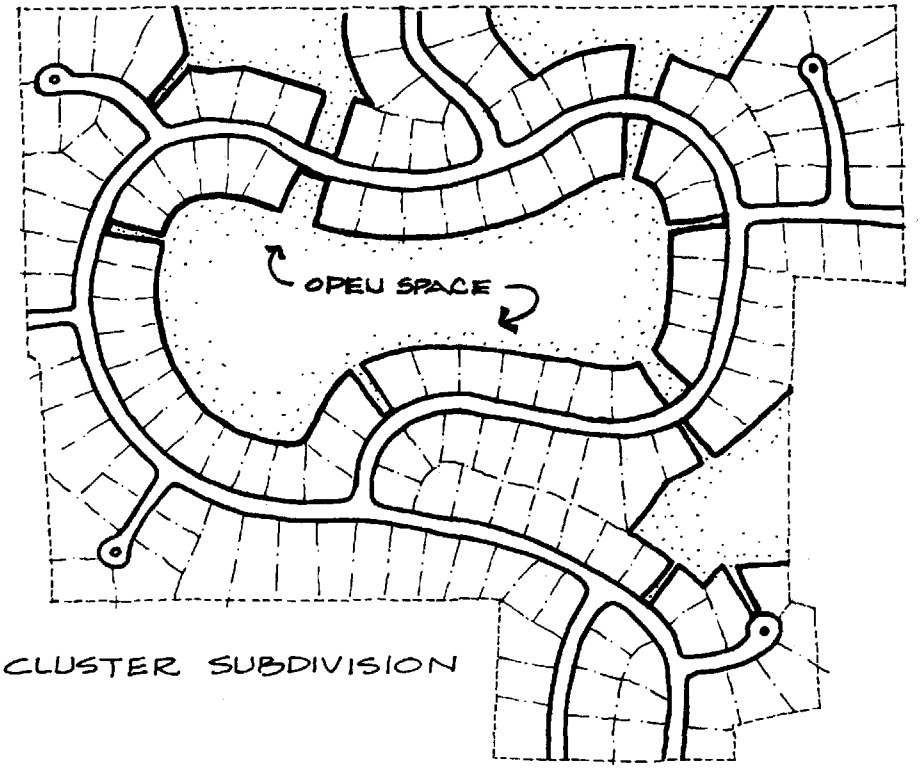
2. The open space provided in the cluster plan should meet predetermined standards including a minimum open acreage requirement (small, scattered parcels of open space become dumping grounds). It should link up to other open spaces, where possible, in accordance with an overall open space plan; and ownership should be determined (public or private) by the planning board in accordance with local policy and need. If the open space to be provided does not come up to such standards, the planning board should have the option to require a conventional subdivision.

3. In some instances, a community may offer additional options to the developer to gain additional open space. For example, a portion of the permitted units might be developed as town houses rather than single-family units for a considerable savings in open space. There need be no increase in density and the community would gain an alternative dwelling type.

4. As a general guide, single-family cluster subdivisions should result in at least 40 percent of the gross land area in open space, all open space should be interconnected (linked), and no cluster project should be approved with less than five acres in open space.



CONVENTIONAL SUBDIVISION



CLUSTER SUBDIVISION

Pathways

The use of the cluster technique calls for careful attention to the location and design of pathways linking the developed portion of the tract with recreational, cultural and shopping facilities, and open space. The recommended width of the passageways should not be less than 20 feet. They should be designed to permit pedestrian and bicycle traffic so that a portion (five to eight feet) should be hard-surfaced.

The pathways should generally run along the rear property lines and between lots. When laid out properly, they should provide direct access between the major elements of the development. Some care should be exercised to define the public walkway and private property, Split rail fences and hedges can serve this purpose.

The walkway system should be included as part of the property to be owned and maintained by the property owners association. As an alternative, although a decidedly poor one, the walkways could be secured as easements to be maintained by the abutting property owners. Very often, however, this results in problems with respect to maintenance.

Review Checklist of Key Items

1. Does the designated open space qualify as open space?

2. Is the developed open space functional in terms of area, dimensions, and location?

3. Are there areas of the site appropriate for designations as undeveloped open space?

4. Are all open spaces interconnected?

5. Are provisions for maintenance of the common open space adequate?

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Chapter 10

RECREATION

Introduction

The need for adequate and conveniently located recreational facilities is universally accepted by both the public and private sectors of our society. The amount, type, and location of these facilities depends on the probable occupancy of the residential development, and this is directly related to the type of housing, ownership or rental patterns, housing costs or rents, and size of the project. This chapter discusses what facilities should be considered, area and locational requirements, and how they may be secured as part of the approval process.

Sidewalks and Trails

The two most popular outdoor recreational activities in the United States are driving and walking. A third increasingly more popular sport is bicycling. All three use roads, sidewalks and trails, facilities which can be required as a condition of approval of any residential development.

Since the automobile has become an essential element in the lives of most Americans, improved roads are almost automatically required as part of any development. Sidewalks, unfortunately, are considered an intrusion into the "bucolic" life style of suburban housing developments, and many communities have stopped requiring them in major subdivisions.

This is a serious mistake. Apart from the need for sidewalks for circulation and safety, sidewalks can be an important element in the recreational system of a community. They serve as walking and hiking trails for all age groups and particularly the elderly and very young. Sidewalks are also the primary informal and unsupervised recreational system for the preschoolers for tricycle riding, skating, and riding any of the multitude of wheeled vehicles. When three to five year olds are sent out to play, the sidewalk becomes their domain. Boundaries are easily discernible and the children are relatively safe from intrusion from foreign elements; i.e. cars, older children on bikes, etc.

To service the wide variety of roles, sidewalks should be four feet wide and may be macadam or concrete. Macadam is usually difficult to skate on but does follow the natural contours more closely, is easier to repair, and is more immune to ground heaves -- it stretches rather than cracks.

Concrete, on the other hand, is a "faster" surface, will resist weed growth, and many believe it is more attractive than macadam.

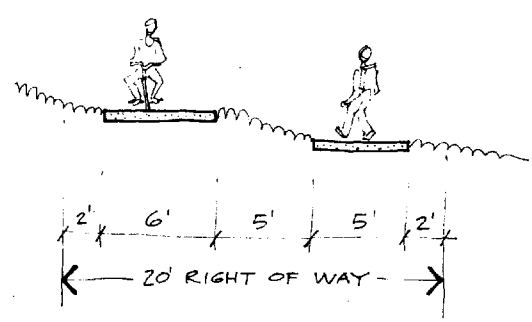
In any event, sidewalks should be required as part of any large scale residential development. The closest edge to the curb should be about three feet from the curb within the right-of-way lines. They should be placed to and from parking areas and buildings and between buildings and recreation areas.

Closely related to sidewalks as a recreational facility are trails. The best description of how trails fit into the recreational system was set forth by Walter Wells, vice-chairman of the N.J. Chapter of the Sierra Club at the N.J. Trails Conference, March 7, 1973. He said:

> "A trail connotes a way into and through woods and wilderness where the restraints and pressures of daily routine can be laid aside and where one may go with as little encumbrance as one may wish. A trail may be a route along a brook, or through deep woods, or to a point unreachable by any other way. A trail may be a way to individual solitude or to a quiet hour with family and friends or a vigorous challenge to one's strength, skill and endurance. Wherever its route, the worth of a trail is dependent on the visible and audible impact on the user of the trail's surroundings. In its ideal, a trail is corallary to the concept of wilderness, where man may enter but does not remain and where his going leaves no mark."

Trails may be used for a variety of purposes. They can be for hiking, bicycles, snowmobiles, trail bikes, or horses. Unfortunately, many of these uses are incompatible with each other and some are detrimental to the lands they pass through. Some judgment should be exercised in limiting the use of trails. For example, trails passing through residential areas might be limited to bicycles and hiking since motor bikes or snowmobiles generate considerable noise and annoyance as well as danger.

While it is possible to develop multi-use trails such as for hikers, bicycles, and horses, most experts favor separate trails for each mode. They feel that individual needs and interests preclude combining trails. It is possible, if the right-of-way is sufficiently wide, such as 20 feet for example, to provide for a six-foot macadam bike trail adjacent to a hikers' path.



In residential developments trails should lead somewhere. They might run along the rear of lots to playgrounds, parks, schools, or public buildings, or to commercial areas. Trails should follow streams, and could be developed along power line or utility easements or as part of the road right-of-way.

The problem of trail maintenance often arises. If the development is proposed for condominium or homes association ownership, the maintenance and upkeep can be included as part of their responsibility. Even if a straight fee simple arrangement is proposed, maintenance of trails (or other recreational facilities for that matter) could be included in the deeds.

On the other hand, much can be said for outright municipal ownership and maintenance. At the least, the use of the trails would then be open to all residents of the municipality. As a general rule, trail systems serving mostly a single development should be owned and maintained by the residents of the development. If the system is part of a larger municipal-wide or regional system, at least some of the key elements should be municipally owned. This general rule is applicable for all types of recreational facilities.

Bikeways

Bikeways can be provided as part of an overall trail system or separately. In any event, they can and should be an integral part of any design for major residential development.

As noted in the Department of Community Affairs Bikeways, A Guide to Their Design and Operation, bikeways,

> "... (are) a system of secondary routes, usually parallel to main streets, leading from commercial and residential areas to schools, shopping centers, parks, playgrounds and recreational and cultural centers." (p. 10)

There are no hard and fast rules on laying out bicycle trails. Common sense would suggest that the trails should traverse a variety of "cityscapes and landscapes" with defined points of interest, through areas of scenic value and with places to rest or with an opportunity to participate in other activities.

Some communities have delineated bikeways along utilities' rights-of-way (with the permission of the utility, of course), through parks and public lands, along easements, and through tax delinquent strips. In new subdivisions, the bikeways can be required in the same manner as roads or sidewalks.

The bicycle trail should be marked with the International Bicycling Symbol, and where the bikeway is part of a vehicular road, it should be placed so that the bike lane is appropriately marked along the

roadside and drivers alerted to the bicycle traffic.

