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Summary of fair share analysis

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SUMMARY OF FAIR SHARE ANALYSIS

FOR

BERNARDS TOWNSHIP

LOW AND MODERATE INCOME HOUSING

AS PREPARED BY WILLIAM W. ALLEN

Prepared by:

Frederick C. Conley
Administrator

SUMMARY OF FAIR SHARE ANALYSIS

FOR

BERNARDS TOWNSHIP LOW AND MODERATE INCOME HOUSING

PREFACE

This report is intended as a vehicle for summarizing the
analysis of fair share as prepared by Township Committeeman William
W. Allen. It has attempted to summarize that report without the
extensive documentation and mathematical analysis which is con-
tained in the full report.

It should initially be pointed out that Mr. Allen's report
includes additional complexity that has been added to the analysis
since the adoption of Ordinance 385 on May 18, 1976. This addi-
tional complexity had the net result of reducing the fair share
figure from 354, which was in the ordinance, to 350.

I.   MANDATE

Section 3.0 of Mr. Allen's report explains the Mt. Laurel
mandate to which the fair share analysis was a response. The fol-
lowing is the basic criteria which were used in developing a fair
share analysis:

.1.   Present and Prospective Need

The analysis does contain a determination of Bernards
Township's present need of low and moderate income housing which is

I.   MANDATE (continued)

based on the New Jersey Department of Community Affairs study on this subject in 1975. The basic thrust of the analysis, however, is on prospective need. The Township's basic obligation under Mt. Laurel is to provide zoning for new units of housing which, therefore, means the emphasis is on future need rather than to provide housing for households that are already housed. Exhibit I presents a chart showing how present and future need are brought together in determining the Township's fair share.

2.   Regional Need

It is clear that the Mt. Laurel decision imposes an obligation on us to assume a regional need of housing, which means we must, therefore, define our fair share in terms of a region. A model was used, however, which made it unnecessary to draw arbitrary, definitive limits on the Bernards Township region.

3.   Location Theory

The report makes it clear that the total response to the Mt. Laurel decision involves true regional planning. It is also clear that true regional planning is beyond the jurisdiction and resources of an individual municipality. In selecting employment location as the key vehicle for determining housing location, the Township has selected a factor whose importance is not in dispute.

II. FUTURE NEED

This section will summarize the analyses that were performed for determining the portion of Bernards Township's fair share of future housing need.

1. Basic Concept

At the heart of the Township's analysis of future need is the principle that place of residence is related to place of work. The term "commutershed" describes a region in which people live who work at a particular job site.

Since there is a tendency to keep the daily commute short rather than long, it can be expected that the further we go from an employment site, the fewer residences of that site's employees we will find.

A mathematical expression of this relationship was developed which made it possible to test the truth of the theory and to determine municipal zoning responsibilities to employment sites.

This model is explained in detail in Section 4.0 of the report. We have called this model a "job oriented residential distribution"(JORD).

It was determined from analyses done at RCA in Bridgewater and previous study information made available by the Township's planner, that approximately 50% of the employees at any given job site live within ten miles of that job site. This information was converted into a mathematical expression which made it possible to determine the likelihood that an individual will live in a given municipality that is a certain distance from his job. That mathematical expression of probability can then be used to determine the

likely number of employees of a given job site that will live in a particular municipality which is a certain distance from that job site.

To do this, three pieces of information are necessary: the number of employees at the job site, the distance of the municipality from the job site, and the land area of the municipality. Both distance from the job site and land area of the municipality are necessary as can be seen from the following two examples:

A municipality could have 50 square miles of land area but if it is 100 miles from a particular job site, there is not much likelihood that employees of that job site will live there.

Conversely, a municipality could be in close proximity to a job site, but if it is extremely small in land area, the likelihood of an employee living in that community will be restricted by this land area factor.

The formula which we derived enabled us to make the likelihood that employees of a given employment site would live in Bernards Township dependent upon both the distance of that employment site from the Township and the Township's land area.

II.   FUTURE NEED (continued)

    2.   Data Needs

        In order to implement the model, the following informa-
tion was necessary:

        (a)   Information on employment centers within the
              region.

        (b)   The distance of those employment centers from
              Bernards Township.

        (c)   Projections on growth of employment in the region.

        (d)   The distance of this new employment from Bernards
              Township.

        The following are the ways in which these data problems
were handled.

        By use of the report entitled, 1974 Covered Employment
Trends in New Jersey, data was obtained on covered employment by
municipalities in the region. We could not specifically determine
the distance of that employment from Bernards Township. By use of
information from the Tri-State Regional Planning Commission, we
were able to determine the distance between Bernards Township and
each of the municipalities whose employment we obtained. This in-
formation was used in the distance aspect of the equation. By an
analysis of this employment data by municipalities between 1970 and
1974, we were able to project employment growth in those locations
in accordance with that trend.

        These projections were done through 1976 and then through
1982. By subtracting the 1976 figures from the 1982 projections, we

were able to derive employment growth by location for a six-year period from the present. This six-year time frame was selected because the further into the future one projects, the more un-reliable the projections become, and because six years is consis-tent with the future planning time frame prescribed in New Jersey's new land use law.

For the six counties analyzed as significant under the formula, the following results were obtained from these projections:

ACTUAL AND PROJECTED COVERED JOBS

County	1970 Actual	1970 Adjusted*	1974 Actual	1976 Projected	1982 Projected	Growth 1976-1982
Essex	326,151	352,750	326,350	313,901	279,332	- 34,569
Hunterdon	12,991	14,050	15,559	16,373	19,080	- 2,707
Middlesex	171,337	185,310	205,511	216,423	252,761	36,338
Morris	86,378	93,422	109,532	118,601	150,565	31,964
Somerset	46,498	50,290	60,490	66,341	87,516	21,175
Union	217,425	235,157	225,462	220,766	207,257	- 13,509
Total						44,106

* Job growth is being analyzed as a determinant of population growth. Data
on covered jobs has two deficiencies as a determinant of population growth:
changes in the coverage ratio and changes in the participation ratio. This
simply means that legislation changes the percentage of total jobs that are
covered by unemployment insurance, and the percentage of the population that
is in the work force changes. In order that the analysis could deal with
jobs as a determinant of population without these factors, the 1970 covered
jobs were adjusted to eliminate changes between 1970 and 1974 in both the
covered ratio and the participation ratio.

3. Jobs, People and Households

By applying the formula which was described in Section II. 1. to the data described in Section II.2., we were able to determine the future jobs in the region for which Bernards Township had a housing responsibility.

The following are the results of that application of the formula:

Counties	Bernards Share of New Jobs 1976 - 1982
Essex	− 176.90
Hunterdon	10.62
Middlesex	344.08
Morris	494.37
Somerset	602.19
Union	− 151.73
Total	1122.63

It was necessary, however, to convert this job information into needed housing units. This was accomplished by using two ratios derived from officially published data.

(a) Jobs and People

It was possible to trace an historical relationship between covered jobs and total population and to trace a trend in that relationship.

By means of this information, it was possible to predict the total population associated with the covered jobs for which Bernards Township would have a housing responsibility. This resulted in people for whom the Township would have a responsibility in the years 1976 to 1982 and led to a population of 3634.74 for which Bernards Township was responsible from 1976 − 1982.

(b)   People and Households

It was then necessary to decide how many housing units these people would need.

There also existed in census data, a mathematical relationship between total population and households. From this it could be determined that there were 3.16 persons per household.

By dividing the total population for which Bernards Township had a housing responsibility by 3.16, it was possible to convert those population figures into households for which the Township had responsibility. This result was as follows:

$$\frac{3634.74 \quad \text{Share of People to be Housed}}{3.16 \quad \text{Persons per Household}} = 1150.2 \quad \text{Share of Households}$$

4.   Housing Units and Low and Moderate Income Housing Units

Having determined the housing units for which Bernards Township was responsible from 1976 - 1982, it then became necessary to determine how many of such units should be subsidized or low and moderate income units.

Section 8 of the 1974 Amendments to the Federal Housing Act provides rental subsidy for families whose income is below 80% of the median family income of the area. Since the most recent family income data available was from the 1970 census, that information was used.

Since all of the counties in the region of this study except Hunterdon County are within the Newark SMSA, and since the U. S. Department of Housing and Urban Development would use the Newark SMSA median income as a criterion for eligibility in any

community in the SMSA, we used that same SMSA figure as an eligibility criterion.

In each county of the region, therefore, it was determined what percentage of the families had incomes below 80% of the median family income of the SMSA. It is this same percentage of families which would be determined eligible for rental subsidy.

The total number of housing units for which Bernards Township would have responsibility was then multiplied by this percentage to determine the number of subsidized or low and moderate income units for which Bernards had responsibility.

Presented in average form, the following future obligation for low and moderate income housing units resulted:

$$
\begin{array}{ll}
1150.23 & \text{Share of Housing Units} \\
\times \quad .258 & \text{Low and Moderate Income Families Eligible for Subsidy (\%)} \\
\hline
267.76 & \text{Share of Low and Moderate Income Units}
\end{array}
$$

III. PRESENT NEED

Although the thrust of this study has been determining housing responsibility as a result of employment growth in the region, the Township did attempt to address the question of present need. Information on this question was extremely scarce, however.

The only document that we could find to assist us in this task was a DCA report on New Jersey housing needs. This report was based entirely on 1970 census data and categorized this data according to two sets of housing deficiencies: financial and physical.

The financial deficiencies simply referred to families which paid too high a percentage of their income for housing. Since this was not a land use issue and not affected by municipal government decisions, this data was not used.

III.   PRESENT NEED (continued)

The physical deficiencies section of the report gave in-formation on units which were "deteriorated" and "dilapidated". Since the deteriorated units were defined as those needing rehabil-itation and not replacement, it was determined that this need also was not affected by land use decisions.

The dilapidated units were in need of replacement and, there-fore, this need was affected by land use questions.

The JORD formula was applied to the location of all dilapi-dated units in the region to determine Bernards Township's fair share of replacing such units. This number of units was added to the units determined to be the responsibility of the Township under future need to arrive at a total Bernards Township fair share of low and moderate income housing units.

The result of this analysis was to give Bernards Township a fair share for present need of 90.1 low and moderate income hous-ing units.

At this point in the study, therefore, the Township's present and future fair share for low and moderate income housing is 357.86.

IV.   SPECIAL ADJUSTMENTS

1.   AT&T and Mt. Airy Associates

The 1976 - 1982 projections of employment were based on 1974 data, but the Township had specific knowledge of employment in-creases in the Township after that date. The data was adjusted to

IV.   SPECIAL ADJUSTMENTS (continued)

take into account the new office facilities constructed by AT&T
and Mt. Airy Associates.

This results in adding 110 units to the Township's fair
share of future need, increasing that portion to 378 units, and
the total fair share to 468.

2.   Ridge Oak

Construction has recently started on 248 units of elderly,
subsidized housing units in the Township. Although the original
statistic at the start of our analysis was covered employment, that
statistic was converted to total population before an obligation for
housing units was determined. The obligation which has been defined,
therefore, is for housing the full range of the population, not just
the employed portion.

