THE COMPREHENSIVE PLAN

Prepared for the

DURHAM PLANNING BOARD

and

New Hampshire Department of
Resources and Economic Development

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The Planning Services Group, inc., Consultants
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Preliminary reports on the various aspects of the Comprehensive Plan began appearing in November 1967. Each of the four reports preceding this one has been reviewed by the Planning Board and by other state and local agencies directly concerned with the various topics. The preliminary reports were all exposed to general public discussion as well, and the meetings have been well attended and fruitful. We acknowledge the contributions made by Durham's articulate citizens who will, we hope, see their aspirations reflected in the Plan.

This report is a summary of the information, thinking, and revision which has gone into the Comprehensive Plan. It is written in three parts. The first concerns the factual and reasoned background of the separate elements of the proposed Plan. The contents of the prior reports already reviewed at public meetings and subsequently revised are given in condensed form. In addition, there is fresh material on the subjects of historic areas, industrial parks, and traffic circulation. The reasoning behind the combination of these elements into a comprehensive plan itself is set forth in the second section. The report concludes with a review of the actions that may be taken by various official and unofficial bodies to achieve the desired goals.

This report has been reviewed by the Planning Board and approved for publication. The final step will be its official adoption by the Planning Board. Thus, the Comprehensive Plan becomes Durham's plan for action.

ELEMENTS OF THE PLAN

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I. ELEMENTS OF THE PLAN - Land, Water and Existing Development 5

The salient points affecting the proposed Comprehensive Plan are as follows:

1. Durham's natural and historic beauties are unusual and worthy of preservation.
2. Because the areas with soils even moderately suitable for on-site sewage disposal are fragmented and limited to a small fraction of the total area, any compact development should take place within the Oyster River basin, the limit for economical extension of utilities. This drainage basin can be visualized as the northern half of Durham. It contains about 3,500 acres of available vacant land - enough for about 22,000 more residents under present zoning.
3. The greatest concentration of soils favorable for development without utilities lies along Packers Falls Road, partly inside the Oyster River basin. There are large deposits of water-bearing gravels within this area, however, where particular care must be taken to avoid pollution from sewage effluents that could affect Durham's water supply. The area least favorable for development, because of poor drainage, tumbled land, and remoteness, is that traversed by Dame Road, the interior of Durham Point.
4. While the problem of water supply is being solved by the tapping of the Lamprey River, equal effort is needed to provide for an expanded treatment plant, storage, and enlarged and extended mains before the supply can be distributed in the amounts and pressures needed for firefighting and for service to outlying developments. The engineering study completed in October 1968 is now under review by the bodies concerned.
5. Pollution of the Great and Little Bays is a regional problem.

The state has made great progress by requiring the installation of public sewer systems in the surrounding towns. Active regional leadership is still needed in order to develop a proper balance between the public navigational, recreational, and ecological values of the Bays and between private and public use of the shore lines.

6. There is a possibility of an eventual sewer extension from Newmarket. This could serve to open up the southern Packers Falls-Newmarket Road area for development, depending on the ultimate capacity of the Newmarket system. The possibilities should be explored with the Newmarket Planning Board. It appears, however, to be an issue for the long-range rather than the middle-range future.

All considerations for Durham's growth -- accessibility to the University, town center, and schools; the financing of its own utility extensions; the dependence on Dover for labor supply and shopping -- point to the advantages of encouraging further growth around the current center. Newmarket's own growth is expected to be so slow (1.2 percent per year) that its effects are not likely to be felt in Durham.

As to the future pattern of residential development, public hearings indicate a mixture of desires. On the one hand, Durham's natural and historic beauties are cherished, the lively University-oriented atmosphere of the center is enjoyed, a limited number of apartments is acceptable for the convenience of incoming faculty and retired people, and such citified conveniences as sidewalks and lights are popular. On the other hand, complete separation between town and country is not envisioned. Most express the desire, for their own parts, to live in initmate contact

with natural surroundings. The conclusion we draw is that while an increase in density is acceptable within the village, the majority would prefer to see new development in the form of small subdivisions on large lots well buffered by wooded areas and in a manner respecting the major shorelines of the Oyster and Lamprey Rivers and the Bays.

The major natural features to be considered in the Plan are these:

1. The variety of land and water habitats for plants and wild life is an uncommon and priceless resource for the town's inhabitants and offers natural laboratories for students. The most valuable of these habitats is the tidal estuary, along which there should be a minimum of disturbance by developers and road-builders. The fresh-water rivers and ponds are also of interest and should also be protected against encroachment.

2. The Crommet Creek-Horsehide Brook Corridor holds great promise as a conservation area.

3. The 1000-acre interior of Durham Point has more potential as a wilderness than for residential development.

4. The watershed area of the Oyster and Lamprey Rivers (west and southwest of the University) should be protected from excessive run-off. In other words, despite good soils, it should not be intensively developed unless provision is also made for public sewerage and for drainage.

5. The town has an unusual opportunity to develop a series of greenways along the streams penetrating the village. In addition to their aesthetic and conservation value, these greenways could offer walkways connecting various community facilities.

6. In the past, the town has relied heavily on the athletic facilities of the University. Both the town and the University are approaching the size where such sharing will become difficult. The town should begin to establish its own facilities for selected sports as well as support University efforts to develop recreational areas available to the community at large.

Thought and activity have already been focused on the preservation of open space and major recreation areas. Land in Madbury has been generously offered for use as a tri-town park to be shared by the University, Durham, Lee, and Madbury. The University has already begun to develop a ski slope there. Eventually the park might also contain a golf course and miscellaneous fields and courts. An alternative to the University swimming pool might be found in the creation of an artificial pond for swimming in the Doe Farm Town Forest, fed by the Lamprey's clean waters.

Public reaction to conservation of undeveloped areas has been one of hope, and there is evident willingness to participate in regional efforts to preserve the Bays. The public meeting on Open Space uncovered understandable concern by homeowners in developed areas along proposed village "greenways" lest their privacy be interrupted and their property abused. The voluntary granting of purely scenic easements* in such developed areas, however, does not impose unwanted traffic on the donors, and yet would ensure that streambeds and banks remain undisturbed. Where there is not yet any development, however, easements may be made wide enough to allow public as well as private use and enjoyment. A width of 10 feet is adequate where it is merely a question of protecting a streambank from encroachment or of providing a path, although greater width is needed where scenery is a concern. The use of easements as opposed to outright public ownership works well, especially in cluster developments where houses are so placed as to permit a flow of green space around them. We feel that the

*An easement is a partial right over the use of land owned by others. A scenic easement restricts alteration of land by building or fill but does not disturb the owner's use of the land in any other way.

Conservation Commission would be wise to acquire easements of appropriate character from willing owners to ensure that the good faith of the present stream abutters is perpetuated by their successors.

Acquisition of land for conservation in the proposed Crommet Creek-Horsehide Brook Corridor has gotten off to a good start with an offer of a forty-acre donation. Because of the possibility of relocating Route 108 near this area, acquisition of the entire section north of the Teeri property should be high on the list of priorities, and the Conservation Commission should play an active role in determining the place and manner of the route's construction.

The state-sponsored Pilot Program in Durham, designed to make the town aware of the many technical services available from state agencies, has already borne fruit. The town has requested and received advice on the acquisition of water rights and the repair of Mill Pond dam. An analysis of game covers has been conducted by the University under a contract from the state Fish and Game Department. The study should be valuable in deciding how to handle such areas as the Oyster River Cover and the proposed wilderness area in Durham Point Interior and will pinpoint other areas of high value in this respect.

Expert advice should be sought in the Pilot Program on the type of river crossing necessitated by the proposed relocation of Route 108 which would be least disturbing to the Oyster River's ecology and recreational use.

The plan for the center was predicated on the assumption, supported by responses to the survey*, that it is desirable to increase the amount of shopping done in Durham. The major findings of the report are as follows:

1. The present retail and office services depend more on student customers, on the whole, than on the resident population, which does most of its shopping in Dover. The exception is automotive services which attract local patronage. Existing business development plus vacant land zoned for Business A is sufficient to allow for the doubling of the floor space devoted to retail and services and the quadrupling of office space. (This includes associated parking.) With the expected increases in both resident and student population, and since the present stores are supplying less than a third of Durham's ordinary household needs, the presumed doubling of floor space is not excessive in the long run. A new business district is not needed, however, and would only weaken the existing center. A separate area for large offices might in time be justified.
2. The north and south sides of Main Street can reinforce rather than detract from one another. The divisive effect of Main Street should be minimized. The common element running through the suggested plans is the separation of through traffic from local cross-town traffic. To facilitate shopping, walkways should be developed connecting all parts of the shopping area.
3. Not only should through and local traffic be separated, but through traffic should, as far as possible, be diverted altogether

*June 1967, prepared by the Planning Board and conducted by the League of Women Voters.

from the critical portion of Main Street. To this end, it is proposed that access roads leading into the campus from the Bypass on the north and from Newmarket Road on the southeast be given high priority.

4. Location of a new Town Hall in the center is one of several possibilities that the town's site selection committee might consider in its report to the next Town Meeting. This location has the advantages of convenience and lively surroundings. Another feasible and reasonably convenient possibility is a site on Newmarket Road, north or south of Mill Pond, where it could tie in well with the proposed greenways linking residential areas to the Oyster River and its string of parks. A town-owned community center is perhaps premature but could be planned as a later addition to the new Town Hall.

5. When the time is ripe for a new fire station, it should be located within 3/4 of a mile of major campus buildings and of the business center, without interrupting the expansion of either area. The site should have a choice of exit roads.

6. It is important to the center's commercial success as well as to the town's image that the center be designed as an attractive whole. While the town can provide the framework of public streets, parking, sidewalks, and landscaping, the results depend equally on individual agreement to adhere to mutually accepted design standards and lot arrangements.