Bikeways should be at least eight feet wide for two-way traffic with a recommended minimum of five feet. Maximum grade may not be as important as the length of the grade. Experts claim that the length of the climb rather than the grade is what usually tires riders. A 10-percent grade is probably the maximum, although it can be exceeded for very short periods.

The length of a trail varies depending on the terrain, grades, and connecting trails. Since the average cyclist can sustain a speed of ten miles per hour, a five-mile system can be traversed in about one-half hour.

Any turning radius should be at least 12 feet in diameter, and sharp curves along the route should be avoided.

Surfaces can vary and often include asphalt, concrete, dirt, turf, gravel, and soil cement.

Playgrounds

Playgrounds or playlots should be provided in all residential developments of 50 dwelling units or more. As a rule of thumb, there should be one playground for approximately each 300 persons or 75 children. In newer subdivisions with 50 or more single-family homes, these are realistic approximate population figures.

The playground could have as little as 2,000 square feet or up to 5,000 square feet. It is primarily designed for small preschool children. The effective service radius would be one block or one-eighth of a mile, providing there are no major impediments to free access such as major streets, etc.

The equipment in a playground might include swings, slides, play sculpture, etc. Benches for parents are also important.

While the playlot is not as important in large lot detached home subdivisions because of the availability of individual back yards, they do provide a common meeting area for preschoolers and also allow for socializing for the parents.

The playground is essential as a recreational element in multi-family or planned unit developments. The standards for playgrounds for larger developments vary. The American Public Health Association calls for 2.75 acres per 1,000 population.

The Community Builders Handbook suggests the following range:

Population	Size (acres)
2,000	3.25
3,000	4.00
4,000	5.00
5,000	6.00

The playgrounds should include sufficient equipment and facilities for the 5 to 12 year olds and for senior citizens. Again, specific equipment would depend on the expected mix of population. It might include the swings and play sculpture for the young children, basketball courts or backboards, open paved areas for various activities, sunny and quiet areas for the elderly, a wading pool, and sandboxes.

The minimum area for a large playground is approximately 2.5 acres.

Tennis Courts

The rapid growth in the popularity of tennis is best illustrated by the recommended standards stated in the 1968 edition of the Community Builders Handbook. They called for one court for each 2,000 population.

Only five years later, House and Home, the marketing and management magazine of the building industry, called for at least one court per 100 dwelling units and in communities heavily oriented toward sports, at least one court per 50 units.(37) This represents a 500 to 1,000 percent increase.

Courts are relatively inexpensive to build ($10,000-20,000 per court) and can be tucked into out-of-the-way places. An acre of land, for example, can accommodate eight courts and a clubhouse.

Maintenance can be minimal with properly designed courts, and the exact type of court should be indicated on approved plans.

Parking requirements for tennis courts depend on location. Maximum parking need is estimated at six off-street spaces per court, although four spaces per court are usually sufficient.

(37)"Tennis: Fast Growing and Very Inexpensive." House and Home. February 1973, p. 78.

Swimming Pools

In any large residential development, the most basic facility is th swimming pool.

As a general rule, a swimming pool should provide three square feet of pool area per resident above wading pool age.[38] A 570 unit mixed development would probably generate 1,500 residents above wading pool age, so a 4,500 square foot pool is necessary.

The actual design and to some extent the size of the pool depends again on the market. Older people prefer smaller pools located close to their own dwelling unit. Their socializing is done on a smaller scale.

Children, from those that can use adult pools to teenagers, are the most active. They need space for water games, competitive swimming, and diving areas. Their needs call for a very large pool with adjacent active recreation facilities.

Somewhere in the middle are the younger adults whose needs are for larger pools and a more active social environment than the elderly, but not quite so active as the younger group. Of particular importance is the fact that many in this group will have young children using the wadi pool. We recommend that the wading pool and the young adult areas be designed together.

Swimming pools are the most intensive of recreational facilities. They generate considerable noise, particularly on weekends. They can be nuisances, and their location and how they relate to surrounding areas must be carefully planned. Fences may have to be erected at the periphery of the lot to effectively block noise from pools and for obvious security and privacy reasons. Lights should be carefully placed so as not to generate glare on adjacent properties.

Parking should be provided, but the exact amount can only be determined by examining how many persons or families will be served by the pool and then making a reasonable estimate, based on their distance from the pool, as to how many will drive and how many will walk.

General Comments About Recreational Facilities

1. One of the best sources of information on local recreational needs is the municipal recreation commission. All development plans should

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(38) House and Home, February 1973, p. 80, as follows: For every 1,000 residents, 450 will be in pool area during peak period. About ¼, or 113, will be in the pool. Each swimmer requires 27 square feet. The 113 will need about 3,000 square feet or 3 per resident.

be referred to them to comment on location, type, and suggested operation of proposed facilities.

2. The location of recreational facilities should be carefully planned to arrive at a proper balance between a convenient location to encourage maximum use and the need to minimize any possible adverse effects on surrounding areas.

   A good example is the previously discussed swimming pool. It would be most desirable to locate this kind of facility directly in the center of the development to encourage pedestrian or bicycling access. However, pools generate considerable noise and are used until dark or even later in lighted pools. They can be a nuisance to surrounding homes. A further complication is the need to provide more parking for pool users as the location is set further away from the center of the development.

   There are no easy solutions, but planning boards should be at least aware of the problems.

3. Despite the fact that recreational facilities such as the type being discussed here are designed for exercise, most users would violently oppose any requirement that they walk to the facility. It would appear that a short block is the maximum walking distance to any recreational facility. Parking facilities should be considered, and these should be bermed or shielded from adjacent properties.

4. Where the recreation facilities are proposed to be owned and maintained by the developer (such as in a multi-family development) or by a condominium or homes association in mixed developments, some policies as to fees and guests should be established as part of the approval. The facilities are, after all, designed and built for the inhabitants of the development. If the fees are too high and few of the residents can use them, the community is then forced to provide the recreation.

   In addition, recreational facilities should not be allowed to become profitable principal uses. This could easily happen by permitting "open admission" for a fee to anyone who wanted to use the facilities. They are primarily for the residents of the development and should be so designated.

5. Be careful of so-called multi-use facilities. Basketball backboards on the edge of paved parking lots are not the same as backboards in a paved playground. This is not to imply that they should not be encouraged, but it should be kept in mind they are supplemental facilities.

6. While most larger playgrounds are often developed as part of school sites, some problems have arisen on the joint use of this

property. A clear understanding, preferably written, should be developed with the board of education. It should include hours of operation, use during vacation periods, liability, damages, maintenance, etc.

7. Make sure private facilities owned and maintained as part of a residential development are not in competition with municipal facilities. This problem is manifesting itself with swimming pools. Many municipal pools have dropped in membership as younger family members leave home and older residents do not feel any urgency to join. In fact, because most municipal pools cater to families with children, older residents may welcome the chance not to renew their membership.

   Private pools, particularly those in senior citizen developments, siphon off this increasingly more important market by providing facilities that older people want.

8. Orientation of most recreational facilities is not critical but generally should run in a NE-SW direction. Of greater importance is the need to carefully orient passive recreation facilities. For example, a southerly exposure is the warmest and captures the short fall, winter and spring sun, but it can also be uncomfortable in the summer. Careful landscaping can shade the hot summer sun.

9. Small garden plots should not be overlooked as a recreational opportunity, particularly for the elderly. The plots should be southerly oriented.

10. Parks and playgrounds can be dividing and/or integrating facilities. If a senior citizen project is designed to be located in an existing residential area, a park to be developed as part of the project should be designed to be used by both existing neighborhood residents and the senior citizens. The design must be carefully worked out to provide for the facilities and degree of privacy each group of users needs, but properly located, the park could serve to prevent the isolation which so often occurs.

Review Checklist of Key Items

1. Have proposed recreation plan reviewed by recreation commission.

2. Trails should be required to connect with sidewalks and open spaces.

3. Small sitting areas with recreational equipment and benches should be conveniently located in each neighborhood.

4. Parking areas for recreational facilities should be screened and buffered from surrounding residences.

5. High nuisance recreational activities (swimming pools, for example)

should be carefully located to reduce any adverse impact on surrounding areas.

6. Review all agreements relating to use of project facilities by residents.

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Chapter 11

LIGHTING

Proper lighting is essential in any site plan for safety and security reasons. A well-planned lighting scheme can also be a major aesthetic attraction by highlighting buildings and vistas. Lighting standards and fixtures can be attractive as well as functional.

A badly designed lighting plan can be more dangerous than no lighting at all. It can cause glare and temporarily affect the vision of drivers and pedestrians, possibly causing accidents. The haphazard lighting plan will leave areas in darkness, an invitation for illegal behavior. Badly directed or unshielded lighting can have a serious adverse impact on surrounding areas.

A well-designed lighting plan should be adapted to the specific site and proposed development. Higher output lights may be necessary in projects where a substantial percentage of the inhabitants will be elderly. More lights are needed when a hilly site is developed. Lower lights should be considered when a project is on a hill to prevent glare from extending beyond the site. Areas affected by fog or haze may require special types of light.

Definitions

There are three key definitions relating to light.[39] Unwanted light is called glare, and the most universally accepted lighting standard establishes a maximum level of illumination, expressed in footcandles,[40] beyond which all light is classified as glare. Glare is the sensation produced by brightnesses within the visual field that are sufficiently greater than the luminance to which the eyes are adapted, causing annoyance, discomfort, or loss of visual performance or visibility. Direct glare results form high brightnesses or insufficiently shielded light sources in the field of view or from reflecting areas of high brightness. Reflected glare results from specular reflections of high brightnesses in polished or glossy surfaces in the field of view.

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(39) As presented in the universally accepted source book on lighting, the Illuminating Engineering Society Lighting Handbook. The latest edition is the fifth edition published in 1972. It is edited by John E. Kaufman and published by the Illuminating Engineering Society, 345 East 47th Street, New York, N. Y. 10027.

(40) Footcandle is the unit of illumination.

