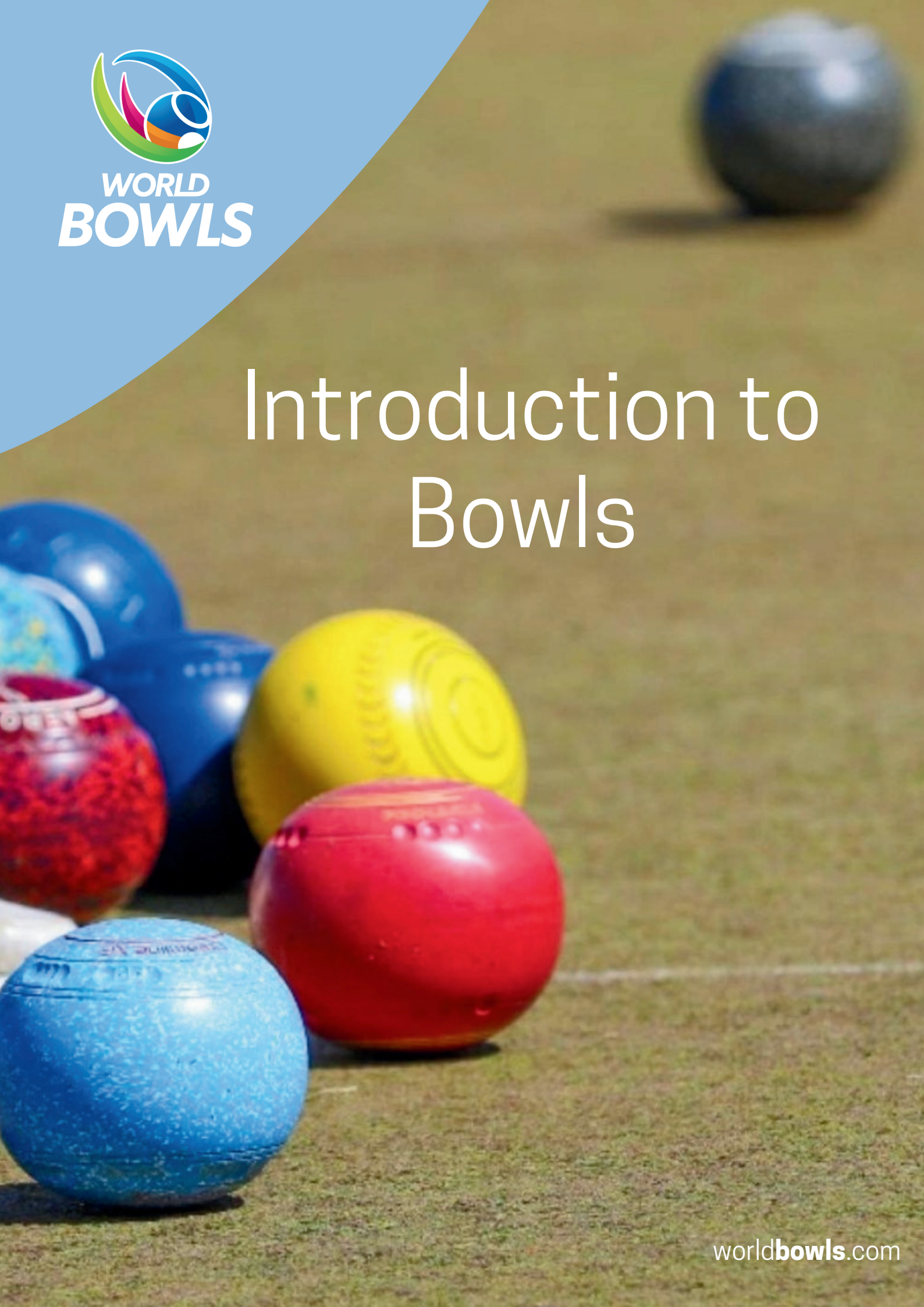
WORLD BOWLS

Introduction to Bowls



worldbowls.com

INTRODUCTION
TO BOWLS

There are 90 countries over six continents that belong to the World Bowls Federation. Bowls also enjoys a presence in a number of other countries, where its popularity also continues to grow.

Bowls is a target sport played on a flat surface (grass, synthetic grass or carpet). Similar in concept to the Italian game of Bocce or the French game Petanque, the main distinguishing features are how the bowl is delivered, the playing surface and that the bowl is biased.

Bowls is played on a simple premise. Once the target known as the 'jack' has been rolled – each player delivers a set number of bowls depending on the format of the game. Players/ teams take turns in bowling.

A shot is scored for every bowl that rests closer to the jack than any of your opponents bowls (once all bowls have been delivered). After each 'end'

(when all players have bowled), players then bowl back in the opposite direction. A game can be a set number of ends, or played to other various formats.

Bowls' broad appeal

Bowls is a game for people of all ages and abilities from young children through to older adults. At the elite level, the majority of players in the Australian team are young adults and in recent years has had players as young as 15.

Bowls can be played on equal terms by almost anyone. It does not require special strength or athletic ability. You can be any size or shape and most persons with disability can play bowls with

able-bodied athletes.

One of the unique features of bowls is that diverse age groups can play together – few other competitive sports enable someone to play with a parent and grandparent on the same team.

The backbone of our sport is club based, and open competitions are still seen as the favoured competitive form of the game. The sport has opened up other opportunities for club members and non-members alike. Social programs such as ‘Get on the Green’, barefoot bowls, corporate tournaments and other club events have all contributed to a resurgence of bowls in recent times.

A worldwide game

There are 90 countries over six continents that belong to the World Bowls Federation. Bowls also enjoys a presence in a number of other countries, where its popularity also continues to grow.

Most Commonwealth nations play bowls and the sport has been part of the Commonwealth Games since 1930.

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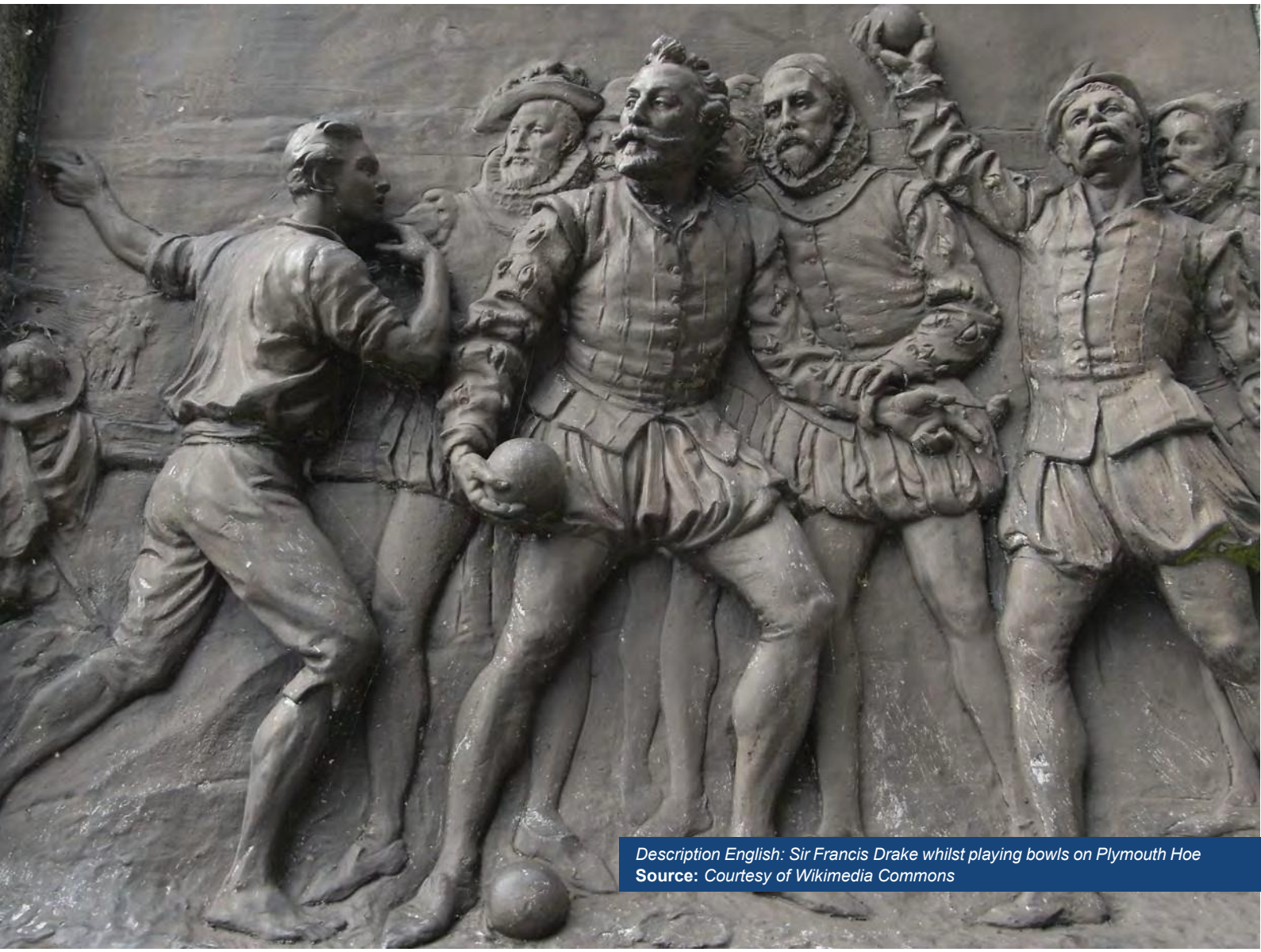
THE HISTORY OF BOWLS



Description English: Sir Francis Drake whilst playing bowls on Plymouth Hoe
Source: *Courtesy of Wikimedia Commons*

Perhaps the most famous historical game took place in 1588, with legend claiming that Sir Francis Drake insisted on finishing a game of bowls at Plymouth even as the invading Spanish Armada approached.

There are numerous theories regarding the origin of the sport, however archaeological findings from Egypt suggest a sport with biased stone balls was played close to 7000 years ago. A variation of the sport, which later came to be known as 'bocce', was popular in Rome in the days of Julius Caesar. The spread of the Roman Empire may explain the early introduction of the game to much of Europe, while other variations of the game were gradually appearing across the globe, from China to Polynesia.

The oldest surviving bowling club is in Southampton (England) and dates back to 1299, and as the game grew in popularity in the 14th Century, the respective kings of France and England banned the sport as it was seen to be distracting people from the militarily-critical practice of archery. The sport is referenced in no less than three of William Shakespeare's plays, at a time when it was almost exclusively played by nobleman and punishment was enforced when commoners were caught playing amongst themselves.

The preferred style of play at the time was 'crown bowls', perhaps a reference to the popularity of the sport amongst the royals. The game was played on an uneven grass surface until the flat-green game was developed in Scotland where it found a welcome home. The Scots also developed a formal code of laws, the essence of which still form many of the current rules and regulations.

Perhaps the most famous historical game took place in 1588, with legend claiming that Sir Francis Drake insisted on finishing a game of bowls at Plymouth even as the invading Spanish Armada approached.

As the British colonised much of the world, so did the sport of bowls spread: to Australia, Canada and the United States amongst others. Although the sport has never reached great heights in the United States, George Washington's father Augustus was a keen competitor and is believed to have commenced construction of a bowling green in 1732, the year of George's birth.

In the late 1800s, national bowling associations were being established across the globe. The Royal Victorian Bowling Association (Australia) was formed in 1880, while the Scottish Bowling Association came into existence in 1892.

Today there are more than 55 member National Authorities in 51 Member Nations, with the prestigious World Bowls Championships taking place every 4 years.

THE GAME

The Bowl – (not a ball), is slightly radially asymmetrical and has a small emblem and ring on one side, a large emblem and ring on the other. Always keep the small ring on the inside of your delivery.

Who can play

The popularity of bowls lies in its unique appeal to people of all ages, sizes, shapes and abilities. Although traditionally played by senior citizens, the sport has been rejuvenated in recent years and the average age of participants in Australia, New Zealand, South Africa and Malaysia has dropped sharply.