One of the basic issues raised by public discussions of this report was whether the business center should be expanded at all. The expressed desire for a better shopping center is no guarantee that it would be more intensively used, nor are costly public improvements any guarantee that

private developers will move in, although they are less likely to come without such improvements. It is clear, however, that a center worthy of Durham's image and income will not come into being unless definite action is taken by the town, the businessmen, and the University to overcome the handicaps of scrambled circulation, cramped lot arrangement, and inchoate appearance.

The basic scheme for circulation improvement in the center is the evolution of roads back of Main Street on both sides to permit local traffic and delivery trucks to circulate and park without tangling with arterial traffic. Traffic bound to the northern half of the campus and to the New England Center for Continuing Education can be diverted by rearrangements within the business area, supplemented by eventual extension of Strafford Avenue west of Garrison Road to meet the suggested access road from the Bypass. Expansion room for business can be provided in part by an understanding that the University will confine itself to properties outside the center proper. In part, agreements among the businessmen to develop joint rear service yards and parking will use existing space more efficiently. Another contribution can be made by zoning so designed as to balance the permitted floor area of stores against the public or private parking which will service them. Appropriate sign regulation, as just inaugurated, can prevent the worst abuses. Positive action to improve appearance can also be taken by the development of public and private landscaped sidewalks within the center. The businessmen, finally, may jointly select a general system of wall, window, and sign treatment whenever external alterations are made in order to establish a style signature for this potentially unique center.

Much of the proposed redesign of central circulation is already

foreshadowed by existing drives or by readily obtainable rights of way. The extension of Rosemary Lane northeast past the West parking lot to Madbury Road would allow traffic from that heavily settled part of town to avoid the most congested part of Main Street and would define the northwest boundary of business development. To the south of Main Street, a street parallel to College Brook, later swinging north to meet Madbury Road, would complete the scheme. This road, incidentally, should not be allowed to connect to purely residential roads such as Chesley Drive.

One of several possibilities suggested for a site for the new Town Hall might be in the center, east of the aforementioned extension of Madbury Road. The site is large enough to permit its use not only for the Town Hall but also for a future fire station and community center. If extended south to include both sides of College Brook, the site would afford an opportunity for the development of recreational facilities associated with the future community center. This open area would be especially valuable if it happens that the ORCSD School Board decides against building the next elementary school in a location where its playground can serve Durham's needs for a summer playground. Federal Urban Beautification funds can assist substantially in developing the proposed landscaping.

Questions which came up during this year's development of the Osgood site south of Main Street also point to some deficiencies in the existing zoning provisions for business areas, namely the absence of a definition as to what constitutes subdivision of nonresidential land subject to review by the Planning Board, the absence of adequate off-street parking requirements (for although the developer intends to provide enough

parking for his own needs, there is nothing to prevent him from later using part of the parking lot for additional buildings); and the absence of earth removal regulations. Another place where the existing zoning by-law is unclear is in the matter of controls over the form of apartments permitted in Business A districts. Setback, height, and parking requirements must be carefully designed if the two uses are not to conflict, and will be considered in the zoning revision.

Review of studies of the central business district with the University's planning committee has highlighted the problem of providing parking for 200 or more visitors not residing on campus to the auditorium and restaurant of the New England Center for Continuing Education. Also, it is clear that Garrison Road will increasingly take on the character of an internal campus road. University planners have indicated that additional parking and related circulation improvements are being planned in this vicinity.

The most important points are:

1. The land needed to accommodate the expected increase in residents from 4,000 in 1967, to 6,400 in 1980, totals somewhere between 700 and 800 lots. Vacant lots in preliminary or approved subdivision plans plus as yet unsubdivided land within the village could accommodate more than half the increase, depending on how much of this land is put on the market and on the number of apartments built. Although incoming faculty members often prefer to rent the first two years, the demand for apartments by middle-aged residents should not be overemphasized. In other words, except in the center, all new development would be in single-family homes, possibly including some townhouses designed to rent. While subdivision activity might increase beyond the projection as the tax rates in towns lacking Durham's services begin to approach Durham's rate and thus swing the growth of population of other areas in Durham's direction, this does not affect the basic conclusions - only the speed at which the residential area and schools might fill up.

2. It makes sense, therefore, to channel the remaining half of the 700-800 lots expected by 1980 into a single direction where it can be efficiently served by one major utility extension. The direction suggested is south of the Oyster River, between the railroad and the proposed Conservation Corridor. There are several reasons for developing this area: convenience to the center and the University, especially with the proposed "Link Road" between Newmarket and Mill Roads; the efficient utilization of water and sewer extensions; and the appropriate scale of the area.

3. A possible solution to the problem of housing the married students and junior staff might be a mobile home park in the Lamprey River basin west of Doe Farm. The soils are good, and the location is well insulated from residential areas. Subject to appropriate subdivision regulations, it would be possible to create an attractive environment at low cost to meet the problem of housing perhaps 300 more student couples off campus. The density should be low so as not to overtax the soil's ability to absorb effluents, and the park should be surrounded by an untouched belt of green.

4. It is expected that more families will settle in Durham in the next 15 years than in Lee and Madbury combined. Since Lee already has one elementary school, and since Madbury will still be far too small to fill more than a fraction of any school, the most rational location for the needed third elementary school is in Durham. A location equally accessible to the existing Faculty and Wedgewood Developments and to the potential development area south of the Oyster River would minimize busing and be within reach of utility extensions.

5. Enrollment projections for the district indicate that, while the (expanded) high school will serve for ten years or more, new classrooms will be needed for the lower grades by 1970, up to a total of 12 new rooms by 1980. The elementary school site should, however, be at least 10 usable acres, to allow for ultimate expansion to 16 rooms, plus the usual complement of kindergartens and special-purpose rooms.

6. For reasons of economy and accessibility, the one additional playground needed for the School District should be provided at the new school site. No additional school-connected playfield is

needed, especially if the proposed tri-town park in Madbury is designed to offer a variety of family-oriented sports.

Sites of historic interest, compiled by Mr. Philip Wilcox of the Durham Historic Association, include the locations of old garrisons, meeting houses and churches, historic markers, colonial houses, and cemeteries. The greatest concentration of these points of interest is on Newmarket Road, running south from Main Street to Durham Point Road. Here are located the Town Hall, containing also the Historic Association's museum, a substantial cemetery, the old Shipyard Landing, Mill Pond, the site of the General Sullivan homestead, and the Town Pound all adorning a chain of old colonial homes. "Church Hill" also retains a colonial flavor. Elsewhere are scattered historic sites, other houses, and family cemeteries.

The concentration of old buildings on Main Street and Newmarket Road warrant special attention. Some protection is afforded by the exclusion of commercial uses and, above all, by the respect of most owners for colonial heritage. However, it would be possible to enact an Historic District zone, administered by an Historic District Commission (Ch. 31-89 RSA). The Commission would have the power to review "those considerations which affect the relationship of the (applicant for a building permit's) proposal to its surroundings, to the location and arrangement of structures, and to the compatibility of land use within the district...," and to grant or withhold approval accordingly. In the event that the town feels that such an Historic District is desirable, the Historic Association should be consulted on the delineation of the district.

As much to the point is the protection of the pleasant green and blue setting - as true a reminder of the old days as the buildings themselves. Fragments of an Oyster River greenway already incorporate several of these historic points, beginning with the Smith Chapel on the west and

ending with the Shipyard Landing and Sullivan monument on the east. The greenway - or at least scenic easements - should be extended east, past the proposed Conservation Corridor, which would then contain the old Burnham Garrison site, as far as the site of the first Meeting House of 1655. It is recognized that sections of the proposed greenway may be unobtainable, but the undeveloped portions should be safeguarded by scenic easements at least.

The state's study line for the relocation of Route 108 threatens historic and scenic values at the Shipyard Landing. In a subsequent section on circulation, we suggest, for this and other reasons, that the relocation be shifted to the east. Presumably there would be a grade intersection with Durham Point Road which would tend to increase traffic at the accident-prone Town Pound corner. This traffic should, on the contrary, be reduced because this stretch of Durham Point Road is unsafe and difficult to realign. Instead, the proposed link road from Mill Road to Newmarket Road should be extended to meet Durham Point Road east of the Teeri property. This would permit reduction of the westerly part of Durham Point Road to the status of a local street.

The other old sites are too scattered to be collected within a consistent planning or zoning treatment. It might well be a function of the Historic Association, however, to remain alert to the possibility of moving threatened old houses onto new sites near the existing concentration of colonial homes and restoring them for resale, as has been done in Cambridge, Massachusetts.

Opinions expressed at public meetings have shown that Durham is alert to the possibility that the presence of industry may be more of a loss than a gain to the town. The valuations added by new industrial buildings may not be enough to offset the costs of supplying town services to the industrial area and the cost of educating the children of families who move in because of new employment. This is not to speak of the general detriment to the town's residential values if objectionable types of industry were to enter. All the same, the question of whether or not industry should be encouraged on a highly selective basis is worthy of examination. There are potential benefits: the possible tax surplus, a little extra income for stores, research relationships with the University, a source of jobs for students, a less purely academic population. There are realistic limitations and dangers too, and of these we shall speak first.

The question has been justly asked, what industry wants to come here? A stone and gravel crushing concern from another state has bought over 200 acres on the Lamprey River below Doe Farm; there is nothing in Durham's present zoning by-law on Rural Districts which would control either its earth-stripping activity or, as long as there are no neighbors to object, its development as a smoke-stack industry. A computer-oriented tax accounting firm lost interest when it learned that Durham has no specific zone reserved for industry. A New England regional administrative office had qualms about its decision to move to Durham, because Boston was so much more convenient for making quick air trips and catching hold of "visiting firemen." Route 128, the beltway around Boston where many research firms are located, is close enough to inhibit such development in Durham, whose lone University is competing against a constellation in Boston and whose own professionals can easily travel south to Route 128 to confer with their many colleagues.

