important to know how much you have to spend. As a general rule, a new synthetic turf field can run anywhere from $850,000-$1,000,000. This is also true for replacing an existing grass field with artificial turf. A typical drop-in field, (replacing an existing synthetic turf field), runs between $450,000-$550,000.

These figures do not include anything other than the construction of the new field. Your project's cost may vary when you factor in architects, engineers, planners, etc.

Another piece that will increase the initial cost, but pay for itself overtime is a pad, or elastic layer. These "e-layers" are designed to improve the shock absorption and makes replacing your field (in 8-10 years) much less expensive.

The second aspect of your budget: knowing where the money will come from. If you have the money in-hand, great; otherwise, consider ways to offset the cost.

- Build a multipurpose field (soccer, football, lacrosse, field hockey).
- Sharing the financial burden with other schools, or teams.
- Fundraising by selling advertising space on the field.
- Donation drives from the community.

Fundraising, building a multipurpose field, donations drives and/or sharing the field with another institution can make a huge impact on the cost. Consider a convertible or "roll-up" field, so it can be changed out for different teams or events. **Figure out the budget**.

Turf Selection—What turf to use and why? The technology and techniques of manufacturing synthetic turf have evolved a lot over the years, and so have the standards for what makes turf safe, playable, and durable. Not all synthetic turfs are created equal and selecting the right turf is a big part of constructing the perfect field.

In addition, your synthetic turf is just one component in an athletic field. We like to think of them as a complete system comprised of a compacted soil base, intelligent drainage network, precisely layered gravel, optional elastic layer (e-layer), on which the turf and infill are laid.

Please note the specifications of our Matrix Turf. I won't go into the specific properties and testing methods, but in general here are a few things to consider when selecting the appropriate turf:

What activities will take place on the field? Certain synthetic turf systems are optimized for different sports. For instance, we have artificial turfs designed for American football, soccer, and two types for baseball—one for the field, and another specifically for the running paths.

How often will the field be used? The more you use something, the faster it will wear out, so it makes sense to plan accordingly. If your turf field will be used 24/7, consider paying the premium for a higher quality turf system.

Who will be using the field? High school sports are more demanding than elementary and middle school sports and collegiate sports are more demanding than high school sports. Consider the level of competition taking place on your turf.

Where will the field be located? Is the field an indoor practice field, or an outdoor multipurpose field? Will you need a roll-up

turf system to remove or change the field for different events? Location and climate are two big factors that affect the longevity of a field.

The significant thing to understand here is the importance of turf quality, especially when combined with the other components involved in the field construction. **Select your turf**.

Deadlines—When can construction start and when does the field need to be completed? The amount of time required to build a synthetic field is fairly straightforward. Your start and completion dates are flexible. Knowing the estimated project duration can help you establish these two important dates.

For a drop-in field, figure no less than 7-10 weeks from breaking ground to completion. For a new field, and replacing grass with synthetic turf, there are other factors that may affect the critical path. *The critical path is a timeline for construction projects that outlines specific events that must occur in a set order. If any of the events on the critical path are shifted, they affect the subsequent events.*

Your start date depends on when and how often the field is used. If it's a new field that's irrelevant, because it's clearly not being used; but, taking into account the timelines I presented, you can probably estimate a completion date.

>> **REGULAR USE** of a maintenance vehicle improves lifespan and maintains a safe surface.

One of the things we pride ourselves on is being on time, so once you have these dates establish, hold your construction company accountable. **Establish your deadlines**.

Requirements—How will the field be used, by whom, and how often? Is the field going to be a practice field, or strictly for game use? Will others be using the field outside of your organization? Will events take place during the day, or in the evening and at night?

The answers to these questions can help you plan the type of turf, select accessories (lighting, goals, equipment), and even establish how the field will be paid for. (As I mentioned, the cost may sometimes be divided up between multiple teams or institutions.) **Outline the requirements**.