Standards

In the zoning ordinance, the performance standards section should have minimum and maximum light requirements. If not, consider the following. All direct glare should be prohibited. The maximum amount of light that would be permitted is that produced by lights on standards not to exceed the maximum height of a building allowed in the zone and shielded to restrict the maximum apex angle of the cone of illumination to 150 degrees. Where lights abut residential properties shielding on one side of the light can also be required.

The maximum intensity of illumination on roadways as recommended by the IES is as follows.

TABLE 10

RECOMMENDATION FOR AVERAGE HORIZONTAL FOOTCANDLES[a]

(Lumens per Square Foot)

A. Roadways (Other than Expressways or Freeways)

	Area Classification		
Classification	Down-town	Inter-mediate	Outlying and Rural
Major	2.0	1.4	0.9
Collector	1.2	0.9	0.6
Local or minor	0.9	0.6	0.2[b]

B. Expressways and Freeways[c]

Classification	Expressways
Continuous urban	1.4[d]
Continuous rural	1.0
Interchange urban	2.0
Interchange rural	

[a]The average horizontal footcandles recommended represent average illumination on the roadway pavement when the illuminating source is at its lowest output and when the luminaire is in its dirtiest condition.

[b]Residential.

[c]The value of 0.6 footcandle for freeways is being continued from the 1953 American Standard Practice for Street and Highway Lighting pending the results of research currently being carried on under the supervision of the Highway Research Board.

[d]2.0 footcandles in downtown area.

Note: The following factors should be considered:

1. Intersecting, converging and diverging roadway areas at grade require higher illumination than that recommended. The illumination in these areas should be at least equal to the sum of the illumination values provided on the roadways which form the intersection.

2. The lowest footcandle value at any point on the pavement should not be less than one-third the average value. The only exception to the requirement applies to residential roadways, where the lowest footcandle value at any point may be as low as one-sixth the average value.

For other critical areas, the recommended footcandles are as follows:

At intersections	2.0
Parking areas	1.0
Maximum at property lines	1.0
Residential areas	0.6 (average)
	0.1 (minimum)

What to Light

Lighting should be located along streets, in parking areas, at intersections and where various types of circulation systems merge, intersect, or split. Pathways, sidewalks and trails should be lit using low or mushroom-type standards. Stairways and sloping or rising paths require illumination, as do building entrances and exits.

Lighting should also be provided where buildings are set back or offset. This is to prevent the familiar "dark corner" where danger, real or imaginary, often lurks.

Gordon Cullen, in Townscape, makes some general comments on lights.(41) The fixtures should be in scale with the street or environment. They should neither overpower a scene by being too large or by being too small not contributing to the "intricacy of the scene".(42)

Cullen calls for particular care in preserving urban enclosures such as squares, focal points, crescents, etc., and not destroying the "static quality" of these spaces by introducing the motion produced by a string of light poles which artificially and hurriedly carry the eyes beyond.

Lighting should also be required for parking areas. Here again, some objections will be forthcoming. If it is provided, it usually is in the form of spotlight-type mounted fixtures mounted high up on the corners or sides of the buildings. These should be avoided since they will require long extension ladders to change burned-out lamps. As a result, they are not replaced promptly. The fixtures also rust, particularly where they

(41)Cullen, Gordon, Townscape, Reinhold Publishing Company, New York, 1961.
(42)Op cit., p. 144.

join the base, and often "droop", which cuts off light to areas or shines it into apartments.

Pole mounted standards should be required. The standards and style of light should be consistent with the type and style of the architecture of the buildings. The poles should be between 12 and 15 feet high and arranged to give a fairly uniform lighting pattern of at least 0.5 footcandles throughout the lot. At driveway intersections, the lights should produce at least three footcandles for safety reasons.

The fixtures themselves should be capable of being shielded on any side, and the light cone should not exceed 135 degrees.

Required Documentation

The planning board should require the applicant to submit a lighting plan for the proposed development. The plan should indicate the location of all proposed lighting. The plan should note the maximum light intensity expressed in footcandles from each light, and the circumference of the minimum required intensity from each light should be indicated on the plan. An example of such a plan is shown on the next page.

The planning board should also receive a picture of the proposed standards upon which the lights will be attached as well as the fixtures themselves. There should be some attempt to coordinate the light standards with the architectural style. For example, a contemporary architectural style normally should not have colonial style lights or standards.

Street light styling should be the same or similar to any accessory lighting on the houses such as post lights or door lights.

Review Checklist of Key Items

1. Standards upon which lights are placed should be spaced at a distance approximately equal to four times the height.

2. Keep the height of standards low. The maximum height should be in scale with the surroundings and should not exceed the maximum building height permitted in the zone or 25 feet, whichever is less.

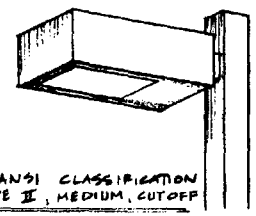
3. Spotlights, if used, should not be located on buildings and faced outward. These create dark shadows adjacent to the building and affect security. The glare blinds persons looking at the building and the light is thrown directly on adjacent properties. Put spotlights on standards pointing toward the structures, being careful not to blind residents.

4. Use lighting shields to keep glare on the site.

5. Consider light locations from a maintenance point of view. If they are too high or in out-of-the-way places, burned-out bulbs will not be replaced quickly.

FIXTURE DESCRIPTION

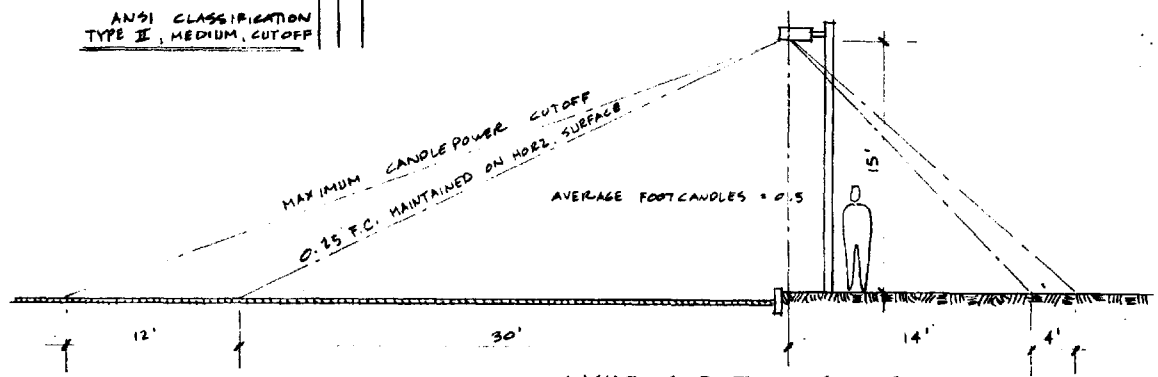
7" X 14" X 23" HOUSING, ALUMINUM FRAME, DARK BRONZE BAKED ENAMEL FINISH, HEAT AND IMPACT RESISTANT CLEAR GLASS LENS, ENCAPSULATED HIGH POWER FACTOR REGULATING BALLAST, (1) - 175 W. ARCHED ARC METAL HALIDE LAMP.



ANSI CLASSIFICATION
TYPE II, MEDIUM, CUTOFF

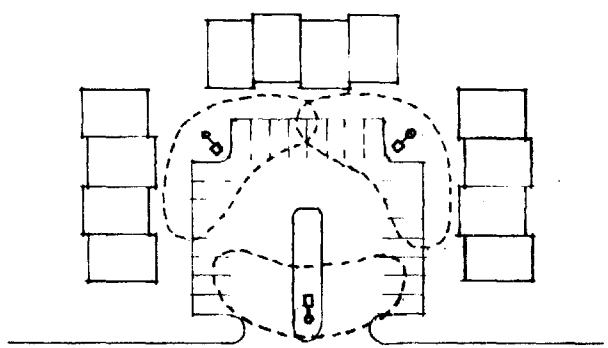
POLE DESCRIPTION

LAMINATED SQUARE WOOD POLE, NATURAL UNSTAINED FINISH WITH PRESERVATIVE TO PROTECT AGAINST DECAY. POLE STANDARDS TO SUSTAIN A TRANSVERE WIND LOADING OF UP TO 100 M.P.H.



LIGHTING DETAILS & ELEVATION

NOT TO SCALE



PLAN - 1" = 50'-0"

LEGEND:

FIXTURE AND POLE

ISOLUX TRACE

THE VILLAGE AT MILLTOWN

MILLTOWN, NEW JERSEY

LIGHTING PLAN

for

QUAD ONE

JASON HIGHTOWER, AIA, ARCHITECT

SEPT. 12, 1976

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   This magazine is an excellent source of lighting manufacturers who will supply municipalities photographs and sketches of their products. Articles on lighting also appear in the magazine from time to time.

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3. Kaufman, John F., ed. Illuminating Engineering Scoiety Lighting Handbook. 5th ed. Illuminating Engineering Society, New York, 1972.

Chapter 12

SIGNS AND STREET FURNITURE

The design review of signs and street furniture is generally more applicable to mixed use developments such as a PRD (planned residential development) application than to a standard major subdivision application. However, all major subdivisions include some elements of street furniture, if only in the use of street lighting standards and fire hydrants.

In Chapter 2 the need for a systematic process in subdivision and site plan review was stressed, beginning with the "big picture" and ending with design details. Signs and street furniture are prime examples of design details which should be left until the final stage of the design review.

In fact, these two elements could be omitted from the initial review procedure entirely and handled by making any review approvals subject to later approval of all signs and street furniture. This procedure is purely administrative and is in no way intended to reduce the importance of these two elements to the attractiveness of the end product.

Sign Considerations

Signs visually communicate information to the stranger. There are three basic elements of signing -- the viewer, the sign, and the location of the sign. As Fruin notes,(43) each have certain requirements which the sign designer must consider. These are illustrated in the following chart.

Sign regulations are customarily included in the local zoning ordinance, although some communities have enacted separate ordinances to control and regulate signs. However they are regulated, signs are structures and as structures they should be subject to the same kind of design review as buildings. In other words, our concern is with the specific design, location, size, and lighting of proposed signs in relationship to other elements of the overall site design.

