Introduction

Many local authorities will be aware that **sport**scotland has developed a Facilities Planning Model (FPM) as a planning tool to inform decisions about the provision of community sports facilities. Indeed a number of authorities have commissioned **sport**scotland to run the model to assist with facility planning for their areas. The Government's planning advice for sport, physical recreation and open space (National Planning Policy Guideline 11) advises councils to take account of the FPM in assessing levels of provision of sports facilities appropriate for their area.

The FPM provides an objective assessment of the relationship between the likely demand for sports facilities in an area and the actual supply. It takes into account the distribution of the local population and its demographic structure, as well as the capacity and availability of facilities in the area and their catchment areas.

Using this data, the model is able to distribute demand from the study area to available facilities on the basis of catchment areas, linking people (demand) to facilities (supply) in terms of realistic travel patterns. It then identifies "unmet demand" – that is, demand which cannot be accommodated by existing facilities. This may be because existing facilities are full to capacity, or because there is demand arising from outwith their catchment areas.

The Model provides an objective input to the planning process, assisting with important decisions on the provision, upgrading and replacement of sports facilities. The data which it provides can help develop a strategic approach to the provision of facilities but it must be used with other information as part of a comprehensive approach to developing sport in the community.

This Digest is in the following main sections:

A technical appendix giving additional information on the key component of the Model is also available from **sport**scotland.

1. Use of the Model

The way in which the model is used depends upon the nature of the policy guidance required. In general, however, the full analysis of any issue normally requires several Model runs, which can examine one or more of the following issues:

- the extent to which the existing pattern of provision of facilities is capable of accommodating the forecast demand
- the impact of changing the availability of school or other education sports facilities for community use
- the impact of changing the opening hours of community sports facilities
- the impact of proposed new facilities of specific sizes at defined locations
- the identification of the optimum location and scale for any proposed facilities
- the impact of closing existing facilities
- the implications of population change and major new housing development for sports facility provision
- the possible impact of sports development initiatives on the use of and demand for facilities.

Each facility type requires a separate set of Model runs although the results can be brought together at the policy formulation stage. For example, it is unlikely to be sensible to provide a swimming pool at one location and a sports hall at a separate location only a short distance away.

2. Key Features of the Model

The methodologies used most commonly in the past for sports facility planning have been general provision standards (such as the National Playing Fields Association's long-standing six acre standard); sieve mapping and market research. Each has both strengths and weaknesses and the FPM aims to build on the best elements of them. The Model:

Relates demand to supply

The Model provides an objective assessment of the relationship between the likely demand for sports facilities and the current supply of them in a defined area, based on the demographic structure and distribution of the local population and typical catchment areas for specific facility types. The estimate of demand is based on the demographic structure and geographical distribution of the local population. As a result, the Model provides a consistent planning methodology across local, regional and national levels and so helps to promote a hierarchy of provision.

Uses research-based catchment areas

Information about typical catchment areas for specific facility types enables the link between demand (volume of visits) and supply (capacity of facilities) to be made in terms of realistic travel patterns and distances. The model ignores administrative boundaries but takes full account of road networks and barriers to travel, such as rivers and lochs.

Applies to a wide range of facilities

The Model can provide a consistent and objective analysis across a range of different facility types: athletics tracks, bowling greens, indoor bowls centres, cricket pitches, football pitches, golf courses, hockey pitches, ice rinks (for both curling and skating), rugby pitches, sports halls, squash courts, synthetic grass pitches, swimming pools and tennis courts.

Adopts realistic proposals based on research

All models are only as good as the information and assumptions on which they are based. Accordingly, **sport**scotland has sought to identify realistic Model parameters, particularly in terms of the demand for sport and recreation. Account has also been taken of the financial pressures on local authorities and other providers: the Model does not advocate a level of provision which is unsustainable in terms of capital or revenue costs. Such pressures should not, however, deny the opportunity of the Scottish population to participate in the sport of their choice reasonably close to home.

