EVALUATION OF OPEN SPACE POLICIES FOR OUTDOOR RECREATION, WITH REFERENCE TO SOUTH EAST LONDON.

VOLUME II

C O N T E N T S

CHAPTER 4. PUBLIC OPEN SPACE POLICY AND THE EXISTING PROVISION IN SOUTH EAST LONDON.

The hierarchy of open space provision recommended in the Greater London Development Plan[1]. as a guide to the distribution, siting and kind of open spaces required, acts as a target or ideal against which existing provision can be measured. This function has been noted in another context by Cosgrove and Jackson although it is equally applicable to open space:-

> "the value of a theoretical hierarchy of urban places is that it may be tested against reality and the ideal system matched against the existing system to highlight gaps in the present network of provision."[2].

One method of identifying deficiencies is to map existing open spaces and circumscribe them with hypothetical catchment areas based on expected travelling distances. This would identify deficiency areas for different levels of park provision. The Greater London Council produced such deficiency maps in the Report of Studies for Metropolitan and District Parks.[3]. If the deficiencies are then remedied with the appropriate type of open spaces then the actual distribution should begin to resemble the theoretical distribution, assuming that the existing pattern has the potential to develop into the ideal hierarchical pattern.

A number of studies have attempted to test whether a hierarchy of settlements

1. G.L.C. Greater London Development Plan. Approved by Secretary of State for the Environment on July 9th 1976. (London: G.L.C. 1976). P. 88 Table 7. See also Ch. 1. Table 1.2(d) P. 33.
2. I. Cosgrove & R. Jackson, The Geography of Recreation and Leisure. (London: H.U.L. 1972). P. 143
3. G.L.C. Planning Department. Greater London Development Plan Report of Studies. (London G.L.C. 1969). PP. 126-127 Fig. 5.7 & 5.8.

and other phenomena such as shopping centres and playgrounds occur in reality in accordance with central place theory.[4] These test the observed size, distribution and spacing, and function and characteristics of individuals in the system with the ideal central place hierarchy. In this chapter similar statistical tests will be applied to the parks of south east London to see whether a hierarchy exists or, more realistically, could develop in accordance with G.L.D.P. recommendations. The analysis should indicate whether the pursuit of the open space hierarchy is feasible and desirable or whether an alternative policy is more appropriate. The background material on provision developed in Chapter 2 will be incorporated, where appropriate, to explain any incongruencies or anomolies that may occur.

There are three physical components of the G.L.D.P. hierarchy that can be tested against reality: the size; distribution and characteristics of open space. Size is the independent component upon which the distribution and characteristics are dependent.

4.1 Size of Open Space.

Four approximate size categories are recommended in the hierarchy: Metropolitan Parks (150 acres); District Parks (50 acres); Local Parks (5 acres) and Small Local Parks (under 5 acres). In the subsequent analysis these are taken as minimum sizes so that Metropolitan Parks are of 150 acres or over, District Parks 50-149 acres, Local Parks 5 - 49 acres and Small Local Parks under 5 acres. The expected frequency distribution for these size categories (Fig. 4.1), shows discrete groups ranging from a large number of local and small local parks through to a small number of metropolitan parks. The relationship between the numbers is a geometric progression following Christaller's K = 3 hierarchy.[5]

4. See Appendix I(b) P. 49.
5. Ibid.

Fig. 4.1

Size Distribution of Open Space

a Expected distribution according to GLDP

b Distribution for S. E. London

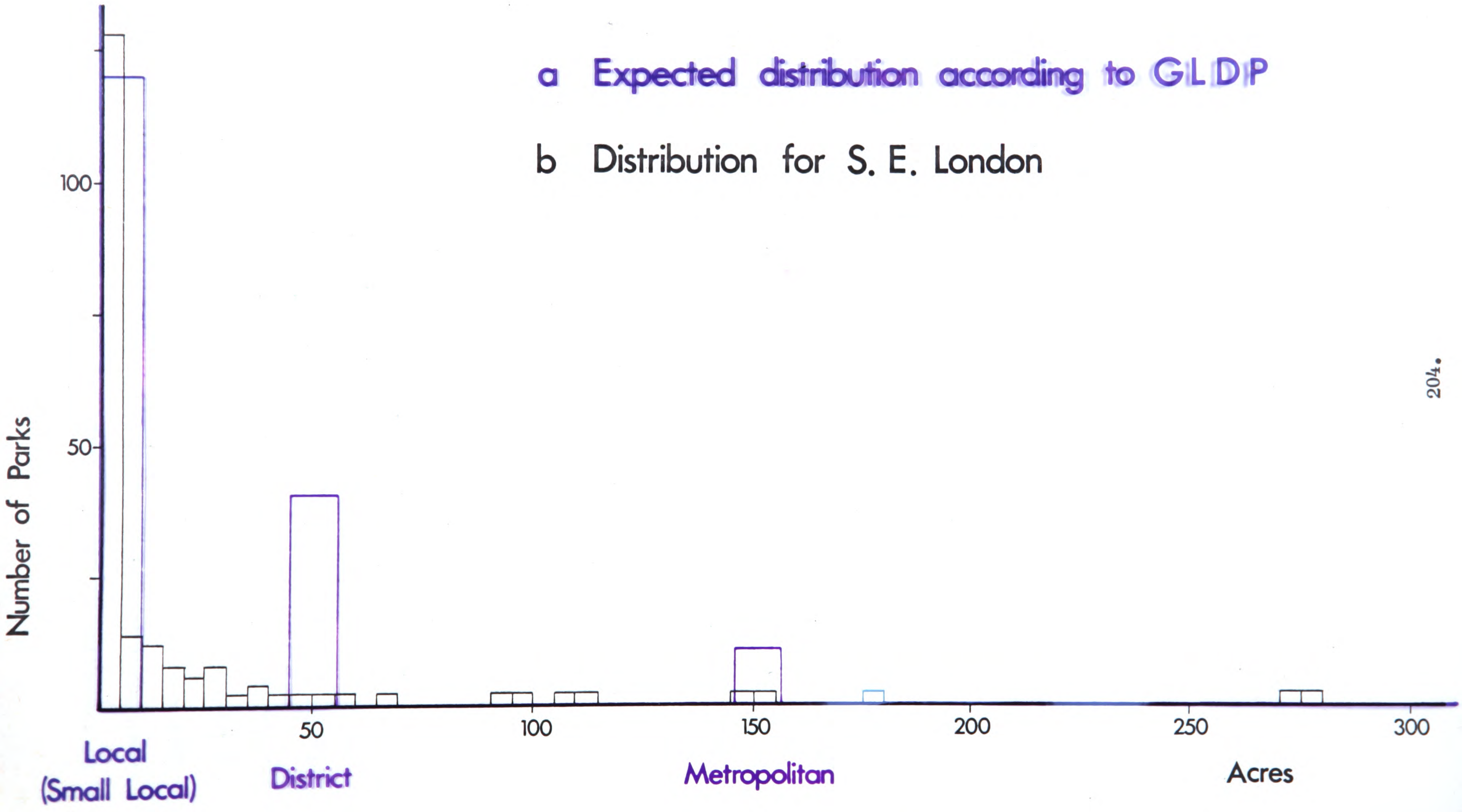
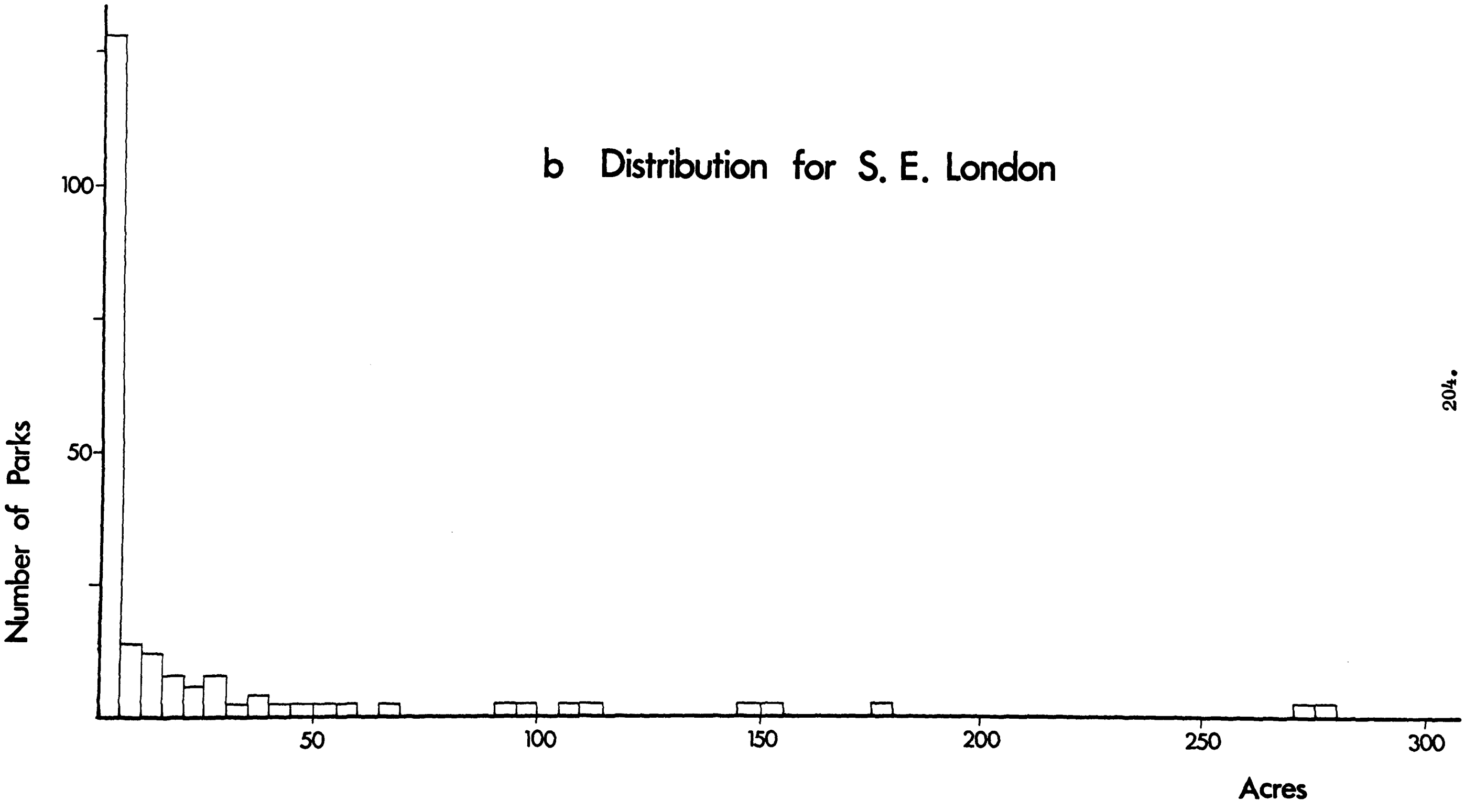


Fig. 4.1

Size Distribution of Open Space

b Distribution for S. E. London



By comparison the observed frequency distribution of open space in south east London shows a large number of small open spaces of 5 acres or less, then very much fewer larger open spaces declining rapidly in number between 5 acres and 60 acres. Larger parks occur at 100, 150, 200 and over 250 acres (Fig. 4.1). This distribution resembles a broken continuum rather than a hierarchy of four discrete size categories. The actual distribution is only hierarchical insofar as there are a large number of small parks and fewer large ones.

4.2 Distribution of Open Space.

The G.L.D.P. hierarchy suggests that parks would be theoretically distributed in a regular hexagonal pattern, with small local parks having the smaller catchment areas and nesting within the larger catchment areas of local parks. In the same way local parks would nest within the larger catchment areas of district parks and so on, through to metropolitan parks.[6.]

There are two related ways of testing whether the actual distribution of parks in south east London resembles the theoretical distribution:

(i) to compare the observed average distance between parks for each size category with the expected distance of the theoretical hierarchy.

(ii) to test the regularity of the distribution of parks for each size category by the use of the Nearest Neighbour Statistic (Rn)[7.]

6. See Ch. 1. Fig. 1.2(d)(i) P.34.
7. See Appendix IV(a) for explanation of Nearest Neighbour Statistic and its application to the distribution of open space. P.223 et. seq.

The analysis will be carried out for metropolitan, district and local park size categories as well as for all three size categories combined.[8.]

(a) Metropolitan Parks.

According to the G.L.D.P. hierarchy every home should be within 2 miles of a metropolitan park. Assuming a hexagonal distribution then individuals in this size category should be 3.5 miles apart.[9.] The observed average distance for parks within the study area is 2.68 miles which is considerably less than the expected. From this it might be inferred that provision at the metropolitan level is more than adequate. Even the upper limit of the range of observed distances is only 3.45 miles for metropolitan parks.[10.] However the average distance gives little indication of the nature of the distribution.

The nearest neighbour statistic (Rn) is 2.03 and indicates that the distribution contains a significant element of regularity at the 95% confidence level.[11.] The metropolitan parks within the study area have a tendency to be regularly distributed and this is in accordance with the theoretical hierarchy.

(b) District Parks.

Parks in this size category should be ideally distributed so that residents are within $\frac{3}{4}$ mile of them. Individual district parks should be 1.32 miles apart, according to the theoretical hexagonal distribution. In fact the observed average distance is 1.27 miles, only slightly less than the expected, but this average masks considerable variation in the range of distances between first nearest neighbour district parks of 0.6 miles to

8. Analysis of small local open space has been omitted due to the visibly clustered nature of this size category.
9. See Appendix I(b) P. 49.
10. See Appendix IV(a) for tables of observed distances and calculations.P.223 et.seq
11. Ibid.

2.15 miles. This variation would suggest that the distribution will not be regular. The nearest neighbour statistic (Rn) is 1.1 which indicates that the distribution is neither significantly regular or significantly clustered. In terms of the statistic it is described as a random pattern. This does not necessarily imply that the processes behind the pattern of district parks are random, any more than the processes behind the location of metropolitan parks are systematic. The statistic can only offer an objective description of distribution not an explanation of its cause.

(c) Local parks.

The G.L.D.P. hierarchy suggests that local parks should be located within $\frac{1}{4}$ mile of each home so that each park would be 0.44 miles apart. In a similar way to district parks the observed average distance of 0.49 miles is similar to the expected distance. Similarly there is a wide range of values for distances between first nearest neighbours of local parks of 0.2 miles to 1.25 miles. The nearest neighbour statistic (Rn) is 1.0 which indicates that there is neither a tendency towards regularity or clustering, in fact a perfectly random distribution.

This analysis can be applied to metropolitan, district and local parks together. Because of the nesting of parks of different size categories implicit in the hexagonal arrangement all parks should be regularly distributed and each park should be within 0.44 miles of its nearest neighbour i.e. both metropolitan and district parks will serve also as local parks.[12] The observed average distance between all parks and their first nearest neighbours,

12. See Appendix I(b) P. 49.

irrespective of size is 0.49 miles which is the same as for local parks. The nearest neighbour statistic is 1.14 which although indicating a tendency towards regularity is not significant at the 95% confidence level and suggests a random distribution of all parks.

These findings can be corroborated by visual inspection of Fig. 4.2. Metropolitan parks appear to be most regularly distributed, although there is a deficiency at this level in north Southwark. The deficiency analysis carried out by the Greater London Council confirms this finding.[13.] District and local parks are well represented in the outer suburbs and are almost totally absent in inner parts of north Southwark and Lewisham. The reverse is true for small local parks, which are heavily clustered in inner areas. This situation is confirmed for the whole of Greater London in the Report of Studies:

> "very large open spaces are spread fairly evenly throughout the metropolis and small open spaces less evenly."

Table 5.2 shows that outer London has a higher proportion of medium sized spaces (5-50 acres) than inner London.[14.]

4.3 Characteristics of Open Space.

The G.L.D.P. also recommends that parks at different levels in the hierarchy should have certain characteristics and facilities to enable them to perform their intended function.[15.] Table 4.3 summarizes these characteristics for the four types of park provision. There are two important points to note

13. Op. cit. G.L.C. Greater London Development Plan. Report of Studies P.126 Fig. 5.7
14. Ibid para. 5.4 and Table 5.2.
15. See Ch. 1. Table 1. P. 33.

Fig 4.2 Areas of Public Open Space Deficiency

Local & Small Local Parks (5 Acres & under)

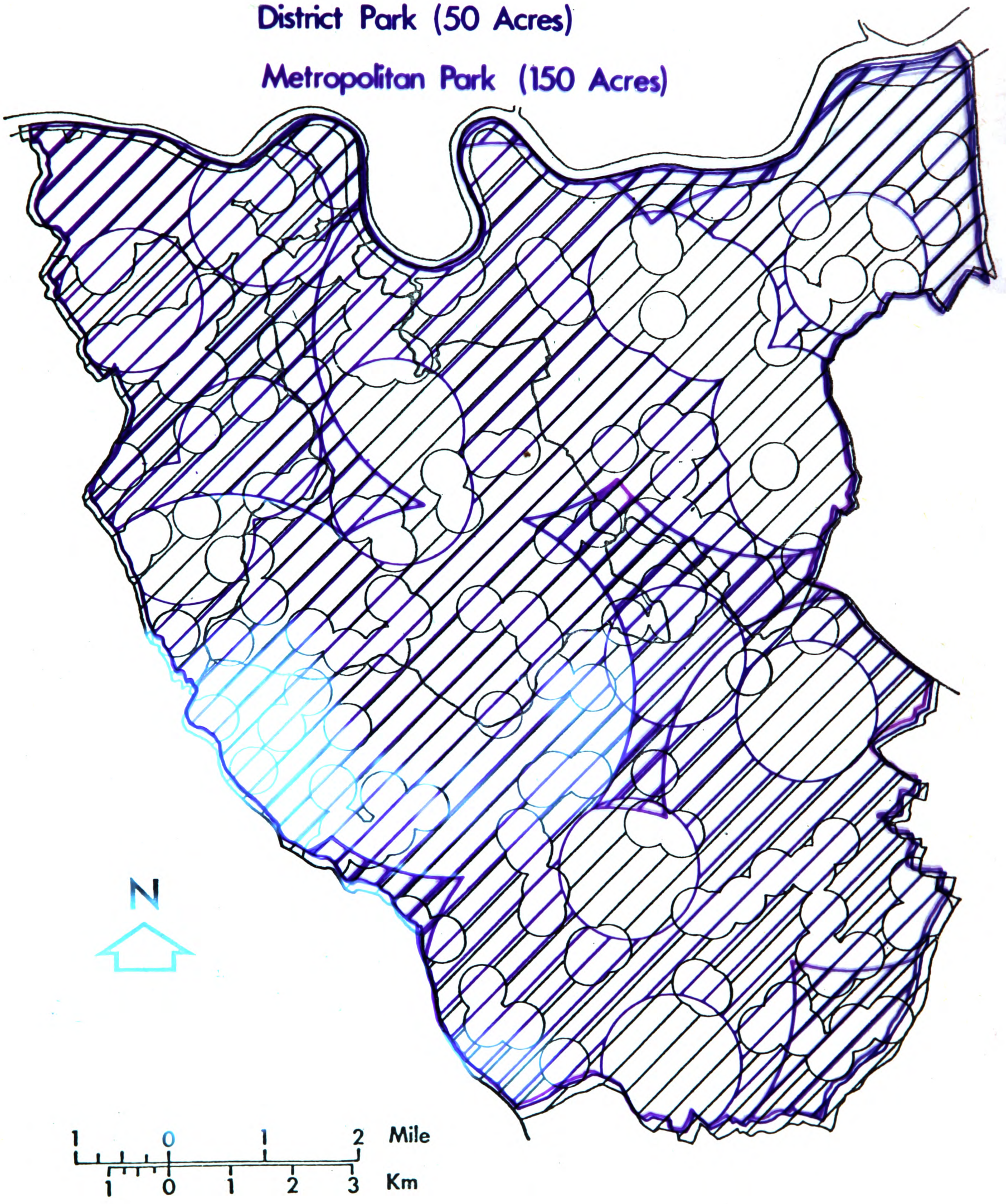


Fig 4.2 Areas of Public Open Space Deficiency

Local & Small Local Parks (5 Acres & under)

District Park (50 Acres)

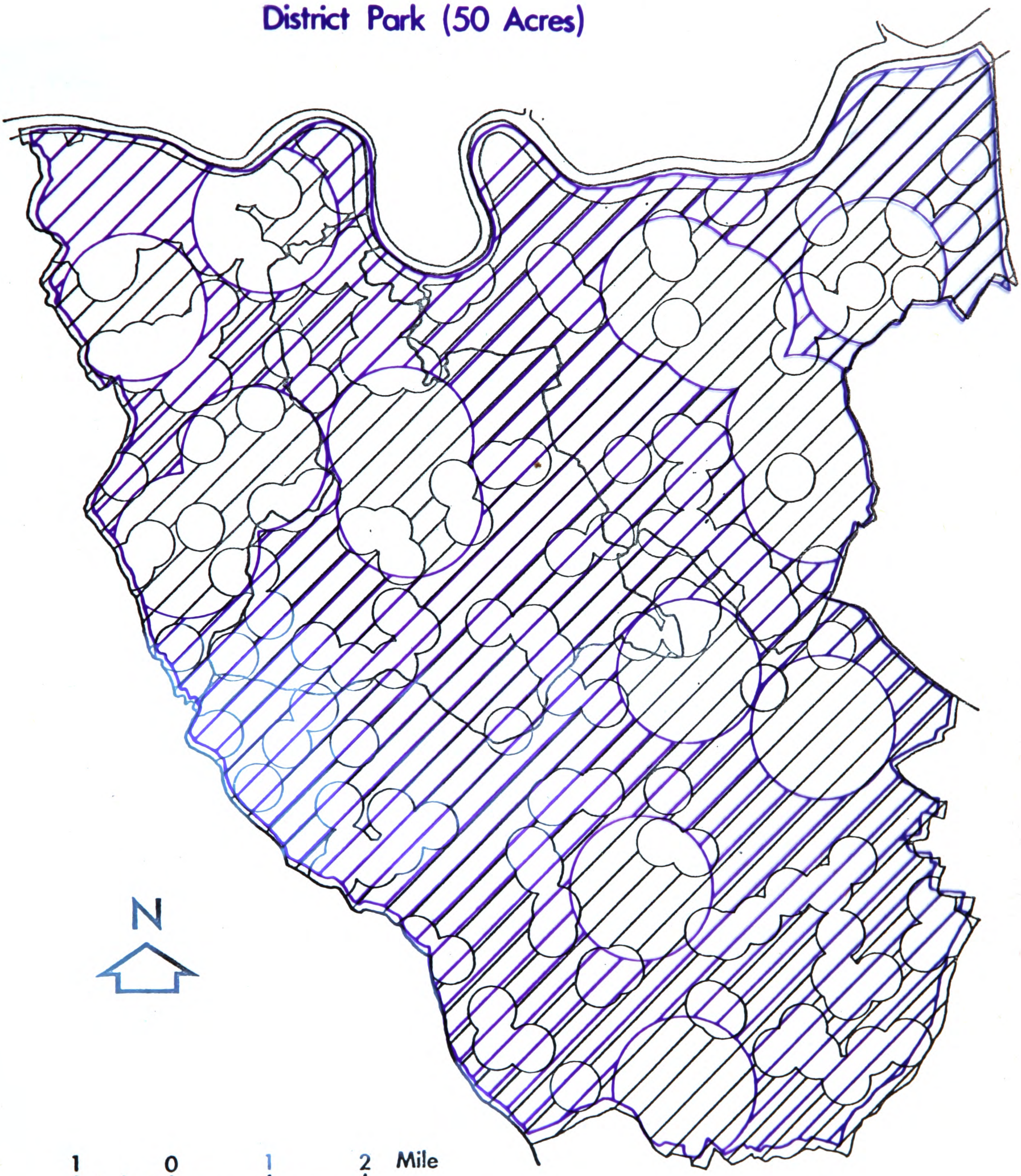
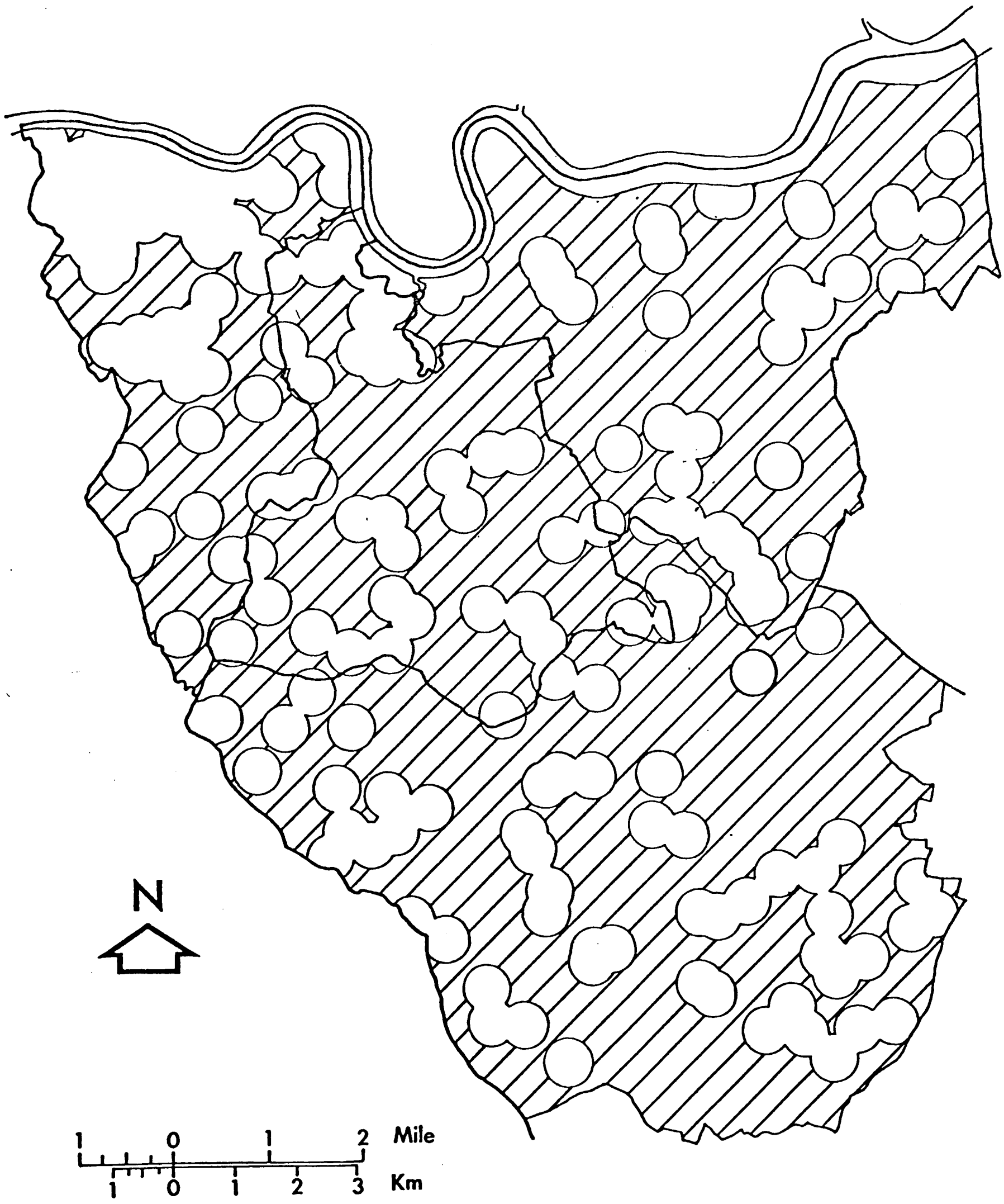


Fig 4.2 Areas of Public Open Space Deficiency

Local & Small Local Parks (5 Acres & under)



which are fundamental to the open space hierarchy. As a general rule the number of facilities increases as the size of park increases, and also there is a nesting of characteristics with increasing park size e.g. district parks contain all the characteristics of local and small local parks. Parallels can be drawn with Central Place Theory where the number of functions increases for higher order central places and higher order places perform the functions of lower order places.[16.]

Table 4.3

Actual description	Characteristics specified						
Characteristics		Natural Terrain	Specialist facilities	Car parking Areas	Playing Fields	Courts	Childn. Sitting areas. Gardens.
(a) Metropolitan. Either natural heathland, downland, commons, woodlands etc., (ii) formal parks providing for both active and passive recreation e.g. boating, entertainments etc., May contain playing fields but at least 100 acres for other pursuits. Adequate car parking is essential.	(a)(i)	1		1			
	(a)(ii)	1	1	1	1	1	1
(b) District. containing playing fields, but at least 30 acres for other pursuits (as in local parks) and some car parking.	(b)		1	1	1	1	1
(c) Local - Providing for games, children's play, sitting-out areas, landscaped environment, and playing fields if the park is large enough.	(c)			1*	1	1	1
(d) Small Local. Gardens sitting out areas and/or children's playgrounds.	(d)					1 or	1

* May occur, depending on size.

16. See Appendix I(b). P.49.

An important exception to this general rule is metropolitan parks (a)(i) which are natural heathland, downland, commons or woodland and have no facilities other than car parking. In this case it is solely the natural terrain that provides the metropolitan function rather than a wide range of man-made facilities. This park type does not conform with the nesting arrangement either, as it does not contain the facilities to enable it to function as a district, local or small local park. This has important implications for the operation of the hierarchy insofar as areas adjacent to parks of this type may be deficient in district and local park facilities.

With the exception of this non-conforming park type it should be possible to test whether the characteristics of south east London parks resemble the G.L.D.P. hierarchy in the following ways:

(a) to see whether a positive relationship exists between size of parks and the number of characteristics/facilities they possess.

(b) to examine whether certain types of characteristics are associated with different park sizes and whether the nesting arrangement operates.

(a) Size and number of characteristics.

A considerable amount of empirical work has been undertaken to test the existence of a functional hierarchy of settlements by relating size of settlement to range of functions.[17.] These relationships have been analysed

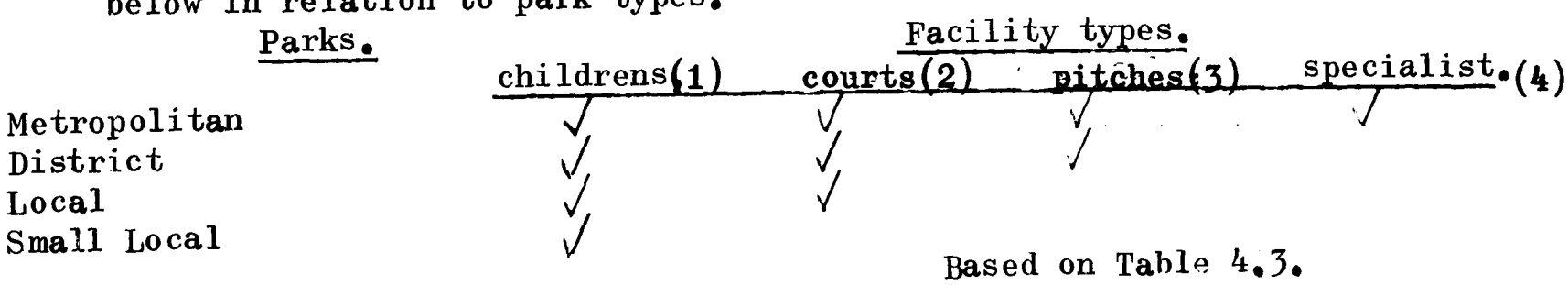
17. e.g. B.J.L. Berry & W. Garrison. Functional Bases of the Central Place Hierarchy; Economic Geography 34(1958) PP. 145-154.
H.A. Stafford Jnr. The functional bases of small towns; Economic Geography 1963 (39) PP. 165-175
K.A. Gunarwandena. Service Centres in Southern Ceylon; University of Cambridge Ph.D. Thesis 1962.

by statistical measures of association and scatter diagrams.

A descriptive graphical approach will be adopted here to show the relationship between size and the number of characteristics of parks in south east London and to compare this with the expected relationship suggested by the hierarchy. Fig. 4.3(i) shows the relationship between the size of metropolitan, district and local parks and the number of facilities occurring in each. The overlay indicates the type of scatter that should occur in order to reflect the theoretical hierarchy and it is clear that the majority of parks do not conform to this pattern. There are no discrete size groupings as was noted earlier, but rather a continuum. Also there is no clear relationship between size and the number of facilities. All three categories contain some parks with no facilities, implying that the nesting arrangement for these is absent. Additionally a number of district parks, in terms of the number of facilities they contain, perform the function of metropolitan parks and the same is true for local parks performing district functions.

This is shown more clearly on Fig. 4.3(ii) which indicates the frequency distributions of facility types,[18] for parks of different size categories. In Fig. 4.3(ii) both metropolitan and district parks are treated together. According to the hierarchy all district parks should have three facility types and all metropolitan parks four. The non-conforming parks with between 0 and 2 types of facility are explained by the semi-natural open spaces referred to earlier. Local parks should contain two types of facility according to the hierarchy. It is apparent that a large number

18. A distinction is made in this analysis between individual facilities (Fig. 4.3(i) and facility types (Fig. 4.3(ii)). The latter are listed below in relation to park types.



Based on Table 4.3.

Fig 4.3 (i) Relationship Between Size of Park & Number of Facilities

a Expected scatter of parks after G.L.D.P.

b Scatter of Parks for S.E. London

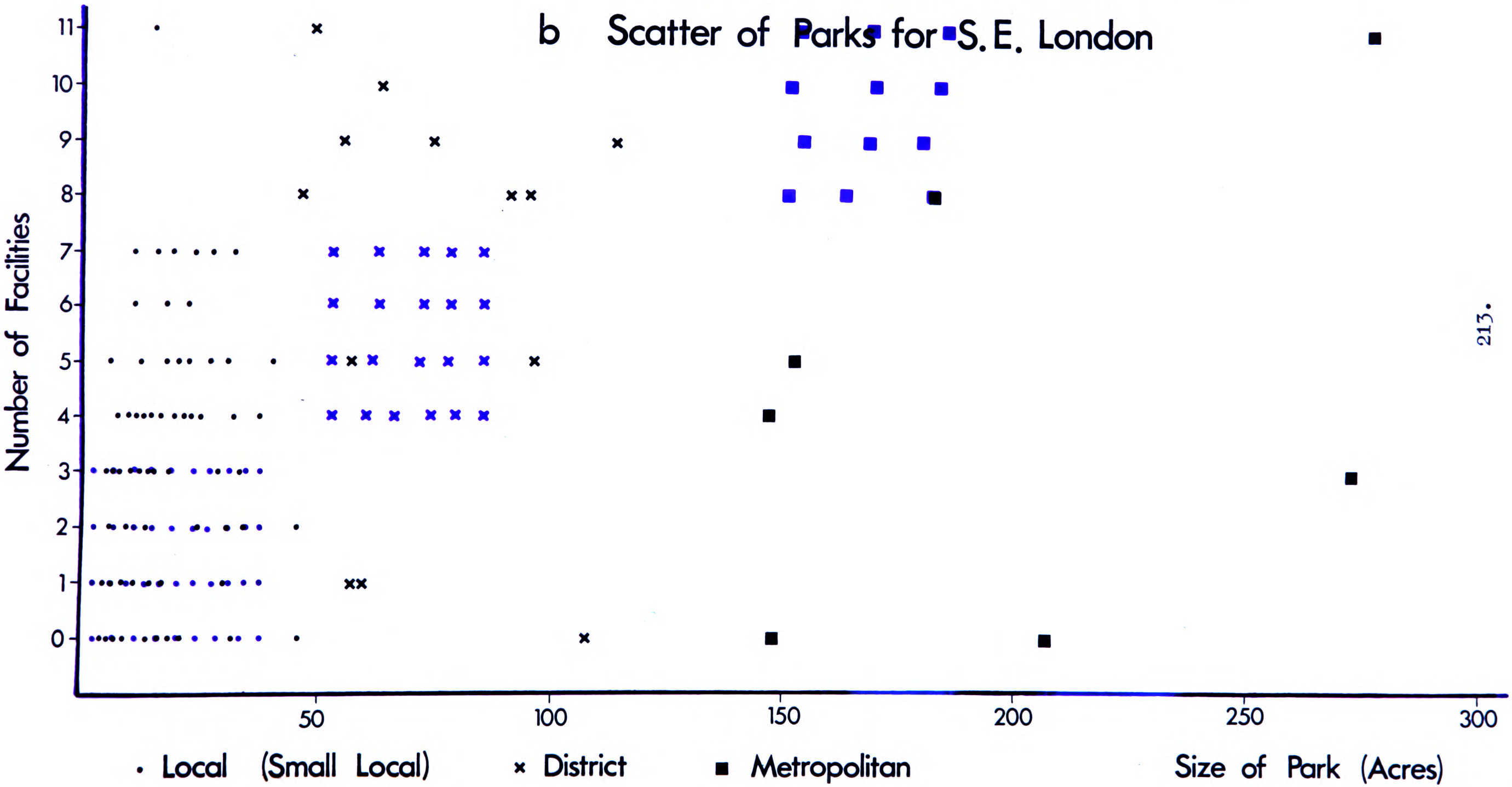


Fig 4.3 (i) Relationship Between Size of Park & Number of Facilities

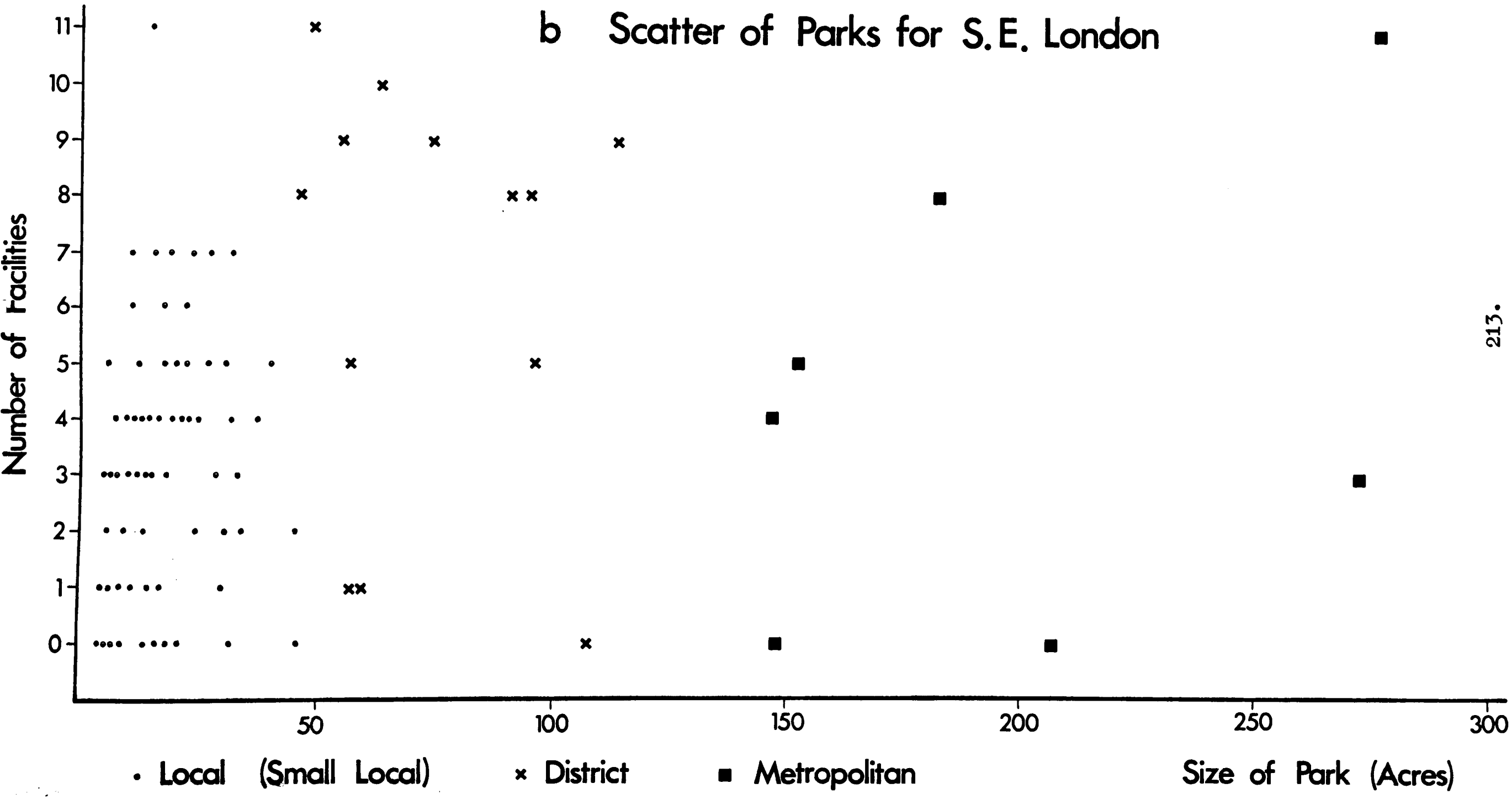
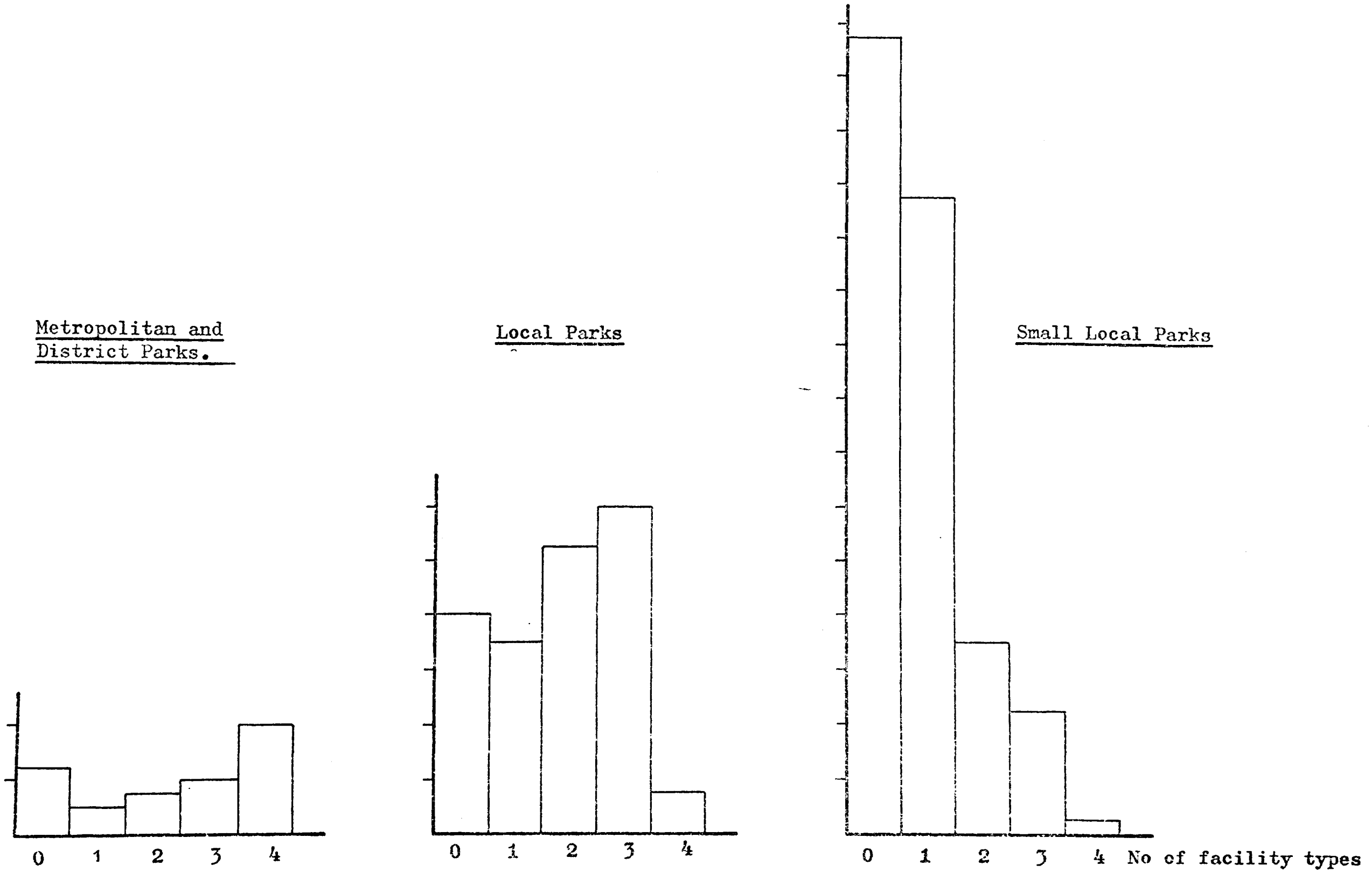


fig 4.3 (ii) Public Open Space by number of facility types



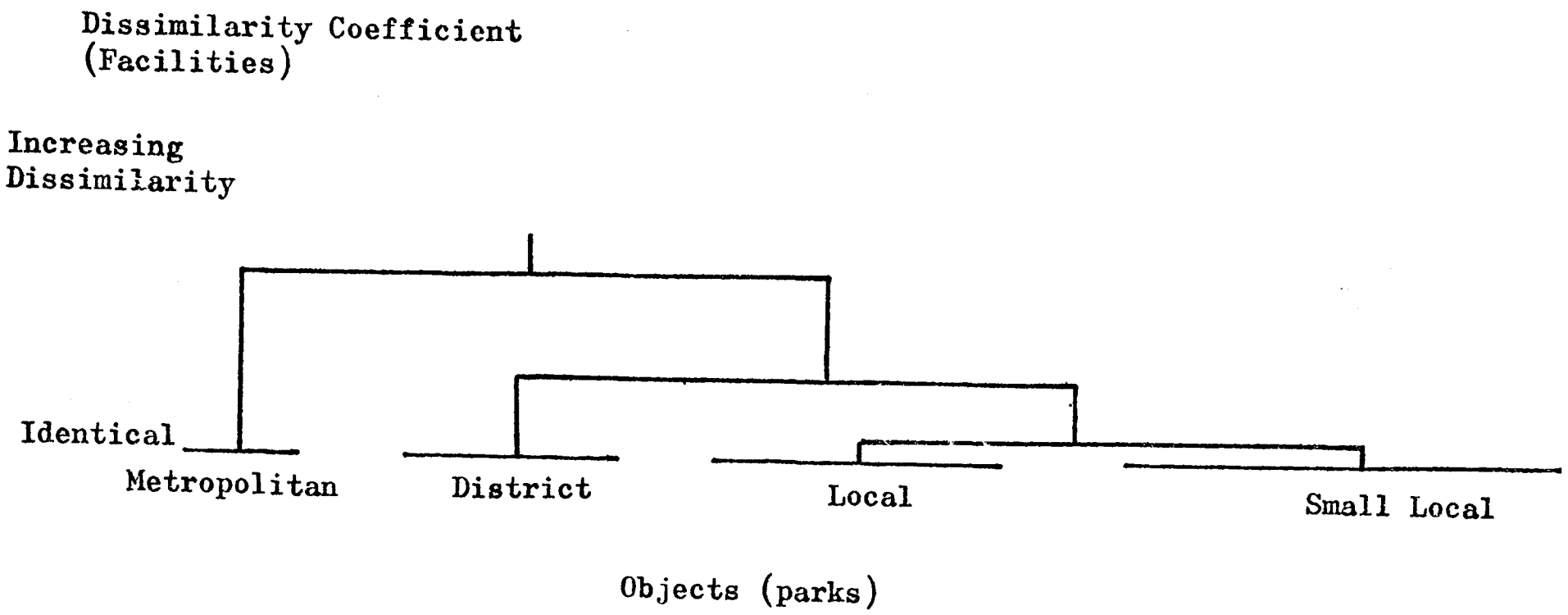
have three facility types thereby performing a district function and a larger number have only one or no facilities, performing the function of small local parks. The hierarchy is most closely reflected for small local parks, with the majority of parks containing only one or no facilities.

(b) Size and type of characteristics.

The preceding analysis gives no indication of the type of facilities associated with different size categories. Table 4.3 sets out the facility types for the four park categories of the G.L.D.P. hierarchy. In theory there should be four homogeneous groups of parks in terms of the type of facilities they contain (excluding the semi-natural metropolitan parks referred to earlier). There should also be a nesting of facilities in accordance with the hierarchy. An ideal technique for testing for the existence of discrete and homogeneous groups of parks according to facility type and the nesting arrangement is that of single link cluster analysis.[19] This is a taxonomic device for grouping objects (parks) according to similarity of variables (facilities). The main output from this analysis is a dendrogram, or two-dimensional tree diagram which illustrates the grouping of a set of objects (parks) into clusters. The dendrogram illustrates the hierarchical nature of this grouping process. Identical pairs of parks cluster first by definition at the lowest level of dissimilarity. These groups then join other individuals or groups of parks at a higher level of dissimilarity until the entire set of parks forms a single group. Fig. 4.3(iii) will clarify the process and illustrates the type of dendrogram that could be expected if parks conformed to the G.L.D.P. hierarchy.

19. See Appendix IV(b). P. 233 et. seq.

Fig. 4.3(iii)Dendrogram expected from G.L.D.P. hierarchy.



The facilities are identical for each size category, and form discrete homogeneous groups at the lowest level of dissimilarity. Between groups the local and small local parks are most similar and fuse together at the next lowest level of dissimilarity. District and local parks in a similar way fuse at a higher level of dissimilarity, and finally metropolitan and district parks fuse at the highest level of dissimilarity at which level the whole set forms one group.

Fig. 4.3(iv)* shows the dendrogram resulting from the cluster analysis of parks by facility in south east London, and it is evident that there is no clear cut hierarchy. Apart from two large early clusters of parks with similar facilities the remaining parks tend to be more complex and dissimilar one to another, and failing to form separate classes they join the expanding cluster individually.

*Inside back cover.

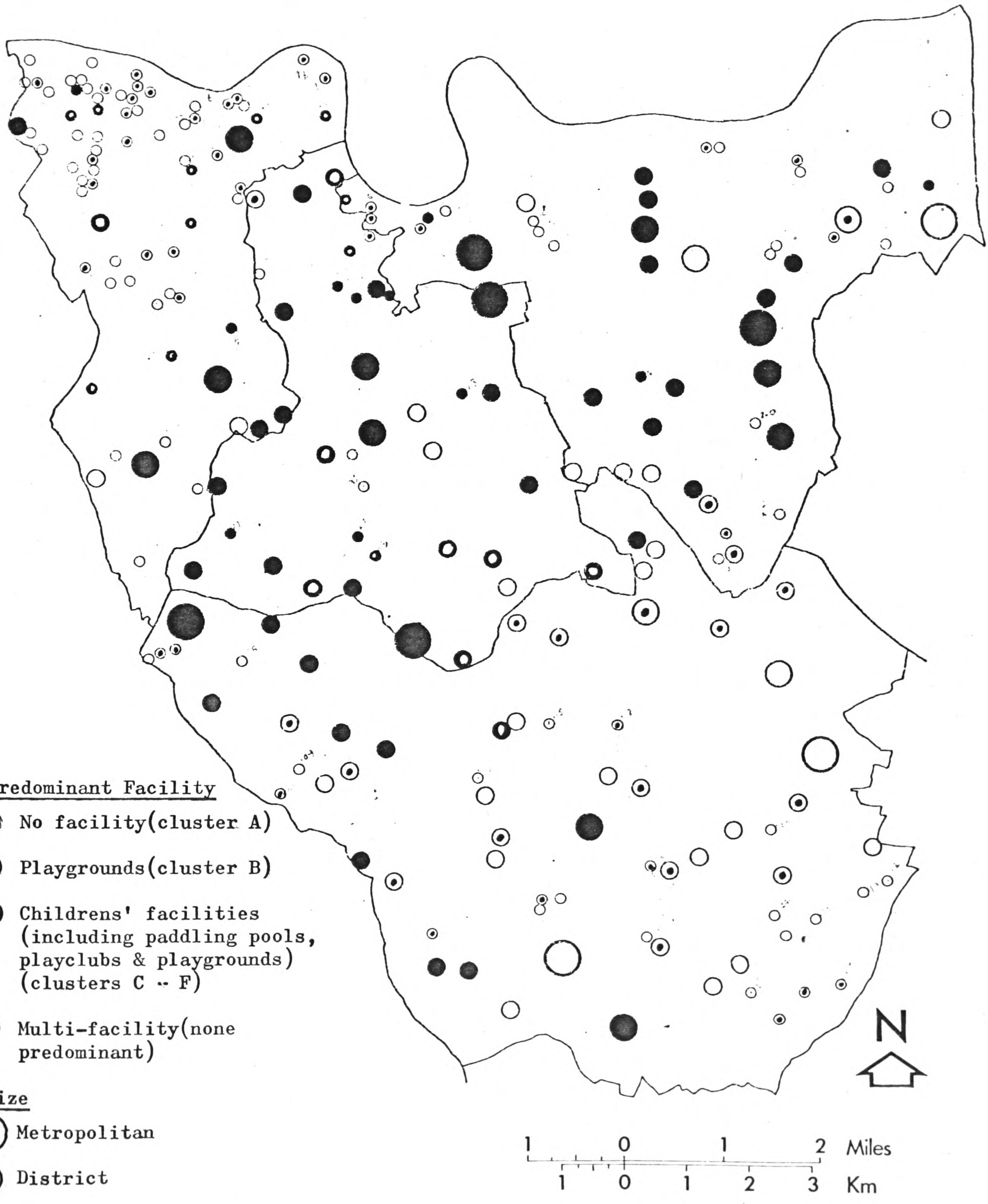
In order to interpret the dendrogram more fully a level of dissimilarity (3.5671) was chosen to differentiate the major clusters of parks. There are only two important clusters; those parks with playgrounds as the predominant facility; and those parks with no facilities at all. Apart from this there are only small clusters (of five or less parks) or parks which are dissimilar at this level. For ease of analysis a number of small clusters displaying similar characteristics i.e. combinations of childrens' facilities have been manually grouped. The four categories to emerge have been mapped (see Fig. 4.3(v))for south east London. This map also relates size of open space to the categories which have been defined, and will be referred to in the description that follows of each category.