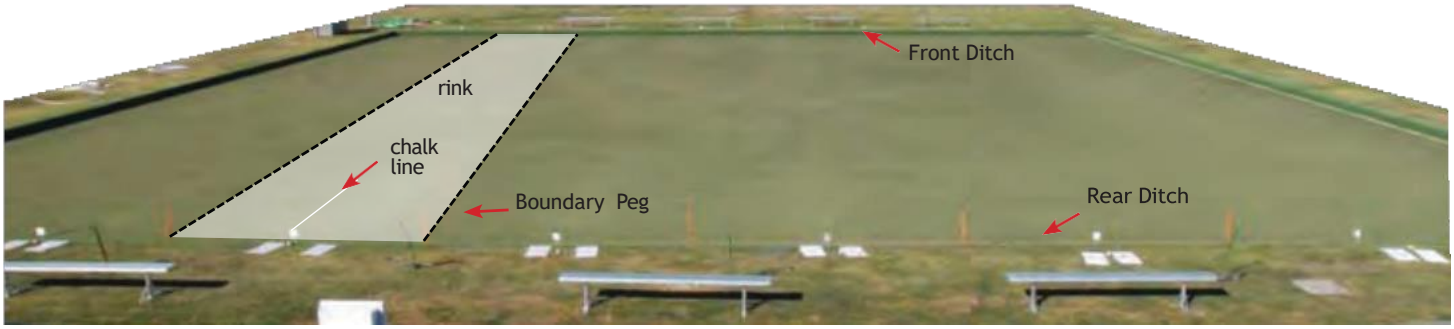
The 2002 Australian movie 'Crackerjack' introduced a new generation to the sport and has significantly boosted casual bowling participants in Australia, with clubs offering social and unstructured 'barefoot' bowling sessions.

The average age of many national representative teams is now significantly younger than that of other sports against which bowls generally competes for the younger demographic, such as cricket and golf.

The bowling green

Is a four sided area of grass or synthetic playing surface surrounded by a ditch.

It is divided into playing areas – rinks, with a chalk line marking the centre of the rink.



The mat

Is either rubber or plastic, is the area from which you deliver the bowl. The mat end is called the rear ditch and the end to which you are bowling is called the front ditch.

The Scoreboard

Is situated at the end of each rink. It displays the opponents names or team colours, the score for the current match and the number of ends played.

The bank

Is the vertical wall of the outer edge of the ditch above the surface of the green. The plinth is the edge of grass which adjoins the ditch. The rink marker is the white disc and number situated on the top of the bank.

The Bowl

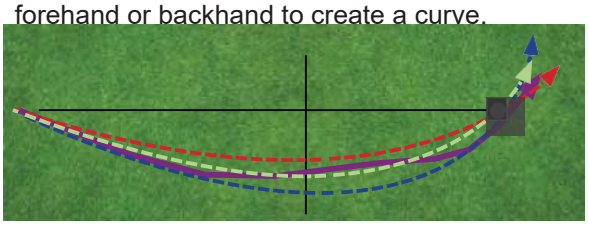
(Not a ball), is slightly radially asymmetrical and has a small emblem and ring on one side, a large emblem and ring on the other. Always keep the small ring on the inside of your delivery.

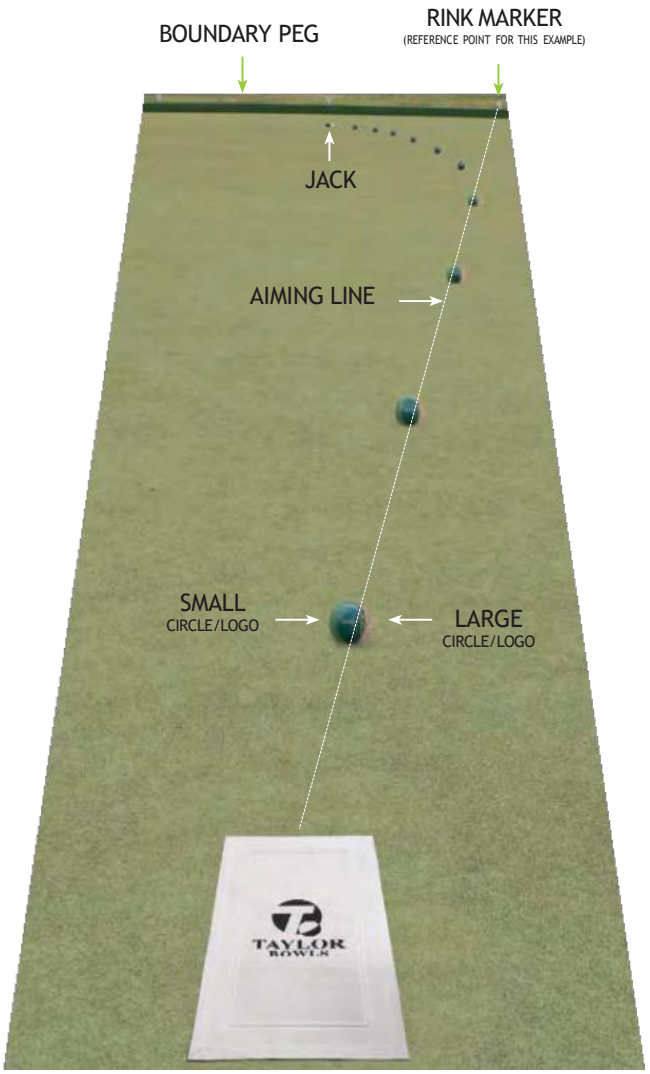
Bowls are biased, so they do not roll in a straight line but in a curve. This makes the skill of bowling more challenging, as it relies on bowlers judging the distance, weight and aim (or line).

They are solid and reasonably weighty (between 1.4kg - 1.59kg). The weight of a bowl varies depending on the size, with the size of the bowl ranging from sizes 00 to 7 catering to all ages and hand sizes, with 00 being the smallest. The bowl is not a perfect sphere as they are designed to curve as the bowl slows down.'Bias' is the 'draw' or amount of 'curve' the bowl takes as it rolls smoothly along the green. The curve is due to shape of the running surface which is slightly higher on the non-bias side.

The faster a bowl is delivered the straighter it will run, as it loses speed the bias takes effect, reaching the maximum 'draw' as the bowls slows down towards the target before coming to a stop.

For a beginner, if a genuine bowl is not available, a tennis ball, cricket ball, softball, etc. can be used and the effect of the bias can be created by adding a lump of blu-tac to one side. These balls would be delivered with the lump facing the forehand or backhand to create a curve.





FOREHAND SHOT FOR A RIGHT HANDER
BACKHAND SHOT FOR A LEFT HANDER

Games and activities

There are a number of games which are played in bowls. They include:

- **Singles** – one player against another (opponent), four bowls are played alternatively.
- **Pairs** – two players in each team with two, three or four bowls being used, each player alternating against an opposing team member.
- **Triples** – three players, each playing two or three bowls alternately against an opposing team member.
- **Fours** – four players, each playing two bowls alternately against an opposing team member.

Types of games

Bowls can be played in different ways depending on the type of competition and time available:

- **Number of ends** – For example, a pennant game can be up to 25 ends. The team with the most 'shots' or 'points' after 25 ends is the winner. It can take around four hours to play this format.
- **Sets play** – Similar to tennis, the game is broken into 'sets' of a determined number of ends.
- **Points** – Sometimes you might play a game where the winner is the first to 11 or perhaps 18 points for a longer game
- **Time** – For beginners or juniors, you may want to set a time limit. For example, the team leading after 30 minutes of play is the winner.

Game variations

A number of variations may be played as competition or games.

Consistency

Played by two, three or four players with four, three or two bowls respectively. The objective of the game is to deliver bowls as close to the jack as possible with the four closest bowls scoring, which can belong to any player, the closest bowl scores four points, the next closest three points, the next two points and the fourth bowl one point.

Target bowls

Played by two, three or four players with two, three or four bowls each. Three circles are carefully chalked on the green and points are gained for delivering a bowl into the circles on a three, two, one basis. (Remember: to consider the time required for four participants using four bowls in the above two variations and the impact on the enjoyment of players.)

Jack target

Against an opponent deliver four jacks to four different positions on the rink, e.g. short, long, wide, narrow – at various lengths. Each player delivers one bowl to each jack. The player does not have to bowl to the same jack in the same order as his opponent. The scoring is as in a singles game. The closest bowl to each jack receives one point.

There are many activities and drills to assist with developing the skills of your players. The Bowls Australia Activities Handbook is included as part of your coaching accreditation. It details many activities and drills and is an integral resource to be used in tandem with your Bowls Australia Club Coach manual.

Role of the Lead, Second, Third and Skip

In a team each player has a different role, it is important to understand these differences.

Lead

- In team games places the mat at the discretion of the skip.
- Delivers the jack as close as possible, to a distance determined by the skip.
- Plays draw shots close to the jack to lay a good foundation for the development of the head.

- A lead should practise the art of delivering the jack and try and perfect the basic shot of the game. “The draw shot.”

Second

- Introduces the team to opposing players.
- When in a team of four:
- Should have the capabilities to draw to the jack or to a position as requested by the skip.
- Should be a competent “on shot” player.
- Needs to be a versatile and competent player.
- Keeps the score at each end on the card provided.
- Checks score after each end with opponent.
- Records the progressive score on the scoreboard, at each alternate end (when playing at home).
- Checks the total score at the end of game with opponent.

Third

- Should be a versatile and experienced player.
- Should be a competent in playing all shots. Draw, metre on, resting shot, wresting shot, on shot and drive.
- Is the director for the time spent at the head.
- Acts as the measurer at completion of an end.
- Should have a good knowledge of the rules.

Skip

- Is the person in charge of the team.
- Needs to have tactical and bowling skills.
- Directs the players to develop the head.
- Should be a capable exponent of the game.
- Should have the capabilities to get the best from the team.
- Should have a comprehensive knowledge of the rules.
- Must display encouragement and never be critical.

Basic Rules Of Bowls

Ensure that your players know and understand the basic rules of bowls and they display good sportsmanship. As the coach you will lead by example and should be able to answer any questions on the basic rules of the sport. A handy tip is to keep a current copy of the Law Book in your bowls bag to ensure you can answer any questions which may arise from your players.

Tactics

Bowls is a game of skill which also requires a keen tactical ability. In simplistic terms, your aim as a coach is to ensure your players are aware that the aim of the game is to get as many bowls closer to the jack than one’s opposition. Furthermore, you need to ensure your players are aware their aim is to deliver a bowl to a position that blocks your opponent from getting near the jack. This can be of particular advantage when the player already has one or more bowls closer to the jack.

Having said that, another basic strategy to teach is the jack is unlikely to be knocked forwards, so it is better to be a little behind the jack than short (unless the aim is to block the opposition line to the head). Another important tactic is teaching where to place the mat and roll the jack when starting an end. Good coaches educate their players to identify and take advantage of whether their opponent has trouble bowling either short or long distances to the jack.

At this level, tactics is only covered in brief. To learn more about bowling tactics, see your state/territory coaching contact who will explain the relevant Bowls Australia accredited educational courses on offer.

Etiquette

Just as the coach is a role model in terms of sportsmanship, the same applies to demonstrating appropriate etiquette.

Some of the common etiquettes for the sport of bowls include:

- Wear appropriate footwear (flat soled shoes)
- Avoid dumping bowls
- Avoid leaving the rink for long periods of time
- Avoid resting feet on the plinth
- Avoid straying on to neighbouring rinks
- Hand bowls to one another when convenient
- Avoid distracting players on neighbouring rinks
- Share the task of kicking bowls after the completion of an end
- Avoid distracting players whilst a player is on the mat preparing for delivery
- Refrain from interfering with the head until the result of an end has been agreed upon
- Shake hands at the start and end of the game
- Collect all mats and jacks and return to the usual distribution point

Bowls Environment

Green care

A key role of the coach is to educate your players on the importance of green care. All clubs rely heavily on the quality of their greens and it is the responsibility of all players to ensure the work of the greenkeeper is not detrimentally affected by any player's actions during practice or play.

All players should be advised that appropriate footwear (flat soled shoes) should be worn on the green at all times and twisting or dragging of feet will cause damage to the green. Jacks or bowls should not be dropped or dumped on to the green. Advise players not to stand or sit with their feet on or near the plinth area nor in the ditch.

Coaching Tip

Let new players know how to identify the 'bias' side – by the smaller of the circles or logos marked on the bowl. As you hold the bowl in front of you, the little circles would always be facing the centre of the rink.

Bowls equipment – the bowl

The weight of a bowl varies depending on the size. Bowls are manufactured in different sizes ranging from 00 to size 7, with 00 being the smallest. The appropriate bowl size is determined by several methods relating to the players' hand and finger size, wrist and arm strength. The final decision on choosing bowl weight would be made by the player as to what feels most comfortable. Bowl sizing charts can be used to determine the most appropriate size bowl. Alternatively, a simple method of fitting a bowl in between your players fingers and thumbs may also be used as a guide (see photo). Ultimately, you should ensure your player is comfortable with the size of their choice.