In seeking to set a middle course, **sport**scotland has used research data on the use of sports facilities and existing levels of facility provision. The Model parameters are kept under review to take account of changes in the relative popularity of different sports, technical innovations such as synthetic grass pitches and the impact of sports development initiatives.

Adopts a prescriptive developmental approach

An important feature of the Model is that it prescribes an appropriate level of provision for an area in a way which reflects nationally determined expectations and policies. **sport**scotland believes this level of provision represents good practice rather than an unattainable ideal because the demand parameters used have been determined practically and not theoretically – that is, derived from surveys of actual situations.

The conclusions which can be drawn from the use of the Model are normally expressed in terms of the number and size of facilities required at particular locations to meet the estimated level of demand. However, the Model does not predict actual usage of those facilities: this is determined by range of factors, not least management and promotional policies, programming and the quality or attractiveness of the facility concerned. Nonetheless, the FPM will generate broad estimates of potential throughput which may be useful when considering policy options.

3. The Purposes of the Model

Scottish local authorities have a statutory duty to ensure adequate provision for sport and recreation in their area. However, there is no definition of 'adequate' within legislation. In any case it will vary from one area to another and from urban to rural authorities. Nevertheless, National Planning Policy Guideline 11: Sport, Physical Recreation and Open Space specifically endorses the use of the FPM for statutory planning purposes and states that:

'Every council should include in its development plan its views on the level of provision required for sporting and physical recreation facilities, including parks, open spaces, pitches and playing fields.'

The main applications of the Model are:

National planning for sport

sportscotland has used the Model as an input to its own strategies such as Sport21. It is also used for appraising bids for funding for major projects and applications to the **sport**scotland Lottery Fund under the Sports Facilities Programme. The Scottish Office also took account of the Model's conclusions for golf when drawing up Planning Advice Note 43: Golf Courses and Associated Developments.

Local sport and recreation planning

The model has a variety of uses in the development of sports strategies and facility planning, such as:

- as an aid to developing a strategy for capital investment in sport and recreation facilities and making effective use of available resources
- as a method of helping to determine the most appropriate location and scale for proposed new facilities
- as a method of assessing priorities: for example, should a sports hall or artificial turf pitch have higher priority?
- to assess the potential impact of proposed new facilities on local participation patterns; for example, the extent to which the users of an existing facility might transfer to a new one
- as an objective method of appraising community aspirations: for example, many local communities want a swimming pool
- investigating the facility implications of different assumptions about the impact of sports development policies
- to help identify the potential impact of management policies, for example in relation to opening hours
- to provide an input to feasibility studies for individual projects when estimating demand and therefore possible use.

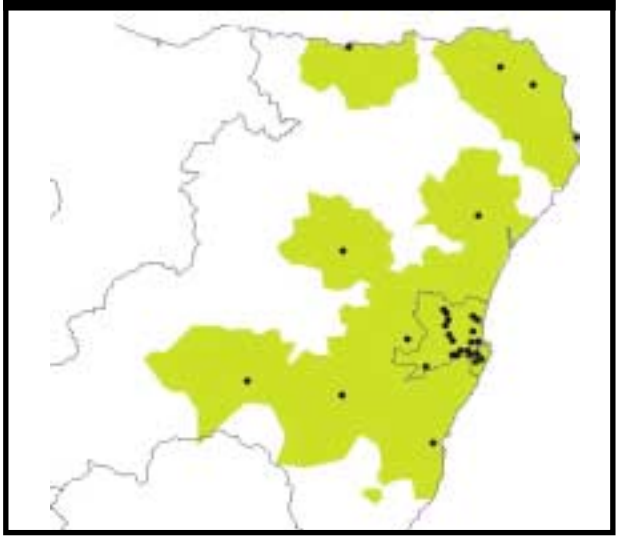
However, the Model output must be interpreted with great care when used at the level of the individual project because of specific local circumstances.