Several inferences may be drawn from these apparently random observations. First, the Rural District, where zoning permits a variety of uses, is vulnerable to types of industry which Durham clearly does not want. The Lamprey River area offers water, railroads, and good soils, as well as proximity to Newmarket, from which a labor supply could be drawn and which might even furnish sewer connections, were this desired by both towns. There is justifiable fear, however, that an industry seeking this type of location would be of a size and character which would spoil the Lamprey River's beauty and which would result in a demand for low tax-yield homes and for road reconstruction befitting heavy trucks and commuter traffic. We recommend that no industry be allowed in the revised zoning for this area.

The brief glance from the accounting firm, on the other hand, suggests that Durham is handicapped by the fact that it has no suitable industrial zone. Light industrial, research, and office firms want zoning protection as much as any resident. The existence of a zone is also evidence of a favorable local attitude towards industry.

The argument that Route 128 is too close will lose its force in time; the Route 128 belt is now almost entirely filled and concerns are beginning to move out to Route 495 to Hudson and Marlborough - almost as far from Boston as is New Hampshire.

In terms of what Durham would like, first let us say that, except for the sake of students, there is no visible need for additional opportunities for local employment. On the contrary, most nonprofessional or clerical help would have to be imported. In tax terms, the ideal would be a warehouse or automated operation - all building and no men - but Durham,

despite Route 4, is not really a good focus for regional distribution. The type of concern best fitting Durham's circumstances is that featuring a high proportion of professional or subprofessional employment, attracted by the University atmosphere, its library, and its computer and research facilities - in other words, a research laboratory or office. This is the kind of establishment which would add to the tax base and fit in well with the town's character, and yet add little to its costs.

A recent study, Research Parks from the Community Viewpoint*, can be used to assess Durham's attractions for such a use. For certain industries, they are rather good. Professor Hughes' sampling of 89 research parks, mixed and pure, discloses the particular kinds of research which might find Durham attractive. These are the wood or construction research firms, physical and aerospace sciences, electronics and professional services. All of these give a high value to what Durham has to offer: relationship to a university, a community with good schools, recreational facilities and cultural life, and access to highways and utilities. Presence of raw materials, air transportation, and clerical labor supply, in all of which Durham is weak, is of minimal importance to these concerns. A factor of importance to some is the tax base; here Durham's position is not bad, considering the many services provided. The final factor of great importance is government attitude. This is within Durham's control; it can set aside and protect an area suitable for research industries and make its advantages known.

If Durham does decide to leave the door open for selected types of

*G. David Hughes, Research Parks from the Community Viewpoint, Graduate School of Business and Public Administration, Cornell University, May 1966.

industry, where should they be located? Sometimes the question is raised whether or not it would be better to scatter small industrial sites in rural areas than to concentrate them into one industrial park, on the theory that such scattered sites would tend to disperse traffic, be less visible, and offer budding industries an inexpensive start. Even apart from the serious legal problem of avoiding spot zoning, there are several dangers in this course. An initially modest and unobtrusive industry may wish to grow or change its character and then find itself unable to do so because of objections from the residential neighborhood which is also seeking to expand. The industry may eventually require utilities unobtainable in rural areas. It may generate traffic which, while not great in volume, is disturbing to the area and destructive of lightly built roads. And finally, such isolated sites would not be nearly as attractive to prospective small industries as an industrial park which provides good roads, utilities, a guaranteed chance to expand, and a pledge of serious community backing. Furthermore, Professor Hughes points out in his study that a zone permitting a mixture of research establishments allowed to manufacture prototypes and sales and administrative offices has a far greater chance of succeeding than one permitting pure research alone. He calls this a "science and technology park." It is easier to control such a mixture in one carefully regulated zone than on many scattered sites. We therefore recommend that only one area be zoned until the demand for more land is evident and that it be the area with the best chance of success.

Access to a highway and provision of utilities are of considerable importance to the types of research Durham could attract. When close contact is to be maintained with the University, proximity to the campus also becomes essential. In addition, industries need reasonably level

land. Finally the location should be such as not to distort Durham's residential character. The one area which has all of these qualifications is that between Mast Road and the Route 4 Bypass extension.

Other locations along the Bypass lack either level land, access roads, or proximity to utilities. Nonetheless, the area northwest of the Bypass also merits consideration. To offset the disadvantages mentioned, it does have the high degree of visibility from the Bypass which industrialists value. Access roads and utilities could eventually be furnished by improving Beech Road and extending it to meet Concord Road west of its interchange with the Bypass. The area also contains some pockets of soils suitable for on-site sewage disposal. Most parcels are large and not presently committed to University or residential use.

By contrast, of the area first mentioned northwest of Mast Road, approximately half is owned by the University. The 30 acres owned by UNH which front onto Concord Road are already leased in part to the Northeastern Forestry Research Station, which plans eventually to employ 75 persons full time, plus part-time student help. The rest of this parcel will be used for the future University service building. There may also be a television station on adjacent land. The remaining 200-odd acres are open farm land, except for six houses on Mast Road. The 85 acres thereof now being farmed by the University are being held in reserve in case it some day wishes to use this as a small airport for the purpose of maintaining closer contact with other campuses throughout the state. If a change in Portsmouth air traffic patterns does some day permit this use, one can readily see how a local airport could become an asset to research development of the type envisioned. If no airport is developed, however, the University would still have the pos-

sibility, under industrial zoning, of granting long-term leases on the land to research firms, whose buildings would be taxable even though the land is retained in University ownership. Stanford University did this very successfully with the Stanford Industrial Park.

The size of the area involved has the advantages of offering developers a choice of parcels without seriously inhibiting Durham's residential development and of making it practical to zone for very low building coverage, say 10 percent. Low coverage is important not only for the quality of the proposed industrial park, but also as a means of protecting the Oyster River watershed from excessive run-off. By way of example, 100 acres developed at 10 percent coverage can house 1,000 employees when first in use, and up to 2,000 when built to capacity. Since the total area which might some day be developed comprises several hundreds of acres, it is clear that Durham will be offering potential developers a very generous choice.

Parts of the circulation problem which were originally studied in detail under other headings are recapitulated here for convenience before going on to the discussion of an integrated circulation plan.

1. State proposals for improvement of the highway system include:

   a. extension of the Route 4 Bypass west beyond Lee;

   b. access road, with diamond interchange, from Bypass to Concord Road (rights of way already purchased and incorporated into UNH campus design, but construction deferred - see Map 1);

   c. grade separation between extended Edgewood Road and Bypass to replace grade crossing at Madbury Road (rights of way purchased, but construction not expected until warranted by accident record at Madbury Road);

   d. relocation of Route 108 east of Newmarket Road, crossing the Oyster River south of Coe Corner (not yet designed, but possible within 10 years);

   e. improvement, possibly involving relocation, of Route 4 east of the Bypass (far future).

2. Detailed study of the center led to the following proposals:

   a. diversion of UNH-oriented traffic from the congested central portion of Main Street by early construction of access road from Bypass (1-b above) to pick up traffic from north and east and by construction of a link road leading from Newmarket Road to Mill Road south of the Oyster River to pick up traffic from the south;

   b. rerouting of local traffic to the rear of the shopping area north and south of Main Street in order to reserve Main Street for through traffic as far as possible and to

reduce left turns and jogs;

c. allied development of rear service yards and parking areas;

d. short- and long-range solutions to the localized traffic problem at the ORCSD elementary school;

e. review of UNH proposals for additional on-campus parking lots and access thereto, especially by way of a westward extension of Strafford Avenue.

3. Projections of the growth of population, University enrollments, and car ownership ratios led to the general conclusions that:

a. commuter traffic to the University from outside Durham might double by 1980;

b. the number of cars registered to Durham's residents and resident students might increase by 60 percent by 1980;

c. overall, there will be 70 percent more traffic on local streets by 1980 than at present. Applying this figure to Main Street, this means average daily traffic volumes could approach 15,000 vehicles per day (as compared to 8,500 after the opening of the Bypass) unless the commuter portion of the traffic is in part diverted.

4. Selection of the area most favorable to residential expansion reinforces the idea of a link road (2-a above) because:

a. it would open up a good residential area south of the Oyster River;

b. it would furnish access from Lee to a new elementary school, if located in this general area as suggested;

c. it could be extended east to relocated Route 108 and meet Durham Point Road, collecting local traffic.

These items taken together already furnish a large part of the circulation framework insofar as the center is affected, but one must consider the circulation system as a whole. This can be conveniently done by classifying roads by their major function.

Limited Access Highways and Related Improvements

Limited access highways are intended for fast traffic between major destinations. Such highways act as a barrier between land uses, especially when no intersections are permitted at grade. The part of Route 4 known as the Bypass falls in this category. It will have three interchanges within Durham: diamonds at Dover Road and at the proposed access road, and a partial interchange at Concord Road, supplemented by an interchange in Lee. Access to the frontage on Concord Road in Durham west of the Bypass involves use of the Lee interchange or of local Durham streets. This is why the frontage on Mast Road, which can be reached directly from the Concord Road interchange, is one preferred as an industrial location.

The proposed access road from the Bypass through the northwestern campus should in due time be supplemented by one or two side roads. Strafford Avenue should be extended to meet the access road, so that the large University and New England Center for Continuing Education parking lots west of Edgewood Road can be reached without detours.

