

# Successful Putting Green Construction Starts With Planning

Putting green construction projects must account for playability goals, agronomic requirements, and budgetary considerations.

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*Using a proven construction method is not enough to ensure the success of a new putting green. There are many other factors that must be considered as well.*

Nothing impacts the game of golf and the enjoyment of those who play it more than putting greens. Although they typically only represent 2 percent of a golf course's acreage, it is not uncommon for golfers to play 40 percent of their shots from putting greens.<sup>1</sup> Putting greens may not account for a large area, but because they are so important they receive more inputs per square foot than any other playing surface.

Good putting green performance starts with a sound construction method and high-quality materials. The USGA Recommendations for a Method of Putting Green Construction have helped golf facilities achieve excellent putting surfaces for more than 50 years.<sup>2</sup> However, there are a

myriad of other factors that impact the long-term performance and care of putting greens. Even properly built putting greens can fail or underperform if other key issues are overlooked. Similarly, playability issues can develop in surrounding areas if putting green complexes are not considered during construction. This article highlights nine often overlooked tips to optimize the performance of new putting greens and their surrounding areas.

**TIP 1:**  
**Hire a Golf Course Architect, Test Construction Materials, and Optimize the Growing Environment**

Golf course architects are usually engaged to design new putting greens.

They can provide valuable advice throughout all stages of a construction project. Working with an accredited soil testing laboratory also is essential to determine suitable construction materials, including sand, gravel, and amendments. An accredited lab can also help manage quality control.<sup>3</sup> It is equally critical that all putting green sites provide proper growing conditions for turfgrass. Without adequate sunlight and air circulation, even a well-designed and properly constructed putting green will not succeed.

**TIP 2:**  
**Select the Right Turfgrass for New Putting Greens**

Golf courses are built in widely varying climates, so it is important to select the

best-adapted turfgrass species for your location. For some areas, the choice of which turfgrass species to use is quite clear. However, in areas such as the transition zone where many turfgrass species can survive, the decision becomes more difficult. Fortunately, plant breeders have significantly advanced putting green turfgrasses over the past two decades. Many improved bentgrasses and bermudagrasses are now available. For areas with warmer climates and poor-quality irrigation water, seashore paspalum has been successful. Zoysia-grass is another new option for putting greens that is gaining popularity.<sup>4</sup> After choosing a turfgrass species, select a variety with desirable characteristics. Factors such as disease resistance, spring greenup, heat and cold tolerance, shade and wear tolerance, and the ability to tolerate poor-quality irrigation water must be considered. Compare

results from the [National Turfgrass Evaluation Program](#) (NTEP) to determine how particular turfgrass varieties have performed in research trials at universities in different climates. The NTEP reports, for example, can help you determine which creeping bentgrass cultivars are least susceptible to dollar spot or other diseases that may be particularly problematic in your area.

**TIP 3:**  
**Carefully Plan Surface Drainage and Traffic Flow for Successful Agronomy**

Properly built USGA putting greens have excellent internal drainage, but surface drainage is still extremely important. Effective surface drainage is especially critical for putting greens in northern climates where frozen soils and winter injury are common. Positive surface drainage also is very important

for putting green surrounds. Ideally, putting greens should have positive surface drainage in at least two, or preferably more, directions. Avoid locating design features where they will impede surface drainage. Also, avoid concentrating surface drainage into areas that receive heavy traffic.

**TIP 4:**  
**Plan Ahead for Adequate Hole Locations**

No putting green should be constructed or renovated without providing sufficient area for hole locations. A wide variety of hole locations makes for more interesting golf, and it is critical for spreading wear. Most putting greens should have a minimum of five hole location areas. However, putting green design is not an exact science, so there may be some exceptions to this tip.

Turfgrass selection, putting green contours, and the desired green speed



*To manage costs and optimize playing conditions, it is essential to choose the most appropriate putting green turfgrass for your facility. There are many improved grasses from which to choose.*





*Putting surfaces should be designed to provide enough surface area and hole locations to spread wear across the surface.*

are all important factors that affect the playability of a putting green. Advances in maintenance practices, equipment, and plant genetics have allowed superintendents to provide very fast putting surfaces. However, all putting greens have an architectural speed limit — i.e., a speed beyond which the number of usable hole locations quickly declines. Regularly exceeding the architectural speed limit concentrates more traffic on less area. It also limits the flexibility of course setup and prevents golfers from enjoying hole locations that were intended by the original design.

Three-dimensional modeling technology can identify usable hole locations based on preferred green speed and designed contours. The technology precisely displays usable hole location areas on a topographic map of each putting green. The maps help visualize contours and speed. For example, if putting green speed is 11 feet, as measured using a USGA Stimp-meter®, hole locations will generally be limited to areas with a slope no steeper than 3 percent. Areas with steeper slopes cannot be used for hole locations at that speed because the ball may not

come to rest. While not every putting green design needs to abide by the recommendations from 3-D modeling to optimize hole locations, this technology can provide extremely valuable

information. Companies are available to assist with this important aspect of planning.

**TIP 5:**  
**Account for Mowers and Other Maintenance Equipment**

During the planning and design process, consider how the putting greens and their surrounds will be maintained. Labor costs and availability, fluctuating maintenance budgets, and other economic developments may necessitate changes in mowing operations. Having the ability to use walk-behind mowers and triplex mowers or even robotic mowers is extremely beneficial. A 10-foot-wide buffer area around putting greens that is free of design features that hinder equipment maneuverability makes it much easier to use large, labor-saving equipment. Unfortunately, many superintendents are limited by putting green complex designs that can only handle walk-behind mowers due to the proximity of bunkers or steep slopes.