Game time

Many players will think about the opposition and their history or recent form. The most important aspect of being in control is being confident and fully aware of your own game. It is more likely that you will succeed in the game by playing to your strengths and control the various aspects of your game to improve on in the match. You can certainly affect how your opponent's impact on the game by the length played in the match and the ability to change the length when necessary.

While some of this comes with experience, a good deal of it comes down to being able to observe accurately and make sound game time decisions. Don't convince yourself that you cannot win the game before you start.

Outside influences

It is vital you have an awareness of the things you can control and things you cannot. Sound preparation is all about preparing yourself to control the controllables and limit the influence of the things you cannot control.

The fixture, the opposition, the rules and conditions of play, the playing surface, the venue, any other outside influences (for example, crowds moving, delays at lunch, inconsistent markers/ umpires) are all examples of things you cannot control. Therefore, they shouldn't alter your thinking or have a negative influence on your tactical game.

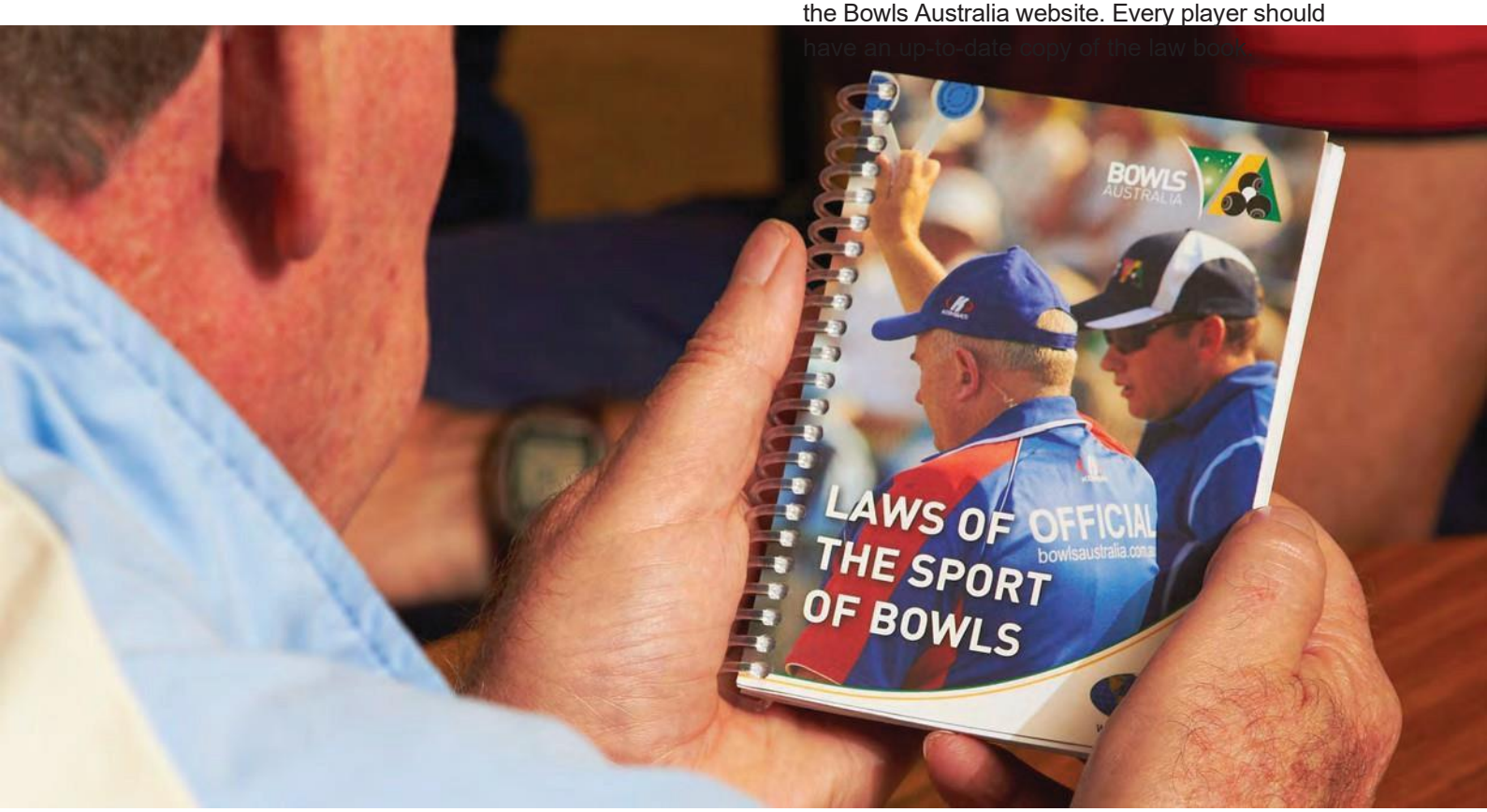
Laws and conditions of play

The laws of the sport of bowls

Just as it is important for a player to know how to play the game, it is equally important to be familiar with the most current laws by which the game is played. World Bowls create the laws that govern the sport of bowls. Bowls is played under these laws right around the world, including Australia except where World Bowls grants an exemption. These exempted laws are covered in Australia's domestic regulations. The domestic regulations are also included in the law book.

The ability to locate laws with ease prevents a time delay during games and allows the correct decision/interpretation to be made quickly and without fuss. Players should have a sound understanding of the index of the law book.

The laws of the sport of bowls is available for purchase from your state/territory association or the Bowls Australia website. There are also a list of policies relating to bowls that can be found on the Bowls Australia website. Every player should have an up-to-date copy of the law book.



COACHING
BOWLS

Your success as a coach is measured by the ability of the player to improve their consistency of their delivery – often this is achieved with a slight correction as opposed to a complete overhaul.

The Delivery

Fundamentals of bowling and technique

The photo sequences will demonstrate several players, each with different, but sound technique. When influencing a player's development in their delivery, ideally you should allow them to find their own routine and style – and then work on improving their performance to their desired level.

It is perfectly acceptable for your player to use their own style if they are producing their desired result on a consistent basis – remember, as a club coach, your player is the customer and you should employ a 'customer-focused approach'. Your success as a coach is measured by the ability of the player to improve their consistency of their delivery – often this is achieved with a slight correction as opposed to a complete overhaul.

Constants and variables

To have a successful bowls delivery, there are several 'constants' which are necessary to produce a sound delivery style – i.e. without the constants, your player will not achieve a consistent delivery.

They are:

- Intended line – being able to deliver the bowl on the intended line desired by the bowler
- Balance and stability – remaining balanced and stable during the delivery to assist with delivering the bowl correctly
- Controlled momentum – ensuring the backswing, follow-though, step and forward momentum produce the desired length delivery
- Smooth release – delivering the bowl and ensuring the release facilitates little (if any) wobble or bounce; and

- Consistent repetition – above all else, being able to repeat the action (even the most strange of actions if repeated consistently can achieve excellent results).

Within each of the above ‘constants’, there are several ‘variables’ which can be completed differently depending on the player and still achieve the same ‘constant’. For example, there are several types of grip which can all produce the desired result of a smooth release. Additionally, there are several lengths of step which can achieve controlled momentum through the delivery. The variables within the constants are:

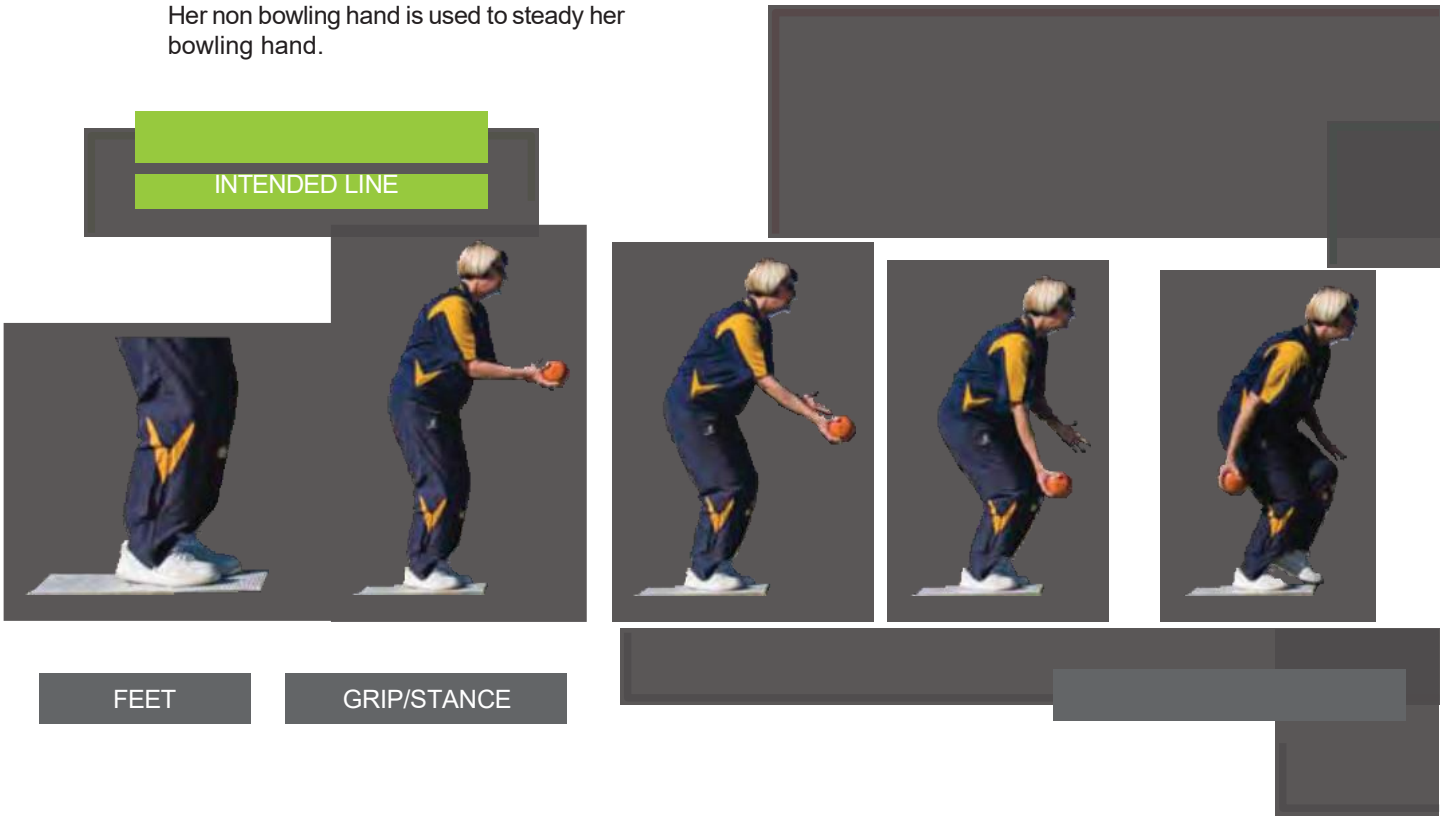
- Feet – ensure your players position their feet on the mat along the desired aiming line
- Grip – let your player find the grip most comfortable to them, taking into consideration the desired shot and external factors such as green speed and weather conditions
- Stance – your player may prefer and upright, bent or combination stance to commence their delivery
- Bend – fundamental to a successful delivery is to keep low at the moment of release and during the follow-through
- Step – your player should step to a distance which is comfortable for their own style, recognising the link between the length of step and the speed of the delivery
- Deliver – the delivery is a pendulum action of the arm. The palm of the hand should follow the bowl/jack in a natural follow through. Delivery may include varying length of backswing depending on the player. During the backswing, it is recommended the player:
  - begin the backswing before they step (to assist with timing), and
  - approximately when the arm is level with hip, take a step forward, transferring body weight to the front foot
  - The bowl is released when the arm is slightly in advance of the front foot, assisting the player to deliver/release the bowl smoothly out of the hand on to the green, minimising wobble and avoiding dropping or dumping on the green.

Use the following six examples to assist with developing your players – recognising that each delivery style is different, although each of the six players have achieved tremendous success in their bowls career. The coloured lines above the delivery style highlight the ‘constants’ and the grey lines below the images demonstrate the ‘variables’.

DELIVERY FUNDAMENTALS

Commences with an upright stance – eyes focussed on the target adjusting her grip and aiming line ready for delivery. Her non bowling hand is used to steady her bowling hand.