The state intends to relocate Route 108 south of Coe Corner and to design it as a limited access highway (no access by abutters), although intersections would be at grade until traffic volumes warrant bridging. For the sake of school bus safety, however, there should be at least one grade-separated crossing. Relocated Route 108 will therefore become something of a barrier within the town and its location should be carefully

studied from the town's point of view. The present state "study line" shows the route as running from Coe Corner across Beards Creek and the Oyster River to a point just west of the Wedgewood development and thence generally parallel to Newmarket Road. It is conceivable that initially the state might build only the northerly section, to bypass the accident-prone stretches of the present route east and south of Town Hall and rejoin Newmarket Road below Laurel Lane.

The reasons for suggesting that the town seek to have the relocation take place to the east instead of west of the Wedgewood development are given below, reading from north to south:

- to pull the Oyster River crossing as far as possible from the old Shipyard Landing area and avoid crossing Beards Creek;
- to avoid discharging more traffic into the poor Durham Point Road-Newmarket Road intersection (which, in the interests of historic preservation, should not be radically reconstructed) and yet leave the western end of Durham Point Road open as an exit for the Wedgewood development;
- to run outside instead of through the major new residential areas south of the Oyster River;
- to afford direct access to and a neat boundary for the proposed regional park centered on Dame Road;
- in general, to space Newmarket Road and relocated Route 108 well apart for maximum efficiency.

The tentative alternate layout east of the Wedgewood development discloses several problems of design which would have to be solved. Again reading from north to south, the questions are:

- how to manage the extension at Coe Corner so that Jacksons

Landing remains accessible to the town;

- what type of structure to use in crossing the Oyster River which will least disturb tidal flows, passage of small boats, and the view;
- how to run the road along the steep westerly slope of the proposed Crommet Creek-Horsehide Brook Conservation Corridor without coming into serious conflict with conservation purposes (see page 41);
- at what points east-west collectors should cross the proposed highway. (This will be discussed under the heading of collector streets.)

The state highway department has expressed its willingness to cooperate with conservation interests. We therefore suggest that the Durham Conservation Commission present its detailed objectives in the protection of the old Shipyard Landing, of the recommended conservation corridor, and of the proposed wilderness area at Durham Point interior to the state before the design stage is reached, so that a reasonable balance between conservation and construction criteria may be attained.

Improvement of Route 4 between the Spaulding Turnpike and the Bypass (Piscataqua Road) to limited access standards is not now in sight. Intensive development of the frontage along Piscataqua Road might be expected to accelerate such a project by making the stretch more subject to accidents. It is in Durham's interest to discourage such development by continuing its present policies of low-density residential zoning and of requiring a minimum of 1,200 feet between intersections with local roads, reinforced by a low priority for the extension of utilities in this direction. At such a time as the road does require thorough rebuilding, it would

seem natural to do so in its present location, which is topographically the most favorable. For the present, Route 4 will be considered as an arterial street in the circulation plan.

Routes 4 and 108 are Class I Trunk Line Highways, under complete control by the state. An exception is made for Class I highways within designated compact areas of towns with a population of 4,000 or more, which are then treated as Class IV highways maintained with the aid of TR-B (Town Road Aid - Apportionment B) funds, matched by the town. When a town reaches 5,000 in population, its Class IV roads also become eligible for 50 percent federal aid, matching the town plus TR-B contribution. Durham's Main Street will certainly come into the TR-B category by 1970, and should qualify for federal aid soon after.

Arterial Streets

Like limited access highways, arterial streets serve as connections between towns, although less smoothly and at lower speeds. Durham's principal arteries consist of the old Route 4 (Piscataqua Road, Main Street, and Concord Road) and the present Route 108 (Dover and Newmarket Roads). Routes 155-A (Mast Road, Main Street, Dover Road) and 155 (Manchester Road) also serve as arterials. Madbury Road and Packers Falls Road are borderline cases in that they do serve as elements of the inter-town system but are used primarily as collector streets within Durham. Edgewood Road, when extended across the Bypass toward Route 155, will take the place of Madbury Road to some extent. Because of the difference in traffic carried, it is probably more sensible to classify Madbury and Edgewood Roads as arterials and Packers Falls Road in a lesser category.

The major proposal affecting the arterial road system, aside from the improvements to Main Street and the relocation of Route 108 already discussed, is the idea of constructing a link road between Newmarket and Mill Roads. This link should be extended across the Oyster River west of the railroad as far as Mast Road, incorporating the part of Mill Road which crosses the railroad. Ideally, the link road would have to be extended northwest to meet Concord Road, but because of the intervening construction of the Bypass extension this is no longer practical. Thus the link road serves as a southern bypass to Main Street, permitting traffic from Newmarket to head directly for the University, for the proposed science and technology park on Mast Road, and thence along Mast Road, to the Concord Road or Lee interchanges with the Bypass. The portion of the link road between Mast and Mill Roads can be laid out so as to run close to the edge of the University's property on the north side of the Oyster River (altogether avoiding the College Woods), and to leave a usable parcel of the University's land on the south side of the river. This portion should be constructed before improvements are made to the Mill Road bridge over the Oyster River, so that emergency vehicles would not be forced into long detours to reach the areas feeding into southern Mill Road.

The expectation that the proposed link road would be of value not only to the town but also to commuters to the University and the proposed science and technology park and in general to drivers headed from Newmarket to Lee and west, justifies a search for non-town construction funds. It would be reasonable to request legislative designation of the link road as Route 155-A, replacing the Main Street portion of the present route, thereby raising it to the status of a Class II State Aid Highway. The state would then become responsible for half the cost of construction

and maintenance. It is unlikely, however, that the state's highway department would support this proposal, because of the heavy pressure of more far-reaching projects. Since the University would also benefit from this road and from the area it would open up for settlement, the town and University may well choose not to await state aid, but to cooperate in the cost of land acquisition and initial construction.

Any private or public (e.g. school) development which occurs in the area to be traversed by the proposed link road should be designed to accommodate relevant portions thereof. Use of the proposed link road as an arterial street comes somewhat into conflict with the ideal of residential collector streets without through traffic. We suggest that frontage be on the side streets only and that intersections with side streets be widely spaced.

Collector Streets

As the name suggests, these streets collect local neighborhood traffic and bring it into the arterial system or to the major destinations within town, such as the schools. Mill Road is a good example. In many parts of town it is difficult to distinguish between local and collector streets, especially in rural areas, where one street can serve both functions.

The major change contemplated in the system of collector streets is the extension of the proposed link road from Route 108 east to Durham Point Road. This would not only provide the Wedgewood development and the Teeri property with another access but would also open another logical area within the major drainage basin for development. At the same time, it would diminish use of the western portion of Durham Point Road, thus avoiding the difficulties of reconstructing this hazardous portion.

The proposed extension east of the link road could be laid out so as to cross the Wedgewood development at a convenient point; this short portion should be reserved at once. Then it should cross the Conservation Corridor at the least destructive place. The layout facilitates eventual subdivision to the north and south thereof, well within the drainage basin. The right of way for this road should be secured early, but its construction will not become urgent until Route 108 is relocated. It is unlikely that the town can expect financial assistance for this road, but, on the other hand, the town will have to expend less for improvements to Durham Point or Longmarsh Roads.

Eventually, when the proposed regional Durham Point wilderness area comes into being along Dame Road, Longmarsh Road might be relocated and extended east to merge with the northern end of Dame Road. The link road and Longmarsh Road extensions together with the bent portion of Durham Point Road (which needs improvement) would form a useful collector loop road in that part of town.

Mill, Packers Falls, and Bennett Roads also form a natural collector loop road. The intersection between the latter two is dangerous and should at some time be improved. One way to do this would be to swing Wednesday Hill Road due east to meet Bennett Road, bringing Packers Falls Road up in a straight line from the south. This would also enable traffic to avoid the hazardous section of Bennett Road where it dips alongside the Lamprey River.

Miscellaneous Bridges, Intersections, and Local Roads

The most urgent improvements are listed below. The Wiswall Road bridge must be reconstructed to allow passage of school buses. The

intersections of Mast and Concord Roads, of Garrison Road and Main Street, and of Durham Point Road and Newmarket Road should all be squared off, as all three points are accident breeders. The Mill Road bridge over the railroad, on which the town has already had the required hearing, needs widening, and particularly so as it may form part of the proposed link road. Since one of the possible points of entry to the University campus is in this vicinity, the University's planners should make their wishes known before the bridge is reconstructed.

The second group of improvements is generally related to the construction of new roads. The Mill Road bridge over the Oyster River should be reconstructed. Sight lines at the intersections of Canny and Bagdad Roads with Dover Road should be opened. The relocation of Route 108 should stimulate construction of the proposed extension of the link road east to Durham Point Road. Relocated 108 should also connect with the local road system to the west at Longmarsh and Stagecoach Roads.

The third group consists of localized improvements for which no particular schedule is set. Newmarket Road in general needs better shoulders. The Newmarket Road bridge over the Oyster River needs widening, according to the Town Engineer. The intersection of Bennett and Newmarket Roads is semi-blind. A privately sponsored project - that of extending Bunker Hill Lane so that a proposed trailer park in Madbury may be reached from Piscataqua Road - is not acceptable, as it runs counter to the objective of allowing only minimal interference with Route 4. Cowell Drive should be extended east to Bay View Road to serve as an alternate route for emergency vehicles and to shorten the walk to school.

Street Design Standards

The standards given in Table 1 represent ultimate goals for street development in Durham. They have been reviewed by the Superintendent of Public Works. It is not expected that all collector and arterial streets need to be constructed to the full widths suggested at this time, but the rights of way for eventual widening should be secured as early as practicable. Standards for the major state highways are not included, since these are constructed by the state to meet its own specifications.

