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This Appendix is to be read in conjunction with the British Orienteering Rules of Orienteering.

1. Introduction

1.1   Purpose

1.1.1   This Appendix provides guidance to Planners, advice on best practice and defines the levels of Technical Difficulty which are used to specify course standards.

1.1.2   The key planning objectives are to produce safe, fair and enjoyable courses that meet the defined requirements for a given event.

1.1.3   This Appendix cannot replace training and previous experience. All Planners are encouraged to read relevant literature and to attend training courses.

1.2   Support

1.2.1   The British Orienteering website contains a large volume of support material aimed at Planners; see the Mapping and Planning section of the Event Officials Handbook and the Planners section under Officials.

1.2.2   Of particular interest are the British Orienteering Course Planning Guide by Graham Nilsen as well as other online individual documents on how to plan colour coded courses, e.g. Advice on planning orange courses

2. General

2.1   Formats

2.1.1   Whilst the fundamentals of course planning are common to all types of event different styles are required for the different formats of the sport:

- Long distance (Classic) Orienteering usually takes place in forest terrain. The emphasis is on route choice to test a competitor's ability to use a variety of navigational techniques in physically challenging terrain over an extended period of time.

- Middle distance Orienteering usually takes place in forest terrain. The emphasis is on continuous map reading in the terrain, Technical Difficulty, a relatively high density of controls, changes in direction and micro rather than macro route choices. Runnable terrain of Technical Difficulty 4-5 is most suitable, the more technical the better.

- Sprint Orienteering usually takes place in urban or semi urban areas and parkland, the technical standard is enhanced by the need interpret the map and make decisions at high speed. The emphasis is on continuous decision making, map

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reading and interpretation, and route choice rather than finding controls. A clear and very accurate map and clear control descriptions and placements are essential. Safety is a key consideration where traffic may be encountered. A more detailed mapping standard is used in comparison to Long or Middle formats.

- Ultra-long distance Orienteering takes place over long distances with mostly long legs and complex route choices. There will be a low density of controls, and those that require high technical skills to find are less likely to be included since this discipline aims to test stamina more than technical skills.

- Urban events (City Races) usually take place in urban terrain, predominantly towns or city centres, using public open spaces, pedestrian and trafficked streets as well as parks. The same mapping standard is used as for Sprint Orienteering but the courses are longer and with more emphasis on macro route choice.

- Night Orienteering has an emphasis on route choice and successful navigation to controls. The Technical Difficulty of a course is enhanced by darkness and this needs to be considered when planning. Legs and control placements that are fair during the day may be less so at night.

- Relay Orienteering provides head to head racing between teams whilst maintaining sufficient uncertainty that competitors need to continually map read. Parallel or gaffled courses are planned. All the teams in a particular race need to cover exactly the same legs in total, but not in the same order.

- Score Orienteering has an emphasis on choice of routes, selecting which controls to visit within a set time period. The challenge is enhanced if most of the competitors cannot visit all of the controls. The controls can be visited in any order and need not all be visited.

- String Orienteering is designed for children who are not yet able to undertake an orienteering course. A continuous string joins controls on distinctive features. The map is large scale and may have been simplified. The terrain may be either forest or semi urban but there will be an absence of traffic.

2.2   Technical Difficulty

2.2.1   The Technical Difficulty of a course is based on the skills needed to successfully complete it. The aim of the Planner should be that the courses at an event show a progression of Technical Difficulty, with each course providing the appropriate level of technical and physical challenge. The specification of each level of Technical Difficulty is included in the table below.

2.2.2   The Technical Difficulty of a course is that of its hardest component. For example, a course is of Technical Difficulty 3 if it has just one element at that difficulty, even though the rest may be easier. However, a well-designed course of Technical Difficulty 3 will have most, if not all, of its elements at that difficulty.

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2.2.3   It is recognised that many orienteering areas in Great Britain do not allow courses of the higher technical difficulties to be planned on them. In order to allow events to take place whilst still adhering to the guidelines a compromise has therefore to be accepted. In such areas Planners will plan at the correct level as far as the terrain allows. For example, if the area only allows courses with a Technical Difficulty up to 4 to be planned, then those courses requiring Technical Difficulty 1, 2, 3 and 4 can be planned exactly to the guidelines. Those courses specified as requiring Technical Difficulty 5 should then be planned at Technical Difficulty 4, accepting the fact that they will be less than ideal but the best that the terrain will allow.

2.3   Definitions of terms:

2.3.1   Route choice: The option of taking more than one (sensible) route between two controls. This may, for example, be a choice of two different path routes, or one of a long path route versus a direct cross-country route.

2.3.2   Decision point: A point at which you can no longer continue along the same path or other line feature, for example being required to turn right at a path junction. A decision point on a leg does not imply a route choice. There may only be one obvious route between controls, but this could require the ability to navigate at a number of decision points.

2.3.3   Collecting feature: A large feature beyond a control which, when reached, confirms to the competitor that they have completely passed through an area of ground. A collecting feature is usually a line feature.

2.3.4   Relocating feature: A distinct feature that may be used by a competitor to relocate their position on the map.

2.3.5   The table which follows defines the planning requirements for each level of Technical Difficulty (TD), together with the orienteering skills which are to be tested.

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TD	Routes and route choice	Numbers of controls	Control sites	Relocation and cost of errors	Skills required (letters refer to the 'Step by Step' skill categories)
1	Route all along tracks and paths. No route choice, including at the start banner.	Controls reasonably close together (200m maximum). A control at every Decision Point.	Paths, tracks – junctions, crossings and bends. Features on paths e.g. bridges, gates, to give variety to the control descriptions. The banner and punches at a control should be sited in the direction of the next control.	Should not be required.	Understand map colours and commonly used symbols. (A) Orient the map using compass and terrain. (A) Orienteer along tracks and paths. (B) Make decisions at 'Decision Points' identified by a control site. (B)
2	Route all along obvious line features such as tracks, paths, fences, walls, rivers, large ditches and very distinct vegetation boundaries. No route choice, including at the start banner.	Controls fairly close together (350m maximum). Leg lengths should not vary greatly. A control is not needed at every Decision Point, but there should be at most two Decision Points per leg.	On the line feature along which the competitor is travelling. Obvious other features close to, with the banner clearly visible from, the line feature, e.g. knolls, boulders.	Generally should not be needed, but can be done by re-tracing the route along line features.	Orienteer along obvious line features (handrails). (C) Make decisions at a 'Decision Point' without the assistance of a control to identify it as such. (C) Leave a line feature to go to a visible control site near to it, then return to that line feature. (D)

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TD	Routes and route choice	Numbers of controls	Control sites	Relocation and cost of errors	Skills required (letters refer to the 'Step by Step' skill categories)
3	For controls not on a line feature then a route along line features to an obvious attack point should be possible. Simple route choices.	Relatively frequent controls on short courses, less so on longer ones. Legs of different lengths.	Any line feature. Prominent point or contour features, but these should be easily found from an attack point on a line feature.	There should be a collecting feature close behind all controls that are not on a line feature.	Corner cutting. (E) Basic use of compass to allow short cuts through the terrain between two line features. (F) Navigate a short leg on a rough compass bearing to a control on or in front of a collecting feature. (F) Simplification of legs with several Decision Points. (G) Make simple route choice decisions. (H)
4	Significant route choices.	As few as necessary for good planning based on the length of the course. Legs of different lengths.	Any feature which does not require map reading through complex contour detail.	Collecting features behind all controls. Errors should not be expensive in terms of time lost.	Navigate long legs on a rough compass bearing to a collecting feature. (I) Fine orienteering on short legs using an accurate compass bearing. (J) Navigate for short distances using simple contour features – hills, ridges, large re-entrants and spurs. (K)
5	Significant route choices. Course should force regular changes in technique, e.g. long route choice followed by short intricate legs.	As above.	Any feature, particularly those demanding careful map-reading to locate – but the banner must not be hidden, nor the control excessively isolated (no Bingo controls).	Control sites far from obvious relocating features. Errors can result in a large time loss.	Navigate for long distances using only major contour features – hills, ridges, large re-entrants and spurs. (L) Read and interpret complex contours. (M) Concentration over long distances. (O) Recognition of indistinct features. (O) Use all the different skills and adapt speed and technique to changes in the terrain and orienteering difficulty.

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2.4 Physical difficulty

2.4.1   The nature of the terrain over which the competitors will be running should be considered for all age groups. Areas of dense undergrowth (e.g. rhododendrons) or which are difficult underfoot (e.g. boulder fields), do not test the orienteering skill of 'running navigation' and so should be avoided. Steep descents, whilst acceptable for M/W21, should be kept to a minimum for younger juniors and older veterans. Features such as fences which may provide significant obstacles for younger competitors, or less agile age groups, should be taken into account.

2.4.2   All courses should avoid offering route choices that may tempt competitors into physical danger.

2.5 Planning for juniors

2.5.1   Competitors in the younger junior age categories need every encouragement to enjoy the sport, and the feeling of failure engendered by a lengthy spell lost in the forest is a major disincentive to younger competitors. Children are attempting a sport that provides a considerable mental challenge, and the need for courses to match their abilities cannot be over-stressed. Even at large events, designed to find a true champion as the winner, it has to be remembered that junior competitors are far more erratic in their performance than seniors. Simple and short courses planned to the correct technical standards and recommended lengths are the only way to produce an evenly grouped results list whilst still finding the true champion.