Cluster A. Parks with no facilities predominant. (Figs. 4.3(iv) and 4.3(v).)

This is the largest cluster containing 83 parks representing 37% of the total set. It is not a homogeneous cluster and some parks have very limited sports facility provision as follows: 10% have football pitches; 5% have cricket pitches; 4% tennis courts; and one park has a bowling green and another playground.

These "no facility" parks are predominantly small in size with 73% being small local parks of under 5 acres and 24% being local parks (5-50 acres). The remaining 3% are metropolitan parks of the "semi-natural" type. This cluster conforms fairly closely with the theoretical hierarchy insofar as small local parks should have either limited play facilities or sitting out areas and gardens. Whilst the presence of the latter was not incorporated into the analysis it can be inferred that this minimal type of facility would be present in many of the parks in this cluster.

Fig 4.3(v) Location of major clusters of parks by facility



The distribution of the parks in this cluster does not conform with the expected regular distribution of small local and local parks which the hierarchy implies. Inspection of Fig. 4.3(v) suggests that parks are geographically clustered within $2\frac{1}{2}$ miles of central London and beyond 5 miles of the centre. This pattern was noted earlier in the general analysis of park provision,[20] the inner group being typified by churchyards and squares, the only remaining open spaces in the densely developed inner parts of London, and the outer group being typified by semi-natural open spaces such as commons, heaths and woods.

Cluster B. Parks with playgrounds as predominant facility.

There are 59 parks in this category representing 26% of the set. This is not a homogeneous cluster and some parks have a limited level of sports facility provision: 29% have football pitches; 19% tennis courts; 15% cricket pitches; 10% netball courts and 5% bowling greens.

These facilities are associated with smaller parks, 68% of the cluster being small local parks of less than 5 acres and 29% being local parks between 5 and 50 acres. The remaining 3% are district parks. In terms of type of facility related to size, this cluster most closely resembles the theoretical hierarchy.

Again there is no regular distribution of parks in this cluster but rather a concentration in north Southwark within $2\frac{1}{2}$ miles of central London and beyond 5 miles from the centre. The concentration in Inner London is explained by the very small parks in this area (nearly all 5 acres or less) in which only

20. See Chapter 2 Section 2.3(b). P. 96 et. seq.

limited facilities can be provided. In such high density urban areas playgrounds take priority in terms of facility provision. In the outer suburbs the parks in this cluster are generally larger (5-50 acres) and the predominance of playground provision as opposed to other facilities may be a matter of borough policy. Also there may not be such a need to provide such a range of facility provision being adjacent to open country and furthermore sports facilities are very well provided for by the public sector. The lack of variety in facility provision beyond 5 miles of the centre is confirmed by earlier background analysis.[21.]

Clusters C D E F Childrens' facilities.

These four clusters account for 24 parks, or 10.5% of the total. They contain combinations of childrens' facilities including playgrounds, playclubs, paddling pools and 5-a-side kickabout areas. Three fifths of these parks are under 5 acres and the remainder under 50 acres. The provision of predominantly childrens' facilities is confined to local and small local parks as for playground provision only (cluster B). The geographical distribution of these parks is similar to that of parks in cluster B, and are virtually all confined to the London boroughs of Lewisham and Southwark. Both these boroughs have well developed policies towards play provision and playleadership which partly accounts for the distribution. Southwark has a number of all weather kickabout areas which act as high intensity use facilities in inner areas otherwise deficient in open space.

Remaining clusters and individuals. No particular facility predominant.

21. Ibid

The remaining parks in the set (26%) form 5 small clusters of 4 or less individuals at the 3.5671 level of dissimilarity or are individuals dissimilar to one another and failing to form clusters. The combination and range of facilities is slightly different for these parks drawn from sports facilities, childrens' facilities and specialist facilities.

These parks encompass a much larger size range than in the previous groups discussed. 8% are metropolitan parks of over 150 acres, 17% are district parks (50-150 acres) 53% are local parks (5-50 acres) and 22% are small local parks under 5 acres. One would expect that parks containing more complex combinations of facilities would be larger. However the lack of any discrete clusters associated with different sized parks indicates a lack of hierarchy among the larger parks of south east London.

The location of these parks is concentrated in a band between $2\frac{1}{2}$ and 5 miles of the centre of London (Fig. 4.3(v)). Again there is no regularity of distribution of parks reinforcing the absence of a hierarchy. This distribution is confirmed by earlier analysis of the supply of open space which indicated that multi-facility parks were found beyond the inner city area in the true suburbs, but not so much in the outer suburbs of south Bromley.[22.]

4.4 Greater London Development Plan hierarchy and the parks of south east London.

The threefold analysis of this chapter has attempted to show whether the existing public open space system of south east London exhibits any of the characteristics associated with the hierarchy. Apart from the regular

22. See Ch. 2 Section 2.3(b) P. 94 et. seq.

distribution of metropolitan parks and the large number of local and small local parks with limited facilities (although no regular distribution) there is little evidence of the hierarchy of parks being replicated in south east London. Rather the size, distribution and characteristics of parks suggest the random development outlined earlier. There is no reason why the open space of south east London should display hierarchical tendencies. However the attempt to pursue such a policy as a target to be achieved would have serious implications for open space provision. The desirability of restructuring the existing park system of south east London in accordance with the hierarchy is questionable given the physical land use constraints and also the variation in population characteristics and likely demand for open space. The assumption of an isotropic plain where population, communications and land use are evenly distributed, upon which the theoretical hexagonal distribution is based, is absent in south east London.

A more realistic approach is to use the hierarchy as a means of identifying deficiencies in existing provision, although physical and economic constraints may limit the ability of planning authorities to remedy deficiencies.[23.]

So far only the physical dimension of the hierarchy has been examined. The use that the community makes of open space and the demand for it should ultimately guide policies of open space provision.

23. See Part II Ch. 9 P. 388 et. seq.

APPENDIX IV (a) The use of First Nearest Neighbour Analysis in testing for regularity in the distribution of parks of different size categories.

The nearest neighbour statistic (Rn) was originally developed by two botanists Clark and Evans[1]. as a means of objectively describing and analysing plant distribution patterns. It has since been applied to other disciplines including geography where it has been used for example in empirical work on Central Place Theory as applied to settlement patterns[2]. and childrens' playgrounds.[3].

The first nearest neighbour statistic compares the observed average distance between nearest neighbours of a set of points distributed over space with the expected average distance between those points. The result will fall between two extremes of a completely clustered distribution (Rn = 0) or perfectly regular distribution (Rn = 2.15). Where Rn = 1 both the observed and expected average distances are equal and the pattern is described as being random, without any tendency either to clustering or regularity. A value of less than one results from the observed distance being smaller than the expected, implying some degree of clustering. A value greater than one suggests a tendency towards regularity.

The value of this statistic for testing central place distributions is that

1. P.J. Clark. F.C. Evans, "Distance to the Nearest Neighbour as a measure of spatial relationships in population." Ecology (Vol. XXXV 1954) PP.445-453.
2. L.C. King "A Quantitative Expression of the Pattern of Urban Settlement Areas of the United States." Tijdschrift Voor Economische en Sociale Geography, 53, 1-7
3. L.S. Mitchell. "An evaluation of Central Place Theory in a Recreation Context, The case of Columbia, S. Carolina." Southeastern Geographer (Vol VIII 1968) PP. 45 - 53

the theoretical hexagonal pattern, where points are arranged according to a lattice of equilateral triangles with each point equidistant from six other points, represents a perfectly regular distribution where Rn = 2.15

Calculation of First Nearest Neighbour Statistic (Rn).

The formula for the first nearest neighbour statistic is as follows:-[4.]

$$Rn = \frac{\bar{D}\ Obs}{0.5\ \sqrt{a/n}}$$

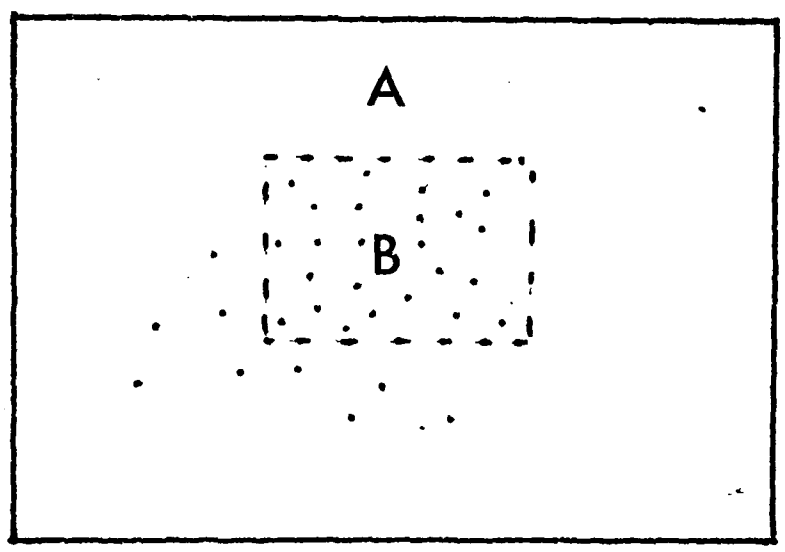
Where $\bar{D}$ Obs = the mean observed distance of points from first nearest neighbour

a = area over which points are distributed

n = number of points

$\bar{r}$ E = $0.5\ \sqrt{a/n}$ = the mean expected distance of points from first nearest neighbour.

An important consideration in using this calculation is deciding on the size of area (a), as this can significantly affect the Rn value (Fig. IV b(i)).



4. Full details of the calculation and interpretation of the statistic are given in:
P.A. Pinder & M.F. Witherick "The Principles, Practice and Pitfalls of Nearest Neighbour Analysis. Geography (LVll, 1972) PP. 277-88.

If area (a) is adopted then the point pattern will be described as clustered whilst area (b) would suggest a random or possibly regular pattern. This does not seriously affect the application of this statistic to the park pattern of South East London as open space can occur throughout the area which is a representative sample of the metropolitan area.

Of more importance is the related problem of measurement of the first nearest neighbour at the boundary. Nearest neighbour distances which span the boundary should be either all included or all omitted. If distances are measured between points within the boundary, this would have the effect of biasing the mean observed distance upwards, as there may be points which are nearer but which lie across the boundary. In the parks analysis these nearest neighbours which lie beyond the boundary are included.

Application of Technique to parks in south east London.

The analysis is based on the diagrammatic representation of metropolitan, district and local parks as circles of differing sizes. Measurement of first nearest neighbour distances are from the midpoints of the circles. Where two parks of the same size category are contiguous, they are treated as a single park e.g. Greenwich Park and Blackheath. Tables IV (a) 1 - 3 show the observed nearest neighbour distances for metropolitan, district and local parks respectively, whilst Table 4 shows the nearest neighbour distances between parks of all three size categories. Open spaces can be located on Fig. IV (a)(ii).

Substituting in the formula above.

$$Rn \text{ (metropolitan parks)} = \frac{2.68}{0.5 \times \sqrt{\frac{73.83}{7}}} = 2.03$$

where a = 73.83 sq. miles

n = 7 parks

$D\ \bar{O}bs$ = 2.68 miles

Similarly

$$Rn.\ (\text{District Parks}) = \frac{1.27}{0.5 \times \sqrt{\frac{73.83}{14}}} = 1.1$$

$$Rn.\ (\text{Local Parks}) = \frac{0.49}{0.5 \times \sqrt{\frac{73.83}{79}}} = 1.0$$

$$Rn.\ (\text{All Parks}) = \frac{0.49}{0.5 \times \sqrt{\frac{73.83}{100}}} = 1.14$$

For interpretation of results see Section 4.2

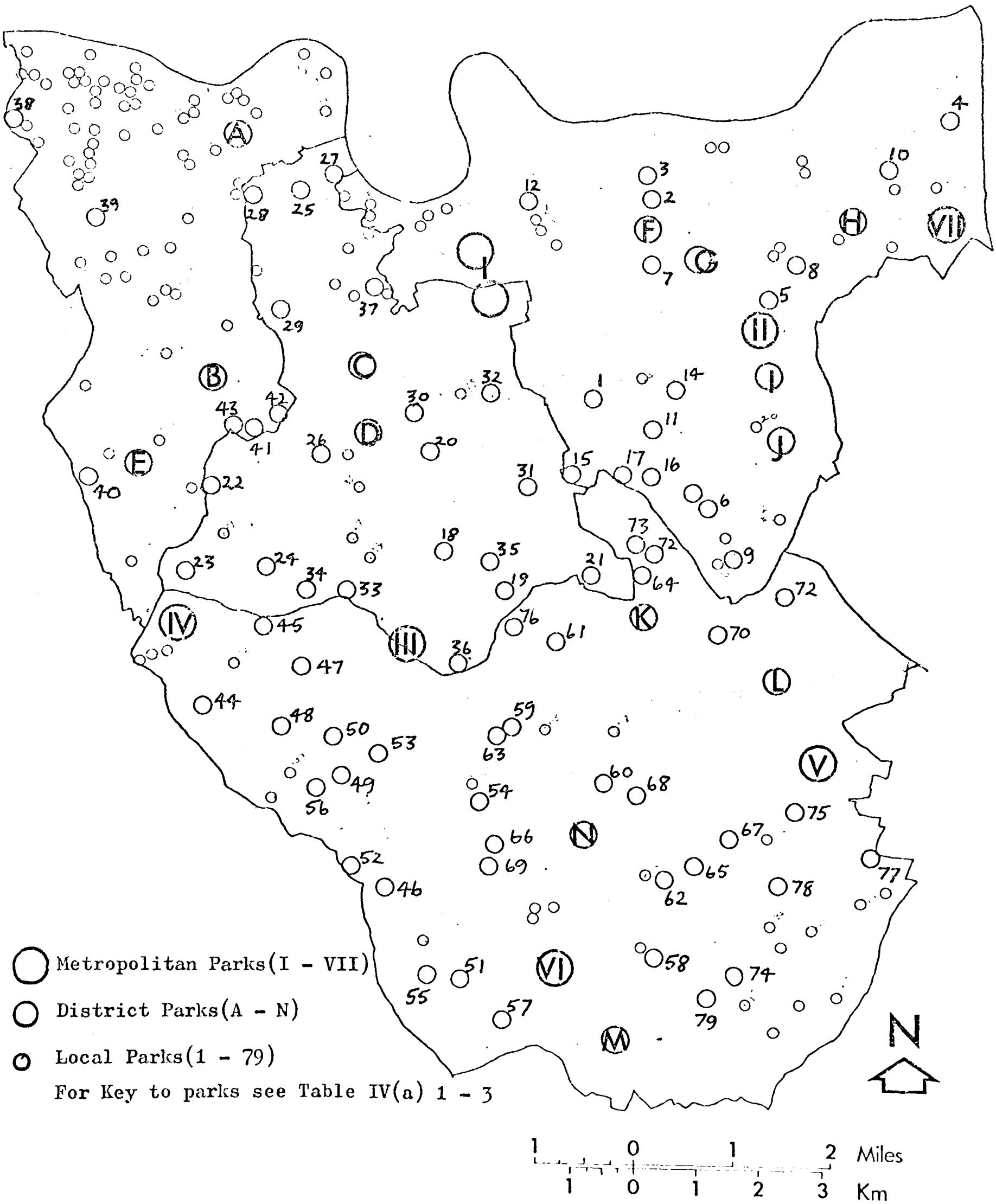
Significance of Rn Results

In common with many statistics the nearest neighbour value can be tested for significance. As the result is based on a sample of observations it is necessary to know what reliance can be placed on it as being representative of the entire distribution. Clark and Evans developed a formula for the standard error of the expected average distance.

$$S.E.\ \bar{r}\ E = \frac{0.26136}{\sqrt{\frac{(n \times n)}{\bar{a}}}}$$

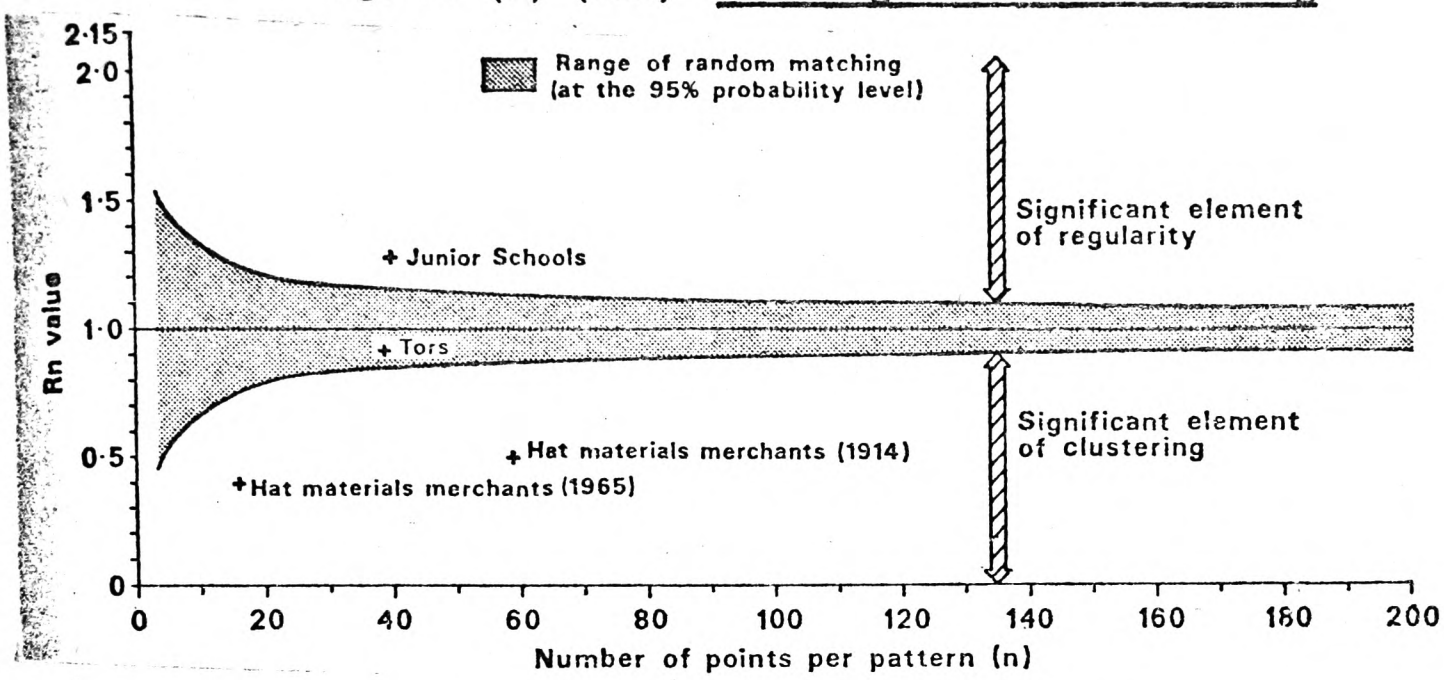
For Rn to be either significantly regular or clustered $\bar{D}$ Obs must occur outside the range $\pm$ 2 S.E. $\bar{r}$ E.

Fig IV(a)(ii) Public open space



This range has been calculated and plotted on a graph for different numbers of points (See Fig. IV(a)(iii)).

Fig. IV (a) (iii) The Range of Random Matching



Source op.cit. P.A. Pinder & M.E. Witherick P. 287

Tables IV (a) 1 - 4

Observed Distance from First Nearest Neighbour.

1. Metropolitan Parks.

Map Ref.		1st Nearest Neighbour	Distance (miles)
I	Greenwich Pk/Blackheath	Shooters Hill	2.9
II	Shooters Hill	Bostall Woods	2.15
III	Beckenham Place Pk.	Crystal Palace	2.35
IV	Crystal Palace	Beckenham Place Pk.	2.35
V	Petts Wood	Hayes Common	3.45
VI	Hayes Common	Petts Wood	3.45
VII	Bostal Heath Woods	Shooters Hill	2.15
			Σ 18.8
2. District Parks			$\bar{D}$ Obs 2.68

Map Ref.		1st Nearest Neighbour	Distance (miles)
A	Southwark Park	Peckham Pk.& Common	2.5
B	Peckham Pk. & Common	Dulwich Park	1.2
C	Hilly Fields	Ladywell R.G.	0.7
D	Ladywell R.G.	Hilly Fields	0.7
E	Dulwich Pk.	Peckham Pk. & Common	1.2

Map Ref.		1st Nearest Neighbour	Distance (miles)
F	Charlton Pk.	Woolwich Common	0.6
G	Woolwich Common	Charlton Pk.	0.6
H.	Plumstead Common	Woolwich Common	1.6
I.	Eltham Park	Avery Hill Pk.	0.7
J.	Avery Hill Pk.	Eltham Pk.	0.7
K.	Elmstead Wds.	Chislehurst Common	1.5
L.	Chislehurst Common	Elmstead Wds.	1.5
M.	Keston Common	Norman Pk.	2.15
N.	Norman Pk.	Keston Common.	2.15
			Σ 17.8
		D Obs	1.27

3. Local Parks.

Map Ref.		1st Nearest Neighbour	Distance (miles)
1.	Sutcliffe Pk.	Queenscroft	0.7
2.	Maryon Pk.	Maryon W.	0.2
3.	Maryon W. Pk.	Maryon Pk.	0.2
4.	Abbey Wd. Pk.	Plumstead Gdns	0.8
5.	Eaglesfield	Shrewsbury Pk.	0.45
6.	Fairy Hill	Tarn	0.25
7.	Hornfair	Maryon Pk.	0.65
8.	Shrewsbury Pl.	Eaglesfield	0.45
9.	The Copse	Fairy Hill	0.6
10.	Plumstead Gdns.	Abbey Wd. Pks.	0.8
11.	Queenscroft	Well Hall Pleas.	0.5
12.	E. Greenwich Pleas.	Maryon Pk.	1.25
13.	Tarn	Fairy Hill	0.25
14.	Well Hall Pleas.	Queenscroft	0.5
15.	Horn Pk.	Northbrook Pk.	0.5
16.	Middle Pk. PF	Sidcup Rd. O.S.	0.3
17.	Sidcup Rd. O.S.	Middle Ph. PF	0.3
18.	Forster Memorial	Downham Wood	0.5
19.	Downham Fields	Downham Wood	0.35
20.	Mountsfield Pk.	Lewisham Pk.	0.4
21.	Chinbrook Meadow	Marvels Wd.	0.5
22.	Hornman Gdns.	One Tree Hill	0.7
23.	Sydenham Wells	Mayow Pk.	0.8
24.	Mayow Pk.	Home Pk.	0.5
25.	Deptford Pk.	Pepys Pk.	0.4
26.	Blythe Hill Pk.	Brenchley Gdns.	0.6
27.	Pepys Pk.	Deptford Pk.	0.4
28.	Senegal Fields	Deptford Pk.	0.5
29.	Telegraph Hill	Ravensbourne Pk.	1.0
30.	Lewisham Pk.	Mountsfield Pk.	0.4
31.	Northbrook Pk.	Home Pk.	0.5
32.	Manor Ho. Gdns.	Lewisham Pk.	0.8
33.	Home Pk.	Southend Pk.	0.4

Map Ref.		1st Nearest Neighbour	Distance (miles).
34.	Southend Pk.	Home Pk.	0.4
35.	Downham Woodland	Forster Memorial Park.	0.5
36.	Warren Ave,	Shaftsbury Pk.	0.7
37.	Ravensbourne Pk.	Telegraph Hill	1.0
38.	Geraldine Mary Harmsworth	Kennington Pk.	0.8
39.	Burgess Park. Park.	Kennington Pk.	0.8
40.	Belair	One Tree Hill	1.2
41.	Honor Oak	One Tree Hill	0.2
42.	Brenchley Gdns.	Honor Oak Pk.	0.3
43.	One Tree Hill	Honor Oak	0.2
44.	Betts Pk.	R.G. (S. Norwood)	0.45
45.	Alexandra Rg.	Home Pk.	0.6
46.	Blake R.G.	High Broom Wd.	0.4
47.	Cator Pk.	Alexandra R.G.	0.6
48.	Churchfields Rec.	Croydon Rd. R.G.	0.5
49.	Crease Pk.	Stanhope P.F.	0.3
50.	Croydon Rd. O.S.	Crease Pk.	0.4
51.	Coney Hall R.G.	Sparrows Den	0.35
52.	High Broom Wd.	Blake R.G.	0.4
53.	Kelsey Pk.	Crease Pk.	0.4
54.	South Hill Wd.	Pickhurst R.G.	0.5
55.	Sparrows Den.	Coney Hall R.G.	0.35
56.	Stanhope P.F.	Crease Pk.	0.3
57.	Well Wood	Coney Hall R.G.	0.6
58.	Hollydale O.S.	Farnborough Co.	0.7
59.	Church Ho. Gdns.	Martins Hill/Queensmead Pk.	0.2
60.	Havelock R.G.	Whitehall Rec.	0.4
61.	Kings Meadow R.G.	Shaftesbury Pk.	0.45
62.	Magpie Hill R.G.	Parkfields R.G.	0.4
63.	Martins Hall	Church Ho. Grounds	0.2
64.	Marvels Wd.	Mottingham R.G.	0.2
65.	Parkfield R.G.	Magpie Hall	0.4
66.	Pickhurst R.G.	Pickhurst Green	0.2
67.	Southborough O.S.	Parkfields R.G.	0.45
68.	Whitehall Rec.	Havelock R.G.	0.4
69.	Pickhurst Green	Pickhurst Rec.	0.2
70.	Chislehurst R.G.	Edgebury O.S.	0.8
71.	Edgebury O.S.	The Copse	0.7
72.	Mottingham R.G.	Mottingham S.B.	0.2
73.	Mottingham S.B.	Mottingham R.G.	0.2
74.	Farnboro. R.G.	Farnborough Co.	0.35
75.	Willet R.G.	Southboro O.S.	0.7
76.	Petts Wd. R.G	Southboro O.S.	0.7
77.	Famboro CO.	Famboro R.G.	0.35
78.	Shaftesbury Pk.	Downham Fields	0.4
79.	Poverest R.G.	Willet R.G.	0.9.

4. All Parks.

Metropolitan Parks.

Greenwich Pk/Blackheath	E. Greenwich Pleas.	0.9
Shooters Hill	Eaglesfield	0.35
Beckenham Place Pk.	Warren Ave. P.F.	0.6
Crystal Palace	Sydenham Wells	0.55
petts Wood	Willett R.G.	0.55
Hayes Co.	Well Wood	0.8
Bostall Heath & Wds.	Lesnes Abbey Woods	0.75

District Parks.

Southwark Park	Senegal Fields	0.6
Peckham Pk.	One Tree Hill	0.55
Hilly Fields	Ladywell Rec.	0.7
Ladywell Rec.	Lewisham Park	0.5
Dulwich Park	Belair R.G.	0.5
Charlton Park	Maryon Park	0.3
Woolwich Common	Hornfair Park	0.5
Plumstead Common	Plumstead Gdns.	0.6
Eltham Park	Shooters Hill	0.5
Avery Hill	Eltham Pk.	0.7
Elmstead Wds.	Marvels Wd.	0.4
Chislehurst Common	Chislehurst R.G.	0.85
Keston Common	Hollydale O.S.	0.9
Norman Park	Havelock R.G.	0.55

Local Parks.

Sutcliffe Park	Queenscroft	0.7
Maryon Park	Maryon Wilson Park	0.2
Maryon Wilson Park	Maryon Park	0.2
Abbey Wood Parks	Plumstead Gardens	0.8
Eaglesfield	Shooters Hill	0.35
Fairy Hill	Tarn	0.25
Hornfair	Charlton Park	0.4
Shrewsbury Park	Eaglesfield	0.45
The Copse	Fairy Hill	0.6
Plumstead Gardens	Plumstead Co.	0.6
Queenscroft	Well Hall Pleasance	0.5
E. Greenwich Pleasance	Greenwich Park/Blackheath	0.9
Tarn	Fairy Hill	0.25
Well Hall Pleasance	Queenscroft	0.5
Horn Park	Northbrook Park	0.5
Middle Park P.F.	Sidcup Road O.S.	0.3
Sidcup Road O.S.	Middle Park P.F.	0.3
Forster Memorial Park	Downham Wood	0.5
Mountsfield Park	Lewisham Park	0.4
Chinbrook Meadow	Marvels Wood	0.5
Hornimans Gardens	One Tree Hill	0.7

Sydenham Wells	Crystal Palace (M)	0.55
Mayow Park	Home Park	0.5
Deptford Park	Pepys Park	0.4
Blythe Hill Park	Ladywell Rec. Ground	0.5
Pepys Park	Deptford Park	0.4
Senegal Fields	Deptford Park	0.5
Telegraph Hill	Ravensbourne Park	1.0
Lewisham Park	Mountsfield Park	0.4
Northbrook Park	Horne Park	0.5
Manor House Gdns.	Lewisham Park	0.8
Home Park	Southend Park	0.4
Southend Park	Home Park	0.4
Downham Woodland	Forster Memorial Pk.	0.5
Warren Ave. P.F.	Beckenham Place Pk.	0.6
Ravensborne Park	Hilly Fields	0.8
Geraldine Mary Harmsworth Pk.	Kennington Park	0.8
Burgess Park.	Kennington Park	0.8
Belair Park	Dulwich Park	0.5
Honor Oak Park	One Tree Hill	0.2
Brenchley Gardens	Honor Oak Park	0.3
One Tree Hill	Honor Oak Park	0.2
Betts Park	S. Norwood R.G.	0.45
Alexandra R.G.	Home Park	0.6
Blake R.G.	High Broom Wood	0.4
Cator Park	Alexandra R.G.	0.6
Churchfields R.G.	Croydon Road R.G.	0.5
Crease Park	Stanhope P.F.	0.3
Croydon Road O.S.	Crease Park	0.4
Coney Hall R.G.	Sparrows Den P.F.	0.35
High Broom Wood	Blake R.G.	0.4
Kelsey Park	Crease Park	0.4
South Hill Wood	Pickhurst R.G.	0.5
Sparrows Den P.F.	Coney Hall R.G.	0.35
Stanhope P.F.	Crease Park	0.3
Well Wood	Coney Hall R.G.	0.6
Hollydale O.S.	Farnborough Common	0.8
Church House Gardens	Martins Hill/Queensmd.	0.2
Havelock R.G.	Whitehall R.G.	0.4
Kings Meadow R.G.	Shaftesbury Park	0.45
Magpie Hall R.G.	Parkfields R.G.	0.4
Martins Hill/Queensmead	Church Ho. Gardens	0.2
Marvels Wood	Mottingham R.G.	0.2
Parkfields R.G.	Magpie Hall R.G.	0.4
Pickhurst R.G.	Peckhurst Green	0.2
Southborough O.S.	Parkfields R.G.	0.45
Whitehall R.G.	Havelock R.G.	0.4
Pickhurst Green	Pickhurst R.G.	0.2
Chislehurst R.G.	Edgebury O.S.	0.8
Edgebury O.S.	The Copse	0.7
Mottingham Sports G.	Mottingham Rec. G.	0.2
Mottingham Rec. G.	Mottingham Sports G.	0.2
Farnborough R.G.	Farnborough Co.	0.35
Petts Wood R.G.	Southborough O.S.	0.7
Shaftesbury Park	Downham Fields	0.4
Farnborough Co.	Farnborough R.G.	0.35
Willett Road R.G.	Southborough O.S.	0.7
Poverest R.G.	Petts Wood R.G.	0.7

Σ 49.5

D Obs 0.49

APPENDIX IV(b) The Use of Single-Link Cluster Analysis in classifying public open space by facility.

Cluster analysis refers to a set of techniques which attempt to group a sample of objects (n) into (g) classes on the basis of similarity between (p) variables. In this analysis a hierarchical clustering technique known as the single link or nearest neighbour method is used to group a sample of parks into classes on the basis of similarity between their facilities. A computer programme devised by Hennessey was used to perform this analysis.[1] The workings of the method will be briefly outlined together with an evaluation of the suitability of its use in this context. This will be followed by a description of the data preparation and input.

The Method.

The first stage of the procedure involves the computation of a matrix of dissimilarity coefficients (d.c.) for each set of objects (parks) in the sample. The lower the dissimilarity coefficient for any pair of parks the more alike they will be in terms of the facilities they contain. When the coefficient is zero then the pair will be identical on this basis.

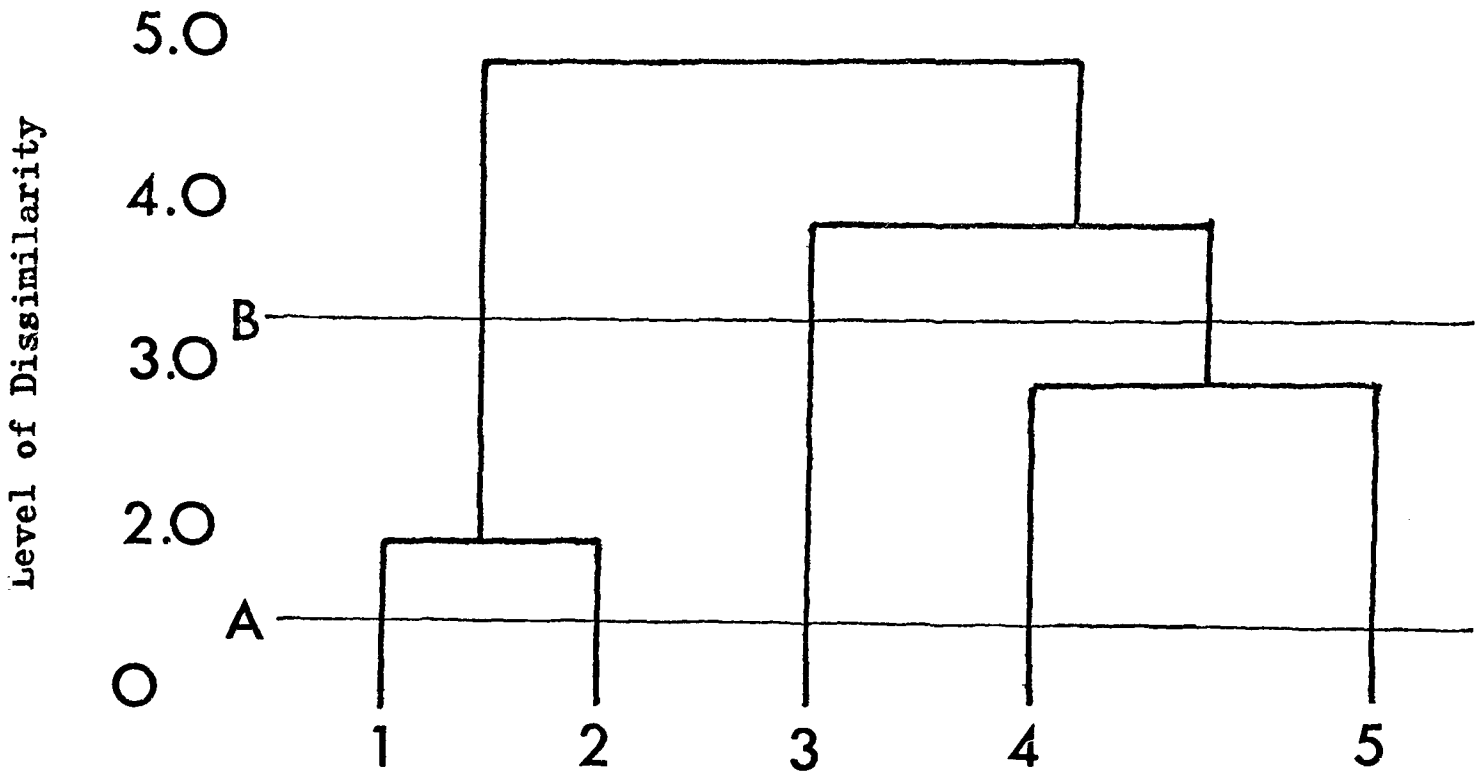
The pair or pairs with the lowest coefficients are fused to form a group at the lowest level of dissimilarity. The matrix is then re-computed to form dissimilarity coefficients between groups and the remaining individual objects in the set. From this second matrix pairs of objects or groups with the lowest coefficents are again fused to form further groups at the next lowest level of dissimilarity. This process continues by a series of

1. P.F. Hennessey. A Fortran Programme to perform Single Link Cluster Analysis (1974). Dissertation for BSc. (Hons.) Degree CNAA Polytechnic of N. London.

successive fusions until all the objects (parks) in the sample fuse to form one group at the highest level of dissimilarity.

The main output of this process is a dendrogram or tree-diagram illustrating the fusion of objects into groups at each particular level of dissimilarity.

Fig. IV(b) (i) Single Linkage Dendrogram.



In order to interpret the dendrogram a level of dissimilarity must be chosen to differentiate clusters of objects (parks) which offer the greatest level of explanation to the analysis. At dissimilarity value A there are no groups of objects, only individuals, but at B there are two groups.

The application of this method in order to test the presence of a hierarchy

of facilities among parks in south east London is very appropriate as the groups or clusters are arranged hierarchically insofar as identical pairs of objects (parks) cluster first, these then join other objects or groups of objects at a higher level of dissimilarity and so on until the entire set of objects forms one group at the highest level of dissimilarity.

There is a disadvantage of the single link method known as "chaining" which refers to the tendency of the method to cluster together at a relatively low level objects linked by chains of intermediates.[2] This results in optionally connected clusters but not necessarily homogeneous and compact clusters which would be most suitable in this context. Consequently discrete clusters in this analysis may not be homogeneous e.g. all parks with only playgrounds, but may include some open spaces with one or two other facilities which relate more closely to that cluster than to any other. Clusters, therefore, tend to be of a predominantly one type of facility although not exclusively of that type of facility.[3]

Data input.

Standardized data on the type and number of facilities of each park in south east London was card punched for input to the programme. There were three broad facility types containing a number of different facilities (see Table IV b (i)).

The data was weighted according to the number of each type of facility

2. See N. Jardine & R. Sibson (1968). The construction of hierarchic and non-hierarchic classifications. Computer Journal 11. 117-184. Also B. Everitt Cluster Analysis (1974). Heineman P. 61.
3. See Ch. 4. P. 217 et. seq.

contained in any individual park e.g. number of football pitches. This was done by applying a standardized score between 0 and 100 based on the range of units per facility for all parks. In the case of football pitches the range was between 0 and 28, the park containing the latter being assigned the value of 100 for its football pitches. Thus it was possible to compare parks not just by type of facility but by number of each type of facility. Table IV b (ii) shows the coding frame for the standardized score).

Table IV b(i) Park facilities data.

	Facility Type		Facilities
I	Sports	- Pitches	- Football - Hockey - Rugby - Cricket
		- Courts/ Greens	- Netball - 5-a-side - Tennis - Bowls - Putting
II	Children's facilities		- Playgrounds - Play clubs - Paddling pools
III	Specialist facilities		- Swimming pools - Athletics stadia - boating - floodlit pitches - museums/buildings - zoos - cafeterias

Fig. IV b (ii)

Coding Frame for Facility Weighting

			Score
A	FOOTBALL	1	4
		2	7
		3	11
		4	14
		5	18
		6	21
		7	25
		8	29
		9	32
		10	36
		11	39
		12	43
		13	46
		14	50
		28	100
B	HOCKEY	1	50
		2	100
C	RUGBY	1	33
		2	66
		3	100
D	CRICKET	1	8
		2	15
		3	23
		4	31
		5	38
		6	46
		7	54
		8	62
		9	69
		10	77
		11	85
		12	92
		13	100
E	NETBALL	1	25
		2	50
		3	75
		4	100
F	5-A-SIDE		100

			Score
G	TENNIS	1	6
		2	11
		3	17
		4	22
		5	28
		6	33
		7	39
		8	44
		9	50
		10	56
		18	100
H	BOWLS	1	50
		2	100
I	SWIMMING		100
J	PUTTING		100
K	ATHLETICS		100
L	BOATING		100
M	PADDLING		100
N	PLAYGROUND		100
O	KIDS CLUBS		100
P	FLOODLIGHTING		100
Q	PUBLIC BUILDINGS		100
R	CAFES		100
S	ANIMALS & AVIARIES		100

CHAPTER 5. PUBLIC OPEN SPACE POLICY AND THE USE OF OPEN SPACE FOR INFORMAL RECREATION IN SOUTH EAST LONDON.

The physical characteristics of the size, spacing and distribution of open space represent only one dimension of the Greater London Development Plan hierarchy of provision. The other is the expected use that will be made of different park types by the community. These are closely related as the use made of a park will depend on its intrinsic characteristics - size, facilities and location.

Certain aspects of the use of open space in south east London for informal recreation have been developed earlier.[1.] At this stage a more detailed analysis will be made to see how far the use of open space in the study area replicates the expected use of parks in the hierarchy. The expected use refers to visiting characteristics i.e. the distance people can be expected to travel to different park types and the nature of the visit they made and the types of visitor. These are given in Table 5 and extracted from the original formulation of the hierarchy.[2.]

Table 5. Expected use of parks in G.L.D.P. hierarchy

	Type	Main Function	Distance from home.
1.	Metropolitan Park	Weekend or occasional visits by car or public transport	2 miles, or more where the park is appreciably larger.
2.	District Park	Weekend or occasional visits by foot	$\frac{3}{4}$ mile

1. See Ch. 3. Section 3.3(a) P. 154.
2. G.L.C. Greater London Development Plan : Approved by Secretary of State for the Environment on 9th July 1976. (London: G.L.C., 1976) P.88 Table 7.

3.	Local Park	For pedestrian visitors including nearby workers	$\frac{1}{4}$ mile
4.	Small Local Park	Pedestrian visits especially by old people, children and workers at midday; particularly valuable in high density areas.	$\frac{1}{4}$ mile or less

From the survey of park users in south east London[3.] it will be possible to test these "expected" visiting characteristics against "actual" visiting characteristics. Following Chapter 4, size is taken as the independent component upon which visiting characteristics are dependent.

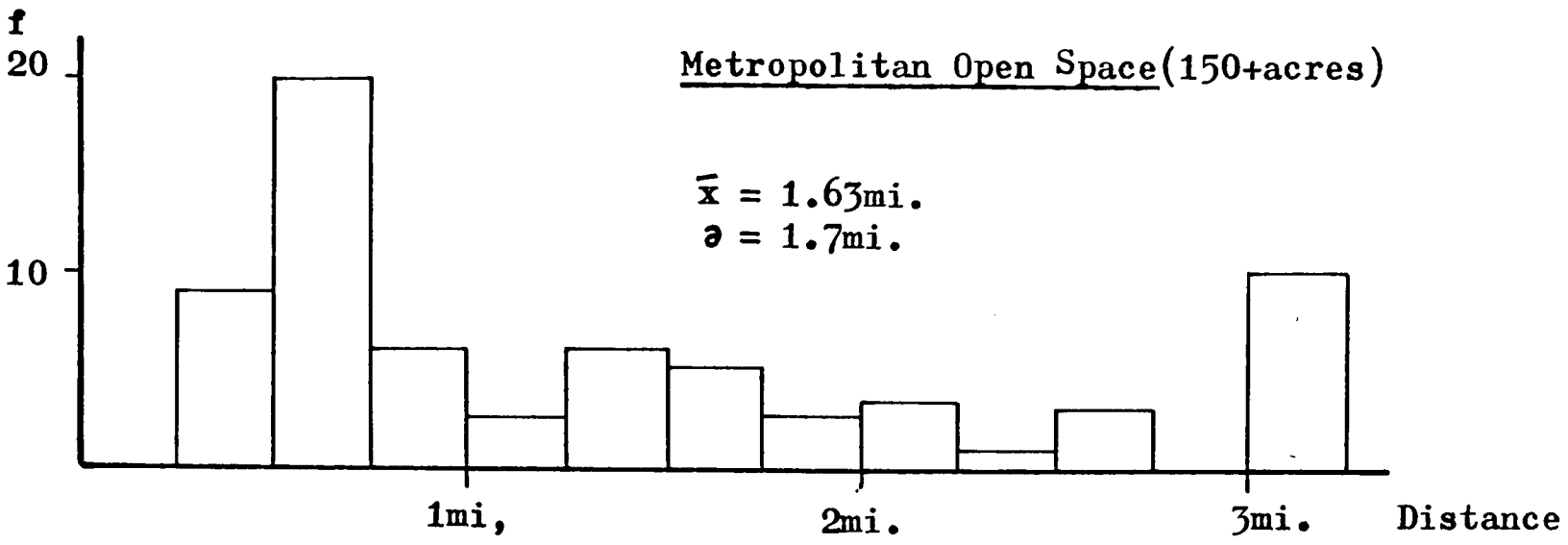
5.1 Size of Park and Distance Travelled.

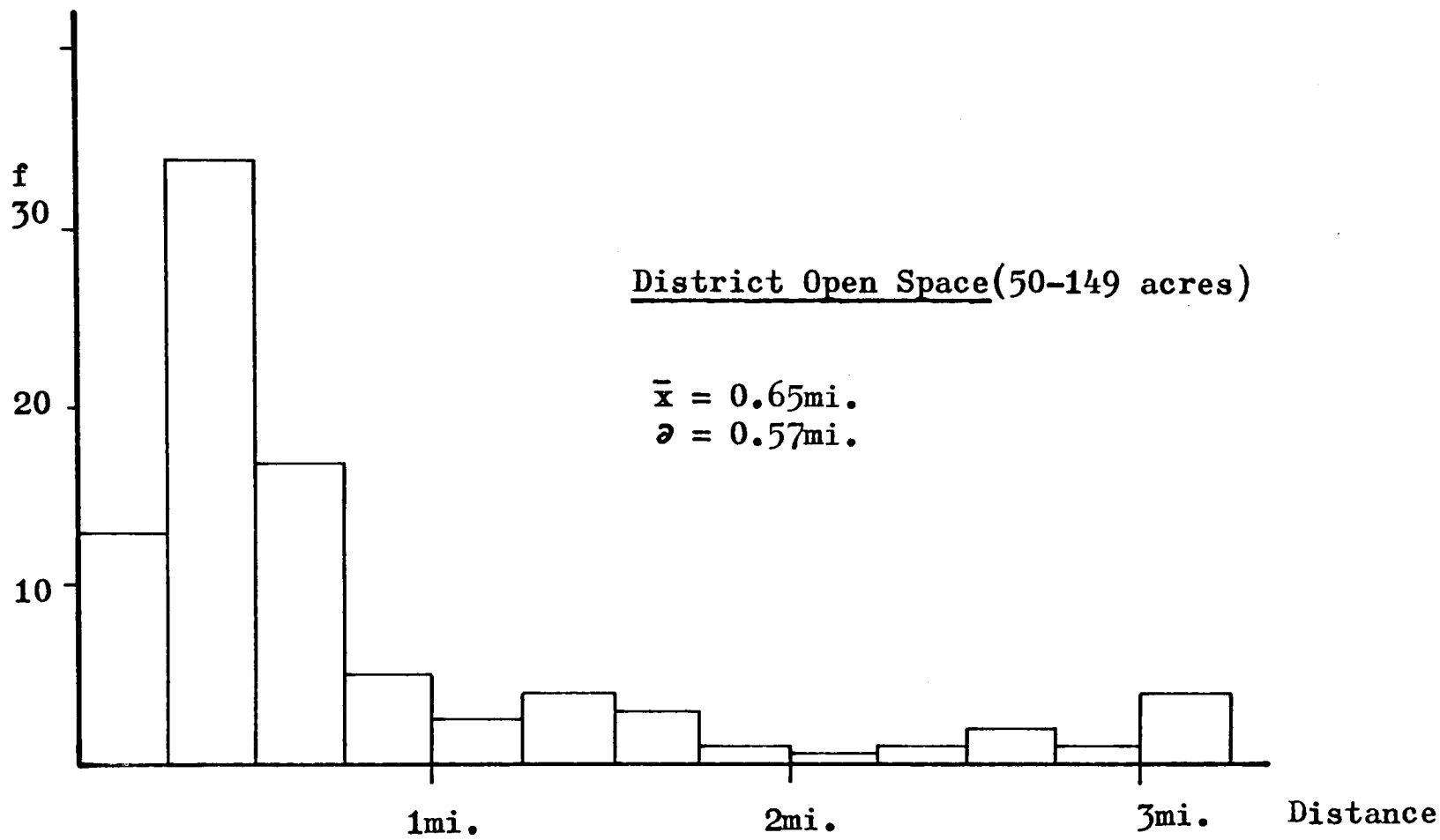
The distance from home outlined in Table 5 represents the maximum distance that an individual should be required to travel to a park of that size. The analysis below will examine the average distances and the frequency distribution of distances travelled to parks of metropolitan, district and local types in south east London.