Specs of Hellas Construction's Matrix Turf

Property (ATSM Std.)	Specification
Pile Weight (D418/D5848)	42 - 46 oz./Sq.Yd.
Primary/Secondary Backing Weight (D5848)	7.7 oz./Sq.Yd.
Secondary Coating Weight (D5848)	20 - 22 oz./Sq.Yd.
Total Weight (D5848)	69.9 - 75.9 oz./Sq.Yd.
Yarn Denier (D1907)	12,400
Pile Height Finished (D418/D5848)	2 ¼" - 2 ½"
Tufting Gauge (D5793)	1/2"
Primary Backing (D5848)	D12 or Tri-layer woven Polypropylene
Secondary Coating (D5848)	Polyurethane
Tuft Bind without Infill (D1335)	10 lbs. +/-
Grab Tear (width) (D1682/D5034)	250.1 - 273.1 lbs. Force
Grab Tear (length) (D1682/D5034)	197.6 - 236.1 lbs. Force
Carpet Permeability (D4991)	>40 inches/hour
Flammability (Pill Burn) (D2859)	Pass
G-max (Impact Attenuation) (F355)	<130 at installation <190 over warranty life
Realfill™ Infill (E-11)	5 - 6 lbs +/- per square foot
Fabric Width	15'
Perforation	3/16" Holes 4" X 4"
Yarn	250 microns & 150 microns

- All characteristics listed above nominal +/- 5%
- Matrix® turf incorporates life like individual blades of grass, tufted into the strongest and most dimensionally stable backing system available with a polyurethane pre-coat for the ultimate in tuft-bind.
- Matrix is filled with a pea gravel (2-3 lbs) and cuboidal rubber infill (2.5-3.0 lbs) - Realfill™.
- Infill will be a minimum of 75% of synthetic turf pile height.
- The monofilament fibers curl down to cover and trap the rubber granules preventing the system from expelling the infill upon impact.
- Matrix is a fully UV stabilized system ideal for outdoor use.

PHASE 2: Construction

The second main phase is the actual construction of your synthetic turf field. This is where the majority of the money and time will be spent, so it makes that it is also the most important phase. The milestone in phase two is vendor selection.

Vendor Selection—Who will construct the field and install the turf? Selecting a construction company is of equal importance to selecting the turf, because the construction of the field affects the safety, performance, and longevity of the field. Poorly constructed athletic field turf may fail within the warranty period leading to increased maintenance costs and sometimes may require a full field replacement.

Some criteria for selecting and evaluating a sports construction company:

- Safety Record
- Expertise
- Reputation
- Project Management

Notice that "price" is not included within the list. Price, as a criterion for evaluation, is rarely an accurate gauge when all other factors are considered. For instance, what is the value of having your field completed on time?

Safety Record—Large construction projects require the use of heavy machinery. Sometimes these machines can cause expensive accidents, and even lead to injury and death. The last thing you want is negative PR, so make sure you select a construction company with an impressive safety record.

Expertise—This is a combination of how long the company has been manufacturing artificial turf and installing athletic fields, and

the actual team that will be performing the construction work. The company may be 50 years old, but the team doing the work is composed of the cheapest labor they could find to contract the work to.

Reputation—Don't just take the word of the salesperson, call several references, and don't solely rely on the recommendation of the few references they provide. Ask to see the entire list of projects the construction/manufacturing company has worked with and call as many as you have time for.

Project Management—This is often overlooked, but affects the entire project from start to finish. It is not very common in the synthetic turf and sports construction industry, but finding a company that manages the entire project from a single source is extremely important. Working with one vendor, rather than several, can save you time and money.

During the construction of your field, you should maintain a constant stream of communication with the project manager and your salesperson. Expect to receive weekly (if not daily) progress reports and make sure you are aware of any issues that may arise during construction.

Remember your established deadlines and hold your construction company accountable.

Consider a co-op—Many public institutions have to take the project to bid. But, a cooperative purchasing unit, or co-op, eliminates that need and has other benefits, such as:

- Assisting with contract creation
- Reducing the time from contract to construction
- Performing the due diligence to ensure quality
- Reducing the overall cost of the project

There are several regional and national programs that do the legwork for you, making the vendor selection process much easier, and reducing your cost because prices may have been pre-negotiated with the co-ops.