2.5.2   Planning the junior courses is the most difficult task in terms of providing courses of just the right technical and physical level. If conflict between length and technical standard occurs the course must be to the correct technical standard. The junior courses should always be taken into account when locating the start and finish of the event to ensure that these courses are not too long and can be taken through suitable terrain.

2.5.3   White standard courses: In some areas (particularly open areas) because of the absence of paths it may still be possible to plan a white course of suitable standard by substituting prominent line features. If competitors are required to cross open ground a taped route must be used. This must start and finish at controls. See also *Advice on planning white courses* on the British Orienteering website for further guidance.

2.6 Planning for seniors

2.6.1   Older orienteers are technically just as capable as the M/W21 competitors. It is therefore totally inappropriate to combine their courses with the technically easier junior courses just because the recommended course lengths are similar, unless the terrain prevents courses of high Technical Difficulty being set.

2.6.2   Any restriction on their physical ability relates largely to speed over the ground. One result of this is in the interpretation of the phrase 'control sites far from obvious re-

locating features'. A control that may not be considered far from an attack point or obvious relocating feature by an M21 competitor may impose a significant time penalty for a W65 who has to return to the attack point and make a second approach.

2.7   Course lengths

2.7.1   For certain events and competitions, the required lengths of courses are defined in terms of course length ratios relative to a base course. In general, the most reliable method of approach is:

(i) decide on an appropriate length for one base course (usually M21E or Black) with reference to the expected winning time of that course.

(ii) use the course length ratios and recommended class combinations given in tables found later in this Appendix, or in the appropriate Competition Rule, to calculate the required lengths of all the other courses. The course length ratios have been calculated from the results of a large number of events over several years.

2.7.2   Various methods for deciding on the length of the base course are available; all however have their pitfalls. The main methods are:

i)   Comparison with previous events. Often the most reliable method - most British areas have already been used for orienteering; even new areas usually have similar terrain locally with which they can be compared.

ii)   Points to note:

- was the entry representative, or were all the good runners elsewhere?
- runnability changes as vegetation matures
- undergrowth has more effect in the summer/autumn
- was the planning for the previous event unusual in e.g. the amount of climb or track running required? If the problem is climb, calculate a 'corrected' (i.e. flat equivalent) length by adding 1 km to the length for every 100 m of climb – and remember to take it back off again when you plan your own courses.

ii) Test running – planning a course and then running it. This is often difficult to interpret, as:

- navigating to a feature is generally much easier in an event, when there is a flag on it
- running solo tends to be slower than running competitively
- extrapolating the speed of a top runner from that of the test runner is not always straightforward.

2.7.3   Applying the course length ratios – points to watch out for:

- M21 (or Black) probably uses the whole area. The shorter courses use only part of it, and this might be more or less runnable, or steeper/flatter, than the average
- rough terrain has a greater effect on the running speed of younger and older competitors than of M21s

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- older competitors are significantly affected by steep terrain, particularly downhill
- older competitors find dense tree growth more of an obstacle – suppleness decreases with age
- There is no magic formula for allowing for these variables.

2.7.4 Do not try to adjust the course length to cater for the expected quality of the competitors, e.g. by making a particular course longer because you know that some top orienteers will be entering. Similarly, if the running times on a particular course turn out to be longer than intended simply because the quality of the entry was low, this does not mean that the course was planned too long!

2.7.5 For other events, the required lengths of courses are as given in the sections to follow or the relevant Competition Rule. Whilst it is possible to go through the above exercise for choosing course lengths based on M21L, it is usually sufficient simply to plan within the range of normal lengths given in the guidelines.

2.8   Control descriptions

2.8.1 Control descriptions need to be prepared for all courses in accordance with the "International Specification for Control Descriptions" (2004 edition) available from the Document Library section of the IOF website (www.orienteering.org) and also from the British Orienteering website.

2.8.2 Note: particular care needs to be taken with Sprint/Urban control descriptions where inaccuracy e.g. on which side of a wall, can a very significant effect on a race.

2.9   Electronic punching

2.9.1 A computer file, which exactly matches the course file, needs to be prepared for input into the electronic punching system software. The Planner will need to liaise with the results team about the way in which electronic course data is to be transferred to the event software.

2.10   Safety, risk assessment and mitigation

2.10.1 Planners should read British Orienteering Rules of Orienteering and Appendix E: Event safety. In particular, the dangers of a particular type of terrain will generally be known to local inhabitants and to local orienteers so check with them, e.g. for old mine shafts etc. Don't assume that all orienteers will follow the best route between controls; even hazards well away from the expected routes should be thought about.

2.10.2 The Planner must take into consideration all hazards that competitors may encounter. Dangerous features must be marked with yellow or yellow and black tape if they are likely to be visited by any competitors and are not already clearly marked on the grounds as dangerous.

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2.10.3   The Organiser and Planner will need to pay particular attention to competitors under 16 years of age. In the eyes of the law, the Organiser is acting in loco parentis for children under the age of 16 and must be seen to take precautions over and above what a careful parent would take for the safety of their children.

2.10.4   Juniors aged under 16 on the day of the competition are not permitted to compete on courses where there are possible routes that require competitors to cross roads with significant traffic unless appropriate traffic management arrangements have been put in place. A disclaimer signed by a parent or guardian does not circumvent this rule.

2.10.5   Appropriate traffic management arrangements may include: mandatory safe routes, crossings controlled by lights/marshals, the use of under-passes/bridges, timed out legs etc.

2.10.6   Roads with traffic management that induce low speeds (eg 15mph as on many campuses) are acceptable for under 16s as are minor roads with good visibility, but busy public roads are not.

2.10.7   The Planner's input into the risk assessment form should be completed at an early stage, e.g. at the draft planning stage.

3. Planning and the map

3.1   Course drawing

3.1.1   Courses may be prepared by computer using a variety of course drawing software packages. Whilst the detail of operation of them may be different the principles remain the same

3.1.2   The courses file is likely to go through several versions in the lead up to the event and the Planner and Controller should agree on a version control procedure to prevent old versions being mistaken for the current one.

3.1.3   All data, courses for printing, loose control descriptions, maps for control hanging and checking etc. should be generated from the same version of the same file

3.1.4   Representative courses should be checked independently to ensure that the length generated by the system is correct

3.1.5   Late changes should be avoided. If these are necessary additional checks should be included

3.1.6   Care needs to be taken that map detail that is clear on the computer (e.g. at x8 magnification) is clear on the printed map

3.1.7   Physical checks of maps are still necessary (e.g. overlapping block colours) and the Controller may ask to see proof copies of the map before printing is approved.

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3.1.8   Course markings on the map are to be as laid down in the 'International Specification for Orienteering Maps 2000', (booklet available from British Orienteering Office or its website) or to download from the IOF website at http://www.orienteering.org.

3.1.9   Sprint maps must be drawn to the "International Specification for Sprint Orienteering Maps" (ISSOM – latest edition is 2007); download from the IOF website at http://www.orienteering.org; also available from the British Orienteering website.

3.1.10   The courses and map corrections must be printed in purple (red/violet) colour. All line thicknesses should be 0.35mm at 1:15,000 scale. The course drawing software should do this automatically but this should be confirmed nevertheless. Ditto for 3.1.11/12/13 which follow.

3.1.11   The starting point of the course must be marked by an equilateral triangle of side 7mm which points towards the first control. The centre of the triangle shows the precise position of the start point.

3.1.12   The site of each control must be shown as the centre of a circle of 6mm diameter. The circle should be broken to avoid obscuring important detail. If the control feature is shown on the map symbolically rather than to scale, the circle should be drawn so that the symbol lies exactly at the centre. For example, if you use the east side of a dot knoll as a control site then the circle should be drawn around the middle of the symbol, not the east side of it. However, if a feature such as a knoll shown by a ring contour (i.e. hill) is drawn to scale the centre of the circle must be drawn where the control site is (e.g. N side), rather than at the centre of the ring contour.

3.1.13   The position of the finish must be shown as the centre of two concentric circles of diameter 5mm and 7mm. Where a course uses two or more maps with map exchanges then the finish should be shown on all maps.

3.1.14   If the controls are to be visited in a prescribed order they must be numbered in that sequence. The numbers must be printed on a north-south axis, with the top north, and should be positioned so that they do not obscure any important detail.

3.1.15   Control numbers should be positioned so as to obscure as little map detail as possible but close enough to the circle as to avoid ambiguity. Particular care should be taken when controls are close together e.g. crossovers and there is possibility for confusion e.g. control numbers 6 and 9 are close.

3.1.16   If the controls are to be visited in a prescribed order they must be joined by straight lines. These lines should be broken to avoid obscuring important detail, diverted to meet up with compulsory routes, broken or diverted to indicate compulsory crossing points, and broken or diverted to avoid lakes, 'out of bounds', or other areas that cannot be crossed by competitors. If necessary lines joining controls along tracks should be offset to avoid obscuring the track on the map.

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3.1.17   Where lines joining two pairs of controls cross one another, it is conventional to break the line which joins the controls to be visited later in the course where it crosses the "earlier" line.

3.1.18   The convention for Sprint/Urban maps (ISSOM drawn) is that the lines drawn between control circles are not broken or diverted around impassable objects but go straight across them instead, the exception being where they are diverted to pass through a compulsory crossing point.