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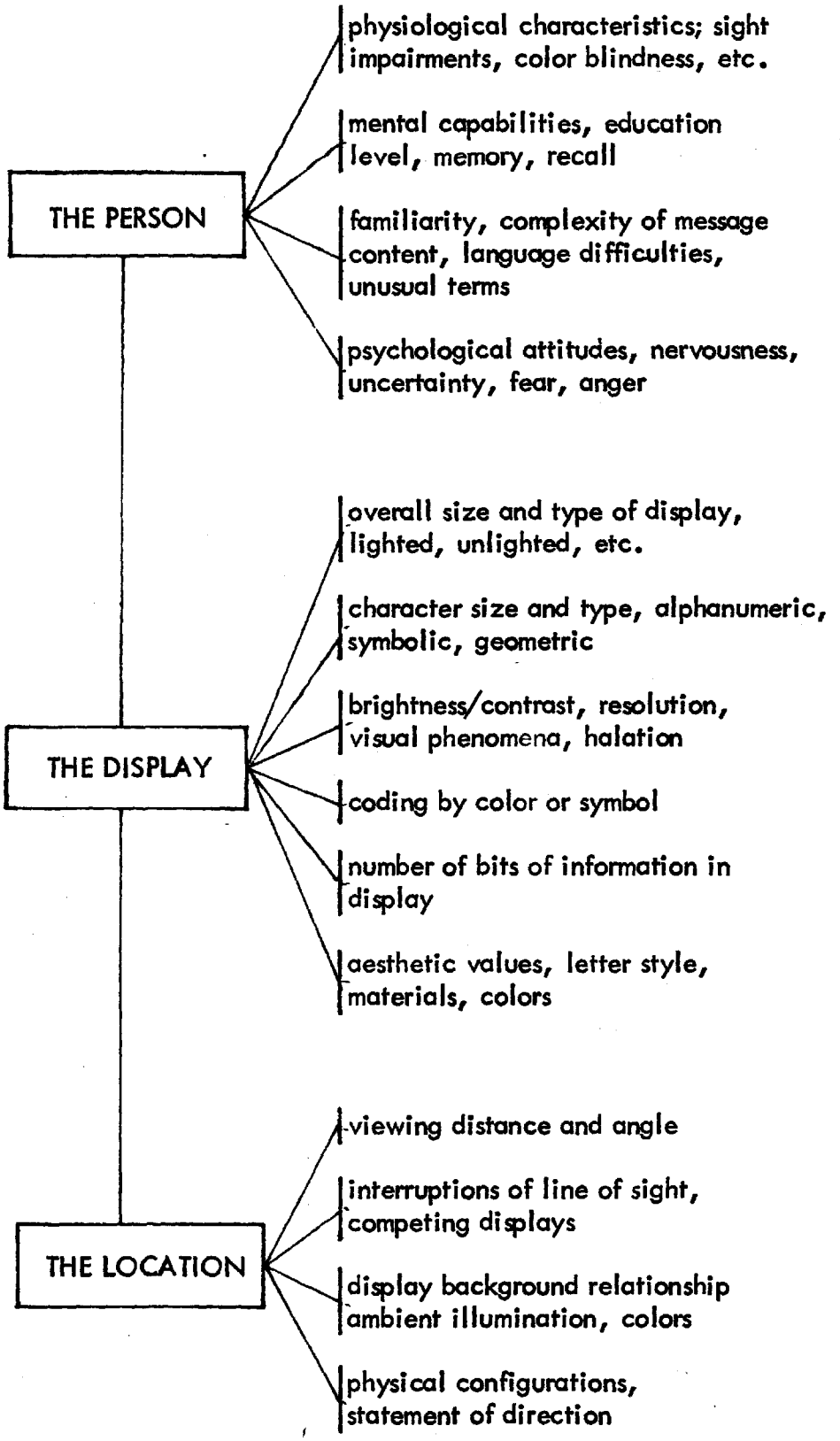
(43) Fruin, John J., Pedestuary Planning and Design, Metropolitan Association of Urban Designers and Environmental Planners, Inc., New York, N.Y., 1971.

ELEMENTS OF VISUAL COMMUNICATION BY SIGNS



Signs are required since they give directions and provide needed information. Unfortunately, signs are often misused, poorly planned, almost always too numerous, and if designed at all, it is usually as an afterthought. To avoid these problems, some of the following points should be considered as part of design review.

Design theme. There should be a consistent sign design theme throughout a particular project. The design theme would include style of lettering, construction, material, type of pole or standard (wood or metal, for example), size, and lighting. Color of letters and background is also important and should be carefully considered in relation to the color of the material of buildings or where the signs are proposed to be located. Keep in mind, however, that approximately 10 percent of the population have varying difficulties with color (color blindness, etc.).

Location. From a safety point of view signs should be located so as not to obstruct sight distances. This is particularly important at intersections. The location of signs should be selected in terms of visibility. Signs designed to be seen from vehicles should be perpendicular to the line of travel, while signs designed to be read on foot should be parallel with walks.

Size. Most signs are too large. The general standard for directional signs, for example, is a letter size of two inches plus one additional inch of letter height for each 25 feet of viewing distance. A sign designed to be read from 100 feet should have letters of at least six inches high.(44)

Signs affixed to building walls advertising a product, service, or occupant should not exceed five percent of the wall face to which it is attached. Signs from interiors designed to be read from the outside could also be included in this figure.

Kinds of Signs

The residential subdivision normally would have several types of signs. All should be indicated on the plan as to location, size, style, and construction.

1. Street signs are the most common and while most examples are undistinguished, this need not be the case. The applicant should submit the specific design which is intended to be installed in the development.

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(44) Fruin, John J., op cit.

2. Identification signs may be located on buildings. Often there are letters and number such as BUILDING B-4, RECREATION BUILDING, or RENTAL OFFICE. Identification signs are often free standing on sidewalks, indicating the direction to the particular building. Both should be noted on the sign plan.

3. Directory signs in large multi-family projects are fairly common and list the names, buildings, and apartments of the occupants. One of this type is usually located at the entrance of several structures.

4. Bulletin boards are used to announce coming events and can be found in front of community buildings, churches, etc.

5. For sale or rent signs are often a source of annoyance to residents because of their size, tenure, location, and number. The planning board should impose realistic controls on their size (four feet may be reasonable), tenure (in place only until 75 percent of the lots are sold or apartments rented and then removed), location (on the lot or at the entrance of the development), and number (one on each scattered lot and one at the entrance).

6. Home occupation signs indicate the residence and place of business of a permitted home occupation. One sign per occupation and limited to two square feet in area is reasonable.

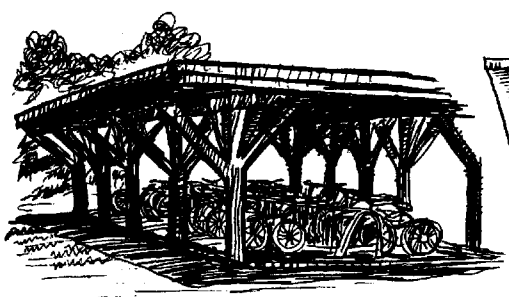
7. Directional signs such as No Parking, Deliveries, etc., should be limited to four square feet and follow the general design scheme for signs throughout the project.

Street Furniture Considerations

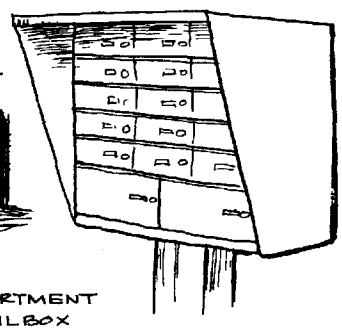
Street furniture may be defined as the man-made elements of an urban landscape. These are the functional elements of our environment that may include phone booths, benches, planting boxes, mail and meter boxes, water towers, lighting standards, directional signs, bollards (posts), fire hydrants, power lines, fences and walls, water fountains and pools, drinking fountains, trash receptacles, bike racks, sculpture, paving and steps, and bus shelters. Unfortunately, these elements are often taken for granted as part of the built environment and consequently ignored or overlooked in the review process.

An example of some of the above elements is shown on the following picture. The design review considerations of these elements are similar to those for signs discussed earlier. In fact, a directional sign is considered to be an element of street furniture. These review considerations include location, size, lighting, and design relationship. For some elements of street furniture, however, the biggest problem will be to get the developer to provide them in the first place.

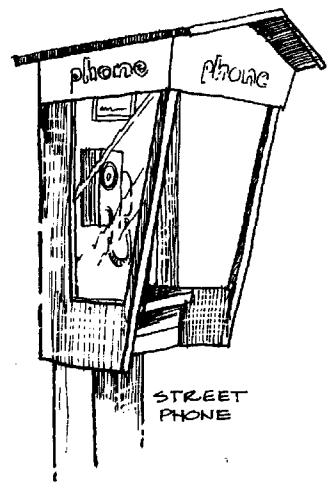
STREET FURNITURE EXAMPLES



BIKE SHELTER



APARTMENT MAILBOX



STREET PHONE

Standards for Street Furniture

Certain street furniture is functional in nature and should be located where the demand is. Bike racks, for example, would be necessary in front or to the rear of multi-family areas, and with easy access to bike trails. They also should be placed near service areas and by recreational activities.

If bus service is available, bus shelters should be required at least at major intersections. The stops themselves should be on the far side of the intersection so as not to block other vehicles or limit passage through the intersection. It would be desirable to provide indentations off the main travel routes to accommodate the buses. The shelters should be designed to keep rain off those waiting for the buses and to break the wind. They should not be entirely enclosed to allow the interiors to be readily observed.

Fences and walls often pose problems. They should be protected from parking vehicles. There should be a consistency in the type of fences permitted; otherwise, the result is a jumbled and chaotic look. Heights should be limited; four feet appears to be the maximum. They should be permitted only where they are functional--no spite fences!

