



Making Smart Plays

SPORTS FIELDS (/ARTICLES/?CATEGORY=SPORTS+FIELDS)

By Thomas Shay

Good planning always contributes to a higher probability of success for any project, and planning for your next multi-purpose athletic-field project is no exception, be it development or redevelopment, natural grass, or synthetic turf. At the outset of this type of project, there are three primary tasks to keep in mind: a thorough field investigation, site planning and concepts, and feasibility review, which includes costs and permitting. These core activities will serve as a compass for guiding overall success, as they afford project owners the opportunity to determine and set aside the necessary resources, which will often save time, money, and aggravation throughout the project, including construction, and even operations and maintenance.

Executing your next athletic-field project can be an entirely manageable if you have the information necessary to make the decisions right for a particular set of circumstances. The more educated that owners are on the planning process for both natural-grass and synthetic-turf athletic fields, by consulting an impartial perspective on the planning, design, permitting, and operations and maintenance of these facilities, the better decisions owners can make about the project. You will find here a general overview at the preliminary planning level, meant to steer the project towards a successful grand opening and beyond.

Choosing Between Synthetic Turf And Natural Grass

The central question when considering upgrades to sports and recreation facilities, and specifically athletic fields, is whether to install a natural-grass or synthetic-turf surface. Many project owners may be initially driven to one or the other based on the upfront costs of construction; however, there are many other factors to consider, including site conditions and constraints, level of demand on the facility, and resources available for maintenance, to name a few. Everyone loves the feel and playability of a natural-grass field, but many owners find the demand for resources to maintain a quality natural-grass field properly can add up quickly, especially in cases where the fields are overused.

The construction costs for field surfaces can vary widely depending on your plan to utilize natural materials or your choice of a synthetic-infill system. For instance, according to the Sports Turf Managers Association, a natural field that uses on-site native soil (and no added topsoil or sod) could cost \$0.60 to \$0.90 per square foot; however, if you use a sand cap and set up a drainage system on a natural field, that cost can rise to \$4.25 to \$5 per square foot. Some factors that can influence the price for natural fields include topsoil costs, existing soil properties, sod thickness and accessibility, the accessibility for heavy equipment, and soil interface issues. The range for installing infilled synthetic-turf systems, including the carpet, infill, and base, is much larger than for installing natural grass, due to the multiple options for each that project owners have, ranging from \$4.50 to \$10.25 per square foot—though the higher end of this range is more typical for most synthetic-turf field developments. Factors that affect the cost of this type of installation include synthetic-turf carpet, the type of underground drainage system and local stormwater requirements, shock pad, drainage layer and base materials, edge material, and type of infill used. Keep in mind that these costs only represent the construction of the field and do not include components such as fencing, walkways, access, support structures, or other utilities. The cost of these additional elements need to be considered when developing a comprehensive budget.

While the lower cost of construction for natural fields might be immediately attractive to many owners, looking beyond upfront capital provides a better idea of what the overall cost will be. Something to keep in mind when weighing your options between natural grass and synthetic turf are the types of sports the field will be used for, water availability, existing soil and terrain, and the amount of use and level of play.

For factors like water availability and native-soil condition, geographic location can be a key indicator, so looking at other multi-use fields in your geographic region might help you to get a better idea of what types of fields are most successful.

The Real Costs Of Operating And Maintaining Fields

For some owners, the choice between a natural and synthetic field will be an easy one, but for others, looking more closely at the costs of operation and maintenance, and even rehabilitation or replacement, will be necessary in determining which surface is best. While most of the sources on associated costs come from sources with a vested interest in selling one surface over the other, it can therefore be difficult for project owners to locate objective answers. However, a couple of studies can help to point you in the right direction.

One of these studies from Oregon State University analyzed the installation costs and maintenance budgets collected from managers of five synthetic and five natural-grass fields at three different locations throughout Oregon. Using analysis software, the study provided 20-year budget cycles along with a dollar per player-use hour value for each field by taking into account online schedules and player rosters. The study found the average cost of installing a synthetic field is \$1,149,750, with an average 20-year budget of \$3,744,147; the average cost of installing a natural-grass field, on the other hand, is \$464,000, with an average 20-year budget of \$2,120,622. Not insignificant was also the finding that the synthetic fields averaged \$7.76 per player-use hour, and natural-grass fields averaged \$52.92 per player-use hour, with one natural-grass field's value as high as \$99.26 per player-use hour.