3.1.19   Any part of the course where the competitor is obliged to follow a compulsory route must be clearly and precisely indicated on the map by a dashed line.

3.1.20   Forbidden routes (e.g. busy roads, railways) must be shown by a chain of purple crosses.

3.1.21   A boundary which is forbidden for competitors to cross and which affects the courses must be marked as "forbidden to cross" on the competition map. This don indicated by overprinting the mapped feature with a solid purple line, except on Sprint/Urban maps where solid overprinted lines are only used where a boundary has changed from being passable to impassable and the map does not show this. Crossing points must be indicated by curved brackets.

- Whether crossing points are mandatory or not needs to be unambiguous both in the event details and on the map
- Where there is only one valid option for crossing an "un-crossable" boundary, the line between controls should be bent to this point. In this instance there should be no advantage to be gained by not using the crossing point and it is unlikely that the previous control will be more than 100m before the boundary. If in doubt consider placing a control at the crossing point.
- Where there is more than one option for crossing the "un-crossable" boundary, the line between controls should be broken either side of the boundary. Sufficient crossing points should be provided such that there is an option on all likely route choices and no competitor will gain an advantage by not using a crossing point.

3.1.22   The dimensions of the course overprint symbols on 1:10,000 (or larger scale) maps should be as defined in 3.1.10 to 3.1.13 above. However, for competitions in which both 1:10 000 and 1:15 000 maps are used, the size of the overprint symbols on the 1:10 000 maps may be 150% greater than on the 1:15 000 maps. Factors to consider:

- Overprint symbol enlargement allows the control descriptions to be the same on the 1:15,000 and 1:10,000 maps if both are used at the same event.
- Some courses, such as White, and some types of event, such as Sprint races, may have controls relatively close together. Enlarged circles might overlap to an unacceptable degree.

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3.1.23   Editing, which will also include the breaking of control circles and connection lines, should be an important part of the process of preparing the master course overprint file. Time should be allowed for this in the planning timetable.

3.1.24   Maps should be clearly identified by course number and/or title so that competitors can identify their courses.

3.1.25   If maps are not printed on waterproof material they should be protected by a sealed plastic covering of at least 250 gauge (or a heavier gauge if the map unit size exceeds A4) prior to issue to competitors.

3.2   Measurement of distance and height climb

3.2.1   Course length measurements are defined in the rules and quoted to ± 0.1km (e.g. 5.5km, not 5.50km). This is the shortest route which a competitor could reasonably possibly take, irrespective of whether or not the competitor would be sensible to do so.

3.2.2   Height climb measurements are defined in the rules and quoted to ± 5m. That is, it is measured "along the shortest sensible route", which may well be longer than the route used for measuring the course length. This is not necessarily the "optimum route", nor is it necessarily the route which the Planner would take: it is simply the course length route extended to avoid those hills/valleys etc which all competitors will also avoid. The intention is to give a figure which is representative of the climb which a competitor could actually undertake. As a rule of thumb, if a competitor will go over it, count it in; if you're not sure whether they'll go over it, count it in – only discount it if you are certain that all the competitors will go around it.

3.3   Map corrections

3.3.1   If corrections have to be made to the map subsequent to map printing, and it is not possible to manually alter the printed map, copies of the map showing no information other than any map corrections essential to the competition should be displayed and available for study before the start line. An adequate number of maps detailing the map corrections are to be made available.

4. The start

4.1.1   The position of the centre of the start triangle shown on the map must be on a mapped feature and identified on the ground by a control banner. For TD1 and 2 courses this feature will need to be a path or similar feature; also it should not be at a junction or intersection, as this would require the beginners to decide which way to go without knowing where they have just come from.

4.1.2   Where a map exchange is used the position of the start of the next section of the course must be marked on the ground by a control banner if it is a significant distance away from the previous control site.

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4.1.3   The position of the start kite or master maps should be such that competitors waiting to start cannot see, or have minimum visibility, of the route taken by competitors who have started. The map issue point should be such that all competitors will visit the start kite.

4.1.4   The courses should be designed so that competitors are unlikely to return past the start on their way to the first control site.

4.1.5   For larger events, or with chasing starts the pre-start and start needs to be of sufficient size to accommodate the number of competitors.

5. The finish

5.1.1   The precise location of the finishing line must be clear to all competitors approaching it.

5.1.2   It is important to ensure that the finish is easily located. A common last control with taped route to the finish will ensure this. This will also ensure that competitors all approach the finish from the same direction and improve the flow of competitors through the finish system.

5.1.3   As a minimum the finish should consist of a punch unit and control flag, preferably with a prominent finish banner. There should be no possibility of a competitor being unable to find the finish. Sufficient punching units should be used to cope with the likely frequency at which competitors will finish.

5.1.4   The finish should be manned as it may often be the first place where a competitor can report that an injured competitor needs urgent assistance or a problem with the course.

6. Control site layout

6.1.1   The control banner should be visible from all directions of approach unless the control description indicates otherwise.

6.1.2   Punching stations should be clearly visible and easily accessible from the control banner.

6.1.3   A back up system should be provided should the electronic system fail. For SI this is usually a pin punch and for EMIT a paper card in the brick. However, this is optional for level C/D events.

6.1.4   At competitions of level B and above, the layout of the control banner, control code and marking devices should be the same for all controls. For major races a model control should be displayed at the pre-start.

6.2   Proximity of controls

6.2.1   The British Orienteering Rules of Orienteering allow some flexibility in how close together controls can be sited. This should be used with caution (and not at all in World

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Ranking Events: IOF rules have "shall" not "should"): it should always be possible for a competitor to decide from the map which control to go to without needing to rely on the control code, and to do so quickly. If you are going to infringe either limit, you will need a good reason which you are able to justify to competitors. Remember also that it may be necessary to allow for a little drift in the positioning of the circle on the overprint, and that in a detailed part of the map there may be some distortion in order to fit the symbols into the space available – if in doubt, measure the distance on the ground.

6.2.2   There is usually little point in putting controls closer than 30m apart – competitors are, in effect, navigating to the same point. An exception might be e.g. when one control is on a point feature, used by a technical course, the other on a path junction on a yellow course or for a road crossing.

6.2.3   The 60m limit may also be breached for younger junior courses e.g. when two successive decision points come close together on a white course (but this will require the circles to overlap even at 1:10 000, so consider taking the course elsewhere) particularly if the course is not being overprinted).

6.2.4   Be pessimistic when interpreting 'features which appear similar in the terrain', e.g. paths and rides are obvious ones not to mix, but some vegetation boundaries have faint paths along them (or develop them as an event takes place). 'Similar features' does not just mean those mapped with the same symbol: it is not fair, for instance, to use both a fence and a ruined fence. Neither is it acceptable to claim that e.g. boulder (2 m) NE side and boulder (1 m) SW side are different: they are both boulders.

6.2.5   Note that the situation is different for courses on larger scale maps, e.g. Sprint/Urban using ISSOM maps, where minimum separations are smaller.

6.2.6   Other combinations to avoid include
- stream/ditch/linear marsh
- depression/pit/shallow re-entrant
- knoll/spur
- re-entrant/side of a spur
- re-entrant/a feature (e.g. a marsh) in a re-entrant
- essentially, do not use any close combination of controls which could be confused by competitors.

6.3   Control site selection

6.3.1   Consideration should be given to the fairness of control sites
- The control feature should be visible from within 10m or 10% of the distance from the nearest attack point. E.g. a lone pit in the middle of a large block of flat forest is unlikely to be fair but if related to the shape of the ground would be.

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- On no account should the control flag be hidden. Thus control flags should usually be placed at the side of pits or small depressions, and not "hidden" at the bottom.
- Particular care should be taken over the fairness of controls in low visibility/ "green" forest
- Spectator controls need to be chosen to give ready visibility to the maximum audience. A return to the assembly area works well but care needs to be taken that competitors can enter and leave without confusion
- Note: drinks points and road crossings need to be established early in the planning cycle in conjunction with the Organiser

7. Running speed ratios

7.1.1   In order to obtain appropriate course lengths the running speed ratios for the different age classes need to be known. The table below shows the figures used in calculating the course length ratios and are based on data from long distance races.

Age Class	Speed ratio	Age Class	Speed ratio	Age Class	Speed ratio	Age Class	Speed ratio
M10	0.74	W10	0.73	M45	0.86	W45	0.67
M12	0.70	W12	0.62	M50	0.82	W50	0.63
M14	0.80	W14	0.65	M55	0.77	W55	0.58
M16	0.84	W16	0.67	M60	0.70	W60	0.53
M18	0.90	W18	0.70	M65	0.64	W65	0.48
M20	0.92	W20	0.71	M70	0.57	W70	0.42
M21	1.00	W21	0.82	M75	0.50	W75	0.35
M35	0.92	W35	0.71	M80	0.41	W80	0.28
M40	0.89	W40	0.69	M85	0.32	W85	0.19

7.1.2   Note that M/W10 ratios are for TD2 courses and M/W12 ratios are for TD3 courses.

7.1.3   Speed ratios for older competitors in Sprint/Urban races tend to be slightly higher due to the less physical nature of the courses.