TABLE 1
DESIGN STANDARDS FOR TOWN ROADS, DURHAM, NEW HAMPSHIRE

	Arterial	Collector	Local
Speed Limit	40 mph	35 mph	30 mph
Access	controlled[5]	unlimited	unlimited
Distance Between Intersections	1200'	rural 1200' urban 250'[6]	250'[6]
Travel Lanes	2 @ 12'	2 @ 11'	2 @ 10'
Parking Lanes[1]	2 @ 8'	2 @ 8'	1 @ 8'
Paved Width	40'	38'	28'
Sidewalk[2]	2 @ 6-1/2'	rural: 1 @ 6-1/2' urban: 2 @ 6-1/2'	
Snowbelt[3] and Planting	2 @ 11'	rural: 2 @ 7-3/4' urban: 2 @ 4-1/2'	
Total Right of Way	75'	60'	50'
Maximum Gradient[4]	6%	6%	8%
Minimum Horizontal Curve Radius	550'	400'	300'

Source: Adapted for local conditions from standards developed by the American Society of Highway Officials.

Notes:
1. Parking bays should be substituted for lanes where existing trees or stone walls can thereby be preserved.
2. The width of a sidewalk plow (6-1/2').

Notes for Table 1, Continued:

3. Snow in urban areas is carted away; the extra width is for utility lines laid below a grass strip.
4. No grade in excess of 3% shall be permitted within 100' of any intersection.
5. Applies to new subdivisions only, whose lots should face side streets rather than arterial streets.
6. Except in built-up areas.

The arterial standard (again excluding state routes) would apply to the link road from Mast Road to Route 108 as relocated. The distance between intersections would also, as at present, apply to Routes 4, 108, and 155-A. The standards for rural collector streets would apply to Mill Road (except where part of the arterial link road), Bennett Road, Packers Falls Road, and to the loop formed by the eastward extension of the link road, Durham Point Road, and the extension of Longmarsh Road. Madbury, Edgewood, Bagdad, Emerson, Garrison, and Mill Pond Roads, Strafford Avenue, and Coe Drive should be considered as urban collector streets.

Finally, we recommend adopting the practice that all developers be required to design drainage not only to clear their own streets of storm water but also to accommodate additional run-off which may occur as areas upstream from them are developed in their turn. The inadequate drainage characteristic of small towns adds greatly to the burden of maintaining streets and can so easily be prevented.

PLANNING CHOICES AND DECISIONS

II

Now that the range of practical possibilities for each element of the plan has been defined, the time has come to weigh the relative importance of these elements. The decisions are expressed in terms of a comprehensive plan for development. The plan, once agreed upon, forms a guide to the zoning desired by the town and to the scheduling of capital improvements projects.

We recommend that first priority be given to conservation, because once the prized environment is lost, it can never be replaced. The chief elements visible in the plan are the Crommet Creek-Horsehide Brook Conservation Corridor leading from the Oyster River to Adams Point, and the regional wild or natural park centered on Dame Road. Greenways are shown along the full length of the Oyster River and its tributaries, although it is recognized that portions lying in areas already developed may not become available.

The major open-air recreational areas indicated are the school playgrounds and playfields, all linked by the greenways where still feasible; the Doe Farm Town Forest, which could be developed for picnicking and eventually contain a swimming pond; and the tri-town park in Madbury, which could offer skiing, golf, and other adult or family sports to the three towns of the school district and to the University.

Conservation objectives also affect the proposed zoning adjacent to the Oyster and Lamprey Rivers and to the Great and Little Bays. Only uses with a very high proportion of open land should be permitted in their vicinity, so that run-off and landscape are not disturbed. A minimum setback should be required from all water frontage.

The fundamental decision to be made here is whether residential growth should be guided into a definite direction. The economics of providing municipal water and good collector streets, and of minimizing transportation to schools and playgrounds all indicate an answer of yes. The same is implied by the expressed local appreciation of the university atmosphere, sidewalks and lights, "friendliness," and wide open landscapes. On the other hand, the liking for rural atmosphere around one's own particular house is at least equally strong. The outcome of these somewhat contradictory desires are small clusters of subdivisions separated from one another by woods, slopes, and streams and yet all compactly contained within areas that may reasonably expect full municipal services.

The choice of practical areas for residential expansion is limited by the problems of sewage disposal. On-site disposal of any scale or permanence is possible only in the Packers Falls section of Durham, much of which lies beyond feasible utility extensions or, alternatively, overlaps water-bearing gravels where care must be taken not to pollute Durham's water supply. It will be safer in the long run to select areas which can be sewered. The most favorable area from the points of view of extension of all municipal services and of convenience to the University and the town center is that land south of the Oyster River reaching as far as the divide in the drainage basin, bounded generally by Beaudette Brook on the west and Horsehide Creek on the east of Newmarket Road. This area is large enough to accommodate all residential growth by 1980, even without counting on the filling in of gaps within existing development and even at low densities.

The next question is the selection of densities. A balance needs to be struck between, on the one hand, a density high enough to support

municipal services and also to reduce the size and cost of required minimum lots for those who do not desire large lots and, on the other hand, the retention of the greatly desired feeling of openness. Densities now permitted by existing zoning where both water and sewer are present range from four to six families per net acre (in round figures) in the Class I Residential District up to ten families for apartments in the Class II District. In the Class III Residential and Rural Districts and in other areas not served by the town water and sewers, the limit is generally one family per acre, although multi-family structures may approach a density of four per acre. We suggest that the density of two to three families per net acre in one- or two-family homes may appropriately be applied to the area directly south of the faculty development which is closest to the University, but that the standard of one single-family house per acre be retained in the area surrounding the Wedgewood development. In order to accomplish the town's objectives of promoting economical construction and of retaining an open appearance, we urge that cluster zoning be provided as an option to developers. This would permit reduction of the size of individually-owned house lots in exchange for an equivalent amount of common open space. The result would be a concentration of houses adjacent to streets and utilities, with a counterbalance of open (and unserved) land away from the streets.

The Planned Unit Development concept is an extension of the idea of cluster zoning. It would further reduce the land occupied by a given number of dwellings by allowing some of them to take the form of town-houses or even apartments. In the case of a large subdivision, such as the 250-acre Echo Hill development in Amherst, Massachusetts, additional recreational or shopping facilities may be allowed as a service to the area. In that example, there is a range of dwelling types (including units renting for $175-300) suitable for a university town in a very open setting.

Furthermore, the length of town road was reduced by about a half over that in a conventional subdivision of the same area. Durham should certainly consider this precedent.

The question of provision for new apartments has not been resolved by either the townspeople or the market. Local builders believe, however, that most incoming faculty would prefer to rent rather than buy for their first two years, and will accept rents of $175-200. Since there is very little area left within the most central district where apartments are permitted under current regulations, and land is consequently expensive, a compromise solution between confining apartments to a limited area and allowing their unhindered expansion appears in order. This would be to allow apartments of the low-density "garden" or "terrace" type in all areas served by full utilities, but only by Special Exception. The Planning Board and the neighbors would then have a chance to evaluate each project and yet not close the door on what appears to be a needed type of housing.

Since the areas proposed for coherent development are by themselves sufficient to accommodate all growth expected in the next two decades, it becomes possible to consider lowering permitted densities in the parts of town which are to remain truly rural. The effects would be both the direct ones of more landscape per house and more room for replacements to the original on-site sewage installation and the indirect one of lowered appeal to the large subdivider. The suggested standard is 1-1/2 to 2 acres per family as compared to the maximum lot size as required today of 40,000 square feet. While no data on the size of isolated rural lots has been collected, the average property is undoubtedly very much larger, if one excepts small waterfront or seasonal cottages.

Even in the rural areas, however, there are distinctions to be made, as Durham recognized when it designated the Oyster River frontage between Piscataqua and Durham Point Roads as a separate zone. The Class III Residence zone is not as wide open to nonresidential uses as the Rural zone applicable to other outlying parts of Durham, but it does permit such uses as marinas and motels which are inconsistent with the popular desire to retain the natural quality of the waterfront. The latitude offered by cluster zoning is desirable here too, although, because of poor soils, the individual lot size should not fall below one acre. The desirability of an imposed setback from the waterfront has already been mentioned. This large lot requirement with the option of cluster zoning would also be compatible treatment for the band of good soils along Packers Falls Road, since this is an area where subdividers not interested in the sewered areas should be induced to go. Probably the Mill Road-Packers Falls area would be the next phase in Durham's residential development approaching the turn of the century.

In the remainder of town, where neither location, scenery, nor soils invite settlement, the large-lot requirement should be rigid, without the cluster zoning option.

Durham depends primarily on residential valuations for its revenues. One should not permit incompatible uses to arise next door, as can now happen in the Rural District and to a lesser extent in the Class III Residence District. Perhaps a little more latitude may be given to uses within the fixed large-lot areas where the least development is expected, but even here, nonresidential uses should be confined to those which may be construed as forming the resident's own occupation, not allowing the intrusion of outside business concerns for which neither

Durham's economy nor its job seekers have a need. For those business concerns which do fulfill a local need, special areas can be provided, as described in the following section.

It appears from both the survey of citizens and the planning analysis that the two reasons for desiring nonresidential development are convenience to the residents or to the University and diversification of the tax base. Employment as such is not sought, nor does Durham have the raw materials, the transportation, or the market to bring business homing in. Given the criteria of convenience and net tax return, plus the recognition that Durham's primary functions are academic and residential, the town can afford to be - and should be - very selective about the type of commerce it admits and its location.

Retail and Small Office Uses

It is clear from surveys that Durham is losing an unnecessarily large share of its food and household purchases to Dover. If there is to be even modest growth in retail and services in keeping with the projected growth of both resident and student population, without attempting to capture a higher proportion of the shopping dollar, an effort will have to be made to make the shopping district work more easily, or the needed stores will prefer other locations. The area now available for business development is adequate as such, provided it is efficiently developed.