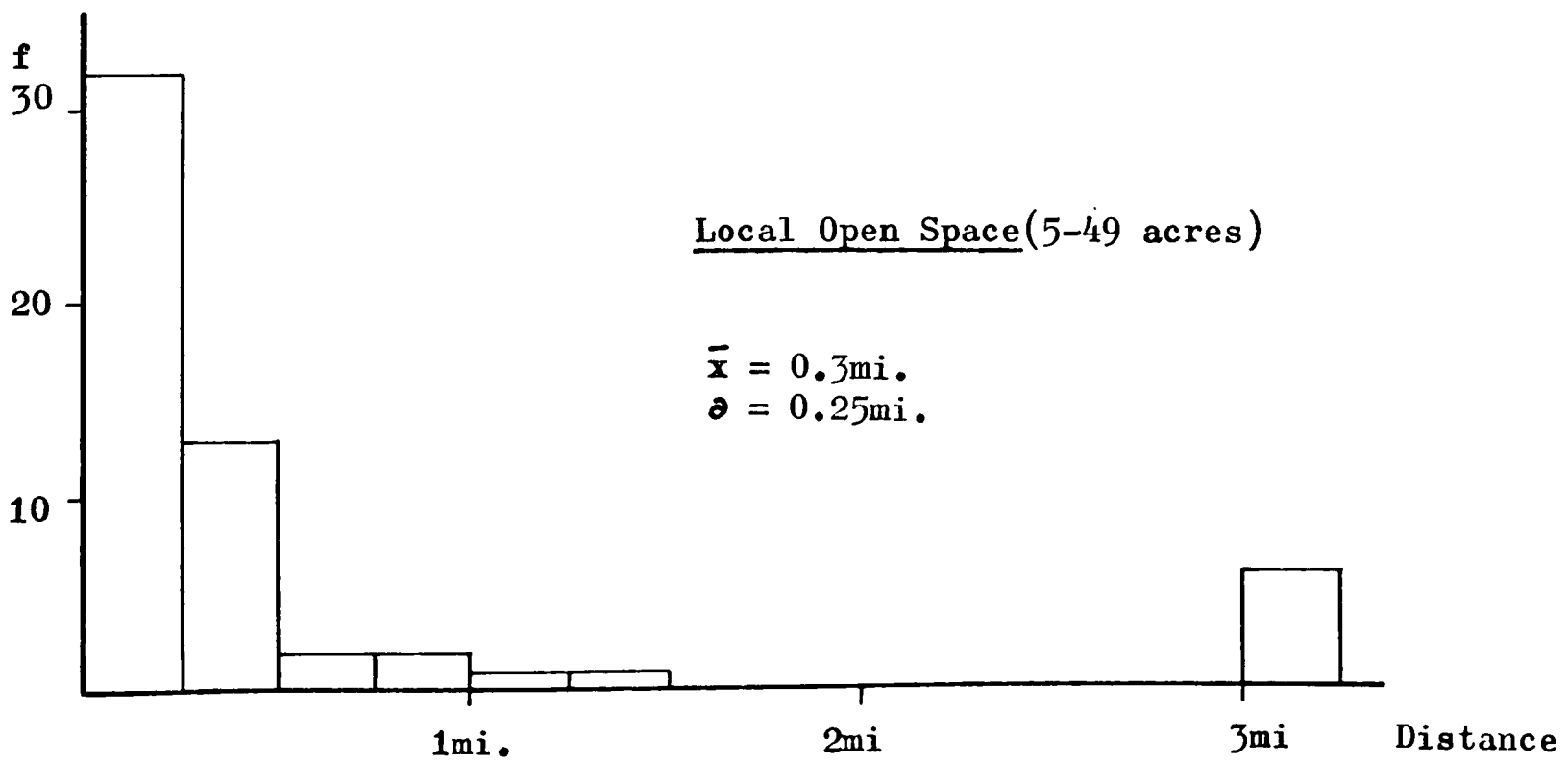
Fig. 5.1 shows the frequency distribution of distances travelled by respondents to parks of different sizes. There are proportionately more visitors from over a mile to metropolitan parks than to district and local parks (nearly half of all visitors). The local parks have the most skewed distribution with 80% of visitors travelling less than $\frac{1}{2}$ mile. Both district and local parks have a number of visitors from over three miles. The explanation for this, in each case, is that the visit is primarily to a facility contained within the park and not the park itself

3. See Appendix V(a) for details of survey. P. 254.

Fig 5.1 Distances travelled to parks of different sizes







Source: See Appendix V(b) Table 2.

e.g. the Imperial War Museum in Geraldine Mary Harmsworth Park, Southwark.

These visits were considered atypical for district and local parks and were excluded from the calculation of average distance travelled.[4] Fig. 5.1 shows the average distances ranging from 1.63 miles for metropolitan open space to 0.3 miles for local open space. These averages conform closely with the G.L.C. findings on the relationship between size of park visited and distance travelled.[5]

Similarly the standard deviation (σ)[6] decreases as the size of park visited decreases Table 5.1 interprets this statistic showing that the variation

Table 5.1

Metropolitan parks.	95% of visits within	5 miles
District parks	" "	1.77 miles
local parks	" "	0.79 miles

about the mean is much greater for metropolitan than for the other park types.

The implication of this analysis is that the larger the park, the farther people are prepared to travel. There is one finding which does not conform to this general conclusion: in some cases the effect of facilities located within parks has a considerable influence on distance travelled, in spite

4. See Appendix V(b) P. 262 et. seq.
5. G.L.C. Dept. of Planning & Transportation. Surveys of the use of Open Space. (2 vols; Research Paper No. 2; London: GLC, 1968) I, P.76, para 270.
6. Standard deviation is a measure of dispersion about the mean (see Appendix V(b)). P. 262.

of size. The G.L.D.P. Report of Studies acknowledges in passing that:-

> "a parks catchment area is related to its acreage and, to a lesser extent, to its facilities." [7.]

The Report does not substantiate this claim or show the "extent" of this relationship. From a qualitative analysis of data for south east London, the type of facility which attracts visitors from a long distance tends to be specialist sports facilities such as athletics stadia or unique leisure or cultural facilities e.g. museums, rather than any typical park facilities.

5.2 Size of Park and other visiting characteristics.

From Table 5.1 four components of park visiting are explicitly stated in relation to the four park types: frequency of visit; time of visit; mode of travel and distance travelled. There are two implicit components which are not stated but which are related: length of visit to park, trip time to park. The relationship between these components can be summarized as follows:-

Table 5.2 –

Visiting characteristics.

(a) High Frequency	(b) Low Frequency
Any time	Weekend
Travel by foot	Travel by car or public transport
Short distances	Longer distances
Short visiting time	Longer visiting time
Short journey time	Longer journey time

7. G.L.C. Dept. of Planning & Transportation, Greater London Development Plan. Report of Studies (London: GLC, 1969) P. 123, para 5.17(c).

The G.L.D.P. hierarchy suggests that local and small local parks would cater for the visits characterised by (a) and metropolitan and district parks would cater for (b) type visits. From the survey of park users in south east London an attempt will be made to show whether:-

(a) the components listed in Table 5.2 are related

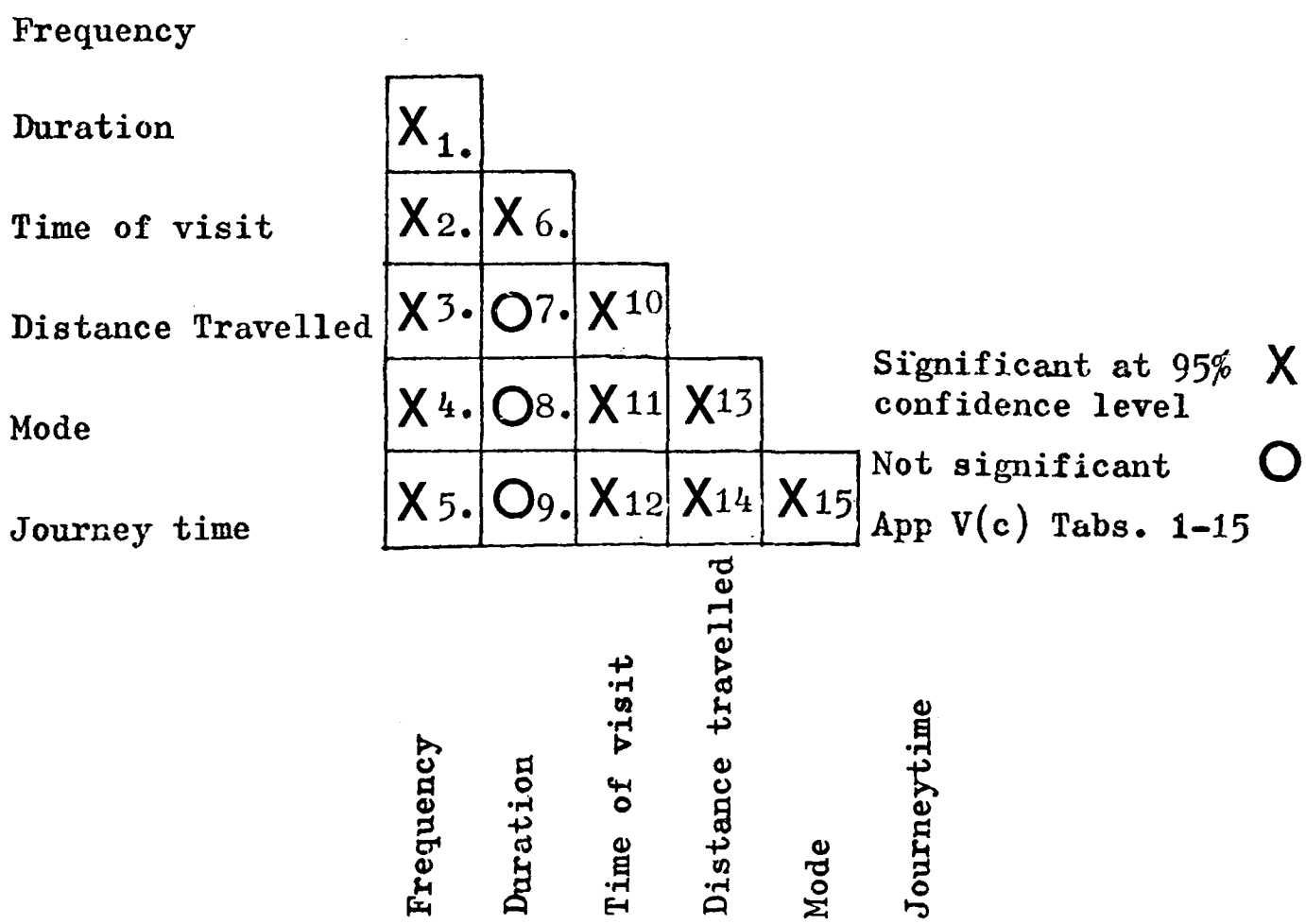
(b) the visit types (a) and (b) are associated with different park types

Chi-square analysis will be used to test these relationships and their significance.[8]

(a) Inter-relationships between park visiting characteristics: S.E.London.

Table 5.2(a) summarizes the significant and non-significant relationships that were found to exist between characteristics of visits to parks in the study area.

Table 5.2(a) Matrix of Associations between park visiting characteristics



8. See Appendix V(c) for details of Chi-square analysis and contingency tables. P. 268.

Certain sets of relationships emerge:-

(i) frequency is associated with all other trip characteristics and the nature of the relationship can be summarized as follows: more frequent trips are associated with shorter stays in parks, occur at any time, are over shorter distances, take a shorter time and are made by foot. For less frequent trips the converse is true. This conforms with the expected trip characteristics in Table 5.2 based on the G.L.D.P. hierarchy.

(ii) time of week of visit is related to all other characteristics: weekend visits tend to be less frequent, of longer duration, and the journey distance and time tend to be greater with mode of travel being by motorized transport. The reverse is true for visits which occur at any time - either weekday or weekend.

(iii) distance travelled, mode of travel and journey time are closely related: the longer the distance, the longer the journey time and the more likely the journey will be made by motorized transport. Conversely shorter journeys take less time and tend to be made by foot. These are self-evident relationships which would be expected to occur; distance being the independent variable upon which time of journey and mode depend.

(iv) The matrix also indicates an absence of significant relationships betweer duration of visit and other trip characteristics, with the exception of time of visit when weekend visits tend to be of longer duration.

The G.L.C. surveys of open space confirmed the relationships identified as significant in the foregoing analysis: frequency was found to be related

to other visiting characteristics;[9]. distance, mode of travel and journey time were found to be inter-related.[10]. The survey also found that duration of visit[11]. and time of visit[12]. were significantly related to other visiting characteristics.

The lack of significant association between duration of visit and other characteristics in south east London may be due to the categories "two hours or less" and "over two hours" as not being sensitive enough to indicate positive relationships with the other variables. Intuitively one would expect length of stay at parks to be related to all the other characteristics, and in fact it is related to time of visit. At a slightly lower confidence level duration of visit would also be significantly related to journey time, shorter trips being associated with shorter stays.

Consequently the relationships expected to exist in the G.L.D.P. hierarchy are in the main shown to occur in the use of open space in south east London.

(b) Park types and visiting characteristics.

The foregoing analysis will be extended to test whether relationships exist between size of park and the trip characteristics. Table 5.2(b) shows

9. G.L.C. Dept. of Planning & Transportation, Surveys of the Use of Open Space. op.cit. I P. 16 Table 6.
   Ibid I, P. 17 Fig. 4 & 5
   Ibid I, P. 26 Table 18
10. Ibid I, P. 22 Table 13
11. Ibid I, P. 19 Table 11
   Ibid II, P. 101 Table 82
12. Ibid I P. 16 Table 6
   Ibid I P. 17 Fig 4 & 5
   Ibid I P. 18 Table 8.

both the significant and non-significant relationships which were found to exist for parks in south east London.

Table 5.2(b) - Matrix of associations between size of park and visiting characteristics.

Visiting characteristics	Size of Park	Table No. (App V(c))
Frequency	0	16
Duration	0	17
Time of visit	0	18
Distance travelled	X	19
Mode	X	20
Journey time	X	21

Significant X
(at 95% confidence level)
Not significant 0

The only significant set of relationships to emerge is between park size and distance travelled, mode of travel and journey time. Larger parks attract visitors from greater distances, whose journeys tended to be by motorized transport and take a longer time. The converse is true of smaller parks. Consequently it is only the spatial aspects of the hierarchy which can be supported by empirical data for parks in south east London. The aspatial characteristics of frequency, duration and time of visit are not significantly associated with size of parks. The explanation for this lies in the nesting of functions implicit in the G.L.D.P. hierarchy. Each larger park type in the hierarchy is assumed to encompass the function of the next smaller park type. Consequently large metropolitan parks and small

local parks will have high frequency, short duration visits made at any time, although metropolitan parks should have more low frequency, longer duration weekend visits. This possibly blurs the relationship which cannot be detected by means of chi-square analysis, whereas the spatial aspects are more obvious and apparent and exhibit positive relationships with park size.

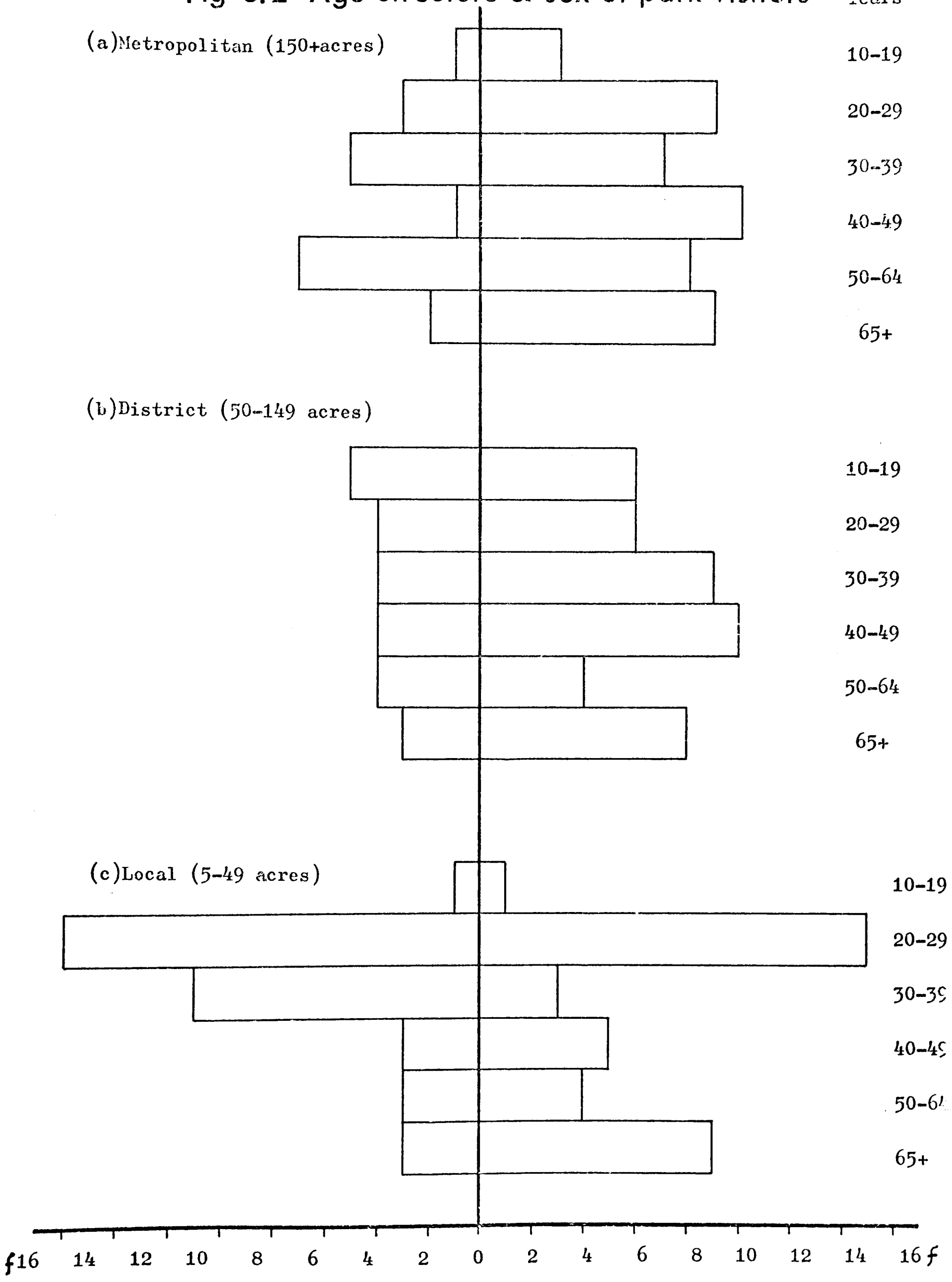
The G.L.C. surveys confirmed these findings indicating relationships betweer size of park and distance travelled and mode of travel.[13] In addition significant relationships were found to exist between size of open space and frequency, time and duration of visits.[14] For the reason outlined in the previous paragraph the analysis used for park visiting data for south east London failed to show these relationships, although it can be concluded that they are present.

(c) Size of park and type of user.

A limited analysis of the demographic characteristics of park users was made in relation to the size of park visited. Fig. 5.2 indicates the age/sex structure of visitors to metropolitan, district and local sized parks. For the metropolitan and district parks there are larger numbers of male respondents and fewer female respondents fairly evenly distributed across all the age ranges. The presence of the middle aged as well as

13. Ibid I, P. 28 Table 19
Ibid I P. 23 Table 15
14. Ibid I P. 20 para. 78, P. 24 Tab. 17
Ibid I,P. 18 para. 62, P. 18 Table 7
Ibid I,P.20 para. 70, P. 19 Table 11.

Fig 5.2 Age structure & sex of park visitors



young and old suggests that these parks may attract visiting by family groups

In contrast the age structure of visitors to local open spaces shows a high proportion of young male and female respondents between 20-29 years and a considerable number of women between 30 and 39 years. Women, possibly with young children, make more use of smaller, local parks. There is also an increased number of retired male visitors which tends to suggest that local open space is fulfilling its function for the less mobile members of the community. These findings are broadly confirmed by the G.L.C. surveys[15]. and are contained within the hierarchy. Balmer also obtained similar findings for parks in Liverpool which he incorporated into his own hierarchy of provision.[16]

5.3 A hierarchy of use.

The foregoing analysis in the main supports the three sets of findings on which the G.L.C. have developed the hierarchy viz:-

(i) The inter-relationships between visiting characteristics

(ii) Size-distance relationships.

(iii) Size of park and types of user.

(i) The inter-relationships which were found to exist between visiting characteristics of users of parks in south east London (5.2(a)), conform with two of the three types of demand for general recreation in parks which emerged from the G.L.C. surveys viz:-

(a) short distance/short duration high frequency use.

15. Ibid I, P. 73 para 262
16. Liverpool City Planning Department - Use of Open Space in Liverpool. op.cit P. 35-36 and P.53

(b) more selective longer distance/lower frequency family and weekend use

(c) Very much more selective low frequency and special occasion use.[17.]

The latter type was not distinguished for south east London and was also not supported by the findings of a survey of open space use in Liverpool.[18.]

(ii) The G.L.C. findings were related to further findings on the relationship between park size and distance people were prepared to travel, to form the empirical basis for the hierarchy of provision. The size - distance relationships are summarized as follows:-

Size of Park (acres)	Average radius[19.] of catchment area (GLC)	Average radius (S.E. London).
2 - 49	up to 0.25 mi	0.3 mi
50 - 149	up to 0.75 mi	0.65 mi
150 and over	2 - 5 mi	1.63 mi

The south east London survey broadly confirms these findings the average radius being slightly greater for parks 2 - 49 acres, and less for larger parks.[20.] Balmer's study suggests that catchment area is not soley affected by size of open space, but also by the facilities it contains. Parks betweer 2 - 100 acres can have catchment radii of $\frac{3}{4}$ - 1 mile or 2 - 3 miles depending

17. G.L.C. Surveys of the Use of Open Space. op.cit I, P.71 para. 253
18. Liverpool City Planning Dept. op.cit P. 20 para. 34.
19. G.L.C. Greater London Development Plan : Report of Studies. op.cit P. 123 para. 5.17 (c)
20. See Fig. 5.1

on characteristics and unique facilities which the park may contain.[21] The analysis in 5.1 also suggests that facilities, particularly those which are unique e.g. a museum or specialist sports facility, may have a considerable effect on catchment area, which over-rides the effect of size. In these instances it is the facility that is the primary attraction and not the park. The G.L.C. Report of Studies does not acknowledge this factor.[22] Certainly the effect of typical park facilities does not appear to have a great attraction for visitors. There was not a significantly greater proportion of visitors to parks in south east London containing 5 or more facilities compared with those containing less.[23]

(iii) Finally the identification of demand groups based on age and sex which are associated with different sizes of parks and are confirmed for south east London and Liverpool, are the remaining element of the hierarchy.

With the exception of the effect of unique facilities on catchment area, the analysis in 5.1 and 5.2 supports the three sets of findings which form the basis of the hierarchy. However the combination of the visiting characteristics and size-distance relationships do not necessarily suggest a hierarchy, nor is it at all evident that:-

"The survey clearly indicates that some form of a hierarchical concept is required to describe the demands expressed."[24]

21. Liverpool City Planning Department. op.cit P. 36.
22. G.L.C. Greater London Development Plan : Report of Studies. op.cit. P.123, para 5.17 (c).
23. See Ch. 3 Section 3.3(a) P. 154.
24. G.L.C. Surveys of the Use of Open Space. op.cit. I, P.73 para. 265.

The findings of the south east London survey and the G.L.C. surveys which show relationships between size of park and distance travelled and other visiting characteristics, and the nesting function that is implicit in these findings, does lend support to a hierarchy of open space based on size and function. However analysis in Chapter 3 suggests that there is a preference for visiting large parks as opposed to small,[25.] a finding which was also found to be true by the G.L.C.[26.] A "large" park demand was identified based on a direct relationship between the volume of visits to parks and their size. Furthermore the G.L.C. found that there exists a "short distance" demand, as a large proportion of visitors were willing to travel up to 0.25 miles regardless of the size of park.[27.] From these findings it might be equally well implied that parks of 50 acres and over should be located within a short distance of every home. This is acknowledged in the Report of Studies.[28.] Consequently the hierarchy does not necessarily follow from the analysis of this chapter or of the G.L.C. surveys, although it can be made to fit these findings.

The hierarchy of open space provision is one of a number of possible planning policies supported by findings on use and it is pertinent to ask whether such a policy should be adopted in the absence of any physical evidence of a hierarchy of open space occurring in south east London.[29.]

The validity of the hierarchy can also be questioned in terms of variation

25. See Ch. 3 Section 3.3(a) P. 154 et. seq.
26. G.L.C. Surveys of the Use of Open Space. op.cit. I, P. 72 Fig. 15 & 16.
27. Ibid I, P. 72-73 paras 256-260
28. G.L.C. Greater London Development Plan, Report of Studies. op.cit. P. 123 para 5.21.
29. Ch. 4 Sec. 4.4 P. 221 et. seq.

in the patterns of use of open space that may occur within the metropolitan area. It has been shown that the factors affecting recreational demand vary considerably over south east London.[30] The foregoing analysis has indicated certain relationships which are true for the whole study area which lend support to the hierarchy. It has not shown any variations in use within the study area. This will be developed more fully in Chapter 6 where the patterns of use of open space by schoolchildren will be examined.

30. Ch. 3 Sec. 3.4 P.167 et. seq.

APPENDIX V (a) Details of User Survey of Open Space in South East London.

Sample: A systematic random sample of visitors was taken for a cross-section of parks, selected (non-randomly) on the basis of size, characteristics and location. Table V(a)(i) indicates the parks selected, grouped according to size type of G.L.D.P. hierarchy, and the number of interviews conducted.

Fig. V(a) is an accompanying location map. A sample size of 250 was chosen, although only 222 interviews were attempted due to manpower constraints. 216 interviews were successfully completed with a small refusal rate of 2.5%.

Table V(a) (i).

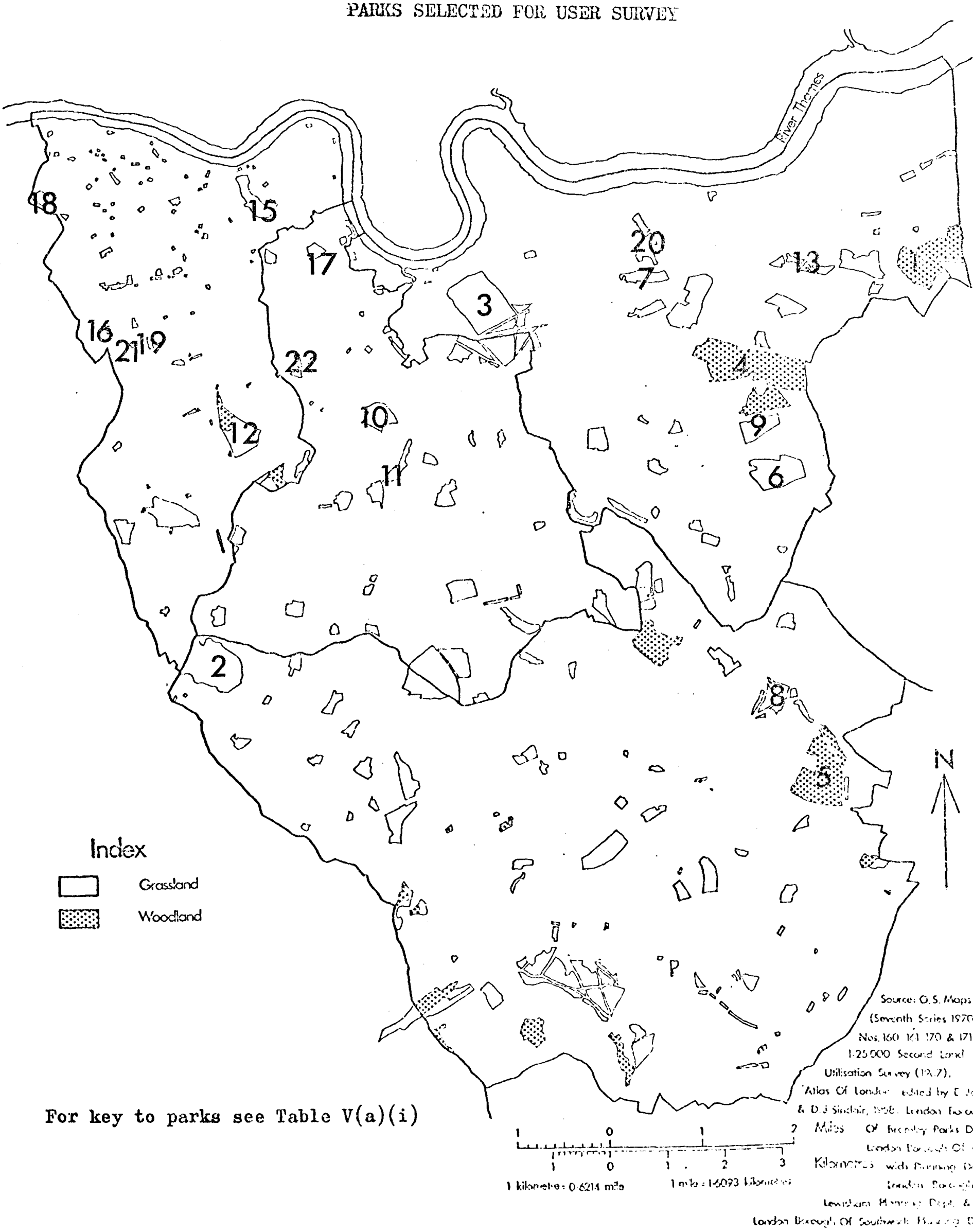
Metropolitan Open Spaces	Interviews completed	Map ref.
Bostall Woods	10	1
Crystal Palace Park	13	2
Greenwich Park	23	3
Oxleas Woods	19	4
Petts Woods	4	5
	69	
District Open Spaces		
Avery Hill Park	6	6
Charlton Park	7	7
Chislehurst Common	5	8
Eltham Park	3	9
Hilly Fields Recreation Ground	14	10
Ladywell Recreation Ground	16	11
Peckham Park and Common	14	12
Plumstead Common	13	13
Southwark Park	11	14
	89	
Local/Small Local Open Spaces.		
North Camberwell Open Space (Burgess Park)	7	15
Camberwell Green	3	16
Deptford Park	20	17
Geraldine Mary Harmsworth Park	8	18
Lucas Gardens	12	19
Maryon Wilson Park	2	20
St. Giles Gardens	2	21
Telegraph Hill Park	4	22
	58	

Sampling errors.

As the survey is a sample of park users the information derived from it is

Fig V(a)(i) Public Open Space

PARKS SELECTED FOR USER SURVEY



Source: O.S. Maps (Seventh Series 1970) Nos. 160, 161, 170 & 171, 1:25,000 Second Land Utilisation Survey (1970), 'Atlas Of London' edited by D. Jones & D.J. Sinclair, 1968, London Borough Of Bromley Parks Dept. London Borough Of Greenwich with Planning Dept. London Borough Of Lewisham Planning Dept. & London Borough Of Southwark Planning Dept.

For key to parks see Table V(a)(i)

subject to a certain amount of error. The size of the error will depend on the size of the sample, the larger the sample the smaller will be the sampling error. The sample size of the survey of park users was 216. Table V(a)(ii) gives the range of the sampling error at the 95% confidence level i.e. percentages based on the survey should be interpreted as follows:-

"there is a 95 out of 100 chance that the true value of this statistic is between ....% and .....%

Table V(a)(ii). Percentage of sample with attribute			+ 1.96 SE. - %
50	:	50	6.7
45	:	55	6.6
40	:	60	6.5
35	:	65	6.4
30	:	70	6.1
25	:	75	5.8
20	:	80	5.3
15	:	85	4.8
10	:	90	4.0
5	:	95	2.9

Questionnaire design.

The layout and content of the questionnaire (appended) is substantially the same as the household survey questionnaire. It differs in two respects: there is a section at the beginning giving details of the park, and the time and weather conditions when the interview took place; it refers specifically to the site where the interview is taking place.

Fieldwork.

The survey was conducted in May and June 1972 and 1973. Twelve student volunteers were briefed on techniques of interview. Within each selected open space interviewers would site themselves at a suitable vantage point (a main gate, crossing of paths) and would interview the person to whom they were nearest at ten minute intervals. Bias was avoided by not placing interviewers at any particular facility within parks.

The timing of interviews is critical with regard to the use of open space. Interviewers were sent out at a variety of times, both weekday and weekends. Predominance was given to weekend and weekday evenings interviewing as being the most busy times.

Data processing.

Information contained in the completed questionnaires was converted into numeric form and transcribed onto coding sheets. These were used as the punching documents from which to punch information onto cards. The data was input to the I.C.L. survey analysis package XDSB and run on Thames Polytechnic's I.C.L. 1900 computer.

T H A M E S P O L Y T E C H N I C

Inter-school Division of Geography. RECREATIONAL USE OF OPEN SPACE II. USER SURVEY

Details of Interview.

Location in park/open space.....

Day.....Time of interview.....

Weather: Sunny; fair; cloudy; (delete).

PART I. GENERAL USE.

1. When did you last visit this open space? (specify which)

within the last week	(1)
" " month	(2)
" " three months	(3)
" " year	(4)
over a year ago	(5)
never	(6)

2. How often do you usually go to this open space?

more than once per week	(7)
once per week	(8)
Once every two weeks	(9)
once every month	(10)
once every three months	(11)
less than once every three months	(12)

3. Do you usually visit it

on a weekday	(13)
at the weekend	(14)

and at what time do you visit?

morning	(15)
afternoon	(16)
evening	(17)
all day	(18)

4. What is your main reason for coming here?

for a walk	(19)	
to exercise dog	(20)	
to watch/play sports or games	(21)	
to take out children	(22)	
to go for picnic/outing	(23)	
to attend open air activity (other thansport)	(24)	(specify.....)
to visit something of particular interest	(25)	(" " .....)
to use facilities	(26)	(" " .....)

5. Is this the main purpose of your visit?

yes (27)
no (28)

if no, was it combined with a

shopping trip (29)
worktrip/lunchbreak (30)
a visit to see friends or relatives (31)

6. How long do you usually stay here?

..... (32)

7. How did you travel here?

walking	(33)	cycle	(37)
car	(34)	motorcycle/ scooter	(38)
bus	(35)	other	(39)
train	(36)		

if you came by car did you have any difficulty parking?

yes (40)
no (41)

and where did you park it?

..... (42)

8. How long did the journey take?

..... (43)

9. Would you please tell me where you have come from? (exact address if poss.)

.....(44)

10. Is there any open space nearer to your home than this one?

yes (45)
no (46)

if yes, which one

..... (47)

Why did you visit this open space and not the nearer one)

..... (48)

11. Is there anything you particularly like about this open space?

..... (49)

or anything you particularly dislike?

..... (50)

12. Do you think the provision of facilities here could be improved by any of these?

cafes	(51)	facilities for old people	(55)	
toilets	(52)	" " children	(56)	
parking space	(53)	" " sports/games	(57)	N.B. If facilities are considered adequate tick here ( )
litter bins/ benches	(54)	other (specify)	(58)	

PART I IFOR MOTHERS OR ESCORTS WITH CHILDREN

13. How often do you bring your child/children here?

more than once per week	(59)
once per week	(60)
once per month	(61)
once every three months	(62)

14. Do you usually bring him/her/them here

on a weekday	(63)
at the weekend	(64)

and at what time?

morning	(65)
afternoon	(66)
evening	(67)

15. How do/does your children/child spend their/his/her time here?

..... (68)

16. Do you know if this open space has any playscheme or organised activities for children?

yes	(69)
no	(70)

if yes does/do your child/children take part in them?

yes	(71)
no	(72)

if no (70) do you think something of this nature should be provided?

yes	(73)
no	(74)

PART III FOR THOSE PLAYING SPORTS OR GAMES

17. Which sport are you going to play?

..... (75)

18. Are you using this open space as a member of a sports club?

Yes	(76)
no	(77)

if yes which one?

..... (78)

19. How often do you play?

more than once per week (79) once per month (81)
once per week (80) once per 3 months (82)

20. On what day of the week do you play?

..... (83)

and at what time?

..... (84)

21. Are the facilities for sport adequate in this open space?

yes (85)
no (86)

if no, what provision should be made?

..... (87)

PART IV PROFILE DATA

22. Age/Sex matrix.

Interviewee	0 - 9 m. f.	10-19 m. f.	20-29 m. f.	30-39 m.f.	40-49 m. f.	50-64 m. f.	65+ m. f.	
.....								
Others(specify)								(88)
1.....								(89)
2.....								(90)
3.....								(91)

23. Employment/education matrix.

	employment ft.	pt.	unemp.	retired	occupation	education (school leaving age)	
Interviewee							
Others(specify							(92)
1.....							(93)
2.....							(94)
3.....							(95)

24. Do you own a car yes (96) no (97)

if yes do you go for day trips to the countryside in it?
yes (98) no (99)

if yes, where do you go?

.....(100)

Why do you go there? .....(101)

25. Do you own your house (102) rent from council (103) rent from landlord(104)

26. Do you have a garden yes (105) no (106)

APPENDIX V(b)

Table 1. Distances travelled to Metropolitan, District and Local Parks.

(a) Metropolitan Open Space

Park.	Distance (mi)	No. of facilities
Bostall Woods	5.94 0.25 2.0 0.69 2.0 0.56 0.31 1.63 2.69	0
Crystal Palace	1.44 3.81 2.69 0.94 2.31 0.81 0.31 0.44 0.56	11
Greenwich Park	0.56 0.38 10.0 3.56 0.5 1.06 1.44 0.5 1.81 0.38 4.63 0.44 0.75 0.69 0.75 0.56 1.63 2.63 3.88 0.81 0.81 0.56 6.19 1.44 1.63 0.5 0.6	8

Park	Distance (mi)	No. of facilities
Oxleas Woods	0.56	3
	2.13	
	1.38	
	0.44	
	0.69	
	4.63	
	1.88	
	1.06	
	1.44	
	0.69	
	0.69	
	0.69	
	1.19	
	1.5	
	1.5	
	3.75	
	0.68	
	4.64	
	1.4	
Petts Wood	0.56	0
	0.6	
	0.6	
	0.36	
	Σ 111.13	
	$\bar{x}$ 1.63	
	σ 1.7	

(b) District Open Space

Park	Distance (mi)	No. of facilities
Avery Hill	0.24	8
	0.44	
	0.4	
	1.88	
	(3.56)	
	0.4	
Charlton Park	0.24	9
	0.86	
	(5.2)	
	0.36	
	0.36	
	0.16	
	0.32	
	0.24	
Chislehurst Common	0.24	0
	0.4	
	0.5	
	0.5	
Eltham Park	0.24	8
	1.04	
	0.6	

Park	Distance(mi)	No. of facilities
Hilly Fields Recreation Ground	0.44	8
	0.22	
	0.34	
	0.13	
	0.16	
	0.19	
	2.78	
	0.28	
	0.34	
	0.28	
	0.31	
	1.56	
	0.57	
	(12.0)	
Ladywell Recreation Ground	0.22	9
	0.66	
	0.59	
	0.41	
	0.38	
	0.41	
	0.41	
	0.38	
	0.56	
	0.25	
	0.38	
	0.31	
	0.31	
	0.84	
	(3.06)	
Peckham Park & Common	1.69	9
	0.94	
	1.38	
	2.38	
	0.56	
	1.44	
	0.5	
	0.69	
	0.31	
	0.25	
	0.44	
	0.75	
	0.56	
	1.69	
Plumstead Common	0.91	0
	0.44	
	0.41	
	0.34	
	0.34	
	0.41	
	0.63	

Park	Distance (mi).	No. of facilities.
Plumstead Common (cont.).	0.72	0
	0.63	
	0.44	
	0.22	
	0.5	
	0.5	
Southwark Park	0.38	9
	0.63	
	2.63	
	0.44	
	1.19	
	2.5	
	0.38	
	0.19	
	1.25	
	1.25	
	Σ 54.04 (excludes distances of 3 mi.+)	
	$\bar{x}$ 0.65	
	σ 0.57	

(c) Local Open Space.

N. Camberwell Open Space	0.28	6
	0.16	
	0.2	
	0.44	
	0.08	
	0.16	
	0.32	
Camberwell Green	1.24	1
	0.12	
	0.12	
Deptford Park	0.94	8
	0.38	
	0.19	
	0.19	
	0.19	
	0.19	
	1.25	
	0.25	
	(4.0)	
	0.19	
	0.19	
	0.13	
	0.19	
	0.10	
	0.19	
	0.31	
	0.38	
	0.25	
	0.38	
	0.38	

Park	Distance (mi)	No. of facilities.
Geraldine Mary Harmsworth Park	0.16	11
	0.24	
	0.68	
	0.5	
	0.25	
	(3.0)	
	(3.25)	
	(+25.0)	
Lucas Gardens	0.88	0
	0.24	
	0.08	
	0.2	
	0.2	
	0.2	
	0.2	
	0.2	
	0.2	
	0.2	
	(3.5)	
	0.25	
Maryon Wilson Park	0.24	1
St. Giles Gardens	0.2	2
	0.2	
Telegraph Hill Park	0.28	4
	0.2	
	0.16	
	(5.25)	
Σ	15.35 (excludes distances of 3mi.+)	
$\bar{x}$	0.3	
σ	0.25	

Notes on calculations.

mean distance $\bar{x} = \frac{\Sigma x}{n}$

where Σx sum of distances
n = no. of visitors

e.g. Metropolitan Parks

$$\bar{x} = \frac{111.13}{68} = 1.63 \text{ mi}$$

standard deviation $\sigma = \sqrt{\left(\frac{\Sigma x^2}{n} - \bar{x}^2\right)}$

where Σx the sum of squared distances

n no. of visitors
$\bar{x}^2$ squared mean distance

e.g. Local Parks

$$\sigma = \sqrt{\left(\frac{7.9195}{51} - 0.3^2\right)} = 0.39 \text{ mi.}$$

Table 2.

Size of Park by Distance Travelled.

Miles	Metropolitan (150+ acres)	District (50-149 acres)	Local (0-49 acres)
0 - 0.24	-	13	32
0.25 - 0.49	9	34	13
0.50 - 0.74	20	17	2
0.75 - 0.99	6	5	2
1.00 - 1.24	3	2	1
1.25 - 1.49	6	4	1
1.50 - 1.74	5	3	-
1.75 - 1.99	2	1	-
2.00 - 2.24	3	-	-
2.25 - 2.49	1	1	-
2.50 - 2.74	3	2	-
2.75 - 2.99	-	1	-
3.00	10	4	6
Total	68	87	57

APPENDIX V(c) Use of contingency tables and chi-square analysis in testing for relationships between park visiting characteristics.

The chi-square test (χ^2) can be used to evaluate whether or not frequencies which have been empirically obtained differ significantly from those which would be expected under a certain set of theoretical assumptions. This test can be applied to frequencies which have been cross-classified to form contingency tables e.g.

Frequency of Park Visiting

Time taken to reach park	once per week or more	less than once per week	
15 mins. or less.	10	2	12
	(6)	(6)	
Over 15 mins.	2	10	12
	(6)	(6)	
	12	12	

It can be assumed that the frequency of visiting is not affected by the time taken to reach parks.

The figures in brackets represent the expressed frequencies that would occur under this hypothesis. By using the χ^2 test it is possible to compare observed with expected frequencies and test whether they are significantly different. If they are then the original hypothesis must be rejected in favour of saying that frequency of park visiting is affected by the time taken to reach a park.

Calculation.

$$\chi^2_{(calc.)} = \sum \frac{(O - E)^2}{E}$$

where O = Observed frequencies

E = Expected frequencies

In the aforementioned simplified example the formula is substituted as follows:-

$$\chi^2_{(calc)} = \frac{(10 - 6)^2}{6} + \frac{(2 - 6)^2}{6} + \frac{(2 - 6)^2}{6} = \frac{(10 - 6)^2}{6} = 10.66$$

Testing for Significance

As with other measures of association it is necessary to test for significance. In the above example two hypotheses are tested:

H_o (null hypothesis) frequency of park visiting is independent of time taken to reach parks.

H_1 (alternative hythesis) frequency of visiting is related to time taken.

If the calculated chi-square is greater than that which would have occurred by chance then the alternative hypothesis is accepted i.e. that these park visiting characteristics are significantly associated.

The calculated chi-square statistic is tested against a theoretical chi-square distribution whose magnitude varies depending on:

(i) the significance level chosen (α). In the subsequent analysis a 95% confidence level (0.05) will be used so that where $\chi^2_{(calc)} \geq \chi^2_{(0.05)}$ there is a 95% probability that the relationship will be significant.

(ii) degrees of freedom (d.f.). This depends on the number of cells in the contingency tables obtained as follows:-

$$(r - 1)(C - 1)$$

Where r and C are the numbers of rows and columns.

As the $\chi^2_{(calc)}$ statistic increases as the size of table increases then the theoretical chi-square necessary for significance at the 95% confidence level will also be larger as degrees of freedom will increase.

In the above example if the confidence level is 95%

and d. f. = 1

then $\chi^2_{(0.05)} = 3.841$

$\chi^2_{(calc)} > \chi^2_{(0.05)}$

indicating that the alternative hypothesis (H_1) is accepted and that there is a relationship between these variables.

Interpretation of Statistic.

The presence of a significant association identified by the χ^2 test gives no indication of the direction or the strength of the relationship. It is usually possible to ascertain intuitively whether the relationship is positive or negative e.g. in the above example observation suggests that there is an inverse relationship: as journey time increases frequency of visiting decreases.

The strength of the relationship cannot be ascertained from the magnitude of χ^2 (calc) although there are tests which can be used. In this analysis it is sufficient to know whether significant relationships exist or not.

Table 1. Frequency of Visit by Duration of Visit
Frequency of Visit

Duration of Visit	More than once per week	Once per week/ once per 2 weeks	Less than once per 2 weeks	
Less than 2 hours	86 (83.4)	31 (27.1)	18 (24.5)	135
Over 2 hours	40 (42.6)	10 (14.3)	19 (12.5)	69
				20 ∴
	126	41	37	204

Ho: Duration of visit independent of frequency of visit

H_1: Duration of visit associated with frequency of visit

$\alpha = 0.05$
d.f. $= 2$
$\chi^2_{0.05} = 5.99$
$\chi^2_{(calc)} = 7.2$

$H_1 > H_o$ at the 95% confidence level $\therefore$ H_1 is accepted.

Table 2. Frequency of Visit by Time of Visit
Frequency of Visit

Time of visit	More than once per week	1 per wk/ 1 per 2 wks.	Less than once per 2 wks.	
Anytime	103 (82.5)	17 (26.3)	11 (22.2)	131
Weekend	16 (36.5)	21 (11.7)	21 (9.8)	58
	119	38	32	189

$\alpha = 0.05$ $\quad \chi^2_{(0.05)} = 5.99$
d.f. $= 2$ $\quad \chi^2_{(calc)} = 45.7$

Ho: Frequency of visit is independent of time of week.

H_1: Frequency of visit is associated with time of week.

$H_1 >$ Ho at the 95% confidence level $\therefore$ H_1 is accepted.

Table 3. Frequency of Visit by Time of Visit
Frequency of Visit

Time of visit	More than once per week	once per week/ once per 2 weeks.	Less than once per 2 weeks	
Weekday	39 (27.3)	9 (14.9)	9 (14.9)	57
Weekend	16 (27.7)	21 (15.1)	21 (15.1)	58
	55	30	30	115

Ho: Time of visit independent of frequency of visit

H_1: Time of visit associated with frequency of visit.

$\alpha = 0.05$ $\quad \chi^2_{0.05} = 5.99$
d.f. = 2 $\quad \chi^2_{(calc)} = 19.25$

$H_1 > H_o$ at the 95% confidence level $\therefore$ H_1 is accepted.

Table 4. Frequency of Visit by Distance Travelled
Frequency of Visit

Distance travelled	More than once per week	Once per week/ once per 2 weeks.	Less than once per 2 weeks	
0.75 miles or less	106 (92.5)	30 (28.7)	16 (30.8)	152
Over 0.75 miles	23 (36.5)	10 (11.3)	27 (12.2)	60
	129	40	43	212

$\alpha = 0.05$ $\quad \chi^2_{0.05} = 5.99$
d.f. = 2 $\quad \chi^2_{calc} = 32.23$

Ho = Frequency of visit and distance travelled to park are independent

H_1 = Frequency of visit is related to distance travelled to park.

$H_1 >$ Ho at 95% confidence level $\therefore$ H_1 is accepted.

Table 5 Frequency of Visit by Mode

Mode	More than once per week	Once per week/ once per 2 weeks	Less than once per 2 weeks	
Walking/ Cycling	107 (97.6)	31 (31.5)	21 (3.0)	159
Motorized transport	20 (29.4)	10 (9.5)	18 (9.0)	48
	127	41	39	207

α = 0.05
d.f. = 2

$\chi^2_{0.05}$ = 5.99
χ^2(calc) = 15.64

Ho = Frequency of visit and mode of travel are independent

H_1 = Frequency of visit is associated with mode of travel

$H_1 >$ Ho at the 95% confidence level $\therefore$ H_1 is accepted.

Table 6 Frequency of Visit by Journey Time

Journey time	More than once per week	Once per week/ once per 2 weeks	Less than once per 2 weeks	
Under 15 minutes	96 (87.6)	36 (31.0)	16 (29.4)	148
Over 15 minutes	20 (28.4)	5 (10.0)	23 (9.6)	48
	116	41	39	196

Ho: Journey time independent of frequency of visit

H_1: Journey time associated with frequency of visit

α = 0.05
d.f. = 2

$\chi^2_{(0.05)^2}$ = 5.99
$\chi^2_{(calc)^2}$ = 32.4

$H_1 >$ H_o at the 95% confidence level $\therefore$ H_1 is accepted.

Table 7. Duration of Visit by Journey Time.

Time of Visit	Duration of Visit. 2 hours or less	Over 2 hours	
Anytime	103.5 (97.6)	37.5 (43.4)	141
Weekend	33.5 (39.4)	23.5 (17.6)	57
	137	61	198

α = 0.05 $\quad \chi^2(0.05)$ = 3.84

d.f. = 1 $\quad \chi^2(calc)$ = 4.02

Ho: Duration of visit and time of visit are independent

H_1: Duration of visit is related to time of visit

$H_1 >$ Ho at the 95% confidence level $\therefore$ H_1 is accepted.

Table 8. Duration of Visit by Distance Travelled.

Distance	Duration of visit 2 hours or less	Over 2 hours	
0.75 mi. or less	116.5 (115.5)	27.5 (28.5)	144
Over 0.75 mi.	49.5 (50.5)	13.5 (12.5)	63
	166	41	207

α = 0.05 $\quad \chi^2(0.05)$ = 3.84

d.f. = 1 $\quad \chi^2(calc)$ = 0.14

Ho : Duration of visit and distance travelled are independent.

H_1 : Duration of visit is related to distance travelled

Ho $> H_1$ at the 95% confidence level $\therefore$ Ho is accepted.

Table 9 Duration of Visit by Mode of Travel.
Duration of Visit.

Mode of Travel	2 hours and under	Over 2 hours.	
Walking/ Cycling	105.5 (104.9)	44.5 (50.1)	155
Motorized transport	26.5 (27.1)	13.5 (12.9)	40
	132	63	195

Ho = Duration of visit and mode of travel are independent

H_1 = Duration of visit is associated with mode of travel.

Ho $>$ H_1 $\therefore$ independent

α = 0.05 $\quad$ $\chi(0.05)^2 = 3.84$

d.f. = 1 $\quad$ $\chi(calc)^2 = 0.05$

Table 10. Duration of Visit by Journey Time.
Duration of visit

Journey time	2 hours and under	Over 2 hours	
15 minutes and under	101.5 (96)	45.5 (51)	147
Over 15 minutes	28.5 (34)	23.5 (18)	52
	130	69	199

α = 0.05 $\quad$ $\chi(0.05)^2 = 3.84$

d.f. = 1 $\quad$ $\chi(calc)^2 = 3.5$

Ho = Duration of visit and journey time are independent

H_1 = Duration of visit is associated with length of journey

Ho $>$ H_1 at 95% confidence level $\therefore$ Ho is accepted.

Table 11. Time of Visit by distance travelled.

Distance travelled	Time of visit: Anytime	Weekends	
0.75 mi or less	104.5 (98.7)	39.5 (45.3)	144
Over 0.75 mi	30.5 (36.3)	22.5 (16.7)	53
	135	62	197

$\alpha = 0.05$ $\quad \chi^2(0.05) = 3.84$

d.f. = 1 $\quad \chi^2(\text{calc}) = 4.02$

Ho: Time of visit is independent of distance travelled to park.

H_1: Time of visit is related to distance travelled to park.

$H_1 >$ Ho at the 95% confidence level $\therefore$ H_1 is accepted.

Table 12. Time of visit by mode of travel.

Mode of travel	Time of visit: Anytime	Weekend.	
Walking/ Cycling	105.5 (100)	40.5 (44)	144
Motorized transport	26.5 (32)	17.5 (14)	46
	132	58	190

$\alpha = 0.05$ $\quad \chi^2(0.05) = 3.84$

d.f. = 1 $\quad \chi^2(\text{calc}) = 4.1$

Ho : Time of visit and mode of travel are independent

H_1 : Time of visit is related to mode of travel.

$H_1 >$ Ho at the 95% confidence level $\therefore$ H_1 is accepted.

Table 13. Time of Visit by Journey Time

Journey time	Time of visit: Anytime	Time of visit: Weekend	
15 minutes or less	98.5 (92.1)	38.5 (44.9)	137
Over 15 minutes	20.5 (26.9)	19.5 (13.1)	40
	119	58	177

$\alpha = 0.05$ $\quad \chi^2(0.05) = 3.84$

d.f. = 1 $\quad \chi^2(\text{calc}) = 6.0$

Ho: Time of visit and journey time to park are independent

H_1: Time of visit is related to journey time to park.

$H_1 >$ Ho at the 95% confidence level $\therefore$ H_1 is accepted.

Table 14. Distance Travelled by Mode.

Mode	Distance travelled: .75 miles or less	Distance travelled: more than 0.75 miles	
Walking/Cycling	139.5 (112.6)	22.5 (49.4)	162
Motorized transport	8.5 (35.4)	42.5 (15.6)	51
	148	65	213

$\alpha = 0.05$ $\quad \chi^2(0.05) = 3.84$

d.f. = 1 $\quad \chi^2(\text{calc}) = 87.9$

Ho = Distance travelled and mode of travel are independent

H_1 = Distance travelled is associated with mode of travel.