8. Long distance course planning

8.1 Terrain

8.1.1   The terrain should be appropriate for the level of competition and the courses planned.

8.2 Map

8.2.1   The map should be produced to the latest version of the International Specification for Orienteering Maps (ISOM). The map scale should be 1:15,000 or 1:10,000. See also Appendix D: Mapping. Subject to the provisions in Schedule 1, Appendix D Mapping 2014.

8.3 Planning philosophy

8.3.1   The Long distance profile is physical endurance. It takes place in a non-urban (mostly forested) environment, and aims at testing the athletes' ability to make efficient route choices, to read and interpret the map and plan the race for endurance during a long and physically demanding exercise [IOF Competition Rules].

8.3.2   The format emphasises route choices and navigation in rough, demanding terrain, preferably hilly. The control is the end-point of a long leg with demanding route choice, and is not necessarily in itself difficult to find [IOF Competition Rules].

8.3.3   The Long distance may in parts include elements characteristic of the Middle distance with the course suddenly breaking the pattern of route choice orienteering to introduce a section with more technically demanding legs [IOF Competition Rules].

8.4 Colour-coding

8.4.1   Courses are designated by colour, where each colour represents a course of a certain length and level of Technical Difficulty (generally the darker the colour the longer or harder the course).

8.4.2   The colours denote relative lengths and not absolute ones. Thus a Blue course might be 6.5 km long at a Long distance event, but just over 4 km at a Middle distance event on the same area.

8.4.3   This ensures a consistency of course standards between events so that someone entering a Blue course at a Long distance event one weekend is encouraged to enter the Blue course at a Middle distance event the following weekend in order to be running the 'right' course, i.e. the one which will produce the appropriate winning time for the competitors on the course.

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8.4.4   A junior novice would be expected to start on either the White or Yellow course, whilst an adult novice would begin with either the Yellow or Orange course depending on their confidence, with progression either towards longer courses with the navigation remaining relatively simple, or on to technically difficult courses up to the appropriate length for their fitness.

8.5   Courses

8.5.1   The organising club will decide which courses are to be provided unless specified in any Competition Rule. Whilst the colour-coded scheme is not intended to restrict a Planner's options, it is essential that if a course is designated as a particular colour then it is of the appropriate length and Technical Difficulty.

8.5.2   In those areas which only provide orienteering of a lower than ideal Technical Difficulty for the Green courses and above, courses up to Light Green are to be planned to the correct absolute standard.

8.5.3   The range of courses offered will depend on the size of the area, terrain, expected number of competitors, etc. clubs should try to provide a range suitable for most abilities.

8.5.4   At larger events it may be necessary to plan parallel courses. For example, if the Blue course is oversubscribed, introduce courses called Blue1 and Blue2. These will be of a similar length and may have a number of common controls

8.5.5   It may not be possible to provide certain colour courses on some areas. For example, a technically difficult area with few or no paths may not allow a White course. Similarly it is difficult to plan a course of Brown or Black length on a relatively small area without undue repetition. However, such an area may be eminently suitable for a Middle distance race provided it meets the Technical Difficulty criteria.

8.5.6   The Black course, if planned, will have an expected elite winning time of 67 minutes.

8.5.7   All other course lengths should be scaled to the length required for this course, which has been allocated a course length ratio of 1.00.

8.5.8   Where no Black course is planned, it is still necessary to determine the length of a nominal Black course with an elite winning time of 67 minutes in order to use the ratios for the other courses. In this instance the winning time on the Brown course by a top standard elite competitor should be 57 minutes.

8.5.9   Course length ratios refer to course lengths which are "corrected" for height climb (by adding 0.1 km for every 10m of climb).

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8.5.10   For the courses of Technical Difficulty 1, 2 and 3 it is more important that the course is of the correct TD than of the correct length. It will often be the case that the nature of the terrain forces the course length away from the precise course length ratios given above.

8.5.11   The lengths shown in the table below are intended as a guide. For easy areas the course lengths will be towards the top end of the range. For difficult or more physical areas the course lengths will be towards the bottom end of the range.

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8.6 Table showing suggested courses and classes for a Long distance event

Colour	Course length ratio M21=1.00	Min/Max length	TD	Men's classes	Women's classes	Men's short and B classes	Women's Short and B classes
Black	1.00	10.0-14.0	5	M21			
Brown	0.85	8.5-12.0	5	M35 M40			
Short Brown	0.69	7.0-10.0	5	M18 M20 M45 M50	W21	M21S	
Blue	0.56	5.5-7.5	5	M16 M55 M60	W35 W40	M35S M40S	
Short Blue	0.45	4.5-6.5	5	M65	W18 W20 W45 W50	M50S M20S M45S M50S	W21S
Green	0.39	3.5-5.0	5	M70	W16 W55 W60	M55S M60S	W35S W40S
Short Green	0.33	3.0-4.0	5	M75 M80 M85 M90	W65 W70	M65S	W18S W20S W45S W50S

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Very Short Green	0.28	2.5-3.5	5		W75 W80 W85 W90	M70S M75S M80S M85S	W55S W60S W65S W70S
Light Green	0.30	3.0-4.0	4	M14	W14	M16B	W16B
Long Orange	0.5	5.0-7.0	3			M21N	
Orange	0.25	2.5-3.5	3	M12	W12	M14B	W14B W21N
Yellow	0.22	2.0-2.9	2	M10	W10	M12B	W12B
White	0.14	1.0-1.9	1			M10B	W10B

9. Middle distance course planning

9.1   Terrain

9.1.1   The terrain should be appropriate for the level of competition and the courses planned. It is possible to use smaller areas for Middle distance races since the longest course is to be planned such that a top elite-standard competitor would win it in 30-35 minutes.

9.1.2   However areas should ideally be chosen which offer more technical interest than needed for standard events with Long distance courses.

9.2   Planning philosophy

9.2.1   The Middle distance profile is technical. It takes place in a non-urban (mostly forested) environment with an emphasis on detailed navigation and where finding the controls constitute a challenge. It requires constant concentration on map reading with shifts in running direction out from controls [IOF Competition Rules].

9.2.2   The element of route choice is essential but should not be at the expense of technically demanding orienteering. Very long legs should be avoided but small and medium scale route choice is encouraged. The emphasis should be on high speed running where competitors need to adjust their speed for the complexity of the terrain. There will be a higher density of controls than for an equivalent Long distance race.

9.2.3   The course require speed-shifts e.g. with legs through different types of vegetation [IOF Competition Rules].

9.2.4   TD5 courses should be planned to be as consistently technically difficult as possible.

9.3   Colour-coding

9.3.1   Courses are designated by colour, where each colour represents a course of a certain length and level of Technical Difficulty (generally the darker the colour the longer or harder the course).

9.3.2   The colours denote the relative lengths and not absolute ones. Thus a Blue course might be 6.5 km long at a Long distance event, but just over 4 km at a Middle distance event on the same area.

9.3.3   This ensures a consistency of course standards between events so that someone entering a Blue course at a Long distance event one weekend is encouraged to enter the Blue course at a Middle distance event the following weekend in order to be running the 'right' course, i.e. the one which will produce the appropriate winning time for the competitors on the course.

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9.3.4   A junior novice would be expected to start on either the White or Yellow course, whilst an adult novice would begin with either the Yellow or Orange course depending on their confidence with progression either towards longer courses with the navigation remaining relatively simple, or on to technically difficult courses up to the appropriate length for their fitness.

9.4   Courses

9.4.1   The organising club decides which courses are to be provided unless specified in any Competition Rules. Whilst the colour-coded scheme is not intended to restrict a Planner's options, it is essential that if a course is designated as a particular colour then it has to be of the appropriate length and Technical Difficulty.

9.4.2   In those areas which only provide orienteering of a lower than ideal Technical Difficulty for the Green courses and above, courses up to Light Green are to be planned to the correct absolute standard.

9.4.3   The range of courses offered will depend on the size of the area, terrain, expected number of competitors, etc. clubs should try to provide a range suitable for most abilities.

9.4.4   At larger events it may be necessary to plan parallel courses. For example, if the Blue course is oversubscribed, introduce courses called Blue1 and Blue2. These will be of the same length and may have a number of common legs.

9.4.5   It may not be possible to provide certain colour courses on some areas. For example, a technically difficult area with few or no paths may not allow a White course.

9.5   Course length ratios

9.5.1   The Black course equates to the M21E course at the British Middle distance Championships with an expected elite winning time of 30-35 minutes.

9.5.2   All other course lengths should be scaled to the length required for this course, which has been allocated a course length ratio of 1.00. Winning times for all the courses of Technical Difficulty 5 should then be within the same range of 30-35 minutes.

9.5.3   Course length ratios refer to course lengths which are "corrected" for height climb (by adding 0.1 km for every 10m of climb).

9.5.4   For the courses of Technical Difficulty 1, 2 and 3 it is more important that the course is of the correct TD than of the correct length. It will often be the case that the nature of the terrain forces the course length away from the precise course length ratio given above.

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9.5.5   The lengths shown in the table below are intended as a guide. For easy areas the course lengths will be towards the top end of the range. For difficult or more physical areas the course lengths will be towards the bottom end of the range.