Part of that total population are senior citizens. Credit
has, therefore, been taken for the new units to be constructed.

Because the size of these units anticipates smaller house-
hold sizes than used in our figures which converted population to
households, full credit was not taken for the 248 units, but rather
an adjusted number of 117.7.

The total fair share is, therefore, reduced from 468
units to 350 units.

FAIR SHARE ANALYSIS

FOR

BERNARDS TOWNSHIP

LOW AND MODERATE INCOME HOUSING

Prepared by:

William W. Allen
Township Committee
Planning Board

July 16, 1976, Draft
October 31, 1976, Final

Fair Share Analysis for Bernards Township
Low and Moderate Income Housing

1. Introduction

Bernards Township enacted Ordinance 385 on May 18, 1976.
This zoning ordinance made provision for 354 dwelling
units for households of low and moderate income and
177 units for market income. 354 was the estimate of
the Bernards fair share which followed a preliminary
analysis in April. This present analysis attempts to
refine the computations and to incorporate some addi-
tional principles. The result is a new fair share
estimate of 350 low and moderate income housing units.
Though there has been some collaboration with others,
primary responsibility for this analysis and the views
expressed rests with the author.

2. Summary of Fair Share Computation

2.1. This analysis deals with the Bernards Township fair
share of "low and moderate income housing", or LAMIH.
It does not treat the question of housing for middle
income or other households.

2.2. Zoning is for new dwelling units. A ratio of 3.16
persons per dwelling unit is used here. This has been
derived from 1970 census data presented by C. K. Agle.

2.3. Only a fraction of new dwelling units are for low and
moderate income households. 25.8% is used here. It
has been derived from 1970 census data for the Bernards
region.

2.4. Our region is not defined in purely geographical terms.
Rather, it rests on the concept of commutershed.

The principal assumption is that there is a relationship
between the place where one works and that where one
lives. Some forces tend to decrease commuting dis-
tance, while others tend to increase it. There is a
predictable pattern of residential sites around an
employment site. This pattern is described by a
mathematical model called a "job oriented residential
distribution", or JORD.

2.5. Present need is derived from a Department of Community
Affairs analysis based on 1970 census data. It results
in a LAMIH fair share debit or obligation of 90.1
housing units.

2.6. Future need is based on projections of population,
and these in turn rest on projections of employment
growth. These are derived from New Jersey data on
"covered employment". The average annual population
growth for the state is 1.16% by this method for the
1976-1982 period.

2.7. The LAMIH fair share debit for this future need is
378.1 housing units.

2.8. Bernards will provide housing for senior citizens
via the Ridge Oak project. This will serve as a
credit equivalent to 117.7 LAMIH units.

2.9. The resultant net balance for which Bernards should
zone is 350 LAMIH units.

3. Mandate

"We conclude that every such (developing) municipal-
ity must, by its land use regulations, presumptively

make realistically possible an appropriate variety and choice of housing ... at least to the extent of the municipality's fair share of the present and prospective regional need therefor." (Justice Hall in Mount Laurel, Ref. A)

This is our mandate. It contains several independent requirements.

3.1. <u>Developing municipality</u>. A term used to describe municipalities of "sizeable land area outside the central cities and older built-up suburbs ... which ... have substantially shed rural characteristics ... are not completely developed and remain in the path of inevitable residential, commercial and industrial demand and growth." (Ref. A) The term probably applies to our municipal neighbors. We in Bernards have conceded that it applies to us.

3.2. <u>Zoning</u>. Our municipal responsibility is to establish "land use regulations", principally zoning, which are suitable for the needed housing. It is <u>not</u> to finance land purchase or home construction. Other private or public agencies must do this.

3.3. <u>Variety</u> <u>and</u> <u>choice</u> <u>of</u> <u>housing</u>. Ord. 385 and this analysis deal with low and moderate income housing (LAMIH), that is, housing which is suitable for households near the low end of the income spectrum. "Appropriate variety" suggests that housing must be provided for which meets the requirements over the entire income spectrum. Further work must be done to determine our degree of compliance and any additional obligations for middle and other incomes.

(3)

3.4. Regional need. In this study I have defined region in terms of a model based on probable home-to-work travel distances. This is the "job oriented residential distribution", or JORD, described in Ref. B. The commuting distance concept is most reasonable for those households which contain one or more job holders or persons seeking employment. It is also reasonable for households of those who are now retired and wish to remain in communities where they lived during their working years. A small proportion of the population fits none of these categories but these people must be housed somewhere. Since no superior model comes to mind, these needs are also accommodated here via the JORD model.

In summary, housing needs for the entire population are dealt with via the JORD commuting model. This includes the large majority who are linked to the job market and the small minority who are not.

3.5. Present need. The N.J.D.C.A. has estimated 1970 housing needs. (See Ref. F) The analytical method is indirect and somewhat suspect. However, I have seen no better or more current study and have used the DCA study as the basis for the "present need", that is, the 1976 need.

3.6. Prospective need. Future need for the period from 1976 to 1982 has been estimated by projecting county trends of covered employment from the 1970-1974 period.

3.7. <u>Past need</u>. Some dwellings may be in poor condition and some areas too congested, and these conditions may have been aggravated by zoning practices which are now deemed wrong. However, everyone lives somewhere already, and there is no mandate in Mount Laurel to provide for massive population shifts which will somehow redress alleged past sins. To the degree that past housing needs are still reflected in present needs, then these are accommodated in this analysis. Otherwise, in determining need there is no backward look.

3.8. "<u>Fair</u>" <u>share</u>. My dictionary defines "fair" as "showing no partiality; just; upright; according to rules, principles ..." I believe the computation of the Bernards LAMIH share meets these criteria. Except for the data which supports the JORD model, the analysis rests on official state and federal data. It proceeds mechanically. Judgemental factors regarding Bernards, which might be considered self-serving, do not play a substantial role. A similar fair share computation could be made for any other municipality in the region.

3.9. <u>Quotas</u> <u>and</u> <u>land</u> <u>use</u> <u>planning</u>. There is <u>no</u> suggestion here that fair shares which are computed from the JORD model and then incorporated into each municipality's land use regulations, represent good land use planning. They do not. These fair shares represent a pure quota system. This is regional sharing, not regional planning. It is necessary at this time because the

mechanism is not now in place which can impose
planning principles on the region.

Regional planning with teeth in it, that is, regional
zoning, will probably come. In fact, the gradual
awakening to the implications of a pure quota system
will probably stimulate the political process to make
it come. For now a quota system based on a formula
approach is appropriate. Later, when planning
principles enter the equation, there will be some
shifting of shares. Share computed in a simpler
manner now, can serve then as the basis for the
bookkeeping.

The present simpler approach is also practical.
Bernards has the resources to develop a fair share
formula and this analysis is an example. It does not
have the resources to develop a regional plan. That
requires information for every municipality in the
region, not just for Bernards.

Regional zoning decisions will require a weighing
of planning information in the same scale with other
priorities. The political process will influence
the final product. Bernards cannot impose its own
views on the region. Of course, Bernards should
participate in the political process which leads to
regional zoning decisions.

Quota systems are used elsewhere. In the schools to
establish racial balance, and in employment via
affirmative action programs to establish better
balance with regard to race and sex. These are not

(6)

perfect, but they do constitute some forward movement in areas where there is no general consensus for a more sophisticated treatment.

4. ## Job Oriented Residential Distribution, JORD

Where a person lives is a function of many factors – housing cost and quality and availability, family ties, his income and life style – but certainly important are the location of his job and the burdens of home-to-work travel. A place of residence is related to a place of work, and, other things being equal, there is a tendency to keep the daily commute short rather than long.

The term "commutershed" has been coined to describe the region in which people live who work at a particular employment site. This is a valuable concept. However, we also need a quantitative method for determining the region. It helps to give names to things, so define the manner in which employee residences are distributed throughout the commutershed as a "job oriented residential distribution", or more simply, JORD. (This concept was first described in Ref. B and the empirical and theoretical foundations were presented there. Only the conclusions and application are included here.)

The following expression is basic in the JORD model.

(1)
$$F = \frac{1}{B^{\left(R^E\right)}}$$

(R is raised to the exponent E, and this quantity serves as the exponent of B.)

F is the fraction of employee residences which fall outside a circle of radius R.

E is an empirically derived constant equal to 1.4.

B is a constant for a particular employee distribution or commutershed.

Define R50 as the median commute or the radius of the circle which encompasses 50% of the residences. Then

(2)
$$0.5 = \frac{1}{B \left(R50^{1.4} \right)}$$

EQ(2) can be solved for B and this value of B used to determine F for other values of R.

In this analysis R50 = 10.0 miles.

Note that R is the commuting distance "as the crow flies", not the distance actually traveled by road.

Since (EQ(1) gives the fraction of job oriented residential sites outside, or inside, a circle of radius R, it can also be used to estimate the fraction of sites in a ring or the fraction of sites per square mile in a ring. A more direct route is to convert EQ(1) to a probability density function and then to differentiate with respect to R.

EQ(3) is the result.

(3)
$$D = \left(\frac{0.7}{PI} \right) \left(LOGe(B) \right) \left(\frac{1}{R^{0.6}} \right) \left(\frac{1}{\left(\frac{R^{1.4}}{B} \right)} \right)$$

The above seems somewhat intimidating but need not cause concern. I have used a computer to generate tables - analogous to tables of logarithms or square roots - and one need only refer to them to find D as a funtion of R.

CHART (1) presents plots of F and D from EQ(1) and (3)
for the case of R50 equal to 10.0 miles. (1000 D is plotted.)
D is a probability density or likelihood that a
person will live in a particular square mile of
territory if he works at a site R miles away. In the
real world a person lives at a specific site; he is
not spread around. If we multiply D by 1000 then the
result is the number of persons from a site employing
1000 persons who can be expected to live in a particular
square mile at a distance of R miles.

Consider two examples.

Bridgewater is 7.0 miles from Bernards at the township
centers.

$$\text{With} \qquad R50 = 10.0$$

$$R = 7.0$$

$$\text{then} \qquad D = 0.001256$$

$$\text{and} \qquad 1000 \, D = 1.256$$

This means that on the average we can expect 1.256
residents per square mile in Bernards for every 1000
persons who work in Bridgewater. Since the Bernards
area is 23.5 square miles then the Bernards residents
who work in Bridgewater can be expected to be

$$29.5 = 23.5 \times 1.256$$

for every 1000 Bridgewater jobs.

On the other hand Linden in Union County is 16.4
miles from Bernards. The corresponding value of D
is 0.000287. We can expect only 6.7 persons to live
in Bernards from each 1000 Linden jobs. The distance
is more than double (234%) and the residential impact
is less than one quarter (23%) that of Bridgewater.

(9)

Fraction, F, outside circle of radius R.

Density, D, per square mile from 1000 jobs.