PHASE 3: Post-construction

The number one misconception about synthetic fields is that they do not require maintenance. Just like real grass fields, artificial fields need to be cared for to maintain optimal safety and performance.

The company responsible for constructing your field should provide some type of post-construction orientation for your facilities department, to educate them (and you) on what needs to be done to clean and care for your synthetic field.

In addition to internal maintenance, it is recommended that your artificial turf field be checked for safety before each season.

Constructing a synthetic turf field is a long, layered process, much like the field itself. There are many layers (components) and each one affects the others. ■

Ross Clurman, Hellas Sports Construction, can be reached at (512) 250-2910 or rclurman@hellasconstruction.com.

>> **Photo credit:** Medallion Athletic Products, Mooresville, NC

Overseeing synthetic turf installations

THERE'S A NEW FIELD going in. And you've just been informed you're responsible for supervision, oversight and all the rest of the management.

For those whose experience pertains mainly to field management, that can be a daunting task. Sure, you know how a field is built—base, sub-base, drainage, surface, infill and so forth—and how it's maintained, but how can that really help you work with the pros who will be doing the install?

Easy, say those in the industry: bring all your knowledge to the table, and be ready to share it.

"Be available," says Jeff Emanuel of Nemaha Landscape Construction, Inc. in Lincoln, NE. "Communication and logistics beforehand makes everything go smoothly when the job gets started. That should be the number-one priority. The field manager is a great resource to catch things before and at the time of install to make sure final build-out meets the field manager's and the owner's need."

Coming into the project, you already have an advantage, whether or not you're aware of it. You're on site every day, or just about every day. You know things about the use of the field, the problems it might have experienced in the past, and lots of other information that are invisible to the contractor, who is just looking at the surface. So here are some pieces of the puzzle you can put down on paper:

• The field itself: List everything you know about when the field was built, who did the construction originally, what surface it is, and any changes that have been made to it over the years. List its regular maintenance program and types of equipment used.

• Problems: Does the field (or the area around it) have any problems, such as drainage issues? Make sure you note those.

• Field use: What types of sports is the field hosting, how often and at what levels? Any other uses (graduations, festivals, marching band practice, etc.) should also be noted.

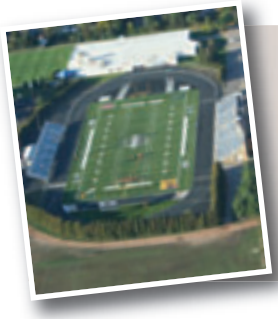
• Weather: According to Norris Legue of Synthetic Surfaces, Inc. in Scotch Plains, NJ the weather can impact a new field greatly, and anyone charged with supervising installation should have a good grasp on it: "No two outdoor installations are the same," says Legue. "Hot, cold, damp, dry, wind, passing clouds and rain are all factors that quickly get people into trouble. Also, outdoor installations under variable conditions are a different world than indoor installation under stable environmental conditions."

Something the field manager can do to keep the lines of communication open, says Emanuel, is to "attend regularly scheduled meetings to stay up to date and in the loop. Be approachable and get to know the install foreman. A good foreman will respect a reciprocal relationship."

Both sides need to keep an eye on the construction documents, and also on the field itself. Sometimes, things look good on paper, but don't work in real life. And in many cases, the field manager is the person who will know immediately whether something will or will not be effective.

"Be honest," says Emanuel. "If the field manager doesn't like something, that needs to be brought to the builder's attention so they can discuss and remedy issues before the task or project is past the point of no return."

Many field managers, because they're skilled in maintenance, want to chip in and help with the construction as well. Emanuel cautions against that.



Both sides need to keep an eye on the construction documents, and also on the field itself. Sometimes, things look good on paper, but don't work in real life.

