

Golf Course Design and Specifications Related to Maintenance

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IN NO OTHER FORM of construction is design and maintenance so closely intertwined. Both are driven by the wish to provide the golfer with the most pleasant recreational experience possible. To please the golfer, designers and superintendents must be fully sympathetic to the other's purposes and problems. Some issues must be addressed and some compromises made.

First, it must be stressed that maintenance is more important to the golfer than design. Given a choice between a well designed but poorly maintained golf course, or a poorly designed but well maintained one, the golfer will nearly always choose the best maintained. Second, it should be remembered that maintenance has a greater influence on the difficulty and speed of play of a course than does design. When greens are kept fast, fairways lush, roughs long, and sand bunkers soft, the golf course will play difficult and slow. And last, it is the subtleties or nuances of a golf course, such as flowers, shrubs, selected tree plantings, tee accessories, etc., that make a golf course memorable and enjoyable. In summary, this means that the golf course superintendent exercises far greater impact on the golf course and the golfer than does the designer. Hence, he should be aware of his power and responsibility, and likewise, he should be given full credit for making a round of golf an enjoyable experience.

These influences are 100 or more years old. In researching old magazines for a book I'm writing on golf course architecture, I continually find references to the great condition of this or that course, with only occasional mention of the design. So with the supreme role of maintenance established, let us then look at my real focus: Design and specifications related to maintenance.

First, we know that the single most important element of a golf course is drainage. I am certain you know the story about the well-known superintendent who was asked, "what does it take to

keep a golf course so beautiful?" His reply was, "about 5% common sense and 95% drainage. An if you don't have much common sense, then put in more drainage."

TWO ELEMENTS of drainage must be studied and coordinated: 1) surface drainage and, 2) sub-surface drainage. This means that unless a site has perfect internal drainage, the entire area must be analyzed for its drainage characteristics and patterns. These should be planned to remove all the water from the site. This usually means a system of drainage swales and catch basins, that lead into pipes or tile, a tile system for every green and bunker, a series of ponds and drains, and sometimes a retention-detention basin. The exact mechanics of drainage is really not within the scope of this paper, but the fact that it is a design element critical to good maintenance is.

Greens are the most intensively maintained portion of the golf course, so design of greens is closely related to maintenance. Green design should first produce good surface and sub-surface drainage. One approach is to design greens that drain in three or four directions and do not collect all of the water and dump it to one area, usually the front. Second, install tile on 15- to 18-foot centers and gravel backfill them under all putting surfaces and bunkers. Next, specify a soil mix for greens that resists compaction and has good internal drainage. Greens should provide enough areas for hole locations to spread out foot traffic and add interest to the golf course.

On tees, the design intent is to provide not only strategy and interest through multiple tee settings, but also to enhance maintenance by providing surface drainage, adequate space to spread traffic and wear, insuring good air drainage across the tee, and providing an appropriate irrigation system.

The style of bunkers, their shape, size, slope, and sand size, can evoke enough

discussion to take up a conference. First, the bunker should be built so that it will reject surface water from running in, especially on sand faces, to reduce water erosion. This means that all edges of the bunkers should be at least a couple of inches above grade. Second, the bunker should be drained either by tile or a French drain. Third, the bunker bottom should be perfectly concave or bowl-shaped, smooth and compacted before sand is installed.

TO THIS POINT, my discussion has focused on the physical factors of design and has not addressed turfgrass, the single most important specification related to maintenance. No other factor under the control of the golf course architect will dictate the overall maintenance practices or playing conditions than the selection of turfgrass. The choices are varied. A few years ago this was not the case. Routine and standard specifications were acceptable. In view of the enormous advances in turfgrass breeding and selection over the past few years, this may not be the best practice today. In fact, I believe that each individual golf course site should be studied for its inherent climatic and edaphic qualities, along with local environmental restrictions and attitudes, before turfgrasses are selected and specified. Ideally, a probable maintenance regime should also be defined, within any budgetary limitations, before turfgrasses are selected. Then knowing specific site factors (drainage, soil fertility and texture, quantity and quality of irrigation water, proposed pesticide schedules, mowing equipment and height, etc.), climatic factors (wind, normal rainfall patterns, air drainage, and length of playing season), along with edaphic factors (soil chemistry, soil biology, and physical limitations), social factors (E.P.A. or conservation restriction, probable total play, private or public golf course, existing competition, etc.), and budget factors, turfgrasses may be selected.

(Right) Note the contrast between an unmowed sheep fescue rough; the mowed hard fescue rough; bluegrass fairways and bentgrass greens.

(Below) At Cypress Point, California, native grasses, bentgrasses, fescues and beachgrasses all have their effect.



Let me give you some concrete examples. Few golfers would deny that bentgrass is the finest playing surface in New England. It gives the best tee, fairway, and putting surface. But bentgrass is bentgrass whether it is on a tee, green or fairway, which means it is susceptible to the same insect and disease problems, requires similar fertility, water, management culture, etc. Bluegrass, on the other hand, cannot provide the beautiful playing conditions on tees and fairways that bent does, but it requires fewer pesticides, less fertility, less water, and presents fewer cultural problems. The difference in maintenance budgets is difficult to estimate, but I believe it to be in the \$40,000 range. That is assuming the necessary water is there to sustain it through stress periods. Then the third alternative turf type would be a fine fescue mix, which would provide marginal playing qualities compared to bent or blue, but would require very little water, minimal fertilization, infrequent mowing, and almost no pesticides. Last, one might consider the fine-bladed tall fescues that would provide the least desirable playing conditions, but would be easy to care for. The point is that several choices and combinations of choices



Dennis Highlands Golf Course on Cape Cod has contrasting grasses and still a playing time of 4½ hours.

could be made, all of which will directly affect maintenance. The maintenance budgets may range from a low of \$150,000 to in excess of \$350,000.

WHICH IS the right turfgrass to specify? I have no idea, because each site has its own variables. The choice will be right as long as one considers:

1. site specific factors
2. climatic factors
3. edaphic factors
4. social factors
5. budget factors
6. the spectrum of genetic material available.

The process takes time, study, and understanding if it is to be properly done. A wrong choice can be costly and a right choice can make a golf course spectacular. Therefore, the golf course designer should be very deliberate and methodical in choosing turfgrass seed blends.

I have tried to establish a relationship between golf course design and specifications related to maintenance, and I have cited items that influence it. The most important thing to remember is that maintenance is more important than design.