Distance, R, from job site in miles.
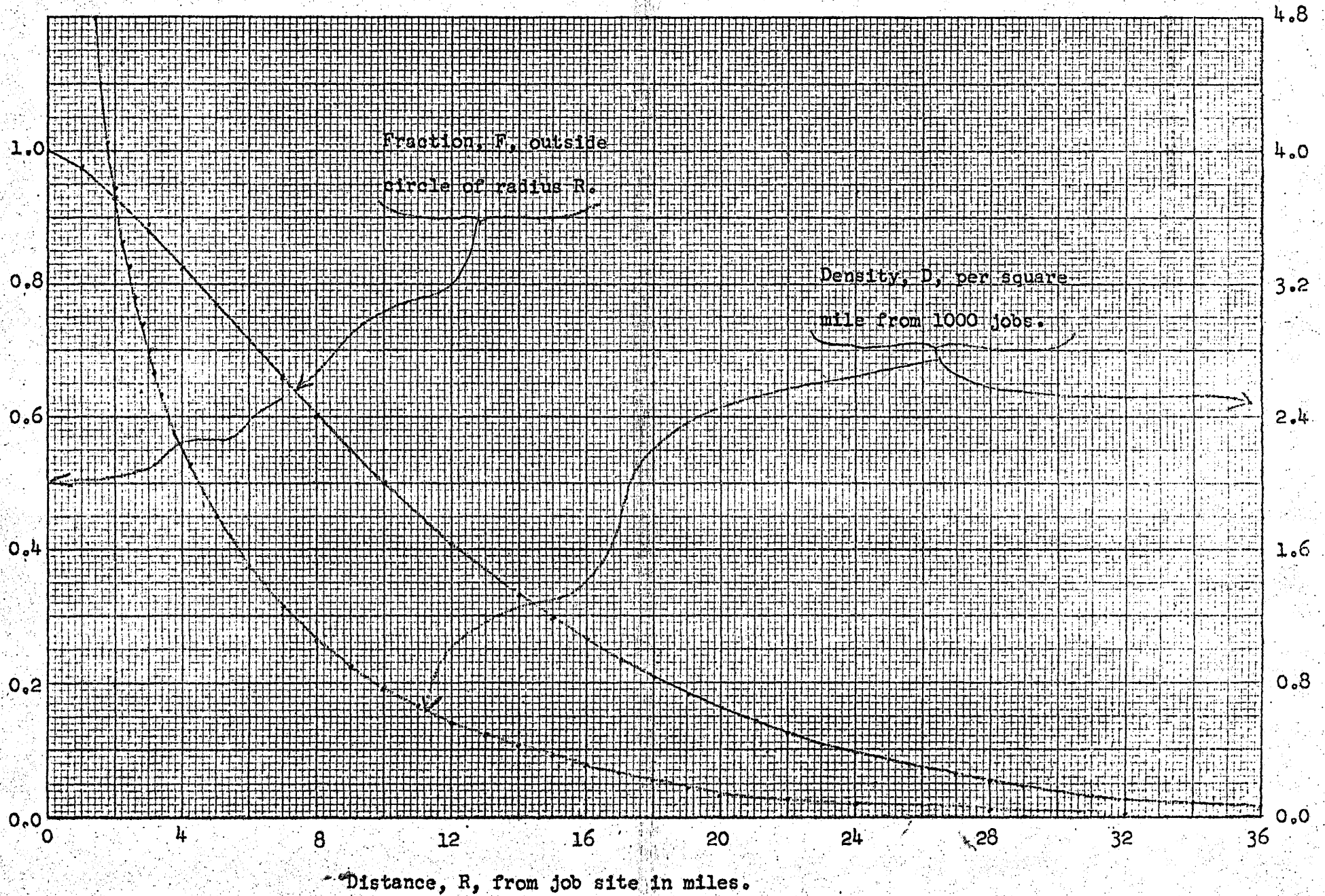
The concept of diminished impact with increased distance is intuitively obvious. The value of the specific JORD model for fair share computations is that it provides the ability to _assign_ population densities to various parts of a commutershed. We can estimate how many holders of Bridgewater jobs can be _expected_ to live in Bernards. Similarly for Linden or anywhere else. By summing over all communities around Bernards we can develop a total _expectation_ for Bernards. If our zoning accommodates this number then we have provided for our fair share.

In this analysis I sum over six counties - Essex, Hunterdon, Middlesex, Morris, Somerset, and Union - for a total of 154 municipalities. Given more time I would include Mercer, Sussex, and Warren as well because each has a portion within reasonable commuting range of Bernards. Since these western counties have relatively less employment than those to the east, their absence from the computation tends to increase the influence of the eastern counties which are included and which have greater employment.

5. JORD Mathematics

Certain approximations and simplifications are necessary in applying the JORD model. These are described in this section.

Consider Bernards as a job site and the region around it as a commutershed. Since D is a probability density then an integration over the entire region should give unity as the result, or

(4) $\int^A D \, dA = 1$

where A is the area of the region. If there are N

municipalities in the region with areas of Ai, then

(5) $\sum_{i=1}^{N} \int^{Ai} D \, dA = 1$

For any municipality there is some central point

such that

(6) $\int^{Ai} D \, dA = DDi \times Ai$

where DDi is a function of RRi and RRi is the distance

from Bernards to the central point.

The EQ(5) becomes

(7) $\sum_{i=1}^{N} DDi \times Ai = 1$

This is much easier to deal with if we can first

locate the municipal centers or some good approximations

to them.

Similar simplifications are made in other branches of

science. In mechanics one may consider all mass to

be concentrated at a point rather than distributed

throughout a body. In optics one may consider that

light originates from a point rather than from an

area. The validity of any such approximation rests

on the usefulness of the results.

One appealing choice for the center of a municipal-

ity is the geographic center. This is analogous to

a center of gravity. Consider a jigsaw puzzle with

one piece for each municipality. If one places a pin under the geographic center of one piece then the piece will balance. Geographic centers are objective and do not change with time. Unfortunately, data for these was not found.

The Tri-State Regional Planning Commission has established coordinates for population centroids, that is, centers of gravity for population, for each municipality based on the 1970 census. I use these centers in this analysis.

By using these approximations EQ(7) may not hold, and in its place we have

(8)
$$\sum_{i=1}^{N} D_i \times A_i = QP = 1-ERROR$$

where QP is the cumulative probability, and ERROR is the deviation between QP and unity. We want ERROR to be small.

ERROR exists because of the imperfect choices for municipal centers, and because the region chosen is not large enough. In any case, we can adjust or "normalize" the final result by dividing any summation over the region by QP. More on this later.

If Bernards contains employment equal to E, and we assume QP equal to one, then

(9)
$$E \times \sum_{i=1}^{N} D_i \times A_i = E = \sum_{i=1}^{N} E \times D_i \times A_i$$

$E \times D_i \times A_i$ is the expected number of persons who reside in i and work in Bernards.

In the example above consider Bernards, the employ-
ment location, as the "donor", and municipality i,
the residence location, as the "acceptor". (The
terms donor and acceptor are borrowed from solid
state technology.) Each municipality may be a donor
as well as an acceptor. Let j be the suffix for
donors and i that for acceptors. Then throughout the region

$$\sum_{j=1}^{N} Ej = \sum_{j=1}^{N} Ej \sum_{i=1}^{N} Dij \times Ai = \sum_{j=1}^{N} \sum_{i=1}^{N} Ej \times Dij \times Ai$$

$$= \sum_{i=1}^{N} \sum_{j=1}^{N} Ej \times Dij \times Ai = \sum_{i=1}^{N} Ai \sum_{j=1}^{N} Ej \times Dij$$

where Dij is the density value for Rij, which is the
distance between municipalities i and j. Restating
the above

$$(10) \quad \sum_{j=1}^{N} Ej \sum_{i=1}^{N} Dij \times Ai = \sum_{i=1}^{N} Ai \sum_{j=1}^{N} Ej \times Dij$$

This proves that one may first sum over all acceptors
from one donor and then sum over all donors (left
side of EQ(10)), or may first sum over all donors
to one acceptor and then sum over all acceptors
(right side of EQ(10)). Either way all employment
is accounted for.

The JORD model describes the impact on acceptors
from a single donor. EQ(10) demonstrates that it

(13)

can be turned inside out to determine the impact on one acceptor from many donors. This is the version we need to determine the impact on Bernards of regional employment.

Now that EQ(10) has been "proved" we must concede that it is only true in the ideal case. Define the "edge" of the Bernards region as the ring beyond which the donors have negligible impact on Bernards, a ring of 20 miles, for example. Then a donor just inside this ring will have its own region extend another 20 miles. For EQ(10) to hold, the summations must extend over a circle of 40 miles.

New Jersey does not extend without limit. The Long Branch region has no acceptors to the east, and those to the west would have to double their quota. Some adjustments might have to be made at the New York and Pennsylvania borders. The main value of EQ(10) is to demonstrate a concept. Since Bernards is centrally located, EQ(10) is probably reasonably true. The final result can always be adjusted by the QP factor of EQ(8).

6. Median Commute, Choice of Ten Miles

The principal data supporting the JORD model was residence data for employees of RCA in Bridgewater. (See Ref. B) The median commute, or R50, was 10.2 miles for the total of 1935 employees. There was also some evidence that this median value would be less if population density increased. Population density near Bernards Township is less than that for

(14)

Bridgewater, so an R50 value less than Bridgewater would not seem appropriate.

Our planner, Mr. C. K. Agle, has reported that independent studies of his in the fifties disclosed a median commute of about 10 miles for the Somerville area. Therefore, a value for R50 of 10 miles is used in the present analysis.

For the Bernards region, a larger value for R50 would tend to assign greater weight to the distant municipalities, like Linden. A smaller value would tend to assign greater weight to the nearby ones, like Bridgewater, and to Bernards itself.

7. Basic Data

7.1. Covered employment. The N.J. Department of Labor and Industry keeps data on "covered employment", that is, employment which is covered by the N.J. Unemployment Compensation Law. The report entitled "1974 Covered Employment Trends in New Jersey" and published in October 1975 is the basis for this analysis. (Ref. C) It provides employment data for each municipality and each county in the state. Pertinent data from this source is included in Attachments 1 and 3 of the present report. All covered jobs which are identified by municipality are included in this analysis. The state report also includes a small number of "undistributed" jobs, that is, jobs which are not assigned to specific municipalities. Since the employment data is used here primarily to define the Bernards region,

the undistributed jobs are of no value, and they
are not used here. For this reason state totals
included here are slightly less than totals published
elsewhere.

The effective date for the data is September 1974.
1975 data by municipality was not available when this
analysis was made.

For this analysis the Bernards region is derived
from an analysis of six counties - Essex, Hunterdon,
Middlesex, Morris, Somerset, and Union. Given more
time, Mercer, Sussex, and Warren would also be
included.

Covered employment for each municipality in the six-
county region, 154 in all, is presented in Attach-
ment 1, Column E, or ATT(1) COL(E). Covered employ-
ment by county for the whole state is presented in
ATT(3) for 1970 and 1974.