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Table showing suggested courses and classes for a Middle distance event

Colour	Course Length Ratio Black=1.0	Min-Max Length (km)	Technical Difficulty	Men's Classes	Women's Classes
Black	1.00	5.0 -7.0	5	M21 M35 M40 M18 M20	
Brown	0.83	4.1-5.8	5	M45 M50	W21 W18 W20
Blue	0.75	3.7-5.4	5	M55 M60 M16	W35 W40
Green	0.60	3.0-4.2	5	M65 M70	W16 W45 W50
Short Green	0.50	2.5-3.5	5	M75 M80 M85	W55 W60 W65
Very Short Green	0.40	2.0-2.8	5		W70 W75 W80 W85
Light Green	0.45	2.2-3.1	4	M14	W14

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Orange	0.30	1.5-2.1	3	M12	W12
Yellow	0.30	1.5-2.1	2	M10	W10
White	0.20	1.0-1.5	1		

10. Sprint course planning

10.1   Terrain

10.1.1   The terrain should be appropriate for the level of competition and the courses planned. Sprint races are usually staged in very runnable park or urban (streets/buildings) terrain. Occasionally, some fast runnable forest may be included.

10.1.2   One key aspect of the philosophy of Sprint Orienteering is that it is to be clearly different in nature from the Middle and Long disciplines. Thus it is not merely be a very short version of them, so terrain which is densely forested should not be used for Sprint competitions.

10.1.3   Suitable terrain is often provided by University campuses, ornamental public parks, old town/city centres, modern high density housing estates, etc. Note that where the terrain involves significant traffic, it may not be possible to provide courses for the youngest competitors.

10.1.4   The area need not be particularly large and terrains occupying as little as 0.33 km^2 have been successfully used for major Sprint races.

10.1.5   In addition, the terrain should not be so steep that it prevents high speed running.

10.1.6   Areas so complex that it is doubtful whether a competitor can interpret the map at high speed should be avoided (e.g. when there are complex three-dimensional structures).

10.2   Map

10.2.1   The map should be produced to the latest version of the International Specification for Sprint Orienteering Maps (ISSOM). The map scale should be 1:4000 or 1:5000. See also Appendix D: Mapping. It is crucial that the map is correct and possible to interpret at high speed, and that the mapping of features that affect route choice and speed are accurate.

10.2.2   In addition, it has become traditional at the largest events to give older competitors a map at a larger scale and with enlarged symbols sizes too. Although not an IOF standard, maps at 1:3000 have been used with success.

10.2.3   In non-urban areas, the correct mapping of conditions reducing running speed, both to degree and extent, is important. In urban areas, barriers hindering the passage must be correctly represented and drawn to size [IOF Competition Rules].

10.2.4   Many orienteers are not yet as familiar with ISSOM (International Specification for Sprint Orienteering Maps – available for download from the IOF website) symbols as they are for the more usual ISOM ones. In particular, it is crucial that competitors are familiar

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with the symbols used for impassable features, including impassable walls, fences and vegetation. This could be achieved by printing these in any pre-event details.

10.2.5   Planners and Controllers should note that it is conventional to join control circles with straight lines on the course overprint, even where the lines go through buildings or across lakes, etc. This avoids having a confusing spaghetti of otherwise bent lines covering the map. The exception is where there are mandatory crossing points where the usual rules apply, and lines must be broken or bent to go through them.

10.2.6   It is also more important than usual to break control circles on the overprint where they obscure important details. For example, the best way into a control may be via a narrow passageway, but if its existence is obscured by the overprinted circle, then many will not see the route.

10.3   Planning philosophy

10.3.1   The Sprint profile is high speed. It tests the athletes' ability to read and translate the map and to plan and carry out route choices running at high speed. The course is to be planned so that the element of speed is maintained throughout the race. The course may require climbing but steepness forcing the competitors to walk should be avoided [IOF Competition Rules].

10.3.2   Finding the controls should not be the challenge; rather the ability to choose and complete the best route to them. For example, the most obvious way out from a control should not necessarily be the most favourable one. The course should be set to require the athletes' full concentration throughout the race. An environment that cannot provide this challenge is not appropriate for a Sprint race [IOF Competition Rules].

10.3.3   In order to achieve the aims set out above:

- Average leg lengths will be short, 120m to 180m being typical.
- Have frequent changes of direction (small crossover loops are good).
- Long legs may be set, as long as their execution involves a high rate of decision making along the way.
- Dog legs can provide good challenges too; but avoid the possibility that they may cause clashes between incoming and outgoing runners if space is restricted.
- Aim to make every leg pose a route choice challenge, especially in urban terrain. Control sites will often have to be positioned with great care in order to achieve this.

10.3.4   The higher density of controls sites needed for a Sprint race sometimes means that controls are closer together than they are in Middle/Long races. The minimum separation of controls is correspondingly less than for Middle/Long races and is 15m (or 30m if the control sites are on similar features). These separations are measured around impassable objects rather than being straight line distances.

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10.4   Technical Difficulty

10.4.1   The definitions of the levels of Technical Difficulty are defined with forest based orienteering in mind and so do not easily equate to Sprint races. The nature of the terrain often limits the maximum Technical Difficulty to TD3 since control sites are rarely far from line features. Senior courses should be planned to be as technically difficult as possible, however the perceived Technical Difficulty is often higher than this because of the high decision making rate needed to execute a Sprint course satisfactorily.

10.4.2   This also means that the provision of courses which are perceived to be TD1 may not be possible.

10.5   Courses

10.5.1   The winning time for Sprint races should be between 12 and 15 minutes, and this is one of the defining characteristics of the Sprint discipline.

10.5.2   Where an age-class competition is held, the winning time for each age class should be 12 – 15 minutes. This can be achieved by designing a set of courses of differing lengths such that groups of age classes of similar ability run the same courses

10.5.3   Course lengths are given as straight line distances, but due to the nature of Sprint orienteering the actual distances run by competitors will usually be greater. In a typical urban/campus environment actual distances may be 30-40% more than the straight line distance. The table below gives suggested courses for a typical urban sprint. Note that if a technical (e.g. complex forest) area is used then separate TD3/4 courses should be provided for the M/W12/14 competitors.

10.6   Table showing suggested courses and classes for a Sprint event

Course	Course Length Ratio Course1=1	Min-Max Length (km)	Technical Difficulty	Men's Classes	Women's Classes
1	1.00	2.5-2.9	3-5	M21 M16 M18 M20 M35 M40	

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				M45	W16
2	0.85	2.1-2.5	3-5	M50	W18
					W20
					W21
					W35
3	0.75	1.8-2.2	3-5	M14	W40
				M55	W45
				M60	W50
4	0.60	1.5-1.8	3-5	M12	W14
				M65	W55
				M70	W60
					W65
5	0.50	1.2-1.5	3-5	M75	W70
				M80	W75
				M85	W80
					W85
6	0.40	1-1.2	2	M10	W10

10.7   Practical planning considerations

10.7.1   Controls may need to be manned to avoid vandalism, especially if the terrain is public and/or spectators are allowed on the course.

10.7.2   Alternatively, controls may need to be securely fixed to permanent objects such as street furniture. Where this is done using ties through the hole in SI boxes, care needs to be taken to ensure it is still possible to punch easily.

10.7.3   It may be necessary to use marshals at road crossings and at exits from narrow passageways, alerting spectators of approaching competitors and making sure that competitors are not hindered.

10.7.4   Take care to ensure that the gates etc which are marked as open on the map are actually open on the day of the race.

10.7.5   Courses must be planned to avoid tempting competitors to take shortcuts through private property and other out-of-bound areas.

10.7.6   Where there are impassable walls/fences/hedges, there is a high risk that some competitors may try to cross them. Provision of warning tapes and marshals should minimise this.

10.7.7   Controls on impassable features (walls, fences, etc.) may tempt competitors to cross, lean over or reach through the impassable feature. Such control sites are best avoided but, if this is not possible, great care is needed with control (and punch) placement to avoid the possibility of competitors gaining an unfair advantage. At events using maps produced to the ISSOM specification, impassable features (as defined in ISSOM) must not be crossed by any part of a competitor's body. Hence it is NOT permitted to reach through or lean over such a feature to punch at a control site.

10.7.8   Where a busy road has to be crossed it is preferable to plan a long leg crossing the road diagonally in order to give competitors more opportunities to cross safely.

10.7.9   Where possible road crossings should be avoided towards the latter stages of a course when competitors are becoming fatigued.

10.7.10   Consider requiring competitors to wear numbered bibs as a way of aiding identification by marshals in the competition area.

10.7.11   Having the start and finish in the same arena makes for a good atmosphere.

10.8   Control descriptions

10.8.1   Control descriptions are often more important than at forest-based events. Many control sites have a number of possible descriptions. The Planner should try to use the most obvious description; the challenge of Sprint orienteering is to navigate (and chose routes) between controls rather than decipher complicated control descriptions.

10.8.2   Loose control description sheets should be available to competitors.

10.9   Safety when sprint in urban terrain

10.9.1   Urban terrain brings additional potential risks to the event and it is essential that a proper risk assessment is carried out before the event is sanctioned.

10.9.2   Urban races present a number of potential hazards not usually present at forest based events.

10.9.3   The most significant of these is the presence of public roads and moving vehicles. These hazards are to be carefully assessed as part of a comprehensive risk assessment early in

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the organising process. Risks can usually be reduced by holding the event on a Sunday morning.