The possibility of developing an outlying shopping center was explored. The best site for outlying business would be on the east side of Dover Road just north of the Bypass, as it would intercept Dover-bound shoppers and home-bound commuters. Soils and slopes in the area are reasonable for building, access can be managed, and the disturbance to residential expansion would be minimal. The drawbacks of this alternative are, first, grave doubt as to whether such a secondary center could compete successfully with larger centers outside Durham, and second, the dampening effect on existing business.

We therefore recommend that future business development take place in the center, albeit with a concerted effort to provide improvements to its circulation and appearance, including intensive landscaping.

Automotive Uses

Unlike the retail sector, the gasoline service stations and auto repair shops are heavily patronized by the residents. The expected increase of 75 percent in local car ownership over the next fifteen years may be counterbalanced to some extent by the shift of through traffic away from "Gasoline Alley" to relocated Route 108 and to the proposed link road bypassing town to the south. It would appear that the existing stations are enough for local convenience. No doubt others will seek to enter the competition, but it is questionable whether Durham would gain enough either in convenience or taxable values to make future gas stations into desirable enough neighbors to outweigh the side effects of traffic, noise, and glare. If it is felt that some additional stations are essential in order to serve residents (as opposed to commuters), there is the possibility of allowing them as a special permit use in the fixed large-lot area adjacent to arterial streets. The controls on signs and illumination on such locations should then be very strict.

Science and Technology Park

Analysis of Durham's potential for industry showed that the most compatible forms of industry for Durham would be highly professionalized concerns to whom the presence of the University would be advantageous. For greatest success, there should be a mixture of prototype manufacturing and large offices in addition to research. Proximity to a highway, to the University, and to utilities is of importance. Conversely, most of Durham's residents do not wish industry to be conspicuous. The location

which best meets all these objectives is that bounded by Mast Road, the Lee and Madbury town lines, and the Bypass extension While it is not expected that the large area will be quickly filled, the size is advantageous in that it allows a choice of sites and makes it feasible to impose controls of very low density development to help overcome the objections to locating in a watershed.

Several alternatives were considered. The first was creation of scattered industrial sites, on the theory that these would be less conspicuous and would diffuse traffic. Such sites not only present serious legal problems of description and regulation but are also likely to fail in both the fundamental purposes of enriching research and employment opportunities for faculty and students and of attracting solid tax producers. Other park sites were also weighed, particularly the site south of Doe Farm which has a railroad, water from the Lamprey River, good soils, and is closer to Newmarket's labor supply. These are qualities, however, of negligible importance to the type of light industry meeting Durham's objectives and are, on the contrary, more likely to appeal to heavy industry incompatible with Durham's desire to preserve the beauties of the Lamprey River. The area should be reserved for residential uses at a later stage in Durham's development.

The two most pressing needs in the category of public buildings are a new regional elementary school and a new town hall. It is none too early to begin choosing a site for relocating the Fire Department, although actual construction may be many years off. The Public Works Yard should in time be either expanded or relocated. The question of a community center will, for the time being, probably be solved on an unofficial basis rather than through municipal initiative, but the town should keep the future possibility of a town-operated center in mind. The University library serves as the town library. It is expanding to meet the demand.

Elementary School

The final selection of a site for a new school is up to the Oyster River Cooperative School District, not to the town, and will be conditioned by the availability of land. We have, however, attempted to narrow down the choices on the basis of objective criteria, because, if Durham is the town selected, the location of the school should be integrated with the town's plan.

It appears that a location in Durham is indeed most logical. Analysis of the expected growth in population (excluding University students) shows that Durham will have more new settlers than Lee and Madbury combined. If a high proportion of walk-in pupils is a serious consideration, Madbury is not in the running, with a population of only 800 expected by 1980. Rather, the new elementary school should be located so as to serve the concentrated growth in Durham; in other words, south of the Oyster River between Mill Road and Route 108. Such a location has the further advantage of being within reach of utility extensions. The proposed link road, or southern bypass, would facilitate access from Lee, the next most populous town.

Four 10-acre sites within this area have been suggested for initial exploration on the basis of adaptability for buildings and playgrounds. From the town's point of view, location in the area south of the Oyster River helps to stimulate development in the desired direction. It is also important to the town to have the new school's playground in a central enough location to serve as the principal summer community playground, substituting for the limited area at the Junior High. The proposed land use map shows the site most favored by virtue of its centrality, the ease of extending utilities, and its attractive position on the Oyster River. This site is south of Mill Pond, west of Newmarket Road. Our preference, however, is not necessarily that of the School Board, which must struggle with the realities of three-town representation and of the market.

The fifth possibility for a site in Durham would be off Mill Road near Packers Falls Road and Lee. Soils here are good for on-site sewage disposal and wells, and utilities might be extended the 1.5 miles in this direction before temporary on-site facilities fail. The location would, however, require transportation of practically all pupils until sometime after 1980, and can therefore be legitimately weighed against other locations in Lee or Madbury.

Town Hall

Opinion on whether the Town Hall should be located where most people are during the day or where they are at night seems to be equally divided; either location will work. The advantage of a central location is precisely that: a visual center and accessibility to all segments of the community. A location on Newmarket Road, on the other hand, places more emphasis on the Town Hall's relationship to residential

areas old and new.

The site selection committee is presently looking at several parcels south of the present Town Hall. Eventually the Public Works Yard might be pressed into service as well. The minimum site should be 1-1/2 or 2 acres in order to provide a better setting and to allow for more parking during peak periods of use by the public (since there is no shoppers' parking nearby to accommodate the overflow). These dimensions could be achieved by the purchase and assembly of several parcels in the vicinity of the existing Town Hall, allowing new offices and parking lots to be developed in stages. Eventually, the present Public Works Yard might be absorbed into the site as well.

Another possibility would be a site adjacent to the new elementary school if this is located as suggested near Mill Pond. The combined school and Town Hall parcels could form an excellent community center for recreation and outdoor festivities. The open view toward the center from the south could, with discreet placement of buildings, be permanently preserved. Even if the school is not to be built here, the location is still a suitable one for the Town Hall. In that event, enough additional land should be acquired to allow, say, for a Little League field and a park to serve as a focus for unprogrammed neighborhood recreation and for an eventual community center.

Fire Station

The two chief considerations in locating the future fire station are coverage (within 3/4 mile) of both the business center and the student concentrations, and a choice of exit roads. It need not necessarily be combined with Town Hall. A location within a quarter mile west or

south of the center would be the best. The actual site should be selected by the Fire Commissioners, with the advice of fire underwriters, once the details of central circulation improvements are known. If the Town Hall site is to be within the Osgood property, there would be enough area to accommodate the fire station as well.

Public Works Yard

The Public Works Yard can eventually be moved to the Teeri property next to the incinerator. The move is neither essential as yet nor convenient until such a time as better access is provided to the Teeri property by an extension eastward of the proposed link road. Early vacating and expansion of the present site, however, would permit it to be added to the land for the new Town Hall, as mentioned above. The plan shows the Yard's ultimate location on the Teeri property.

The several objectives underlying recommendations for new roads are as follows:

1. quick access to parking lots around the University's periphery without unnecessary disturbance of residential and business areas;
2. diminution of the strain on Main Street;
3. access to areas favored for early development;
4. better bus routes to schools;
5. use of limited access highways to separate unlike land uses rather than to divide similar residential areas;
6. distinction between the functions of arterial, collector, and local roads.

The first and second objectives are the reasons for suggesting that the already designed access road from the Bypass to Concord Street be constructed as soon as possible. The University should construct a connection to the end of Strafford Avenue to improve access to the New England Center for Continuing Education.

The same objectives also motivated the proposal for a link road, or southern bypass, between Newmarket Road and Mill Road, entering the campus from the south. The link road should be extended both west and east in the interest of the third and fourth objectives as well as for the obvious advantage of completing a southern bypass between Mast Road and relocated Route 108, since the link road serves the areas best suited for residential and industrial development.

Objective 5 resulted in the proposal to relocate Route 108 to the east of the line tentatively sketched by the state. The route shown on the plan

separates the prime residential area from the proposed conservation corridor and regional park instead of splitting off the Wedgewood development from the rest and dividing the new school's service area. This alignment would also be less damaging to the old Shipyard Landing area and Beards Creek than the state's line, although care must still be exercised to preserve the nature of the Oyster River and the Horsehide Creek marsh.

Objective 6 underlies the suggested improvements which would result in two useful collector street loops: the Mill-Packers Falls-Bennett Roads loop and the loop consisting of the extension eastward of the link road, part of Durham Point Road, and an extension due east of Longmarsh Road.

The plan for Durham's center is designed to fulfill Objectives 2, 4, and 6, rerouting shopping and local traffic to the rear of the stores and permitting through traffic to pass unhindered.

The various other circulation improvements suggested have to do with local hazards, such as poor alignment, dangerous intersections, or a narrow bridge.

ADMINISTRATIVE ELEMENTS

III

It is all very well to present ideas and hopes in a plan, but how are they to be realized? The town is by no means powerless, even acting alone. In conjunction with groups interested in one phase or another of the Plan - the University of New Hampshire, the Businessmen's Association, the Oyster River Cooperative School District - substantial progress can be made. Some projects require the cooperation, technical advice, and financial assistance of other levels of government - the region, the state, the various federal bureaus - for their fruition. The following pages outline the powers the town can use or set in motion to guide its physical development in the directions expressed in the Comprehensive Plan.

Zoning

The most obvious of the planning tools is zoning, which directs the manner in which privately owned land may be used. A new zoning ordinance will be prepared on the basis of this Plan for submittal to Town Meeting.