7.2. Physical data. The area of each municipality is
presented in ATT(1) COL(A). The distance to the
"center" of the municipality (population centroid
as determined by Tri-State Regional Planning
Commission) from that of Bernards is given in
ATT(1) COL(R). The density value per EQ(3) is
given in ATT(1) COL(D).

7.3. Dilapidated housing. The N.J. DCA published a report
(circa 1974) entitled "An Analysis of Low and Moderate
Income Housing Need in New Jersey." (Ref. F)
This report rests on 1970 census and other data and

states "it employs the most accurate Census data
and methods available". For each municipality it
presents three components of "physical housing need"
and two of "financial housing need". The Bernards
fair share analysis points towards municipal land
use regulations, and more specifically towards zoning
for new housing units. Financial need is established
in the DCA analysis through an excessive rent burden
in terms of household income. The remedy for this is
financial - higher earnings or rent subsidies, for ex-
ample - not zoning. Therefore, units based on financial
housing need are not included in the present fair
share analysis.

One of the components of physical housing need in
the DCA report is "deteriorated" housing. The need
here is to repair and renovate, not to tear down
and start from scratch. Again zoning is not the
remedy, and this component is not included in the
present analysis.

One component of physical housing need is "dilapidated"
housing. Here the remedy is to tear down and start
over and zoning can play a role. This component
is included in the present analysis.

The third component of physical need is "lacking
plumbing". By a census quirk this class was stripped
away before the deteriorated-dilapidated classifi-
cations were made. The lacking-plumbing housing units
can be deteriorated, dilapidated, or neither of
these. Following a verbal discussion between the

(17)

Township Administrator, Fred Conley, and a DCA

representative the following treatment is used.

The lacking-plumbing component is assumed to be

either deteriorated or dilapidated, and the pro-

portion of each is the same as that for deteriorated

and dilapidated in the given municipality. Consider

Bridgewater as an example.

Class	Housing Units
Deteriorated	324
Dilapidated	180
Lacking plumbing	92
Adjusted dilapidated	213

where
$$213 = 180 + 180(92)/(324 + 180)$$

This adjusted dilapidated estimate is given for each

municipality in ATT(1) COL(H).

Computed this way, the dilapidated estimate and its

fair share impact tend to be inflated.

The DCA report speaks mainly of low and moderate

income households and their housing needs. It is

not clear whether there are also additional dilapi-

dated housing units which are associated with house-

holds of higher income and not included in the report.

If this is the case then the dilapidated estimate and

its fair share impact are understated.

8. JORD Summations

The computation method involves the assignment of one

component of the share to each municipality in the

region, computing that component for each, and then

summing over all municipalities to derive the total share.

In Section 5, JORD Mathematics, it is demonstrated that the impact of Bernards employment on some other municipality, say Bridgewater, is given by

$$E \times D_i \times A_i$$

where E is the Bernards employment, D_i the density value from EQ(3) for a value of R_i equal to the intermunicipal distance, A_i the area of Bridgewater, and i a subscript denoting Bridgewater as one of many in the Bernards region. In this case Bernards is the donor, the giver or generator of the jobs, and Bridgewater is the acceptor, the receiver of the residents.

To account for the entire region it is necessary to sum over all 154 municipalities. This is represented by

$$(11) \quad \sum_{i=1}^{154} E \times D_i \times A_i = E \times \sum_{i=1}^{154} D_i \times A_i = E \times QP$$

where
$$\sum_{i=1}^{154} D_i \times A_i = D_1 \times A_1 \text{ for municipality \#1}$$
$$+ D_2 \times A_2 \text{ for municipality \#2}$$
$$+ \quad " \quad " \quad " \quad "$$
$$+ D_{154} \times A_{154} \quad " \qquad " \qquad \#154$$
$$= QP$$

The function QP was introduced in EQ(8). This is the fraction of Bernards employment which the summation accounts for. (QP stands for cumulative probability.) Since we want to account for all of it, then QP should equal unity.

The summation of EQ(11) can be broken down by county and then these subtotals added. These results are presented in ATT(2). Here we see in COL(I) LINE(9) that QP = 0.91729. This indicates that the summation over the six counties only accounts for 92%. Inclusion of Mercer, Sussex, and Warren would probably correct most of this discrepancy, though some error is introduced by the use of the population centroid as the municipal center. (See Section 5)

It is possible to adjust or "normalize" this data by dividing all subsequent summations by 0.91729, and this is what is done here.

Analogous to the Bridgewater share for Bernards employment, where Bernards is the donor and Bridgewater is the acceptor, is the Bernards share for Bridgewater employment, where Bridgewater is the donor and Bernards the acceptor.

The summation element is given by

$$E_i \times D_i \times A \qquad (A = 23.5)$$

where E_i is Bridgewater employment, D_i is the density function, and A is the area of Bernards. The total from all donors is

$$(12) \quad \sum_{i=1}^{154} E_i \times D_i \times A = A \times \sum_{i=1}^{154} D_i \times E_i$$

This is the total impact on Bernards of all the 154 municipalities or donors in the six-county Bernards region. These sums are given by county in ATT(2) COL(K), and then normalized (divided by 0.91729) and given in COL(M).

(20)

The adjusted total for the six counties, ATT(2)
COL(M) LINE(9), is 9623.47 and this can be interpreted
as the probable number of persons who would hold
jobs in the region and live in Bernards, or the
quota of residents which would be assigned to
Bernards, _if the JORD model were followed exactly_.
ATT(1) PAGE(10) gives total six-county jobs of
942,904. The Bernards quota works out to

$$1.02\% = (9623.47)/(942,904)$$

The Bernards land area is 23.5 square miles and this
equals $1.34\% = (23.5)/(1758.4)$
of the six-county land area.

Thus, the proportional Bernards resident quota is of
the same order of magnitude as its proportion of land
area. The resident quota is actually less, but this
is reasonable because maximum job concentration is
considerably to the east and the JORD formula takes
this into account.

Anticipating a later result, the 9623 Bernards
resident quota of employed persons works out to a
municipal population of 31,000, about double the
present number. Clearly, the great planner in the
sky and his assistants down here have used something
other than the JORD model to determine where people
will live. And we should all be thankful for this.
A strict application of the JORD formula would
create a nearly homogeneous region. As stressed
earlier, the JORD model _is a sharing tool, not a
planning tool_.

The dilapidated housing component is summed and

adjusted in the same manner as for employment.

These results appear in ATT(2) COL(J) and COL(L).

9. Employment and Population Growth

Future housing need rests on population growth.
There is general agreement that population growth
follows job growth. For example, in a 1973 pub-
lication of the Rutgers Center for Urban Policy
Research entitled Modeling State Growth: New Jersey
1980 (Ref. G), the authors state: "The basic force
for change in the model is job growth - the number
of jobs directly establishes the characteristics
and numbers of both workers and households."

The function of the JORD model is to assign respons-
ibility for the housing for the population increment
according to a scheme which takes into account the
locations of the new jobs and the probable locations
of the new residences. The JORD model is the link
between the locations of job growth and the locations
of population and housing growth.

Economic analysis can aid in job projection and
Ref. G proceeds this way. However, there is no
such analysis available for use in this study which
encompasses the job growth years of the early seventies.
Therefore, a simple projection of the experience
from 1970 to 1974 is made and carried through to 1982.
The N.J. Dept. of Labor and Industry publishes each
year an estimated population for July of that year.
(See Ref. D) The 1975 report gives summary data
back to 1970. Since we are using covered employment

to project population the Ref. D data can be used
to establish the ratio between population and this
employment.

ATT(4) presents totals for New Jersey population
data per Ref. D. COL(B) entitled "FACTOR" is derived
by dividing each total in COL(A) by the total for
1974 in COL(A) LINE(11). Similarly for covered
employment, COL(C) is the yearly total (minus the
"undistributed") and COL(D) is the factored value
based on 1974. By factoring population and employ-
ment by their 1974 bases, it is possible to plot
them on a common axis, and this is done in CHART(2)
which follows.

Examination of CHART(2) discloses that the rate of
growth in covered employment prior to 1974 exceeds
that for population. The proportion of covered
jobs in the population has increased. There are
several possible explanations.

(1)   The proportion of jobs which are covered by
       unemployment compensation has increased through
       legislative action or through a change in job mix.

(2)   Participation in the labor force has increased.
       That is, there are more working mothers,
       fewer children, etc.

(3)   There has been a reduction in net out-
       commutations.

I make no attempt to assess these factors quanti-
tatively, nor to project them. However, I do use
their demonstrated aggregate impact to adjust
1970 employment.

Ref. E states: "...population projections cannot
be precise and should not be regarded as predictions.
They can, however, be used in short or long-term
planning in both the public and private sectors..."
With that admonishment, let us proceed to project,
not predict.

The population curve from 1970 to 1975 shows a slow-
ing of growth relative to the 1960-1970 period.
(Annual figures were not available for this decade).
CHART(2) is plotted on "linear paper" rather than
"semi-log paper", and with this a constant growth
rate would produce an upward bending curve. Here
the curve bends toward the horizontal, suggesting a
material change from the earlier pattern. Therefore,
it is reasonable to base the 1982 projection on the
more recent experience rather than the earlier one.
Since 1974 is the latest data for employment, the
1970-1974 period is used.

ATT(4) COL(E) gives the ratio of population to employ-
ment for 1970 and 1974. By using the ratio of these
factors, the 1970 data for covered employment is
inflated or "bumped up" to a 1974 equivalent condition,
and this is done for each county separately. These
results are given in ATT(3). Then the adjusted 1970
employment figure is divided into the 1974 figure to
determine the four year growth rate. This rate is then
used to project employment for 1976 and 1982.

The 1976 and 1982 projections are given in ATT(3)
along with the average projected annual growth

percentage and the total growth percentage from 1976 to 1982.

Consider Somerset County.

$$46498 = \text{1970 employment}$$

$$50290 = 46498(3.5017)/(3.2377)$$
$$= \text{1970 employment adjusted}$$

$$60490 = \text{1974 employment}$$

$$4.72\% = [(60490)/(50289)]^{\frac{1}{4}} - 1.00$$
$$= \text{average growth from 1970 to 1974}$$

$$66341 = (60490)(1.0472)^2$$
$$= \text{projected 1976 employment}$$

$$87516 = (60490)(1.0472)^8$$
$$= \text{projected 1982 employment}$$

$$21175 = (87516) - (66341)$$
$$= \text{projected employment increase from 1976 to 1982}$$

$$35.0\% = (21175)/(60490)$$
$$= \text{total \% increase from 1976 to 1982}$$
$$\text{in terms of 1974 base}$$

As with the JORD model, this job projection is a mechanical or formula technique, and it is valid to the degree that it gives reasonable and useful results. It leads to a population projection which we can call a "job oriented population projection" or JOPP. We need some means of evaluating it with regard to more sophisticated methods.