Statutory land use planning

The FPM can be used to help derive an appropriate local level of provision of facilities for an area in a way which is sensitive to population structure and distribution. This is best done in conjunction with a Playing Field Strategy. The land use requirements of this level of provision – for example, the need for sports pitches – can then be included in Structure or Local Plans.

The Model can also be used to estimate the impact of planned or forecast changes in the population structure and distribution, for example as a result of major housing developments. As such it can provide a key input when negotiating planning agreements for developer contributions to the provision of new or improved sports facilities.

SQUASH COURTS IN ABERDEENSHIRE: Locations and Catchment Areas



4. Initial Policy Decisions

Before the Model can be run the following decisions need to be made:

- identify the geographical area to which the model results and subsequent policy decisions will apply – the 'policy area'. It will usually be defined by local government administrative boundaries
- because demand can normally be both imported from and exported to neighbouring areas, it will be important to include these areas as part of the wider 'study area'.

The inclusion or exclusion of certain facilities is also a key policy decision which must be taken at the outset as it can make a significant difference to the results. The main considerations are:

- the cut-off point for the minimum standard of facilities to be included in the analysis: for example, in an assessment of sports hall provision, should only halls above a predetermined minimum size be included?
- 'fitness for purpose', which may include the age, condition, economic performance and compliance with governing body or other appropriate standards
- whether school and other educational facilities are to be included and if so how much community use can they accommodate
- whether private facilities such as hotel leisure centres and company sports centres should be included
- whether different scenarios should be investigated such as changes to opening hours, opening or closing of facilities, opening school facilities to more community use etc.

5. Description of the Model

The Model uses visits rather than bookings as its basic unit of measurement because some facilities, such as swimming pools, are used on a casual basis. Furthermore, for some facilities a booking may be for almost any number of people. Visits are not the same thing as users or visitors however because one individual user may make several visits within whatever time period is used for estimating demand – usually a week.

The Model has three key components:

- Demand – the estimated number of visits from people wanting to use a particular type of facility in the normal peak periods per week (the times when most people want to participate and therefore when facilities are under the greatest pressure – usually after 5pm on weekdays and at weekends during the peak season).
- Supply – the aggregate capacity of those facilities available in the area during the normal peak periods per week to accommodate the estimated demand for each sport.
- The catchment areas of different facility types.

These components are summarised below and also in greater detail in the separate Technical Appendix.

Example: Squash Courts

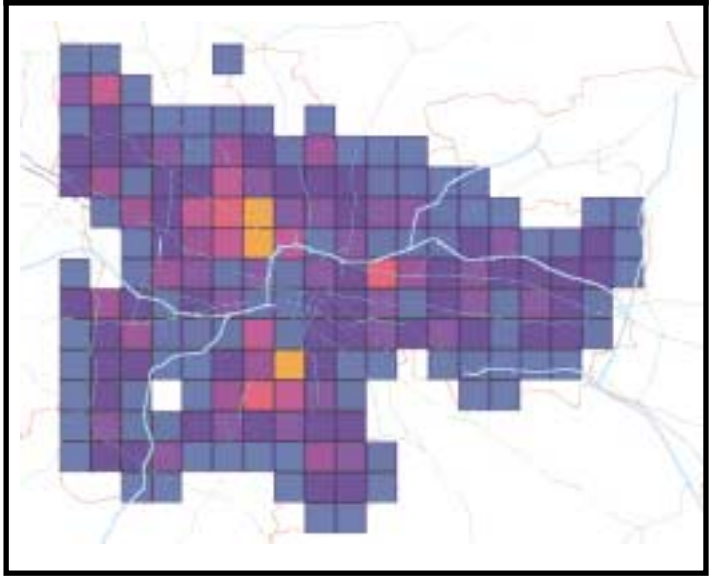
The facility type which is simplest to analyse using the model is the squash court because of the set numbers of players (two per court) and pre-determined booking periods. For example, in a typical week, if 120 people each wish to play for one hour on a midweek evening between 6 and 10 p.m. the demand will be for 120 hour long visits to a squash court. Between the same times, one court will have a capacity to 'supply' two players x four bookings per night or a total of 40 visits over five nights from Monday to Friday. The comparison of demand (120 visits per week) with supply (40 visits per court per week) indicates three courts will be required, provided all the players are within the catchment area of those three courts. However, if some live outside the catchment of all three courts, additional courts may be needed. Deciding the exact number of courts to provide, and where, will then be a matter of judgement in the light of available resources.