Hand movesfrom the bowl to the thigh to assist with the balance and stability



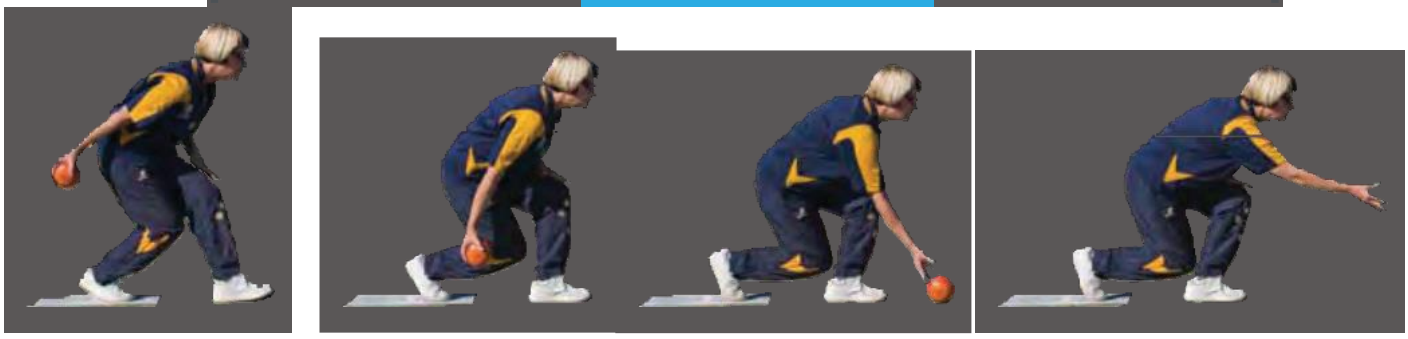
DELIVERY SUMMARY

She commences her delivery from an upright stance. Adjusts her grip and feet to ensure she delivers the bowl on the intended line and uses her non-bowling hand to steady her bowling arm. Once the delivery action commences, the non-bowling hand drops to the thigh/knee for increased balance and stability. She has a medium length step and medium length pendulum motion ensuring controlled momentum for her delivery. She bends down low and remains low to allow for a smooth release of the bowl. Importantly, she is able to repeat the action ensuring consistency with her individual delivery style.

BALANCE & STABILITY

CONTROLLED MOMENTUM

SMOOTH RELEASE



STEP

Stays down through the
delivery and follow through

DELIVER

Mid-range backswing
to approximately 45 degrees

Commmences the delivery with the non-bowling hand on the knee to assist balance and stability.

DELIVERY SUMMARY

He commences his action with his feet close to the front of the mat and finds his intended line. His head remains still throughout the delivery, assisting with balance and stability. His pendulum swing is moderately large, offset by a slightly small step to ensure controlled momentum.

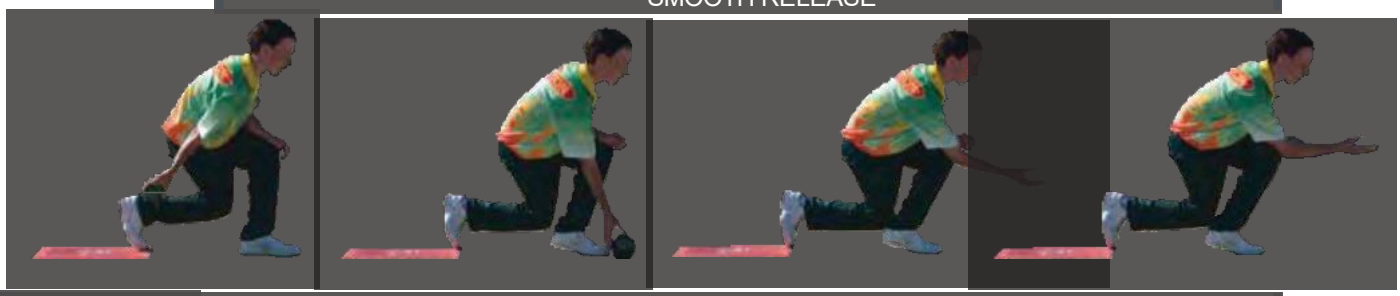
He releases the bowl close to the ground and directly below his eyes to ensure a smooth release. Importantly, he can repeat the action ensuring consistency with his individual delivery style.

Stays down low through
the delivery and follow through.

BALANCE & STABILITY

CONTROLLED MOMENTUM

SMOOTH RELEASE



Head over the bowl at the moment
of the delivery. Releasing the bowl just
in front of the front foot.

FACILITIES & CONSTRUCTION

This guideline provides an overview of the process and main considerations when planning a major project.

Purpose of the guidelines

Installing a new green, natural or synthetic, or refurbishing an existing green is one of the most important projects a bowling club will undertake. Most bowling clubs operate on a limited budget, so it will be critical to ensure any investment is wisely spent with the risk of something going wrong minimised. Major greens projects involve significant costs - which can escalate or be wasted if badly managed.

A construction or refurbishment project is going to offer a new challenge for most bowling clubs. It will require new skills and ways of working. Although Bowls Australia recognises that it may be preferable for a bowling club to employ specialist personnel with major projects, it is also acknowledged that many bowling clubs have the experience and resources to be actively and directly involved in the construction or refurbishment work.

Regardless of the model used, a key to any refurbishment or construction project is sound planning. Planning is not an added option, but is crucial for the project in order to: identify the key risks, ensuring sound financial management, maintaining a clear focus on essential matters, carrying the project to a successful conclusion and establishing the foundations for effective ongoing management.

In approaching the task of planning a major project the bowling club should avoid re-inventing the wheel and look to capitalise on the experiences of others and the national resource provided by Bowls Australia, Sports Turf Institute Aust. and other parties. The primary intent of these construction guidelines is to assemble and pass on the experiences and expertise of others who have embarked on construction work.

A synthetic green turf

A natural green turf

How to use the guidelines

Although the nature of a major greens project will vary, the same general procedure can be used to plan and implement the majority of projects. This guideline provides an overview of the process and main considerations when planning a major project.

A project could be broken down into four main phases:

i. Planning/investigation phase

ii. Design phase

iii. Construction phase

iv. Post construction phase

During the planning phase, it will be necessary to investigate a number of key items, including the costs and benefits of different options, legal and environmental considerations and the required performance standards. A bowling club embarking on a major project will be able to follow a pathway through the construction guidelines by selecting relevant chapters. For example, a bowling club constructing a new synthetic turf green would refer to the following:

Overview of options

Planning process

Design and construction phase

Constructing a new synthetic green

Performance testing, maintenance and environmental/legal

Defining a major greens project and Financial considerations

Introduction

A major greens related project is a capital works program that incurs significant cost and time outlay. Such projects warrant extra resources and planning and the likely involvement of outside expertise. Major greens projects could include:

- Re-surfacing of a natural turf green;
- Constructing a new natural turf green;
- Conversion of a natural turf green to a synthetic surface, or vice versa;
- Construction of a new synthetic turf green.

Major projects could also include upgrade works such as a greens drainage project, the installation of a roofing structure, the installation of lighting,installation of a watering system or the replacement of the synthetic carpet.

2.2 Playing surface options

When it comes to the playing surface, there are essentially two main categories of bowling greens – natural grass and synthetic turf. Within each category, there are different construction options/ product types available.

Natural turf greens can vary in regard to how the root zone is constructed (e.g. sand or soil), the turf type used (e.g. cool-or warm-season grass type) and the maintenance program. Expert advice, coupled with local experience, should be sought in order to identify what will work best for the bowling club location.

Synthetic turf outdoor greens were first introduced into Australia over 30 years ago. There are now several different types of synthetic green products on the market, each with varying performance characteristics.

Tufted synthetic turf, generally sand-filled

Woven mat or carpet

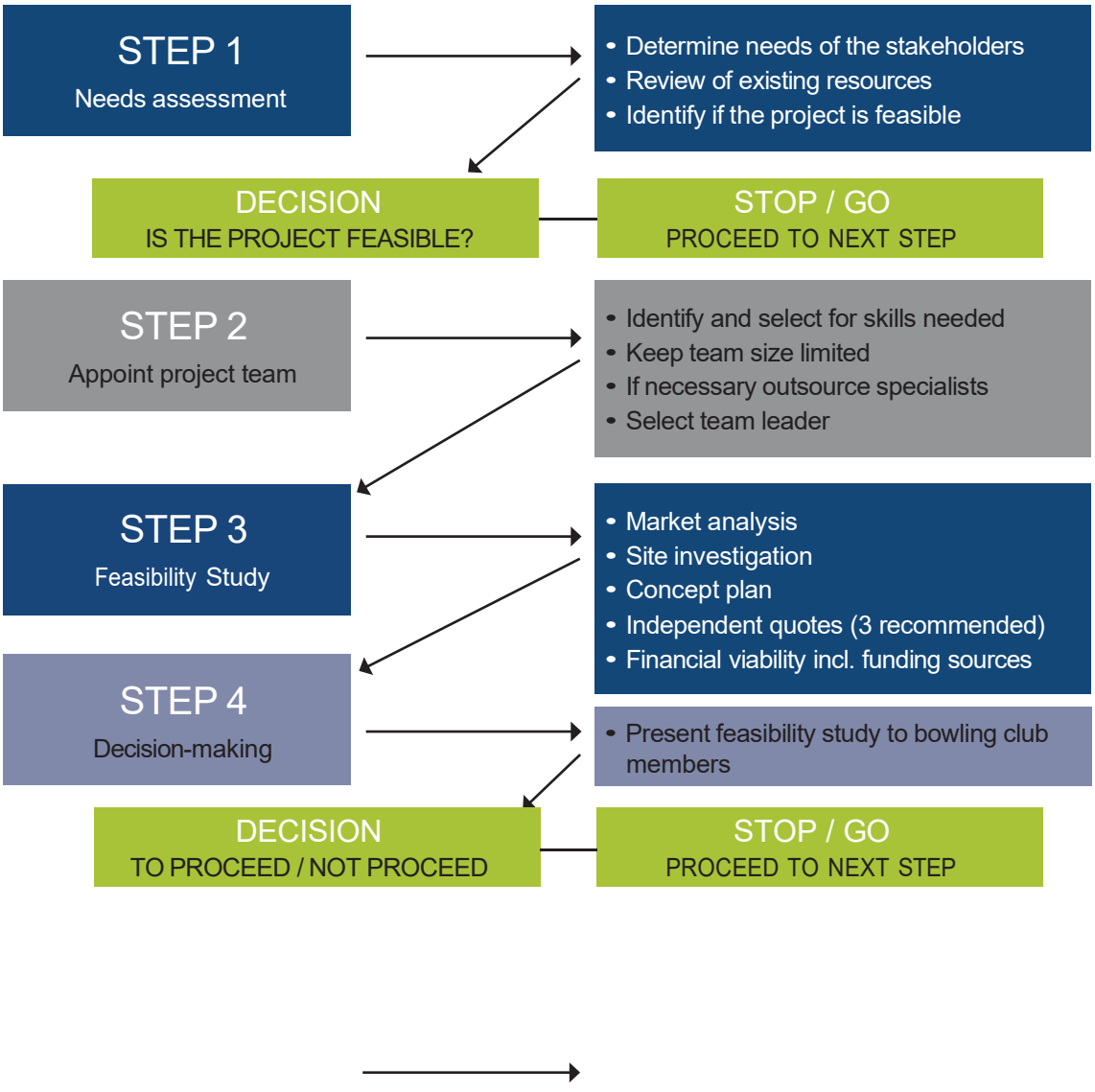
Needle-punch carpet

Bent natural grass

THE PLANNING PHASE FOR A MAJOR GREENS PROJECT

Key steps in the planning/investigation process

There will be many variables to consider along the project path. No two sites and projects will be the same and adjustments will need to be made for site specific conditions. This aside, a standardised approach can be followed when undertaking a major project.



Step 1. Needs assessment

At the outset and once an improvement concept has been mooted, it is important for a bowling club to identify clearly the need for any change and the proposed investment. A needs assessment must identify:

- The bowling club's strategic direction;
- Reasons for proposed change;
- Benefits/disadvantages to stakeholders;
- Other.

OUTCOME = Report produced by the project team for bowling club outlining the proposed change and requesting a decision by the club committee on whether to pursue the project further.

It is likely the needs assessment will originate from a committee meeting, with a sub-committee tasked with the responsibility of undertaking a preliminary assessment of the proposed development. A bowling club may wish to canvass views of members via a survey or a general meeting.

Step 2. Appointing the project team

Subject to a positive report from the initial needs assessment, the next step is to establish a team that take the project to the next level. Selecting the project team, especially the team leader, is a critical step. The make-up of the planning team will be influenced by a number of factors, including:

- Who are the stakeholders?
- Who is funding the project?
- What expertise is needed?
- What skills are on offer?