**TIP 6:**  
**Install Tracer Wire Around Putting Green Perimeters**

It is very common for the original perimeter of a putting green to gradually



*Putting green designs that accommodate different types of mowers increase maintenance options, which can reduce labor and resource inputs.*



*Carefully planning the approach and surrounds areas will have a positive impact on turf quality, playability, aesthetics, and golfer enjoyment.*

shift. Bermudagrass putting greens are especially prone to becoming smaller and more rounded over time. Installing an underground copper wire along the putting green boundary during construction allows for quick location of the original perimeter using a wire tracer. There are even mower attachments that allow operators to easily follow the tracer wire when making their cleanup passes. The same technology is used by robotic mowers to maintain the original size and shape of putting greens. Survey-grade GPS technology provides another option for mapping and maintaining putting green shapes.

#### **TIP 7:** **Set Up the Irrigation System for Success**

All putting greens rely on irrigation systems to provide supplemental water

when Mother Nature doesn't supply enough rainfall. Making sure turfgrass is getting the proper amount of water, especially newly constructed putting greens, is crucial. Too little or too much water can delay a grow-in and reduce long-term performance.

Setting up a new putting green irrigation system to optimize water usage is often overlooked. Depending on the irrigation design and location of the putting green, the amount of water that should be applied to maintain healthy turf can vary significantly from one putting green to the next. Irrigation models are available to estimate the amount of water that will be applied by taking into consideration putting green size, sprinkler output, and runtime. Using these models helps avoid applying too little or too much water. Proper irrigation setup has many benefits besides maintaining adequate

rootzone moisture. Properly watering-in plant growth regulators, protectants, and fertilizers helps maximize their efficacy. Irrigation models provide the insight needed to fine tune overhead irrigation. Your regional USGA agronomist can also assist with irrigation planning.

#### **TIP 8:** **Maintaining Good Surrounds Makes Good Putting Greens Even Better**

The collar is an area of play adjacent to a putting green perimeter that has a slightly higher height of cut than the putting green. Historically, collar width coincided with the width of mowing equipment, generally between 18 and 72 inches. Today, golf courses feature a wide variety of collar shapes, sizes, and mowing heights. Some golf courses even have multiple heights of



cut that gradually increase with the distance away from a putting green. Conversely, many courses have eliminated various mowing heights around putting greens and now maintain just a single collar height of cut. This simplifies mowing operations while still providing golfers with the option of hitting either a putt, chip, or bump-and-run shot. Minimizing the number of unique mowing heights and making collars wide enough to support large mowers will reduce long-term maintenance costs.

Turfgrass selection must also be considered because the water requirements and traffic tolerance in collar areas may differ significantly from the putting greens. Sometimes, as is often the case in cooler climates where creeping bentgrass is used, collars may be planted with the same turf that

is used on putting greens. The opposite is true when using warm-season turfgrasses. Bermudagrass varieties used on putting greens are not suitable for collar turf or putting green surrounds, so other varieties are planted.

The rough and putting green surrounds should also be provided excellent growing conditions to optimize turf health and playability. Putting green surrounds are extremely important due to the high number of approach shots that end up in these areas during normal play. Even professional golfers with the highest percentage of greens in regulation on the PGA Tour hit only 11.7 greens in regulation per round during the 2017 season. Average golfers typically hit far fewer greens in regulation. Therefore, providing high-quality turf from which to play recovery shots around putting greens is very

important. Weak turf near putting greens overly penalizes golfers for shots that only slightly miss their target.

The factors that most commonly limit the turf quality of putting green surrounds are shade, tree roots, inadequate irrigation coverage, off-type grasses, and traffic stress. Keeping trees away from surrounds is always important for optimizing turf health, especially for warm-season turf like bermudagrass that has high sunlight requirements.<sup>5</sup> Maintaining a zone free of shade and tree roots that extends 50 to 75 feet around putting greens is a good target that will positively impact turfgrass health and vigor. Installing separate sprinklers along the putting green perimeter to independently irrigate the surrounds also is important because their water requirement can differ significantly from the putting surfaces. Finally, provide multiple areas from which golfers can enter and exit putting greens to prevent the turf in collars and surrounds from becoming worn.

#### TIP 9: Sand Cap or Topdress to Provide Firm Approaches

Other very important playing areas adjacent to putting greens are the approaches, and the firmness of approaches is of particular importance. When the firmness of putting greens and approaches is similar, golfers can more easily play a variety of shots, including the popular bump-and-run. Fewer shot options are available when approaches are soft. However, providing consistent firmness in approaches isn't easy, especially if they are built with native soils that drain poorly.

Two popular solutions to improve firmness and drainage are regular topdressing and sand capping. A 3- to 6-inch-deep sand cap over native soil can provide favorable results. However, consult with an accredited laboratory to identify the best sand and determine the exact depth necessary for each sand-capping situation. Sand capping is generally extended 10 to 15 yards from the front of a putting green to provide an ample area for bump-and-run shots. The approach should be designed as wide as possible to simplify



*Adequate drainage in approach areas is critical for maintaining healthy turf and quality playing conditions. A firm green and soft approach make for very poor playability.*





Analyzing irrigation coverage before and after installation can ensure good coverage and help predict the approximate irrigation requirements for each individual green.

mowing operations and to allow for more bump-and-run opportunities. If budget restrictions limit sand capping, consider sand capping only the approaches on long par-3 or par-4 holes where golfers hit long approach shots and would benefit from the added surface firmness. Even with sand capping, adding extra drainage is still advised. Also, make sure the final grading provides for a smooth surface that allows putting from the approaches.

## CONCLUSION

These tips are examples of how the success of a putting green construction project depends on many factors besides those most commonly considered. The ideas presented should

be treated as key parts of an overall plan for a successful putting green construction project.

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