$h_1 >$ Ho at the 95% confidence level $\therefore$ H_1 is accepted.

Table 15. Distance travelled by Journey Time.

Journey time	Distance travelled: 0.75 mi or less	Distance travelled: Over 0.75 mi	
15 mins or less	140.5 (122.6)	33.5 (51.4)	174
Over 15 mins	2.5 (20.4)	26.5 (8.6)	29
	143	60	203

α = 0.05 $\chi^2(0.05) = 3.84$

d.f. = 1 $\chi^2(\text{calc}) = 61.48$

Ho = Distance travelled is independent of journey time

H_1 = Distance is associated with journey time

$H_1 >$ Ho at the 95% confidence level $\therefore$ H_1 is accepted.

Table 16 Mode of Travel by Journey Time.

Journey time	Mode of travel: Walking	Mode of travel: Motorized transport	
Under 15 mins	122.5 (114.9)	23.5 (31.1)	146
Over 15 mins	25.5 (33.1)	16.5 (8.9)	42
	148	40	188

Ho: Mode of travel is independent of journey time

H_1: Mode of travel is associated with journey time

α = 0.05 $\chi^2(0.05) = 3.84$

d.f. = 1 $\chi^2(\text{calc})^2 = 10.6$

$H_1 >$ Ho at the 95% confidence level $\therefore$ H_1 is accepted.

Table 17 Size of Park by Frequency of Visit

Size of park.

Frequency	150 acres or over	50-149 acres	0-49 acres	
More than once per week	35 (41.1)	60 (53.4)	32 (32.5)	127
Once per week/ once per two weeks	17 (13.3)	13 (17.2)	11 (10.5)	41
Less than once per two weeks	15 (12.6)	14 (16.4)	10 (10.0)	
	67	87	53	207

α = 0.05 $\quad \chi^2(0.05) = 9.49$

d.f. = 4 $\quad \chi^2(\text{calc}) = 4.6$

Ho = Size of park is independent of frequency of visit

H_1 = Size of park is associated with frequency of visit

Ho $>$ H_1 at 95% confidence level $\therefore$ Ho is accepted.

Table 18 Size of park by Duration of Visit

Size of park

Duration of visit	150 acres or more	50-149 acres	Less than 50 acres.	
Two hours or less	43 (45.7)	61 (57.6)	35 (35.7)	139
Over two hours	26	26	19	71
	69	87	54	210

α = 0.05 $\quad \chi^2(0.05) = 5.99$

d.f. = 2 $\quad \chi^2(\text{calc}) = 1.13$

Ho = Size of park and length of stay are independent

H_1 = Size of park is related to length of stay

Ho $>$ H_1 at 95% confidence level $\therefore$ Ho is accepted.

Table 19 Size of Park by Time of Visit

Time of visit	Size of park: 150 acres or more	50-149 acres	Less than 50 acres.	
Anytime	41 (46.9)	57 (55.4)	42 (37.7)	140
Weekends	25 (19.1)	21 (22.6)	11 (15.3)	57
	66	78	53	197

α = 0.05 $\quad \chi^2(0.05) = 5.99$

d.f. = 2 $\quad \chi^2(\text{calc}) = 4.43$

Ho: Size of park and time of visit are independent

H_1: Size of park is related to time of visit

Ho $>$ H_1 at the 95% confidence level $\therefore$ Ho is accepted.

Table 20 Size of Park by Distance Travelled

Distance	Size of park: 150+ acres	50-149 acres	0-49 acres	
0.75 miles or less	28 (43.5)	65 (57)	44 (36.5)	137
More than 0.75 miles	40 (24.5)	24 (32)	13 (20.5)	77
	68	89	57	214

α = 0.05 $\quad \chi^2(0.05) = 5.99$

d.f. = 2 $\quad \chi^2(\text{calc}) = 22.7$

Ho = Size of park is independent of distance people are prepared to travel.

H_1 = Size of park is associated with distance people are prepared to travel.

$H_1 > Ho \quad \therefore \quad H_1$ is accepted at 95% confidence level

Table 21. Size of Park by Mode of Travel

Mode of Travel	Size of park: 150+ acres	50–149 acres	0–49 acres	
Walking	39 (50.8)	73 (65.5)	47 (42.7)	159
Motorized transport	30 (18.2)	16 (23.5)	11 (15.3)	57
	69	89	58	216

α = 0.05 $\quad \chi^2_{0.05} = 5.99$

d.f. = 2 $\quad \chi^2_{(calc)} = 15.3$

Ho = Size of park is independent of mode of travel of visitors.

H_1 = Size of park is associated with mode of travel of visitors

H_1 Ho H_1 is accepted at the 95% confidence level

Table 22 Size of Park by Journey Time

Journey time	Size of park: 150 acres or over	50–149 acres	0–49 acres	
15 minutes or under	42 (49.4)	64 (58.9)	43 (40.7)	149
Over 15 minutes	26 (18.6)	17 (21.1)	13 (15.3)	
	68	81	56	205

α = 0.05 $\quad \chi^2_{0.05} = 5.99 \quad \chi^2_{0.10} = 4.61$

d.f. = 2 $\quad \chi^2_{(calc)} = 5.77$

Ho = Size of park is independent of journey time

H_1 = Size of park is related to journey time

Ho > H_1 at the 95% confidence level $\therefore$ H_o is accepted.

H1 > Ho at the 90% confidence level $\therefore$ H_1 is accepted

CHAPTER 6. THE USE OF PUBLIC OPEN SPACE BY SCHOOLCHILDREN

The introductory analysis of the use of open space for informal recreation in Chapter 3 compared the main differences in use between adults and children, and between teenagers and younger children. At that stage some reference was made to the size and type of park visited. That analysis will now be developed in a similar way to that of Chapter 5 to test the effect of size and type of park on distance travelled, and also on the other visiting characteristics of schoolchildren. The inter-relationships between visiting characteristics will be compared with those of adults and also with the G.L.D.P. hierarchy. If the patterns of use differ substantially from those of adults and those expected in the G.L.D.P, it may be that a hierarchy of provision will be inappropriate to the needs of children.

The analysis of the last chapter will be developed further to examine the effects of location on the use of open space by children. Any differences in visiting patterns between different parts of south east London may also suggest that a hierarchy of provision which is applied uniformly may be inappropriate to meeting differing needs. Such findings may also be applicable to the adult population.

The analysis is based on a survey of schoolchildren[1]. which because of its structure and size has enabled locational analysis to be undertaken. Where possible comparison will be made with the G.L.C's own survey of schoolchildren,[2]. based on a sample of schools in Inner London in 1964.

1. See Appendix VI(a) for details of survey. P. 298 et. seq.
2. G.L.C. Planning Department. Surveys of the Use of Open Space (2 vols; Greater London Research Paper No. 2; London: G.L.C, 1968) Ch. 5.

The use of open space for informal recreation is only one facet of the outdoor recreation of children. The use of open space for sport will be considered in Chapter 7, although no analysis will be made of school activities or the use of educational playing fields.

6.1 Inter-relationships between park visiting characteristics.

Within the G.L.D.P. hierarchy children are considered as an important sub-group of general users of public open space. Provision for children is only specifically mentioned in the hierarchy in relation to local and small local open space.[3.] The G.L.C. intends that small local parks of less than five acres should be used by young children, accompanied by a parent with limited time available, who require specialised play facilities at a short distance from home. The provision of play areas in local parks (5-49 acres) is for older children who can travel farther afield unaccompanied. Although not mentioned explicitly in the hierarchy, the playing fields that district parks offer together with play areas and playgrounds provide facilities for both older and younger children. The same is true of metropolitan parks, and in addition the hierarchy anticipates that children will visit these large parks as members of a family group on outings.

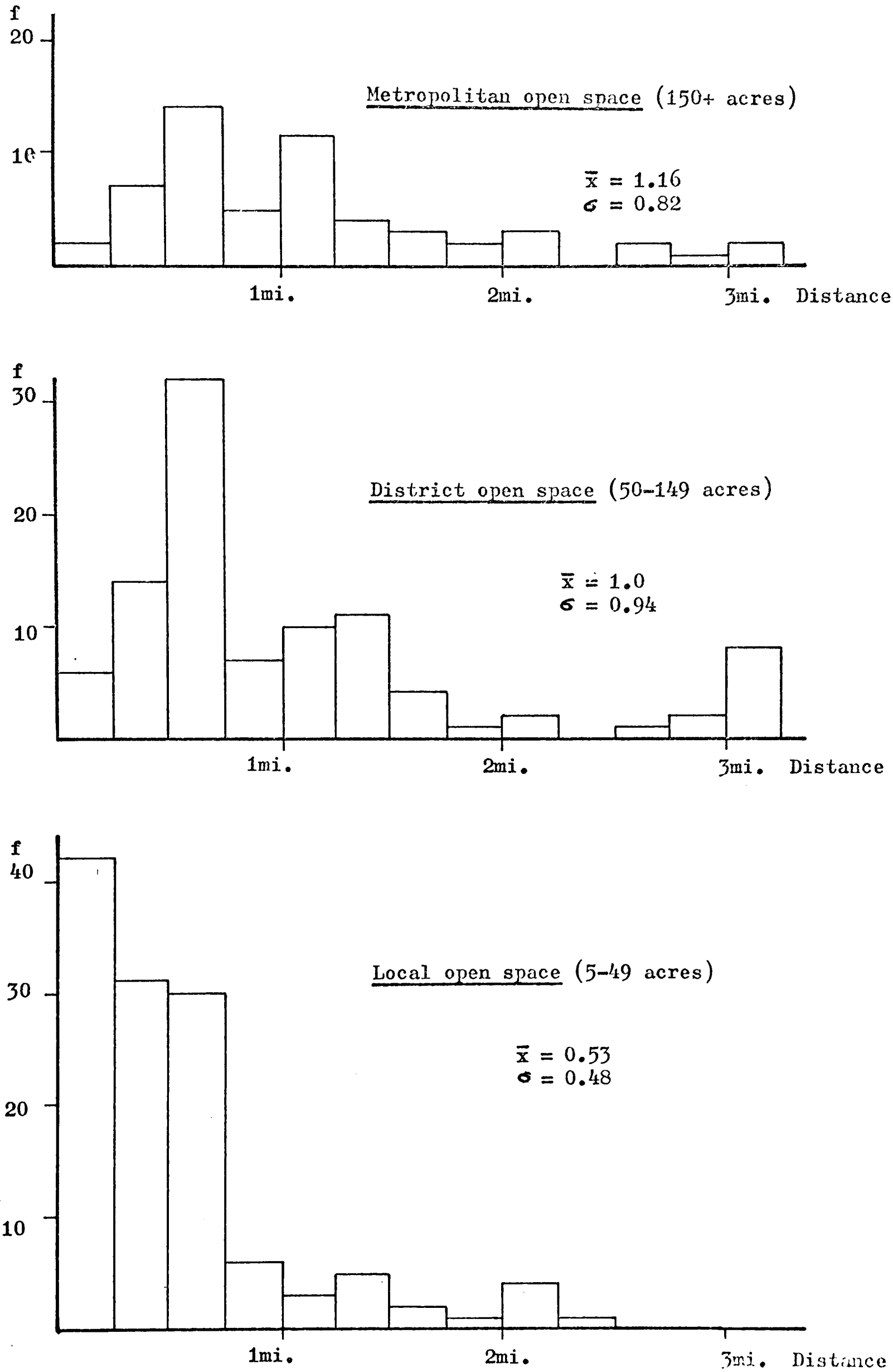
The visiting characteristics of children accompanied by their parents will inevitably reflect adult patterns. The following analysis will concentrate solely on the visiting characteristics of unaccompanied children.

(a) Size of park and distance travelled.

Fig. 6.1(a) shows the frequency distribution of distances travelled by

3. See Ch. 1 Table 1.2(d) (i) P. 33.

Fig 6.1(a) Size of park by distance travelled by schoolchildren



Source: See Appendix VI(b) Table 2.

schoolchildren visiting parks of different sizes in south east London. The distance profiles for metropolitan and district open space display a degree of similarity insofar as proportionately more children are prepared to travel over one mile in both cases (50% and 39% respectively) than to local parks (12%). The latter profile is considerably skewed with83% of children travelling less than $\frac{3}{4}$ mile.

The average distances travelled reflect the nature of these profiles. Childrer on average travel 1.16 and 1 mile respectively to metropolitan and district parks, but only 0.53 miles to local parks. The standard deviation (σ)[4]. also indicates the shape of the profiles, the variation about the mean being considerably greater for metropolitan and district parks than for local parks, as Table 6.1(a)(i) indicates.

Table 6.1(a)(i). Interpretation of Standard Deviation (σ) for visits to different park types.

Metropolitan	95%	of visits within	2.43 miles
District	"	"	2.84 miles
Local	"	"	1.47 miles.

By comparison the distance profiles for adult visiting (Fig. 5.1), show a much clearer difference between metropolitan and district parks. Average distances and standard deviations are compared in Table 6.1(a)(ii).

4. Standard deviation is a measure of dispersion about the mean (see Appendix VI(b)). P. 309.

Table 6.1(a)(ii).

Park Type	Average Distance $\bar{x}$		Standard Deviation(σ)	
	Adults	Children	Adults	Children
Metropolitan	1.63	1.16	1.7	0.82
District	0.65	1.0	0.57	0.94
Local	0.25	0.53	0.25	0.48

The average distance travelled by adults to metropolitan parks is greater than for children, and to district parks is less than for children. For metropolitan parks this can be explained by the lesser degree of personal mobility of children. Adults can use cars to travel greater distances.

The average distance travelled by children to district and local parks is greater than for adults, possibly reflecting a willingness to walk farther. This is reflected in the standard deviation, which for district parks is greater than for metropolitan type parks.

Consequently the three discrete sets of distances which adults are prepared to travel to different park types do not apply to children. The latter will travel similar distances to metropolitan and district parks and considerably shorter distances to local parks.

A conclusion from this analysis is that the differences in size between metropolitan and district parks are not significant in attracting children. This suggests that it is the facilities that the parks contain as well as the size that affects the distance travelled. Table 6.1(a)(iii) compares the proportion of visits made by children to parks with differing levels of

facility provision for the three size categories.

Table 6.1(a)(iii). No. of facilities contained in parks visited by size.[5.]

No.	Metropolitan	District	Local	Total
	%	%	%	%
0 - 4	48	18	65	46
5 - 9	52	82	35	54
Total	100	100	100	100

Whilst the proportion of children visiting metropolitan parks with five or more facilities is similar to the overall average, the proportion visiting district parks with a larger number of facilities is considerably higher. This suggests not only that there are proportionally more multi-facility district parks,[6.] but also that children are attracted to multi-facility parks and are prepared to travel farther to them. Inevitably smaller local parks have a smaller range of facilities and are attractive over shorter distances.

(b) Size of open space and other visiting characteristics.

The size of open space will not only affect the distance children are prepared to travel but may also affect other visiting characteristics: frequency, time of visit, mode of travel and journey time. The presence of relationships between these characteristics will be tested by means of chi-square analysis (χ^2)[7.] Table 6.1(b) shows both the significant and non-

5. See Appendix VI (b) Table 3. P. 312.
6. See Ch. 2. Fig. 2.3(b)(iii)P. 100.
7. See Appendix V(c) for details of technique: calculation and interpretation. P. 254.

significant relationships that were found to exist between the characteristics of visits made by schoolchildren in the study area.

Table 6.1(b) Matrix of associations between park visiting characteristics.

	Size	Frequency	Time of visit	Distance travelled	Mode	Journey time
Frequency	X[1]					
Time of visit	O[2]	X 6				
Distance travelled	X[3]	O 7	O[10]			
Mode	X[4]	O 8	O[11]	X 13		
Journey time	X[5]	X 9	O[12]	X 14	X[15]	

significant at 95% confidence level X

Not significant O

AppVI(c) Tabs 1-15

The relationships described in the previous section are confirmed by chi-square analysis. The size of parks visited is significantly associated with the distance children are prepared to travel. The direction of the relationship can be inferred as positive: the larger the park the farther children will travel to it.

Distance, mode and journey time are also closely inter-related, the latter two being dependent upon the former. These relationships exist between

the visiting characteristics of adults in south east London.[8.]

Childrens park visiting habits are also similar to adults insofar as frequency of visiting is related to size of park, time of visit and journey time i.e. children made short distance visits to smaller parks more frequently than larger, at any time of the week, whereas they tend to travel longer distances to larger parks at the weekend. However frequency is not significantly associated with mode of travel or distance, and time of visit is not associated with size of park visited, distance travelled, mode or journey time. For these characteristics the patterns of visiting behaviour are not so clear cut as for adults.

Information on length of stay in parks visited was not obtained from the schoolchildren's survey, although the G.L. C. survey noted that children visiting larger parks generally stayed longer than those visiting smaller parks, and children who travelled farther stayed longer.[9.] The G.L. C. survey also confirmed the significant relationships found to exist between the visiting characteristics of children in south east London.[10.]

6.2 Effect of Location on Park Visiting Characteristics.

The analysis of park visiting behaviour, for adults and children, has so far ignored the effect of location. A review of participation studies in

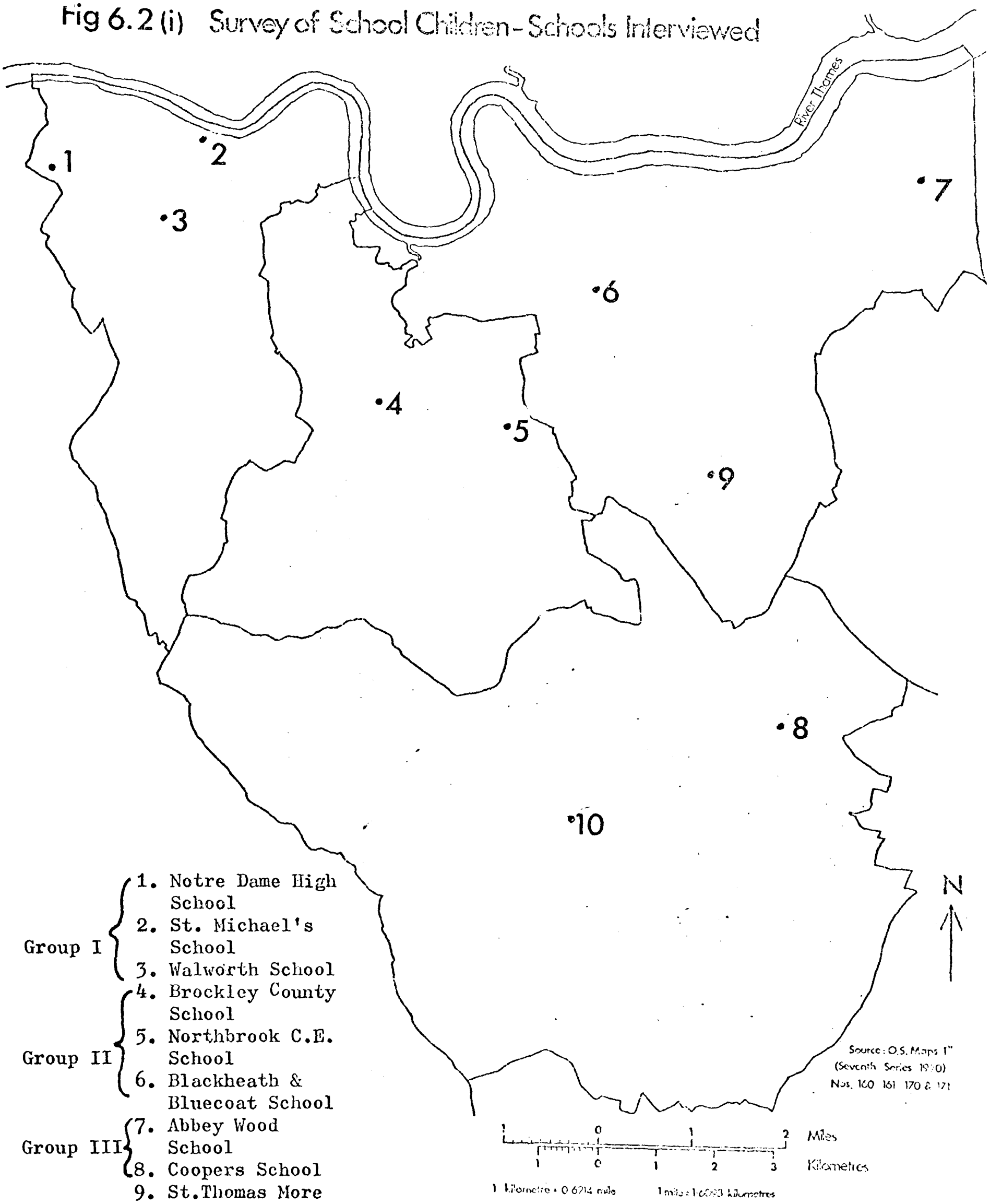
8. See Ch. 5 Section 5.2 P. 242 et. seq.
9. G.L.C. Surveys op. cit. I, Ch. 5 P. 62 para 214.
10. G.L.C. Surveys op.cit II, P. 222 Table 192
P. 223 Table 195
P. 224 Table 196.

Chapter 3 suggested that patterns of park visiting among adults do not differ significantly between inner and outer London. However it was found that the nature of park visiting among children is affected by location, the key factor being the supply and accessibility of open space. The mobility of schoolchildren is more restricted than that of adults and consequently recreational opportunities are lessened in areas deficient in open space. Children living in areas deficient in open space tend to use parks less and make use of open sites adjacent to houses and flats. They also visit less frequently and a greater proportion use public transport to get to parks. Conversely children in well-provided areas tend to visit more larger parks than smaller,more frequently.

The following analysis compares the responses of children from three groups of schools located at increasing distances from Central London. (See Fig. 6.2 (i)). Group I schools are located within 3 miles of the centre of London, Group II between 5 and $7\frac{1}{2}$ miles from the centre and Group III are approximately 10 miles from the centre. The subsequent analysis will examine the aggregate response for each group and will be referred to as inner, suburban and outer respectively.

In earlier analysis the size/distance relationship has been shown to be significant for both adults and children. In terms of size of parks visited, proportionally more larger parks (metropolitan and district) are visited in both inner, suburban and outer areas than smaller (local) parks, when compared with sizes of parks existing in those locations, (Table 6.2). In all locations the proportion of small parks far exceeds larger parks, however the larger parks are much more popular. This was found to be true

Fig 6.2 (i) Survey of School Children - Schools Interviewed



Group I
1. Notre Dame High School
2. St. Michael's School
3. Walworth School

Group II
4. Brockley County School
5. Northbrook C.E. School
6. Blackheath & Bluecoat School

Group III
7. Abbey Wood School
8. Coopers School
9. St.Thomas More School
10. Ravensbourne School

of adults and children.[11] The effect of location is very slight with somewhat more smaller parks being visited in the outer area.

Table 6.2 , Size of Park Visited by location[12].

	Metropolitan and District (over 50 acres)		Local (0-49 acres)	
	Parks visited	Existing parks	Parks visited	Existing parks
	%	%	%	%
Inner	67	4	33	96
Suburban	70	13	30	87
Outer	41	14	59	86

The level of facility provision for all parks in south east London has been shown to have little effect on the visiting preferences of adults, although children tend to prefer visiting parks with a larger number of facilities. Children in inner and suburban areas visit proportionally more parks with a higher level of facility provision than exist in those locations whilst children in outer areas visit considerably fewer.[13] One explanation for this difference may be that children living on the urban fringe will have more opportunities for countryside recreation and consequently parks with a high level of facility provision may have lower priority for them.

For facilities requested, some minor variations were noted with location, although high priority was generally given to a cafe, social centre, and indoor play area and very low priority to play on equipment and bushes and adventure play areas.[14] There was a greater knowledge of and participation

11. See Ch. 3. 3.3(a) P. 154 et. seq.
12. For original data and base numbers see Appendix VI(d) Table I P. 321.
13. See Appendix VI(d) Table 2 P. 321.
14. See Appendix VI(d) Table 3 P. 321.

in playschemes in the inner area than in the suburban and outer areas.[15] This is most certainly a reflection of supply, the inner boroughs having well developed play leadership schemes.

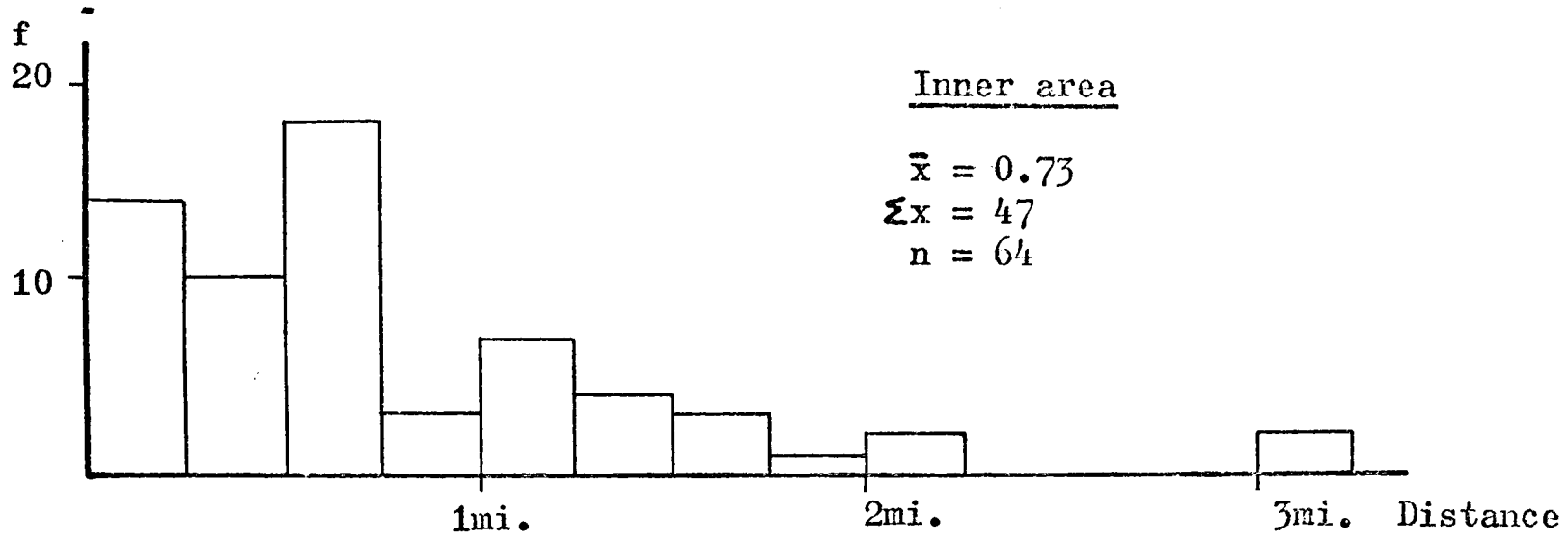
The distance travelled to parks by children in inner, suburban and outer areas was not found to be significantly different. Fig. 6.2(ii) shows the distance profiles for all parks visited in each area which display similar characteristics, the one exception being the higher proportion of visits of under $\frac{1}{4}$ mile in the inner area. The average distance travelled ranges from 0.73 miles in the inner area to 0.83 miles in the outer area representing a slight increase with distance from the centre.

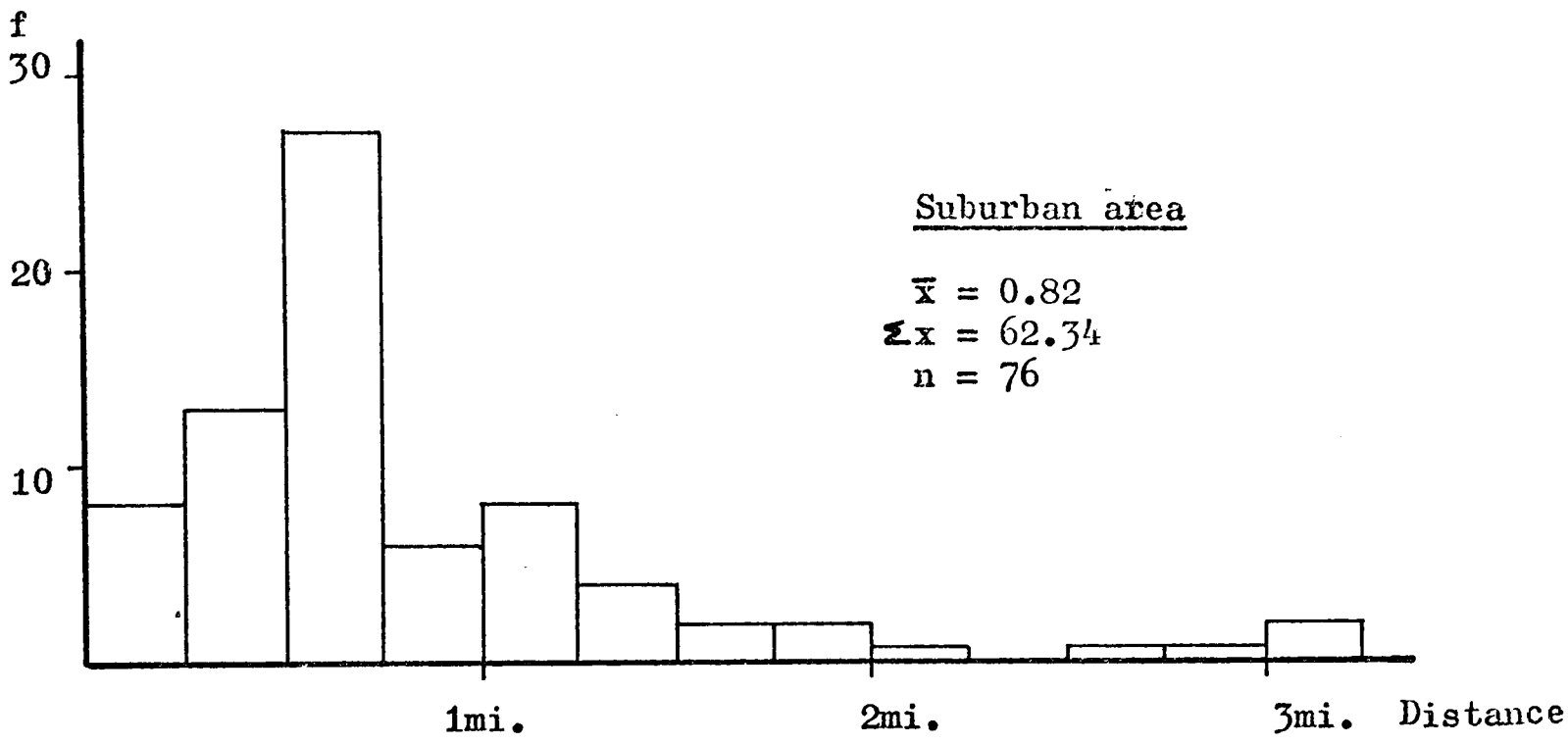
There is a considerable difference in the distance travelled to metropolitan and district parks (over 50 acres) and local parks, for the three locations. Children in inner areas are prepared to travel 0.92 miles on average to larger parks and 0.36 miles to smaller, and those in outer areas will travel 1.15 miles and 0.67 miles to larger and smaller parks respectively.[16] The slight increase in the average distance travelled between inner and outer areas is reflected in the overall size/distance analysis.

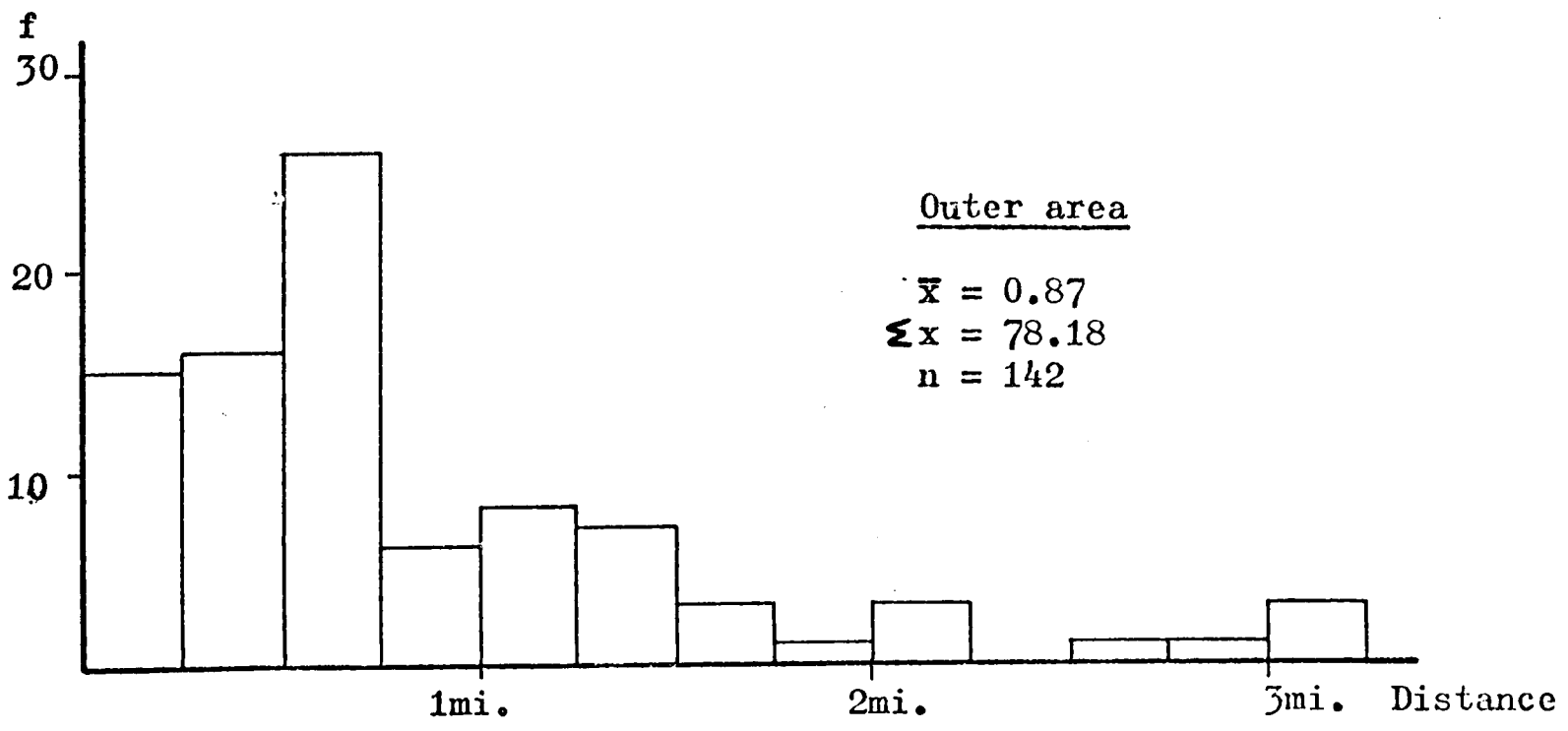
There are slight differences in the mode of travel to parks between inner and outer areas. Proportionally fewer children walk to parks with increasing distance from central London and more cycle. There is no discernible patterr for motorized transport although the highest proportion of those travelling by car (6%) are in the outer area.[17] The general trend conforms with the

15. See Appendix VI(d) Tables 4 & 5. PP. 321 - 322.
16. See Appendix VI(d) Table 7. P. 322.
17. See Appendix VI(d) Table 8. P. 322.

Fig 6.2 (ii) Distances travelled by schoolchildren in inner, suburban & outer areas







Source: See Appendix VI(d) Table 6.

slight increase in distance children are prepared to travel in outer areas.

Similarly journeys of over 15 minutes duration are slightly higher in the outer and inner areas and slightly lower in the suburban area,[17]. suggesting that accessibility to open space might not be so good in the former cases as in the latter. 94% of children in the suburban area thought that the park they usually visited was easily accessible from home, compared with 90% for the inner area and only 80% for the outer area.[18]. This is consistent with the analysis of supply of public open space which suggested that the amount and quality of park provision was best in suburban areas compared with inner and outer urban areas.

This pattern is reflected in the frequency of park visiting. 74% of children in the suburban area visit a park at least once every two weeks compared with 51% in the outer area and 46% in the inner area.[19].

The activities undertaken by children in the parks that they visit does not differ significantly between areas. The three most popular activities in each area are meeting friends, walking and playing sport.[20].

Similarly the time of visit does not vary with location. The most popular times are afternoon or anytime at weekends or during the holidays.[21].

17. See Appendix VI(d) Table 9. P. 323.
18. " " Table 10 "
19. " " Table 11 "
20. " " Table 12 "
21. " " Table 13. P. 324.

6.3 Implications for hierarchy of open space provision.

There are some important differences between the park visiting patterns of children and adults. The clearly defined size/distance relationships found for three park types for adults, upon which the G.L.D.P. hierarchy is based, is only true for two park types in the case of children i.e. smaller local parks and larger district parks of 50+ acres. The largest size type (metropolitan 150+ acres) does not have a significantly different effect from district parks in terms of distance travelled.

Secondly parks with a large number of facilities are more attractive to children than those with fewer. The level of facility provision did not significantly affect park visiting among adults.

Thirdly frequency of visit and time of visit are not so clearly related to distance travelled, mode and journey time for children as for adults. This may be partly explained insofar as children are restricted in the modes of travel available to them (walking, cycling) which will have less effect on how frequently and when they wish to visit parks.

Location only marginally affects these visiting patterns, the main differences being attributable to differences in the size, quantity and other characteristics of open space provision. Access to parks is greatest in the truly suburban parts of south east London. Although it is not possible to measure the effect of social characteristics of children on their use of open space, it is felt that this is fairly slight.

From these findings it could be suggested that for older children multi-facility

parks of at least 50 acres should be provided at between $\frac{3}{4}$ mile and one mile of home. This would conform fairly closely with the district parks in the G.L.D.P. hierarchy. These parks should be located uniformly throughout the metropolitan area. Larger metropolitan parks (150+ acres) would not need to be provided on this basis. However, existing metropolitan parks which are meant to function as district parks should have a wide range of facilities.

Following the success of playleadership schemes, in some boroughs, for younger children, it may be appropriate to develop activities programmes, events (sporting and social) for older children in such parks. The possibility of locating youth club facilities in or adjacent to parks would further enhance their attraction for older children.

For younger children the G.L.D.P. recommendations for small open spaces within $\frac{3}{4}$ of a mile of home providing "play on" equipment would seem to be appropriate. Leadership and organized play have been proved to be successful and should continue to be developed.

APPENDIX VI(a). Details of Survey of Schoolchildrens use of open space.

Sample:-

The Inner London Education Authority and the London Borough of Bromley, the two education authorities operating in the study area, were approached with a view to conducting the survey in a sample of secondary schools. The sample is not random. Two or three schools were selected for each borough, by the education authority, although an attempt was made to ensure a cross-section of comprehensive, selective and non-selective schools.

Table 1. Sample of Schools.

Borough	School	Type	Year	Size of Class.
Bromley	Coopers	Comp. (mixed).	4th	60.
	Ravensbourne	Selective (boys)	3rd/4th	60.
Greenwich	Abbey Wood	Comp. (mixed)	4th	60.
	St. Thomas Moore	Non-selective (mixed)	3rd	30
	Blackheath & Bluecoats	Non-selective (mixed)	3rd	30
Lewisham	Brockley County Grammar.	(boys)	4th	25
	Northbrook	Comp. (mixed)	3rd	25
Southwark	St. Michaels	Non-selective (mixed)	3rd	35
	Walworth	Comp. (mixed)	3rd/4th	60
	Notre Dame	Grammar (girls)	4th	20

Table 1 indicates the type of schools which were selected.

Within the schools third and fourth year classes of average ability range were requested. This age group was considered to be most suitable as they would

not have so many demands upon their time as older pupils. Also older pupils might not be fully representative of the ability range, and younger pupils may have difficulty comprehending and usefully completing the form.

Sampling errors.

A sample size of 343 completed questionnaires was obtained. In common with the other surveys the results of this sample survey are liable to a certain amount of error. Although not strictly random, it is felt that the selectior procedure of schools and classes should have provided a good enough cross-section to assume that the properties of the normal distribution will apply to this sample and that it will reflect this age group's population.
The response rate was effectively 100%.

Table VI(a) (ii) gives the range of the sampling error at the 95% confidence level i.e. percentages based on the survey should be interpreted as follows:-

> "there is a 95 out of 100 chance that
> the true value of this statistic,
> say 50%, is between 55.3%
> and 44.7%."

Table VI(a) (ii)

Percentage of sample with attribute.			± 1.96 S.E. %
50	:	50	5.3
45	:	55	5.3
40	:	60	5.2
35	:	65	5.0
30	:	70	4.8
25	:	75	4.6
20	:	80	4.2
15	:	85	3.8
10	:	90	3.2
5	:	95	2.3

Questionnaire Design.

The questionnaire was designed in four sections:-

(i) The general use of public open space.

(ii) Outdoor activities undertaken in spare time as member of a sports or youth club, or organized group.

(iii) Outdoor activities undertaken during school time.

(iv) Interviewee details: name, address, age, sex, school name and form number.[1].

The questions in part (i) broadly relate to the questions in the Household and User Surveys of adults. The main difference is that for certain questions children were asked to provide two sets of answers: one relating to their present park visiting behaviour and one relating to when they were five years younger. In this way it was hoped to elicit the needs of both pre-adolescents and teenagers.

Parts (ii) and (iii) were not subsequently analysed and not used in the body of the text. The basic profile data was required for catchment area analysis and locational analysis.

The assistance of the I.L.E.A. Research Department is acknowledged in the design of the questionnaire.

Fieldwork.

No pilot survey was undertaken owing to the difficulty of interviewing in school and the disruption involved. The survey was conducted by myself

1. See attached questionnaire.

during the Autumn term of 1972.

with considerable assistance from my supervisor. It was usually conducted in lieu of a geography or social studies class and we were introduced to the children by the respective teacher. A brief talk was given, in which the overall survey was explained. A discussion of aims and methods of collection, processing and analysis of data was given and the children were encouraged to participate and as such there was a teaching element in the exercise. More pertinent to the survey was the fact that they would appreciate the questionnaire to a greater extent with some background knowledge.[2]

The questionnaire forms were then distributed to the class and each question was taken individually and assistance given to individuals in completing it.

There were no major problems with the collection of data, apart from occasional groups of rowdy individuals. The reliability of the answers may not be particularly high for certain individuals and an attempt to screen the "non serious" answers was made at the coding stage.

Data processing.

The responses were coded and placed onto computer punch documents. The prepared cards were input to a survey analysis programme I.C.L. XDSB and run on Thames Polytechnic's ICL 1900 computer. Output was in the form of one, two and three way tables giving numbers and percentages.

2. Letters are appended.

T H A M E S P O L Y T E C H N I C.

Inter-School Division of Geography.

RECREATIONAL USE OF OPEN SPACE III. Survey of School Children.

Part I. GENERAL USE OF PUBLIC OPEN SPACE.

Public open space includes any of these: Parks, Gardens, Recreation Grounds, Woodlands, Heaths and Commons and Playing Fields.

This section is concerned with your use of public open space during your spare time, but not as a member of a club or as a part of school activities as these will be considered later.

1. What is the name of the park or open space you usually visit in your spare time?

..... (1)

2. How often do you go there?

More than once per week (2)
Once per week (3)
Once every two weeks (4)
Once every month (5)
Once every three months (6)
Less than once every three months (7)

3. At what time do you usually visit it? (Please tick appropriate box(es))

	Weekdays	Weekend	Holidays	
Morning				(8)
Afternoon				(9)
Evening				(10)
All day				(11)
Anytime				(12)

4. What do you usually do there? (Please tick your 3 most important activities.)

Walk (13) ( )
Take dog out (14) ( )
Rest, relax and enjoy scenery (15) ( )
Meet friends (16) ( )
Watch sports or games (specify which .....) (17) ( )
Play sports or games (specify which .....) (18) ( )
Play informal games e.g. adventure or ball games (19) ( )
Use "play on" equipment (19a) ( )
Attend open air activity (specify .....) (20) ( )
Visit something of particular interest
(specify which .....) (21) ( )
Other .....) (22) ( )

5. How do you get there?

Walk (23). Cycle (24). Bus (25). Car (26). Train (27).

6. Is the park or open space easy to get to from where you live?

Yes (28)
No (29)

If no, why not? ..... (30)

7. How long does it take to get there from home?

..... (31)

8. What do you like most about the park or open space that you visit?

..... (32)

And what do you most dislike, if anything?

..... (33)

9. For the park or open space that you visit, in the usual way, what improvements would you like to see made?

Sports facilities (specify which .....) (34) ( )
Cafe facilities (35) ( )
Social centre or meeting place (36) ( )
Indoor or covered play areas for bad weather (37) ( )
"Playing on" equipment (37a) ( )
Area of bushes and trees for adventure or "make believe" games (38) ( )
Events held in park (specify which .....) (39) ( )
Other (specify which .....) (40) ( )

10. Are any playschemes or organised activities run in the park or open space you usually visit during the summer months?

Yes (41) ( )
No (42) ( )

If yes, do you take part in them?

Yes (43) ( )
No (44) ( )

Part II. <u>OUTDOOR ACTIVITIES UNDERTAKEN IN SPARE TIME AS MEMBER OF SPORTS OR YOUTH CLUB, OR OTHER ORGANISED GROUP, E.G. SCOUTS OR GUIDES.</u>

11. Do you belong to a sports or youth club or the scouts or guides where you spend some time on outdoor recreation?

Yes (45)
No (46)

If yes, which one? ..... (47)

12. What activities, or games, do you take part in? (specify)

..... (48)

13. Which park or open space do you use for these activities?

..... (49)

14. How often do you use this park or open space for these activities?

More than once per week	(50).	Once per month	(52)
Once per week	(51).	Once every three months	(53)

15. At what time do you usually go there? (Please tick appropriate box(es))

	Weekdays	Weekends	Holidays	
Morning				(54)
Afternoon				(55)
Evening				(56)
All day				(57)
Anytime				(58)

16. How do you travel there from home?

Walk (59). Cycle (60). Bus (61). Car (62). Train (63).

17. How long does the journey take from home?

..... (64)

18. Are the facilities of the park or open space adequate for your purposes?

Yes	(65)
No	(66)

If no, what would you like provided?

..... (67)

Part III. <u>OUTDOOR ACTIVITIES UNDERTAKEN DURING SCHOOL TIME</u>.

19. Please list which sports or outdoor activities you take part in during school time?

..... (68)

20. For these activities do you use playing fields within your school grounds? (69)

Or do you have to travel some distance to them (n.b. this applies only to your home ground)? (70)

21. If you have to travel, what is the name and address of the playing fields or open space you use?

..... (71)

22. How do you travel there from school?

Walk (72). Cycle (73). Bus (74). Train (75). Schoolbus (76). Car (77).

23. How long does the journey take?

..... (78)

PLEASE COMPLETE:

NAME: ..... AGE: ..... Yrs. FORM: .....

HOME ADDRESS: ..... NAME OF SCHOOL
(street name
and postal ....
district only)
.....

BOY/GIRL (delete which is inapplicable)

Director:
D. E. R. Godfrey, M.Sc., Ph.D., F.Inst.P., F.I.M.A., C.Eng., A.F.R.Ae.S.
Secretary:
P. C. Oxlade, B.Sc.(Econ)., Dip.F.E., F.C.I.S.

THAMES POLYTECHNIC

WELLINGTON STREET
LONDON S E 18 6PF
Telephone: 01-854 2030

Your Ref. Our Ref. VPG/GD Ext. 411/409

SCHOOL OF HUMANITIES

Head of School:
Valerie Pitt, M.A.(Oxon.) M.A.(Cantab.), B.Litt.

29th June 1972

Dear Sir/Madam,

I am conducting an enquiry into the use and adequacy of open space for recreational purposes in a number of boroughs in South East London, and I would greatly appreciate your permission to conduct a questionnaire with third or fourth form pupils in this connection.

I enclose a copy of the questionnaire, which I would like to put before the pupils. The nature and purpose of the research project would be explained to them and they would be invited to fill up the questionnaire question by question. My research assistant would be available to help with individual queries as they arose. I would appreciate a double period, if such is available, in order that the youngsters might have time to be told something about the project and perhaps discuss points with us.

I would be most grateful if you could indicate whether you would be willing to allow your school to take part in the survey, and what time/ times would be most suitable for us to meet the children.

I am an experienced secondary school teacher and would be quite happy to take over the group for the alloted time without staff present, if that would be of any help to you at this busy time of year.

I should add that Mr. Barraclough has given his permission for us to approach secondary schools in connection with this project.

Yours sincerely,

E.E.M. Bowler, BA, BSc(Econ), PhD, Cert.Ed
Head of Geography Division

Director:
D. E. R Godfrey, M.Sc., Ph.D., F.Inst.P., F.I.M.A., C.Eng., A.F.R.Ae.S.
Secretary:
P. C. Oxlade, B.Sc.(Econ)., Dip.F.E., F.C.I.S.

THAMES POLYTECHNIC

WELLINGTON STREET
LONDON S E 18 6PF
Telephone: 01-854 2030

Your Ref. Our Ref. Ext.

SCHOOL OF HUMANITIES

Head of School:
Valerie Pitt, M.A.(Oxon.) M.A.(Cantab.), B.Litt.

Dear

We would like to thank you for your kind assistance, together with that of your staff and pupils, in making our visit to your school possible.

We hope that you were not inconvenienced too greatly by our visit and that your children may have benefited by learning a certain amount about questionnaire surveys, their analysis and use in planning.

We are taking this opportunity to include a brief outline of the geography options within the C.N.A.A. degrees being offered at Thames Polytechnic, which may be of interest to your staff and pupils.

Yours sincerely,

E. Bowler.

V. P. Green.

Dr. E.E.M. Bowler
V.P. Green
Division of Geography

APPENDIX VI(b) Table 1. Distances travelled to Metropolitan District and Local Parks by Schoolchildren: S.E. London.