The N.J. Dept. of Labor and Industry published in 1975 a document entitled, "New Jersey Population Projections 1980-2020" (Ref. E). Commenting on the study, Ref. E states: "Four series have been developed

in order to give the user some latitude of choice.
Each series is considered reasonably possible within
the bounds of the assumptions and the data series used.
In essence, these _series present the highest and_
lowest levels that could reasonably occur, all
things being equal." (Emphasis added.) These
official state projections bracket and thus tend to
validate the much more simplistic projections de-
veloped in the instant analysis (JOPP) which are based
on job oriented population growth.

In brief, and quoting from the state study, the
rationale for each series follows.

"Series I presents the lowest possible level of
growth that could occur, assuming everything equal."

"Series II reflects a continuation of the current
trend of population growth in the state for the period
1970 through 1974."

"Series III was developed using the long-term county
trends as reported in all U.S. Censuses of Population
from 1900 to 1970... The current economic downturn
that has gripped the state was not taken into con-
sideration because the last data element used was
for July 1, 1970."

"Series IV... used the 1950/1974 and 1960/1974 Census
data projected to the year 2020 and averaged."
Several adjustments were made including, "Consideration
also was given to the revival of the state's major
urban centers as employment generators." Series IV is
the highest estimate.

Series I through IV for 1980 and 1985 are given in ATT(4) and plotted in CHART (2).

Total 1982 projected employment for N.J. is given in ATT(3) and again in ATT(4) COL(C) LINE(17). By multiplying this by the population-to-employment ratio in COL(E) we project 1982 population and this appears in COL(A) LINE(17). This is the JOPP projection. It is also plotted in CHART(2).

CHART(2) shows that the job oriented population projection of the instant analysis is slightly higher than the state Series III projection, suggesting that the JOPP technique tends to give a high estimate when applied over the entire state. To the degree that housing needs are dependent upon the JOPP result, these housing needs are also inflated.

Ref E contains projections for each county for each series and only the state totals have been presented here. One might argue, since the purpose of the present analysis is to estimate housing needs for people, that a more direct course would be to use the state population projections for the counties in the Bernards region rather than follow the job projection route. There are three major arguments for the JOPP technique.

(1) The JOPP projections are formula estimates and therefore meet the test of "fairness" in that they are "according to rules". On the other hand the narrative in Ref. E states

(27)

Total New Jersey Covered Employment and Population   CHART 2

Factor based on 1974

- Population
- JOPP estimate for 1982
- Series IV
- III
- II
- I
- Covered employment
- Historical Data
- Projections

Year
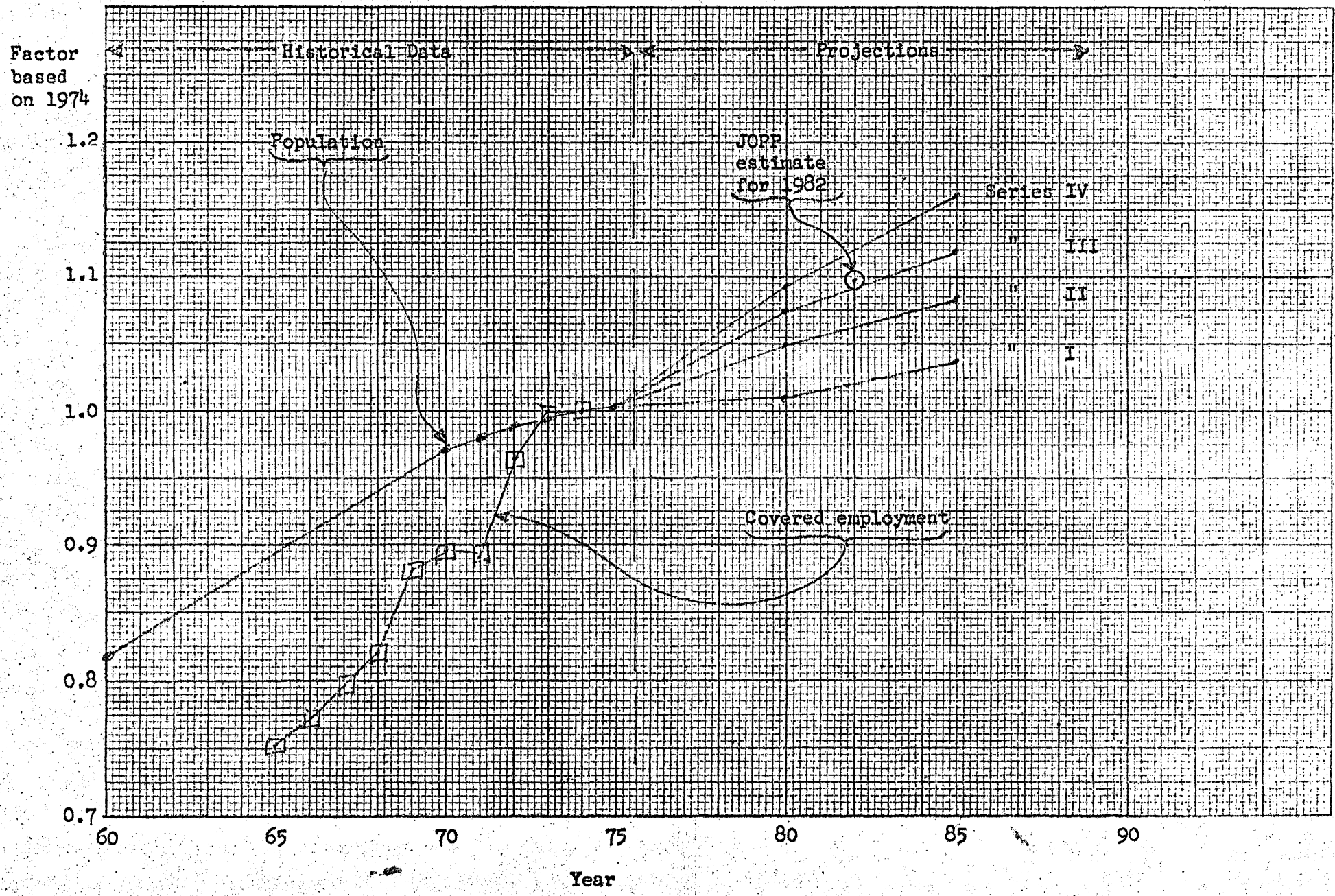
that the state projections "give the user some latitude of choice". Any such "choice" could easily be branded as subjective and self-serving.

(2) Under the JOPP method, County job projections are used to develop <u>numerical</u> <u>population</u> <u>projections</u>. The probable <u>residential</u> <u>locations</u> are determined via the JORD model, and these are not confined to the county which generates the jobs. To the degree that the JORD model is fair then it produces an allocation of zoning responsibility which is also fair. On the other hand the state projections are based on analyses of past trends and other planning factors and not on any concept of fairness.

(3) State employment data is revised and published each year, as is population data. An analysis identical to the one presented here can be performed for any municipality in any year and its fair share brought up to date. In my view this is a major argument for the JOPP approach.

ATT(5) summarizes the job growth for each county in the Bernards region and the Bernards share. COL(M) is the share via the JORD analysis and ATT(2) COL(M) where Bernards is the acceptor. COL(N) is the 1976 to 1982 growth taken from ATT(3). COL (P) is COL(M) times COL(N), and it represents the incremental

(28)

Bernards share produced by the six-year growth.

Essex and Union show negative growth and the other
four counties show positive growth.

Special treatment is required for Bernards Township
and the balance of Somerset County. AT&T with 3400
jobs and Mount Airy Associates with 941 will complete
their projects during the six-year planning period
of this analysis, and Bernards has an obligation to
accommodate this local job growth in its fair share
analysis. By EQ(1) and if one considers Bernards
to be a 23.5 square mile circle, then the local
share is for 10.674% or 463.36 jobs. This is given
in COL(P) LINE(6). It represents a 308.5% increase
over 1974.

The Somerset County six-year projected increase is
35.006%. Since a specific local computation has
been made, resulting in a much larger increment, it
is reasonable to adjust downwards the growth
contribution of the remaining 20 municipalities in
Somerset and avoid double counting. This adjustment
is shown in ATT(5) NOTE(2). It follows from Somerset
data presented in ATT(3) and Bernards 1974 data
presented in ATT(1) PAGE(8).

Without this adjustment the total Somerset contri-
bution to the Bernards share is 602.19 (ATT(5)
COL(P) LINE(5)). With the adjustment the Bernards
and other Somerset contributions are 909.82 (LINE(6)
plus LINE(7)), an increase of 307.63.

The six-county total is a Bernards share of 1430.26 jobs.

No attempt has been made to project job growth for _individual_ communities outside Bernards. The computational effort would be much greater and the added significance in doubt.

10. Six-Year Planning Period

The period of projected growth is 1976 to 1982, six years beyond the present. The planning horizon should be long enough to give a developer an opportunity to plan and implement a housing proposal and six years should be adequate for this purpose.

Projections become less reliable, as they extend further into the future. For housing purposes, the longer the growth period used to project need the greater that projected need will be, assuming that the growth trend is up. Without some timed-growth provision, zoning, which is enacted to satisfy a longer-term and more uncertain need, could result in excessive housing in the near term.

A municipality's fair share grows with time and is therefore a function of time. Early satisfaction of a long term need would oversubscribe the fair share over the near term.

Finally, regional planning and zoning will probably change the rules. There is no reason to make excessive commitments now.

bias

Therefore, the planning period which is most fair to
the municipality is a short one. The specific choice
is somewhat arbitrary. Six years is selected here
because the new Municipal Land Use Law endorses this
planning period. In Section 76 of the act it states:
"The governing body shall, at least every 6 years,
provide for a general re-examination of its master
plan and development regulations..."

11. Population vs. New Jobs

This analysis is directed towards a need for housing.
We must first convert the estimate of new jobs to
a population increment.

ATT(7) COL(T) gives the population growth in Bernards
which is reflected by the Bernards share of job
growth for each county. The conversion from jobs
to people is made using the 3.2377 ratio for 1974
from ATT(4) COL(E).

By using a factor which relates total population to
total covered jobs, all elements of the population
are encompassed, including those who have no linkage
to the job market, such as persons in institutions or
retirement communities. If shares are developed this
way throughout the state then the needs of the entire
population are accommodated. The surplus of out-
commuters (those who leave New Jersey at the start
of the work day) over in-commuters is also accommodated.
The projection of jobs and conversion to people by
a fixed ratio is not invalidated if more jobs become
covered, since the statistical increase in jobs would

be counterbalanced by a decrease in the ratio. However, if the labor force participation rate increases then the projection derived here will tend to overestimate real housing need.

The total resident impact on Bernards of regional job growth is 4630.74 people and this is given in ATT(7) COL(T) LINE(7).

12. Population vs. Dilapidated Housing

ATT(2) COL(L) gives the Bernards share for dilapidated housing in the counties. This data is restated in ATT(6) COL(Q). The 1970 census provides data on persons per household. (See Ref. H) This is listed by county in ATT(6) COL(R).

Consider Somerset County.