>> **Photo credit:** Rettler Corporation, Stevens Point, WI

>> **Photo credit:** Warner Larson, Inc., Boston, MA

"Don't commit to performing work that is part of the builder's scope of work; promises can be made where they shouldn't by field managers wanting to help out and expedite the process. A good relationship is key, but actual physical help or directing the work isn't always a good thing. Input is one thing; however the builder's foreman shouldn't modify the scope of work without all project stakeholders agreeing to modifications to the original scope of work."

As with all projects, there are best practices. Emanuel says his include the following:

Do:

• Be proactive and think outside the box.

• Stay in the loop on decisions that affect the field manager's ability to manage/maintain the field when finished.

Don't:

• Make promises/changes you as the field manager can't keep.

• Approve any changes before the field designer/architect (if applicable) or owner approve them.

The installation of a new turf field may be one of the most important projects for your facility. And to make it pay off, you need to keep open the lines of communication. Communication, after all, is like currency—it works best when it flows both ways, in equal measures. ■

Mary Helen Sprecher wrote this article on behalf of the American Sports Builders Association. Available at no charge is a listing of all publications offered by the ASBA, as well as their Membership Directory. For info, 866-501-2722 or www.sportsbuilders.org.

Getting USC ready for some football

When it comes to re-sodding our practice field for the football team, there is a lot of planning that goes into the project before the first piece of sod goes in. We must first select the variety of grass that will go in as well as our best window to install it. We were going with the 419 but when it was time to install the sod, we ended up going with the Tifsport variety which the sod farm said was in better shape due to the weather we were having. The football team's first game happened to be in Hawaii that year, giving us an extra day of grow in period before the team would get on it again after their first game.

The center was pretty beat up after 29 practices, seven walkthroughs and one practice game in 29 days. We needed roughly around 30,000 square feet to cover between the hash marks and another 5,000 square feet to re-sod miscellaneous worn spots from practice drills.

With the re-sodding project itself starting on the first of September, we started preparing the field for the compaction that comes along with machinery used to remove the existing turf to be removed, as well as the machinery used to install the new sod. We sliced the field in two directions on August 27 because it is a less evasive form of aerating as the football team was still using the field. The team's final walkthrough before traveling was on the 31st, as soon as their walkthrough was over, we got on the field and hollow tine aerated with quarter inch tines all of the turf that was not going to be removed.

The center was pretty beat up after 29 practices, seven walkthroughs and one practice game in 29 days.

The next day, the first of September, the contractors arrived to remove the turf to be re-sodded. We layed down the plywood where the machinery would be traveling across the turf that would not be replaced. After that, we pretty much stayed out of the way and let the contractors do their work, though we try to have one person who stays with them to help in any way and to also keep an eye on things! The sod was removed in one day and would be ready for the 1-inch thick cut sod the next.

By 6 am the next day, we were out there hollow tine aerating the bare soil where the sod had been removed. That completed aerating the entire field before we went out and broadcasted out Calcium Silica fertilizer over the entire field, the existing turf as well as the soil to be re-sodded. Once the fertilizer was out, the sod started going in with the contractors laying the sod as we helped remove the turf trimmings that go along with laying in the sod to make it fit snug. The rest of us loaded up our vehicles with sand and shovels and began filling in the seams.

Once we started advancing with filling in the seams, two of our guys broke off and started to sweep the sand into the seams. We had 60 yards of sand to fill our seams and topdress with. Once the seams were filled and broomed in, we topdressed the entire field with the remaining sand until it was all gone. We had one person dragging in the sand behind our spreader and another person rolling the sod behind the person dragging. We started to water in the sod behind the person rolling the field until the entire field was completed.

The next day, September 3, we came in and painted the football field to be ready for the practice on Monday. When the paint dried, with the nice weather we had and the quick dry paint we use, it only took about 20 minutes before I was able to get on it and apply Rx Gold liquid fertilizer over it to help with the root growth. The field was rolled the next 2 days over the weekend to tighten up the sod. I came back in on Monday morning and applied Rx Supreme liquid fertilizer over it. The team would be on the field roughly 7 hours after I sprayed it, the reason I was able to fertilize it on a practice day was that this fertilizer does not require to be watered in, otherwise we wait till after practice or a day off to fertilize.