Where practical the project team should comprise individuals with appropriate but different skills (e.g. accountancy, engineering, marketing, town planning), and who has the time available. It is best to keep the team to a manageable size (suggest five to eight persons) in order to facilitate communication and decision making. It is recommended to out-source expertise where it isn't available within the bowling club such as project management. In many cases, such as where council ownership or funding is involved, it will be mandatory to commission external expertise and to follow a formal tendering procedure.

OUTCOME = Appointment of a project team and team leader.

Step 3. Feasibility study (the investigation)

Before assembling the business case it will first be necessary to conduct what is best termed a feasibility study.

The feasibility study forms the backbone of the investigation process. The feasibility study will involve various parties, including:

- Identifying and interviewing the stakeholders – those from within the bowling club and elsewhere who should be consulted to ascertain requirements and who could offer useful advice;
- Consulting with the sport's governing body or other bowling clubs who can assist and who have been through the same or similar process in order to find relevant data and key contacts;
- Establishing the aims of the project and the intended use of the facility;
- Approaching supply companies and others in regard to options and costs;
- Investigate funding opportunities and meet with potential funding agencies;
- Meeting with the local authorities and engineers in order to assess matters such as the zoning restrictions, legal and environmental issues associated with the development;

- Investigating the site. The overall goals of the feasibility study include:
- Evaluating the costs and benefits of different options and the overall viability of the project;
- Identifying risks to the project;
- Investigating technical aspects such as subsoil stability, drainage performance, etc.
- Identifying any legal or planning constraints on the proposed development;
- Determining feasible timescales for the project development and completion. A feasibility study template for constructing a new green is provided in Appendix 1.

Step 4. Decision -making

Once all the above information is received the bowling club is then in a position to make an informed decision on whether or not to proceed and if so how and when to proceed. Decisions should be based on sound, objective data, rather than 'gut feel'. Ascertain a monetary value on all costs and benefits, where practical. If the decision is in favour of the project going ahead then a start can be made on preparing the project plan.

3.6 Step 5. The project plan

The last element in the planning and investigation process is to produce the project plan. This plan will define how the project will be managed and the way forward for the duration of the project. It is essentially about what will be done, by whom, when and at what cost.

The project plan should include the following points

The project plan should include the following points

It EM	DESCRIPTION
1. Management structure	• Composition and main roles of the project team; • Allocation of responsibilities for each of the project components.
2. Project/contract delivery method	• Refer to Chapter 4.
3. Pre-requisites	• Any fundamental requirements needed for the project to succeed (e.g. securing a grant or loan).
4. Assumptions	• Such as securing a grant or loan to fund the project;
5. Contingency plans	• Identifying factors outside the control of the project team but on which the project depends for successful delivery; • Developing risk management strategies.
6. Timetable	• Project stages, milestones, dependencies, tolerances and control points.
7. Expected outcomes	• What will be delivered, when and to what standard, at each of the defined stages.
8. Resources required	• List the resources required, and who is responsible for supplying the resource.
9. Cost management	• Provision of cash flow forecast, financingoptions and terms, etc.
10. Communication strategy	• Identifying all stakeholders, their specific interest in the project, how to best engage them, framework for meetings and the like.

The project plan is a living document. It is the key working document throughout the life of the project. It must be regularly reviewed at project team meetings. It should form the basis of the agenda for meetings. Any changes must be evaluated and documented if cost over-runs and other pitfalls are to be minimised.

PROJECT DESIGN AND CONSTRUCTION PHASES

Once the project plan has been approved by the bowling club, the next step is to plan the implementation of works. A starting point here is to determine the delivery method.

4.1 Project delivery method

There are three main methods by which a major project can be delivered, namely:

- Option one - Using a specialist designer to prepare detailed specifications and then call for tenders from approved installers;
- Option two - Providing a performance-based design brief and appointing a contractor to install;
- Option three - Appointing a contractor to do both design and install.

The choice of project delivery method will determine the way in which the design and construction team/s are procured. For example, under option one, an independent designer is commissioned to plan and oversee the project, whereas with option three the appointed contractor is responsible for providing design as well as installation.

With option one, the appointed designer will be required to produce tender documentation (Section 4.5) and design specifications (Section 4.6) to allow for competitive tendering, to advise the bowling club on suitable tenders and to project manage operations.

With option two, someone (usually from within the project team) is appointed to produce a design brief (Section 4.4), to seek submissions directly from a range of suppliers, to select a design and then to project manage the successful tenderer.

For option three, the preferred supplier will provide a design-build service, invariably using their own customised specifications for how the green should be built.

Each of the above options has advantages and disadvantages. For example, it would be considered risky engaging an installer under a design and construct approach (option three) if they did not have a proven track record or appropriate professional indemnity insurance.

A bowling club may have previously identified the type of surface they desire, and even the contractor they wish to use, even before the feasibility study is conducted. In this case, option three is viable. In situations where the bowling club has the time and resources to scope the products and suppliers available, and to identify the technical and financial capabilities of prospective contractors, then option two is viable. From this, a short-list of contractors to be invited to tender against the design brief can be produced.

The bowling club is primarily interested in the performance of the green on completion. As such, it is important they protect their investment through having documentation that clearly specifies the required performance standards. Consideration should be give to using the Australian Standard Condition of Contract AS4000 as the basis of the contract between bowling club and contractor.

4.2 Commissioning specialist personnel

A major project, such as constructing a new green, generally requires the input of specialist personnel such as project managers, design consultants, engineers, civil works company and installation experts. The appointed body(ies) will be entrusted to ensure the project is handled professionally and that the client's expectations are met. Specialist personnel will need to be outsourced, unless the bowling club has appropriate expertise in-house. Using recognised specialists may in fact be a stipulation from the funding body(ies). The cost of the external consultant will need to be factored into the overall project cost.

4.3 Preparing documentation

Regardless of the project delivery method it will be important to ensure appropriate documentation is prepared and standard form contracts are used. The form of documentation required will depend on how the project is delivered. At the very least, the bowling club should have documentation that clearly specifies the required performance of the playing surface.

Documentation could include:

- A design brief outlining the expected performance standards, along with other key requirements; A detailed technical specification and drawings which provide a “how to” approach for each facet of the works;
- Tender documentation. It should be borne in mind that any paperwork with contractors and others constitutes a legal document. The club should consider having any legal documents reviewed by a lawyer before they are signed.

4.4 The design brief

It is important to start with a clear design brief to ensure the bowling club gets what it wants from the project. The design brief could vary in scope and detail, but will tend to focus on the required outcomes (time frames as well as performance). Where possible the design brief should include objective performance measures (e.g. the playing surface performance shall meet World Bowls Ltd standards). An example of a design brief is provided in Appendix 2.

4.5 Tendering

The tender documentation includes both the technical specifications and all associated information and requirements. Tender documentation would normally be produced by the appointed designer and forwarded to selected contractors.

The tender documentation would typically include the following:

- A scope of services;
- General conditions of tender;
- A copy of the draft contract;
- Relevant supporting information such as preliminary plans.

It is important that the tender documentation is accurate and avoids ambiguity, as this can open the door for misunderstanding and ultimately dispute and additional costs through variations.

After review of tenders a contractor will be selected by the project team against pre-determined criteria. Tenders are typically evaluated using a weighted attribute system where the key criteria are identified and each bid ranked.

Attributes evaluated may include:

- Compliance to tender requirements;
- Experience/track record;
- Methodology and known product performance;
- Presentation and content;
- Price.

Tendering is likely to be compulsory in many projects, given that bowling clubs are often located on council land. Even if tendering is not compulsory, it is recommended in order to ensure the bowling club is getting the best deal.

The project team should compare the tender sums submitted with their own estimate of the works and identify any major discrepancies together with the reasons for those discrepancies.

Remember that the cheapest tender is not necessarily the best option. It is important to respect that tendering is a legal process and that rules cannot be altered unfairly.

4.6 Construction specifications and drawings

In contrast to the design brief (which largely focuses on the result required), construction specifications provide a full and precise description of how to carry out the work. The specifications and associated drawings serve as the blueprint for constructing the green, regardless of who is appointed to undertake the works.

Example of a design specification (for pipe drainage installation in a natural turf green)

1. The existing 200mmADS storm water drain around the perimeter of the green shall be used as the outlet for the internal drainage lines.
2. 100mm diameter perforated corrugated plastic drain pipe shall be used for all internal drains.
3. Drain trenches shall be excavated every 5m on the diagonal across the green, and shall be a minimum of 125mm below the sub-grade level and excavated on a grade of 1 in 200.
4. Specialist junctions must be used to connect the 100mm to the 200mm diameter outlet.
5. Trenching work shall only be undertaken with a laser-graded endless chain trencher device.
6. Trenches for all internal (100mm dia. pipe) shall be no more than 200mm wide.
7. Trenching shall only be carried out when the soil is in a firm (not wet and sticky) condition.
8. The base of the trench shall be cleaned of all debris before placement of the drain pipe.
9. A 2-8mm angular

4.7 Construction phase

This is the stage when the physical work commences. Given that construction methodology will largely be site and product specific, the scope of this section is limited to providing general guidelines only.

Each product will have its own design requirements, and each installer will have their own methodology for undertaking the works.

Many bowling clubs tend to leave contractors to their own devices at this stage, preferring to reduce expenditure on professional supervision of the work. However, this can be false economy.

Inevitably queries and issues will arise on site during the construction period and it is important that a properly qualified or experienced person is available to respond quickly on the bowling club's behalf. Delays in responding can lead to hold-ups and additional costs.

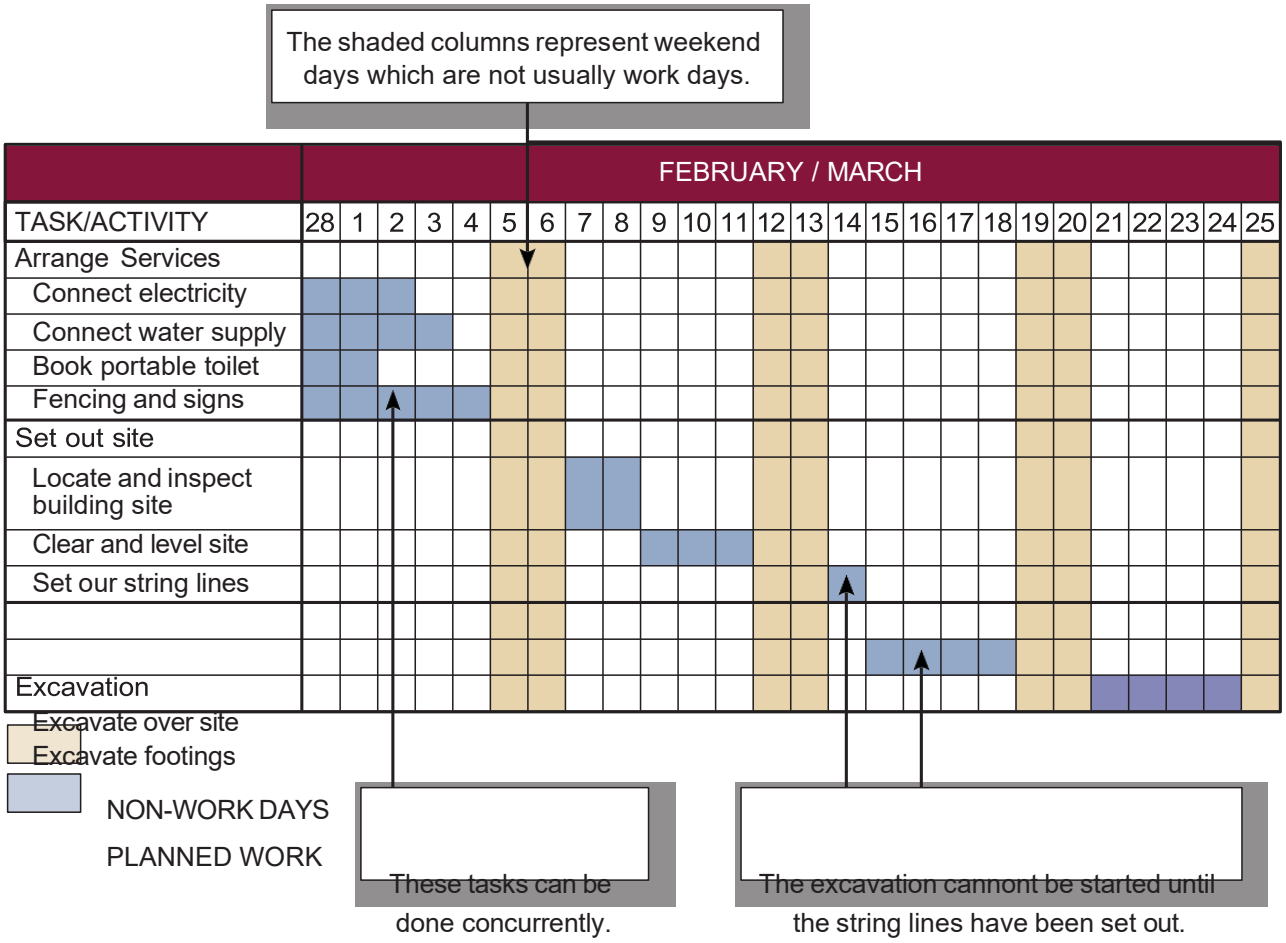
An obvious variable to contend with in a major greens project is the weather. Persistent rainfall and soft working conditions is a common nightmare with earthworks and drainage. It is important to ensure earthworks are postponed in overly wet conditions when the soil is soft and sticky, as this can jeopardise future performance. This point must be referenced in the contract documentation.