The Bernards share of dilapidated housing is 53.16 units. The census shows 3.4 persons per housing unit. On the premise that the dilapidated units house the average number of persons, then the dilapidated units reflect

$$180.74 = 53.16 \times 3.4$$

people who are housed in dilapidated units and who must be accommodated in the Bernards fair share for new housing. This computation is made for each county and presented in ATT(6) COL(S).

The total resident impact on Bernards of dilapidated housing in its region is 1103.15 and this is given in ATT(6) COL(S) LINE(7) and ATT(7).

13. New Housing Units vs. People

ATT(6) COL(R) shows that the average of persons per

household varies from 3.0 in Essex to 3.4 in Middle-
sex, Morris, and Somerset. Rather than try to select
one of these or to develop some kind of average for
the present analysis, I use another approach.

Our planner, C. K. Agle, has developed a table of
dwelling sizes in terms of numbers of bedrooms, as
a function of family sizes. These latter are derived
from the 1970 census. This table is the basis for
the mix of dwelling sizes in Ord. 347 which established
the Planned Residential Neighborhood and in Ord. 385
which established the Balanced Residential Complex
for low, moderate, and market income housing. It
is reproduced in the 1975 adopted Master Plan for
Bernards Township.

Since the ultimate goal of the present analysis is
zoning for the mix of housing called for in the Agle
table, then it is reasonable to assume that the aver-
age family size for which the housing mix was
established will equal the average family size which
will occupy the housing. This average is 3.16
persons per household. It is used to convert the
estimate of those people who need housing into an
estimate of needed housing units.

14. Percent of Low and Moderate Income Housing

Our mandate calls for an "appropriate variety and
choice of housing" and this means housing for house-
holds which span the complete spectrum. However, the
thrust of this analysis is to determine the Bernards
fair share for households of low and moderate income.

The 1970 census provides data by county on household
income. Households are grouped in income ranges
but it is possible to interpolate and estimate a
percentage which falls below any particular income.
The median annual household income in the Newark SMSA
(Standard Metropolitan Statistical Area) was $11,845
in 1970. (See Ref. H) According to the U.S. Dept.
of Housing and Urban Development (HUD), which is
the principal source of rent subsidies and, therefore,
tends to make the rules, "low income" is defined as
income up to 50% of the median and "moderate income"
as that up to 80% of the median. (These classes
have since been renamed as "very low income" and
"lower income" but the definitions remain.) Both
low and moderate income fall below 80% of median
and this was $9476 for the Newark SMSA in 1970.
Interpolating for this value in the 1970 census data
leads to the fraction of low and moderate income
households listed in ATT(7) COL(V).
Hunterdon lies in a different SMSA and had a slightly
lower median income in 1970 of $11,336. Since the
Hunterdon impact is very small this small difference
is ignored.
The low and moderate proportion varies from 24.0%
for Morris to 43.5% for Essex. What value is
appropriate for the Bernards fair share computation?
One could argue that the Somerset value of 25.0%
is appropriate since the housing will be in Somerset
and the households would be typical of those in Somerset.

(34)

This argument is weakened if it is suggested that the relative affluence of Somerset is the result of exclusionary zoning and true "fair sharing" would shift the distribution of incomes.

A fairer scheme is to develop a weighted average based on the contribution to the Bernards share from each donor county and the fraction of low and moderate income in that donor county.

ATT(7) lists a Bernards Resident Share via Housing in COL(S), the people which could expect to find homes in Bernards and who are now living in dilapidated housing in the Bernards six-county region – this is the present need –, and a Resident Share via Jobs in COL(T), the people which could expect to find homes in Bernards as a result of regional job growth – this is the future need. COL(U) is the sum of COL(S) and COL(T) and represents present and future need in terms of people who need housing.

Two counties have a negative impact, Essex and Union, due to a decline in jobs which has greater impact than dilapidated housing. It does not seem reasonable to include these in the weighting.

Weights are listed in COL(W) which are based on the contributions from the other four counties listed in COL(U). A weighted average of the values in COL(V) is then computed using the weights in COL(W) and the result is shown in COL(V) LINE(8).

The result is 25.8% low and moderate income households. This is the proportion which is used to determine

this so-called "weighted avg." is almost the same as ↗

(35)

the Bernards fair share of low and moderate income housing.

Since there are potentially controversial elements in this estimate it is worthwhile to review the process by which the result is reached.

(1) 1970 census data is the basis of the household income estimate and that for dilapidated housing. More recent data would be used if it were available.

(2) This fair share analysis leads to <u>zoning for new housing</u> which is required by those who can be expected to seek housing in Bernards after moving from dilapidated housing in the Bernards region and by the families of those who fill new jobs in the region, and more specifically by the portion of these who are of low and moderate income.

Most new housing is occupied by relatively affluent families who are trading up from lower cost housing. The vacated units may be smaller or structurally simpler, older, in less desirable neighborhoods, etc. This statement is most true for families with children at home and less so with singles and couples who have not begun or who have completed the child rearing cycle. At any rate there is a <u>continuous process of readjustment</u> by which families occupy new or different housing units based on their individual needs and resources.

We can describe this process by the terms
"trickling down", "trading up", "musical
chairs", etc. However, the fact of the process
and the results are clear. Those with higher
income tend to occupy the new and more costly
housing, and those of lower income tend to
occupy the older and less costly.

Some may say this is not fair and one's opinion
depends upon his basic social philosophy. But
all must agree that this is a realistic assess-
ment of what actually occurs.

(3) Though the assumption in Ref. F is that most
occupants of dilapidated units are of low and
moderate income, the argument in Section (2)
above suggests that the remedy is for these
families to move up the housing ladder but
not necessarily all the way up to new housing.
The remedy for a dilapidated housing unit
is a new unit. It is probable that the dilap-
idated unit is now occupied by a low income
family and that the new unit will be occupied
by a higher income family. By the readjustment
process, the former will find housing which is
lower cost and probably less desirable than a
new dwelling, but at least it will not be dilap-
idated.

It is also likely that the lower cost housing
will be found in the older urban areas.

(4) Though families are not entirely mobile, and

ignoring for the moment the question of ex-
pansion in the <u>number</u> of households, the net
addition of one new housing unit to the region
will improve the housing opportunity for one
low income family, and this will be true regard-
less of who occupies the new unit. Of course,
this is an overly simple illustration which
describes a tendency or statistical probability.
The principle is most valid when there are
large numbers of new units.

In an economy where the number of families is
expanding faster than the number of new housing
units, then those with the lowest income will
be forced into the least desirable housing and
their situation will deteriorate. However, if
the supply of new housing more than keeps pace
with the formation of new families then the
situation for low income families will improve.
The point here is that <u>any addition</u> to housing
stock, which has the effect of increasing supply
relative to demand, will improve the lot of
low income families, regardless of the price
of the new housing and the incomes of those
who occupy it.

(5) Even though the addition of new housing in
Bernards will initiate a chain of events which
will result in a step upwards for some low
income families, the data we now have is in-
sufficient to predict <u>where</u> that low income

family will locate. We must make some rather
arbitrary decision. That decision for this
analysis is that the proportion of families,
which will locate in Bernards and which will
have low and moderate income, will be the same
as the proportion of those families in the
donor counties. These are the counties which
currently have the dilapidated housing or will
generate the jobs.

This technique probably exaggerates the number
of low and moderate income families which will
locate in Bernards. Though somewhat arbitrary
it is at least according to rules and should
be deemed fair by our neighbors in the region.

15. Ridge Oak Senior Citizens Project

Wheels are in motion to provide housing in Bernards
for senior citizens via the Ridge Oak project. There
will be 248 units with an estimated 1.5 persons per
dwelling. (Data from Robert Boye, Pres. of Ridge Oak,
Inc.) All rentals will be subsidized according to
low and moderate income criteria. This project will
be complete and occupied during the six year planning
period and therefore can be used as a credit against
our fair share obligations in this period.

Since the new zoning will average 3.16 persons per
dwelling, the credit must be adjusted downwards for
the fewer Ridge Oak persons per dwelling.

The credit in equivalent units is

$$117.7 = 248(1.5)/(3.16)$$

(39)

Since the fair share computation is based on a
population statistic which encompasses all elements
in the population, including senior citizens, it
is reasonable to take credit for housing which
satisfies needs for this element of the population.
A similar argument for a credit can be made on the
occasion of new low and moderate income housing
provided by any agency or institution such as
Bonnie Brae, Deaconry, or Lyons Hospital.
I propose that we keep a tally of all LAMIH units
provided by any source and use these to reduce the
outstanding obligation.

16. LAMIH Balance Sheet

ATT(8) summarizes the fair share result. The housing
and job components are taken from ATT(7) and factored
by 3.16 persons per dwelling and 25.8% low and moderate
income. The result is a net fair share of LAMIH for
Bernards of 350 units and this is the number which
must be provided for in our zoning at this time.

17. Periodic Review

Until such time as regional zoning is introduced or
other agencies take control, Bernards must periodically
review its fair share obligation for new housing
and adjust its zoning accordingly. I propose that
this be done each year using the most recent official
job and population statistics, local data on housing
units provided through all mechanisms since the enact-
ment of Ord. 385, and any other pertinent data. A
new six year obligation should be determined. It should

be adjusted for actual housing debits and credits
incurred or realized during the prior year.

18. <u>Note on Computations</u>

Many digits are carried along in the above computations.
This is not intended to suggest that the results are
correspondingly precise or "significant" in the
scientific sense. There are two reasons for not
rounding. It is easier to follow a computational
trail when the intermediate results are left unrounded.
Rounding during a computation tends to introduce its
own errors.

19. <u>Schematic Summary of Analysis</u>

The foregoing analytical steps are presented schematically
in CHART(3). The chart does not delineate the precise
computational steps, but rather shows the computational
flow in conceptual terms.

Present Need

40815 units	Dilapidated housing: Bernards region
0.84%	Bernards share via JORD
344 units	Dilapidated housing: Bernards share
3.21	People per dwelling unit
1103 people	People needing housing: Bernards share

Future Need

44106 jobs	Employment growth: Bernards region
3.24%	Bernards share via JORD
1430 jobs	Employment growth: Bernards share
3.24	People per job
4631 people	People needing housing: Bernards share

5734 people	People needing housing: Bernards share from present and future need
3.16	People per new dwelling unit
1815 units	Housing need: Bernards share
25.8%	Proportion LAMIH
468 units	Gross Bernards share for LAMIH
118 units	Ridge Oak credit to LAMIH share
350 units	Net Bernards share for LAMIH

Definitions: JORD - job oriented residential distribution

LAMIH - low and moderate income housing

Revised chart, WWA, 11-19-76

(handwritten margin notes: "Vacancy deterioration", "household formation")

References.