(a) Metropolitan Open Space.

x	x^2	x	x^2
0.6	0.36	1.1	1.21
3.8	14.44	0.7	0.49
2.2	4.84	1.4	1.96
0.8	0.64	0.6	0.36
1.1	1.21	2.6	6.76
1.0	1.0	1.1	1.21
0.6	0.36	0.7	0.49
0.6	0.36	0.7	0.49
0.7	0.46	1.1	1.21
1.0	1.0	0.4	0.16
1.1	1.21	2.6	6.76
1.4	1.96	1.6	2.56
1.9	3.61	0.4	0.16
1.4	1.96	0.6	0.36
1.4	1.96	1.6	2.56
1.0	1.0	1.8	3.24
0.9	0.81	0.4	0.16
0.5	0.25		
0.9	0.81	64.78	112.92
2.6	6.76		
1.5	2.25	$\bar{x}$ 1.16	n = 56
2.0	4.0		
0.6	0.36	σ = 0.82	
0.9	0.81		
2.8	7.84		
0.7	0.49		
4.0	16.0		
0.5	0.25		
1.1	1.21		
0.7	0.49		
0.48	0.23		
0.48	0.23		
0.44	0.19		
0.2	0.04		
0.2	0.04		
0.44	0.19		
0.84	0.71		
1.12	1.25		
1.08	1.17		

(b) District Open Space.

x	x^2	x	x^2	x	x^2
1.5	2.25	0.6	0.36	0.5	0.25
1.2	1.44	0.8	0.64	0.4	0.16
0.4	0.16	0.6	0.36	4.0	16.00
1.5	2.25	0.6	0.36	0.5	0.25
1.3	1.69	0.5	0.25	1.3	1.69
0.4	0.16	0.3	0.09	5.0	25.0
1.2	1.44	0.4	0.16	0.4	0.16
0.4	0.16	0.8	0.64	1.4	1.96
1.1	1.21	0.6	0.36	0.5	0.25
0.6	0.36	0.6	0.36	0.8	0.64
0.4	0.16	0.6	0.36	1.5	2.25
0.6	0.36	0.4	0.16	1.4	1.96
1.3	1.69	0.3	0.09	0.2	0.04
1.2	1.44	0.9	0.81	0.6	0.36
0.4	0.16	0.5	0.25	2.2	4.84
1.4	1.96	1.0	1.0	0.9	0.81
0.5	0.25	1.2	1.44	3.4	11.56
0.2	0.04	0.6	0.36	2.5	6.25
0.2	0.04	0.5	0.25	2.8	7.84
0.6	0.36	0.5	0.25	4.1	16.81
0.6	0.36	0.3	0.09	0.4	0.16
0.4	0.16	0.6	0.36		
0.2	0.04	3.0	9.00	97.7	184.33
0.5	0.25	1.3	1.69		
0.8	0.64	0.5	0.25		n = 97
0.4	0.16	0.7	0.49		
0.4	0.16	1.0	1.0	$\bar{x}$ = 1	
0.4	0.16	0.6	0.36	σ = 0.94	
2.1	4.41	0.4	0.16		
0.6	0.36	0.6	0.36		
0.5	0.25	2.9	8.41		
0.7	0.49	0.4	0.16		
0.5	0.25	1.9	3.61		
1.7	2.89	3.1	9.61		
0.1	0.01	0.3	0.09		
1.0	1.0	0.4	0.16		
3.1	9.61	0.4	0.16		
0.6	0.36	1.2	1.44		

(c) Local Open Space.

x	x^2	x	x^2	x	x^2	x	x^2
0.5	0.25	0.4	0.16	0.5	0.25	0.4	0.16
0.1	0.01	0.3	0.69	0.5	0.25	0.3	0.09
0.1	0.01	0.1	0.01	0.2	0.04	0.3	0.09
0.6	0.36	0.1	0.01	0.2	0.04	0.2	0.04
0.3	0.09	0.1	0.01	1.4	1.96	0.9	0.81
0.5	0.25	0.6	0.36	0.5	0.25	0.1	0.01
0.6	0.36	0.5	0.25	0.5	0.25	0.2	0.04
0.5	0.25	0.6	0.36	0.7	0.49	0.2	0.04
0.3	0.09	0.6	0.36	0.6	0.36	0.1	0.01
0.2	0.04	0.2	0.04	0.5	0.25	0.2	0.04
0.2	0.04	0.9	0.81	0.4	0.16	0.4	0.16
0.1	0.01	0.2	0.04	0.6	0.36	0.1	0.01
0.4	0.16	0.1	0.01	1.1	1.21		
0.1	0.01	0.0	0	2.2	4.84	68.3	65.45
0.1	0.01	0.1	0.01	1.4	1.96		n = 129
0.4	0.16	0.3	0.09	0.4	0.16		
0.2	0.04	0.1	0.01	0.9	0.81	$\bar{x}$ = 0.53	
1.4	1.92	2.1	4.41	0.8	0.64	σ = 0.48	
0.2	0.04	1.5	2.25	0.6	0.36		
0.5	0.25	0.2	0.04	0.6	0.36		
0.2	0.04	0.6	0.36	0.3	0.09		
0.1	0.01	0.8	0.64	0.4	0.16		
0.2	0.04	0.4	0.16	0.2	0.04		
0.3	0.09	0.3	0.09	1.3	1.69		
0.6	0.36	0.2	0.04	0.7	0.49		
0.3	0.09	0.4	0.16	0.1	0.01		
0.3	0.09	0.4	0.16	1.4	1.96		
0.2	0.04	2.1	4.41	1.0	1.0		
1.6	2.56	0.2	0.04	0.3	0.09		
0.3	0.09	0.2	0.04	2.3	5.29		
0.6	0.36	0.5	0.25	0.4	0.16		
0.2	0.04	0.9	0.81	0.6	0.36		
0.2	0.04	0.2	0.04	0.1	0.01		
0.4	0.16	0.7	0.49	0.4	0.16		
0.4	0.16	0.2	0.04	0.6	0.36		
0.7	0.49	0.4	0.16	0.6	0.36		
1.8	3.24	2.0	4.0	0.7	0.49		
0.4	0.16	1.2	1.44	0.6	0.36		
0.6	0.36	0.6	0.36	0.3	0.09		

Table 2. Size of Park by Distance Travelled: Schoolchildren.

Miles	Metropolitan (150+ acres)	District (50- 149 acres)	Local (0 - 49 acres)
0 - 0.24	2	6	42
0.25 - 0.49	7	14	31
0.50 - 0.74	14	32	34
0.75 - 0.99	5	7	6
1.0 - 1.24	11	10	3
1.25 - 1.49	4	11	5
1.50 - 1.74	3	4	2
1.75 - 1.99	2	1	1
2.00 - 2.24	3	2	4
2.25 - 2.49	-	-	1
2.50 - 2.74	2	1	-
2.75 - 2.99	1	2	-
3.0 +	2	7	-
Total	56	97	129

Table 3 No. of facilities contained in parks visited by size.

	Metropolitan	District	Local	
0 - 4	25	16	86	127
5 - 9	27	73	47	147
Total	52	89	133	274

APPENDIX VI(c)

Table 1. Size of Park by Frequency of Visit.

Frequency	Size: Metropolitan (150 acres or more)	District (50-149 acres)	Local (5-49 acres)	Total
More than once per week.	11 (12)	15 (20.2)	34 (27.8)	60
1 per wk/2 per wk.	17 (37.4)	39 (37.4)	55 (51.5)	111
Less than once per 2 wks.	27 (20.9)	39 (35.4)	39 (48.7)	105
Total.	55	93	128	276

$\alpha = 0.05$ $\quad \chi^2(0.05) = 9.49$

$df = 4$ $\quad \chi^2_{calc} = 18.3$

Ho: Size of park and frequency of visit are independent

H_1: Size of park is related to frequency of visit

$H_1 >$ Ho at the 95% confidence level. $\therefore$ H_1 is accepted.

Table 2. Size of Park by Time of Visit

Time of week	Size. Metropolitan (150+ acres)	District (50-149 acres)	Local (5-49 acres)	Total
Weekday	26 (30.8)	54 (58.8)	92 (82.4)	172
Weekend	51 (46.2)	93 (88.2)	114 (123.6)	258
Total	77	147	206	430

$\alpha = 0.05$ $\quad \chi^2(0.05^2) = 5.99$

d.f. $= 2$ $\quad \chi^2_{calc} = 3.8$

Ho: Size of park is independent of time of week when visit occurs

H_1: Size of park is related to time of week when visit occurs

Ho $>$ H_1 at the 95% confidence level. $\therefore$ Ho is accepted.

Table 3. Size of Park by Distance Travelled.

Distance	Size. Metropolitan (over 150 acres)	District (50-149 acres)	Local (5-49 acres)	Total
Less than 0.75 mi.	24 (38.1)	61 (66.6)	106 (86.3)	191
0.75 mi. and over	32 (17.9)	37 (31.4)	21 (40.7)	90
Total	56	98	127	281

$\alpha = 0.05$ $\quad \chi^2(0.05) = 5.99$

d.f. = 2 $\quad \chi^2(calc) = 31.8$

Ho: Size of park and distance travelled are independent

H_1: Size of park and distance travelled are related

$H_1 >$ Ho at the 95% confidence level. $\therefore$ H_1 is accepted.

Table 4. Size of Park by Mode of Travel.

Mode	Size. Metropolitan (over 150 acres)	District (50-149 acres)	Local (50-49 acres)	Total
Walking	25 (34.7)	74 (75.1)	111 (100.2)	210
Cycling & motorized transport	18 (18.3)	19 (17.9)	13 (23.8)	50
Total	43	93	124	260

$\alpha = 0.05$ $\quad \chi^2(0.05) = 5.99$

d.f. = 2 $\quad \chi^2(calc) = 20.2$

Ho: Size of park and mode of travel are independent

H_1: Size of park is related to distance travelled.

$H_1 >$ Ho at the 95% confidence level. $\therefore$ H_1 is accepted.

Table 5. Size of Park by Journey Time.

Journey Time	Size. Metropolitan (150 acres and over)	District (50-149 acres)	Local (5-49 acres)	Total
Less than 15 mins.	19 (31.1)	66 (65.0)	98 (86.9)	183
15 mins. and over	25 (12.9)	26 (27.0)	25 (36.1)	76
Total	44	92	123	259

α = 0.05 $\quad \chi^2(0.05)$ = 5.99

d.f. = 2 $\quad \chi^2(calc)$ = 20.9

Ho: Size of park and journey time are independent.

H_1: Size of park is related to journey time.

$H_1 >$ Ho at the 95% confidence level $\therefore$ H_1 is accepted.

Table 6. Frequency by Time of Visit.

Time of Visit	Frequency. More than once pr.wk.	Once per week/ once per 2 wks.	Less than once per 2 wks.	Total
Weekday	69 (46.7)	31 (52.2)	39 (42.5)	139
Weekend	84 (105.6)	134 (113.9)	98 (94.5)	316
Total	153	165	137	455

α = 0.05 $\quad \chi^2(0.05)$ = 5.99

d.f. = 2 $\quad \chi^2(calc)$ = 27.6

Ho: Frequency of visit and time of visit are independent

H_1: Frequency of visit is related to time of visit

$H_1 >$ Ho at the 95% confidence level $\therefore$ H_1 is accepted.

Table 7. Frequency of Visit by Distance Travelled.

Distance	Frequency: Over once per week	1 per week/ 1 per 2 weeks	Less than once per 2 weeks	Total
Less than 0.75 mi.	44 (44)	76 (72.1)	65 (68.9)	185
0.75 mi. or over.	25 (25)	37 (40.9)	43 (39.1)	105
Total	69	113	108	290

$\alpha = 0.05$ $\quad \chi^2(0.05) = 5.99$

d.f. = 2 $\quad \chi^2(calc) = 1.19$

Ho: Frequency of visit and distance travelled are independent

H_1: Frequency of visit is related to distance travelled.

Ho > H_1 at the 95% confidence level ∴ Ho is accepted.

Table 8. Frequency by Mode of Travel.

Mode	Frequency: Over once per week	1 per week/ 1 per 2 weeks	Less than once per 2 weeks.	Total
Walk	66 (63.8)	104 (105.2)	102 (105.2)	272
Cycle	31 (27.4)	44 (42.3)	42 (45.3)	117
Motorized transport	14 (19.7)	35 (32.5)	35 (31.8)	84
Total	111	183	179	473

$\alpha = 0.05$ $\quad \chi^2(0.05) = 9.49$

d.f. = 4 $\quad \chi^2(calc) = 3.13$

Ho: Frequency of visit and mode of travel are independent

H_1: Frequency of visit is related to mode of travel.

Ho > H_1 at the 95% confidence level ∴ Ho is accepted

Table 9. Frequency of Visit by Journey Time.

Time	Frequency: More than Once per wk.	1 per week/ 1 per 2 wks.	Less than once every 2 wks.	Total
15 Minutes or less	61 (54.5)	95 (90.4)	80 (91.1)	236
Over 15 minutes	15 (21.5)	31 (35.6)	47 (35.9)	93
Total	76	126	127	329

$\propto$ = 0.05 $\quad \chi^2(0.05) = 5.99$

d.f. = 2 $\quad \chi^2(\text{calc}) = 8.35$

Ho = Frequency of visit and journey time are independent

H_1 = Frequency of visit is related to journey time.

$H_1 >$ Ho at the 95% confidence level $\therefore$ H_1 is accepted.

Table 10. Time of Visit by Distance Travelled.

Distance	Time of week: Weekday	Weekend	Total
Less than 0.75 mi.	96.5 (95.9)	158.5 (159.1)	255
0.75 mi. or over	53.5 (54.1)	90.5 (89.9)	144
Total	150	249	399

$\propto$ = 0.05 $\quad \chi^2(0.05) = 3.84$

d.f. = 1 $\quad \chi^2(\text{calc}) = 0.01.$

Ho: Time of visit is independent of distance travelled.

H_1: Time of visit is related to distance travelled

Ho $>$ H_1 at the 95% confidence level $\therefore$ Ho is accepted.

Table 11. Time of Visit by Mode of Travel.

Mode	Time of visit		
	Anytime	Weekend	Total.
Walking	147.5 (143.5)	260.5 (264.5)	408
Cycling, motorized transport	24.5 (28.5)	57.5 (52.5)	81
Total	172	317	489

α = 0.05 $\quad \chi^2(0.05) = 3.84$

d.f. = 1 $\quad \chi^2(calc) = 1.04$

Ho: $> H_1$ at the 95% confidence level $\therefore$ Ho is accepted.

Table 12. Time of Visit by Journey Time.

Journey time	Time of visit		
	Anytime	Weekend	Total
Less than 15 minutes	125.5 (123.2)	225.5 (227.8)	351
15 minutes or over	45.5 (47.8)	90.5 (88.2)	136
Total	171	316	487

α = 0.05 $\quad \chi^2(0.05) = 3.84$

d.f. = 1 $\quad \chi^2(calc) = 0.24$

Ho: Time of visit and journey time are independent

H_1: Time of visit is related to journey time

Ho $>$ H_1 at the 95% confidence level $\therefore$ Ho is accepted.

Table 13. Distance Travelled by Mode.

Mode	Distance: Less than 0.75 mi.	0.75 mi. or over	Total
Walking	169 (158.4)	78 (88.5)	247
Cycling	73 (68.6)	34 (38.3)	107
Motorized transport	30 (44.9)	40 (25.1)	70
Total	272	152	424

α = 0.05 $\quad \chi^2(0.05)$ = 5.99

d.f. = 2 $\quad \chi^2(calc)$ = 16.5

Ho: Distance travelled to parks is independent of mode.

H_1: Distance travelled is related to mode of travel.

$H_1 >$ Ho at the 95% confidence level $\therefore$ H_1 is accepted.

Table 14. Distance Travelled by Journey Time.

Journey time	Distance. Less than 0.75 mi.	0.75 mi. or over	Total
Less than 15 minutes	146.5 (129.7)	53.5 (70.3)	200
15 minutes or over	41.5 (58.3)	48.5 (31.7)	90
Total	188	102	290

α = 0.05 $\quad \chi^2(0.05)$ = 3.84

d.f. = 1 $\quad \chi^2(calc)$ = 19.9

Ho: Distance travelled to park is independent of journey time

H_1: Distance travelled is related to journey time.

$H_1 >$ Ho at the 95% confidence level $\therefore$ H_1 is accepted

Table 15. Journey Time by Mode.

Mode	Journey time: 15 mins. or less	Journey time: Over 15 mins	Total
Walking	207 (186.9)	63 (83.1)	270
Cycle	93 (81)	24 (36)	117
Motorized transport	24 (56.1)	57 (24.9)	81
Total	324	144	468

α = 0.05 $\quad \chi^2(0.05) = 5.99$

d.f. = 2 $\quad \chi^2(calc) = 72.6$

Ho: Journey time and mode of travel are independent

H_1: Journey time is related to mode of travel.

$H_1 >$ Ho at the 95% confidence level $\therefore$ H_1 is accepted.

APPENDIX VI(d)

Table 1. Size of Park by Location: Schoolchildren.

	Metropolitan. (150+ acres)	District. (50-149 acres)	Local (0-49 acres)	Total
Inner	5	38	21	64
Suburban	25	28	23	76
Outer	26	31	85	142
Total	56	97	129	282

Table 2. No. of facilities contained in parks visited by location

	0 - 4	5 - 9	Total
Inner	9	43	52
Suburban	10	66	76
Outer	108	38	146
Total	127	147	274

Table 3. Facilities requested by location.

	Inner	Suburban	Outer
Sports facilities	14	13	29
Cafe	35	34	58
Social centre	15	31	36
Indoor play area	47	23	43
Play on equipment	6	3	1
Bushes/ adventure areas	10	4	6
Events/other	22	13	25

Table 4. Knowledge of playschemes by location.

	Do not know	Yes	No	Total.
Inner	4	45	25	74
Suburban	7	36	39	82
Outer	11	38	57	106

Table 5. Participation in playschemes by location.

	N.A.	Yes	No.	Total
Inner	12	31	31	74
Suburban	33	11	38	82
Outer	38	23	45	106

Table 6. Distance travelled to parks by location

Miles	Inner	Suburban	Outer
0 - 0.24	14	8	27
0.25 - 0.49	10	14	33
0.50 - 0.74	18	27	34
0.75 - 0.99	3	6	9
1.00 - 1.24	7	8	9
1.25 - 1.49	4	4	8
1.50 - 1.74	3	2	4
1.75 - 1.99	1	2	2
2.00 - 2.24	2	1	6
2.25 - 2.49	-	-	1
2.50 - 2.74	-	1	2
2.75 - 2.99	-	1	2
3+	2	2	5
Total	64	76	142

Table 7. Average distance travelled to parks by size and location.

	Metropolitan and district (50 acres or over)	Local (0 - 49 acres)
	mi.	mi.
Inner	0.92	0.36
Suburban	0.98	0.44
Outer	1.15	0.67

Table 8. Mode of visit by location.

	Walk	Cycle	Bus	Car	Train	Base
Inner	68	18	12	4	2	148
Suburban	71	27	13	2	1	164
Outer	81	33	20	13	1	212

Table 9. Journey time to open space by location.

	Under 15 mins.	15 mins. and over	Total
Inner	50	23	73
Suburban	60	22	82
Outer	69	46	105

Table 10. Accessibility to open space by location.

	Accessible		
	Yes	No	Total
Inner	65	7	72
Suburban	77	5	82
Outer	85	21	106

Table 11. Frequency of park visiting by location.

	Over once per week	once per wk/ once per 2 wks.	Less than once per 2 wks.	Total
Inner	10	24	40	74
Suburban	17	44	21	82
Outer ;	25	29	52	106

Table 12. Activities undertaken in park by location.

	Inner	Suburban	Outer
Walking	32	32	51
Taking dog for exercise	17	19	24
Resting and relaxing	9	12	20
Meeting friends	35	41	58
Watching sport	22	18	28
Playing sport	26	40	37
Informal play	4	10	8
use "play on" equipment	4	4	2
activities/ interest	8	3	13
Other	12	18	17
No answer	53	49	60
Total	222	246	318

Table 13. Day and time of visit by location.

	Weekday					Weekend					Holiday				
	a.m.	p.m.	eve.	all.	any.	a.m.	p.m.	eve.	all.	any.	a.m.	p.m.	eve.	all.	any.
Inner	2	2	16	1	6	11	25	11	2	14	6	21	10	4	37
Suburban	5	5	29	1	4	21	27	9	6	22	8	17	5	9	47
Outer	3	6	34	1	5	15	35	5	4	35	7	14	1	7	71.

CHAPTER 7. THE USE OF OPEN SPACE FOR SPORT

The use made by clubs and teams of open space for formal land sports will now be considered. Earlier analysis considered the supply of existing sports pitches in the study area,[1.] and brief consideration was given to the general aspects of use of such facilities.[2.] In keeping with other Chapters in Part II a more detailed analysis of the levels and patterns of use will be made.

However these findings cannot be compared with any standards or criteria for provision of open space for sport, as was the case with public open space, as there are none which are generally accepted, apart from that of the National Playing Fields Association. Rather the analysis will seek to develop further the considerable amount of work done already in assessing the need for sports pitches in Greater London.[3.]

The lack of any criteria for the provision of pitches for sport led the Greater London and South East Sports Council to conduct a survey to collect information on the supply and demand for sports pitches.[4.] In London such evidence was needed to defend the retention of pitch stocks, many private sports grounds having recently been lost to private development.

The Survey provided the parameters for developing a methodology to determine pitch requirements at the regional and local level.[5.] This methodology

1. See Ch. 2. Section 2.3(b) P. 106 et. seq.
2. See Ch. 3 Section 3.3(b) P. 164 et. seq.
3. Greater London and South East Sports Council. A Playing Fields Strategy for Greater London. (London. G.L. & S.E. Sports Council 1977).
4. See Appendix VII(a) for details of Playing Fields Study 1972-74.
5. See Appendix I.(d) P. 61.

represented a development and extension of the recommendations for assessing pitch requirements outlined in "Planning for Sport."[6]. When applied to the south east and other sectors of London the methodology provided an estimate of the number of pitches required for football, hockey, rugby and cricket, based on empirical data on participation levels, home games played per week and peak times of play, which when compared with existing pitch stocks highlighted deficiencies or surpluses in provision. These overall requirements are considered at borough and sector level and policies for provision, retention and management of pitches have been made on a sectoral basis based on these findings.

Much of the data collected for the Playing Fields Study was not analysed or used in the development of the strategy. This material will be used to develop further the findings of the strategy, in particular the patterns of use of open space for pitch sports in south east London, including:-

(i) relationships between use characteristics - levels, intensity and time of play and the level and quality of pitch provision.

(ii) trip patterns - distances travelled by teams and direction of travel.

From this analysis it is hoped to identify deficiencies and opportunities for sport in south east London, which will form the basis for policies relating to the location, provision and management of pitches in the area.

*

The analysis will concentrate on football, the most important team sport in south east London (representing 65% of all teams), as the information is most

6. Sports Council. Planning for Sport. (HMSO, 1968) Ch. 4

* 76% of football clubs in South East London responded to the survey. No indication is given in the published material of any non-response bias.

comprehensive for this sport. Clearly private sports grounds make an important contribution to provision and comparison will be made between the use of public and private facilities where information is available.[7] Hockey, rugby and cricket will be considered in less detail.

7.1 Football.

Three aspects of the use of pitches by football clubs will be examined in relation to their quantity, quality and location.

(a) Levels and intensity of use.

(b) Time of use.

(c) Travel patterns.

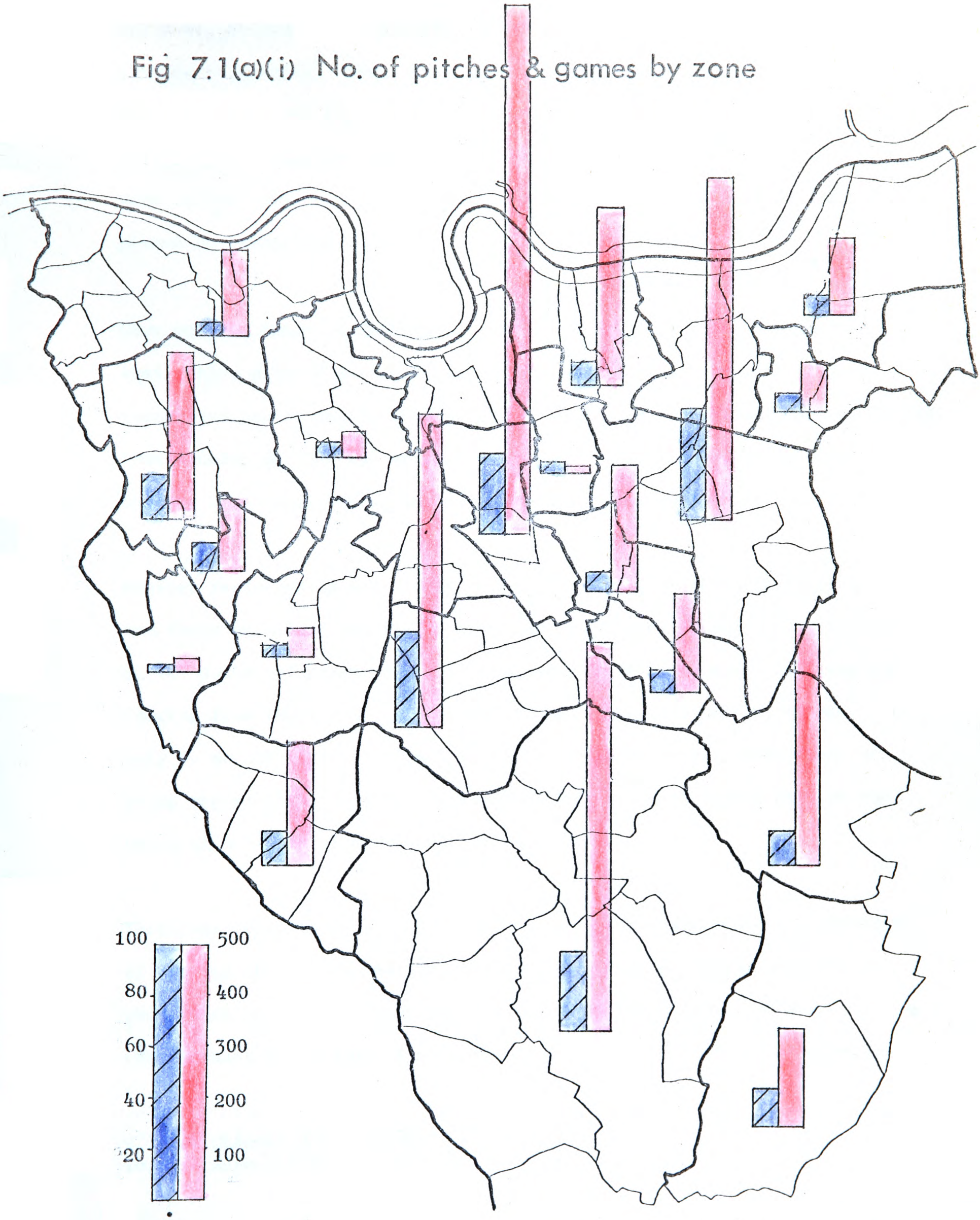
7.1(a) Intensity of Use.

Fig. 7.1(a)(i) indicates for each zone the relationship between the numbers of pitches and the numbers of games played on public and privately owned grounds. There is apparently a direct relationship between pitches and games so that the more pitches there are in any zone the greater the number of games played. This relationship was tested and there was found to be a highly positive correlation between the number of pitches and games (r_S = 0.9 for public pitches 0.71 for private).[8]

Furthermore it might be assumed that the intensity of use i.e. the number of games per pitch would vary inversely with the number of pitches in

7. The use of educational playing fields is not analysed although reference will be made to their impact in the concluding section.
8. See Appendix VII(c) for details of Spearman's Rank Correlation Co-efficient (r_S) and Appendix VII(b) Tables 1 and 2. PP. 354 & 348.

Fig 7.1(a)(i) No. of pitches & games by zone



Source; Greater London & S.E. Sports Council, unpublished data.
Appendix VII (b) Tables I & II

any zone, so that the intensity of use would be less where the supply of pitches is greater. There is in fact a slightly positive relationship for public pitches ($r_S = 0.4$) which is just significant at the 95% confidence level. This suggests that the more public pitches there are in any zone, the more intensively they will be used. No association was found for games played on private pitches.

Care must be taken in interpreting this finding. It was indicated earlier that public pitches are more intensively used than private.[9] However concentrations of public pitches may be used more intensively than scattered individuals, as they may be more attractive to teams seeking to hire them, as they offer more choice and availability in one location.

Another factor which may affect this relationship is the quality of pitches and their ancillary facilities. Information was collected in the survey[10] on the number of games played on grounds with facilities of differing quality, ranging from those with nets and hot showers, through cold water and nets only to no facilities. Grounds with nets and hot showers were taken as being representative of the best quality facilities and were used as the basis of an index of pitch quality.

There was found to be a significant positive correlation between intensity of use and the quality of public pitches ($r_S = 0.54$), which suggests a preference of teams to hire pitches with good facilities. This is corroborated by evidence from a survey of sports facilities in Lewisham

9. See Chapter 3 Sec. 3.3(b) P. 164 et. seq.
10. See Appendix VII(b) Table 3. P. 350.

which highlighted the dissatisfaction with the quality of public pitches.[11.] Also the Playing Fields Study[12.] noted that 50% of the comments on public home grounds in London criticised the poor washing, changing and ancillary facilities.

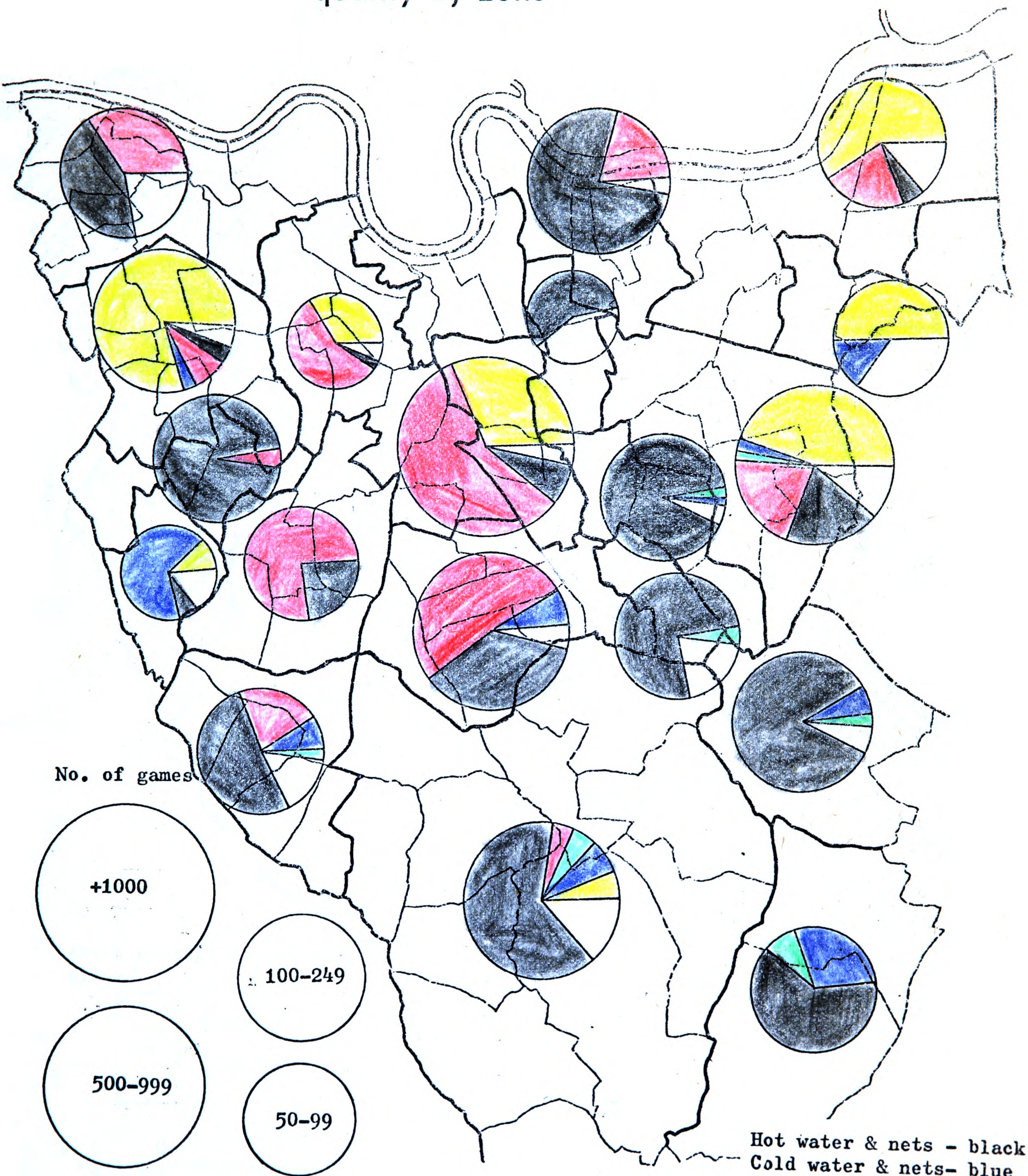
Fig. 7.1(a)(ii) shows the distribution of games played on different quality public pitches and shows the considerable variation between zones in terms of facilities provided. There is no discernible pattern in the quality of pitches used between inner and outer parts of south east London. No information was available for private pitches.

7.1(b) Time of Play.

Information on time of play was collected over the 1970/71 football season in the form of a frequency distribution of games played in different zones at the following times: Saturday morning and afternoon; Sunday morning and afternoon; other.[13.] For the whole study area the principal day and time of play was Sunday morning (44% of all games) followed by Saturday afternoon (35%). Saturday morning, Sunday afternoon and other times were much less important accounting for 7% of games each. Fig. 7.1(b) indicates the distribution of zones where the number of games played exceeded the overall average for the principal day and time of play. The northern parts of Southwark, Lewisham and West Greenwich had above average numbers of games played on Sunday morning whilst the southern halves of Southwark and Lewisham and north Bromley had above average numbers of games played on

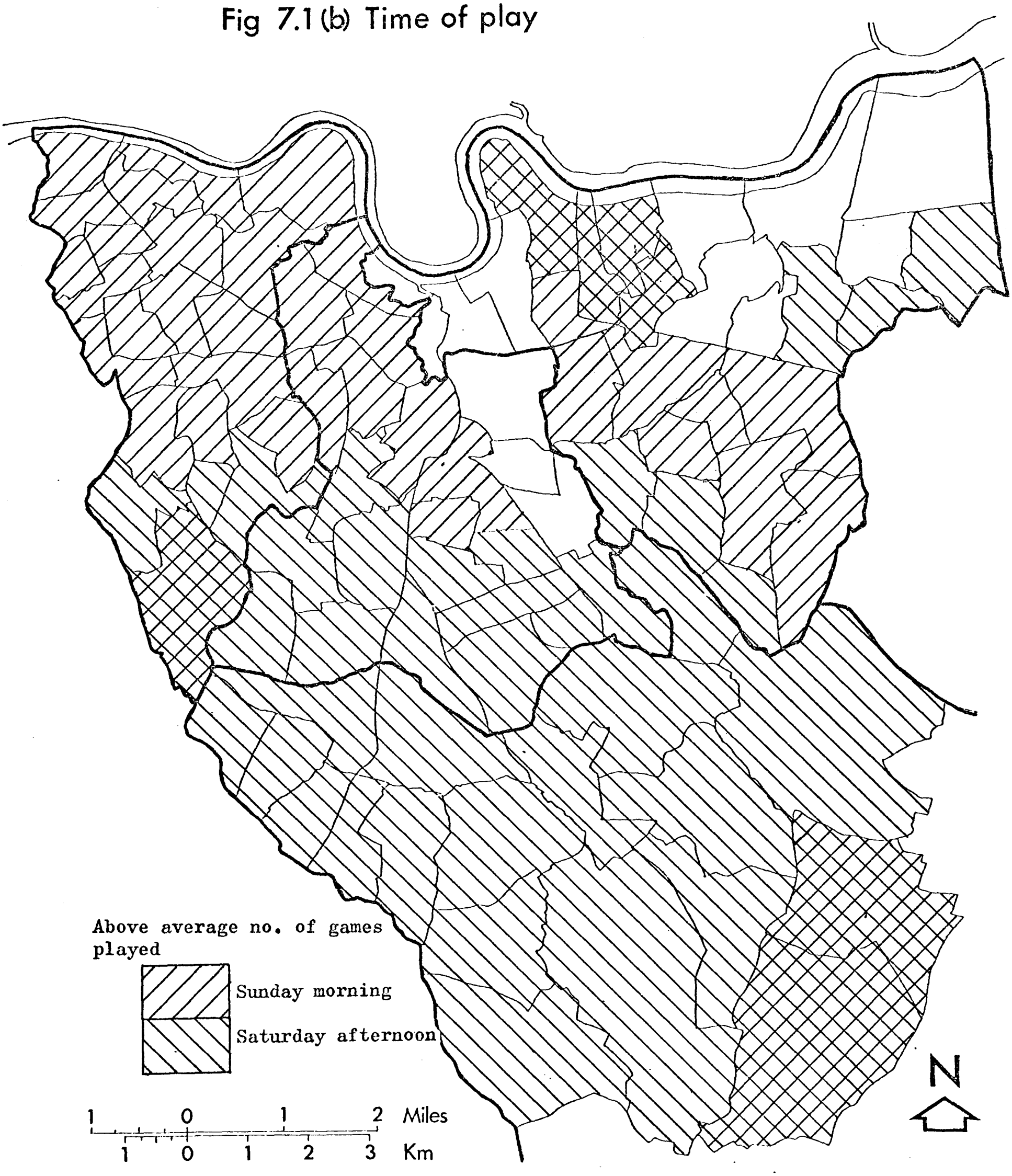
11. London Borough of Lewisham (See Ch. 3. P.160).
12. G.L. & S.E. Sports Council Research & Planning Unit. Playing Fields Study Summary Report Oct. 1974 P.7.
13. See Appendix VII(b) Table 4. P. 351.

Fig 7.1(a)(ii) Games played on grounds of differing quality by zone



Source: Greater London and S.E.Sports Council(unpublished data)
See Appendix VII (b) Table 3.

Fig 7.1 (b) Time of play



Source: Greater London and S.E.Sports Council, unpublished data. Appendix VII (b) Table 4

Saturday afternoon. The distribution is explained by the areas covered by Saturday and Sunday leagues. These findings are broadly supported by information obtained from borough pitch booking officers.

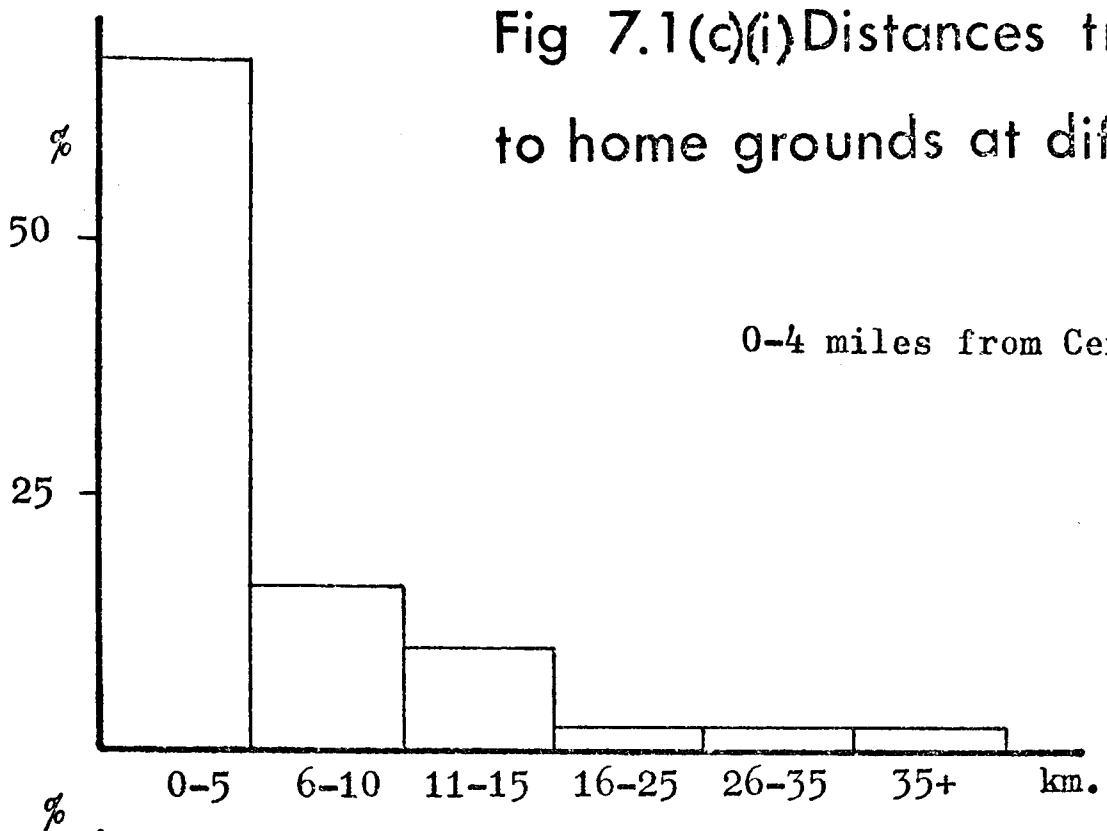
7.1(c) Travel Patterns.[14.]

Information was collected on the average distances travelled by members of teams to their public home grounds by zone. Within the study area 55% of all teams travelled between 0 - 3.1 miles to their home ground, a further 32% between 3.2 - 6.25 miles. Only 7% travelled farther than $9\frac{1}{2}$ miles to their home ground.[15.] Fig. 7.1(c)(i) shows the distribution of distances travelled by teams whose home grounds are located at different distances from Central London.[16.] The trip profiles are not markedly different, the most significant differences being the higher proportion who travel 3.1 miles or less, and the considerably lower proportion who travel between 3 - 6.25 miles to grounds within 5 miles of the centre, compared with teams travelling to grounds beyond 5 miles. This suggests that teams travel farther to grounds in the suburbs, partly explained by the lower population and land use densities which would necessarily increase the distance travelled.

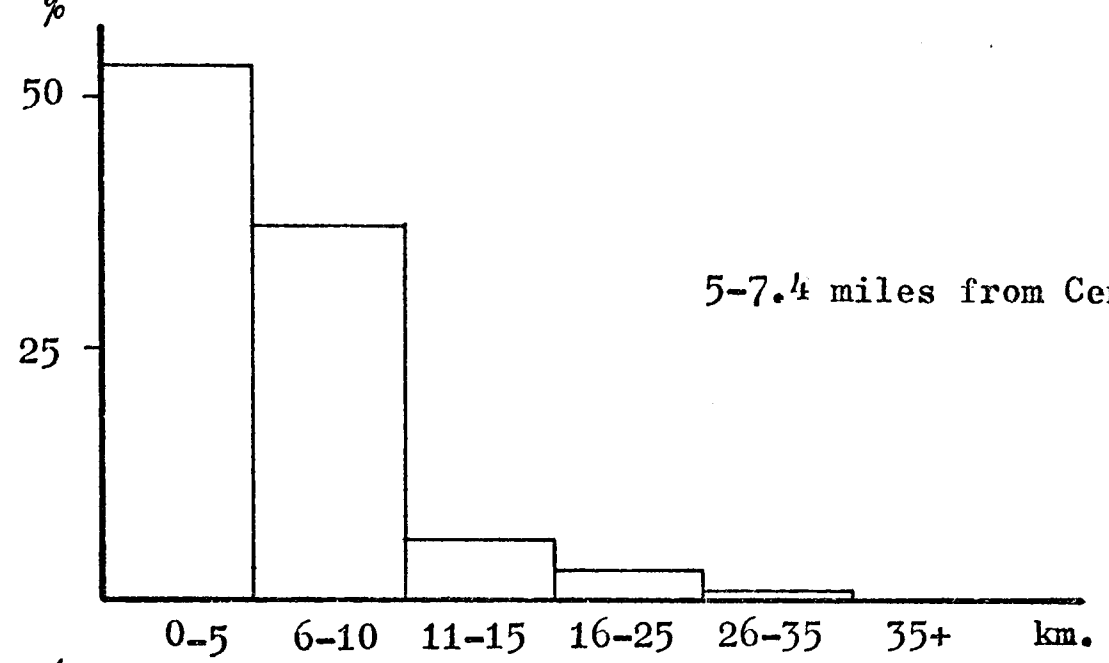
Another factor which will influence the distances travelled is the areal spread of the leagues to which the teams belong. This is most likely to affect the distance travelled to away games although the choice of home grounds will be influenced by the location of other teams in the league.

14. This section relates only to public grounds. The numbers of private pitches are too few for analysis.
15. See Appendix VII(b) Table 5. P. 352.
16. Home grounds are allocated to distance bands according to the distance between the mid-point of the zone in which they occur and Central London.

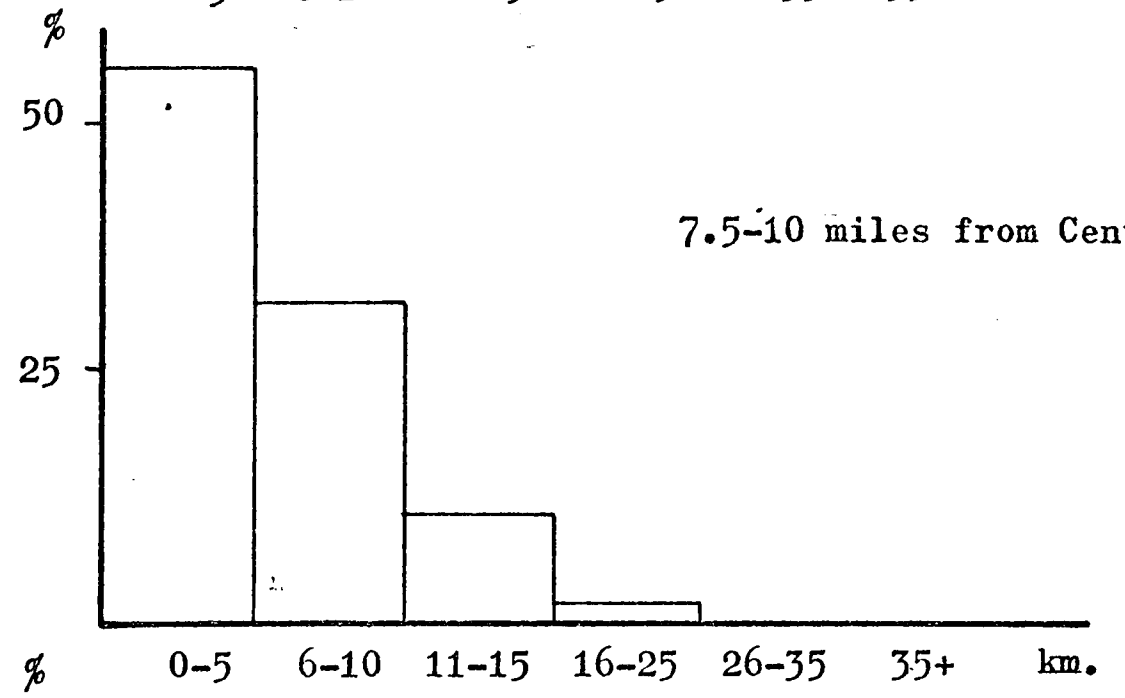
Fig 7.1(c)(i) Distances travelled by teams to home grounds at different locations



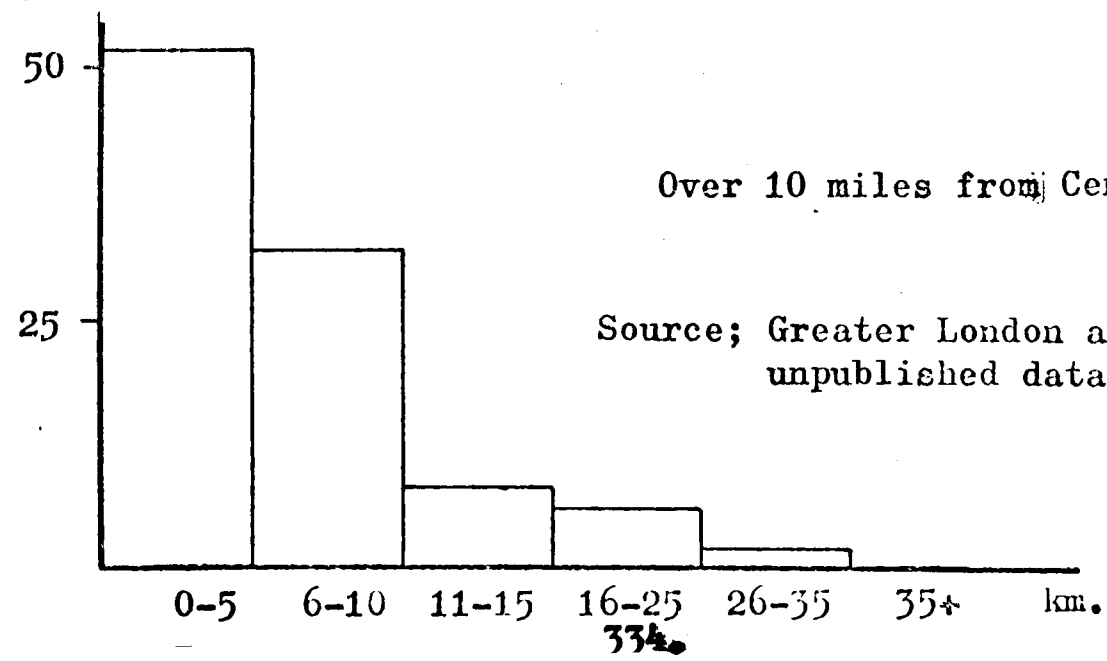
0-4 miles from Central London



5-7.4 miles from Central London



7.5-10 miles from Central London



Over 10 miles from Central London

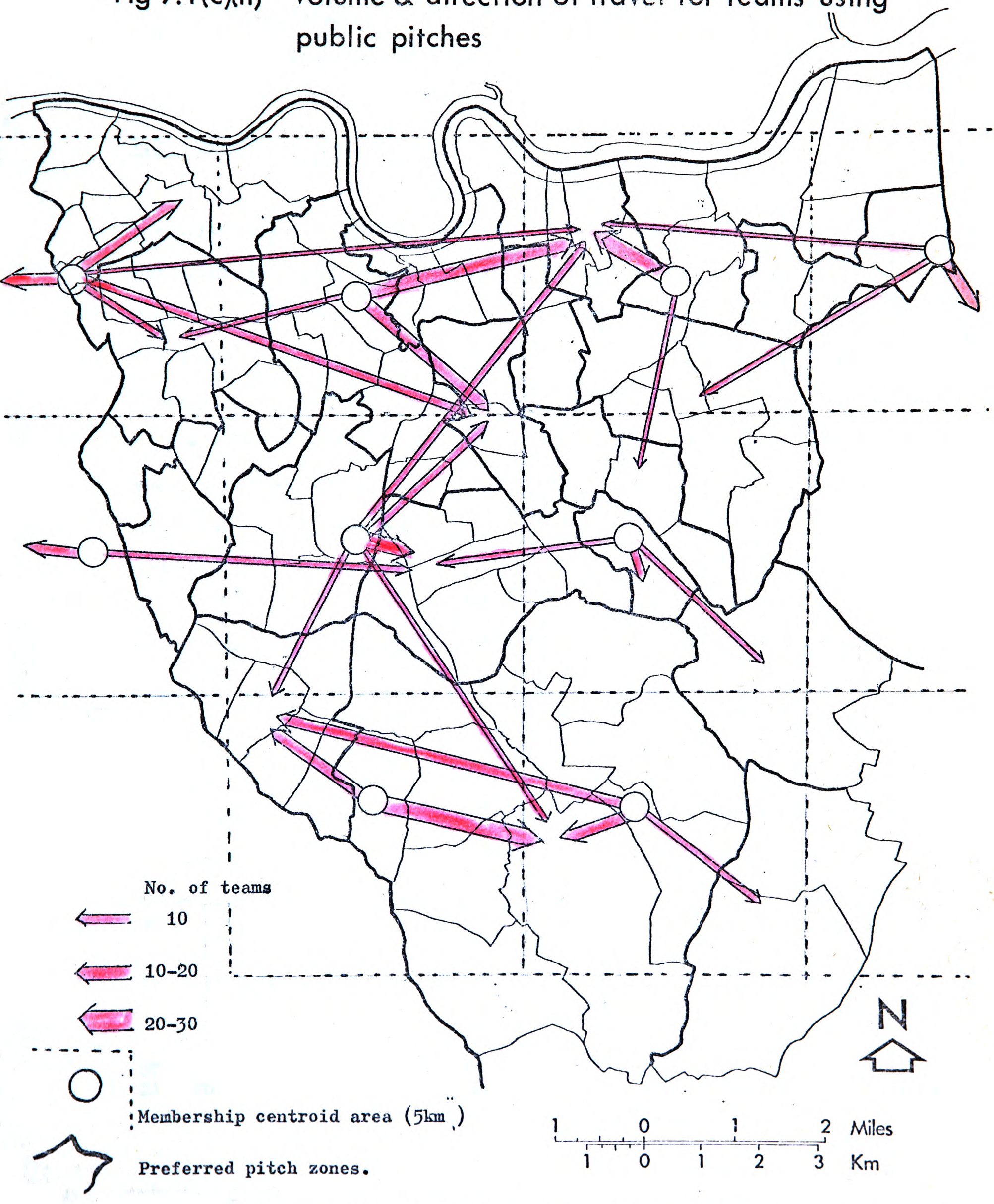
Source; Greater London and S.E Sports Council, unpublished data. Appendix VII (b) Table 5.

Fig. 7.1(c)(ii) shows the volume and direction of travel for teams using public pitches in the study area. The flows represent the proportion of teams whose membership centroids lie within the 5 kilometre grid squares, who wish to use pitches as their first choice in the zones indicated.[17] These flows are dependent upon the available supply of pitches and reflect the distribution of that supply. In North Southwark and Lewisham the main flows are outwards to the suburbs reflecting the paucity of pitches in inner areas. Teams in suburban areas indicate no particular direction of travel except to zones containing suitable pitches. In general terms the larger volume flows are of a fairly short distance, indicating the desire of each team to be as close to its home ground as possible. Smaller flows are of a longer distance and may indicate the lack of available good quality pitches in the immediate locality.