10.9.4   Where deemed appropriate, busy roads may need controlled crossings with marshals and/or timed-out controls.

10.9.5   Particular attention needs to be given to courses planned for competitors under 16 years of age. In the eyes of the law, the Organiser is acting in loco parentis for children under the age of 16 and must be seen to take precautions over and above what a careful parent would take for the safety of their children.

10.9.6   This means that courses for juniors under the age of 16 must not have any routes that require competitors to cross roads with significant traffic unless appropriate traffic management arrangements have been put in place. A disclaimer signed by a parent or guardian does not circumvent this rule.

10.9.7   M/W16s will only be permitted to "run up" if they are 16 or over on the day of the race.

10.9.8   Competitors should be reminded of their responsibility towards their personal safety and the safety of others at the start of the course.

11. Urban

11.1.1   Urban races are usually staged in town and city centres, utilising public open spaces, pedestrianised and trafficked streets and parks.

11.1.2   The terrain is similar to that which might be used for Sprint races but the nature of the race is different in that courses will be longer than for a Sprint, with many longer legs incorporating multiple route choices.

11.1.3   The terrain should be appropriate for the level of competition and the courses planned. Any area of the 'built environment' may be suitable for Urban events. The best areas tend to be the older areas of towns and cities which have developed haphazardly over many years.

11.1.4   Areas with a regular grid type pattern of streets are less suitable. Consideration should always be given to the issue of traffic.

11.1.5   Both vehicular and pedestrian traffic can be a major issue and careful consideration (via the use of a risk assessment) needs to be undertaken before selecting an area for an Urban race.

11.2   Map

11.2.1   The map should be produced to the latest version of the International Specification for Sprint Orienteering Maps. The map scale should usually be 1:5000 or 1:4000. See also Appendix D: Mapping. It is crucial that the map is correct and possible to interpret at high speed, and that the mapping of features that affect route choice and speed are accurate.

11.2.2   In non-urban areas, the correct mapping of conditions reducing running speed, both to degree and extent, is important. In urban areas, barriers hindering the passage must be correctly represented and drawn to size [IOF Competition Rules].

11.2.3   Many orienteers are not yet as familiar with ISSOM (International Specification for Sprint Orienteering Maps – available for download from the IOF website) symbols as they are for the more usual ISOM ones. In particular, it is crucial that competitors are familiar with the symbols used for impassable features, including impassable walls, fences and vegetation. This could be achieved by printing these in any pre-event details.

11.2.4   Planners and Controllers should note that it is conventional to join control circles with straight lines on the course overprint, even where the lines go through buildings or across lakes, etc. This avoids having a confusing spaghetti of otherwise bent lines covering the map. The exception is where there are mandatory crossing points where the usual rules apply, and lines must be broken or bent to go through them.

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11.2.5   It is also more important than usual to break control circles on the overprint where they obscure important details. For example, the best way into a control may be via a narrow passageway, but if its existence is obscured by the overprinted circle, then many will not see the route.

11.3   Planning philosophy

11.3.1   Urban racing doesn't fit exactly any of the IOF recognised formats, but is most closely associated with the Sprint discipline.

11.3.2   Sprint Orienteering tests the athlete's ability to read and translate the map in complex environments, and to plan and carry out route choices whilst running at high speed [IOF Competition Rules].

11.3.3   Urban racing should test athletes in the same way as much as possible but, with a lower control density, will also inevitably test running speed over longer distances. Longer legs should, wherever possible, include an element of route choice and require competitors to continuously navigate during the leg, so punishing anyone who 'switches off', even for a short while. Longer legs should ideally be interspersed with a series of shorter legs.

11.4   Technical Difficulty

11.4.1   The definitions of the levels of Technical Difficulty, as used in the following table, are explained in Section 14. These were defined with forest based orienteering in mind and so do not easily equate to Urban races.

11.4.2   The nature of the terrain usually limits the maximum Technical Difficulty to TD3 since control sites are rarely far from line features. Senior courses should be planned to be as technically difficult as possible, which will generally mean TD3.

11.5   Courses

11.5.1   The organising club decides which courses are to be provided unless specified in any Competition Rule. The suggested range of courses indicated in the table below should be sufficient for most Urban events.

11.5.2   Courses for those under 16 should only be provided if there is a suitable area of traffic-free (or virtually traffic-free) terrain. It is vital that it is advertised in the pre-event publicity which courses are offered and which age classes are recommended to run which course.

11.5.3   The course lengths given in this table are for guidance only. There is no obligation to stick to the recommendations, but the ratios do give an indication of what different age classes expect in relation to the Open Men. Large variations from the recommendations should be highlighted in the event advertising to help prospective competitors make a decision before entering.

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11.5.4   Course lengths are given as straight line distances. Obviously, due to the nature of Urban races, the actual distances run by competitors will usually be considerably greater. If these variations differ significantly between courses, this should be taken into consideration when determining course lengths. Lines between controls on the map need only be bent where competitors have to use a compulsory crossing point. Care needs to be taken when editing the course overprint to ensure control circles and lines are sufficiently broken such that no important detail is obscured.

11.5.5   Guidance should be given on the entry information as to the approximate distance competitors will actually be expected to run.

11.6   Table showing suggested courses and classes for an Urban event

Course	Course Length Ratio Black=1	Min-Max Length (km)	Technical Difficulty	Men Classes	Women Classes
1 Black	1.00	6.0-10.0	3	Men Open (M18-35)	
2 Brown	0.83	5.0-8.0	3	Veteran Men (M40+)	Women Open (W18-35)
3 Blue	0.67	4.0-6.5	3	Super Veteran Men (M55+)	Veteran Women (W40+)
4 Green	0.50	3.0-5.0	3	Ultra Veteran Men (M65+)	Super Veteran Women (W55+)
5 Short Green	0.40	2.5-4.0	3		Ultra Veteran Women (W65+)
6 Light Green	0.50	3.0-5.0	3	Junior Men (M16-)	Junior Women (W16-)

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7 Yellow	0.35	2.0-3.5	2	Young Junior Men (M12-)	Young Junior Women (W12-)

11.7   Practical planning considerations

11.7.1   Controls may need to be manned to avoid vandalism, especially if the terrain is public and/or spectators are allowed on the course.

11.7.2   Alternatively controls may need to be securely fixed to permanent objects such as street furniture. Where this is done using ties through the hole in SI boxes, care needs to be taken to ensure it is still possible to punch easily.

11.7.3   It may be necessary to use marshals at road crossings and at exits from narrow passageways, alerting spectators of approaching competitors and making sure that competitors are not hindered.

11.7.4   Take care to ensure that the gates etc. which are marked as open on the map are those that are actually open on the day of the race.

11.7.5   Courses must be planned to avoid tempting competitors to take short cuts through private property or other out-of-bounds areas.

11.7.6   Where there are impassable walls/fences/hedges, there is a high risk that some competitors may try to cross them. Provision of warning tapes and marshals should minimise this.

11.7.7   Controls on impassable features (walls, fences, etc) may tempt competitors to cross, lean over or reach through the impassable feature. Such control sites are best avoided but, if this is not possible, great care is needed with control (and punch) placement to avoid the possibility of competitors gaining an unfair advantage. At events using maps produced to the ISSOM specification, impassable features (as defined in ISSOM) must not be crossed by any part of a competitor's body. Hence it is NOT permitted to reach through or lean over such a feature to punch at a control site.

11.7.8   Where a busy road has to be crossed it is preferable to plan a long leg crossing the road diagonally in order to give competitors more opportunities to cross safely.

11.7.9   Where possible road crossings should be avoided towards the latter stages of a course when competitors are becoming fatigued.

11.7.10 Consider requiring competitors to wear numbered bibs as a way of aiding identification by marshals in the competition area.

11.7.11 Having the Start and Finish in the same arena makes for a good atmosphere.

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11.8   Control descriptions

11.8.1   Control descriptions are often more important than at forest-based events. Many control sites have a number of possible descriptions. The Planner should try to use the most obvious description; the challenge of Urban orienteering is to navigate (and chose routes) between controls rather than decipher complicated control descriptions.

11.8.2   Loose control description sheets should be available to competitors.

11.9   Safety issues

11.9.1   These guidelines should be read in conjunction with British Orienteering Rules of Orienteering and Appendix E: Event safety.

11.9.2   Urban terrain brings additional potential risks to the event and it is essential that a proper risk assessment is carried out before the event is sanctioned

11.9.3   Urban Orienteering presents a number of potential hazards not usually present at forest based events.

11.9.4   The most significant of these is the presence of public roads and moving vehicles. These hazards are to be carefully assessed as part of a comprehensive Risk Assessment early in the organising process. Risks can usually be reduced by holding the event on a Sunday morning.

11.9.5   Where deemed necessary, busy roads may need controlled crossings with marshals and/or timed-out controls.

11.9.6   Competitors should be reminded of their responsibility towards their personal safety and the safety of others at the start of the course.

11.9.7   Particular attention needs to be given to courses planned for competitors under 16 years of age. In the eyes of the law, the Organiser is acting in loco parentis for children under the age of 16 and must be seen to take precautions over and above what a careful parent would take for the safety of their children.

11.9.8   Juniors aged under 16 on the day of the competition are not permitted to compete on courses where there are possible routes that require competitors to cross roads with significant traffic unless appropriate traffic management arrangements have been put in place. A disclaimer signed by a parent or guardian does not circumvent this rule.