A. Decision of N.J. Supreme Court in Southern Burlington County N.A.A.C.P et al. v. Township of Mount Laurel, March 1975

B. Mount Laurel: A Truly Regional Response, W. W. Allen, memo to Bernards Township Committee and Planning Board, September 1, 1975

C. 1974 Covered Employment Trends in New Jersey, N. J. Dept. of Labor and Industry, October 1975

D. Population Estimates for New Jersey, July 1975, N. J. Dept. of Labor and Industry, December 15, 1975

E. New Jersey Population Projections, 1980-2020, N. J. Dept. of Labor and Industry, 1975

F. An Analysis of Low-and-Moderation-Income Housing Need in New Jersey, N. J. Dept. of Community affairs, circa 1974

G. Modeling State Growth: New Jersey 1980, F. J. James, J. W. Hughes, Center for Urban Policy Research, Rutgers University, 1973

H. City and County Data, 1970 Census, U. S. Dept. of Commerce

MUNICIPAL NAME	AREA A	DISTANCE R	DENSITY D	HOUSING H	EMPLOY. E
BELLEVILLE	3.30	22.09	0.117	0.432	11.278
BLOOMFIELD	5.40	21.04	0.140	0.630	16.503
CALDWELL	1.20	16.10	0.220	0.083	1.592
FAIRFIELD	10.40	20.47	0.151	0.063	12.210
CEDAR GROVE	4.50	20.57	0.149	0.079	3.314
E. ORANGE	4.00	18.82	0.194	2.492	20.027
ESSEX FELLS	1.30	17.54	0.242	0.000	0.196
GLENN RIDGE	1.30	20.17	0.158	0.058	0.699
IRVINGTON	2.80	17.44	0.246	1.052	12.230
LIVINGSTON	14.00	14.33	0.397	0.153	13.343
MAPLEWOOD	4.00	15.55	0.325	0.320	6.491
MILBURN	10.00	13.08	0.478	0.122	8.644
MONTCLAIR	6.20	20.45	0.154	1.080	10.050
NEWARK	24.14	19.53	0.177	12.391	160.879
N. CALDWELL	2.90	19.69	0.172	0.022	0.512
NUTLEY	3.40	22.81	0.105	0.317	12.368
ORANGE	2.20	17.85	0.231	1.091	10.705
ROSELAND	3.50	16.27	0.292	0.079	3.121
S. ORANGE	2.70	16.23	0.296	0.158	4.990
VERONA	2.80	19.32	0.183	0.124	2.313
W. CALDWELL	5.30	17.56	0.224	0.066	5.308
W. ORANGE	12.10	17.30	0.250	0.417	9.577

MUNICIPAL NAME	AREA A	DISTANCE R	DENSITY D	HOUSING H	EMPLOY. E	
ALEXANDRIA	28 20	24 33	0.082	0.030	0.035	
BETHLEHEM	21 38	23 62	0.092	0.028	0.085	
BLOOMSBURY	1 00	27 08	0.052	0.006	0.431	
CALIFON	0 90	14 46	0.385	0.020	0.301	
CLINTON B.	1 34	18 41	0.210	0.018	0.705	
" T.	33 90	16 08	0.301	0.044	0.683	
DELEWARE	36 90	25 80	0.064	0.035	0.072	
E. AMWELL	27 80	21 30	0.133	0.043	0.153	
FLEMINGTON	1 30	22 68	0.106	0.051	6.203	
FRANKLIN	23 30	20 38	0.154	0.022	0.178	
FRENCH TOWN	1 10	27 75	0.046	0.024	0.537	
GLEN GARDNER	1 46	19 69	0.172	0.014	0.157	
HAMPTON	1 36	20 53	0.151	0.018	0.086	
HIGH BRIDGE	2 40	17 34	0.250	0.043	0.351	
HOLLAND	22 70	29 45	0.035	0.045	0.249	
KINGWOOD	35 60	27 18	0.051	0.035	0.056	
LAMBERTVILLE	1 10	29 21	0.036	0.099	1.099	
LEBANON B.	1 10	14 63	0.379	0.093	0.671	
" T.	32 00	17 19	0.254	0.056	0.889	
MILFORD	1 30	28 63	0.040	0.018	1.238	

MUNICIPAL NAME	AREA A	DISTANCE R	DENSITY D	HOUSING H	EMPLOY. E	
RARITAN	38 40	19 59	0.174	0.073	0.615	
READINGTON	47 80	14 00	0.416	0.082	0.989	
STOCKTON	0 60	26 62	0.056	0.007	0.167	
TEWSBURY	31 80	11 66	0.593	0.025	0.085	
UNION	20 36	21 55	0.121	0.025	0.063	
W. AMWELL	21 90	27 79	0.046	0.030	0.061	

MUNICIPAL NAME	AREA A	DISTANCE R	DENSITY D	HOUSING H	EMPLOY. E	
CARTERET	4.50	18.61	0.204	0.272	8.083	
CRANBURY	13.10	25.66	0.065	0.024	3.079	
DUNELLEN	1.00	8.14	1.046	0.099	1.974	
E. BRUNSWICK	21.50	19.10	0.188	0.015	11.142	
EDISON	30.20	14.24	0.403	0.597	34.203	
HELVETIA	0.80	22.44	0.112	0.017	0.074	
HIGHLAND PARK	1.80	14.73	0.373	0.194	2.137	
JAMESBURGH	0.90	24.10	0.085	0.068	1.171	
MADISON T.	37.69	23.01	0.101	0.110	1.772	
METUCHEN	2.80	14.41	0.391	0.155	5.416	
MIDDLESEX	3.60	8.15	1.029	0.110	4.488	
MILLTOWN	1.60	17.45	0.246	0.059	2.758	
MONROE	41.80	24.77	0.076	0.111	0.086	
NEW BRUNS. C.	5.50	14.83	0.362	0.852	26.485	
" " T.	11.30	16.29	0.292	0.150	9.615	
PERTH AMBOY	4.60	18.91	0.194	0.741	16.293	
PISCATAWAY	18.90	10.16	0.748	0.377	14.315	
PLAINSBORO	11.70	23.97	0.086	0.017	0.786	
SOMERVILLE	16.30	19.50	0.177	0.276	3.482	
S. AMBOY	1.30	20.21	0.158	0.160	2.347	

MUNICIPAL NAME	AREA A	DISTANCE R	DENSITY D	HOUSING H	EMPLOY. E	
S. BRUNSWICK	41.40	19.51	0.177	0.122	4,539	
S. PLAINFIELD	8.20	10.21	0.248	0.144	10,617	
S. RIVER	2.80	18.37	0.210	0.197	2,337	
SPOTSWOOD	2.30	21.94	0.121	0.092	1,408	
WOODBRIDGE	23.20	15.77	0.315	0.987	30,807	

MUNICIPAL NAME	AREA A	DISTANCE R	DENSITY D	HOUSING H	EMPLOY. E	
BOONTON B.	2.70	16.64	0.278	0.138	3.146	
" T.	2.50	17.49	0.242	0.030	1.773	
BUTLER	1.80	23.80	0.089	0.101	1.543	
CHATHAM B.	2.30	9.59	0.822	0.056	1.968	
" T.	9.00	7.44	1.174	0.034	0.532	
CHESTER B.	1.62	9.78	0.292	0.016	0.288	
" T.	28.68	9.05	0.905	0.028	0.358	
DENVILLE	12.90	14.38	0.391	0.152	3.241	
DOVER	2.30	13.36	0.456	0.219	8.185	
E. HANOVER	8.40	13.85	0.429	0.039	2.669	
FLORAM PARK	7.60	10.54	0.682	0.033	5.815	
HANOVER	10.80	11.22	0.640	0.027	11.812	
HARDING	16.20	4.77	1.872	0.014	0.237	
JEFFERSON	44.30	20.61	0.149	0.234	0.786	
KINNELON	19.70	22.35	0.112	0.047	0.583	
LINCOLN PARK	7.00	21.01	0.140	0.030	1.317	
MADISON	4.00	8.80	0.934	0.154	3.186	
MENDHAM B.	6.70	6.49	1.369	0.011	0.561	
" T.	17.60	7.76	1.099	0.030	0.215	
MINE HILL	2.80	13.14	0.428	0.089	0.095	

MUNICIPAL NAME	AREA A	DISTANCE R	DENSITY D	HOUSING H	EMPLOY. F
MONTVILLE	18 30	18 40	0.210	0.119	2.923
MORRIS T.	15 80	8 72	0.949	0.115	2.895
MORRIS PLAINS	2 50	10 73	0.692	0.038	4.951
MORRISTOWN	2 00	8 61	0.965	0.375	18.813
MT. LAKES	3 00	14 98	0.356	0.012	0.716
MT. ARLINGTON	2 70	16 36	0.287	0.044	0.094
MT. OLIVE	31 60	14 60	0.379	0.120	0.995
NETCONG	0 80	16 14	0.301	0.043	1.122
PAR. TROY H.	25 30	13 89	0.422	0.112	10.688
PASSAIC	16 50	3 42	2.532	0.056	1.106
PEQUANNOCK	6 90	22 84	0.105	0.099	2.853
RANDOLPH	21 20	10 95	0.661	0.111	1.577
RIVERDALE	1 80	24 50	0.079	0.039	0.982
ROCKAWAY B.	2 02	14 58	0.379	0.104	2.531
" T.	44 80	16 19	0.296	0.217	1.730
ROXBURY	21 00	13 73	0.436	0.179	3.982
VICTORY G.	0 14	12 79	0.500	0.017	0.000
WASHINGTON	45 10	13 90	0.422	0.087	0.636
WHARTON	2 00	14 34	0.397	0.068	2.118

(MUNICIPAL NAME	AREA A	DISTANCE R	DENSITY D	HOUSING H	EMPLOY. E	
BEDMINSTER	26.70	5.92	1.552	0.021	0.680	
BERNARDS T.	23.50	—	4.542	0.054	1.291	
BERNARDSVILLE	13.10	2.61	3.120	0.051	1.486	
BOUND BROOK	1.60	8.26	1.012	0.131	5.916	
BRANCHBURG	20.20	11.12	0.650	0.056	1.028	
BRIDGEWATER	32.84	7.02	1.256	0.213	9.082	
FAR HILLS	5.00	3.61	2.415	0.012	0.453	
FRANKLIN	46.40	13.51	0.449	0.319	6.419	
GREEN BROOK	4.20	7.08	1.235	0.038	1.516	
(ILLSBOROUGH	54.70	13.55	0.442	0.000	1.023	
MANVILLE	2.50	10.35	0.725	0.106	3.403	
MILLSTONE	0.60	13.04	0.485	0.090	1.088	
MONTGOMERY	32.26	19.00	0.192	0.027	1.966	
N. PLAINFIELD	2.90	7.76	1.099	0.263	4.038	
PEAPACK-G.	5.90	5.78	1.550	0.019	0.448	
RARITAN	2.06	9.09	0.890	0.105	4.316	
ROCKY HILL	0.64	20.26	0.156	0.008	0.219	
SOMERVILLE	2.30	8.35	0.996	0.205	10.678	
S. BOUND BR.	0.90	9.27	0.862	0.072	0.678	
WARREN	19.30	4.69	1.910	0.073	2.169	
WATCHUNG	6.20	6.56	1.345	0.028	2.593	