The higher maintenance cost of natural grass can be explained in a study conducted by the University of California (Berkeley) that found maintenance costs of synthetic turf could be as much as 70 to 80 percent lower than natural-grass fields, due to increased playing time. The reasoning is that synthetic-turf fields can be played on during or after wet weather, whereas natural grass can be torn up when saturated. Additionally, synthetic-turf fields are often designed for multi-sport use—a softball field may overlap with space designed for soccer or field hockey. Natural grass requires downtime for mowing, irrigation, and rest to lessen compaction and improve the turf grass. This study determined that natural-grass fields could support 816 hours of use in a three-season year on average, with synthetic fields supporting an average annual 3,000 hours of use. These numbers will vary slightly based on climate and geography, but most accepted estimates place natural-grass fields' annual playable hours between 500 and 1,000, and synthetic fields' at 2,000 to 3,000. Estimating what your weekly player-use hours are expected to be for a multi-use field and determining what sports will be most often played on it are two important factors to consider when choosing an appropriate surface. Additionally, accurately predicting the programming and annual hours of use for a field is a key planning task when analyzing overall costs.

This price-difference per player-use hour is not without exception, though. Geography and climate are important factors in the maintenance costs of natural-grass fields. For example, in a cost-benefit analysis conducted in 2011 by the park and recreation department of the city of San Diego, Calif., it was determined that even with the higher cost associated with irrigating, mowing, and aerating a natural-turf field, the cost of synthetic-turf installation and infill replenishment was still greater over the course of a 20-year life cycle. Keep in mind, though, that with less annual rainfall than many parts of the country, multi-use fields in a city like San Diego will require less downtime due to rain than a natural-turf field in New England or even the Pacific Northwest.

Allotting Funds For Operations And Maintenance

The proper operations and maintenance of athletic facilities and particularly athletic fields is oftentimes an afterthought for an owner, or it is a lower priority, with much of the focus on the design and construction of the project. Without the funding for proper operations and maintenance, the quality and longevity of the field is at risk, which ultimately affects safety and playability.

Most athletic fields, outside of higher-level competition fields with a dedicated staff, are not maintained to an ideal level. Normally, resources are simply not set aside to do so, which should be a good reminder that operations and maintenance are an important category in the initial planning. Even if fields cannot be maintained to an ideal level, the maintenance that is completed will extend the field's usable life, regardless of surface type.

To gain some perspective on these tasks for both natural-grass and synthetic-turf athletic fields, consider the following:

Natural Grass

- Mowing
- Soil testing (nutrients, moisture, etc.)
- Irrigating
- Fertilizing
- Applying pesticides and herbicides
- Aerating
- Dethatching
- Topdressing
- Overseeding
- Sodding
- Down-time (rest)
- Painting playing lines

Synthetic Turf

- Field testing (impact, critical fall height, vertical deformation, force reduction, energy restitution, rotational resistance)
- Checking infill depths
- Sweeping debris/magnet
- Grooming (aerating, brushing, etc.)
- Topdressing
- Repairing seams, lines, letters, numbers, and logos
- Weed control

Another factor with a synthetic-turf field is a possible maintenance contract with the manufacturer. The maintenance tasks listed here are a sample of what might be required, but all synthetic infills will have different maintenance requirements depending on the types of materials and the number of hours of use the field gets per year.

There is a wide range of estimates for the exact costs of maintenance and replacement for both natural-grass and synthetic-turf fields. The Turfgrass Resource Center places the cost of annual maintenance for natural grass at anywhere between \$8,133 and \$48,960, and anywhere between \$13,720 and \$39,220 for synthetic turf. The center also estimates that turf carpet replacement within 8 to 10 years of installation would be \$500,000 for an 85,000-square-foot field, or \$5.88 per square foot. These numbers will depend on a variety of factors, but once you research these costs, you can use the following formulas to define the life-cycle costs of a synthetic-turf or natural-grass multi-use field.

Formula I (Total Life-Cycle Cost):

Synthetic: cost of initial installation + [cost of annual maintenance x 20 years] + cost of turf replacement = Life-Cycle Cost

Natural: cost of initial installation + [cost of annual maintenance x 20 years] + cost of rehabilitation = Life-Cycle Cost

Formula II (Per Hour Cost):

cost of installation + cost of annual maintenance x 20 years/# hours used per year x 20 = Per Hour Cost





Formulating A Plan

The most important phase of a project is the planning. Taking the time (and spending the money) to perform the proper tasks at the planning level for an athletic facility project will pay off many times over. It's no secret that parks and athletic fields are often located on tracts of land that are not particularly useful for other types of development, especially in highly populated areas. These properties might be in areas with compressible soils, floodplains, or a high level of environmental sensitivity. Without proper planning and heeding the advice of qualified professionals, you run the risk of encountering unforeseen conditions at the project site later in the design phase or—worst-case scenario—during construction or after construction is completed. This can easily lead to change orders, delays, and generally a significant decrease in the leverage the owner would have had, had the scope remained on track.