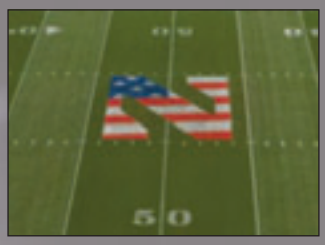
The team practiced that Monday and was happy with the job we did. We postponed our monthly fertilization that we normally apply around the first of every month, so I came in that Friday and applied it, completing our plan of the sod project. The sod is still on the field, a little beat up, but thanks to a good installation and fertilization program, it made it to the end of the season. ■

Cesar Carbajal is team leader for the University of Southern California. This article originally appeared in the December 2010 newsletter of the Greater Los Angeles Basin Chapter of STMA.

F.O.Y.
Field of the Year

Ryan Field, Northwestern University

- **Level of Submission:** College
- **Category of Submission:** Football
- **Head Sports Turf Manager:** Randy Stoneberg
- **Title:** Supervisor of Grounds
- **Education:** High School
- **Work History:** I have been employed by Northwestern University since January 1985. Starting as an entry level worker, I have worked my way up the ladder to Supervisor of Grounds through hard work and long hours. Networking and the STMA has helped me through just about anything and everything.
- **Full Time Staff:** Joe Berube and Rich Thorn
- **Original construction:** 1926
- **Turfgrass variety:** Freedom III Kentucky bluegrass, Everest Kentucky bluegrass, Award Kentucky bluegrass, NuChicago Kentucky bluegrass, and Low-Mow Grass seed mix.
- **Rootzone compostion:** Sandy loam, 85% sand (using USGA mix)
- **Overseeding:** After every coring or slicing, we overseed with 200 lbs of Low-Mow Blue. Starting 4 weeks before our first football game of the year, we overseed weekly with 50 lbs of Low-Mow Blue, so the seed is germinating throughout the playing season. We push extra seed behind each goal post and sidelines on an as-needed basis.
- **Drainage system**: The field itself has a herringbone pattern gravity drainage system on 15-foot centers.



A sideline drainage system handles excess water from the stands. Both systems channel into the storm sewer system. This system has proved it can handle even the worst rains, draining the turf flawlessly during a home game September 12, 2008, the second-rainiest day in Chicago history, when 6.64 inches of rain dumped on the city. Streets flooded and many fans could not get to the stadium at all, but the field performed at its expected level of excellence.

• **Other activities:** Dinners on the 50-yard line, football summer camps, graduations, and commercial video and photo shoots.

CHALLENGES

Northwestern's Ryan Field is known as the "Wrigley Field of College Football" and is a historic gem among college stadiums. To enhance its beauty, 900 purple and white mums designed to be in full bloom for Homecoming are planted each year at the north end.

In 2005, Ryan Field was re-sodded and by the fall of 2007, 50% of the field was covered with *poa annua* grass. "Our media department distributed a press release explaining what *poa annua* is because media kept saying the field was diseased," wrote Supervisor of Grounds Randy Stoneberg in his award application. "Even Coach Pat Fitzgerald was quoted as saying his field had acne because of the pimple effect on TV."

In the spring of 2008, NU sprayed Roundup on the *poa annua* and killed almost half of the field before overseeding with a ryegrass and bluegrass mix. Dead spots did not grow back as fast as needed, so in the fall of 2008 agronomist Tim Van Loo, CSFM, began a *poa annua* "Game Plan" before he moved on to a position at Iowa State. That game plan has been continued by Stoneberg and expanded to other fields with great success.

The game plan is composed of three steps, beginning with the application of selective herbicide Prograss during very specific times in November, December and March for best results. This process leaves the *poa* looking dead in the spring. While some will survive, the goal is to reduce the amount each year. This goal has been surpassed with tremendous results.