Trash receptacles should be located near recreational activities, at street corners, and at designated intervals in the center of the block. Put them where people naturally congregate, such as near fire hydrants and under street lights. Open weave receptacles should be avoided because wind often blows small bits of paper and debris from them. Also avoid the tendency to use discarded 55 gallon drums or such other substitutes. Even painted they leave something to be desired in the way of aesthetics.

Benches, if they are going to entice people to sit, should be located where activity is taking place. This may be where there is both pedestrian and vehicular traffic, or where special activities take place such as markets, churches, schools, or recreation. Benches should be located so as to be in shade during the warmest part of the summer day, but accessible to the winter sun. Southerly exposures with some tree overhang is best.

Street furniture, whether functional or decorative, defines what Cullen describes as "possession".(45) Possession is the method by which towns and neighborhoods develop humanity and intricacy. It permits the out-of-doors to be effectively utilized for social and business purposes.

The methods by which this element is provided include the use of street furniture to attract people, to give focus, and to offer convenience, relief and amenity. It allows and invites people to pause, relax, talk, as well as carry on commerce, learn, and observe.

The concept that Cullen describes is difficult to capture. One hears about it from visitors to old cities in Europe and Asia when they talk about "charming villages" or "delightful squares". These ethereal images are greatly assisted by the effective use and careful location of the street furniture described in this chapter.

Future Approvals

It was suggested earlier that the review and approval of signs and street furniture at some later date be made a condition of approval of development plans. This technique speeds the review process and leaves more time in the future for the careful review of these design details. However, to avoid any problems with the commitment for provision of these elements, any plan that is subject to additional review should at least

(45) Cullen, Gordon, Townscape, Reinhold Publishing Company, New York, 1961.

indicate the number and type of elements to be provided. This could be covered by a listing on the subdivision or site plan as follows:

> "The following elements of street furniture which are not shown on the plan will be provided by the developer, and will be subject to final design review by the planning board for specific location and design."
>
> Phone Booth Locations (3)
> Drinking Fountain Locations (2)
> Bike Rack Locations (4)

Continuity of Design

Although specific architectural building design or style is not within the process of design review and should not be for obvious reasons, your review of many of the items of "street furniture" in a project will have an impact on overall design. For example, street lighting, storage sheds, garbage sheds, mail and meter boxes, etc., should all compliment whatever architectural design is selected for the project.

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Chapter 13

WHERE TO FIND HELP

A variety of individuals and agencies, public, quasi-public and private are available to planning boards in providing the expertise to effectively and professionally review large scale residential development. This chapter discusses where boards may secure this assistance.

Private Assistance

Many communities in the State do not have the financial resources or the work load to afford full-time staffs for legal, engineering, or planning advice. They turn to a large group of professionally trained experts known as consultants for this advice, who may be hired on an annual basis or for specific assignments.

Before hiring a specific consultant, most planning boards interview several firms or individuals. They discuss the kind of services needed, the amount of time that will be required, and carefully review personal qualifications. Before a final decision is rendered most boards will contact other agencies with which the consultant has been involved.

Each of the various professions has lists of qualified individuals or firms which meet the profession's minimum qualifications for membership. They often publish information on how to select a consultant. In addition, since many of these professions are regulated by State boards, they also provide lists of qualified firms or individuals. These boards include the N. J. State Board of Professional Engineers, N. J. State Board of Architects, N. J. State Board of Professional Planners, and the N. J. Bar Association.

Public Assistance

County planning boards. Planning boards can turn to a number of public agencies for advice and assistance. Foremost among these are county planning boards. In many cases the county boards are required by law to approve residential development, but even in situations where their approval is not required specifically, they often can be of immeasurable assistance to local boards. The Union County Planning Board, for example, has a staff traffic engineer and staff hydrologist to aid local boards in these areas.

Soil conservation districts. Soil conservation districts, which now include all New Jersey municipalities, are invaluable in reviewing and solving problems related to soil and water. Under New Jersey's Soil and Erosion and Sediment Control Act, the district will review erosion and sediment control plans. (Municipalities have the option of having their engineer do the reviews if they have an approved ordinance.) As outlined in the New Jersey Department of Environmental Protection's Handbook for Environmental Commissioners, the district has agreements with several Federal and State agencies which enables them to provide technical services to land owners. The Soil Conservation Service of the U.S.D.A. provides full-time, technically trained personnel to carry out the work of the district. Other Federal, State, and local resource agencies also provide resource assistance through the district. The following is a partial listing of services of particular interest to municipal agencies:

1. Interpret soil surveys, identify land use limitations, and make land use recommendations;

2. Analyze water disposal, drainage, erosion and sediment problems, and recommend remedial measures;

3. Provide opinions on problems covered in Item 2 that develop due to rapid urbanization and land use changes, and recommend planned action;

4. Review survey data to insure adequacy for design purposes;

5. Provide design criteria for conservation project measures;

6. Check adequacy of designs of soil and water conservation measures;

7. Make recommendations on installation of project measures;

8. Assist in conducting inventories of resources;

9. Provide planning and development services for the future long-range development of the township;

10. Counsel planning boards and planning consultants on the objectives for long range development of the township; and

11. Assist municipal environmental commissions with resource planning.

Of particular importance to municipalities and landowners is the soil survey program of the Soil Conservation Service. Soil scientists have analyzed all open land in most areas of the State. They have developed detailed soil characteristic information relating to such factors as drainage, erodability, depth to water table, permeability, engineering properties, and other factors which are of importance in making land use decisions.

The soils experts can interpret the information to predict the limitations on each soil type for most land uses. This is particularly important in planning for successful school, park, residential, or industrial developments.

Soil conservation districts and the Soil Conservation Service are authorized to assist local organizations with watershed projects. These projects include flood prevention, land drainage, wildlife area development, water supply, and public recreation.

There are 15 soil conservation districts in the State. The directory in the Appendix shows the location of each district and its headquarters. A phone call or letter is all that is necessary to get action.

The State headquarters for the Soil Conservation District program is located in Trenton, New Jersey. For further information contact: Samuel R. Race, Secretary, State Soil Conservation Committee, New Jersey Department of Agriculture, P.O. Box 1888, Trenton, N.J. 08625. Telephone: 609 292-5540.

State Department of Environmental Protection. The various divisions of the State DEP can provide important resource data and advice in a variety of situations relating to residential review. They are too numerous to mention but include the Natural Resources Council, Division of Environmental Quality, Division of Marine Services, etc.

The Division of Water Policy and Supply is probably the single DEP agency which many municipalities turn to first. Their functions are described in the Handbook for Environmental Commissioners as follows.

This division functions pursuant to 13:1B-47 and 58:22-1 et seq. As trustee of the fresh-water resources of the State, the Division, through a nine-member Council appointed by the Governor with the consent of the Senate, serves as a quasi-judicial body, rendering decisions after public hearings on all applications for diversion or allotments of natural water resources and of water developed for sale by State-owned and operated water facilities, and on equity questions involved in the construction of structures along streams and the delineation and marking of flood plains. The Bureau of Water Control exercises regulatory control of water supply, dams, and stream encroachments; supervises regular stream and groundwater investigation

programs; issues well drillers' licenses and permits for well drilling in certain classifications; compiles statistics and levies charges for excess diversion; and regulates control of private diversion of surface waters. The Bureau of Water Resources is responsible for the long-range planning of water resources development, for matters pertaining to flood control and for the delineating and marking of flood plains. It supervises and directs special groundwater and other investigation programs. The Bureau of Water Supply manages and operates the Delaware and Raritan Canal as a source of public and industrial water supply and for recreational use, and the Spruce Run and Round Valley reservoirs, as a source of public and industrial water supply. It also conducts negotiations to obtain water purchase commitments for Spruce Run and Round Valley reservoirs and the Delaware and Raritan Canal.

State Department of Community Affairs. Another important State agency, with multi-faceted responsibilities in improving the living environment of New Jersey communities, is the State Department of Community Affairs. Operating through six divisions and four quasi-independent agencies, the Department provides information, assistance, guidance, training, and counseling through programs that promote adequate housing, economic and social services, statewide and regional planning, and effective local government services.

Many of the Department's operating divisions exercise important regulatory functions such as review and approval of local and county budgets by the Division of Local Government Services, enforcement of construction and maintenance standards for hotels, motels, and multiple dwellings by the Division of Housing and Urban Renewal, and funding of various programs by the Division on Aging and Division of Human Resources.

Of particular interest to planning boards and planners is the Local Planning Assistance Unit of the Bureau of Local Management Services in the Division of Local Government Services. The Unit provides technical and financial assistance to county and local governments for programs promoting orderly physical growth and development and implementation of sound comprehensive plans to serve as frames of reference for executive policy and decision making.

The Unit conducts workshops with county colleges and county planning boards and extends technical assistance to local governments on various development and zoning matters. It also publishes various technical manuals and a bimonthly newsletter, The Local Planner, which is a particularly valuable resource covering all phases of planning and development.

The Local Planning Assistance Unit can be reached at 609-292-2523.

Private and Quasi-Public Agencies

The Watershed Association of New Jersey includes the South Branch Watershed Association, P.O. Box 5192, Clinton, N.J. 08809; the Stony Brook-Millstone Watershed Association, Box 171, Pennington, N.J. 08534; and the Upper Raritan Watershed Association, P.O. Box 44, Far Hills, N.J. 07931. All the foregoing have a professional staff who can provide technical help in all phases of land and water management, pollution control, conservation education, land acquisition, and environmental planning.

The New Jersey Audubon Society, located at 790 Ewing Ave., Franklin Lakes, N.J., has prepared a general model ordinance favoring those communities interested in natural areas preservation and limited use of open spaces (see Appendix). The Society also is preparing a natural areas inventory, and its professional staff is available on a State-wide basis to assist municipal commissions on matters concerning pesticide pollution, open space for natural environment preservation, wetlands conservation, and conservation education. Many affiliate groups can provide conservation expertise.

The North Jersey Conservation Foundation, Box 333, New Vernon, N.J., has prepared several publications on conservation commissions. Its model ordinances are also found in the Appendix. The Foundation will continue to help the commission movement in the establishment of commissions, the distribution of written material on all conservation subjects, and on open space land acquisition problems.