MUNICIPAL NAME	AREA A	DISTANCE R	DENSITY D	HOUSING H	EMPLOY. E	
BERKELEY H.	6 30	6 62	1.345	0.059	2.220	
CLARK	4 68	13 79	0.429	0.103	6.999	
CRANFORD	4 90	13 46	0.449	0.176	9.558	
ELIZABETH	11 69	18 27	0.214	2.364	48.617	
FANWOOD	1 40	9 57	0.822	0.043	0.736	
GARWOOD	0 70	12 52	0.524	0.066	2.510	
HILLSIDE	2 70	17 35	0.256	0.269	10.689	
KENILWORTH	2 10	13 93	0.463	0.093	9.096	
LINDEN	10 67	16 38	0.287	0.556	29.812	
MOUNTAINSIDE	4 10	10 51	0.714	0.037	5.122	
NEW PROV.	3 70	8 20	1.029	0.081	9.338	
PLAINFIELD	6 00	8 84	0.934	1.147	12.893	
RAHWAY	4 10	15 47	0.330	0.408	12.151	
ROSELLE B.	2 70	15 81	0.315	0.355	4.701	
" PARK	1 30	15 35	0.335	0.144	2.022	
SCOTCH PLAINS	9 30	9 76	0.797	0.143	3.406	
SPRINGFIELD	5 20	12 36	0.532	0.119	8.137	
SUMMIT	6 00	10 46	0.714	0.290	10.103	
UNION	9 00	15 25	0.346	0.587	30.826	
WESTFIELD	6 40	11 57	0.602	0.898	5.958	
WINFIELD	0 17	14 53	0.385	0.049	0.018	

NAME	AREA A	DISTANCE R	DENSITY D	HOUSING H	EMPLOY. E	
ESSEX	127 44			21 079	326 350	
HUNTERDON	437 00			0 904	15 559	
MIDDLESEX	308 79			6 013	205 511	
MORRIS	477 86			3 539	109 532	
SOMERSET	304 20			1 891	60 490	
UNION	103 11			7 389	225 462	
TOTAL	1758 40			40 815	942 904	

MUNICIPAL NAME	AREA A	DISTANCE R	DENSITY D	HOUSING H	EMPLOY. E	
BRIDGEWATER IN SOMERSET AS EXAMPLE	32.84	7.02	1.256	0.213	9.082	
	AREA IN SQUARE MILES = 32.84	DISTANCE FROM MUNICIPAL CENTER MILES TO BERNARDS = 7.02	JOBD DENSITY PER SQUARE MILE 1000 UNITS UNITS PER = 1.256	DILAPIDATED HOUSING = 213 UNITS HOUSING =	JOB GROWTH UNITS = 9.082	

Column ⟶	Line ↓	$\sum D \cdot A$ (I)	23.5 x $\sum D \cdot H$ (J)	23.5 x $\sum D \cdot E$ (K)	Adjust. COL(J) (L)	Adjust. COL(K) (M)
Essex	(1)	0.03041	93.20	1531.86	101.60	1669.98
Hunterdon	(2)	0.08635	3.77	55.98	4.11	61.03
Middlesex	(3)	0.07813	48.17	1784.98	52.51	1945.93
Morris	(4)	0.28583	43.83	1553.96	47.78	1694.08
Somerset(21)	(5)	0.37867	48.76	1577.98	53.16	1720.26
Bernards T.	(6)			137.80		150.22*
Somerset(20)	(7)			1440.18		1570.04**
Union	(8)	0.05790	77.84	2322.75	84.86	2532.19
Total	(9)	0.91729	315.57	8827.51	344.02	9623.47

* Bernards T. only

** Somerset minus Bernards T.

COL(I) is summation from ATTACHMENT 1 of COL(A) x COL(D) over all municipalities.

COL(J) is summation of COL(D) x COL(H) and multiplied by Bernards area of 23.5.

COL(K) is summation of COL(D) x COL(E) and multiplied by Bernards area.

COL(L) is COL(J) divided by o.91729, the grand total of $\sum D \cdot A$

COL(M) is COL(K) divided by 0.91729.

ATTACHMENT 3, Employment Growth By County, Covered

County	1970 Actual	1970 Adjusted	1974 Actual	1976 Project.	1982 Project.	1974-82 Growth Av. %	1976-82 Growth Total %
Atlantic	51,581	55,788	55,557		55,099		
Bergen	267,628	289,454	310,982		358,964		
Burlington	53,643	58,018	68,266		94,514		
Camden	115,256	124,655	130,922		144,417		
Cape May	16,223	17,546	20,983		30,009		
Cumberland	39,484	42,704	43,478		45,069		
Essex	326,151	352,750	326,350	313,901	279,332	-1.93	-10.593
Gloucester	28,206	30,506	35,690		48,850		
Hudson	213,169	230,554	200,050		150,617		
Hunterdon	12,991	14,050	15,559	16,373	19,080	2.58	17.398
Mercer	86,851	93,934	105,414		132,756		
Middlesex	171,337	185,310	205,511	216,423	252,761	2.62	17.682
Monmouth	84,313	91,189	105,487		141,161		
Morris	86,378	93,422	109,532	118,601	150,565	4.06	29.182
Ocean	31,792	34,385	46,401		84,499		
Passaic	155,021	167,663	162,285		152,041		
Salem	18,531	20,043	20,267		20,724		
Somerset	46,498	50,290	60,490	66,341	87,516	4.72	35.006
Sussex	11,184	12,096	15,541		25,654		
Union	217,425	235,157	225,462	220,766	207,257	-1.05	-5.992
Warren	20,404	22,068	24,115		28,796		
Total	2,054,066		2,288,342		2,509,681	1.16	

[handwritten annotations:] 1.0406 (above Monmouth/Morris rows)

[handwritten below Total, with arrow pointing down:] 2,220,582

[handwritten note:] adjustment based on conversion of emp. to constant emp/emp ratio. See p-23

ATTACHMENT 4, State Population and Employment

Year	Line ↓	Population Total	Factor	Employment Total	Factor	Population Employment Ratio	
Column →		(A)	(B)	(C)	(D)	(E)	
1960	(1)	6,066,893	0.819				
1965	(2)			1,722,255	0.753		
1966	(3)			1,769,863	0.773		
1967	(4)			1,824,858	0.797		
1968	(5)			1,877,685	0.821		
1969	(6)			2,023,244	0.884		
1970	(7)	7,192,805	0.971	2,054,066	0.898	3.5017	
1971	(8)	7,261,440	0.980	2,040,452	0.892		
1972	(9)	7,322,685	0.988	2,207,689	0.965		
1973	(10)	7,371,835	0.995	2,287,477	1.000		
1974	(11)	7,408,955	1.000	2,288,342	1.000	3.2377	
1975	(12)	7,433,920	1.003				
1980	(13)	7,487,725	1.011				Series I
1980	(14)	7,780,025	1.050				Series II
1980	(15)	7,958,555	1.074				Series III
1980	(16)	8,095,020	1.093				Series IV
1982	(17)	8,125,594	1.097	2,509,681		3.2377	
1985	(18)	7,693,360	1.038				Series I
1985	(19)	8,032,070	1.084				Series II
1985	(20)	8,298,210	1.120				Series III
1985	(21)	8,596,500	1.160				Series IV

constant if assuming pop/emp ratio is used, 1982 projection is 2,958,400 jobs.

County		1974 Line Share	1976-1982 Change		Comment
			%	Absolute	
Column ⟶		(M)	(N)	(P) = (M) x (N)	
Essex	(1)	1669.98	-10.593	-176.90	
Hunterdon	(2)	61.03	17.398	10.62	
Middlesex	(3)	1945.93	17.682	344.08	
Morris	(4)	1694.08	29.182	494.37	
(Somerset(21))	(5)	(1720.26)	35.006	(602.19)	Total does not include this line.
Bernards T.	(6)	150.22	308.447	463.36	Note 1
Somerset(20)	(7)	1570.04	28.436	446.46	Note 2
Union	(8)	2532.19	-5.992	-151.73	
Total	(9)	9263.47		1430.26	Note 3

Note 1 $463.36 = 4341 \times 0.10674$

Note 2 $446.46 = \left(\dfrac{87516 - 66341 - 4341}{60490 - 1291}\right)(1570.04)$

Note 3   1430.26 jobs reflect 4630.75 people since

$4630.75 = (1430.26)(3.2377)$

Note 4   COL(M) from ATT(2).

COL(N) from ATT(3).

County	Line	Housing Share (Note 1)	Residents Per Household (Note 2)	Resident Share
Column $\longrightarrow$		(Q)	(R)	(S) = (Q) x (R)
Essex	(1)	101.60	3.0	304.80
Hunterdon	(2)	4.11	3.3	13.56
Middlesex	(3)	52.51	3.4	178.53
Morris	(4)	47.78	3.4	162.45
Somerset	(5)	53.16	3.4	180.74
Union	(6)	84.86	3.1	263.07
Total	(7)	344.02		1103.15
Weighted Av.	(8)		3.21	Note 3

Note 1 from ATT(2) COL(L)

Note 2 1970 Census data

Note 3
$$3.21 = \frac{1103.15}{344.02}$$

County	Line ↓	Resident Share Via Housing	Resident Share Via Jobs	Resident Share Total	% LAMIH	% WGT.
Column →		(S)	(T)	(U) = (S) +(T)	(V)	(W)
Essex	(1)	304.80	−572.75	−267.95	43.5	0.00
Hunterdon	(2)	13.56	34.38	47.94	30.5	0.77
Middlesex	(3)	178.53	1114.03	1292.56	30.0	20.75
Morris	(4)	162.45	1600.62	1763.07	24.0	28.31
Somerset	(5)	180.74	2945.72	3126.46	25.0	50.17
Union	(6)	263.07	−491.26	−228.19	30.0	0.00
Total	(7)	1103.15	4630.74	5733.89		100.00
Weighted Av.	(8)				25.8	

Note 1   COL(S) from ATT(6), COL(S).

COL(T) from ATT(5), COL(P) and multiplied by 3.2377.

COL(V) is % low & moderate income households from 1970 census.

Note 2   COL(W) indicates weights assigned to LINES (2), (3), (4), & (5).

25.8% is weighted average of COL(V) using weights of COL(W).

Item	Note	LAMIH Units		
		Debit	Credit	Balance
Dilapidated Housing, Present Need	2	90.1		
Employment Growth, Future Need	1	378.1		
Ridge Oak	3		117.7	
Total		468.2	117.7	350.5

Note 1   [ATT(7) COLUMN(T) LINE(7)] = 4630.75

378.1 = (4630.75)(0.258)/(3.16)

Note 2   [ATT(7) COL(S) LINE(7)] = 1103.15

90.1 = (1103.15)(0.258)/3.16

Note 3   Per Robert Boye, Pres. of Ridge Oak, Inc.

248 dwelling units and 372 low and moderate income residents, equivalent to LAMIH units above according to

117.7 = (372)/(3.16)