Estimating Demand

Different sports have different participation profiles. Moreover, within each sport some individuals participate more frequently than others. Some participation does not require access to purpose built facilities at all, e.g. jogging, but when facilities are required, resident demand for each particular type is a function of:

- the total number of people resident within the study area and its demographic structure
- their demand rate – the proportion of people living in the study area who will wish to use the facility
- their desired frequency of visit – how often they wish to visit their chosen facility type
- the proportion of these visits which arise in the normal peak periods per week.

SPORTS HALLS IN GLASGOW: Unmet Demand



The Demand Rate and Frequency of Visit

Research studies have shown that 70-80% of the difference between individuals' participation in sport is determined by age and gender. Other factors such as ethnicity, social class, disposable income, educational level, personal mobility, general wealth and friendship groups can also be important for any individual but the larger the population, the more these differences average out.

In order to be sensitive to the local population structure, the FPM therefore uses five age sectors for both men and women, which can be thought of as broadly reflecting specific patterns of participation in sport and physical recreation:

- 0-15 years Children
- 16-29 years Active young adults
- 30-39 years Thirty-somethings, many with young children
- 40-59 years Mature adults and 'empty nesters'
- 60+ years Older people

Demand has three elements:

- Participation or expressed demand: people actually taking part in sport.
- Latent demand: when individuals want to take part in a sport but are prevented from doing so by one or more constraints, such as a lack of appropriate facilities.
- Potential demand: demand which might be created in the future, for example by sports development initiatives or by changes in lifestyle or the popularity of different sports.

sportscotland collects data on demand for different types of sports facilities by undertaking surveys in areas of 'good supply' (i.e. where all those wishing to participate have the opportunity to do so). This involves user surveys at facilities, analysis of management information and household interviews. A rolling programme of surveys ensures that the demand parameters up kept up to date.

Participation and latent demand can be respectively measured and estimated. Potential demand, on the other hand, can be neither measured nor predicted accurately. Accordingly the demand parameters which **sport**scotland has derived relate only to participation and latent demand. Together they represent the level of demand, in terms of both rates and frequencies of participation, which it believes should be used as a basis for future planning. It is possible for individual users of the Model to substitute their own demand parameters; however, **sport**scotland strongly recommends that they should always be based on well planned and conducted local research studies.

As the Model relies on census data, the demand estimates relate only to the resident population and not visitors such as tourists. This is not a significant issue, the main exception being golf courses in some parts of the country. The potential demand for facilities from tourists in such cases would therefore have to be considered separately.

The Normal Peak Periods per Week

Just as demand for sport and recreation is not uniform throughout the population, neither is it uniform throughout the week or year. Instead, a high proportion of demand is nearly always concentrated into a limited number of peak hours per week during the playing season. For badminton, squash and basketball the peak times are midweek evenings; for rugby they are Saturday afternoons; and for hockey and golf the weekend. These are the times of peak demand – the periods when most people have the time and want to participate. This translates into the peak usage times at most facilities, creating particular pressures on them at the same peak times each week. It is thus sensible to plan for the normal peak periods.

The Demand Formula

The technical appendix to this Digest gives a worked example of a demand calculation, based on the formula

Demand (visits per week in the normal peak hours) = P x DR x FV x VNP

P = Resident population numbers in each of the ten age/gender sectors
DR = The demand rate for each age/gender sector
FV = The frequency of visit for each age/gender sector
VNP = Proportion of visits in normal peak hours

The smallest geographical area for which census data are available is the Output Area and the use of these data (and updates from the General Register Office for Scotland) allow the spatial distribution of demand to be identified. It is calculated separately for the ten age-gender sectors and the results aggregated to calculate the total demand from each Output Area. The demand from each Output Area within the study area is then aggregated to calculate the total demand.