From this analysis it might be expected that the intensity of use of pitches will decrease as the distance travelled increases.[18] This would be consistent with earlier findings on informal recreation behaviour[19] whereby the frequency of park visiting decreases as the distance travelled increases. When tested it was found that intensity of use varies directly with distance travelled so that longer distances are associated with more intensively used pitches. There is a slightly positive correlation between these two variables of 0.51 which is significant at the 95% confidence level. This is completely opposite to the general pattern of recreational use of a facility and indicates the unusual nature of the use of pitches by teams who are prepared to travel greater distances to play sport. It was noted

17. See Appendix VII(b) Table 6. P. 352.
18. See Appendix VII(b) Table 7. P. 353.
19. See Ch. 5 Section 5.1 , P. 239 et. seq.

Fig 7.1(c)(ii) Volume & direction of travel for teams using public pitches



Source: Greater London and S.E. Sports Council, unpublished data. Appendix VII (b) Table 6.

earlier that intensity of use was associated with pitch quality. When distance was related to pitch quality there was found to be a slightly positive correlation (r_S = 0.53) indicating that higher pitch quality was associated with greater distances travelled.

7.2 Other Pitch Sports.

A similar survey to that conducted for football clubs and teams was carried out by the Greater London and South East Sports Council for hockey and rugby clubs.[20] The limited amount of data collected, with low base numbers for teams and games, makes impossible detailed analysis of patterns of use similar to that undertaken for football. However the main characteristics of use will be described, developing in more detail the general comments made earlier on the use of open space for sport.[21] No survey of the use of cricket pitches was undertaken and information is restricted to that obtained from borough pitch booking departments.

Of the 78% of hockey clubs who responded to the survey 61% of the mens' teams and 72% of the womens' used their own pitches, whilst 26% and 8% hired private pitches and 13% and 20% hired public pitches respectively. Of the 68% of rugby teams responding to the survey 77% played on their own pitches, 8% hired private pitches and 15% hired public. Information on pressure or intensity of use is only available for public pitches, demand being easily met throughout the study area.

For both sports the principal time of play is Saturday afternoon. For the

20. See Appendix VII(a) for details of methodology - response rates etc., P. 341 et. seq.
21. Ch. 3. Sec. 3.3(b) P. 164 et. seq.

season 1971/72 87% of rugby games, 94% of womens' hockey games and 82% of mens' hockey games were played at this time.

Information collected from secondary sources[22]. on cricket teams in south east London showed that 65% use their own or privately owned pitches, and 28% hire public pitches. As approximately $\frac{1}{3}$ of the pitch stock in the area is public, there are proportionately more public pitches than teams that use them. This global figure belies the local inequalities in provision. The pressure on pitches varies immensely with the number available. In Southwark the demand for public cricket pitches on Saturdays is not quite met by supply and there is a 50% shortfall for Sunday pitches. Lewisham has a small shortfall for Sunday pitches, whilst Greenwich is able to meet existing demand. Public cricket pitches in Bromley are only used to 80% capacity on both Saturday and Sunday. Demand exceeds capacity in the inner areas, whereas the situation is reversed in outer areas. The principal day of play is Sunday for public pitches and Saturday for private.

7.3 Policy Implications for Provision and Management of Open Space for Sport.

The foregoing analysis highlights the unusual nature of demand for team sports. Travelling considerable distances to away games is an inherent and accepted feature of team sports played by adults. Distances travelled will depend on the areal extent of the league to which clubs and teams belong. Consequently the precise location of sports pitches is not so relevant as for public open space which should be easily accessible to all groups in the population.

22. National Census of Cricket Clubs 1970.

It has been shown that sports pitches are located in the suburbs as a result of urbanization processes and in several cases have been developed as a complex or group of pitches where land has become available.[23] The findings on use suggest that such concentrations of pitches may well be more intensively used than isolated sites. In terms of planning and management this existing situation may well be the best to develop.

In planning new pitches, additional provision could be made in areas of metropolitan open land such as the "Green Chain" in south east London, which represent areas of opportunity where complexes of pitches can be developed in keeping with planning policies for the retention of open land. In terms of managing and maintaining such facilities economies of scale could be gained from concentrating pitches in one location. The quality of facility provision could also be improved, it being more economic to provide good changing facilities, hot showers and well maintained pitches and nets for a group of pitches rather than for isolated grounds.

This approach would promote the existing pattern of pitch provision and also existing patterns of use. Pitches provided in the suburbs already serve players from Inner London and would continue to do so.

A certain proportion of pitches would need to be sited locally to cater for the needs of junior teams who are less able to travel such great distances as adults. It has been estimated that 20% of the leagues in London and a similar proportion of the hiring clubs are for youth teams.[24] For this

23. See Ch. 2 Section 2.3(b) P.106.
24. Greater London and South East Sports Council. A Playing Fields Strategy for Greater London and op.cit P.19 para. 1.24.

group accessibility is a relevant factor in pitch location. Such provision could be accommodated within general public open space provision i.e. in district and metropolitan parks and also by making greater use of educationa playing fields.

This latter alternative is only viable in the suburbs of south east London. In inner areas such as Southwark, schools are substantially under-provided for locally,and school teams either use local public open spaces or are "bussed" in some cases to school pitches ten miles away from the schools e.g. a sports pitch complex at Merton serves a number of secondary schools in north Southwark.

The need for pitch provision is greatest in the inner areas of south east London, whereas the opportunities to make new provision are minimal. The policies local authorities are pursuing, faced with this situation, and the playing powers and finances available to implement them, will be developed in Chs. 8 & 9. Similarly policies for sports provision in the suburbs will also be investigated.

APPENDIX VII(a) Playing Fields Research Study: Background to Survey of pitch sports requirements undertaken by the Greater London and South East Sports Council 1971 - 1974.

Aim:- The study was undertaken to enable regional and local assessments of the need for sports pitches.

There were no generally accepted criteria for pitch provision at that time and the insensitive national standards[1]. hitherto adopted were of little value in determining local requirements. In London this problem was highlighted by the considerable loss of private sports grounds for residential development. Evidence of need was required to defend the retention of such pitch stocks. The study developed a methodology for pitch requirements outlined in "Planning for Sport."[2].

Surveys.

A saturation postal survey of football, hockey and rugby clubs and a stratified random sample survey[3]. of players was conducted for four study areas:-

(i) South East London (L.Borough's of Bexley, Bromley, Greenwich, Lewisham and Southwark and Dartford M.B.).

(ii) Crawley/Horsham

(iii) Hastings/Bexhill

(iv) Maidstone.

Information for football was collected for the season 1970/71 and for rugby and cricket for 1972/73, the difference being due to the time taken

1. National Playing Fields Association. Playing Space Target 1971.
2. Sports Council Planning for Sport. op.cit.
3. G. L. & S.E. Sports Council Research & Planning Unit. Playing Fields Study. Information Sheet No. 2 1972

to undertake the football survey.

Data was collected on:-

(i) the number and distribution of public/private and industrial sports pitches.

(ii) use of pitches by teams and clubs.

(iii) league, club and team structures.

(iv) players characteristics and patterns of use.

Analysis and presentation.

The findings of the survey were used to develop a 5 stage approach to assessing pitch requirements[4]. which was then applied to 5 sectors of London in developing a strategy of provision of an adequate number and choice of team sports within reasonable distance of London's resident population. This enabled a quantitative assessment of need to be made in terms of pitches required for major team sports and a series of policies were developed for their provision, retention and management.

Much of the information collected from the Playing Fields Study was not used in the preparation of the strategy. This has formed the data base for the analysis of Chapter 7.

Information used for south east London includes:-

(i) Number and quality of pitches.

(ii) Number of teams and games.

(iii) Time of play

(iv) Distance travelled by teams to home grounds

4. See Ch. 1 Appendix I.(d) P. 61.

(v) First choice of grounds by team.

Information is most comprehensive for football which is the most important team sport, representing 65% of all teams in south east London. Comparisons between the use of public and private pitches has been given where available.

The information was collected for zones (comprising a group of Wards) and 5 km^2 areas. These are the two basic locational units used in the analysis. A map of zones and areas, together with a coding sheet for zones, indicating the Wards they comprise is appended.

SPECIAL CODING SHEET FOR ZONE CODES.

00 Applicable but no response/Don't know
01 Not applicable.

Code local authority ward boundaries as follows:- (RDS equivalent zone in brackets).

02	SOUTHWARK	Cathedral Chaucer, Newington, Faraday, Browning, Bricklayers Abbey, Riverside, Rotherhithe, Dockyard (127).
03	SOUTHWARK	St. Giles, Brunswick, Burgess, Friary, Consort, Waverley, Bellenden, Lyndhurst (128)
04	SOUTHWARK	Rye, Alleyn, Ruskin (129)
05	SOUTHWARK	The College (130).
06.	LEWISHAM	Bellingham, Southend, Grove Park, Whitefoot, Culverley, St. Andrew, Southlee (103).
07	LEWISHAM	Blackheath, Manor Lee, St. Mildred Lee (1040.
08	LEWISHAM	Rushey Green, Lewisham Park, Ladywell, Drake, Pepys, Marlowe, Deptford, Grinling Gibbons (105).
09	LEWISHAM	Brockley, Honor Oak, Sydenham West, Sydenham East, Forest Hill (106).
10.	GREENWICH	Eynsham, St. Nicholas, Woolwich, St. Marys, St. Georges, Academy (052).
11	GREENWICH	Abbey Wood, Slade, St. Margarets (053).
12	GREENWICH	Charlton, Hornfair, Eastcombe, Marsh (054)
13.	GREENWICH	Shooters Hill, Kidbrooke, Well Hall, Sherard, Eltham, New Eltham (055).
14	GREENWICH	Coldharbour, Middle Park, Horn Park (056)
15.	GREENWICH	Blackheath, Vanburgh (057)
16	GREENWICH	Park West, Trafalgar (058)
17	BEXLEY	Sidcup West, Sidcup East, North Cray (011)
18	BEXLEY	East Wickham, St. Michaels, Falconwood, Dawson, Lamorbey West, Lamorbey East (012).
19	BEXLEY	St. Marys (013)
20	BEXLEY	Upton, Crayford Town, Crayford West, Christ Church, Brampton, Crayford North, Northumberland Heath, Bostall, Belvedere (014).
21	BEXLEY	Erith (015)
22	BROMLEY	Nottingham (021)
23	BROMLEY	Anerley, Lawrie Park, Penge, Clock House, Manor House (022)
24	BROMLEY	Copers Cope, Martins Hill, Shortlands, Eden Park, West Wickham North, West Wickham South, Keston & Hayes, Bromley Common, Bickley, Plaistow (023)
25	BROMLEY	Chislehurst (024)
26	BROMLEY	St. Pauls Cray, St. Marys Cray (025)
27	BROMLEY	Darwin, Biggin Hill (026)
28	BROMLEY	Chelsfield, Farnborough, Goodington, Petts Wood (027).

Code other zones as follows for player origin information:- (eight figure grid references of notional origins of off-map data in brackets).

29	BROMLEY	Non-mapped parts; all but player origin data is already covered by codes 23 - 28 (54501610
30	DARTFORD M.B.	Should all be mapped (otherwise 55301740).
31.	BARKING	(54801840)
32	BARNET	(52401920)

33 BRENT (52001860)
34 CAMDEN (52801850)
35 CROYDON (Non-mapped parts G.R. 53101580)
36 EALING (51601820)
37 ENFIELD (53201960)
38 HACKNEY (53501850)
39 HAMMERSMITH (52401790)
40 HARINGEY (53101890)
41 HARROW (51401900)
42 HAVERING (Non-mapped parts G.R. 55501870)
43 HILLINGDON (51801840)
44 HOUNSLOW (51301760)
45 ISLINGTON (53201850)
46 KENS.& CHELSEA (52601790)
47 KINGSTON-U-T (52001670)
48 LAMBETH (Non-mapped parts G.R. 52801750)
49 MERTON (52501680)
50 NEWHAM (Non-mapped parts G.R. 54201830)
51 REDBRIDGE (54401880)
52 RICHMOND-U-T (51801730)
53 SUTTON (52801630)
54 TOWER HAMLETS (Non-mapped parts G.R. 53701820)
55 WALTHAM FOREST (53801890)
56 WANDSWORTH (52601740)
57 WESTMINSTER (52801810)
58 CITY OF LONDON (53301810)

Code other non-mapped, non-GLC zones as follows for player origin information:- (the centroid grid references generalise large areas and are <u>not</u> weighted for population; their use is very limited).

59 KENT East of Maidstone-Gillingham (60501500)
60 MAIDSTONE (57501550)
61 KENT West of Maidstone-Gillingham (56001550)
62 SURREY (51001550)
63 SUSSEX (54001200)
64 ESSEX (57502100)

65 OTHER Grid references as appropriate, if named.

Fig VII(a)(i) Zones see pp. 344-345

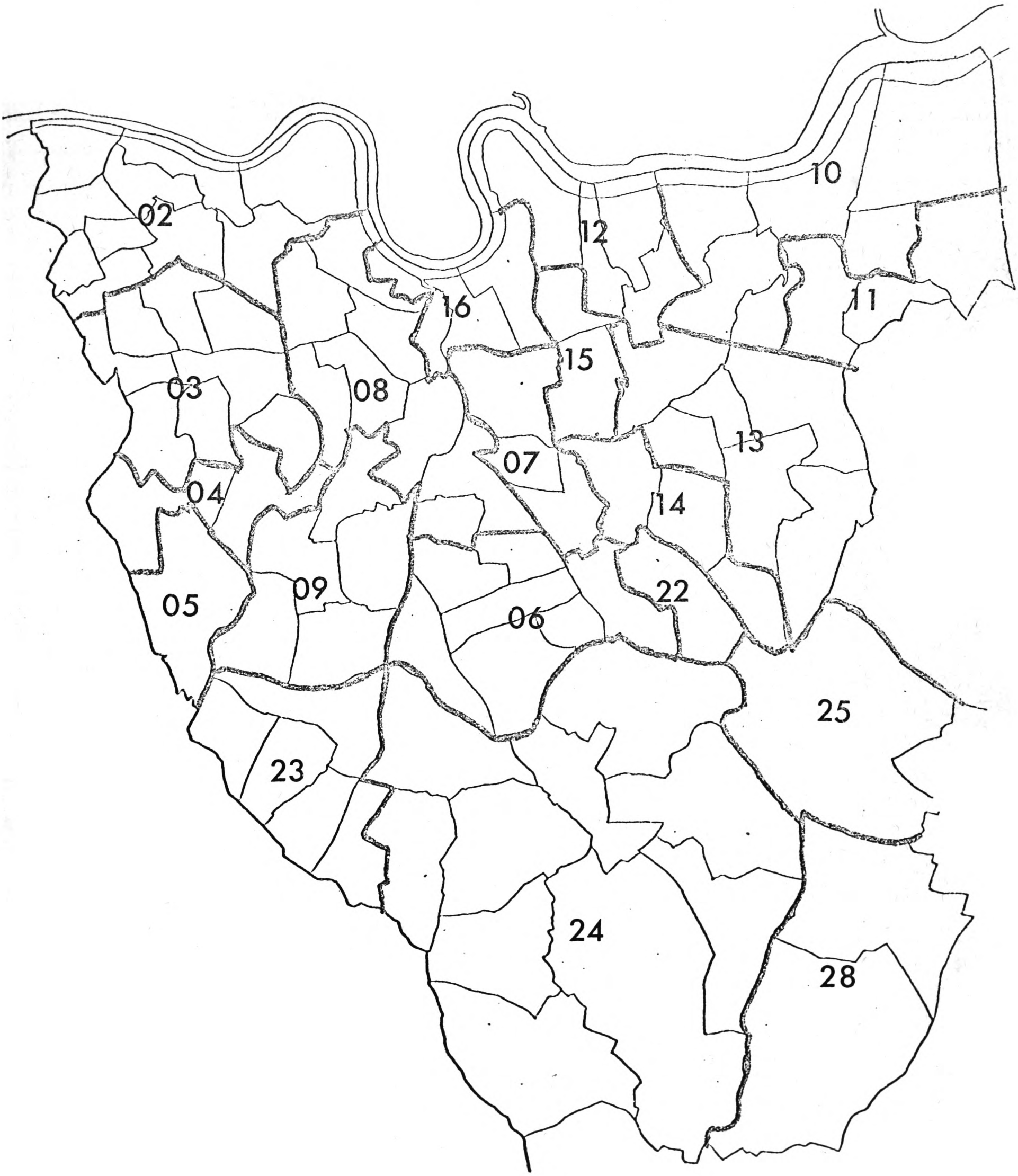
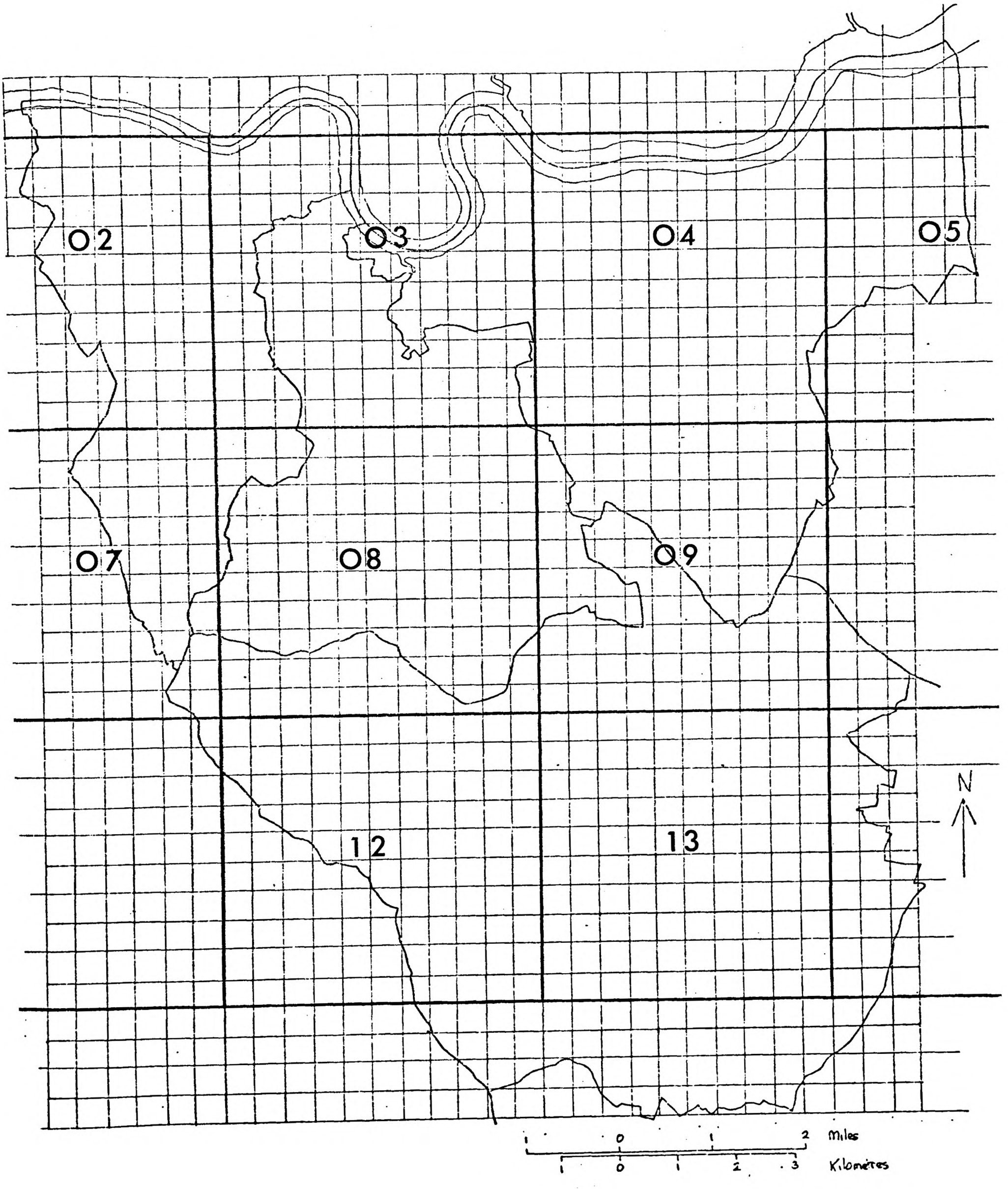


Fig VII(a)(ii) 5 km^2 Areas see pp 344-345



APPENDIX VII(b)

Table 1. No. of pitches and no. of teams by zone.

Zone	Public.		Private.	
	Pitches	Teams	Pitches	Teams
02	4	30	0	0
03	16	63	2	1
04	9	28	0	0
05	2	7	0	0
06	36	152	45	24
07	31	169	40	1
08	5	11	0	0
09	5	11	1	1
10	7	30	0	0
11	6	24	0	0
12	9	65	0	0
13	43	163	16	14
14	8	50	15	13
15	4	3	7	7
16	0	0	0	0
22	9	28	9	2
23	13	60	0	0
24	30	99	9	20
25	13	68	5	5
28	15	24	1	1

Table 2 No. of games and games per pitch by zone.

Zone	Public		Private	
	Games	Games per pitch	Games	Games per pitch
02	165	41.3	0	0
03	325	20.3	11	5.5
04	138	15.3	0	0
05	27	13.5	0	0
06	618	17.2	232	5.2
07	1037	33.5	4	0.1
08	49	9.8	0	0
09	58	11.6	2	2.0
10	149	21.3	0	0
11	86	14.3	0	0
12	345	38.3	0	0
13	666	15.5	180	11.3
14	243	30.4	126	8.4
15	14	3.5	84	12.0
16	0	0	0	0
22	196	21.8	6	0.7
23	238	18.3	0	0
24	769	25.6	221	24.6
25	473	36.4	85	17.0
28	192	12.8	16	16.0

Table 5. Games played on public grounds of differing quality.

	Level of facility provision						
Zone	1	2	3	4	5	6	Base.
02	72	0	0	54	0	39	165
03	13	5	0	25	264	18	325
04	130	0	0	8	0	0	138
05	2	18	0	0	3	4	27
06	225	47	0	315	1	30	618
07	86	1	0	601	308	41	1037
08	1	0	0	29	16	3	49
09	14	0	0	44	0	0	58
10	7	0	0	32	90	20	149
11	0	14	0	0	43	29	86
12	264	0	0	67	0	14	345
13	134	16	13	135	297	71	666
14	220	2	0	4	0	17	243
15	8	0	0	0	0	6	14
16	0	0	0	0	0	0	0
22	148	0	0	8	0	40	196
23	123	22	47	1	4	41	238
24	490	64	27	31	46	111	769
25	394	43	0	0	8	20	473
28	121	55	15	0	6	1	192

1 = Hot water and nets
2 = Cold water and nets
3 = Nets only
4 = Hot water only
5 = Cold water only
6 = Not known

Table 4. Games played by time of play (public pitches)

Zone	Saturday a.m. %	Saturday p.m. %	Sunday a.m. %	Sunday p.m. %	Other %	Base
02	0	24	50	14	12	165
03	17	21	46	15	1	325
04	7	39	43	4	7	138
05	0	48	52	0	0	27
06	12	42	41	1	4	618
07	17	21	42	7	13	1037
08	0	10	74	16	0	49
09	0	52	43	5	0	58
10	9	25	43	22	1	149
11	8	71	21	0	0	86
12	0	36	59	5	0	345
13	6	24	62	8	0	666
14	0	59	34	1	6	243
15	0	0	57	0	43	14
16	0	0	0	0	0	0
22	0	57	42	1	0	196
23	0	48	27	17	8	238
24	2	43	32	8	15	769
25	0	49	30	3	18	473
28	0	38	58	4	0	192
Borough						
Southwark	10	26	47	12	5	655
Lewisham	14	29	43	5	9	1762
Greenwich	4	32	55	8	1	1489
Bromley	1	46	34	7	12	1868
Average Overall	7	35	44	7	7	5774

Table 5. Distance travelled by teams to public grounds by zone location.

Zone location	Distance travelled (mi)*						
	0-3.1	3.2-6.25	6.26-9.4	9.5-15.6	15.6+	N.K.	Total
0-4 mi.	78	18	12	2	2	5	115
5-7.4 mi.	167	116	18	8	4	1	314
7.5-9.9 mi.	232	137	45	7	1	2	424
10+ mi.	95	59	14	11	3	1	183

* The original data (in kilometres) has been converted to miles for comparability.

Table 6. Team membership centroid (within 5 km. grid squares) by first choice of public ground (within zone).

1st choice of ground (zone)	Team membership centroid (5 km. area)									
	02	03	04	05	07	08	09	12	13	Total*
02	19	5	1	0	0	0	2	0	0	31
03	12	7	0	0	3	2	0	0	0	28
04	2	0	1	0	5	2	2	0	0	12
05	0	0	0	0	3	0	0	0	0	3
06	1	4	1	1	6	24	10	1	1	56
07	19	18	4	2	0	7	3	1	0	56
08	1	3	0	0	0	2	0	0	0	6
09	1	1	0	0	0	5	2	0	0	10
10	2	4	5	2	2	1	2	0	0	23
11	0	0	1	1	0	0	0	0	0	2
12	10	20	28	4	3	10	7	0	0	91
13	1	4	4	4	1	1	6	0	1	32
14	1	2	5	1	0	1	7	0	0	19
15	0	0	0	0	0	0	0	0	0	1
16	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	1	13	0	1	20
23	1	0	0	0	3	7	0	17	12	35
24	0	1	0	0	1	9	5	22	11	62
25	0	0	1	0	0	8	10	2	1	33
28	0	0	0	0	0	0	0	0	5	17
Total*	100	71	61	45	60	87	83	52	36	

* Row and column totals do not sum, as not all the areas and zones are included in this table.

Table 7. Average distance between team membership centroid and home ground by zone.

Zone	Public (mi)	Private (mi)
02	5.4	0
03	3.8	4.9
04	4.3	0
05	2.3	0
06	4.0	7.9
07	4.8	4.0
08	2.2	0
09	3.2	0
10	4.3	0
11	5.0	0
12	5.2	0
13	5.0	7.3
14	3.4	6.6
15	6.3	6.6
16	0.0	0
22	4.6	7.9
23	4.0	0
24	5.1	6.9
25	4.9	4.9
28	3.4	8.9

APPENDIX VII(c) Use of Spearman's Rank Correlation Coefficient (r_s) in testing relationships between the use characteristics of football teams in S.E. London.

This statistic provides the means of measuring the association between two sets of ranked data. In calculating the statistic both sets of data are ranked from highest to lowest and the difference between the rankings is squared and substituted in the following formula.

$$r_s = 1 - \frac{6 \leq d^2}{n(n^2 - 1)}$$

If ties occur in the ranking of either set of data then the tied observations are given the mean value of the ranks they cover.

A correction factor must be applied to the above formula for each tie which avoids the increase in r_s which would occur. The correction is to add $\frac{t^3 - t}{12}$ to $\leq d^2$ where t is the number of tied observations.

It is necessary to test whether the sample value r_s is significantly greater or less than zero (i.e. if there is an association between the variables in the population from which the sample was drawn). It is necessary to test:-

$$Ho = 0$$
$$Hl = > \text{ or } < \quad 0$$
$$\alpha = 0.05$$

i.e. whether at the 95% confidence level the non-zero value of r_s is significantly greater or less than zero. The significance can be tested by using a "t" test and substituting r_s in the following formula:-

$$t(calc) = \frac{r_s - P_s}{\sqrt{(\frac{1 - r^2}{n - 2})}}$$

or by using a table of critical values of r_s given below. If r_s (calc) exceeds

the critical value at the given sample size (h) then it is significantly different from zero (H_1 is accepted).

Table 1. Table of critical values of r_s the Spearman Rank Correlation Coefficient,

N	Significance level (one-tailed test)	
	0.05	0.01
4	1.000	
5	0.900	1.000
6	0.829	0.943
7	0.714	0.893
8	0.643	0.833
9	0.600	0.783
10	0.564	0.746
12	0.506	0.712
14	0.456	0.645
16	0.425	0.601
18	0.399	0.564
20	0.377	0.534
22	0.359	0.508
24	0.343	0.485
26	0.329	0.465
28	0.317	0.448
30	0.306	0.432

Example

To calculate r_s for no. of pitches and no. of games by zone.

Ho = r_s is not significantly different from zero

H_1 = r_s is significantly different from zero

pitches (x)	(rank) (order)	games (y)	(rank) (order)	d (x-y)	d^2
4	17.5	165	12	5.5	30.25
16	5	325	7	2	4
9	10	138	14	4	16
2	19	27	18	1	1
36	2	618	4	2	4
31	3	1037	1	2	4
5	15.5	49	17	1.5	2.25
5	15.5	58	16	0.5	0.25
7	13	149	13	0	0
6	14	86	15	1	1
9	10	345	6	4	16
43	1	666	3	2	4
8	12	243	8	4	16
4	17.5	14	19	1.5	2.25
0	20	0	20	0	0
9	10	196	10	0	0
13	7.5	238	9	1.5	2.25
30	4	769	2	2	2
13	7.5	473	5	2.5	6.25
15	6	192	11	5	25
					$\leq d^2 = 137.5$

substituting in formula $$r_s = 1 - \frac{6 \leq d^2}{n\,(n^2 - 1)}$$

$$r_s = 1 - \frac{6\,(137.5 + \frac{2^3 - 2}{12} + \frac{2^3 - 2}{12} + \frac{2^3 + 2}{12})}{20(20^2 - 1)}$$

$$= 1 - \frac{(6)\ (139)}{20(4399)}$$

$$= +0.895$$

By referring to Table 1 it can be seen that r_s is significantly different from zero at both the 95% and 99% confidence levels. $\therefore$ H_1 is accepted. There is a strong positive association between the number of pitches in each zone and the number of games played.

The calculation of r_s and test for significance has similarly been carried out for all other values in Chapter 7 Section 7.1.

CHAPTER 8. THE IMPLEMENTATION OF STRATEGIC OPEN SPACE POLICIES IN SOUTH EAST LONDON.

Open space policies should not only seek to make provision for the recreational needs of the population but must also be capable of being implemented successfully. This will depend on the legislative powers and finances which are available to authorities promoting such policies. The role and effectiveness of advisory and executive bodies in providing new, and retaining existing open space for informal recreation and sport in south east London will be examined both at the strategic and local levels.

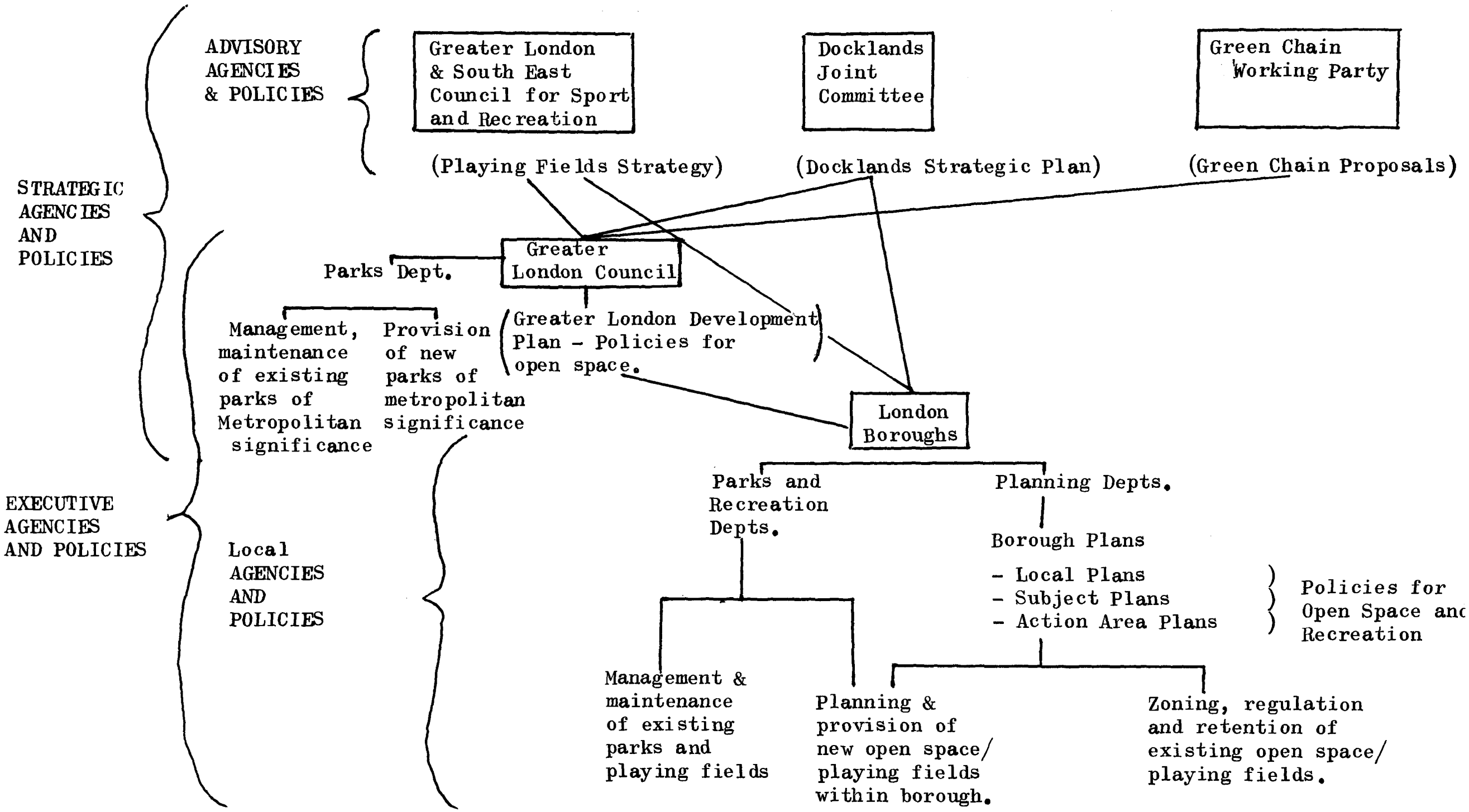
Figure 8 illustrates open space policies operating in the study area and the framework for their implementation. The most important set of policies are contained within the statutory structure plan (G.L.D.P.) and the resultant local plans of the London Boroughs. There are in addition a number of management policies which relate to the running and maintenance of open spaces and the provision of recreational services.

Superimposed on this statutory framework are a number of policies developed by strategic planning agencies in concert with the G.L.C. and borough councils. These either relate to specific issues of metropolitan significance e.g. the provision of playing fields, or to specific locations e.g. Docklands. These policies depend largely on the ability and willingness of local authorities for their successful implementation, although some agencies have planning powers and grant aiding ability.

There are four such strategic agencies responsible in south east London, the G.L.C; the Greater London and south east Council for Sport and

Figure 8.

PLANNING FRAMEWORK FOR OPEN SPACE POLICIES IN S. E. LONDON.



Recreation; the Docklands Joint Committee; the Green Chain Working Party. The powers and finance available to each body will be examined in relation to the policies they promote, and their success in implementation will be evaluated by examining the progress made in provision.

8.1 Greater London Council.

(a) Legislative Powers

The London Government Act 1963 re-organized the local government of Greater London so that the G.L.C. became the strategic planning authority for the metropolitan area and the London Boroughsbecame the local planning authorities.[1] Section 25(3) of the Act charged the G.L.C. to develop a land use plan for Greater London to provide a framework for detailed Borough plans. The draft Greater London Development Plan was published in 1969,&examined at a Public Enquiry as a result of which a number of substantial amendments were made (1972) and was eventually approved in July 1976 by the Secretary of State for the Environment.[2]

The Town and Country Planning Act 1971 altered the status of the G.L.D.P. so that it became the statutory structure plan for Greater London under the new planning machinery when it was approved in 1976. This provided a broader and more up-to-date policy framework to guide the borough plans. For the purposes of land use zoning and regulation the Town Map of the former London County Council Initial Development Plan (approved 1955) still

1. The Inner London Education Authority is also responsible for open space provision in the form of school playing fields but is beyond the scope of this study. There are a number of miscellaneous bodies responsible for open space provision e.g. the Department of Environment, City of London Corporation which because of their limited scope will not be examined.
2. See Chapter 1. Section 1.2(d) P. 32.

has statutory force until it is superseded by local plans.

The G.L.C. is also the executive authority for the planning and provision of new parks and the management and maintenance of existing parks of metropolitan significance i.e. of greater than Borough importance. The London Government Act 1963 Section 58(1) (b) defined open space development powers of the G.L.C. as being the provision of new parks and open spaces:-

> "for the benefit of an area of Greater London substantially larger than the London Borough in or near which the open space is proposed to be provided."[3.]

The development of Burgess Park is the only G.L.C. scheme for park provision in South East London.

The powers of acquisition of land for open space and of maintenance are also outlined in Section 58 and refer to legislation available to both the G.L.C. and the London Boroughs. These include the Public Health Acts 1875 S.164, 1936, 1961 Ss. 52 - 54 and the Open Spaces Act 1906 (except S. 14).

Since the War the philosophy of the L.C.C. then the G.L.C. Parks Department has moved away from the acquisition of new open space to the extension of the opportunities and facilities offered within parks. Within the parks of south east London the Council provides coaching in tennis and cricket, playschemes and adventure playgrounds, concerts, zoos, animal enclosures, fairs etc.,

3. London Government Act 1963 (Eliz. II c. 33 Sect. 58).

(b) Finance.[4]

During 1979/80 the G.L.C. will have spent £2.125m capital on land acquisition, layout and other works in the provision of new open space in London of which £1.18m will have funded the development of Burgess Park. Slightly over 10% of the total will be funded by Central Government Grants, the remainder from the Council's own revenue.

£12.117m will be spent on revenue expenditure for the running and maintenance of parks which are the responsibility of the G.L.C. This expenditure covers salaries of park employees, premises, running costs, maintenance and repairs. Just over 5% of these costs are recouped by income from fees, rents and central government grants.

The considerable sums of money involved give an indication of the financial ability of the Council to implement open space policies, and also suggests the high cost of new open space provision as at Burgess Park, especially when this is related to the rate of progress.[5]

(c) Policy implementation.[6]

The history of development of Burgess Park pre-dates the London Government reorganisation. The County of London Plan recognized the "inadequacy and maldistribution of open space" to be one of four major planning problems

4. Source: G.L.C. Budget 1979/80 and Projections 1980/84 pp. 22 - 25.
5. See Section 8.1(c).
6. This review of progress of Burgess Park is based on J. Bellamy "The Development of Burgess Park." G.L.C. Intelligence Quarterly. Dec. 1976.

in London, the East End and South Bank being identified as the most deprived areas. One of the proposals of this Plan was to alleviate the deficiency in North Camberwell by the creation of a new 120 acre open space which could be developed on bomb damaged sites and as part of the redevelopment of inner boroughs. (Fig. 8.1(c)).

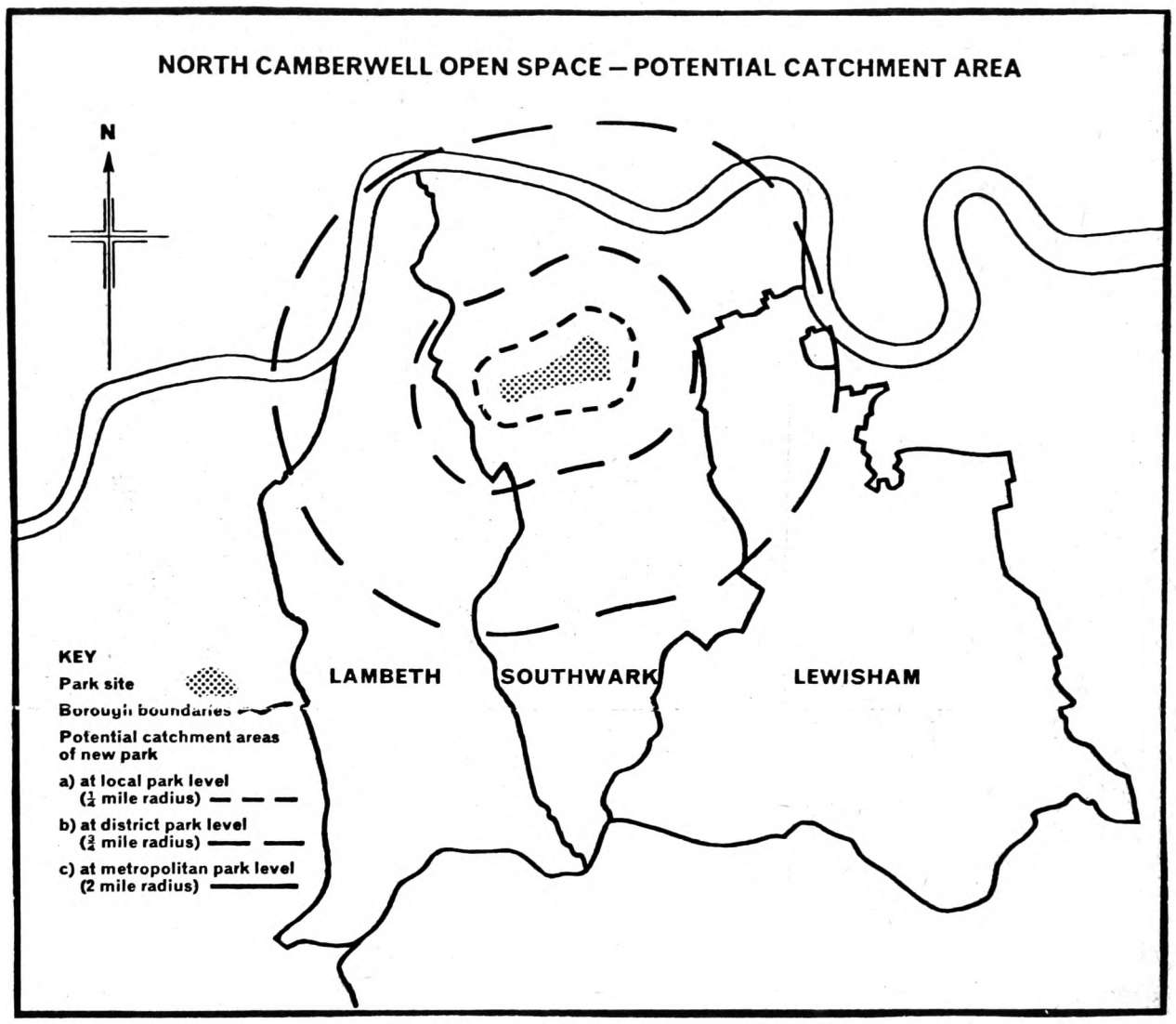
In 1951 the Administrative County of London Initial Development Plan (I.D.P.) was published in accordance with the Town and Country Planning Act 1947 and pursued the objectives of the earlier plan. North Camberwell Open Space was incorporated in the formal zoning notation of the new development plan.

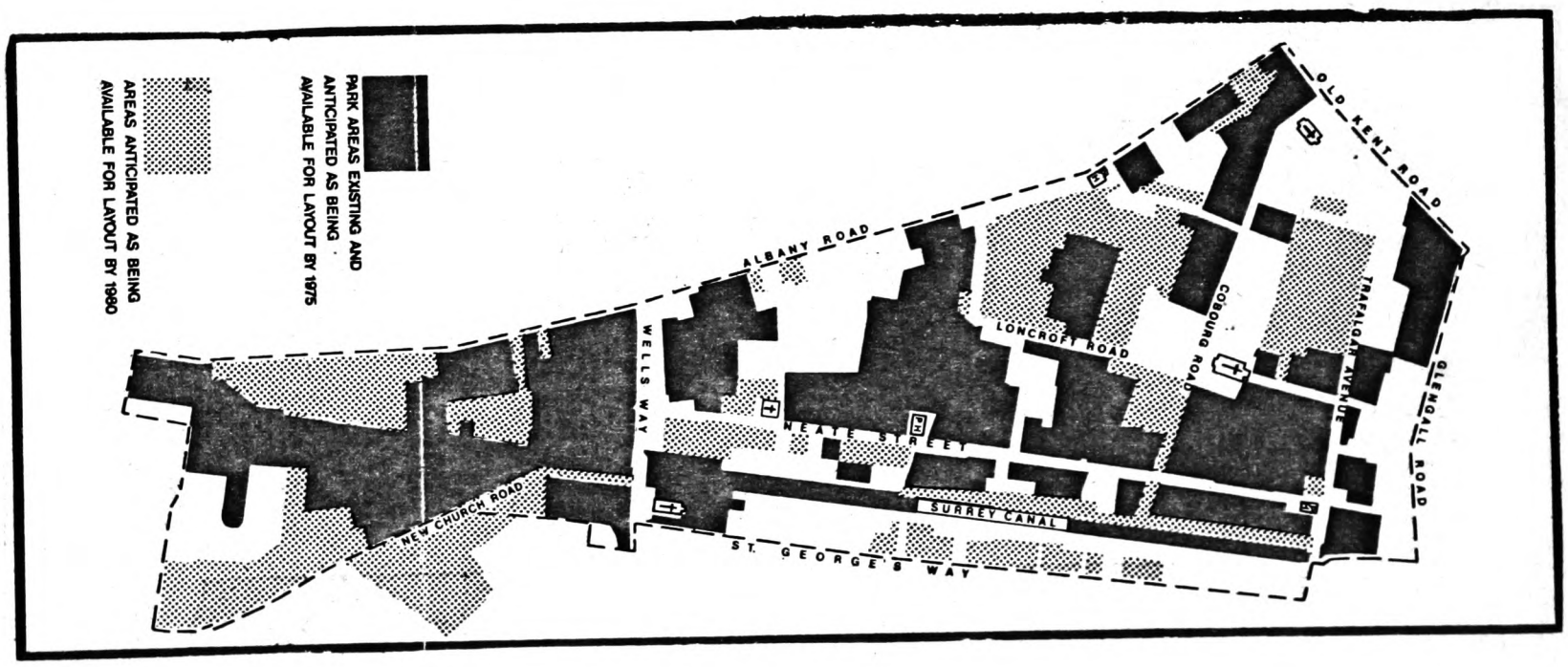
The I.D.P. envisaged a lengthy process with a programme of implementation which would occur in stages spanning the first, second and third periods of the I.D.P. 1955-60, 1960-72, 1972-2005. In the first period bomb-damaged and vacant properties and cleared land would be dealt with to avoid disturbing industry and commerce and that fragmented open space would be put to temporary use. The second stage would convert temporary housing sites and properties suitable for redevelopment - this would see consolidation of open space and would cater for new housing developments; the third stage would provide for the safeguarding of land for long term projects.

In practice 13 acres were converted to open space by 1955 and a further 15 acres were acquired by 1960. By the completion of the First Review in 1960 it was reported that:

> "many small areas (of open space) have been provided, often as beginnings of new parks. The best example is in the new park planned in North Camberwell, of which 39 acres have been acquired

Fig 8.1(c) Burgess Park; Location and Plan





Source; G.L.C. Parks Department, North Camberwell Open Space: News June 1972

and 34 laid out so far."[7]

The rate of progress declined in the second period and this is explained partly by the new government structure for London contained within the London Government Act 1963 whereby the Greater London Council and London Boroughs were established to take effect from 1st April 1965. The responsibility for providing and maintaining public open space is shared between the G.L.C. and the London Boroughs and at that time it was not clear whether the G.L.C. would continue to be responsible for the development of the then North Camberwell Open Space.

The Initial Development Plan had envisaged half the total open space acreage being developed by 1972 whereas in fact only a quarter was, although land acquisition was on target (60 acres were acquired by then but only 31 acres were developed as open space). This process of acquisition and development was and is still being achieved by compulsory purchase powers available to the G.L.C. under housing legislation.[8] Further problems and delays were encountered in the early seventies as there was some opposition to the demolition of some substantial dwellings and some historic buildings. At the same time new housing estates (the Aylesbury Estate (London Borough of Southwark) and the Gloucester Grove Estate (G.L.C.)) were developing and creating an increasing pressure for recreational facilities and playspace.

In 1972 a consultation exercise was conducted to enlist the views of local

7. L.C.C. First Review of Development Plan 1960 Para. 454.
8. Housing Act 1957 (5 & 6 Eliz II c. 56 Part III).

residents and revealed two important factors. Firstly there was a good deal of local support for the park and secondly the piecemeal approach to acquisition and the temporary uses made of acquired areas resulted in dereliction and planning blight. As such it was decided to review the programme and to provide a more positive and secure framework for development.

A three phase completion of the park was suggested:-

1974 - 80: To consolidate and complete the informal recreation area in the western part of the park.

1980 - 88: To develop major facilities for recreation and sport in the central section between Coburg Road and Wells Way.

1989- 95: To develop the easternmost section containing a number of buildings and uses which could not be re-located earlier.

Progress in the first phase has been inhibited due to the depressed economic climate and curtailment of expenditure on recreation. By 1974 47 acres of the park site were in open space use and by 1976 it was estimated that the completion of land assembly for the proposed second stage would bring the park up to 100 acres in 1980. By Spring 1979 68 acres had been laid out, some of it in a temporary form. If the rate of progress between 1974 and 1979 remains the same then the target for 1980 will not be achieved. A recent report[9]. has revised this estimate to suggest that between 90-100 acres will be available for recreational use between 1985 and 1988. This report also indicates that whilst recent land acquisitions have also consider-

9. G.L.C. Report by Chief Officer of Parks Dept., Director of Housing, Director of Valuation and Estates Department, Controller of Planning & Transportation and the Director General. The Future of Burgess Park.April 1978.

ably consolidated dispersed sites into larger open areas, there will still be listed buildings, commercial and industrial sites, and their necessary access roads which must remain in the park over the next 7 - 10 years and possibly beyond.

Instead of continuing to provide temporary open space uses and waiting to commence the final park layout until these residual sites are available, it has been proposed to develop major park facilities on the 87 acres of land available between 1980 and 1988. Table 8.1(c) indicates the phasing of this development and shows the capital expenditure required both for acquisition and layout. There are four major facilities proposed:-
A lake; an outdoor sports centre; flora and fauna display; and a "village green." The lake would provide 13 acres of water surface, a significant inland water space suitable for sailing, canoeing, casual boating and fishing. Eventually a paddling pool, boating pool, restaurant and boathouses will be built adjacent to the lake. The sports centre will provide new facilities for pitch and court sports and will consolidate existing facilities as well as providing changing and refreshment rooms. Five football pitches will be provided, two of which will be floodlit with all-weather surfaces. Also floodlit hard-surfaced tennis courts will be provided and could be used for netball and other court games. The flora and fauna display would be a collection of unusual trees surrounding animal enclosures. Several existing industrial buildings will eventually be used for an interpretation centre and exhibition. The Village Green will be a large grassy open space for fetes and festivals, and cricket matches could also be accommodated.

The programming and capital expenditure for this development is given

in Table 8.1(c) below.

1978/80. Small sites will continue to be laid out to consolidate the western section. It is proposed to complete a fitted playground on the corner of Wells Way and Albany Road and thus to complete the play complex. Annual capital expenditure will continue at £900,000 (£600,000 for acquisitior and £300,000 for layout).

Phase I 1980/85. During this period work will start on all four facilities: 9 acres of lake being provided as a first stage; 3 football pitches and changing rooms, tennis court, toilets and parking facilities; the flora and fauna display would be developed; the Village Green would take on its permanent function when the football pitches are completed and the three temporary pitches can be removed from that area. To carry out this work the annual budget will have to be increased to £1.1m per annum (£600,000 for acquisition and £500,000 for layout).

Phase II 1985/88. This will see the completion of the four major facilities and will result in road closures and acquisition of further industrial, commercial and residential property - a process that will be continuing in phase I. The annual budget would continue at the same rate as for phase I.

At the end of 1988 it is hoped that the four facilities will be largely complete and some 100 acres will be available for public use.

A further £1½m will be required to complete phase II.

Consequently the emphasis over the next eight years is on improving facility provision in the park and not on acquiring further pieces of land to extend the park. Remaining industry in the area amounting to 40 firms employing 650 people will not be displaced for seven to ten years.

Greater problems are envisaged with the acquisition and demolition of the remaining housing in the park area. There are a number of listed buildings in the park and their conservation is in direct conflict with the desire to make use of the full 135 acre site for open space. The buildings which will be protected in this way must be rehabilitated and adapted to the park environment.

It is intended to close most of the roads at present crossing the park, although this will not be possible until existing industrial and residential uses have been re-located.