Subdivision Regulations

The Planning Board has the power, after public hearings, to amend its subdivision regulations, without submittal to Town Meeting, in whatever ways are necessary to conform to the suggested details of residential land use and design of subdivision streets. The major alterations suggested are a provision to permit cluster zoning and possibly also Planned Unit Development and the requirement that, once the project to correct the problems of water distribution has been completed, all large subdividers tie into the public water system. Street drainage requirements should be designed to take care of subsequent developments upstream. In larger subdivisions, the Planning Board should consider requesting the subdivider to set aside a parcel suitable for informal recreation, subject to purchase by the town.

Scheduling of Capital Improvements

The Town Meeting, in voting on appropriations, can give weight to a list of priorities supporting the Plan's goals. Annual preparation of a six-year schedule (not to be confused with the year's financial warrant articles) is technically the responsibility of the Budget Committee, with the help, in Durham's case, of the Public Works Advisory Committee. The Budget Committee may decide to delegate preparation of the preliminary schedule to the Planning Board which is more concerned with projections into the future and whose advice should most certainly be sought. Faithfully followed, the six-year schedule would govern the logical extension of town roads, water, and sewers, provide funds for conservation and park development and so on. The perspective afforded by a schedule would help to spread out the cost of these and other construction or acquisition projects in a manner least burdensome to the taxpayer.

Administrative Decisions

The support of the Board of Selectmen is indispensable to the implementation of the Comprehensive Plan. Their most important role is that of an informed and authoritative catalyst between and among Town Departments, other levels of government, and the public. Acting directly on the Plan without intermediaries or appropriations, they can also regulate traffic and parking and can request state technical advice on numerous types of projects.

Special-Purpose Committees

Permanent committees such as the Conservation Commission, the Parks and Recreation Committee, the Fire Commissioners, the Public Works Advisory and Sewer Policy Committees, the ORCSD (School) Board, and the joint Town-University Advisory Committee can shape their policies

and day-to-day decisions in ways that will further the spirit of the Plan. Members of all of these bodies have been consulted or involved at one stage or another of the planning studies. On their advice and action much depends.

Coordination of Consultants

The Planning Board has requested its consultants to furnish assistance to the town's engineers, Camp, Dresser and McKee, on the design of the water distribution system and the College Brook sewer interceptor; to the University's campus planners, Shurcliff and Merrill, on the design of circulation as it affects campus roads and parking; and to the state-sponsored "Pilot Project" as it affects various aspects of conservation within Durham. The Plan further suggests where future specialized advice would be desirable, as in the design of recreation areas, the treatment of specific conservation problems, the installation of traffic controls, and the layout of new roads. Such coordination of information and design promotes the goals of the Plan and should be fostered by the Planning Board.

Citizen Cooperation

Certain goals can only be accomplished with the aid of citizens acting as organizations or individually. Examples of the former are the Businessmen's Association, whose support will be crucial to the radical improvement of the center, the Historic Association, and the Durham Youth Association. The League of Women Voters has been extremely helpful in soliciting and shaping public opinion. Individual support is exemplified by the generous offer of the lease of land for a tri-town park and of 40 acres for conservation near Horsehide Brook. The very existence of a Plan encourages donations from individuals who would like to see the town treasure its assets in perpetuity as they do themselves.

The involvement of other levels of government is also a two-way street. Generally, it is up to the town to take the initiative, or at the very least, to make its voice heard before the plans of other agencies are fixed.

Durham's Place in The Region

Under the impact of the process of urbanization, federal agencies have been more and more insistent that states adopt formal planning regions in order to qualify for federal water, sewer and other grants. One such region defined by New Hampshire centers on Dover as the major urban place and includes Somersworth, Rollinsford, Durham, Madbury, Lee, and Newmarket as closely related communities. Evidence of joint planning is already manifest among some pairs of these communities. Those who elect to join the formal planning region also will have the benefit of regional and special studies to be prepared by the regional commission. Durham has not as yet voted to join the region.

Several areas of interest shared by other nearby towns were uncovered by the planning studies. One is preservation of the beauty and ecology of the Great and Little Bays. The state's Water Supply and Pollution Control Commission has already taken the fundamental step of requiring sewage treatment all around the Bays. Also, the state has passed legislation to regulate septic tank installations within 1000 feet of water bodies. A broad range of problems still remains to be tackled by all the waterfront towns. What should be the priorities presented to the U. S. Army Corps of Engineers now engaged in a study of the Bays: preservation of the habitat and cultivation of commercial fishing, navigation on a modest or on a commercial level, untouched appearance versus greater accessibility? Would the towns consider the Bays as an entity in developing the best places along the Bays for landings, beaches, parks, and summer colonies to be

shared by all, or will each town try to duplicate facilities? Should the towns supplement state inspection of possible sources of pollution with their own regional sanitarian? How about coordinated zoning regulations along shore lines of all towns, to preserve views for mutual enjoyment?

Another matter of shared interest is the water supply. While Durham has enough to meet its needs for the next 25-30 years, it should support the state's search for future major sources of water. In the interim, it is important to protect the watersheds of the Oyster and Lamprey Rivers in Lee and Epping as much as in Durham.

Newmarket's sewer system may be capable of eventual extension to serve south Durham - another point of common interest for discussion when development of this area is desired.

Durham was also at the geographic and research heart of the Seacoast Region, which produced a number of large-scale studies of the region's economic resources and population. Although the Seacoast Region did not receive legislative ratification as an operating agency, its place may eventually be taken by the smaller, city-centered regions now being organized when they evolve methods of cooperation to ensure that problems with a wide geographic impact (such as location of airports, use of salt-water frontage, control of air pollution, accommodation of the influx of population from Massachusetts, to name a few) are handled at the proper scale.

There are thus four layers of inter-community effort with which Durham should concern itself. The first is direct cooperation among adjoining communities on matters of mutual interest. The second is creation of a

special-interest region, such as for Great and Little Bays. This might be done through a banding together of conservation commissions or, at a later stage, by a cooperative venture between the Dover and Portsmouth regions. The third layer is the formal planning region centered on Dover and the fourth is at the inter-regional or state level.

The regions in turn will come to have a more effective voice at the state level than isolated communities when it comes to such matters as relocation of regional highways and so on. In the meantime, however, towns will have to speak up individually, but can at least assemble joint delegations to Concord on matters of mutual interest.

State and Federal Assistance

Durham's Comprehensive Plan has itself been assisted by federal funds, supplemented by a donation from the state University and supervised by the state's Department of Economic Resources and Development (DRED). Free technical advice has been made available by the state on numerous topics already noted, and DRED's "Pilot Project" has made the town aware of additional sources of help on the state level.

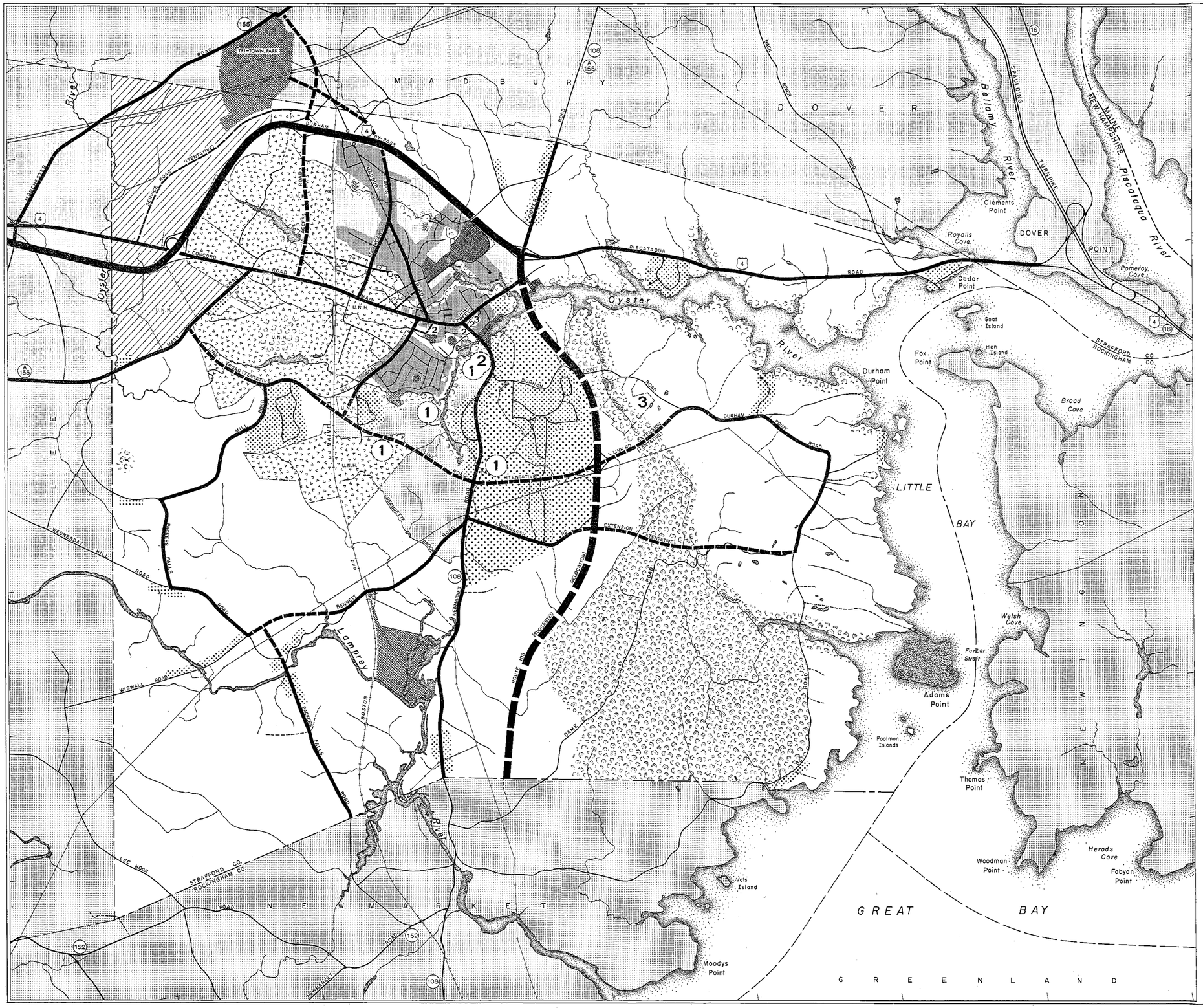
The funds most valuable to Durham in carrying out the Plan are given here in summary. Bureau of Outdoor Recreation (BOR) matching funds may be sought for the acquisition of major areas open to the general public. Urban Beautification grants are obtainable through the Department of Housing and Urban Development (HUD) and would be applicable to the landscaping of the town's center. Normally, Urban Beautification grants are for half of the landscaping costs (not including acquisition or buildings) in excess of normal town expenditures for such activities. There is the possibility of a grant up to 90 percent if the

project qualifies as a demonstration project. Certainly, Urban Beautification funds should be sought for improvements to the center's landscaping and street furniture and might also be helpful in improving the appearance of "Gasoline Alley." Durham has become eligible for these funds because the project is related to the Comprehensive Plan.