Calculating Supply

The Model calculates the capacity of existing or proposed sports facilities to accommodate visits in the normal peak hours per week. There are two main components in the supply calculation:

- at one time capacity: for many activities this is determined by the rules of the sport – for example, ignoring substitutes, a football pitch is used by 22 players. Other facilities such as swimming pools do not have a comparable fixed capacity but may be subject to constraints on the number of people who can use them simultaneously, for example for reasons of health and safety

- activity time: the typical booking period, length of visit or, in the case of golf courses, the interval between tee times.

These two components are used to calculate the number of visits each facility can accommodate each week in the normal peak periods. The capacity of all the individual facilities can then be added to calculate the total supply in an area for each facility type.

The calculation of supply must be comprehensive and include all facilities which are available or potentially available to meet demand, not only those run by local authorities. If a particular facility is only available to a limited extent, at a school for example, this can be reflected in the supply calculation; equally, the effect of increasing its availability can also be assessed.

The basic supply capacity calculation is:

Supply (visits per week in the normal peak hours) = (C x HANPP)/ADV

C = At one time capacity
HANPP = Hours available in normal peak hours per week
ADV = Average duration of visit

Catchment Areas – the Link Between Demand and Supply

If someone wants to take part in sport but perceives the nearest facility as being too far away, they will be unlikely to use it. The times for which potential users will be willing to travel to particular types of facilities on a fairly regular basis can therefore be used to identify catchment areas. Through research, **sport**scotland has identified typical catchment areas for facilities in both urban and rural areas, and these are key inputs to the Model.

Travel times used in the model are based primarily on journeys by private car as research has shown that most visits to sports facilities are by this means.

For swimming pools, many of the users are children and therefore the catchment area is split into walk-in and drive-in areas. The FPM is also being developed to model local public transport networks.

The Model distributes the demand from each Output Area to all the facilities within whose catchment travel time it falls.

If there is more than one facility available to the residents of a particular Output Area, it does not assume they will always use the one nearest to their home. Instead, it seeks to allocate demand in proportion to available facility capacity. A large facility with a high capacity will therefore attract more demand than a small one with low capacity. This is equivalent to assuming that users will prefer a quiet facility to a busy one so eventually all facilities will be equally busy at peak times in relation to their capacity. For swimming pools and sports halls, the Model has been developed to factor in a distance-decay element to the catchment areas: acknowledging the fact that those living some distance from a facility (though still within its catchment) are somewhat less likely to visit than those living nearby.

When all of the demand is allocated to those facilities within the predefined travel time it is possible to identify 'unmet demand', i.e. demand which cannot be accommodated by existing facilities. This demand can be either within the catchment of existing facilities (i.e. these facilities are estimated to be `full to capacity' and therefore cannot accommodate all of the demand within their catchment) or outside the catchment of existing facilities.

In the former case it is possible to assess whether the existing supply can be increased, for example by changing opening hours or other management policies or extending the facility. In both cases it is necessary to consider whether there is a case for additional provision.

The FPM does not take account of differences in the quality of facilities. It allocates demand on the basis of their size and not their relative attractiveness. It is however possible to weight poor quality facilities so that the FPM effectively assigns them reduced capacities.

6. The Model Results

The Normal Output

The standard Model output is a series of tables and maps which show the extent to which existing facilities meet demand, the catchment areas of existing facilities and areas of unmet demand. They provide:

- an estimate of the demand at each facility in the defined study area in the normal peak hours per week. Where the estimated demand is greater than the facility capacity the model estimates unmet demand; where it is less than the facility capacity, the model estimates spare capacity

- an estimate of the unmet demand over the study area, normally presented as totals for 1km or 5km grid squares for ease of mapping. This is demand which cannot be met at existing facilities

- the likely demand at any proposed new facilities.