In the development of Burgess Park the G.L.C. is encountering considerable problems as outlined above and the park will continue to be fragmented for some considerable time. However the change of approach away from acquisition to the development of facilities within the existing open areas may help to reduce the level of criticism of the park which has been accused of being a "green desert" which does not function efficiently as a local park, let alone a metropolitan park. The G.L.C. in its continuing work is in full consultation with the London boroughs of Southwark, Lewisham and Lambeth and is exploring other forms of funding for facilities within the park including Sports Council grant aid and the possibility of commercial provision.

(d) Existing provision.

The G.L.C. is also responsible for managing and maintaining 47 parks in Greater London, 14 of which are in the study area. It also provides a range of recreational services in parks including entertainments, sports coaching and playleadership. Before the re-organization of London government in 1965 G.L.C. owned 172 parks amounting to 7,615 acres. Under the new legislation the G.L.C. handed over 135 parks to the London boroughs, the 47 it retained being of "metropolitan significance." This is evidenced by the fact that those 47 parks accounted for 5,530 acres, over two thirds of the original acreage.

8.2 Greater London and South East Council for Sport and Recreation.

(a) Powers and Finance.

The Greater London and South East Council for Sport and Recreation is the major advisory agency promoting opportunities for sport and recreation operating in the study area. The Council was established in 1976[10] and supersedes the former Regional Sports Council. The Greater London Playing Fields Strategy (1977)[11]. is the main policy document prepared by the Council which applies to South East London and is purely advisory. The likelihood of its implementation by the Greater London Council and the London boroughs is that much greater as a result of the close liaison the Regional Council has had with these authorities during the preparation of the strategy. A steering group of planning and recreation officers from the G.L.C. I.L.E.A, Docklands and Green Chain Working Party and boroughs

10. D.O.E. Regional Councils for Sport and Recreation. Circular 47/76.
11. Greater London & S.E. Sports Council. A Playing Fields Strategy for Greater London (G.L.C. 1977).

has influenced the strategy through the various stages of its preparation. Despite this it will finally be left to the boroughs to decide whether to adopt the proposals for playing field provision.

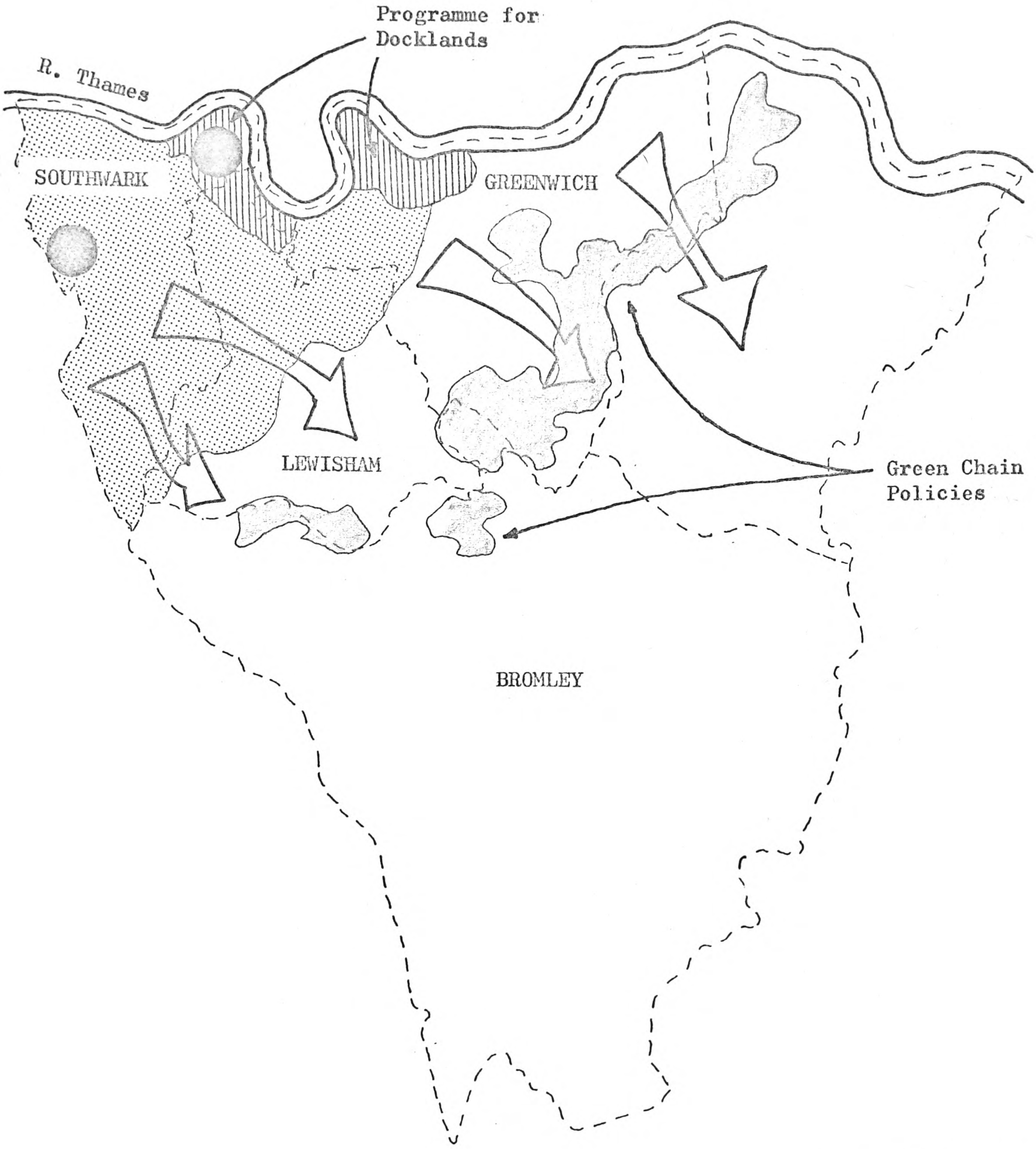
The only financial power that the Regional Council has is the influence of meagre grant aid resources channelled through the Sports Council (1.4m 1978/79). In this way certain high priority schemes can be funded but the share allocated to South East London would be very small indeed. More money has recently been made available for projects in the Inner City under grants for urban deprivation and "Areas of Special Need" and it is possible that schemes for synthetic pitches in the recreationally deprived inner boroughs would be of high priority for such grant allocation.

(b) Policy Implementation

The "Playing Fields Strategy" was not published until 1977 and consequently there has been little time in which to implement its recommendations. The strategy assesses playing field requirements for five sectors of Greater London of which the South East (The London Boroughs of Bexley, Bromley, Greenwich, Lewisham and Southwark) is one. The findings suggest certain policies which should be implemented at a sectoral level as the outer boroughs are in a position to make provision for the outdoor sports needs of inner boroughs. It is assumed that the constituent boroughs of the South East and other sectors would adopt and implement these policies, (Fig. 8.2(b)).

The recommended policies of the Regional Council fall into two overlapping groups; policies for planning and provision, and management policies. In planning new public provision of playing fields the report suggests that 20-25% of overall provision should be regularly distributed in the form of small

Fig 8.2(b) Playing Fields Strategy POLICIES FOR SOUTH EAST LONDON



Source: Greater London and South East Sports Council, A Playing Fields Strategy for Greater London 1977 p.2.16

sites serving a maximum of $\frac{3}{4}$ mile catchment. This would meet the needs of younger players who are less mobile. In addition such sites should be located close to public transport routes and near to existing social and sporting facilities. This distribution would be most critical in an area such as Southwark where the report recommends six or seven small sites accommodating a total of 20 pitches. The remaining needs could be met by providing pitches in larger complexes, in the suburbs. For the northern part of the borough several synthetic pitches are recommended.[12] In recommending provision of new pitches the strategy lends support to the proposals in the Docklands Strategic Plan for playing field provision.[13]

In practice several very modest steps have been made towards implementing the strategy in south east London. The G.L.C. will be developing a playing fields complex in Burgess Park serving an area of need in North Camberwell. It is not clear whether such a development was initiated by the strategy or whether it would have occurred in any case as part of the development of a Metropolitan Park. With regard to grant aid the G.L.C. will be approaching the Regional Council for support although it acknowledges that that source of financial assistance will not be very effective:

> "However it should be stated that such grants are not likely to be greatly significant relative to the total cost of development."[14]

Additionally the Regional Council is grant aiding the provision of an Astroturf all-weather pitch in Fordham Park, Deptford (£16,000 in 1979/80). This will provide an intensive playing surface in an area of considerable

12. Ibid. P.2.13 para 2.23 A(2)
13. Ibid. P.2.14 para 2.24 (A4 & A5).
14. G.L.C. Future of Burgess Park . op.cit. P.5.

open space deficiency in North Lewisham.

A second planning policy advocated in the strategy is the need to preserve all the existing stocks of public private and educational pitches except where deliberate and balanced re-location of pitches takes place as indicated above. Furthermore in an effort to meet the existing shortfall in public pitches, consideration should be given to encouraging the use of private pitches by the general public. This maymean the acquiring of private pitches by local authorities.[15] The Regional Council endorses the "Green Chain" proposals for retaining open space for sport.

For these policies little progress has been made. The strategy itself has been used as evidence in several public enquiries in recent years concerning planning applications for the sale of private sports groundsfor residential development. Although it is not clear to what extent the strategy "per se" has been instrumental in preventing the loss of private open space, in the last few years the loss of playing fields has diminished considerably and consequently the need for local authorities to acquire such facilities. It is very unlikely that local authorities could afford to buy sports grounds at this time. An $8\frac{1}{2}$ acre pitch was bought by Wandsworth Borough Council for £95,000 at the end of 1978. No such purchases have occurred in south east London although a number of private companies have sold sports grounds to other companies.[16]

Among its management policies the strategy recommends, in addition to the dua

15. Greater London and S.E. Sports Council. A Playing Fields Strategy op.cit. P.213 para 2.24 (a) (2) & (3)
16. Evening Standard 2nd May 1979 P.12.

use of educational and privately owned pitches, a centralised clearing house machinery covering public, private and educational pitches for the whole sector or groups of inner and outer boroughs. A booklet outlining opportunities would facilitate this as well as booking and charging policies which assist teams in obtaining pitches which may not be within their boroughs. It may be that formal joint management, finance and planning arrangements might develop between boroughs to help facilitate pitch provision and use and equalize the imbalance of opportunities between inner and outer boroughs. Finally the strategy recommends the improved management of pitches, by improving the quality of pitches and improving ancillary facilities, which will help to increase capacity.[17.]

A football pitch directory was prepared by the Regional Council in co-operation with the G.L.C. and the South East London Boroughs for the 1979/80 season. This provides clubs and leagues with details of public and private pitches for hire, together with a location map.[18.] Response to the Directory was so favourable that a further edition covering the entire London area will be produced for next season. The Regional Council also makes grants to clubs from time to time for the improvement of sports ground facilities.

8.3 The Docklands Joint Committee.

(a) Powers and Finance.

The Committee was established in 1974 comprising representatives from the G.L.C. and the London

17. Greater London and South East Sports Council. A Playing Fields Strategy. P.2.14 para 2.25 (B1-B5).
18. Greater London and South East Sports Council. A Football Pitch Directory for South East London 1978/79 (GLC : 1978) (produced by P. Green).

boroughs of Greenwich, Lewisham, Newham, Southwark and Tower Hamlets and independent members including Government nominees. Its terms of reference were to prepare a strategy for Docklands and to co-ordinate planning and development in the area. In 1976 the London Docklands Strategic Plan was produced to provide a framework for constituent boroughs to prepare local plans and to enable the Joint Committee to co-ordinate the development between the many agencies involved. The Strategic Plan lies outside the legal planning framework, although it is consistent with the overall policies and objectives set out in the G.L.D.P, the statutory structure plan.[19.]

In 1978 the Joint Committee produced a four year rolling programme which gives details of capital and revenue expenditure on public, private and voluntary schemes and relates them to forecasts and targets in the Strategic Plan.[20.] Originally the development of Docklands was intended to be self-financing, funding coming from the main programmes of constituent authorities and the private sector. In 1977 it was realised by Central Government that considerable investment would be required in Docklands and other inner city areas, if any impact was to be made on revitalising their economies and outworn social and physical environments. For Docklands £18m was made available in the Construction Package 1977/79, aimed at large scale capital investment, £3.85m in 1978/79 as part of the expanded Urban Programme (in operation since 1968), and £15m p.a. between 1979 and 1983, again as part of Urban Programme funds. By this large scale investment

19. Docklands Joint Committee. London Docklands Strategic Plan (G.L.C. 1976) P.6 para. 8.
20. Docklands Joint Committee London Docklands Operational Programme 1978/82.

Central Government created a partnership with Docklands.[21.]

Despite the considerable investment there has been recent Government criticism that progress is not occurring as rapidly as it should in Docklands. On 14th September 1979 the Secretary of State for the Environment announced an intention to set up an urban development corporation for Docklands and also for Merseyside. His reasoning was that the problems and opportunities of the area needed

> "a single-minded determination not possible for local authorities concerned with their much broader responsibilities."

Legislation is at present going through to give Docklands powers based on the "new town" model. Constituent boroughs have produced a report opposing the development, as they maintain that progress has been greater than the Government think and that the main problem which is the release of statutory undertakers land and the uncertainty over the London Docks would be equally as problematic to the Development Corporation as to the Joint Committee.[22.] In terms of open space provision within the study area, the amount of programmed open space exceeds that in the Strategic Plan, progress being particularly advanced.

(b) Policy Implementation.

One aspect of the Strategic Plan concerns the provision of open space for sport and recreation, an important element, after provision for housing and

21. D.O.E. A Policy for the Inner Cities. 1977 Cmnd. 6845.
22. Leaders of London Boroughs Greenwich, Lewisham, Newham, Southwark and Tower Hamlets. "Local Democracy Works: the case against Docklands "New Town." October 1979.

employment in an area which is almost entirely deficient in district and local open space and has long standing deficiencies in playing field provision. Many of the existing residents live in flats with no gardens which exacerbates this problem. The open space provided would not only serve new housing areas but existing housing and population in adjacent areas.

In general terms a complex of open spaces is proposed for the Docklands, linked by paths and cycle tracks to the riverside. Within parks it is proposed to provide facilities such as cafes, public houses, museums, art galleries as well as provision for sport and recreation. Another feature will be to group open space uses e.g. parks and playing fields, to give a visual impression of openness, small isolated open areas being avoided. The distribution will be in accordance with the general principles of accessibility laid down in the Greater London Development Plan hierarchy of provision.

Looking in more detail at the proposals for the Surrey Docks, Lewisham and West Greenwich area, Table 8.3(b)(i) indicates the existing and proposed acreages of public open space for sport and recreation.

Table 8.3(b)(i) [23.]

	Population 1991(000's)	Existing POS(acres)	Proposed POS(acres)	Total	Standard (acres per '000 pop.)
Surrey Docks/Lewisham West Greenwich	18 - 22	32	38	70	3.5
Total	100-120	94	350	444	4.0

23. Docklands Joint Committee. A Strategic Plan. op.cit. P. 72

A further 38 acres of public open space are proposed in addition to the 32 acres of existing space. Sixteen acres of the total provision will be used in conjunction with 18 acres of land allocated for secondary school playing fields for the provision of sports pitches including at least one intensive all-weather synthetic pitch. The remainder will be used for informal recreation. The standard of provision of 3.5 acres per 1000 is slightly less than that for Docklands as a whole, owing to the proximity of Southwark Park.

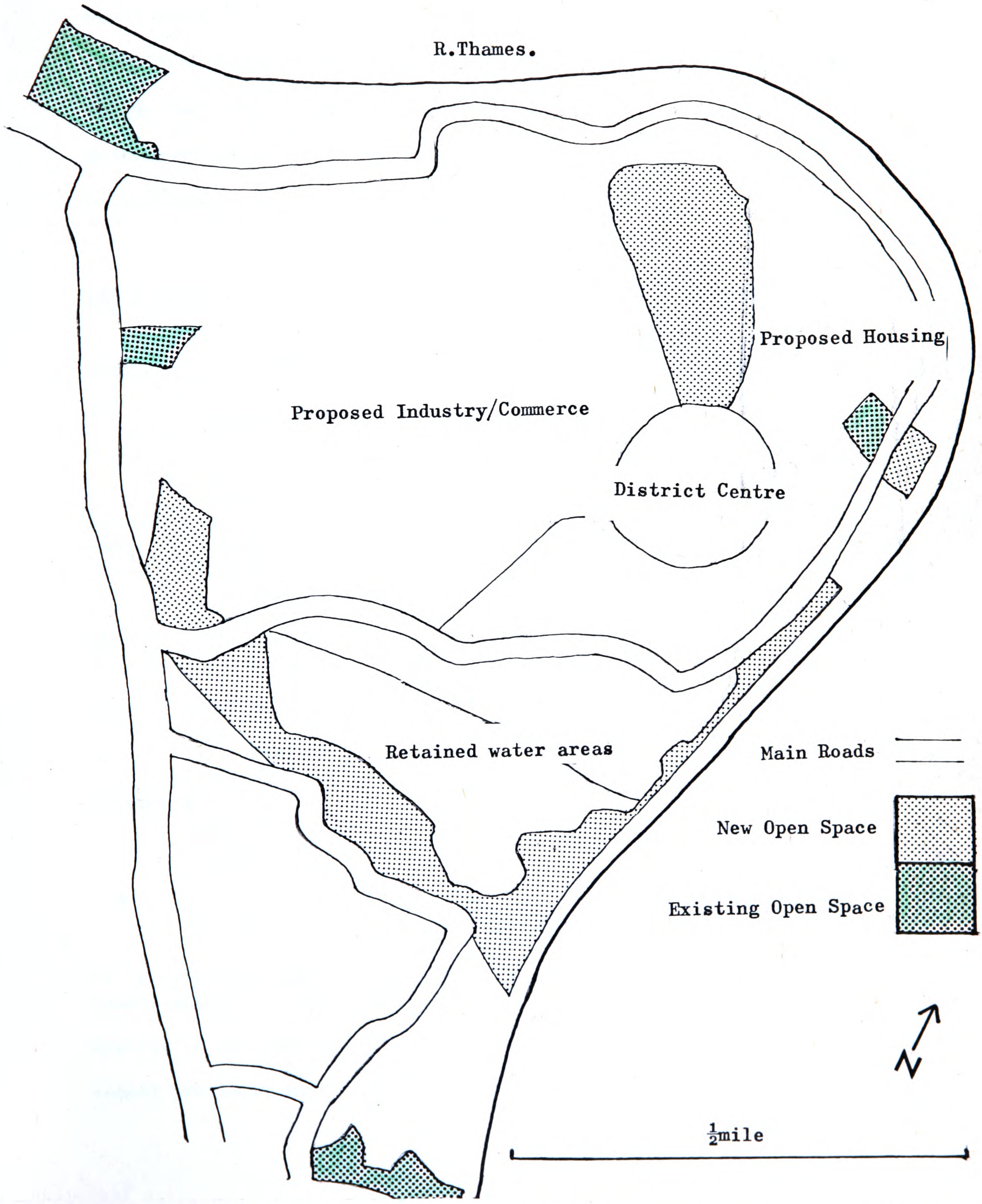
There are only 5 acres of open space in the Greenwich Peninsula, the other part of Docklands within the study area, and there are no proposals for further provision.

By 1979 over 11½ acres of new public open space had been provided in the Surrey Docks area, the majority being a landscaped area - the Russia Dock Woodland developed by the London Borough of Southwark. To the north east a sports complex is being developed, including 3 football pitches and a seven lane running track with pavilion and facilities which should be finished by August 1981. To the east of Russia Dock Woodland is the proposed Canada Dock open space which will include a water area. Other recreational facilities which are being developed include an Adventure Playground at Bryan Road and an all weather play area at St. Pauls School (See Fig. 8.3(b)).

Beyond the Docklands Boundary the G.L.C. is developing Kings Stairs Gardens as an extension of Southwark Park north to the river and an astroturf pitch is planned for Southwark Park.[24]

24. Docklands Joint Committee. Operational Programme 1979-83 December 1979.

Fig 8.3(b) Surrey Docks; Proposed Open Space



Source: Docklands Joint Committee, London Docklands Strategic Plan 1967 p112

Financial details of these developments are given in Table 8.3(b)(ii). The funding of these schemes is met partly by the promoting agencies i.e. G.L.C. and London Boroughs of Southwark and partly from Construction Package and Urban Programme grants. It is difficult to estimate the proportion from each source, as different phases of individual schemes are funded in different ways. Those phases of schemes receiving grant aid are paid for by the sponsoring agency which receives 75% of the costs reimbursed by Government grants. It is estimated that open space plans for this part of Docklands will be complete by 1986.

Table 8.3(b)(ii). Surrey Docks, Lewisham & W. Greenwich Approved Programme 1979-1983.

Agency	Scheme	Capital Expenditure (£ thousands). 1979/80	1980/81	1981/82	1982/3	Tot.
GLC	Kings Stairs Gardens	78	143	-	-	221
	Surrey Docks Playing Fields	269	561	74	-	904
South-wark.	Russia Dock Woodlands	149	500	500	435	1584
	Canada Dock Open Space	-	250	500	70	820
GLC	Astroturf pitch	460	-	-	-	460
Ongoing commitments						
	St. Pauls Play Area	8	8	8	8	32
Southwark	Adventure Playground Bryan Road.	5	5	5	5	20

Source: Docklands Joint Committee Docklands Operational Programme 1979-83 December 1979.

It is intended that the management policies relating to the dual use of school playing fields suggested in the playing fields strategy will be applied to the open space being developed in Docklands. Community and school provision are being developed as unified complexes enabling both

groups to make full use of all open space resources. This will require a unified management policy with the booking of school pitches, public and synthetic pitches being centralised in each respective borough. This policy in time may extend to private sports clubs associated with firms who own their own pitches in the Docklands area e.g. Segas,on the Greenwich Peninsula, who may be encouraged to use public facilities and make their own pitches available for community use.

8.4. Green Chain Working Party.

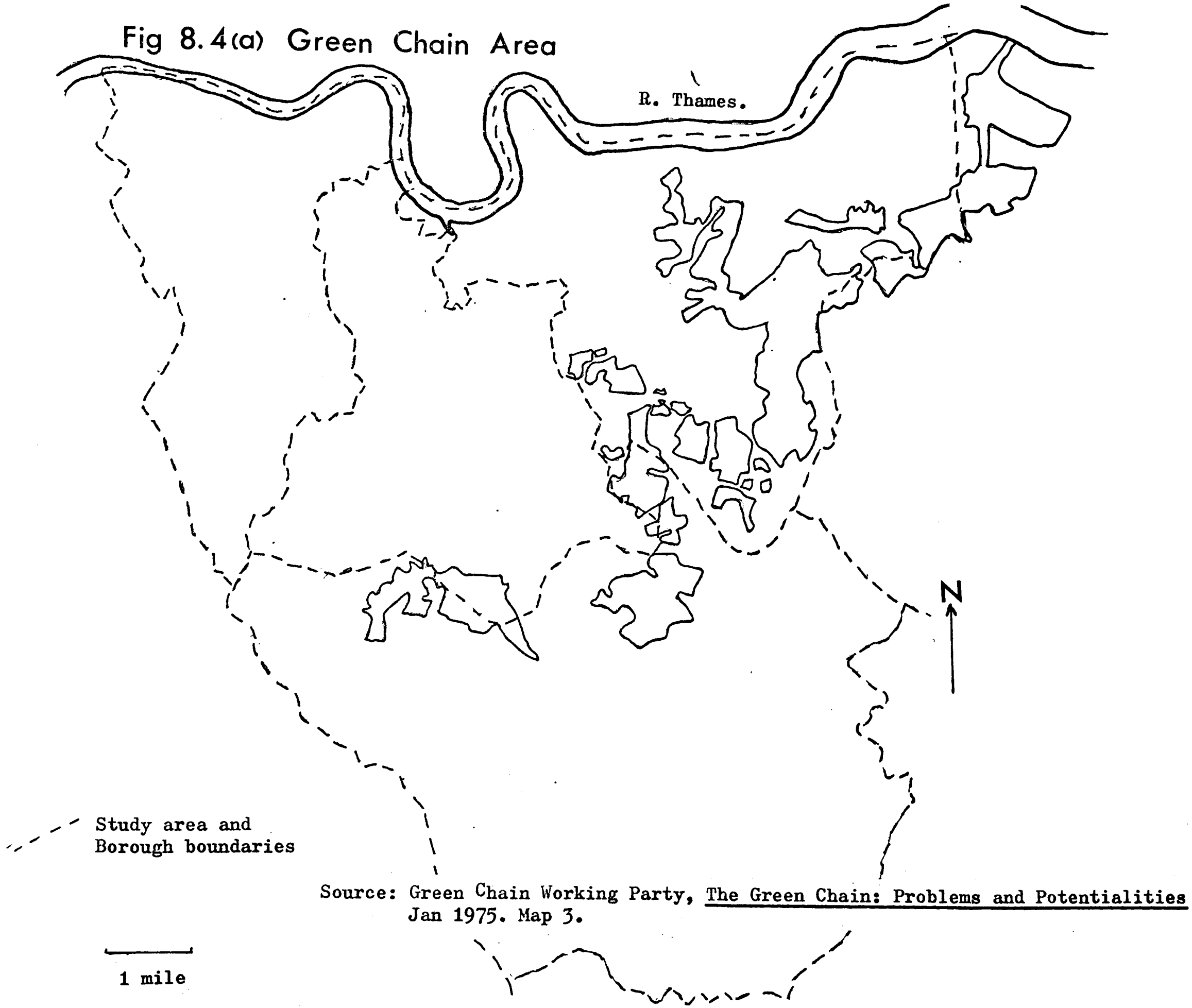
(a) Powers and Finance.

In early 1973 it was decided among officers working on borough plans in south east London that there was a need for strong and co-ordinated policies with regard to larger areas of open land indicated by the draft G.L.D.P. as Metropolitan Open Land. As a result a report examining the possibilities of joint action over maintenance and enhancement of recreational open space and control of development in a major swathe of open land termed the "Green Chain" was produced. The "Green Chain" comprises over 4000 acres of open land, both public and private, stretching from Thamesmead to New Beckenham along the boundaries of Bexley, Greenwich, Bromley and Lewisham Boroughs (Fig. 8.4(a)).

In November 1973 a Joint Working Party of planning and recreation officers from these boroughs, the G.L.C. and the Greater London and South East Sports Council was formed with the following terms of reference:-

> "To undertake a study of the problems and potentialities of open land forming a "Green Chain" of open spaces in the outer built-up areas of south east London. The objectives include the formulation of policies to safeguard the loss of land by development,

Fig 8.4(a) Green Chain Area



Source: Green Chain Working Party, The Green Chain: Problems and Potentialities Jan 1975. Map 3.

the fulfillment of sector and metropolitan recreational needs and the enhancement of its visual and structural contribution for the benefit of the surrounding communities and London as a whole."[25.]

The idea of the "Green Chain" arose in response to the increasing loss of private open land to residential development and the corresponding decrease in the effectiveness of planning policies to stem that loss.[26.] At that time the G.L.D.P. was not a statutory structure plan and the status of metropolitan open land was uncertain. The interim report proposed a two stage approach in developing a planning strategy for the Green Chain: firstly a set of policies would be produced which would be pursued in common by the various authorities in the Green Chain area; and secondly the detailed expression of these policies would be worked up in the form of a local plan or plans. A draft interim policy statement was published in April 1976, although little progress has subsequently been made in the production of a Joint Subject Plan.

The powers and finance available to the Green Chain Working Party are those of the constituent authorities. If there is a need to acquire land for open space purposes then the local authority will have to either reach a negotiated price by agreement with the owner or acquire it compulsorily. In either case this will involve considerable expenditure.

(b) Policy Implementation.

The "Green Chain" policies outlined in the interim document form a series

25. Green Chain Working Party. The Green Chain: Problems and Potentialities - Interim Report. January 1975 P.2.
26. See Ch. 1. Sec.1.2(d) P. 41.

of broad recreational and environmental proposals to guide constituent authorities in developing a unified approach to the Green Chain. A statutory plan for the Green Chain has not yet been produced, although the G.L.C. and constituent boroughs have given support, in principle, to the interim recommendations. Little has been achieved in terms of implementatior and it is not likely until the statutory plan has been approved. Even then it is questionable as to whether the constituent authorities will have the financial ability to implement such a plan given the absence of any additional grant aid and the other pressing demands on local sector spending.

The interim report suggests that it might be desirable to establish a permanent body to put the plan into effect. One possibility would be to form a Regional Park Authority as in the Lee and Colne Valleys. The Lee Valley Authority was established by an Act of Parliament in 1967 and has powers to levy a rate on constituent authorities to provide finance and its own planning powers to facilitate implementation. The Colne Valley authority in contrast merely co-ordinates the executive powers of the various authorities within the area. Successful implementation of policies in this case will depend on the ability and willingness of those authorities.

8.5. Evaluation.

A review of the ability of four agencies in pursuing their strategic open space proposals suggests that effective planning powers and adequate finance are central to successful implementation. The G.L.C. and the Docklands Joint Committee have both made considerable progress in the provision of new open space and both have considerable financial resources with the assistance of Central Government grant aid and executive powers. In comparison the Regional Council for Sport and Recreation and the Green Chain

Working Party depend virtually entirely on the co-operation, ability and willingness of London Boroughs to implement their proposals. Given the heavy commitments on individual boroughs own resources it is likely that only those open space policies which coincide with their priorities and wil directly affect their own residents are going to be implemented. The existence of additional grant aid e.g. the Urban Programme or Sports Council assistance may also facilitate implementation. The problems faced by London Boroughs within the study area in pursuing open space policies will be developed further in the next chapter.

CHAPTER 9. IMPLEMENTATION OF BOROUGH OPEN SPACE POLICIES IN SOUTH EAST LONDON.

The London boroughs are the main providers of open space and related recreational services at the local level. Fig. 8 illustrates how they fit within the overall planning framework of open space provision. Their two main responsibilities in this regard relate to:-

- the planning of open space, including developing proposals for new parks and playing fields and safeguarding existing open space from development pressures.
- the management and maintenance of existing open space in local authority ownership and the provision of recreational services and activities to operate in their parks.

The powers and finance available to all the boroughs in the study area which enable them to perform these functions will be considered first, followed by an examination of the formulation of planning and management policies for open space and the measure of success with which they are being implemented.

9.1 Powers and Finance.

In the four London boroughs work is in progress on the preparation of borough plans and in some cases Action Area Plans and Subject Plans, which contain policies for open space and recreation. Each Council is required to prepare a borough plan under the provision of Schedule 1 of the Town and Country Planning (Amendment) Act 1972. This statutory local plan gives detail at the local level to the broader strategic policies of the G.L.D.P. When adopted the borough plan will supersede the L.C.C. Initial Development Plan (Kent County Council Initial Development Plan in the case of Bromley). The borough plan does not require approval from the Secretary of State for the

Environment, but is "adopted" by the Council concerned after full opportunity has been given to the public to participate in the plan making process.

The London boroughs have Amenity or Recreation Departments similar to those of the G.L.C. that can provide, manage and maintain parks, playing fields and other sports facilities. As a result of the London Government Act 1963 many existing parks owned by the London County Council were handed over to the London boroughs. The powers available to the G.L.C. for the acquisition of land and provision of outdoor facilities for sport and recreation apply also to the London boroughs. Further specific powers relating to the provision of facilities are contained in the following: Public Health (Amendment) Act 1907 Section 76, Public Health Act 1961, Section 52, Physical Training and Recreation Act 1937 Section 4 and the Ministry of Housing and Local Government Provisional Order Confirmation (Greater London Parks and Open Spaces) Act 1967 Section 7.[1].

In theory the London boroughs have a wealth of planning and other legislative powers at their disposal for the provision of open space. The effectiveness of such powers will depend partly on the financial resources available to these authorities.

Local Government expenditure is of two main types; revenue expenditure on services that the local Council provides and capital expenditure on new projects, facilities and land. Capital expenditure is of particular relevance for the provision of open space for recreation. There are two

1. See Ch. 1 Sec. 1.1(d) P. 15 et seq.,

elements within capital expenditure;' key sector' and 'locally determined sector' spending. Key sector expenditure relates to the provision of essentia facilities such as housing and education and is determined in collaboration with Central Government. Provision for open space is from locally determined sector funds and must compete with other local needs. In recent circulars outlining plans for public expenditure, the Government has continued to impose restrictions on local sector spending which has resulted in the deferrment of many desirable schemes for recreation facilities by local authorities. One of the main problems with the provision of new open spaces or the retention of existing privately owned open spaces is the cost of acquiring land i.e. the problem of high costs against low returns. The benefits of open space provision are intangible and difficult to quantify. Against the background of the current financial situation land acquisition by local authorities on an ambitious scale is out of the question.

Restrictions on local government spending have also affected revenue expenditure with less money being available to run coaching courses in parks and open spaces, grants to sports clubs and the management and maintenance of open spaces. This is likely to adversely affect the quality of existing parks which are in the ownership of the boroughs.

9.2 Policies for public open space and other open land.

(a) Southwark.

In 1971 an open space study[2.] was prepared which examined its supply in the borough, in relation to the G.L.D.P. and I.D.P. The G.L.D.P. policy

2. L.B. of Southwark. Recreation in Southwark: Open Space Study 1971.

guidelines were evaluated and adopted with minor reservations as a basis for developing a medium term plan for public open space provision in the borough.

The main reservation with the G.L.D.P. hierarchy was that the minimum recommended size of park for each level was too high. In a high density borough like Southwark the report suggests that metropolitan parks of 120 acres rather than 150 acres, district parks of 25 rather than 50 acres and local parks of 2 rather than 5 acres would be a more suitable minimum size. This would make the hierarchy more feasible in terms of implementation whilst retaining the functions of the different sizes of open space.

This reduction is justified on the grounds that the function of open space is not only dependent upon size, but also the facilities it contains and its other characteristics. Consequently a multi-facility local park may have a district function. This conclusion was reached also by Greenwich planning department[3]. and has been shown to be true from earlier analysis.[4]. It was also noted that metropolitan open space which was woodland or heath could not possibly fulfill the same function as a multi-facility urban park of the same size. Using this modified hierarchy, Southwark laid down a detailed programme of open space provision to 1986 increasing the total amount of public open space from 450 to 690 acres within the borough. It is realised that even by 1986 the proposed open space provision will not be completed due to limited funds to acquire land and develop parks which are competing with other services in the community. As such the emphasis

3. L.B. of Greenwich. Parks and Public Open Spaces in Greenwich. June 1977
4. See Ch. 5 . Sec. 5.3 P. 249.

has now been placed on upgrading the facilities within existing open spaces and by so doing increase their function and effective catchment. Although this does not entirely make up for distances it may be necessary to travel in areas with fewer parks, it will make local parks more attractive and hopefully more used. A corollary to this policy is one of improving accessibility to existing open spaces by means of linkages to residential areas, schools, shops and other open spaces.

Among the proposals advocated for increasing park functions a more recent report[5]. suggests that intensive use playspaces for children and synthetic pitches with floodlighting should be provided where appropriate. There should also be an attempt to increase the use of parks as meeting places by staging exhibitions, shows, concerts, sports galas and other activities.[6]. To pursue these policies would require increased co-operation between the different departments responsible for open space provision and maintenance, as well as with outside agencies. It would also require new expertise among staff to provide these facilities and activities. New methods of integrating different activities within the confines of small parks would need to be developed.

Some implementation of these proposals has taken place, although it has been concentrated in the north Southwark area (including Docklands). It is in this part that the locational deficiencies are greatest and also fortuitously the opportunities for new provision. Many of the open space

5. L.B. of Southwark. Multi-Functional Use of Open Space - Leisure and Recreation Topic Paper. April 1976.
6. L. B. of Southwark. Community Plan 1978.

schemes discussed earlier have been entirely or part-funded by the Council with the assistance of grants from the Docklands Urban Programme.

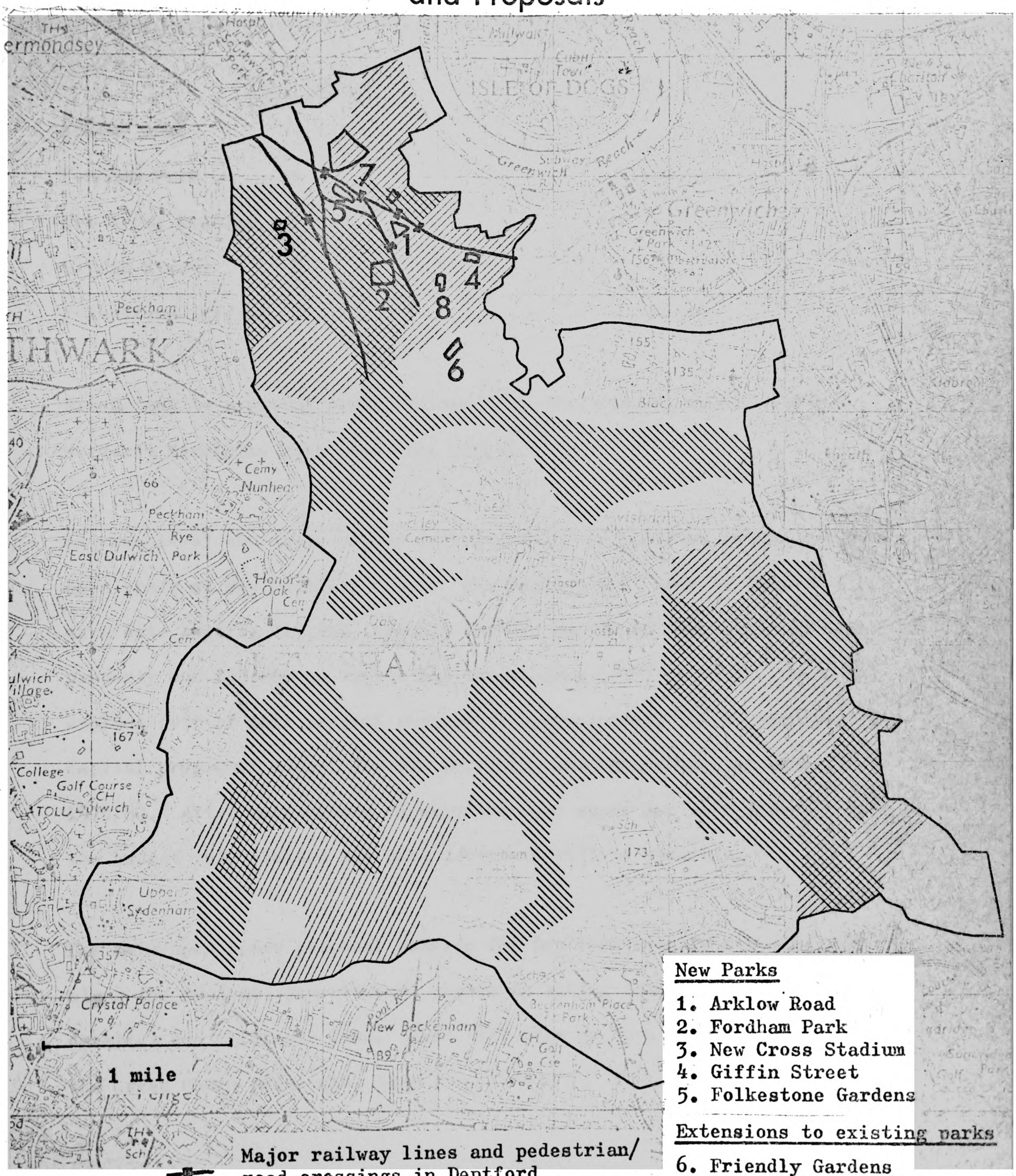
(b) Lewisham.

Lewisham has formulated a set of interim planning policies pending the production of the borough plan.[7] Similarly the borough has been examined in terms of G.L.D.P. standards and policies, and areas of deficiency for district and local open space have been identified (see Fig. 9.2(b)). In addition the existence of several railway lines, particularly in the north of the borough, has reduced the effectiveness of certain local open spaces by dissecting the area and reducing accessibility. Among the deficiency areas identified, those which contained high rise flats with few gardens were given a higher priority than areas of low density development with a better environment.

Within the areas of priority identified the borough council has adopted several methods of alleviating open space deficiency. The main options are the provision of new parks in areas of redevelopment and the extension of existing open spaces. Within the Deptford District plan area the Council has had a fair measure of success in implementing such policies. Table 9.2(b) shows the new spaces, their size and state of progress. Fig. 9.2(b) indicates their location.

7. L.B. of Lewisham. Planning Lewisham. A Statement of Current Policies. July 1975 Ch. 6 P. 46-50.

Fig 9.2(b) Lewisham; Areas of open space deficiency and Proposals



Source: London Borough of Lewisham, Planning Lewisham: A statement of current policies 1975 p.48

Table 9.2(b) Open Space Proposals.

New Spaces in Deptford District Plan Area.

	Size (acres)	Progress.
Arklow Road	5	
Fordham Park	14	Complete
New Cross Stadium	7	
Giffin Street	2	
Folkestone Gardens	7	Complete

Extensions to existing parks include Friendly Gardens, Deptford Park, Margaret Macmillan Park (see Fig. 9.2(b)).

An example of the scale of new park provision in Lewisham is the proposed open space at New Deptford Green. The borough will have to acquire a 5 acre site costing £19,700, spend a further £8,750 on demolition of slum property and £33,000 on layout and landscaping (1979 prices). The total capital cost of this project represents approximately 10% of the Council's capital programme budget for the provision and maintenance of parks in 1979/80. After maintenance on existing open space has been deducted from the budget only limited new park provision will be possible.

The main open space proposal outside the Deptford area is a linear park along the Pool and Ravensbourne rivers by taking into public ownership derelict and allotment land. This will form an open space link as part of the Green Chain proposals, (See Fig. 8.4(a) P. 383).

Considerable progress has been made in implementing open space policies,

especially in areas of redevelopment. However with current restrictions on local sector expenditure it is likely that only piecemeal increases to the stock of open space will be possible in the future. The borough Council is advocating a number of interim policies including the development of small areas of open space (under 5 acres) to reflect the needs and characteristics of local areas, to examine all possible building developments with a view to providing open space as part of them and finally to establish links and walkways to parks, thereby increasing their accessibility. A measure of success has been achieved in the provision of the latter policy in the Deptford area. Fig. 9.2(b) shows the footpath links that have been provided since 1973.

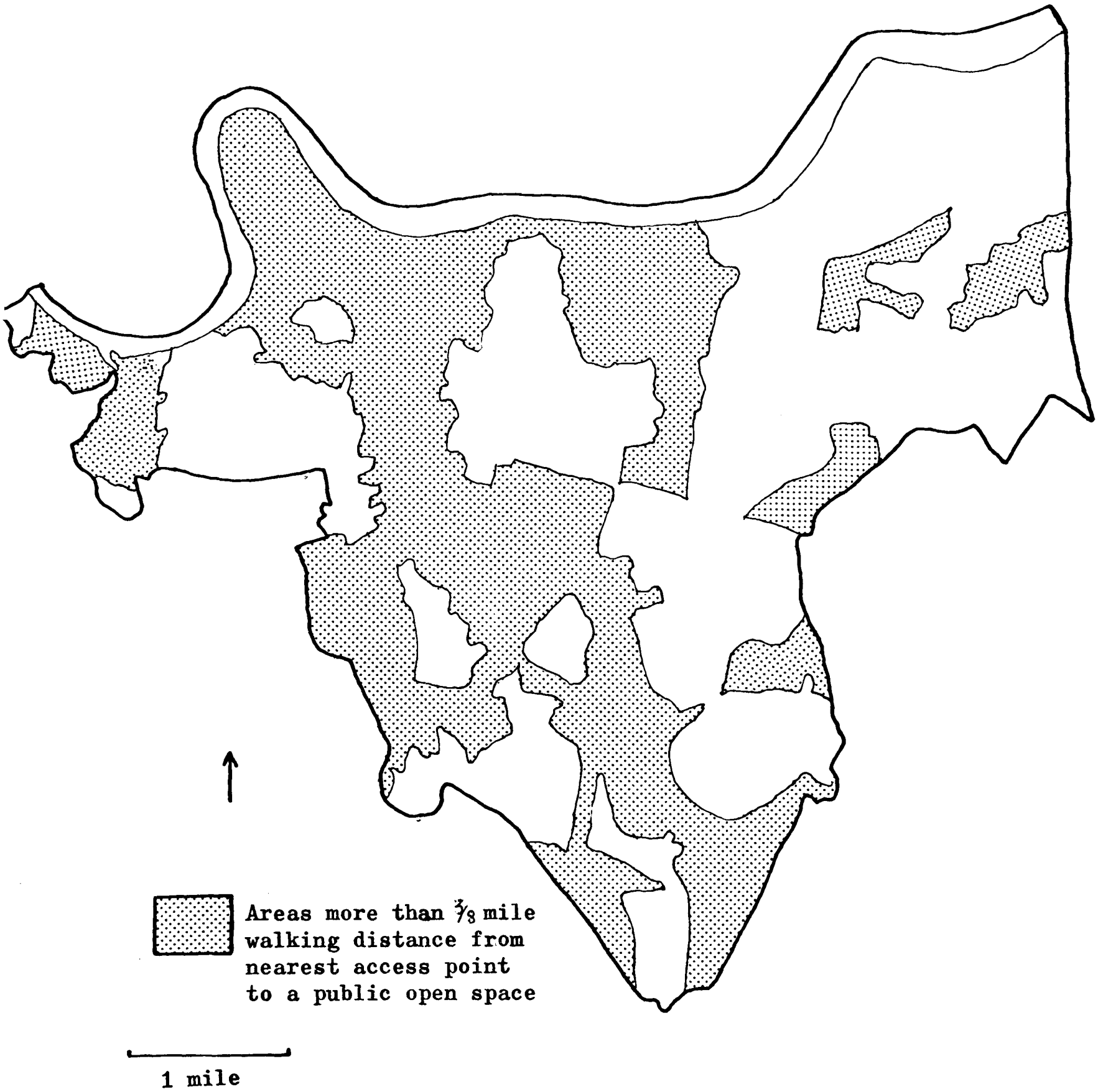
The Amenities Committee of the Council spends in the order of £3 million in 1979/80 on the management and maintenance of public open space. The Counci also provides taster courses in tennis, cricket and golf at selected parks during the summer months, and operates playleadership schemes.

(c) Greenwich.

In June 1977 the Planning Department published a topic report on parks and public open spaces in Greenwich as a draft input to the borough plan. The paper sought to analyse the supply and use of open space in the borough and relate it to the various standards and policies of the G.L.D.P, leading on to the formulation of a series of short and long term policies.

In terms of overall provision Greenwich has 6.7 acres of public open space per 1000 population and is relatively much better endowed than Southwark or Lewisham. However certain local areas of deficiency are identified in the report (see Fig. 9.2(c)), by an analysis which builds on the G.L.D.P.

Fig 9.2(c) Greenwich; Areas lacking local open space



Source: London Borough of Greenwich, Leisure and Recreation: Parks and Public Open Spaces 1977

hierarchy and the deficiency analysis developed in the Report of Studies.[8] Areas of deficiency in terms of local open space provision were identified in the following way. Catchment areas were delimited by main roads, considered to be barriers to movement, and the actual walking distances to park entrances (a distance of $\frac{3}{8}$ mile was chosen). The deficiency areas thus delimited were ranked in terms of relative deprivation using the following indices: population density, average garden size and the existence of incidental small areas of open space. Those areas of deficiency with the highest density, with little or no garden space or incidental open space were given the highest priority.

As an immediate goal, the topic paper recommended the alleviation of local open space deficiency in these areas. A number of approaches to this problem were suggested including the provision of open space as part of a redevelopment scheme e.g. Willmount Street and the Glyndon Estate, which have now been completed. Another suggestion was that existing small areas of public open space could be expanded to form viable units. This has occurred at Charlotte Turner Gardens on the borders of Deptford. The Willmount Street project will cost an estimated £10,000 to lay out and landscape at current prices. Incremental increases in open space provision of this sort typify the low cost projects which are all that can be afforded at the present time.

Other approaches include negotiations to make private and educational open spaces available for public use and securing open space in any private development by making planning approval dependent on its provision. As yet these suggestions have not been implemented. Finally access to existing parks can be improved by footbridges and subways across railway lines or main

8. G.L.C. Greater London Development Plan. Report of Studies (G.L.C. London 1969) Ch. 5 P. 125,128

roads and by improving the location of park entrances.

Another policy area developed in the topic report is the relationship between the function of parks and their size and facility provision. The G.L.D.P. suggests that Metropolitan open spaces should contain District and Local functions. The topic paper argues that the semi-natural areas of Metropolitan Open Space with little or no facility provision cannot provide these functions. Furthermore a formal urban park of over 150+ acres cannot be said to have the same function as an area of woodland or heath of the same size.[9] Consequently the report suggests that the effect of facility provision on the function and use of parks should be examined further in order to decide what investment should be made in facilities. It proposes that many existing open spaces could be improved and thereby increase their functional potential. In some cases this policy might be viewed as a means of alleviating local deficiency.

The other main groups of policies in the topic paper relate to the provision of footpaths, bridleways, cycleways and riverside walks. By providing such links between open spaces it is hoped to increase their accessibility. This policy relates closely with that for the Green Chain. This has been produced as an Interim Policy Statement with a view to developing a Joint Subject Plan.[10] Greenwich, together with the boroughs of Lewisham, Bexley and Bromley are pursuing this concept. Consequently the borough Council fully support it:

> "The Recreational Services Committee has agreed to support, in

9. This was found to be the case for S.E. London.
10. See Ch. 8. Sec. 8.4 P. 382 et seq.,

principle, the recommendations of the Green Chain Working Party, which will protect open space in the Woolwich and Eltham areas as part of a regional plan."[11].

A related policy is that of resisting any attempt to reduce the level of open space provision in the borough. This was endorsed by the Recreational Services Committee in January 1976.[12]. An instance whereby this policy is pursued is cited in Section 9.3.(c).

Similarly to Lewisham the borough operates playparks and playleadership schemes.

(d) Bromley.

Bromley Planning Department is in the process of producing a borough Plan by preparing a Ward by Ward appraisal of the supply of open space. As yet no policies have been formulated and the only ones that apply are contained in the Kent Initial Development Plan and the G.L.D.P. The former provides a land use map for open space zoning and recommends a standard of 4 acres of public open space per 1000 population. Bromley with 7.7 acres per 1000 has a considerable surplus. Furthermore there are only minor locational deficiencies at Penge and Biggin Hill.

In October 1973 a report was published by a Working Party on Parks and Recreation which sought to provide a position statement and a medium and long term policy plan for the Recreation Committee.[13]. Although the

11. London Borough of Greenwich. Community Plan 1976/77-1978/79. Recreational Services P. R.24.
12. Ibid P. R.25
13. L.B. of Bromley. Report of the Working Party on Parks and Recreation October 1973.

factual content of the report has altered somewhat the general tenor of the policy plan reflects current borough aspirations.

With regard to public open space the Council is asked to examine any opportunities afforded by planning applications that would increase the borough's open spaces at no cost to the community. It is also recommended that open space be provided in the two small areas of deficiency by expanding existing parks and providing small new open spaces in accordance with the Initial Development Plan. In Penge proposals include the extension of Betts Park, Penge Recreation Ground and Palace Square as well as the provision of two new open spaces (2 acres each). A further two acre park is proposed for the Biggin Hill area. These are not classified as top priority projects and so it is unlikely that they will be implemented in the near future.

The I.D.P. contains other proposals for new open space but given the surplus of existing provision and the financial climate these are highly unrealistic and will not be implemented.

Priority proposals concentrate on the improved management, maintenance and landscaping of existing open spaces including: horticultural training schemes, employing more labour, repairing roads fences etc., providing new and improved play and other facilities and to develop recreational services. The emphasis on improving quality reflects the surplus of existing provision. The Council is also engaged in the development of the Green Chain.

9.5 Policies for Open Space for Sport.

(a) Southwark.

In the draft Development Plan for Open Space,[14.] Southwark envisaged the provision of public pitches for formal sports to be contained within a hierarchy of public open space in the borough. At the metropolitan and district levels land for formal sports should take up about one third of the total park area. For local parks it is considered better to provide all-weather surfaces e.g. redgra, as grass would not stand up to the pressure of use. In a more recent report[15.] this policy of providing all-weather surfaces in local parks is confirmed and the borough made reference to a Sports Council publication on synthetic surfaces[16.] which indicates the increased capacity of such pitches over conventional ones. Southwark justifies the use of all-weather pitches for the following reasons: natural turf is wasteful of space where the availability of land is limited and land costs are high as its capacity is limited; synthetic pitches with floodlighting where possible increased the capacity six fold where pitch was used in winter only, to 19 fold if used all the year round.