The construction period is a time when disturbance can occur to neighbouring areas in the form of increased traffic, noise and dust. Maintaining contact and consultation with these stakeholders is good public relations and may help to keep the peace. Keep them informed and allow organised site visits to view the progress.

Another critical issue with the construction work is to ensure the correctly specified materials, in particular root zone materials, sand or gravel inclusions, are being delivered. Contract documentation should specify the process used to ensure quality control of delivered materials.

Project management is aided by having a construction timetable mapped out. The timetable may be in the form of a "Gantt Chart". The chart will specify the proposed dates for each key item in the program. It may also document other information such as who is responsible for each item.

An example of a Gantt chart



Towards the end of the construction the contractor or appointed consultant should prepare and provide the bowling club full and accurate information on the works (e.g. location, depth and composition of pipe drains, cabling etc.). This could be in the form of scale drawings, photographs or as-built plans.

The final stage of the construction will entail the performance testing of the completed works and sign-off by a qualified testing agency.

Depending on the contract terms, the contractor may be responsible for maintenance work (including repairing any defects and completing unfinished items such as full commissioning) for a period of six or 12 months. This period is known as the defects liability period or maintenance period.

Constructing a new natural turf green

There is no such thing as a standard recipe when it comes to designing and building a natural turf bowling green. As such, it is recommended that an expert agronomist/engineer be commissioned to help plan and design the development. The design detail will need to account for a number of variables, including:

- Quality of existing materials on site, including the stability of the sub-base;
- Allocated budget;
- Requirements of the green (year-round use);
- Climate, especially as it affects the turf types able to be used;
- Availability of water.

The specialist engineer/turf agronomist will be able to provide information on the relative performance of different construction options and can produce specifications for the selected option.

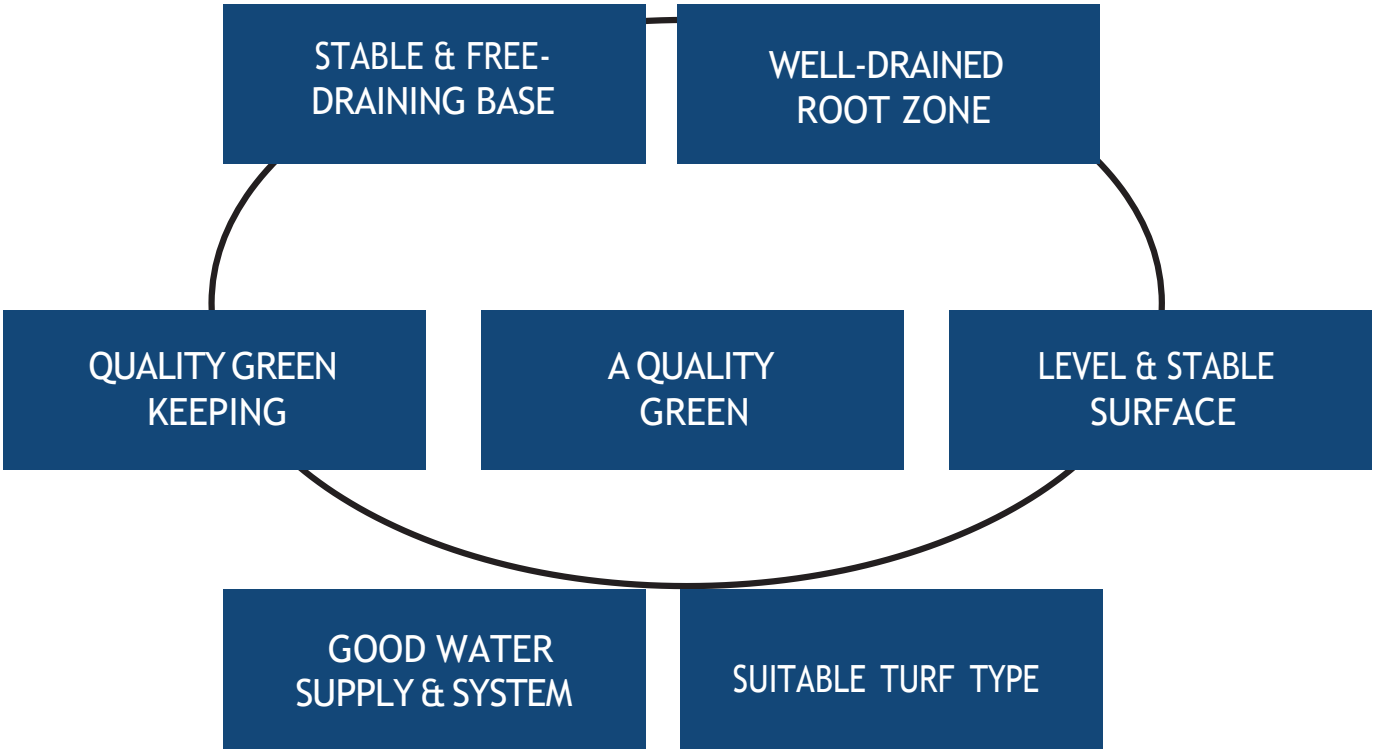
The key components in the design and construction of a natural turf green include:

- Ensuring a stable but free-draining base;
- Providing a suitably drained and aerated root zone;
- Producing a very level surface that will support healthy turf;
- Using a turf type that meets the performance and maintenance needs of the bowling club;
- Providing adequate watering;
- Ensuring quality maintenance.

The base

Construction of the base and drainage system is a critical part of the construction process. Failure to achieve good base stability can result in on-going settling and poor levels. Conversely, an overly-compacted base will restrict water and root development. Engineering standards can be referenced in order to ensure the sub-base is adequately stable.

Installing a new green should involve a professional investigation of the site and nature of the soil profile. There is always the risk of finding unforeseen ground conditions during an investigation.



Although this “bad news” is likely to represent an additional cost, it is critical to address any inherent sub-base issues at the outset. Attention is also drawn to legislative requirements that pertain to earthworks, such as any requirement to have soil tested before it can be removed offsite.

Site problems can include:

- Soft ground resulting from unconsolidated fill material or peaty soil;
- The presence of swelling/shrinking clay, which can cause subsidence if the base dries out;
- Slope stability and erosion issues, especially if the green is located adjacent to a steep slope or water course;
- Contaminated soil. Fill sites are often a journey into the unknown. Again, seek professional help to evaluate what is down there.

Where there is a barrier to sub-surface drainage (such as a site with an impermeable clay base), it will be necessary to install a customised pipe drainage system. Specialist advice should be sought if designing a bowling green drainage system.

The root zone

Sound root zone design is critical to the long term success of a natural turf green. It is important to ensure the right materials are used. Construction materials should be tested and approved by a reputable laboratory for partical size and drainage performance before use.

Sandy loams or loamy sands are the preferred material for constructing bowling green root zones.

Some greens have been built along the same lines as golf greens, using a straight fine to medium grade sand. Although they drain well, these pure sand root zones will generally be more difficult and more costly to manage than using a soil-based media.

Where finer-textured materials are used (e.g. silt loams or clay loams), extra care is required during the construction phase to minimise damage to the soil structure. This will require the careful selection and use of lightweight machinery, and avoiding work in excessively wet conditions.

The turf

The best grass types for a natural turf bowls green are ones that produces a tight, fine, robust cover that can tolerate low mowing height. The main grass species used in Australia are generally of either Agrostis (bent grass) spp. or Cynodon (couch) spp. Bent grass is generally preferred in cooler climatic regions, whereas couch is favoured in the warmer climatic regions.

Within each of the main species, there are various types of grass cultivars. Couch cultivars include names such as Tifdwarf, Tif green and Santa Ana, and bent grass names such as Penncross, Egmont and 1020.

When selecting the turf type, check around the region to see what has stood the test of time and works well at like bowling clubs. Also, refer to your local greenkeeping association for information.

Bent natural grass

Couch natural grass

Rolling a natural turf green

Water use

Natural turf requires water all year round to survive. In the hotter months, a green will typically require in the range of 40m³ of water per week (from rain or irrigation) to maintain turf cover.

Considerably less water is needed in cooler months, especially if the cover goes into dormancy (couch greens). The amount and quality of water required will depend to some degree on the turf and soil types used. Couch, being a warm season (C4) grass, has a lower water requirement than bent grass. A straight sand root zone medium will store less water than a finer-textured soil, and as such will require more frequent watering.

General maintenance

The capability of the greenkeeper is a key factor in the success of a natural turf bowling green. The greenkeeper will need to ensure the right decisions are made in terms of mowing, rolling, fertiliser application, watering, spraying etc.

As each natural turf green installation is unique, the maintenance regime will differ. Please contact your local green keeping association for further information on procedure for maintaining a natural turf bowling green.

CONSTRUCTING A NEW SYNTHETIC TURF GREEN

Introduction

A great deal of information must be gathered before embarking on the construction of a new synthetic turf green. In addition to the more obvious information, the bowling club will need to identify “unknowns”, such as any legal or environmental issues pertaining to the development of a new site.

8.2 Site location

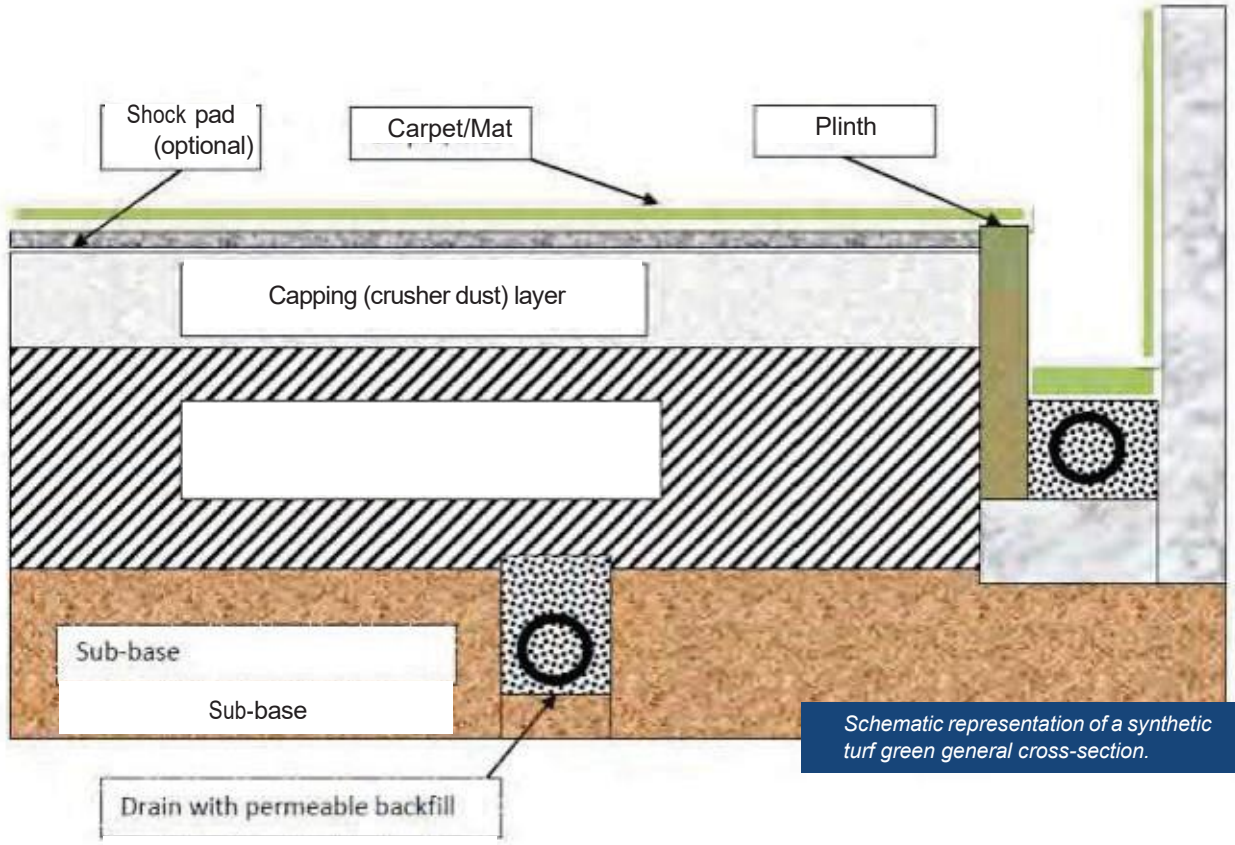
Key considerations when selecting the location for a new bowling green include:

- Ensuring there is sufficient land available to accommodate the required dimensions of the green and its immediate surrounds. Allow for a surround path (usually 1.5–2.0m wide) and outer landscaped area (grass or garden);
- Ideally, avoid sites that might have subsequent problems such as long term subsidence, erosion or flooding;
- Consider the proximity of neighbouring residences and any potential issues arising, such as securing consent for use of lighting;
- Where possible locate the green away from tall buildings and trees that may cast shadows and cause other problems;
- Consider any land ownership or environmental issues that could constrain the development.