New Jersey Federation of Planning Officials, 1308 Wood Valley Rd., Mountainside, N.J. 07092, provides planning referral assistance to municipalities. It publishes a monthly newsletter summarizing important planning cases and through its committees and technical advisors organizes and runs area educational meetings. The Federation carefully reviews all proposed planning legislation and musters support or opposition as needed.

A P P E N D I C E S

APPENDIX A

LEGAL ASPECTS OF DESIGN REVIEW

(by Thomas Norman, Esq.)

The authority for imposing design standards and the subsequent design review by planning boards is found in State planning laws authorizing zoning and subdivision ordinances. Design criteria and standards must conform with State law and guidelines established by the courts in land-use decisions interpreting State planning laws. Planning board members should have an understanding of fundamental legal principles relating to land use regulations in order to appreciate the scope of design review authority, as well as the limitations of that authority.

Statutory Authority

The validity of design review requirements depends on the authority conferred to municipalities by State law, on the provisions of local subdivision and zoning ordinances, and on the reasonableness of the requirements. The Municipal Land Use Law (P.L. 1975, Chapter 291) is the source and limit of authority to impose design review standards by the planning board.

The act allows the adoption of land use regulations which promote "a desirable visual environment through creative development techniques and good civic design and arrangements."(46) It specifically permits subdivision regulations which encourage flexibility, economy, and environmental soundness in the layout and design of the subdivision.(47) Site plan review ordinances may cover similar aspects.

The statute permits planning boards to require site design details to include topography, vegetation, drainage, flood plains, marshes, waterways, existing and proposed buildings, driveways, parking spaces, walkways, means of ingress and egress, drainage facilities, utility services, landscaping, structures and signs, lighting, and screening devices.(48) Subdivision regulations can require site design details with respect to streets, walkways, curbs, gutters, street lights, shade trees, fire hydrants and water, and drainage and sewerage facilities.(49)

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(46)NJSA 40:55D-21
(47)NJSA 40:55D-29.2b.
(48)NJSA 40:55D-7.
(49)NJSA 40:55D-29.

As a practical matter these provisions permit wide discretion in the review of designs in the subdivision and site plan process. Court decisions in the past have upheld site design requirements without the benefit of State legislation.(50) Now, with the authority of the newly enacted Municipal Land Use Law, the issue will shift from that of questioning basic authority to whether the requirement is reasonable.

For example, the statute permits preserving existing natural resources on a site.(51) If, under this authority, a site plan ordinance requires that mature trees be preserved by protecting the root system during and after construction, the basic question of authority is fairly well answered in the affirmative by the language of the State Law. However, may the planning board require that wells be used to protect the trees in case of changes in grade during construction? Can maintenance guarantee assuring replacement of damaged trees be made a condition of approval? All things being equal, the planning board would be justified requiring wells and/or maintenance guarantees as conditions of site plan approval in this case.

Remember, the stated purpose of the State law is to promote a desirable visual environment and good civic design and arrangements; protecting existing trees on the site fits clearly in the mandate.

Ordinance Requirements

1. Basic Authority

A subdivision or a zoning ordinance can be adopted which does not fully implement statutory power. If a condition is required by a planning board that is within the State law authorization but beyond that provided in the local subdivision or zoning ordinances, the subdivider cannot be compelled to comply with the condition. Planning boards and governing bodies must be very careful when drafting subdivision and zoning regulations because failure to include authorization to require design improvements results in the loss of that authority.

2. Vagueness

To give maximum flexibility, some municipalities have ordinances providing that subdivision or site plan designs must be acceptable to the local planning board and not contrary to the public health, safety, and general welfare, or some such general provision. This type of provision supports the imposition of conditions. However, the standard is not specific enough and can be found to be too vague and therefore

(50)Kozesnick vs. Montgomery Township, 24 N.J. 154 (1957).

(51)NJSA 40:55D-41a.

invalid. For example, design requirements of a sign provision in one municipality failed to set forth definite standards for the proper authority in their determination of whether signs above the stated square footage could be permitted. The Court found that the test established in the ordinance actually required only that the municipal officials "be satisfied" with the proposal. This was held to be too vague and consequently invalid.(52)

Conversely, specific standards can sometimes save a design requirement which might otherwise be found invalid. In one case the ordinance provided that every portion of land less than 50 feet from a residential boundary line shall be deemed a business buffer area, and no part of any lot containing a business buffer area can be used for business purposes unless a 20 foot screening belt is established parallel to the zone boundary. The ordinance further required that the screening must consist of evergreen trees with a minimum height of five feet, at such densities so as to obscure business activity from the residential zone. The Court upheld these provisions noting the definitive nature of the standards involved and recognizing that permitted business operations may have a potentially harmful influence requiring protection for abutting residential property owners.(53)

3. Reasonableness

All design regulations, restrictions, and prohibitions as to buildings and structures, their location on lots, and their uses must have a reasonable relationship to the public health, safety, or welfare or other proper objects of the police power. If they do not have such a reasonable relationship, they are invalid. For example, a board of adjustment restricted parking for four or more vehicles to the side or rear yards as a condition of approval for garden apartments. In reviewing this, the Court found that the restriction bears a reasonable relationship to single-family housing but not to garden apartments, where parking facilities are frequently arranged at various angles and positions. This design standard was found unreasonable and set aside.(54)

In another decision, a parking area for a proposed store was rejected by the planning board because it extended too far into a residential zone and the ingress and egress routes from the lot onto the main roadway were not appropriate. The ordinance authorized the planning board to review and approve site plans where a parking area intrudes into a residential zone. In reviewing the planning board's decision,

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(52) Board of Commissioners, Ridgefield Park vs. S. Pater Realty, 73 N.J. Super 155 (CD 1962).

(53) State vs. Gallop Building, 103 N.J. Super 367 (AD 1968).

(54) J.D. Construction vs. Board of Adjustment of Twp. of Freehold, 119 N.J. Super 140 (LD 1972).

the Court found that the rejection could be justified on the basis of traffic safety and protection of adjacent residential dwellings. The relationship in this case was found to be reasonable.(55)

4. Uniformity

Not only must design standards be reasonably certain and definite in meaning, they must be reasonable in all other respects. They must be uniform for each class or kind of building throughout each district, but they may differ in one district from what they are in another district, provided that the classification of the districts is reasonable and valid. For example, the Court upheld a 100 foot buffer requirement for a large scale shopping center in order to protect adjacent residential property owners. However, the wording of the ordinance raised the question whether adjacent property owners in the next community would be entitled to the protection of the buffer requirement.

In its decision the Court found that a fair interpretation of the ordinance would include adjacent property owners in the next town. If it were otherwise, the Court noted, the ordinance provision would be invalid.(56) Uniform treatment of those to be protected, as well as those who are to build, must be maintained at all times in the design review process.

5. Arbitrary Standards

Arbitrary standards must also be guarded against in the design review process since they often prove to be unreasonable. In one case, an ordinance fixed off-street parking space requirements for supermarkets at two square feet of off-street parking space to one square foot of floor area. Three years later this ratio was increased to four to one and a year after that it was raised to six to one. At the trial, expert testimony indicated that a ratio of six to one was far in excess of that needed for parking for supermarkets. Even the municipal expert testified that his firm did not recommend the six to one ratio. The Court noted that the changes were drastic, made within a short period of time, and were far out of line when compared with the average parking ratios fixed by ordinances elsewhere. The ratios were found invalid and set aside.(57)

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(55) Antonelli vs. Planning Board of Waldwick, 79 N.J. Super 433 (AD 1963).

(56) Quinton vs. Edison Park Development Corp., 59 N.J. 571 (1971).

(57) Ridgeview Co. vs. Board of Adjustment of Florham Park, 57 N.J. Super 142 (LD 1959).

Along similar lines, a recent decision on a requirement that called for motels and restaurants to be at least 5,000 feet from the next closest motel or restaurant on the same side of the highway was struck down as arbitrary. The Court in reviewing the justification for the distance could find no rational basis for the 5,000 foot requirement, not could it find any valid purpose of zoning which was achieved by the requirement. The Court noted that traffic safety could be accomplished through proper site design and that the distance requirement was not necessary for that purpose.(58)

Summary

Site design authority permitted by State law allows a great deal of discretion to municipalities. However, before site design standards or conditions may be imposed, authority must be given to the proper reviewing agency in the zoning ordinance or subdivision ordinance. It is not enough to say that the restriction or modification makes sense. It must also be authorized in the ordinance.

The Courts in reviewing these standards are willing to uphold them provided they are reasonable, related to proper zoning or planning objectives, and applied fairly to all in similar circumstances.

(58) Davidow vs. Board of Adjustment of South Brunswick, 123 N.J. Super 162 (AD 1973).

APPENDIX B

TREES, SHRUBS AND GROUND COVER SUITABLE FOR PLANTING IN NEW JERSEY

Chapter 8 discussed the need for care in selecting appropriate species of plant material for particular weather and soil conditions. The United States Department of Agriculture has classified New Jersey into two "hardiness zones" for this purpose. Zone 6, with a minimum temperature range of zero to minus ten degrees includes Mercer and Middlesex counties and all counties to the north. Zone 7 has a minimum temperature range of ten to zero degrees and includes Burlington and Monmouth counties and all counties to the south.

The following trees, shrubs and ground covers are recommended for each zone.