The biggest increase in the provision of conventional pitches in Southwark will occur in Burgess Park, developed by the Greater London Council.[17.]

Another aspect of policy in Southwark is the commitment to resist the

14. L.B. of Southwark. Recreation in Southwark. Open Space Study 1971
15. L.B. of Southwark. Leisure & Recreation Topic Paper : Sub-Topic Paper Multi-Functional Use of Open Space. 1976.
16. Sports Council. Thirty games a week 1976.
17. See Ch. 8. Section 8.1 P. 360 et seq.,

loss of areas of private open space to development, and to seize upon any opportunities for bringing private open space into public use. With regard to the former aspect, the Study[18.] quotes a Population Report adopted by the Council in 1967 which investigated the means of increasing the housing stock in the borough, including the re-zoning of private open space for residential development and commented thus:

> "In view of the valuable contribution they (the private open spaces) make to the amenity of the borough as a whole, as well as to the immediate surrounding area, re-zoning of such areas would be considered only as a last resort."

Subsequently the Minister for the Environment upheld a refusal by the Council to allow the residential development of private open space on Dog Kennel Hill, near Peckham.

This is not always the case and the retention of private open space is not always sacrosanct. The relative importance given to open space for recreation and environment and residential development varies according to the quality of the environment, the existing amount of open space and the pressure for new housing. In Southwark the low quality environment and the paucity of open space make the preservation of all existing open space a priority. The loss of population from the borough over recent years has relieved the pressure for new housing.

The possibility of making private open space available to the public may involve purchase of grounds by the Council. The sharing and joint-use of

18. L.B. of Southwark. Open Space Study. op.cit. P.57.

educational and private playing fields has been adopted by Southwark in principle, as for the other boroughs, but implementation presents a number of problems. It is expected that more success will be obtained from the policy of jointly providing new small public open spaces with sports provision that will save both schools and the community.

(b) Lewisham.

The northern half of the borough faces similar problems of open space provision as that of Southwark. With regard to open space for sports the Council implies that there is little that can be done to increase public provision in its statement of current policies.[19] With regard to private sports grounds, the borough has 18 grounds in the southern part of Lewisham owned by commercial or government concerns which are particularly vulnerable to re-development for other uses. In 1972 the Secretary of State for the Environment gave permission, despite opposition from the Council, to re-develop the Inland Revenue Sports Ground at Marvels Lane. This example counters that for Southwark and indicates that private open space is not necessarily inalienable. As such Lewisham's policy is to preserve existing private grounds in open use and to back this up with a willingness to purchase if necessary. In practice the ability to purchase is limited owing to the lack of finance and the scarcity of land for schools and housing. This aspect will be developed later.

One way of consolidating and securing private open space is to include it as part of areas of metropolitan open land. This policy for the retention of strategic, large areas of open land, can give a planning framework within

19. L.B. of Lewisham. Planning Lewisham. A Statement of Current Policies 1975.

which the redevelopment of private open space can be resisted. The application of this policy in the form of the Green Chain has been examined earlier.[20]

Lewisham is also committed in principle to a policy of dual use and joint provision of sports pitches with educational and private bodies. In terms of sports development the borough operates tennis, cricket and golf coaching courses in some of its parks in the summer months, and also gives grants to sports clubs to improve facilities and grounds.

(c) Greenwich.

Greenwich is well provided with both public and private open space for sports and sees itself as providing these facilities primarily for borough residents but also, more generally, for the benefit of south east Londoners. There is little that can be done to increase public provision for pitch sports at present due to the limited land and financial resources, although opportunities do exist at Thamesmead and Kidbrooke.

The main policy of the borough is to resist the loss of outdoor sports facilities to other land used although it could be agreed that this was not so critical as for Southwark or Lewisham. The Council has justified this policy in two ways: there is a continuing growth in demand for certain formal sports, particularly football; there is great difficulty and expense in increasing provision in inner London and as such inner London boroughs are dependent on a surplus of provision in outer boroughs.

20. See Ch. 8. Sec. 8.4 P. 382 et seq.,

Where private sports grounds fall into disuse the Council intends to take steps to acquire such land[21]. or encourage other bodies such as the Greater London Council, adjacent boroughs deficient in outdoor sports provision, or the Regional Council for Sport and Recreation to take action. One way of off-setting the cost of acquisition of a private sports grounds is to grant planning permission for residential development provided a certain amount of the land is set aside for sport and recreation.

The borough has also adopted certain management policies to increase the use of existing sports pitches including pricing and booking policies to encourage use of clubs at off-peak times and to encourage dual use.

The Council intends to encourage golf provision in the borough by recommending a public course to be developed within the Green Chain where there are a number of areas of opportunity.

The borough gave £1,750 to the Greenwich Sports Council in 1978/79 in order to assist clubs in maintenance and provision of facilities. The Council does some sports development including some work with the disabled.

(d) Bromley.

The only policies that specifically relate to sports provision are the

21. An example of such a policy is cited below:

In July 1975 the Council took on the lease of a 7 acre sportsground formerly leased by Morley College. This involved an annual rent of £1,800 and maintenance and repairs of £8,650. This was done in support of the Green Chain concept and also because it would increase the stock of senior football pitches of which there was a serious shortage.

upgrading of ancillary facilities at certain public pitches in the form of six new sports pavilions. At a lower level of priority the Council intends to extend Magpie Hall Golf Course from a 9 hole to an 18 hole facility and provide a par 3 golf course at the former Star Lane refuse tip. Pitch and putt courses will be provided at three recreation grounds.

Dual use and joint provision with educational institutions are also adopted as policies, in principle, to extend outdoor sports facilities and are seen as particularly valuable in areas remote from public open space.

9.4 Evaluation.

Although the local authorities are in the process of plan making and three have formulated a set of well defined policies in accordance with the G.L.D.P. and other strategic policies, the extent of their implementation is strictly limited. This is not a result of inadequate legislative powers which are wide ranging, but rather a lack of resources for capital and revenue expenditure on open space and recreation.

The three boroughs encompassing parts of the Inner City have applied the G.L.D.P. hierarchy, with some alterations, to the public open space supply in their areas and have identified areas of deficiency. Two improvements to the hierarchy have been adopted to make it more realistic in its application:

(i) Barriers and facilities to access are taken into account in determining catchment areas, in particular in relation to local parks. Barriers include railway lines and major roads. Facility of access is measured in terms of walking distance to park entrances rather than linear distance.

(ii) Size and function of parks are not so well defined as the G.L.D.P. suggests. Parks which are smaller than 50 acres may adequately serve a District function, as may parks below 5 acres serve a Local function. Function is not dependent on size alone but also the facilities that a park contains and its characteristics. Consequently a reduced minimum size of parks at different levels in the hierarchy has been adopted by Southwark, and Greenwich and Lewisham have adopted a flexible approach.

In the deficiency areas identified a number of proposals for implementation have been put forward. These include, the creation of small new open spaces, (5 acres or less) possibly as part of an area of re-development or as a planning gain in a private development, and also the extension of existing parks to increase their function and attraction. Both these measures have been on a fairly small scale with the possible exception of Lewisham which has made considerable progress in Deptford. This reflects the financial burden of new provision to Councils. It is unlikely that there will be any real progress in the near future.

A related proposal is the improvement of facilities contained within existing parks. In this way the use that is made of a park can be increased. A further development is the provision of activities and attractions in parks: exhibitions, concerts, shows, galas, although little has been implemented except playleadership activities and some sports coaching. Functional attraction is also increased by improved accessibility. Greenwich, Lewisham and Southwark are all committed to the provision of footpath links.

The retention of existing open space is of general concern and the three

boroughs are formulating the "Green Chain" to this end. The success of such a policy will also depend on the weight given to it by constituent boroughs and the call of other priorities on limited resources.

There is a difference in emphasis in the policies advocated by boroughs deficient in open space i.e. Southwark and Lewisham as opposed to the two which are not. Highest priority in the former boroughs is given to redressing the deficiencies, inevitably, and also to improving the level of service provision within parks. Playleadership and entertainments in parks are well developed in these boroughs and Greenwich as well. In Greenwich and Bromley greater emphasis is given to improving the quality of existing open space stock and retaining existing provision.

With regard to sports provision there is also a difference in emphasis. Intensive use all-weather pitches, in some cases with floodlighting are being provided in inner areas in response to the lack of space and high land values. In outer areas boroughs are concentrating on improving the quality and facilities of existing pitch stocks, and safeguarding private playing fields against loss to other uses. Greenwich and Bromley are also considering plans for golf course provision indicating a surplus of available open space for this land extensive activity.

All boroughs are committed in principle to the idea of dual use of educational facilities by the community and the provision of joint facilities. There has been little progress in achieving the former and in some inner areas the paucity of education facilities has resulted in the use

of public parks by schoolchildren. Joint provision may be more successful especially in Docklands where schools and community open spaces can be planned as integrated complexes. The dual use of private sports facilities is also regarded by the boroughs as a good idea, but has met with little response from private sports clubs. This is instanced by Greenwich who had no response to a circular letter proposing this idea.[22].

Although the boroughs have developed a considerable variety of policies their implementation has been somewhat limited. Greatest progress has been made where there is money available for capital investment over and above the resources of individual boroughs. These include the developments in Docklands assisted by the Government's Urban Programme, Burgess Park being developed by the G.L.C. In the main the boroughs have implemented modest and low cost proposals. This will continue to be the trend in the immediate future. There is a need to review all the possibilities for low cost additions or improvements to open space which will maximise their recreational potential.

22. L.B. of Greenwich. Community Plan 1977/78-1979/80 Recreational Services P. R.34.

CHAPTER 10 OPEN SPACE POLICIES : PROBLEMS AND OPPORTUNITIES

In evaluating the formulation and implementation of open space policies for Greater London three fundamental questions arise:

1. Are policies correctly formulated in the light of the existing supply of open space and land use pattern?
2. Do policies reflect the needs of the resident population for outdoor recreation?
3. Can policies be adequately implemented given the legislative powers and finance available to providing agencies?

In answering these questions a series of problems and limitations of existing policies will be highlighted together with a number of possible alternatives and new directions.

1. Are policies correctly formulated in the light of the existing supply of open space and land use patterns.

Since the need for urban open space was identified in the early nineteenth century, its provision until recently has been unplanned. By the time early legislation was passed in the mid nineteenth century, much of inner London was compactly developed with little open space apart from squares and churchyards. These Acts gave enabling powers to local authorities and agencies and purchases were made and donations of land received as opportunities arose. This "ad hoc" approach resulted in a random distribution of open space provision within the expanding urban matrix.[1.]

1. See Ch. 2 Sec. 2.2(b) P. 74 et seq.,

Even during the first four decades of this century when town planning was moving towards the comprehensive system of the present day, there was little positive planning of open space. At this stage the amenity rather than the recreational function of open space was paramount, giving light, air and salubrity to the environment in response to the high density, unhealthy, urban conditions of the nineteenth century.

The National Playing Fields Association recommended a standard of 6 acres per 1000 population in 1926 but this did not become a part of Government policy or become codified in statutory plans until the 1950's. During the intervening period "ad hoc" acquisition by public bodies such as the London County Council and by private firms and companies continued as the remaining country seats and estates on the edges of London were sold.[2.]

Current planning policy has been left with this legacy and has tried to apply some order to it. A recent survey[3.] of use has indicated that accessibility is paramount in planning open space. The Greater London Development Plan in its hierarchy of open space provision has attempted to suggest a park system that is accessible to all Londoners, but the uneven distribution of open space within the built up area suggested that a hierarchy of provision could not be satisfactorily superimposed. More detailed analysis showed that the size distribution of parks in south east London resembled a broken continuum rather than a set of discrete categories; their spatial distribution was random rather than systematic and there were no discrete and homogeneous groups of park

2. See Ch. 2 2.2(c) P. 80 et seq.,
3. G.L.C. Surveys of the Use of Open Space. (Vol. 1. Research Paper No. 1 G.L.C. September 1968).

according to facility type.[4.]

The G.L.D.P. suggests that the hierarchy should be used as a guide for the siting and location of new parks, since it would not be feasible to develop a park system which adhered rigidly to this basis. In practice its value has been to identify areas of open space deficiency. Planning authorities in south east London have identified parks of different size categories in their boroughs and have circumscribed them with catchment areas in accordance with the hierarchy and have concentrated their efforts to remedy deficiencies.[5.] In undertaking this process the boroughs have made the hierarchy a more sophisticated tool of deficiency analysis. Instead of adopting the simple notional catchment areas, they have attempted to define real catchment areas by taking into account physical barriers and aids to access including main roads, railway lines and footpath links, and have also attempted to measure walking distances.

Within the areas identified, sites are examined for the development of new open spaces. The G.L.C., with considerable legislative powers and financial resources, has been developing a metropolitan open space - Burgess Park in north Southwark. The nucleus of the park was formed on a bomb damaged area which offered an opportunity to develop a new large park. Progress has been slow, partly due to the cost of acquisition and layout of various contiguous sites but also due to the physical constraints of existing housing and buildings and the problems of acquiring and demolishing them. The inner city, because of its closely knit physical fabric and mixed land ownership, can create

4. See Ch. 2 Sec. 2.3(b) P. 94 et seq., and Ch. 4 P. 202 et seq.,
5. Ch. 9 Sec. 9.2 P. 389 et seq.,

considerable constraints on open space development.[6.]

The other providers of public open space, the boroughs, are not so well equipped financially as the G.L.C. to remedy deficiencies, and the approach has generally been "low key" and incremental, small open spaces being created as opportunities arise and extensions being made to existing parks wherever possible. Some boroughs have also sought to increase accessibility to existing open spaces by creating footpath links and providing subways and bridges across busy roads and railway lines. Alsc the function of existing parks has in some cases been improved by providing new or improved facilities, thereby making them more attractive to potential visitors. The development of intensive use pitches is taking place in areas of paucity, as these have up to ten times the capacity of conventional pitches.[7.]

These approaches suggest that open space deficiency is not just merely remedied by providing more open space - that may be the ideal, given no physical or economic constraints - but by the way in which it is managed and made available. Findings suggest that there may be an under-use of existing open space in which case further provision is not the answer, but rather an improvement in accessibility and/or facilities might increase attractiveness to potential users.

Consequently the hierarchy is only really of value as a tool in identifying deficiency areas. Although the distribution of all open space indicates a quantitative deficiency in inner urban areas, it is not necessarily true that these areas are more poorly provided with public parks than the

6. Ch. 8 Sec. 8.1 (c) P. 362 et seq.,
7. Ch. 9 Sec. 9.2 & 9.3 PP. 389 & 401 et seq.,

suburbs and outer areas. As with swimming pools there has been a tradition of local authority park provision since the mid-nineteenth century. At that time they were developed on the edge of the built-up area but nowadays with the massive subsequent growth of the metropolis they are woven into the fabric of the inner city. Consequently inner areas, despite higher population densities, may have parks at least as accessible as those in outer areas.

Nevertheless there is an overall deficiency of all types of open space in the inner city, an area characterised by a poor living environment,[8.] and declining population in recent years. The loss of population ironically leaves more space and scope for re-development incorporating more parks and playing fields, although less money is available to local authorities to implement such policies, due to the level of existing problems and the declining rate base. A good case could be made for continuing area based policies such as the Urban Programme Partnership areas e.g. Docklands, or its successor the Urban Development Corporation, to provide both recreational and environmental open space in large enough quantities in such areas. Although parks may be reasonably well provided there is a considerable lack of playing fields and areas of amenity open space to improve the environmental quality.

Other open land policies contained in the G.L.D.P. are primarily environmental policies, including Metropolitan Land, Areas of Special Character and Other Areas of Opportunity. These seek to preserve and

8. Ch. 2 Sec. 2.3(c) P.110 et seq.,

manage existing swathes of open space where they occur within the built up area. Consequently the question as to whether they are correctly formulated in relation to supply does not strictly apply. They start with existing open space whose location, nature and quantity is already fixed. However their formulation can be questioned in regard to the preservation of open land.

The directive for the preservation of private open space is weakly formulated in the Structure Plan. The financial liability on a local authority to purchase private land under the "alternative development certificate" procedure may be such, now that the Community Land legislation is being repealed, that it may not be able to preserve it from development.[9.] To ensure that such land is not lost to residential development in the future, preservation should be given much greater emphasis, although the most effective measure would be to alter legislation on compensation to reduce the liability of local authorities.

2. Do policies reflect the needs of the resident population for outdoor recreation.

The development of policies for outdoor recreation have gone through three stages of refinement since the nineteenth century:

(i) The most rudimentary formulation of the need to acquire open space for the benefit of those living in the large cities and preserve it from the processes of urban development and enclosure. During this stage enabling legislation was passed but no attempts were made to plan the quantity, type or location of open space.

9. Ch. 1 Sec. 1.1(d). P. 15 et seq.,

Parks were located on the periphery of the built up area where land was available, but away from where the people lived e.g. Southwark Park. They were also designed essentially for passive recreation such as walking and taking the air rather than as places for active recreation.[10].

(ii) The formulation of simple quantitative planning standards expressed in the form " X acres of open space per thousand population." These developed from early attempts to quantify existing provision in towns in the late nineteenth century. The earliest and most enduring standard, still being advocated today, was that proposed by the National Playing Fields Association in 1926. Subsequently various London Plans and the Government have adopted and endorsed this form of policy. Levels of open space provision and the types that should be provided i.e. playing fields, parks, playgrounds, have been justified in terms of "guessed" recreational requirements often based on hazy assumptions. Minimal consideration was given to the distribution of open space during this stage.[11].

(iii) During the early sixties it was realised that these simple standards were not realistic, either in terms of recreational need, or in terms of implementation. Little progress had been made in achieving the targets set down in the Initial Development Plan for London.[12]. At that stage a number of recreational

10. Ch. 1 Sec. 12.(a) P. 19 et seq.,
11. " " Sec. 1.2(b) P. 21 et seq.,
12. " " Sec. 1.2(c) P. 26 et seq.,

demand studies were undertaken in an attempt to quantify need and subsequently incorporate the findings into policies. The most significant was the relationship which was found to exist between parks and open spaces, (their number, size and quality) and the distance people were prepared to travel to them.[13] For the first time the recreational behaviour of park users was being taken into account, and this was incorporated into the G.L.D.P. hierarchy.

Certainly the acknowledgement of accessibility in planning parks was a considerable step forward, but it has been argued subsequently that the G.L.D.P. policies do not go far enough in meeting recreational need. The Layfield Report suggested that the hierarchy did not take account of differing population densities in urban areas, which would affect demand for open space. Also it ignores the effect of roads, railways and communications networks which affect accessibility. A uniform application of this policy, it was argued, would be just as arbitrary as the "acres of open space per thousand" standard, and consequently planning should take account of local circumstances without imposing a rigid system.[14]

This study has tested whether the hierarchy is appropriate in terms of recreational need in two ways:

(i) Whether findings on the use of parks for informal recreation by

13. G.L.C. Surveys of Use. op. cit.
14. Department of Environment. Greater London Development Plan: Report of the Panel of Enquiry. (2 vols; London HMSO 1973).

adults and schoolchildren support it.

(ii) Whether there are variations in recreational demand between different localities in the urban area and whether these invalidate a "blanket" application of the hierarchy.

(i) In general a hierarchy of provision is supported by the findings on the distances travelled and visiting characteristics of adults and schoolchildren.[15] Schoolchildren's recreational behaviour is somewhat different from adults, insofar as distances travelled are shorter, and frequency, time of visit, length of stay, are not so well defined for different types of park. Nevertheless existing use patterns would be catered for if a hierarchy were provided.

It is also apparent that other policies would support the findings on use. In general large parks (over 50 acres) containing a variety of facilities are preferred to smaller parks with fewer facilities. It could be argued that 50 acre multi-facility parks should be provided within $\frac{3}{4}$ mile of each house a policy which would fit the findings equally well. Consequently, although use patterns support the hierarchy a number of alternative policies are possible.[16]

(ii) In the survey of schoolchildren only minor differences were noted in the park visiting characteristics of those living in

15. Ch. 5. Sec. 5.3 P. 249 et seq., Ch. 6 Sec. 6.3 P.296 et seq.,
16. Ch. 5 Sec. 5.3. P. 249 et seq.,

inner, suburban and outer areas. Distances travelled were slightly greater in the inner city and at the rural urban fringe, reflecting the slightly more accessible open space in the suburbs. These differences reflect the differing open space provision rather than differences in recreational demand. Published surveys have indicated that the park visiting characteristics of adults do not differ significantly within the built up area.[17.]

Any variations in use that do occur can be attributed partly to the presence or absence of open space and partly to the demographic and social characteristics of the population. It is difficult to separate these components and the variations that occur within the population are likely to be cancelled out by variations in supply. The analysis of demographic and social factors[18.] was inconclusive and generalised insofar as it could only say that there were higher than average numbers of young people in inner areas and higher than average numbers of the economically better off in the suburbs and outer areas. Both groups, according to various recreational demand studies, have a higher propensity to participate in outdoor recreation. Consequently such analysis cannot give detailed guidance in developing policies which meet differing recreational needs in differing areas. Also local areas contain such a heterogeneous group of people except in a few narrowly defined cases e.g. new housing estates, that to plan for recreational demand groups on an area basis would be invalid.

17. Ch. 3 Sec. 3.2(b) P. 145 et seq.,
18. Ch. 3 Sec. 3.4 P. 167 et seq.,

This lack of discernible differences in recreational needs between different parts of the urban area would support the use of a uniform policy applied throughout, but not necessarily a hierarchical policy.

Taken as a whole the G.L.D.P. open space policies make no specific recommendations for sports provision. It is true that certain areas of playing fields are recommended within the hierarchy and that no doubt sports grounds are assumed to form part of the areas of open land covered by Metropolitan Open Land and other environmental policies. This absence of an explicit policy is a serious omission from the Structure Plan, the responsibility for which has been passed to the Greater London and South East Council for Sport and Recreation. This advisory body with limited grant aiding powers has produced a strategy based on research whose policies have been endorsed and developed somewhat in this study.[19] It is suggested that the Metropolitan Open Land policy as formulated in the "Green Chain" may be a useful method by which to develop a supply of pitches in the suburbs, to serve the deficient inner areas. At present the role of Metropolitan Open Land is not seen explicity as an area for the provision of new pitches, merely the preservation of existing ones. Information on use suggests that there is a considerable under provision of public football pitches and this situation could be improved if a positive policy of pitch provision was written into the Metropolitan Open Land element of the Structure Plan.

19. See Ch. 7 Sec. 7.3. P. 338 et seq.,

5. Can policies be adequately implemented given the legislative powers and finance available to providing agencies?

The ability of local authorities to acquire, manage and preserve open space pre-dates the development of planning policies, and by the turn of the twentieth century considerable discretionary powers were available. Apart from subsequent town planning legislation the only other new areas of legislation in this century relate to physical recreation and educational provision. Taken together the various strands of legislation form a comprehensive set of powers available to local authorities; whether they are used depends on the financial ability and willingness of authorities to pursue the policies in question. To use its compulsory purchase powers, an authority is required to pay alternative use values (e.g. residential) in order to preserve open space, now that the Community Land Act is being rescinded. Also the compulsory purchase of slum property for open space use as at Burgess Park will involve compensation in addition to acquisition and layout costs.

Consequently it is the larger authorities with greater financial resources and access to Government grant aid that will be more likely to be able to implement policies on a reasonable scale. This is true of the G.L.C. and the Docklands Development Organisation, although the physical and financial constraints nevertheless make progress slow.[20] Local authorities who have had limitations on expenditure imposed by Central Government via the Rate Support Grant and loan sanctions over the last four years, have had very little available for capital or revenue expenditure on sport and recreation. It has been a case of maintaining

20. Ch. 8 Sec. 8.3 P. 375 et seq.,

existing services with incremental additions to open space and facilities as opportunities arose.[21] The ability of such authorities to implement strategic policies such as the Playing Fields Strategy and the Green Chain are slight once local priorities and commitments have been met.

A further problem of implementation is the anomaly which exists between advisory bodies such as the Regional Council for Sport and Recreation who formulate policy yet are without executive powers, depending on the co-operation of local authorities. Given the financial constraints within which local authorities operate perhaps more grant aid powers should be given to advisory bodies in order to promote the policies they suggest.[22]

The limited financial ability to use legislation and implement policies makes it appropriate to consider alternative approaches including the involvement of the private and voluntary sectors. Traditionally public open space provision has been the responsibility of the public sector as it is not financially viable for the private sector to provide a free good i.e. open land on which there is no rent or return. The private sector has provided playing fields and sports grounds for the exclusive use of staff of banks, industries and companies or members of sports clubs. There is plenty of scope for joint initiatives involving the private and voluntary sectors and local authorities. Planning authorities may secure "planning gains" by grant sports ground owners planning permission for squash courts and built facilities in return

21. Ch. 9 Sec 9.2 P. 389 et seq.,
22. Ch. 8 Secs. 8.2 & 8.4 PP 370 & 382 et seq.,

for the limited use of pitches by the general public. A residential developer may be granted planning permission in return for the provision of a small amenity or recreational space available to the public adjacent to the development. These involve no costs to the local authority.

Low cost initiatives may involve grant aid to sportsclubs in return for providing coaching facilities for a number of school-leavers and youngsters, or by providing money for improved club facilities in return for some public use of pitches.

There may be scope for the dual use of existing, and joint provision of new educational playing fields. In the suburbs many pitches are used solely by schools during the week with no weekend use. Community use of such facilities would increase effective pitch stocks considerably. The Inner London Education Authority do let out some of their pitches for adults teams, and Bromley Education Authority is committed to dual use in principle. In general the idea of dual use has been widely discussed but implemented only to a limited extent due to difficulties of caretaking at weekends. The revenue implications of employing additional staff for such purposes may limit the extent to which dual use can be operated at this time. There may be more scope in the joint provision of new facilities which can be planned and managed at the outset for community and education use, as in Docklands.

In inner London the situation is reversed with some schools making use

of community facilities in public parks, whilst others bus children to playing fields in the suburbs often up to 15 miles away. Recently the Inner London Education Authority (I.L.E.A.) has proposed an investment programme to upgrade pitches in parks in the inner city with grant assistance from the Regional Sports Council for use by local schools.

With regard to public parks there is scope for local authorities to be more entrepreneurial. In some areas parks are used as venues for fairs pop concerts, flower shows, mini-olympics, the cost of which can be offset by charging realistic prices for admission. In this way parks can become economically viable as well as attracting more people. This approach was pioneered by Mr. H. Winning of Sheffield City Parks Department and has been most fully developed by the Greater London Council.

Finally there is a need for a comprehensive or "corporate" approach to planning open space. At present there is a dichotomy among local authorities between the land use planning policies, concerned with location, quantity and type of provision, and the management and maintenance of open space and the provision of recreational services. Parks should be no longer considered as a negative land use - open space with a limited amenity function. This has been the land use planning approach in the past, but rather as open air recreational facilities with opportunities for the provision of sports activities

youth activities, coaching, exhibitions, entertainments, meeting grounds, competitions and events.

At another level more education is required, both at school and among adults, about the value of outdoor recreation and the role open space can play. This involves a re-orientation of peoples' perceptions and awareness of their local parks as well as emphasizing the positive benefits of exercise. National campaigns occur periodically which attempt to alter habits from those of passive spectating to active participation among the general population.

In answering these three questions it is apparent that there are certain deficiencies in existing practice. Among planning policies the public open space hierarchy provides a useful starting point for identifying deficiencies, but it is not a comprehensive policy. Policies for sports provision are not adequately contained within the existing planning framework and depend on an advisory body to exhort their implementation by local authorities. Policies for the preservation of open land are weak within the existing Structure Plan and legislative and financial powers are inadequate to implement them.

An area based approach could be justified in terms of making more money available through the Urban Programme or through grant giving agencies for the provision of more open space for sport and environmental improvement in the inner city. It is not however justified in terms of the needs of differing demand groups for open space.

Given the "no growth" state of the economy at this time and for the

forseeable future, it is perhaps more appropriate to concentrate less on physically increasing the stock of open space, which is financially impractical, but rather to concentrate on ways of improving the use that is made of existing provision by a number of "low cost" and management measures and an emphasis on development policies which seek to encourage activities and participation, both active and passive, in urban parks.

SELECTED BIBLIOGRAPHY

BOOKS AND REPORTS

Abercrombie P. on behalf of the Standing Conference on London Regional Planning for Minister of Town and Country Planning Greater London Plan. (London L.C.C. 1944)

Aldous T. Battle for the Environment (Fontana, 1972) p.116-143.

Balmer K.R. "Urban Open Space Planning in England and Wales." (Unpublished Ph.D. dissertation. Department of Geography, University of Liverpool 1972). Ch. 3.

Balmer K. Use of Open Space in Liverpool. (Report of Survey commissioned by Liverpool Corporation). (Planning Department and Recreation and Open Space Department, Liverpool Corporation, Liverpool 1973).

Barlow Report. Report of the Royal Commission on the Distribution of the Industrial Population. Cmnd. 6153. (H.M.S.O. 1940).

Barnes J.H. Positive Discrimination and Inequality. (Fabian Research Series. No. 314 1974).

Beresford C. The History of Squares in London, (Unwin, 1907)

Berry B.J.L. Pred. A. Central Place Studies: a bibliography of theory and applications (Regional Science Research Institute 1961). Bibliographical Series 1.

Bowen M.J. "Outdoor Recreation on the Urban Fringe" (University of London 1977 Ph.D.)

British Travel Association/University of Keele. Pilot National Recreation Survey. (Report No. 1. 1967 Report No. 2. 1969).

Brown J.H. Preliminary Bibliography of Recreation and Recreation Planning. (Department of Geography and Geology, Polytechnic, Queensgate, Huddersfield, 1975).

Brown B.J.H. Sources in Recreation. (Huddersfield Polytechnic, 1975).

Burgess G. "The Growth of the City" ed. R.E. Park et. al., The City. (University of Chicago Press 1925). Chapter 2.

Burton T.L. A Classification of Recreation Demands and Supplies. (A University of Birmingham Centre for Urban and Regional Studies, 1967)

Burton T.L. Experiments in Recreation Research, Urban and Regional Studies No. 2. (George Allen and Unwin 1971).

Burton T.L., Noad P.A. Recreation research methods. A Review of recent studies. (University of Birmingham Centre for Urban and Regional Studies occasional paper No. 3. 1968).

Burton T.L. (Ed). Recreation Research and Planning. (Allen and Unwin 1971)

Carter H. The Study of Urban Geography. (Edward Arnold 1972. Ch.5.

Chadwick G.F. The Park and the Town. (Architectural Press, 1966)

Christaller W. Die Zentralen Orte in Suddeutchland 1933. (Translated by C.W. Baskin) Englewood Cliffs N.J. 1966.

Cichetti C.J. Forecasting Recreation in the United States. (Lexington Books 1973.)

Clawson M and Knetsch L. Economics of Outdoor Recreation. (John Hopkins 1968).

Clawson M. Methods of Measuring the demand for the value of Outdoor Recreation. (Resources for the Future, Washington, 1959.)

Clawson M. "Open (Uncovered) Space as a new urban source". Rep. in H. Perloff (ed) Quality of the Urban Environment (John Hopkins Press 1969).

Coleman A and Maggs K. Land Use Survey Handbook (London:H.M.S.O. 1968).

Coppock I. and Prince H.C. eds. Greater London (London: Faber and Faber, 1964).

Cosgrove I and Jackson R. The Geography of Recreation and Leisure. (London: Hutchinson University Library 1972).

Countryside Commission. The Demand for Outdoor Recreation in the Countryside. (Report of Countryside Commission Seminar Jan. 1970)

Department of Environment. Greater London Development Plan: Report of the Panel of Inquiry (2 vols; London, H.M.S.O. 1973).

Department of Environment. Open Space in Urban Areas: An analysis of Development Plans. (H.M.S.O. April 1973).

Department of Environment. A Policy for the Inner Cities. (1977 Cmnd 6845).

Department of Environment. Recreation and Deprivation in Inner Urban Areas. (H.M.S.O. 1977)

Department of Environment. Regional Councils for Sport and Recreation. (H.M.S.O. Circular 47.96. 1976)

Department of Environment. Sport and Recreation. (H.M.S.O. Cmnd. 6200 1975).

Dewey H &Bromhead C.E.N. The Geology of South London. Memoirs of Geological Survey of England and Wales: Explanation of Sheet 276. (London. H.M.S.O., 1921).

Docklands Joint Committee. London Docklands Operational Programme. 1978/82. and 1979/83.

Docklands Joint Committee. London Docklands Strategic Plan. (G.L.C. 1976).

Donnison D. and Eversley O. London: Urban Patterns, Problems and Policies. (Routledge, Keegan, Paul 1973).

Elson M. Recreation Demand Forecasting. A Misleading Tradition. Paper to PTRC Summer Meeting. (Warwick University, July 1975) London DTRC.

Everitt, B. Cluster Analysis. (London, Heinemann 1974).

Forshaw J.H. and Abercrombie P. County of London Plan, (London: L.C.C. 1943).

Garner B.J. The Internal Structure of Shopping Centres. (North Western University Studies in Geography 12. 1966).

Geddes Sir P. A Study in City Development; Parks, Gardens and Cultural Institutes. (Dunfermline 1904).

Gold S. Urban Recreation Planning. (Lea and Febiger, 1973).

Goodall. The Economics of Urban Areas. (Pergamon Press: 1972)

G.L.C. Budget 1979/80 and Projections 1980/84.

G.L.C. 1971 Census: Demographic Social and Economic Indices for Wards in Greater London. (2 vols. Research Report 20; London G.L.C. 1976)

G.L.C. Department of Planning and Transportation. Characteristics of 12 clusters of wards in Greater London. (London G.L.C. 1971). Research Report No. 13.

G.L.C. Greater London Development Plan Approved by Secretary of State for Environment. (London G.L.C. 1976).

G.L.C. Greater London Development Plan, Report of Studies. (London G.L.C. 1969). Ch. 5.

G.L.C. Greater London Recreation Study. (3 vols. Research Report No. 19 London, G.L.C. 1975).

G.L.C. The Migration and Distribution of Socio-Economic Groups in Greater London - Evidence from 1961, 1966 and 1971 Censuses. (Ed. K. Dugmore). (London G.L.C., 1975). Research Memorandum 443.

G.L.C. Modified Greater London Development Plan. (London G.L.C. 1975).

G.L.C. Recreationally Disadvantaged Areas in Greater London. (G.L.C. Research Memorandum 467. ed. M. Nicholls).

G.L.C. Report by Chief Officer of Parks department et. al. The Future of Burgess Park. (G.L.C. April 1978.)

G.L.C. Planning Department. Surveys of the Use of Open Space. (G.L.C. September 1968 7.) Volume 1 Research Paper No. 1.

G.L. and SE Council for Sport and Recreation. A Football Pitch Directory for South East London. (G.L.C. 1978).

Greater London and South East Sports Council. A Playing Fields Strategy for Greater London. (London 1977)

Greater London and South East Sports Council Research and Planning Unit. Playing Fields Research Study (Information Sheet 3, December 1972).

Green Chain Working Party. "The Green Chain: Problems and Potentialities - Interim Report. (January 1975).

Gunarwardena K.A. "Service Centres in Southern Ceylon" (University of Cambridge Ph.D. Thesis 1962).

Haggett P., Cliff A.D., Frey S. Locational Methods. (London: Edward Arnold, 1977). p. 301.

Hennessey P.F. A Fortran Programme to perform Single Link Cluster Analysis. (Dissertation for B.Sc. (Hons) Degree C.N.A.A. Polytechnic of North London, 1974).

H.M.S.O. Office of Population Censuses and Surveys. General Household Survey 1973. (London: H.M.S.O., 1975).

H.M.S.O. 2nd Report of select committee of the House of Lords on Sport and Leisure. (H.M.S.O. Cmnd 5430).

Herbert D.T. Urban Geography: A Social Perspective. (David and Charles, 1972).

Hillman M. and Whalley A. Fair Play for All: A Study of Access to Sport and Informal Recreation. (Political and Economic Planning October 1977). Vol. XLll Broadsheet No. 571.

Horsburgh E.L. Bromley, Kent. From the earliest times to the present century. (London: Hodder and Stoughton.)

Howard E. Tomorrow: A peaceful path to real reform. (1899) re-issued as Garden Cities of Tomorrow. Ed. F.J. Osborn (Faber 1946).

Hoyt. H. The Structure and Growth of Residential Neighbourhoods in American Cities. (Washington D.C. 1939). U.S. Federal Housing Administration U.S. Government Printing Office.

Knight T.E. A conceptual background to the use of social indicators for identification of areas of urban deprivation. (DoE Economic and Statistical Note. No. 21. September 1974.)

Lachlan A. "Urban Recreation: Special Aid for Special Needs" (Unpublished dissertation Oxford Polytechnic 1975.)

Lancaster J.R. and Nicholls L.L. Selected bibliography of geographical references and related research in outdoor recreation and tourism 1930-1971. (Council of Planning Librarians. Exchange Biblio. 1970).

LAVERY P. (ed). Recreational Geography. (Newton Abbot. David and Charles 1971).

Leaders of London Boroughs. Greenwich, Lewisham, New Ham, Southwark and Tower Hamlets. Local Democracy Works: the case against Docklands New Towns. (October 1979).

Little C.E. The Challenge of the Land. (New York: Pergamon Resource and Environment Library 1967).

London Borough of Bromley. Report of the Working Party on Parks and Recreation. (October 1973)

London Borough of Greenwich. Community Plan 1976/77 - 1978/79 Recreational Services.

London Borough of Greenwich. Parks and Public Open Spaces in Greenwich. (June 1977)

London Borough of Lewisham. Planning Lewisham. A Statement of Current Policies. (July 1975). Ch.6.

London Borough of Southwark. Community Plan. (1978).

London Borough of Southwark. Multi-Functional Use of Open Space Leisure and Recreation Topic Paper. (April 1976).

London Borough of Southwark. Recreation in Southwark. Open Space Study. (1971).

L.C.C. Administrative County of London Development Plan: Statement. (L.C.C. 1951).

L.C.C. Administrative County of London Development Plan First Review of 1960 Statistics. (L.C.C. 1960).

L.C.C. London Park and Open Spaces. (London L.C.C. 1906)

Ministry of Housing and Local Government. The Density of Residential Areas. (London H.M.S.O. 1952).

Ministry of Housing and Local Government. The Future of Development Plans. A report by the Planning Advisory Group. (H.M.S.O. 1965)

Ministry of Housing and Local Government. Open Spaces. Technical Memorandum. No. 6. (London H.M.S.O. 1956).

Moser C.A. and Kalton G. Survey Methods in Social Investigation. (2nd ed. London Heinemann Educational 1971).

National Environmental Research Council - Institute of Geological Sciences. British Regional Geology - London and Thames Valley. (3rd ed. London H.M.S.O. 1960).

National Playing Fields Association. Grounds for Action: a description of the work of the N.P.F.A. (London N.P.F.A.) (Publication date not given)

National Playing Fields Association. Outdoor Playing Space Requirements. Review of N.P.F.A. Playing Space. Target 1971. (London N.P.F.A. 1971).

Outdoor Recreation Resources Review Committee. National Recreation Survey Study Report 19. (Washington 1962).

Outdoor Recreation Resources Review Commission. Outdoor recreation for America. (Washington 1962).

Patmore J.A. Land and Leisure. (Newton Abbot: David and Charles 1970).

Patmore J.A. & Rodgers H.B. Leisure in the North West. (N.W. Sports Council 1972).

Patmore J.A. People, Place and Pleasure. (University of Hull 1975).

Platt C.L. In Trust for Chislehurst. (London: Pentagon Print, 1975).

Platt R.H. The Open Space Decision Process. (Spatial Alloc. of Costs and Benefits). (Chicago Research Paper 142).

Rapoport, R. Dart/IFER Study of Brent. (Unpublished at present.)

Rapoport R and Rapoport R.N. Leisure and the Family Life Cycle. (London: Routledge, Keegan Paul, 1975).

Roddis, R.J. Law of Parks and Recreation Grounds. (3rd edition, Shaw and Sons 1969).

Seeley I.H. Outdoor Recreation and the Urban Environment. (London Macmillan 1973).

Sexby Lt. Col. J.J. Municipal Parks, Gardens and Open Spaces of London. (London L.C.C. 1898)

Sharp T. Town Planning. (Harmondsworth: Penguin, 1940) p. 89

Shepherd T.W., Westaway, E.J., Lee T.R. A Social Atlas of London (Oxford University Press 1974.)

Shevky G & Bell W. Social Area Analysis: Theory, Illustrative application and computational procedures. (Stamford University Press, 1975).

Shevky, E & Williams U. The Social Areas of Los Angeles (University of California Press. 1949).

Shomon J.J. Open Land for Urban America. (John Hopkins 1971)

Shonfield A. & Shaw S. (eds). Social Indicators and Social Policy. (London: Heinemann 1972).

Sillitoe K.K. Planning for Leisure. (Department of Education Science) (London H.M.S.O. 1969).

Smith I.G. Charlton. (1970), privately published).

Solesbury W. Policy in Urban Planning. (Pergamon Press 1975).

Spate O.K.H. "Growth of London before 1800"reprinted in Historical Geography of England before 1800. Ed. H. Darby (Cambridge University Press 1969).

Sports Council. Planning for Sport. (Central Council of Physical Recreation 1968).

Sports Council. Thirty Games a Week. (London 1976)

Szumeluk K. Central Place Theory: A Review (London: Centre for Environmental Studies Working Papers, July 1968).

Tankel S.B. 'The Importance of Open Space in the Urban Pattern'. reprinted in Cities and Space. ed. Wingo L. (John Hopkins 1963)

Thorne J. London and its Environs or The Great Ambulator. (12th ed., London 1820).

Tunnard C., Pushkarev, B. Man Made America. (Yale U.P. 1963).

Veal A.J. The Future of Leisure: monitoring and forecasting trends in Recreation and Leisure in Britain. (1979 University of Birmingham URS).

Vernon, Mrs. M.J. On Parks and Gardens. (Transitions of the National Association 1878) for the promotion of Social Sciences.

Vickerman R.W. The Economics of Leisure and Recreation. (Macmillan, 1975).

Webster D.H. Urban Planning and Municipal Public Policy. (Harper Row, 1958).

Whitaker B., Brown K. Parks for People. (1971)

Wingo, L. Cities and Space. (John Hopkins 1963)

Wolfenden Committee. Sport and the Community. Central Council for Physical Recreation. 1960.

Young, M., & Willmott, P. The Symmetrical Family. (London, R.K.P., 1973 rep. Penguin, 1975).

SELECTED BIBLIOGRAPHY

ARTICLES AND PERIODICALS

Bangs H.P. & Mahler S. "Uses of Local Parks" Journal of the American Institute of Planners (36. September 1970) 330-334.

Bellamy J. "The Development of Burgess Park" G.L.C. Intelligence Quarterly December 1976.

Berry B.J.L. & Garrison W. "Functional Bases of the Central Place Hierarchy". Economic Geography. 34 (1958).

Birch F. "Leisure Patterns in Britain" Population Trends. (Office of Population and Surveys). London, Spring 1976).

Boulding, J. "Selected annotated bibliography of Literature on Outdoor Recreation". Reading Geographical paper No.3.

Bowler I.Strachan, A. "Visitor Behaviour in Urban Parks" Parks and Recreation. September, 1976.

BRIGHAM, E.F. "The Determinants of residential land values" Land Economics. 41 (4). 1965.

Campbell E.K. "An approach to research in recreational geography" British Columbia Geographical Series. No. 7 1966 p. 87.

Clark P.J., Evans F.C. "Distance to the Nearest Neighbour as a measure of spatial relationships in population" Ecology Vol XXXV 1954. pp. 445-453.

Evans A.W. "The Economics of the Urban Recreational System" Rep: Studies and Social Science and Planning. Ed. T.Forbes.. (Scottish Academic Press 1974).

Gold S. "Non-Use of Neighbourhood Parks". Journal of the American Institute of Planners. Vol. 38. No. 6. November 1972.

Gooch R.B. "Planning for Recreation" Town and Country Planning. 32. 1964. p.480.

Gooch R.B. "The Role of the National Playing Fields Association" Journal of Planning and Environmental Law. 1973. p163.

Goodall, B. "Some effects of legislation on land values". Regional Studies. 1970.

Hardy, D. "Recreation Space and Social Planning". Planning Outlook. Vol. 14 1974.

Hart, J.T. "Central Tendency in Geographical Distributions" Economic Geography. 30. (1954). pp.48-59.

Jellicoe, G. "The London Park. Yesterday, Today and Tomorrow". Architects Journal. 148. (September 1968) pp.563-71).

King, L.C. "A Quantitative Expression of the Pattern of Urban Settlements in Selected areas of the United States". Tjidscrift Voor Economische en sociale geographie. 53. 1962. pp. 1-7.

Journal of the Royal Town Planning Institute 1928-9. Editorial Comment Vol. 15. p.196. and 1925-6. Editorial Comment Vol. II p.196

Lavery P. "Demand for Recreation: A Review of Studies". Town Planning Review. April 1975. pp. 185-200.

Lever W.F. "Planning Standards" Rep: Studies and Social Science and Planning. Ed. T. Forbes. (Scottish Academic Press 1974).

Lever W.F. "Recreational Space in Cities - Standards of Provision". Journal of the Royal Town Planning Institute. March 1973. pp. 138-40.

Masser I. "The Use of Outdoor recreation facilities". Town Planning Review. 37. 1966 pp.41-54.

Maw, R. "Analysing demand for leisure facilities" Built Environment. November 1972.

Maw, R. "Construction of a leisure model". Official Architecture and Planning. Vol. 32. No.8. August 1969. 924-35.

Mercer. "The Geography of Leisure - A Contemporary Growth Point" July 1970 pp. 261-73. Geography

Mercer D.C. "Urban Recreational Hinterlands". Professional Geographer. March 1970.

Mitchell L.S. "An Evaluation of Central Place Theory in a Recreation Context, the case of Columbia, S. Carolina" South Eastern Geographer. Vol. VIII. 1968. pp. 45-53.

Mitchell L.S. "Recreational Geography. Evolution and Research Needs". Professional Geographer. March 1969.

Molyneux D.D. "Working for Recreation. Journal of the Royal Town Planning Institute. 54. (1968) pp. 149-57.

National Playing Fields Association. "Playing Fields and Town Planning". Town Planning Review. Vol. XII 1927).

Palmer J.E. "Recreational Planning - a bibliographical review" Planning Outlook 2. 1967. pp. 19-69.

"Park or Public Open Space". Architects Journal. 25th November, 1970. p.1230-32.

Patmore J.A. "Recreation" reprinted in Dawson J.A. and Doornkamp J.C. (eds.). Evaluating the Human Environment. (London: Edward Arnold 1973).

Peplar, G. "Open Spaces" Town Planning Review. 1923. Vol. 10 p. 11-24.

Pinder, P.A. and Witherick M.F. "The Principles, Practice and Pitfalls of Nearest Neighbour Analysis". Geography. Vol. LVII 1972. pp. 277-288.

Planning Outlook. Vol. 14. 1974. Special issue on recreation.

Savile R. "An Open Space in Southwark". Building. June 22nd, 1973.

Smailes, A.E. 'Site, Growth and Changing Face of London' reprinted in The Geography of Greater London - a source book for teacher and student. ed. R. Clayton. (London: Geo. Philip and Son 1964).

Stafford, F. "Is this the way to plan a park"? Architects Journal 165. March 1977. p.472-5.

Stafford H.A. "The functional bases of small towns" Economic Geography. 1963. (39).

Veal, A.D. "Estimating Demand of Urban Recreational Facilities. Planning Outlook. Vol. 14. 1974. pp.58-64.

West W.A. "Provision of Open Space in Urban Development - Legal Background". Journal of Planning and Environment Law. Jan 1973. pp. 24-26.

Willis M. "Provision of Sports Pitches". Town Planning Review. 38 (4). 1968. pp.293-303.

Willmott M and Young, P. "Social Class and Geography" rep. in Dennison D. and Eversley D. London: Patterns, Problems and Policies. (London: Routledge Keegan Paul 1973).

Willmott P. "Some Social Trends". Urban Studies. 6 (3) 1969.

Winterbottom D.M. "How much urban space do we need". Journal of the Royal Town Planning Institute. 1967. 144-147.

Wolfe, R.I. "Perspective on outdoor recreation: A bibliographica survey". Geographical Review. 1964.

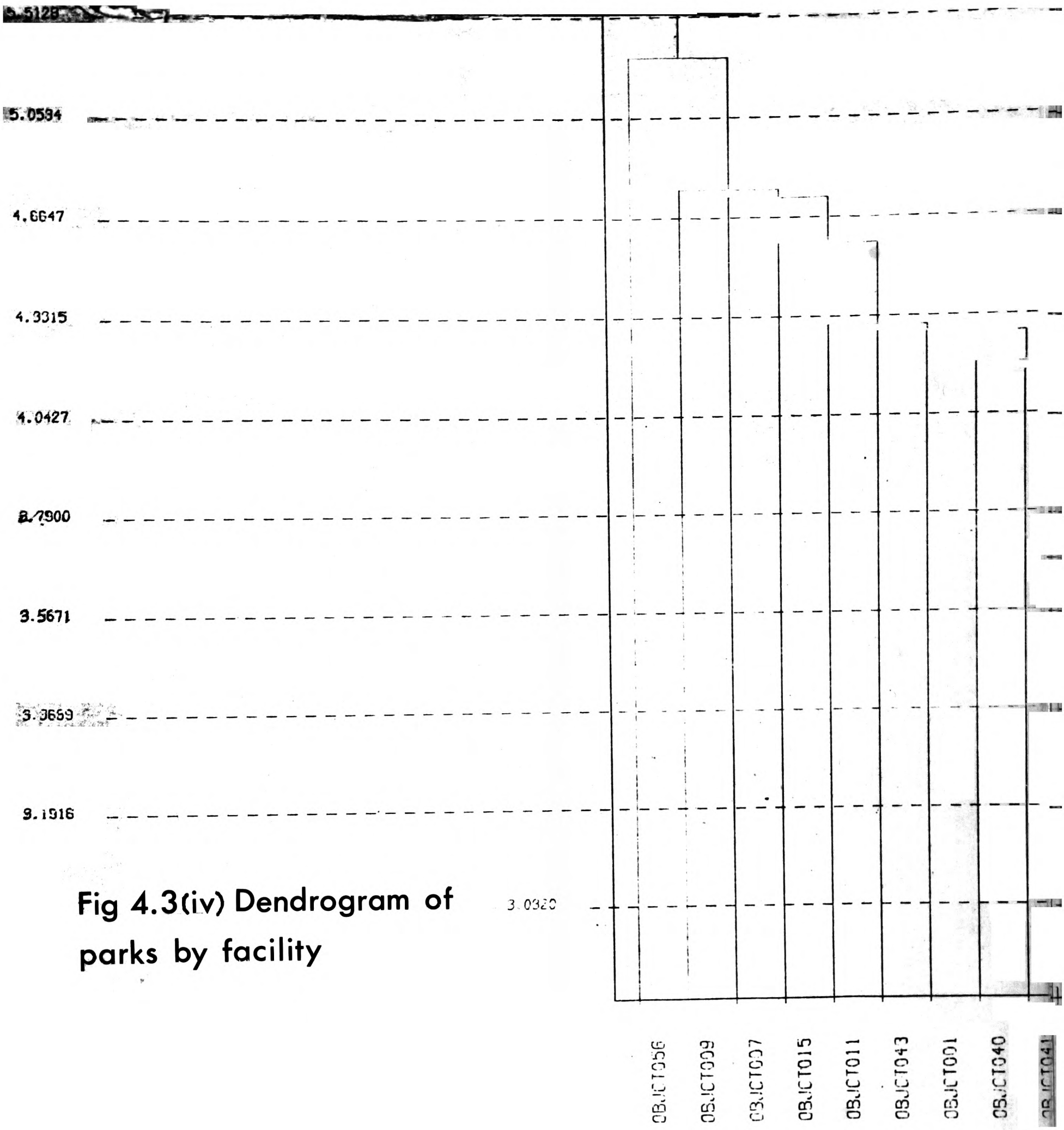


Fig 4.3(iv) Dendrogram of parks by facility