The base

The underlying sub-base is a critical part of the green structure. The base is the most common cause of synthetic green failure. The base must:

- Be able to support the loading placed on the surface over time without subsidence;
- Remain stable and level over time and over a wide moisture content range (shouldn’t move upon wetting or drying);
- Provide acceptable drainage performance, especially if the system selected requires a porous sub-base;



Schematic representation of a synthetic turf green general cross-section.

Drain with permeable backfill

The base of the green is composed of distinct components. Typically there is the underlying subbase, which has been exposed and levelled to form the foundation for subsequent layers. The next layer is invariably an imported coarse and variable-graded stone material, often termed the engineered base layer. Finally a finer, variable-graded, angular or capping layer is installed in order to provide a finished surface upon which the carpet can be laid. Different suppliers/installers will have their own specifications and construction methods for the engineered base and the capping layer. For example, specialist resins may be used to bind and stabilise the capping layer.

Regardless of the base design specifications the bowling club should ensure that:

- A geotechnical investigation is commissioned at the outset in order to determine the site stability and suitability. Professional testing for ground condition should be a pre-requisite for any new site, given that many Australian soils (such as black clays) are potentially unstable;
- A functional drainage system with an outlet of sufficient capacity is designed;
- Existing utilities (electrical, water supply, waste and drainage) are located;
- Legal issues and costs pertaining to the removal or importation of soil material, removal of trees and other structures etc. are understood and complied with (Chapter 11).

It is worth repeating that a professional investigation of the base composition should be conducted at an early stage of the project. This investigation will provide information on ground stability under load, sub-surface drainage characteristics, depth of any topsoil, soil plasticity and other engineering information such as the presence of fill, reactive soil or buried tree stumps.

Contaminant testing should also be budgeted for, especially in landfill sites.

In engaging a geotechnical consultant the bowling club is advised to investigate ground conditions at a minimum of three locations and to a depth of at least 1m. The ensuing report should provide recommendations on:

- soil profile properties;
- soil shrink and swell characteristics;
- soil permeability;
- contamination assessment (where required);
- comments on any factors likely to affect long term stability, such as presence of fill.

The geotechnical report should be mindful of the demanding levelness and stability requirements when building a synthetic green.

Guidelines for constructing the sub-base although most base earthworks will be carried out by the appointed contractor, it is in the bowling club's interest to know what is going on and what can go wrong.

Some guidelines include:

- It is important to identify and remove any soil layer that could potentially degrade and settle over time. This includes any organic layer (topsoil) and any layer identified by the geotechnical report as potentially unstable;
- If material is to be transported off site it is likely to require contamination testing. Test results showing potential contamination may require a re-think in the project design and in the budget;
- After identifying any problem layers, work can commence on shaping the base. This could involve a cut operation only, a fill operation only or a combination of cut and fill;
- If the formation of the base requires fill make sure each layer of fill is well-compacted. Fill material must be built up in layers of no more than 150mm (compacted) thickness. Each layer should be compacted to a uniform density as recommended by the geotechnical consultant;
- Should testing find the required density has not been achieved; the layer should be re-tilled and then re-packed;
- The above sequence shall be repeated until the design fill level has been reached;
- Depending on the system used, a geotextile may be laid over the sub-base before placement of the engineered base layer.

Guidelines for the engineered base and capping layer

As mentioned, each installer will have their own recipe and approach for the engineered base and capping (crusher dust) layer. From the bowling club's viewpoint, the type of material used is largely irrelevant, just as long as the installation meets the required performance criteria. Performance criteria include the following:

Drainage performance

- Both layers must ensure rapid water flow from the surface to the underlying pipe drainage system;
- As a guideline, the engineered base should have a permeability of at least 200mm per hour and the capping layer (after application of the cementing agent) have a permeability of at least 100mm per hour.

Laser levelling stone layer

Levelness requirements

- Both layers need to mirror closely the levelness of the finished surface;
- The completed engineered base should have no more than +/-10mm elevation difference across the entire surface and the capping layer no more than +/-5mm elevation difference.

Stability

- Both layers need to be well-compacted and stable so that there is no movement over time;
- The geotechnical consultant will be able to advise on and test for the degree of compaction required for each of the various layers. Given the importance of the base layers to the long term performance of the green, it is strongly recommended that each layer be checked and performance tested before proceeding to the next stage.

Drainage system

It is generally necessary to install an underlying pipe drainage system, as well as a ditch drainage system, given that the majority of synthetic green designs rely on a porous base to clear water after rain.

It is also worth noting that a number of synthetic green installations have been ruined as a result of an inadequate storm water drain system and water back-flowing through the pipes and up into the green. It is recommended that the green drainage system be isolated from any rooftop or other storm water drainage system.

When designing a drainage system for the green, consider:

- Make sure there is a suitable outlet that enables direct exit of water from the pipe drains, has sufficient capacity and which will not reverse flow. In low-lying areas, where there is the possibility of flooding and back-flow, it is a good idea to include a flap gate in the design;
- Use specialist land drainage materials and fittings (perforated corrugated plastic tubing is the most common form of drainage pipe);
- Use a permeable fill around and over the pipe drain in order to link the drain to the overlying permeable base materials;
- Geotextile material is often used below the engineered base and to line the drain trench. It is best to avoid placing geotextile over the pipe drain backfill, as this can ultimately silt up and limit passage of water into the drain.

The Shock-pad (under-pad)

Many bowling greens today incorporate a shock-pad in order to regulate speed and to make the green more comfortable for users. Various forms of shock-pad can be used, from an integrated pad, where the manufacturer bonds the shockpad to the back of the turf carpet at the factory, to a roll-out pad, which is manufactured and laid separately to the carpet/ mat. There is also the potential for an in-situ pad, which is manufactured on site using a hot mix of rubber shred or crumbs, bound with polyurethane, although this technology is rarely used for bowls.

The nature of the shock-pad thickness will impact on green speed, and this should be considered when selecting an appropriate product.

Shock-pad installation prior to synthetic surface

The carpet

Synthetic bowls products have evolved considerably over the years, with design and installation faults (such as lack of UV stabilisation and inadequate drainage), progressively sorted out.

Various types of synthetic turf products are used for bowls and the options seem to be increasing. Options include:

- 'Tufted' synthetic turf, generally sand-filled;
- Woven mat or carpet;
- Needle-punch carpet.

The earlier greens tended to be open weave pile using polypropylene or polyethylene tufting of around 12mm in length, fixed into a polypropylene and latex backing. The tufts are held upright by a sand infill layer, which is top-dressed and drag-matted into the turf after laying. The selection of sand in these systems is critical, as sand-infill should be non-abrasive, non-staining, well rounded and dust-free material that is non-damaging to bowls.

Woven carpet and needle-punch carpet have gained in popularity in recent years.

Each type of surface has its advantages and disadvantages.

Type of surface	Advantages	Disadvantages
Tufted synthetic (sand-filled)	• Low cost • Ready to go once laid • Can be bowled on in all four directions • If shockpad included, highly comfortable	• Takes time to settle down • Takes more maintenance and critical to keep regularly maintained for consistent play • Can get hot • Can scratch the bowl
	• Consistent performance • Ready to go once laid • No water required • Relative easy to maintain	• Generally most expensive option • Tends to be used in two directions only (perpendicular to seam) • Can get hot • Not easy to repair
Needle-punch	• Lower cost • Ready to go once laid • Generally no water required • Relatively easy to repair if damaged	• Performance (speed and draw) can vary with temperature change such as cloud cover • Can get hot

Selecting the right system

Word of mouth feedback, pricing and required performance (in particular speed) are key factors in determining what type of playing surface to select. A bowling club should look to gather as much information as possible on the different types of surface before deciding on a system. Quite often this involves a reconnaissance visit to other bowling clubs, coupled with an approach to various supply companies.

When assessing performance of greens at neighbouring bowling clubs consider:

- How the green is currently performing (speed, draw, specific characteristics);
- The consistency of the surface under changing weather conditions (wet/dry; cold/hot);
- Whether or not the performance of the green has changed over time with ageing. For example, has the drainage deteriorated?
- The costs of installing and maintaining the surface;
- The expected life of the surface;
- The time frame involved in laying the surface;
- Quality of back up support from the installer;
- How much water is required to maintain the surface (with sand-filled carpets);
- Other, including what went well and didn't go well during the project.

Installation of the synthetic surface is a specialist business, requiring experienced personnel and specialist equipment. The bowling club should ensure the appointed contractor has a proven track record with installing bowls greens.

Life expectancy

The life expectancy of synthetic bowls surfaces will depend on a number of variables, including:

- The product type;
- Standard of installation (especially the stability of the base);
- Amount of use;
- Standard of maintenance;
- Climate.

There is sufficient evidence to suggest a well-constructed and maintained surface could last at least 10 years.

Given the expected longevity of a synthetic surface might be 10 years; the bowling club will need to budget for its eventual replacement. Knowing the estimated replacement cost, it will be possible to determine how much must be set aside each year to cover the depreciation cost. For example, given a replacement cost of $80,000 and a 10 year life span, the annual depreciation cost would be in the order of $8,000 p.a.

Warranty

It is critical that bowling clubs clearly understand the warranty that is being offered with the synthetic turf green. Terms and conditions of warranty will vary between suppliers.

The warranty may apply to just the condition and performance of the surface carpet layer or could apply to the complete system (e.g. performance of the base). The preference would be to have a warranty that covers the entire system, given that failure of the base is one of the most common causes of a green's failure. Cover could include total making good or just the cost of a replacement carpet.

Take care to check on any clause that voids the warranty (these could include incorrect maintenance, incorrect footwear, excessive dumping, vandalism, floods or the like). Consider seeking professional advice to properly understand the scope and cover of the warranty.

Performance testing and performance standards

Introduction

It is strongly recommended that any contract documentation related to a major project, such as construction of a new green, includes reference to recognised performance standards. These standards can be used as the basis for determining if the works is fit for purpose at handover.

Performance testing will be an additional cost, but it constitutes a fraction of the total overall cost and represents essential insurance.

Key points of note in regard to standards for bowls surfaces include:

- Currently, the most comprehensive bowls performance standards used worldwide are the World Bowls Ltd standards. A description of these standards is presented in Section 9.3;
- There are some individual associations, such as Bowls Victoria, who have developed their own set of testing criteria (Section 9.4);
- A bowling club may wish to specify modification or refinement to the World Bowls Ltd or any other standards. For example, the bowling club may opt to set the green speed in a more narrow range, say 13-16 seconds;
- Although the World Bowls Ltd standards are primarily designed for synthetic turf greens, they can also be used for natural turf greens. If using the standards for natural turf greens we advise the levelness standards be set for a defined period, say up to four months after renovation;
- A synthetic turf green is expected to perform well for many years, and as such the bowling club may wish to specify that prescribed standards continue to be adhered to for a longer term, not just at the point of hand over;
- The World Bowls Ltd standards do not specify required performance of the base direct; it is assumed the performance of the surface encompasses how the base performs. However, given that the base is critical to long-term performance of a synthetic surface, it is advisable that additional standards be included in contracts to cover base performance and that the base be tested and signed off before laying the carpet.