11.9.9   Appropriate traffic management arrangements may include: mandatory safe routes, crossings controlled by lights/marshals, the use of under-passes/bridges, timed out legs etc.

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11.9.10   Roads with traffic management that induce low speeds (eg 15mph as on many campuses) are acceptable for under 16s as are minor roads with good visibility, but busy public roads are not.

11.9.11   The Planner's input into the risk assessment form should be completed at an early stage, e.g. at the draft planning stage.

12. Relay course planning

12.1   Terrain

12.1.1   The terrain should be appropriate for the level of competition and the courses planned. It should offer some route choice possibilities, preferably with reasonably complex terrain.

12.1.2   Typically Relay Orienteering takes place in non-urban and mainly forested areas. Open areas may be used but should be of suitable complexity such that they allow runners to lose contact with others.

12.1.3   Terrain with continuous good long distance visibility does not allow competitors to pass each other during the race and turns the competition from a navigational challenge into a physical one.

12.1.4   There should be sufficient variety of control sites in the area to allow different sites to be selected for different courses.

12.2   Map

12.2.1   The map should be produced to the latest version of the International Specification for Orienteering Maps (ISOM). See also Appendix D: Mapping. The map scale should usually be 1:10,000. Subject to the provisions in Schedule 1, Appendix D Mapping 2014.

12.3   Planning philosophy

12.3.1   The Relay is team competition. It takes place in a non-urban (mostly forested) environment. The format is built on a technically demanding concept, more similar to the concept of the Middle than the Long distance.

12.3.2   Some elements characteristic of the Long distance, like longer, route-choice legs should occur, allowing competitors to pass each other without making contact [IOF Competition Rules].

12.4   Laps

12.4.1   Courses should be planned such that competitors cannot easily follow fellow competitors in the same class.

12.4.2   Assuming 3 person teams, for small events it may be sufficient to plan three courses A, B and C and to randomize the allocation of laps to teams.

12.4.3   This gives 6 possible permutations for team / lap allocations: ABC, ACB, BAC, BCA, CAB and CBA

Appendix B: Course planning

12.4.4   For larger events it is better to divide individual courses into two or more sections. The simplest option is to have 3 first parts A, B and C, a common middle control and 3 second parts a, b and c.

12.4.5   The combinations can be Aa, Ba, Ca, Ab etc. Any one team must complete overall laps containing one part A, one part B etc. This ensures that all teams complete the same overall course during the event. It also separates the groups of runners doing (for example) part A as after the common control only one third of the group will carry onto the same second part. This option gives rise to 9 maps with 36 permutations, for example one team may run Ab, Ba and Cc, another Ac, Bb and Ca.

12.4.6   This is generally more than sufficient to separate teams during the competition and it is rare that more complex gaffling of courses is necessary. It is a good idea to select the common control with care such that it is not immediately obvious to competitors that the courses divide following that point. So a control at a compulsory crossing point would not be an optimum common control.

12.5   Gaffling

12.5.1   Sufficient different laps should be planned so that teams are not all running the same course at the same time, in other words such that competitors will need to navigate successfully in order to complete their course.

12.5.2   The likely numbers of teams in any one class will indicate how much the Planner needs to gaffle laps and how many courses need to be planned for each class.

12.5.3   Gaffling may range from minimal (where only two or three different courses are needed for a 3 person relay) to complex (where courses may split at one or more common controls and 9 or more different maps may be used to cover different combinations).

12.5.4   In most cases laps need to be very similar in overall length and physical difficulty and be of the same Technical Difficulty. Some classes at events such as the JK or Harvester, have laps of differing length and/or Technical Difficulty, and the Planner must consult the relevant Competition Rule.

12.6   Fairness

12.6.1   Fairness between laps is crucial to good Relay course planning. Planners often create lap variations by grouping control sites, however it is not good planning to have groups of controls visible from each other as this tends to reduce navigational challenge, leading to a "hunt the right number" approach.

12.6.2   Conversely if three different first controls are in radically different directions from the start then runners can immediately identify the sub-group that they are competing against for the first part of their lap.

Appendix B: Course planning

12.6.3   Early on in courses runners are often best separated by having different leg lengths but in the same general direction from the start.

12.6.4   Head-to-head racing is an important element in Relay events and, in particular, individual laps should have similar challenges in the later part of the course.

12.6.5   Consequently it is not good practice to have significant differences in leg lengths or physical / Technical Difficulty between controls in the very late stages of any lap. If control site options are limited towards the end of courses, it is acceptable to have controls common to all laps.

12.7   Control sites

12.7.1   As for all orienteering competitions, control sites must be fair in all aspects. In Relay events competitive pressure, especially following mass starts, can mean that competitors may make assumptions regarding "their" control sites.

12.7.2   Sites must therefore be unambiguous and any possibility of confusion with other similar sites (whether on the map, description or on the ground) should be avoided at all costs.

12.7.3   Careful consideration of control locations, descriptions and codes should be made.

12.8   Loading

12.8.1   Mass starts lead to packs of runners in the early stages of any competition. The flow of runners through a particular site should be assessed as well as the overall numbers visiting the site. Higher than expected numbers of runners passing through a control at any one time can result from multiple courses using the same site. Examples would be a site which is the second or third control on a course being used by a later starting course as a first control, or a common control, especially if after a "collecting feature" such as a crossing point.

12.8.2   Adequate punch units will be needed for the maximum expected flow and the actual location of these also needs careful placement such that all can be used simultaneously.

12.8.3   The actual control location for a heavily used site should also be considered. A steep slope or restricted access (such as between boulders) is not suitable for high competitor flow.

12.9   Changeover and assembly area

12.9.1   The location and design of the changeover area is crucial to a successful Relay event. It should be adjacent to, or within, the competition area in order to reduce dead running at the start and end of laps.

12.9.2   It is preferable to design the changeover such that waiting competitors are able to see their incoming runner in sufficient time to get to the handover point.

Appendix B: Course planning

12.9.3　The spectator element is very important to a good Relay event, so there should be enough space to also allow spectators to see incoming runners, preferably from the last control onwards.

12.9.4　Larger events such as JK or British Championships should provide additional spectator "value" either by including spectator control(s) or radio control links into a commentary system.

12.9.5　Commentators need to be able to see incoming runners and therefore the siting of the commentary team needs careful consideration.

12.9.6　It is also important that any cabling from spectator or final controls can be routed safely into the commentary position.

12.9.7　It is difficult (but not impossible) to provide the above in a totally flat field but locations where a broad re-entrant, or concave slope are present will provide the best assembly areas.

12.9.8　A convex slope will significantly restrict line of sight for all concerned and is best avoided.

12.9.9　Mass starts inevitably lead to packs of runners exiting the assembly area at one time, so very narrow or steep downhill legs to the first controls are likely to be dangerous.

12.9.10　Sufficient distance should be given for the mass start to spread out before runners meet a potential obstruction or hazard.

12.9.11　All of these considerations need close collaboration between the Planner and Organiser, with approval by the Controller, before detailed course planning can be started. It is therefore important that the location is agreed very early on in the planning process, preferably with a site visit of all of the relevant parties.

12.9.12　The actual handover area also needs careful planning. If at all possible waiting pen(s) for runners should be placed so that waiting competitors can identify their incoming team-mate.

12.9.13　They also need to allow everyone in the pen to see, not just the tall competitors at the front of the group, so a gentle downhill slope is ideal.

12.9.14　Consider having a separate area in front of the pen for shorter (younger) competitors. Incoming and out-going runners need to be able to touch and then exit the handover line safely, so incoming runners approach at an acute angle to the line, not head-on and similarly for out-going runners.

12.9.15　Marshals will be required to keep the line clear and also to help those incoming runners whose team-mate does not appear when expected.

Appendix B: Course planning

13. Score course planning

13.1   Terrain

13.1.1   Score orienteering challenges competitors to maximise their score in a pre-defined running time. There are three aspects to the competition:

1. Selecting a subset of all available controls to be visited;

2. Selecting the order in which controls are visited;

3. Route choice and navigation between chosen controls.

13.1.2   A competitor has to optimise all three aspects and may reconsider them as his run evolves.

13.1.3   The terrain should be appropriate for the level of competition and the courses planned. Score events may be staged in any type of terrain.

13.2   Map

13.2.1   The map should be produced to the latest version of the International Specification for Orienteering Maps (ISOM) or International Specification for Sprint Orienteering Maps (ISSOM), as appropriate to the terrain and event. See also Appendix D: Mapping.

13.2.2   The values of controls should be available on the map, either indirectly through control code when there is a simple relationship of value to code, or with the control value being printed with the control code adjacent to the control circle. This latter option causes more map detail to be lost under the overprint.

13.2.3   For two-part courses including a transition, an option is to have separate back-to-back maps for part 1 and part 2.

13.3   Planning philosophy

13.3.1   In a Score event, at the start, and at most controls, the competitor should be presented with a challenge to decide where best to go next. Competitors heading off in many different directions are indicative of a well-planned Score event. It is poor planning if it is obvious to competitors to take a series of controls in a particular order.

13.3.2   In addition to route selection there should also be route choice between neighbouring controls, except for novices who would usually run cross-country courses at Technical Difficulty 2. For these novices it is useful to have a number of controls make up what would approximate to a course of this standard.