Federal and state funds for major road construction are spent on the initiative of the state Department of Public Works and Highways. The University and town should ask the Highway Commissioner to accelerate the schedule for building the access road from the Bypass. They may also ask for legislative designation of the proposed link road as a Class II highway, replacing the present Route 155-A, with half the construction cost to be borne by the state. Failing such legislative action, the town and University may decide it is in their mutual interests to cooperate in the link road's construction; in any event, town action is likely to be the quickest way to get the road started. Another source of road funds which will be open to Durham once its population passes the 5,000 mark is the "50-50" federal aid for Class IV roads in compact areas, such as Main Street in the center. Finally, there are the state's Town Road Aid-A and -B funds, already familiar to town officials.

Federal aid is in theory also available for up to half the cost of major water and sewer extensions and water-storage facilities (Housing and Urban Development Act of 1965). The problem, however, is that there have been severe cutbacks in federal domestic expenditures. Additional state assistance for up to 40 percent of the project cost is also available for the extension of sewer interceptor lines (Water Supply and Pollution Control Commission). These funds all have a bearing on how the proposed residential area south of the Oyster River is to be supplied with utilities.

In sum, a town does have considerable powers and funds available to it. The instruments are there; a Plan provides the orchestration. Will the town follow the score?



TOWN OF

DURHAM

New Hampshire

DURHAM PLANNING BOARD
and
NEW HAMPSHIRE DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT

Scale
0 2000 4000 6000 8000 FEET

NORTH

COMPREHENSIVE PLAN - TOWN

January 1969

LEGEND

EXISTING PROPOSED

CIRCULATION

- EXPRESSWAYS
- (ARTERIAL) OTHER STREETS

OPEN LAND

- CONSERVATION
- RECREATION

RESIDENTIAL

- MEDIUM DENSITY
- LOW DENSITY
- RURAL

OTHER

- UNIVERSITY
- RETAIL
- AUTOMOTIVE
- RESEARCH PARK

(1) ALTERNATE SITES { 1. SCHOOL, 2. TOWN HALL, 3. PUBLIC WORKS YARD

KEY

- Numbered State Routes
- Other Roads
- Transmission Lines
- Streets Under Construction
- Access Ways
- (U.N.H.) University of New Hampshire
- Other Major Public Properties

THE PLANNING SERVICES GROUP Inc.
Cambridge

CONSULTANTS
Massachusetts

BASE MAP PREPARED AUGUST, 1967

SOURCES

1. U.S. GEOLOGICAL SURVEY QUADRANGLE MAPS.
2. N.H. DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT TOWN MAP, JAN. 1953 ; URBAN AREA MAP, NOV. 1960.
3. N.H. DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS -VARIOUS PLANS AND MAPS.
4. AERO SERVICE CORP-AERIAL PHOTOGRAPHS FLOWN NOV. 7, 1962
5. DURHAM PLANNING BOARD - ENGINEERING AND SUBDIVISION PLANS.
6. UNIVERSITY OF NEW HAMPSHIRE PROPERTY MAP.

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COMPREHENSIVE PLAN — THE CENTER

January 1969

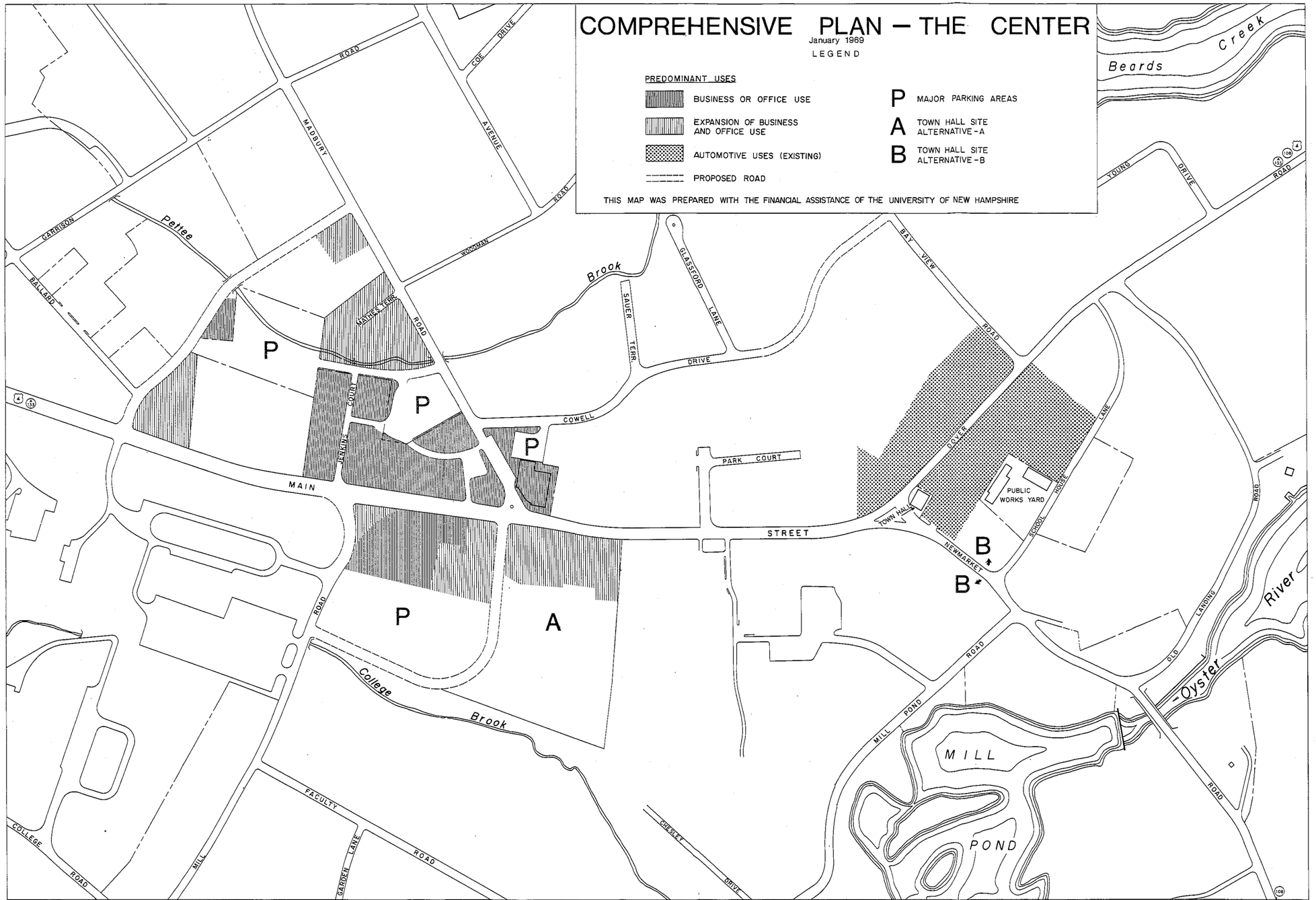
LEGEND

PREDOMINANT USES

- BUSINESS OR OFFICE USE
- EXPANSION OF BUSINESS AND OFFICE USE
- AUTOMOTIVE USES (EXISTING)
- PROPOSED ROAD

- P MAJOR PARKING AREAS
- A TOWN HALL SITE ALTERNATIVE-A
- B TOWN HALL SITE ALTERNATIVE-B

THIS MAP WAS PREPARED WITH THE FINANCIAL ASSISTANCE OF THE UNIVERSITY OF NEW HAMPSHIRE



BASE MAP SOURCES

1. N.H. DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT URBAN AREA MAP, NOV. 1960.
2. AERO SERVICE CORP.—AERIAL PHOTOGRAPHS FLOWN NOV. 1962.
3. N.H. DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS — PHOTOGRAMMETRICS.
4. UNIVERSITY OF NEW HAMPSHIRE MASTER PLAN—APRIL 1967.
5. SANBORN MAP ATLAS, 1946.

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TOWN OF

DURHAM

New Hampshire

DURHAM PLANNING BOARD AND
NEW HAMPSHIRE DEPARTMENT OF
RESOURCES AND ECONOMIC DEVELOPMENT

THIS MAP WAS COMPILED FROM VARIOUS SOURCES WHICH PRECLUDES ITS BEING USED FOR ENGINEERING OR LEGAL INTERPRETATIONS.

Scale

0 100 200 300 400 500 1000 FEET

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