Requirements for the base

The three key components of the base are levelness, drainage rate and stability. Performance standards are required for all three components. These standards for the base need to be matched to the standards used for the completed surface.

Levelness

Levels should be checked after completion of the base works and prior to laying the synthetic turf. The finished level of the green shall not deviate from the design level when measured in accordance with recognised civil engineering practice, using an optical or laser level, by more than ±5mm. The difference in height between adjacent (2m grid) spot levels shall not be greater than 3mm, although variances of up to 6mm may be allowed in places where the trajectory of the bowl is not affected.

Infiltration (drainage) rate

After base works and prior to laying the synthetic turf the base shall have a minimum infiltration rate of 100mm per hour.

Base stability

Base stability encompasses two key components. First, the base must remain stable and level over time. Second, the base should be able to take a certain amount of load bearing without deforming.

Engineering tests are available to derive, objectively, value for both base stability and load bearing.

Standards used need to be tight, but not over the top, bearing in mind we are not building a road.

The geotechnical consultant will be able to adivce on appropriate guidelines for base stability.

The World Bowls Ltd Standards for bowling greens

Scope

This standard specifies requirements for flat green bowls surfaces, in particular synthetic surfaces. The requirements apply to the performance of the system as a whole.

Definitions

For the purpose of this standard, the following definitions apply:

Green speed - The number of seconds taken by a bowl from the time of its delivery to the moment it comes to rest approximately 27.4m from the mat line.

Draw - A measure of the distance between the trajectory of a rolling biased bowl and a straight line between its starting and finishing points. Cushioning - The ability of the surface to deflect and absorb energy as a player walks on it.

Infiltration rate - The rate water enters the green surfacing.

Design level - A comparison of theoretical and actual levels of an installation at defined locations.

Classification

In this standard, surfaces are classified by their performance characteristics. The green speed must be within the range of 10 to 18 seconds. Additionally, it is necessary for the purchaser to specify whether the playing surface and supporting layers is to be permeable or non-permeable.

Dimensions

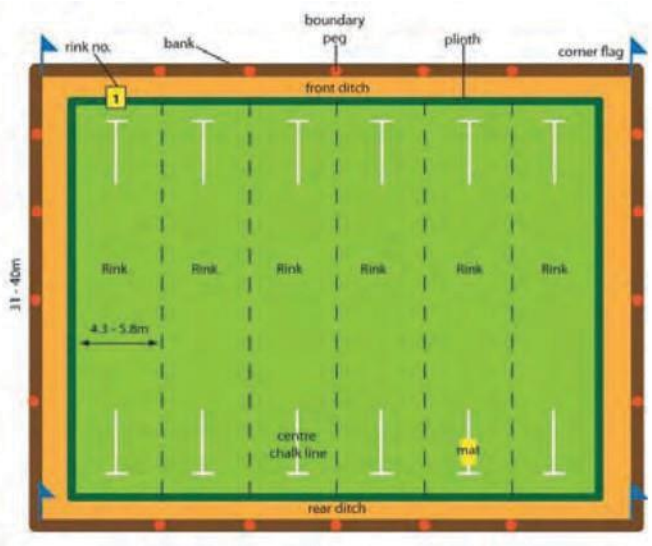
The dimensions of the green shall be as detailed in the Laws of the Sport of Bowls.

The green:

- The green should be either rectangular or square;
- The length of the green in the direction of play shall be between 31 and 40 metres;
- The green should have a suitable level playing surface;
- The playing surface should be either vegetative or a synthetic surface approved by a Member National Authority. For domestic play, Bowls Australia can decide the standards for greens constructed in line with previous editions of this law.

The ditch:

- The green should be surrounded by a ditch;
- The ditch should be;
- Between 200mm and 380mm wide;
- Between 50mm and 200mm deep;
- The ditch should have a holding surface free from obstacles and made of a material that will not damage the jack or the bowls.



The bank:

- The ditch should have a bank against its outer edge;
- The top of the bank should be at least 230mm above the surface level of the green;
- The bank should be vertical and set at a right angle to the surface of the green, or sloped at an angle of not more than 35° from the vertical;
- The surface of the face of the bank should be made of, or be covered with, a material that will not damage the jack or the bowls;
- There should be no steps interfering with play either cut into or positioned against the face of the bank.

Division of the green

The green shall be divided into sections called rinks, each not more than 5.80m, nor less than 4.30m wide. They shall be identified in order (e.g. using numbers, letters, Roman numerals, etc.) with the centre line of each rink being marked on the bank at each end by a peg, disc or other suitable device.

The four corners of the rinks shall be marked by white or brightly coloured pegs made of material which will not damage the jack or bowls and fixed to the face of the bank and flush therewith, or alternatively, fixed on the bank no more than 100mm back from the face thereof. The corner pegs may be connected by a green thread drawn tightly along the surface of the green, with sufficient loose thread to reach the corresponding pegs on the face or surface of the bank, in order to define the boundary of the rink.

Performance

Unless indicated by the manufacturer or supplier, the surfacing shall meet the appropriate parameters in all climatic conditions. It is reasonable to assume the green should be able to meet the standards required for Pennants play as minimum.

Before commencement of verification tests, a facility should be maintained in accordance with the supplier's detailed procedures to the satisfaction of the supplier and facility owners/ users.

Greens shall be tested in locations detailed in each test method. If the results obtained are variable or border-line, the test officers shall use their discretion and select additional field locations to evaluate the whole green's ability to comply with this standard.

If a green is only designed to be used in two opposing directions the test locations for green speed and draw shall be adjusted accordingly.

If an installation is not designed as a full green, but only comprises one or more rinks, each rink shall be assessed in the directions of play as appropriate.

Green speed

The green speed of the surface when measured in accordance with Test Method WBB-01 shall be in the acceptable World Bowls Ltd competition range of 10 and 18 seconds. The green speed obtained in each test location shall be within ±0.5s of the mean green speed.

For carpet-based systems, the test location is limited to the direction of tournament play, which is across the seams. On a carpet-based system, the green speed obtained from the tournament direction locations shall be ±0.5s of the mean green speed.

It is up to each bowling club and installer to decide what speed is appropriate dependent on the level (international, national or bowling club level events) of use required and the expectations of the end users (i.e. the bowlers).

Testing green speed

Surface draw

The maximum draw, when measured in accordance with Test Method WBB-02, of surfaces having green speeds in the range 10 to 14 seconds shall be greater than 750mm, whilst the maximum draw on surfaces having green speeds in excess of 14.1 seconds shall be greater than 1000mm.

The maximum difference between pairs of left and right maximum draws shall be less than 40%.

Surface evenness

Undulations found on the surface shall be no greater than 3mm, when measured using a 3m straight-edge in accordance with test method WBB-03. Undulations of up to 6mm are permissible providing they do not affect the trajectory of a bowl, particularly as it rolls slowly. Undulations greater than 6mm should not occur anywhere on the green.

Design levels

The green shall be level. The finished level of the green shall not deviate from the design level when measured in accordance with recognised civil engineering practice, using an optical or laser level, by more than +/-5mm.

The difference in height between adjacent spot levels shall not be greater than 3mm.

AFTERCARE AND MAINTENANCE GUIDELINES FOR SYNTHETIC GREENS

Introduction

How well a green performs over time depends to a large degree on how well the green is maintained. In the majority of cases maintenance of a newly-installed synthetic green is left up to the bowling club, and it is the bowling club's responsibility to ensure it has the appropriate equipment and expertise on hand. Some commercial companies offer maintenance services as an add-on (note that specialist synthetic turf maintenance is becoming a big business in places like the UK).

When determining the maintenance requirement of a synthetic green it is important to appreciate that each type of synthetic surface will have its own maintenance requirements, and that each supplier is likely to offer customised maintenance programming. This program should be delivered and demonstrated to the bowling club prior to the hand-over of the green. A bowling club needs to know its contractual obligations in regard to maintenance as, for one thing, failure to implement the recommended program could be deemed by the supplier to void warranty.

The following is a broad generic overview of the maintenance requirements for a synthetic green.

For further details, refer to the specific manufacturer's handbook, or the "Maintenance of synthetic surfaced bowling green's." (NZ Sports Turf Institute publication).

General housekeeping and guidelines

Golden rules for good housekeeping of a synthetic green include:

- Avoid unnecessary traffic (foot and machinery) on the green;
- Move rink positions regularly (weekly or more often);
- No smoking or food/drink on the green;
- Use correct footwear (flat-soled shoes; bare feet or stockings);
- No chewing gum;
- Minimise excessive dropping/dumping of the bowl.

It is recommended that the bowling club installs signs around the green informing members of the need to wear appropriate footwear and the rules on food and smoking. Drink should not be consumed on the green. Soft drink products containing various dyes can stain the carpet and the stains can be very hard to remove.

The use of correct footwear on the green is likely to be part of the supplier's stipulations for use of a carpet-type synthetic green. Use of improper footwear on a green may void any claims on warranty.

Chewing gum should be banned from a synthetic green. Chewing gum can be difficult to remove if it gets into the turf of the grass or the weave of the carpet. In the event of gum appearing, one option is to apply ice cubes to harden the gum, as it is more easily removed in a solid form.

Basic maintenance

Watering

A tufted sand-filled green is likely to need watering to maintain the sand base moisture at the correct level and in turn to maintain uniform green speed. A light sprinkling of a few minutes should be sufficient. Fully damper the surface but avoid over watering (flooding).

Rolling (applicable to sand-filled surfaces)

Rolling should only be done at the direction of the installer. Excessive rolling has the potential to increase wear, alter speed and slow down drainage.

Grooming (applicable to sand-filled surfaces)

Correct grooming helps to: maintain the surface drainage, maintain the correct sand level, open up the synthetic pile to reduce compaction, and remove dead algae and moss.

The power brush should be set to penetrate to a depth of about 2 or 3mm into the synthetic surface.

Grooming would generally be carried out monthly or as recommended by the surface supplier.

It is recommended to purchase a leaf blower to keep the green clear of leaves.

Weed/moss/algae control

Control algae and moss before the growth gets out of hand. The treatment procedure usually involves spraying with an approved chemical, as recommended by the surface supplier, then leave until the surface is dry. The surface should then be groomed with the power brush. Small areas can be groomed with a stiff yard broom.

Vacuuming (for woven mat or carpets)

Any loose matter on the surface should be vacuumed using a unit approved by the supplier of the synthetic surface. The vacuuming should be undertaken at walking pace without stopping. Do not over vacuum and use the vacuum only when the surface is dry.

A more thorough cleaning of the surface is likely to be necessary every six months or so, subject to the installer’s advice. This would consist of an initial pre-soak of the surface, then he application of a low foam cleaning solution as recommended by the surface supplier.

After the cleaning solution has soaked for one to two hours, the excess water and any dirt build up can be removed using a wet and dry machine. Do not pressure-wash the surface.

Re-stretching

A woven carpet type synthetic surface will need periodic re-stretching to maintain the desired green speed. While re-stretching is a relatively straight forward process, it is highly recommended this be carried out by the green installation company, at least during the warranty period.

Heavy equipment

Surfaces can be indented and therefore damaged by heavy or sharp objects standing or dropped on the green. Any such equipment that is required to be placed on the surface should be fitted with pads or boards placed under the legs to spread the load (for example, compressors or scissor hoists for adjusting lights).

Prohibit any narrow and small (less than 50mm diameter) wheeled implements from going on the green, such as roller skates, skateboards, bicycles and, in some cases wheelchairs, that may do damage to the green. Check with the supplier's warranty for exclusions.

Plantings

Avoid planting shrubs, climbers or trees near the green. Their roots may disturb the green's surface, and leaves can create additional maintenance.

Shrubs, trees and hedges that must be planted close to the green should be carefully chosen to avoid roots getting under and into the green. A root barrier should be installed in cases where aggressive rooting species have been planted nearby.

Vandalism

Bowling clubs who install synthetic greens should be aware of the risks associated with vandalism.

Vandalism can be reduced by the use of security fencing, motion detector lighting systems, alarms and security checks.

Avoid having heavy but moveable objects, such as chairs and signs, left lying around the green, as these could be used as missiles. Such objects should be bolted down or locked away after each day's play.

Chemicals such as spray paint are extremely hard to remove from synthetic turf, as most of the solvents required to remove paint can also damage the surface.

It is recommended that the bowling club contacts the installer prior to carrying out vandal repairs. Vandalism repairs should be done by the installer and vandalism is not usually covered in the installer's warranty.

Flood

In the instance of flood damage refer to your insurer before contacting your installer.