All unmet demand within a realistic travel time of any particular location can be aggregated to examine the potential demand for new facilities at that location. This figure can be used to determine the appropriate scale for the new facility.

The Model can also be run with different levels of supply to test the implications of policy options such as choosing from a range of locations for a new facility or closing an existing facility. The options can then be compared both in terms of the level of demand at different locations and the impact on existing facilities. Various scenarios can be investigated.

Example

"What if our sports development team is successful in boosting the demand for hockey by 10%?';

What if we open up school facilities for community use at the weekend?'; or

`What if we give planning permission for 500 houses on a particular site?'

Additional Output

Other output from the FPM includes:

- district summaries, allowing aggregate levels of demand and supply to be compared

- estimates of the import and export of demand from or to neighbouring areas. The Model output might suggest a particular facility is being used by a high proportion of residents from outside a particular local authority area. If this is confirmed it could have a significant bearing on promotional or pricing policies. Alternatively if a significant amount of demand is being exported to a neighbouring area this may indicate a lack of local provision

- crude estimates of annual throughputs of specific facilities. Because the Model estimates demand rather than participation any estimates of throughput must be interpreted with great care. However, they can be regarded as potential throughput, assuming any constraints there may be on local participation can be removed or minimised. In reality it will rarely, if ever, be possible to remove all such constraints and so the Model may estimate higher than achievable throughputs. Nonetheless, a comparison of actual with estimated throughputs may provide a useful guide to the relative effectiveness of management policies at different centres, particularly when related to market research

- estimates of demand from specific geographical areas. This may be particularly important if a local authority or centre is planning to target users from a specific area, such as an area of social need. The Model will provide an estimate of the level of demand in the area which can then be used as an aid to programming and the creation of sports development initiatives

- estimates of the catchment areas of existing and proposed facilities. This can be used to define levels of accessibility for the population of the study area, for example 'x% of the total population live within the catchment area of existing swimming pools'.

7. Interpretation of the Model Results

sportscotland will play a leading role in the interpretation of the results to ensure consistency, objectivity and an understanding of the limitations of the Model.

When interpreting the Model outputs it is essential to remember the following limitations:

- It offers a logical analysis of a dynamic situation based on a number of key assumptions

- Although the Model provides a key objective input to the planning process, it is not a substitute for a comprehensive methodology. It should be seen as a tool for investigating supply and demand in order to assist policy formulation for the provision of facilities, not as a replacement for such a policy

- The Model output is not predictive. Its purpose is to prescribe an appropriate, and hopefully achievable, level of community sports provision for identifiable geographical areas

- It is appropriate for use in connection only with facility planning and not sport planning – it does not offer guidance on areas such as sports development. Nonetheless, it can contribute to the appraisal of the use and performance of existing facilities

- If appraisal highlights a significant gap between the estimated demand and actual participation at under-used facilities, this may point to the need to undertake promotional or sports development initiatives or it may be that the condition or management of existing facilities are constraining participation

- It is essential to identify key issues and set the Model results in a policy context. Appropriate courses of action must be identified and evaluated, some of which will not relate to facility provision but to other issues such as management or sports development initiatives

- The Model output must be interpreted in the light of local circumstances and aspirations.

8. Other Planning Models Available from sportscotland

sportscotland has also developed three other planning models relating to the development of sports facilities for use in specific contexts.

- The Rural Accessibility Model
- The Strategic Network Model
- The Relative Assessment Model

The Rural Accessibility Model

The FPM can be used in any context, but in rural areas with low and possibly scattered population it is likely that the estimated number of visits for any proposed facility will be much less than for a comparable activity in a more densely populated urban area. Providers may then conclude that the needs of urban areas should always have priority. However, residents of rural areas should not be deprived of the opportunity to take part in sport provided some means can be found of making available an affordable level of provision.