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13.4   Technical Difficulty

13.4.1   Score events are unsuitable for young novices who usually participate on Technical Difficulty 1 courses.

13.4.2   A standard cross-country course at Technical Difficulty 1 should be considered as an addition to the Score course(s).

13.5   Time limit

13.5.1   The time limit for adult age classes is usually one hour. For younger or older age classes shorter time limits can be offered.

13.5.2   There should be a penalty for exceeding the time limit for the course. It should be such that it is impossible for a 'net gain' to be achieved by significantly exceeding the time limit. For example, if control values are in the range of 10-40 points, make the penalty 30 points per minute late. It needs to be made clear to competitors how this penalty is applied: 30 points per minute (or part thereof), or 1 point for each 2 seconds.

13.5.3   In an ideal Score event it should not be possible for a good orienteer to visit all controls in the allotted time. In a Score event one of the most important decisions for a competitor to make is which controls to omit. If some competitors can visit all controls in the allotted time then, because they do not have to select a subset of controls to be visited, they are running in a different, easier event than the other competitors. They also miss the tactical decision of going for a control at the risk of losing some or all of those points by finishing late.

13.5.4   If the proposed area is so small that the best competitors might collect all controls within the time limit, the following strategies can be considered:
    a)   Use another area that is big enough.
    b)   Use many controls. More work for the Planner and often results in route choice being replaced by a control-picking exercise. Not recommended.
    c)   Reduce the time availability. In small competition areas it is reasonable to reduce the time limit to 45 minutes; any reduction below that is likely to be unpopular with competitors.
    d)   Divide the course into two parts, using the area twice. A method commonly employed is for competitors to collect all controls in part 1 and then as many as they can in part 2. This approach is flawed because part 1 becomes a free route selection cross-country event, missing the selection of a subset of controls aspect of a good Score event. Better is to have two parallel courses, each a part of a total course which cannot be completed in the time limit. Competitors may transition from part 1 to part 2 at any time and at any location. Once they have punched a part 2 control any further part 1 controls they visit are not scored.
    e)   Run the event as a 'Spanish' score event in which all the controls have to be visited, but in any order, the competitor who completes this in the fastest time

is the winner. This format removes many of the decision making strategies of a traditional score event but may be suitable for some events.

13.6   Control sites

13.6.1   In a Score competition a delay in finding one control when sound technique has been used to locate it can have a devastating effect on a competitor's finely judged route selection. Just because a competitor does not have to punch at a control is not to be used as an excuse for an unfairly difficult control placement.

13.6.2   In a well-planned Score event competitors will arrive and depart from controls in many directions. The control feature and control marker should be capable of being approached safely and fairly from all directions.

13.6.3   Control locations should be commensurate with the Technical Difficulty of the course. It is preferable to have separate courses with control sites and legs between them at the appropriate Technical Difficulty. In most Score events there will be two control sets used for different courses: one for juniors and novices consisting of sites and legs of Technical Difficulty 2 and 3, the second for experienced orienteers with TD 3 to 5 legs.

13.6.4   Beware of planning a course consisting of a ring of controls about a central start and finish. Although competitors may leave the start in a variety of directions, their only route selection thereafter will be to decide whether to run the ring clockwise or anticlockwise.

13.7   Control codes, values and control descriptions

13.7.1   Controls may have different points values. This can be used to give additional complexity to the competition, but be careful not to over-emphasise this. Score orienteering is a navigational challenge, not an obscure mathematical exercise. Control values should not necessarily be correlated with distance from start or with difficulty to find. But be aware that high value controls near the start or finish will attract more competitors than other controls.

13.7.2   The values of controls should be instantaneously recognisable from their control code. An option is to give every control the value of its control code; in this method different subsets of controls are less likely to sum to the same score. Another option is to block values, e.g. all controls with codes between 30 and 39 are value 30, controls with codes between 40 and 49 are value 40, etc.

13.7.3   For courses involving transition (see 13.5.4 above), part 1 and part 2 controls should be clearly distinguishable through their control code; for example part 1 control codes may be in the range 100-199 and part 2 control codes in the range 200-299. If (some) controls in part 2 are given higher scores than those in part 1, early transition is encouraged.

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13.7.4   Control descriptions should be produced in accordance with The British Orienteering Rules of Orienteering except that in the heading the course length and climb should be replaced by the course time limit.

Appendix B: Course planning

14. Ultra-long distance course planning

14.1   Terrain

14.1.1   Ultra-long distance events challenge the competitor to race over a distance which is usually much longer than the guidelines for a 'classic' Long distance event.

14.1.2   Ultra-long distance may take the form of a cross-country or a score event.

14.1.3   This guidance applies to events which are registered with British Orienteering. It does not apply to mountain marathons and adventure races that may also have navigation content.

14.1.4   The terrain should be appropriate for the level of competition and the courses planned. The area should be large enough for competitors on the longest course to be presented with a challenging course without the route crossing itself frequently.

14.2   Map

14.2.1   The map may be an orienteering map of a large area, drawn to the latest version of the International Specification for Orienteering Maps (ISOM), or a composite of smaller maps of adjacent areas that can be linked in an obvious way.

14.2.2   Purpose-surveyed and drawn 'mountain maps' may be used, as may specially produced OS extracts, providing that they meet the appropriate approval of the Club or Association, and of the Controller, and can be overprinted with essential information such as crossing points and 'out of bounds' areas.

14.3   Planning philosophy

14.3.1   The essential feature of Ultra-long distance courses is that they should not only test the navigation and route-choice skills of the competitor, but they may also test, by choice of course, their strength and endurance. The competition may also be a test of the competitor's ability to judge their own rate of progress to enable them to complete the course without reliance on aid from another person.

14.3.2   The use of control sites requiring fine navigation may have significant time implications and the use of such sites may be inappropriate for this type of event.

14.3.3   The density of control sites may be lower than that of 'Long' courses, with legs of several kilometres appropriate in many cases.

14.3.4   The competition is not a test of mountaineering, climbing, camping or survival skills.

14.4   Courses

14.4.1   The organising club decides which courses are to be provided.

14.4.2   Planners should provide courses of varying Technical Difficulty and, indirectly through length, varying winning times for different age groups.

14.4.3   In the case of a score event, or where there are score courses on offer, they should follow the score format above.

14.4.4   Very long courses may be unsuitable for novices or those with health and fitness problems. The provision of alternative shorter courses at the event should be considered.

14.5   Safety

14.5.1   The Planner must plan the longest courses with a clearly stated estimated leading time assuming a high quality entry. The officials must allow a reasonable time for slower competitors to complete courses before they are closed.

15. Night course planning

15.1   Terrain

15.1.1   Night events are usually staged in runnable forest or on open areas. The initial risk assessment must take into account any potential dangers associated with the area, and may result in it not being used.

15.1.2   The possibility of bad weather may present an unacceptable risk for exposed terrain, especially in winter. As darkness increases the Technical Difficulty (TD) of any course, the use of areas which provide TD5 orienteering in daylight (such as complex sand dune terrain) should be treated with caution.

15.2   Map

15.2.1   The map should be produced to the latest version of the International Specification for Orienteering Maps (ISOM) or International Specification for Sprint Orienteering Maps (ISSOM), as appropriate to the terrain and event. See also Appendix D: Mapping.

15.2.2   The map scale should be 1:10,000 or larger. It is much harder to read maps at night with only a headlamp, so the event map should take this into account and colours should be checked for clarity under night conditions. Subject to the provisions in Schedule 1, Appendix D Mapping 2014.

15.3   Technical Difficulty

15.3.1   The definitions of the levels of Technical Difficulty are explained in an earlier table (section 3.2). Darkness can increase TD so that a leg which is TD3 in daylight can easily become TD4. This should be borne in mind when planning Night courses.

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15.4   Course lengths

15.4.1   Running speeds at night are 10% to 15% slower than in daylight for faster competitors. Course lengths should be adjusted accordingly.

15.5   Practical planning considerations

15.5.1   Relocation is much more difficult at night because of the competitor's restricted view of the surroundings, even with a powerful light. A safety bearing should be provided.

15.5.2   Control features are to be clear and unambiguous and their suitability should be checked at night. Small features below ground level are to be avoided, especially when vegetation restricts visibility.

15.5.3   Legs which require navigation through "walk" areas and indistinct vegetation boundaries, which are unclear in the dark, are to be avoided.

15.5.4   As in daylight events, competitors may take a route which is unexpected by the Planner. Controls are to be fair if approached from all feasible directions.

15.5.5   In high visibility terrain competitors on different courses approaching a common control from different directions can reveal its location more readily than in daylight.

15.6   Safety

15.6.1   Junior and novice orienteers are relatively rare competitors at Night events. The British and Area Night Championships have a youngest class of M/W16. If they are to be permitted to start at lower level events the Organiser has to be certain that they are competent enough to complete their course, and has the power to insist that they compete with an adult. In a score event a course of daylight TD2 standard can be separated out if there are sufficient controls for this.

15.6.2   In the eyes of the law, the Organiser is acting in loco parentis for children under the age of 16 and has to be seen to take precautions over and above what a careful parent would take for the safety of their children.

15.6.3   It should be noted that disclaimers, signed by parents, are ineffective and would not absolve the Organiser of his/her responsibility in law

15.6.4   Score events should be planned so that there is little temptation to stay out beyond the time limit. This can be done by having severe penalty points for exceeding it.