Zone 6

Trees

Norway Maple
Red Maple
Serviceberry
European Hornbean
Cornelian Cherry
Amur Cork-Tree (male only)
Willow Oak
Littleleaf Linden
Green Ash
Ginkgo (male only)
Carolina Silverball
Goldenrain-Tree
Sweet-Gum
Bradford Pear
Japanese Pagoda - Tree
American Holly

Shrubs

Glossy Abelia
Aralia
Japanese Barberry
Japanese Boxwood
Fringetree
Slender Deutzia
Russian Olive
Forsythia
Japanese Holly
Pfitzer Juniper
Beautybush
European Privet
Shining Sumar
Vanhoutte Spirea
Japanese Yew
Yellowroot

Ground Covers

Bugleweed
Bearberry
Rockspray Cotoneaster
Daylily
Japanese Holly
Pfitzer Juniper

Zone 6 (continued)

Ground Covers (continued)

Barrenwort
Wintercreeper
Forsythia
English Ivy
Japanese Honeysuckle
Memorial Rose
Goldmoss Stonecrop
Periwinkle

Zone 7

Trees

Norway Maple
Red Maple
Serviceberry
American Hornbean
European Hackberry
Green Ash
Ginkgo (male only)
Honeylocust
American Holly
Goldenrain - Tree
Sweet-Gum
Bull Bay
Bradford Pear
Willow Oak
Japanese Pagoda -Tree
Littleleaf Linden

Shrubs

Glossy Abelia
Aralia
Red Chokeberry
Japanese Barberry
Russian Olive
Winged Spindletree
Forsythia
Fothergilla
Japanese Holly
Chinese Witch-hazel
Savin Juniper
Beautybush
Oregon-Grape
Heavenly-Bamboo
Rugosa Rose
Doublefile Viburnum

Ground Covers

Bugleweed
Bearberry
Crownvetch
Rockspray Contoneaster
Barrenwort
English Ivy
Daylily
Japanese Holly
Pfitzer Juniper
Lilyturf
Japanese Honeysuckle
Dwarf Hollygrape
Memorial Rose

APPENDIX C

CONSERVATION DISTRICTS IN NEW JERSEY

Name	Address	Telephone No.
Burlington SCD	Cramer Building Rt. 38, Mt. Holly 08060	609-267-7410
Camden SCD	152 Ohio Avenue Clementon 08021	609-767-3977 or 784-1001
Cape-Atlantic SCD	Atlantic Co. Office Bldg. 1200 W. Harding Highway Mays Landing 08330	609-625-2203 or 625-9400
Cumberland SCD	P.O. Box 148, Rt. 77 Seabrook 08302	609-451-2144
Freehold SCD (Mon. & Midsex. Co.)	20 Court St. Freehold 07728	201-462-1079
Gloucester SCD	Gloucester Co. Office Bldg. Clayton 08312	609-881-0240
Hunterdon SCD	Route 6, Box 49 Flemington 08822	201-782-3915 or 782-6701
Mercer SCD	930 Spruce St. Trenton 08638	609-695-5415 or 989-8000 ex 353
Morris SCD	Court House Morristown 07960	201-538-1552 or 538-1810
Northeast SCD (Bergen, Essex, Hudson & Passaic Counties)	355 Main St. Hackensack 07601	201-646-2979 201-538-1552
Ocean SCD	Ocean County Agric. Center Whitesville Road Toms River 08753	201-349-1007 or 244-7048
Salem SCD	1000 East, Rt. 40, Box 37 Woodstown 08098	609-769-1124
Somerset-Union SCD	308 Milltown Road Somerset County 4-H Center Somerville 08876	201-725-3848 or 526-2701
Sussex SCD	R.D. 1, Box 13 Newton 07860	201-383-3800 or 852-5450

CONSERVATION DISTRICTS IN NEW JERSEY (Cont.)

Name	Address	Telephone No.
Warren SCD	Stiger St. Hackettstown 07840	201-852-5450 or 852-2579

STATE SOIL CONSERVATION COMMITTEE
P.O. Box 1888, Trenton, New Jersey 08625
Tel: 609-292-5540

APPENDIX D

FORMS

Forms can simplify the design review process by insuring that all required agencies, i.e. county, engineer, etc., have received copies and returned their comments. The specific forms and their functions are noted below. (The examples of forms do not include the usual Application for Subdivision (sketch plat, preliminary, or final) forms since these are fairly standard throughout the State.) Forms should refer to appropriate sections in the local ordinances. For example, if a site plan check list calls for a parking plan and the local zoning ordinance has a section on parking, this should be noted next to the requirement. These forms are examples and should be carefully modified to reflect township procedural practices.

SD-1 -- Subdivision Control Sheet

This is the master control form for all subdivisions submitted to the planning board. It remains in the planning board file and indicates when action was taken on a plat.

SD-2 -- Subdivision Committee Report

This provides a written record of any action by the subdivision committee. It can be important in subsequent legal action by an applicant.

SD-3 -- Sketch Plat Check List

SD-3 is filled out initially by the applicant and checked by the zoning officer or planning board secretary to determine if all items have been included. The items on the list are taken from the local subdivision ordinance. The list also refers back to appropriate sections of the local subdivision ordinance.

SD-4 -- Preliminary Plat Checklist

SD-5 -- Final Plat Checklist

SDSP-6 -- Referral Form

This referral form is used in both subdivision and site plan review. It should accompany the exhibits sent to the various agencies.

SP-7 -- Site Plan Application

This form is submitted with all site plans.

Forms (Cont.)

SP-8 -- Site Plan Procedures and Checklists

This is a combination procedure and checklist form given to applicants for site plan approval. It includes suggestions to applicants on engineering, landscaping parking, and signs. Many applicants need assistance on these elements and the suggestions prove helpful.

SD-1

SUBDIVISION CONTROL SHEET

1. General Data

   A. Name of subdivider _____ File # _____

   B. Lot _____ Block _____ Tax map sheet _____

      Address _____

   C. Applicant _____

      _____ Phone # _____

   D. Attorney _____

      _____ Phone # _____

   E. Engineer _____

      _____ Phone # _____

II. Sketch Plat

   A. Referrals

      1. Date submitted to township clerk _____

      2. Date required check list completed _____

      3. Date referred to subdivision committee _____

      4. Classified as a _____ subdivision on _____ by action of subdivision committee.

      5. Action of subdivision committee (affirmed or changed)_____ _____ on _____ by planning board.

6. Referrals:

Agency	Date referred	Date returned
a. Engineer	_____	_____
b. County planning bd.	_____	_____
c. Health officer	_____	_____
d. Building inspector	_____	_____
e. Tax assessor	_____	_____
f. Planner	_____	_____
g. _____	_____	_____
h. _____	_____	_____

B. Planning Board Actions

1. Approved as a minor subdivision on _____

2. Denied as a minor subdivision on _____ for the following reasons: _____
_____
_____
_____
_____

3. Date sketch plat referred back to applicant _____

III. Preliminary Plat Approval

A. Application

1. Date submitted to township clerk _____

2. Date required checklist completed _____

3. Referrals

	Agency	Date referred	Date comments returned
a.	Township engineer		
b.	Board of health		
c.	Building inspector		
d.	County planning board		
e.	Subdivision committee		
f.			
g.			

4. Revised plat received _____

B. Public Hearing

1. Date of public hearing _____

   a. Public hearing continued to _____
   b. " " " " _____
   c. " " " " _____

2. Copy of advertisement submitted _____

3. Affidavit of notice submitted _____

4. Public hearing closed on _____

C. Planning Board Action

1. Preliminary plat approval granted on _____ subject to the following terms and conditions: _____

2. Application denied on _____ for the following reasons: _____

Final Approval

A. Date completed application and checklist items submitted to township clerk _____

B. Referrals

		Date referred	Date comments returned
1.	Clerk		
2.	Township engineer		
3.	Building inspector		
4.	Tax assessor		
5.	County planning board		
6.	Board of health		
7.	_____		
8.	_____		

SD-2

S U B D I V I S I O N C O M M I T T E E R E P O R T

File # _____

Date received _____

Date of action _____

1. Name of applicant _____

   Address _____

   _____ phone # _____

2. Location of proposed subdivision _____

   Block _____ Lot _____ General Area _____

3. Number of lots (including remaining parcel) _____

4. Physical data

	Area of lots	Frontage	Proposed Use
a.			
b.			
c.			
d.			
e.			
f.			
g.			
h.			

5. Zoning district _____ Minimum area _____
Minimum frontage _____

6. Does the subdivision require:

a. Extension of streets? _____
b. Extension of sidewalks? _____
c. Extension of curbs? _____
d. Drainage structures? _____
e. Water? _____
f. Sewer? _____
g. Other utilities? _____

Specify any deficiencies: _____

_____

_____

_____

7. Plat referred to other agencies or officials

Official/Agency	Date referred	Report Received
a. Building inspector		
b. Engineer		
c. Planner		
d. Fire marshall		
e. Health officer		
f. County		
g. Attorney		
h.		
i.		

8. Is board of adjustment action indicated? _____

   If so, for what reason(s) _____

   _____

9. Site inspection(s) made on _____ by following committee members: _____

10. Recommended action:

    a. Classify and approve as a minor as submitted _____

    b. Classify and approve as a minor subject to the following conditions:

       (1) _____

       (2) _____

       (3) _____

       (4) _____

       (5) _____

       (6) _____

    c. Classify as a major for the following reasons: _____

       _____

       _____

    d. Reject for the following reasons:

       (1) _____

       (2) _____

       (3) _____

11. Signatures of subdivision committee:

Chairman _____

_____

_____

_____

_____

_____

Action taken by planning board on _____ as follows:

_____

_____

_____

_____

_____

_____

_____

_____
Secretary

SD-3

SKETCH PLAT CHECK LIST

(if sketch plat requested)

Applicant	P.B.	Item
		1. _____ copies of application form
		2. Fees
		3. _____ copies of sketch plat
		4. Size of map _____ (8 1/2 X 13, 15 X 21, 24 X 36, 30 X 48)
		5. Scale _____ (not to exceed 1" = 100')
		Plats should contain the following data (refer to the subdivision ordinance for details):
		6. Location
		7. Structures, wooded areas, and topography
		8. Owners
		9. Identity
		10. Streets, easements, watercourses, rights-of-way
		11. Lots
		12. Endorsements, minor and exempt subdivisions
		13. Utility and drainage information
		14. Date of original preparation and date of revision, if any, of plat, as well as old name if submitted previously under different title
		15. Evidence of satisfactory percolation test
		16. Certification from assessor that taxes are current