In rural areas, therefore, the key issues may be accessibility (defined in this context as being able to reach a suitable facility within an acceptable travel time) and equality of opportunity. If so, planners may require a means of identifying those locations which will be most efficient in terms of achieving accessibility to the highest number of people.

For example, a particular local authority may determine that 60% of an area's population should live within 30 minutes travel by car and 90% within 60 minutes of a particular facility. There will be many possible locations for proposed new facilities. In the interests of economy it will normally be desirable to select those which will result in the smallest network of facilities which comes closest to achieving the policy aim. The Rural Accessibility Model can be used to identify these locations, assuming every user always goes to the nearest facility.

The Strategic Network Model

The FPM has been designed to allow the effective planning of a range of sports facilities for normal community use. For some facilities, however, providers may have set policy objectives such as the attraction of major competitive events. These particular policies may dictate that particular 'strategic' facilities should be larger than the FPM might suggest. Furthermore, the channelling of certain types of demand to specific facilities, such as high intensity coaching, will distort both the pattern of demand within an area and the capacity of certain facilities in ways which the basic FPM can not accommodate.

If strategic facilities are to be effective they must be within an acceptable travel time of as many people as possible. The Strategic Network Model can be used to identify a network of locations which maximise accessibility.

Accessibility to Swimming Pools in Glasgow

The Relative Assessment Model

This version of the Model has been developed to assess how different parts of the study area compare in terms of their access to sports facilities. It can be used, for example, to assess accessibility to swimming pools by calculating the amount of pool water available to people which can be expressed as square metres of water per 1000 visits or more simply per 1000 people. It does this by identifying all the pools within a set travel time of where people live and then applying a distance decay function to assess the probability of people travelling to these pools. The use of a distance decay function acknowledges that people are more prepared to travel short distances to access a facility but, as travel time increases, less and less people will be prepared to make the journey and so demand decays. It can also take account of the accessibility of facilities by different modes of transport using information on car ownership from the Census.

This Model can be used to identify areas whose residents are relatively disadvantaged in terms of their access to sports facilities. Unlike the standard FPM, however, it does not take into account capacity constraints at facilities. It has been developed for swimming pools and sports halls but could be extended to other types of facilities as appropriate survey data becomes available.

9. Access to the Models

The FPM and its copyright, is owned by **sport**scotland. It contracts running of the FPM to PDMS, the Planning Data Management Service at the University of Edinburgh. Any local authority or other organisation wishing to use the FPM should contact **sport**scotland. In view of the high costs of developing and servicing the Models **sport**scotland normally makes a charge to cover the costs involved in data set up and processing but provides interpretation of the output at no extra charge.

Using the Models is not simply a matter of commissioning **sport**scotland to undertake the necessary work. Instead there should be a formal partnership in which both parties have clearly defined roles and in which the client will have to provide significant input. The roles of the partners will normally be:

Client

- define the purpose of using the Models and the policy and study areas
- agree the planning issues to be tackled and the place of the Models in the proposed planning methodology
- agree the cost of using the Models and commission **sport**scotland to oversee the necessary analysis and provide an initial interpretation of the results
- agree the policy guidance and parameters
- identify any required changes to population data
- check supply data (note that this can be onerous as it is necessary to collect details of all facilities to be analysed and not only those owned or operated by the local authority; **sport**scotland can provide extracts from its own facility database to assist this process)
- understand and agree the interpretation of the initial results from **sport**scotland
- integrate the Model's interpretation with the remainder of the planning process.

sportscotland

- provide initial advice on the possible use of the Models for the defined planning issues and explain the methodology
- agree a realistic programme of work with the local authority and PDMS
- provide an initial sports facilities data set for checking and validation
- agree and specify the required Model analysis and output
- instruct PDMS
- prepare and present an initial interpretation of the Model results
- advise on the use and interpretation of the Model results.

PDMS

- undertake the Model analysis in accordance with the agreed specification and work programme.

*For further information please contact **sport**scotland.*

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