The second step is to overseed with ryegrass and Kentucky bluegrass. Ryegrass can be seeded 2-3 weeks after the final Prograss application while Kentucky bluegrass can be seeded 6 weeks after that date.

The third step deals with any *poa* that comes back. First, a plant growth regulator called Trimmit is applied to slow the growth rate of *poa annua* and allow the Kentucky bluegrass and ryegrass to have a competitive advantage. This keeps remaining *poa* spots smaller and easier to kill the following year. ■

Ryan Field Equipment List

- 2011 John Deere Gator
- 2011 Verti-Drain (leased)
- 2010 Toro 3500 Sidewinder Rotary Mower
- 1998 Cushman Boom Sprayer
- 1996 Toro Topdresser
- 1996 John Deere 955 Tractor
- John Deere AerCore 1500
- 1996 Goossen Sweeper

How water pressure can affect irrigation system efficiency and performance

Editor's note: *This article was written by Lynette Von Minden from Swanson Russell, an agency that represents Rain Bird.*

IT'S CERTAINLY NO SECRET that sports turf managers and groundskeepers are trying to do more with less. From fertilizers and fungicides to equipment and pest management, tight budgets and environmental concerns have made it necessary for these professionals to think outside the box to keep fields in attractive, playable condition.

When it comes to sports field irrigation, rising water prices and an increased emphasis on water conservation mean that sports turf managers must do all they can to use water as efficiently as possible. Over the years, irrigation system manufacturers have introduced many new technologies intended to improve water efficiency without sacrificing a field's health and overall appearance. These technologies range from the extremely sophisticated, like central control systems that enable users to schedule and program irrigation for multiple sites remotely to the seemingly simple, like high-efficiency nozzles for rotors and sprays. However, no matter what type of control system or nozzles an irrigation system uses, it can't operate at top efficiency if the field's water pressure fluctuates or is consistently high. That's where the need for pressure regulation comes in.

The concept of "pressure regulation" certainly isn't new. Most homes have a few appliances or fixtures that regulate water pressure, like low-flow toilets, shower heads and washing machines. But why does water pressure have such an impact on irrigation system efficiency? Water pressure that's higher than the recommended level for any rotor or spray will increase its flow rate, forcing more water through the sprinkler than it needs.

"Every sprinkler head has an optimum pressure operating range," said Chris Dimmick, Rain Bird Corporation's area specifications manager for the Great Lakes region. "During testing, the manufacturer determines this optimum range as it relates to nozzle performance. For every additional 5 psi over and above a sprinkler head's recommended operating pressure, it will use 6-8% more water than it should. While that amount may not sound like much, it adds up to a very significant amount of money and water when an irrigation system runs multiple times per week, 8 or 9 months out of the year."

As if wasting water and money wasn't bad enough, high or fluctuating water pressure also has a negative impact on turf. When water is under excessive pressure, it tends to emerge from the head as mist or fog, which can easily drift away in the wind instead of landing on its intended target. As a result, some areas of the turf may to be too dry, others, too wet. To compensate for the dry areas, many turf managers tend to water more often, creating boggy conditions in some areas of the field and unnecessarily wasting even more water. Not only do they end up with muddy turf and large water bills, the high water pressure and more frequent operation cause greater wear and tear on irrigation system components. This situation leads to systems that may break down more frequently, requiring a higher level of maintenance and possibly decreasing the system's overall life span. The bottom line? More time and money leaking away from already-stretched budgets.

For those sports turf managers who aren't sure whether their irrigation systems are suffering from the effects of high or fluctuating water pressure, it's never too late to find out and take steps to alleviate the problem. While it's possible to observe the system in action and see whether water is emitting from sprays and rotors as visible droplets (good) or mist/fog (bad), it's better to actually measure the water pressure to know exactly what you're up against. "Measuring your water pressure is as simple as attaching a pressure gauge to a hose bib," Dimmick said. "If you don't have a gauge handy or aren't sure how to measure correctly, an irrigation industry professional in your area should be available to help. It's important to