_____ _____

Person preparing check list Date

_____ _____

Township official Date

SD-4

PRELIMINARY PLAT CHECKLIST

Applicant _____ File # _____

Date _____

Applicant	P.B.	Item
		1. _____ copies of application form
		2. Fees
		3. _____ copies of preliminary plat
		4. Two copies of affidavit of ownership or letter from owner authorizing submission of plat
		Plats should contain the following data.
		5. Key map
		6. Lots
		7. Record owner or owners of property to be subdivided; if other than an individual, the corporate officers or partner or other atatutory agent
		8. Subdivider
		9. Person who prepared map, official seal and license numbers
		10. Owners of property within 200 feet of entire tract
		11. Acreage
		12. Elevations, contours
		13. Existing and proposed locations
		14. Streets
		15. Utilities
		16. Sewers, drains, ditches
		17. Percolation tests

Applicant	P.B.	Item
		18. Private sewage disposal
		19. Off-site improvements
		20. Setback lines
		21. Deed restrictions
		22. Open space
		23. Support capability
		24. Proof that current taxes are paid

Person preparing check list _____ Date _____

Township official _____ Date _____

SD-5

FINAL PLAT CHECKLIST

Applicant _____ File # _____

Date _____

Applicant	P.B.	Item
		1. _____ copies of application form
		2. Required fees
		3. One original, one translucent cloth, two color and ten black and white prints
		4. Affidavit from applicant indicating no changes from preliminary or detailing changes in preliminary
		5. Letters from the following individuals or agencies:
		a. Township engineer
		b. Water supplier
		c. Fire department
		d. Board of health
		e. Tax collector
		f. Township clerk
		Plats should contain the following data.
		6. Identification
		7. Tract boundary lines, rights-of-way lines of street names, easements and other rights-of-way, land to be reserved or dedicated to public use, all lot lines with accurate dimensions, bearings, or deflection angles, and radii, arcs and chord bearings, distances, arc lengths, and radii of all curves.
		8. Public use

Applicant	P.B.	Item
		9. Block and lots
		10. Monuments
		11. Consent of owner
		12. Approval
		13. Certifications
		14. Proof that current taxes are paid

Person preparing check list _____ Date _____

Township official _____ Date _____

SDSP-6

REFERRAL FORM

_____ Environment comm.

_____ Utilities authority Date _____

_____ County planning board Subdivision ordinance:

_____ Township engineer Minor - _____
Major - _____

_____ Planner

Sheet _____

_____ Board of health

Block _____

_____ Building inspector

Lot _____

_____ Soil conservation

Zoning _____

_____ Tax collector

_____ Other

Applicant _____ Address_____

Location of property _____

Please review this application for a (subdivision)(site plan) and return to the planning board within 30 days from the above date. Thank you.

_____Secretary

_____ Acceptable

_____ Non-acceptable

Comments:

Date _____ _____
Authorized signature

SP-7

SITE PLAN APPLICATION

(Submit with required fee and ___ copies of site plan containing information listed on site plan check list)

File # _____

1. Name _____ Phone # _____
2. Address _____
3. Existing _____ New _____ Expansion _____ Alteration _____

   Other _____
4. Location _____ Block _____ Lot _____

   Tax map page _____
5. Zone _____ Estimated cost _____ Est. date of comp. _____
6. What is building or site used for now? _____
7. What is proposed use? _____
8. Describe what is proposed to be done: _____

   _____

   _____

   Date _____ Signature of applicant _____

_____

_____

To Be Filled Out by Site Plan Committee

9. Site visted on _____ by _____
10. Recommended for classification as a _____ site plan for the following reasons: _____

    _____

    _____

    _____

11. Recommended for approval subject to the following conditions: _____

_____

_____

_____

_____

_____

_____

Date _____ _____

Chairman of site plan committee

SP-8

TO: Applicants for Site Plan Approval

RE: Site Plan Procedures and Checklists

1. The zoning ordinance requires site plan review for other than a detached one and two dwelling unit building:

   a. before a building permit is issued for an expanded or enlarged use;

   b. for any new use; and

   c. for a change of one permitted use to another permitted use when the structure or premises does not meet zoning requirements.

   Site plan review is also required for parking areas for four or more vehicles, loading and unloading facilities, and essential services such as electric substations, firehouses, etc.

2. In order to simplify the site plan procedures, the following checklist and suggestions have been prepared. Applicants are urged to review each item on the checklist to ensure that it has been covered on the plans. Failure to do so can result in delays for the applicant.

3. Site plans will normally be reviewed by the township's engineer, planner, building inspector, and possibly by other agencies such as the environmental commission, county or State planning agencies. In all cases, a committee of the Planning Board (or the Board as a whole) will inspect the site and make recommendations.

4. During the preceding week before each meeting of the planning board, the township engineer, planner, building inspector and planning board secretary meet to review all site plans scheduled for action by the board the following Tuesday. Applicants desiring to attend should call the planning board secretary for the time and date. Applicants will be notified immediately after this review meeting if there are any omissions on the plan or if additional information is required.

Site Plan Checklist

At least _____ copies of the site plan application form, _____ copies of all maps and exhibits, a check or receipt of fees paid, and a copy of this checklist shall be submitted to the secretary of the planning board at least _____ days prior to the meeting of the planning board when it will be considered. All maps and exhibits shall show the following information with dimensions. Applicants are also urged to read the attached sheets which cover various aspects of site plan submissions.

	Applicant	Planning Board
1. Key map showing property in relation to surrounding area.		
2. North arrow, scale, applicant, and person preparing map.		
3. Location on site and 100 feet therefrom of ponds, streams, drainage ditches, watercourses, rivers.		
4. Location on site and 100 feet therefrom of wooded areas.		
5. Location on site and 100 feet therefrom of easements, rights-of-way, roads and streets.		
6. Location on site and 100 feet therefrom of existing buildings, structures, signs, lights, paving, etc.		
7. Existing contours (indicate source).		
*8. Proposed new buildings or structures including dimensions, distances from property lines, use, first floor corner elevations, and floor areas.		

	Applicant	Planning Board
*9. Proposed contours at two foot contour intervals and spot elevations where needed to show situation properly.		
*10. Location and width of proposed streets and entrances and exits servicing site including type of pavement.		
*11. Location and capacity of off-street parking, loading and unloading including curb stops, bumpers, type of pavement, etc.		
*12. Existing and proposed storm water management system with invert, grade and rim elevations, and calculations showing sizing of pips and off-site disposition of water.		
13. Existing and proposed potable water, including wells and sanitary disposal facilities showing perc test locations and results where applicable.		
14. Proposed soil erosion and sedimentation controls.		
15. Location and details of all signs.		
16. Location and details of all lights.		
*17. Location and details of all landscaping and buffer areas including seeding schedule, slope stabilization, etc.		

	Applicant	Planning Board
18. Location and details of proposed traffic improvements such as acceleration and deceleration lanes, channelization, etc.		
19. Location and details of sidewalks.		
20. Location and details of all curbing and curb returns, including top and bottom elevations.		
21. Location and details of solid waste disposal facilities.		
22. Preliminary architectural plans (if available).		
23. Detailed cost estimates for construction work.		
*24. Designs and details of any structures such as retaining walls, manholes, headwalls, retention and detention basins, etc.		
25. Location and capacity of all petroleum storage tanks.		

Note: If any of the above items marked * are not applicable, the reasons should be noted in a written report to the board.

Suggestions to Applicants for Site Plan Review

A. Engineering Considerations

1. The township has a Storm Water Control and Flood Plain Ordinance. Applicants should be prepared to document conformance with the provisions of this ordinance to the satisfaction of the township engineer.

2. Pavement in parking areas and driveways is normally four inch bituminous stabilized base with two inch FABC surface course and sub-base if required. Applicants are encouraged to use decorative surfaces as a form of hard landscaping if it is comparable to the normal standard and if the township engineer approves.

3. The township engineer is available to meet with applicants to review any proposed engineering details prior to submission of a plan to the board.

B. Landscaping Considerations

As a general rule, keep paved areas to a minimum and provide landscaping and/or ground cover for all unpaved areas.

1. Landscaping shall be specific as to the location, size, spacing, quantity and species (botanical and common name) of all plants as well as the location, type and thickness of all mulches.

2. Where turf is anticipated, topsoiling seeding or sodding, fertilizing, liming and watering specifications shall be provided.

3. Planting details (staking, fertilizing, watering, soil mixture, etc.) specific to soil conditions and the exposure of the site shall also be provided.

4. Size, quantity, species and other pertinent information shall also be listed in the form of a schedule on the site plan or separate landscape plan.

5. The plan approved by the planning board and applicant must guarantee proper maintenance of all plants and ground cover for at least one year and replace if necessary.

6. At least five percent of all parking lots should be landscaped by use of island or landscaped walkways. Decorative or shade trees should be prominent features of the landscaping. Light standards should also be located in these islands or walkways.

7. All parking areas shall be screened from the street and adjoining or adjacent properties. Screening shall include plantings, dropped or depressed parking lots, earth berms, masonry walls, fences, or a combination of these elements.

8. Landscaping designed as buffers or screening in combination with other screening devices shall be a minimum of four feet high at the time of planting and shall consist of at least some evergreen plant materials. Screening shall be carefully placed so as not to impair visibility of vehicles entering or exiting parking areas.

C. Parking Requirements

1. All parking spaces except parallel curb spaces shall be 10' X 20'. Parallel curb spaces should be 8' X 23'.

2. Refer to the zoning ordinance for required driveway widths, aisles, etc.

3. Parking areas should be curbed with granite or Belgium block or concrete curbing.

4. Curbs can be used for wheel bumpers providing sufficient overhang is provided.

5. Hairpin or double parking space markings should be used to delineate spaces.

6. Parking areas should be lighted, paved, and drained.

7. If a one-way system is used, it should flow in a counter-clockwise direction. Angle parking should be used to direct cars in proper direction.

8. Large parking areas should have raised sidewalks between bays at appropriate intervals. Assuming no other form of wheel stop is used, the walks should be at least six to eight feet wide (depending upon whether cars will overhand on one side or two).

D. Signs

A signing plan will be required with all site plans. The ordinance carefully spells out the board's objectives with respect to signs.