This planning phase should include a thorough site investigation, which includes pit tests, geotechnical borings, percolation tests, groundwater assessments, and an assessment as to whether the topsoil is capable of reuse for amending, in the case of a natural-grass field. Initial cost estimates should also be made. It is best to seek a professional opinion rather than relying on contractors and suppliers, who may not disclose all costs for fear of pushing a customer away. All appropriate contingencies should be included in the cost estimate. Consider planning and budgeting for the highest cost scenario, which will leave some flexibility for unforeseen conditions or changes in scope.

Developing a schedule for field construction or improvements is also critical at this stage, as well as making sure existing athletic programs are supported elsewhere. Be sure adequate infrastructure is available (i.e., water, sewer, electric, gas) for field and support facilities. A conceptual layout (or multiple options) and renderings based on known site conditions and constraints should be generated as a visual aid to support other planning level tasks, such as initial permitting coordination efforts, community outreach, and stakeholder meetings. Evaluate other projects that will help this project succeed, such as drainage improvements, infrastructure, or site upgrades.

Community outreach and stakeholder input are necessary at the planning stage to avoid a situation where field users or community members wish the project had proceeded differently. An open and transparent outreach campaign will result in the most favorable outcome for the majority of stakeholders. This

campaign can also be helpful in considering changing demographics and demand from particular user groups.

When structuring RFPs, initially request only a proposal to complete the planning and feasibility-related tasks. The RFP should be specific with a comprehensive review of existing site conditions. Once these are well understood and feasibility is confirmed, complete the remaining permitting and engineering design work or request proposals from the most qualified firms. This approach will provide the most flexibility throughout the development process and, more importantly, will identify major hurdles upfront, resulting in a clear path forward.

Permitting

Permitting discussions should be done early in the planning phase with input from regulators. Even if a project seems routine, different regulatory agencies may have differing opinions on athletic-facility development related to field-surface types, even within the same jurisdictions. Upfront coordination with regulators will identify their particular interests, resulting in fewer surprises when submitting permitting applications and also a reduced probability for lengthy comments and delays down the line.

Review permitting requirements for the following:

- Wetlands, watercourses, and floodplains
- Transportation and traffic
- Water resources (i.e., water, stormwater, wastewater)
- Local code requirements (i.e., minimum setbacks, parking, lighting, noise, etc.)
- Historic and cultural resources
- Wildlife
- Utilities

Planning For Rehabilitation And/Or Replacement

One of the biggest mistakes an owner can make is not planning for advanced maintenance, rehabilitation, and replacement activities for an athletic field. There is no doubt that involved rehabilitation or, in the case of synthetic turf, replacement of the carpet system, will be necessary. Natural-grass fields are typically less costly to rehabilitate than synthetic turf is to replace, which is usually necessary every 8 to 12 years of service, depending on field use, maintenance, and quality of construction. However, the proper planning and design will always result in more cost-effective rehabilitation and replacement work, regardless of the field type.

Though the task of nailing down all of the moving parts of multi-use field development can be daunting, the process becomes a great deal more manageable by using the information presented here. Plan early, involve stakeholders, solicit community support, and develop contingency plans for the worst-case scenario. Diligent research into vendors and sources, and a realistic view of your available budget and schedule, will also streamline the process and help you avoid obstacles down the road as the project gets underway. There is a multi-use field suitable for every geography, size of a parks department, and funding scenario; you just have to ask the right questions to find the right answers.

Thomas P. Shay is a technical manager at Woodard & Curran, an integrated engineering, science, and operations firm. He is a licensed professional engineer specializing in athletic-field and recreation-facility design, and a former college athlete. Reach him at tshay@woodardcurran.com.

Sidebar

The Magnitude Of Hasty Planning

Using due diligence and completing investigations during the planning phase of an athletic-field project recently resulted in estimated construction costs \$2.5 million higher than the original concept-level budget (prepared by a professional). The findings from the investigation resulted in the need to scale back and re-scope the project to address site conditions, including high groundwater, the presence of compressible soils, and other drainage issues. Had the project proceeded to construction without these secondary investigations, it would have resulted in major change orders and schedule impacts. Not addressing these items could have resulted in ground-surface settlement within the new facility, poor drainage, and an expensive, unsuccessful project.

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