a management perspective. When you have a process like this, decisions can be made almost immediately.

"We built the project within three percent of what we put on paper the year before we started construction, and that included expanding the project to include a nine-hole executive course instead of the originally specified three-hole practice range. The overall project progressed right on time and we met all deadlines."

Superintendent on site

While Marsh roughly laid out the 18-hole course in October and November 2001, Tipton was hired in November and came on site for construction in April 2002.

"I worked with Marsh 150 days that summer," Tipton says. "He made sure we both approved every bunker. I wanted to ensure there were sufficient lips to keep water from flowing into them. Each bunker was custom-built."

Tipton also worked closely with Bill Roberts, Landscape's on-site design-build construction manager.

"This is such a huge property that we decided to build two maintenance buildings instead of one," he says. "We designed a second one to be closer to the course and also serve as the pump house. The building is nothing fancy, but it does include an extra 40-by-50-foot work area."

The main maintenance structure, a mile a half from the 1st hole on the championship course, is 50-by-100 feet, with a 10-by-50-foot office space and a break room. An existing steel farm building near the course is used for fertilizer storage.

Tipton specified SR-1119 bentgrass on the greens and tees, and the blend of low-mow bluegrasses called SureShot.

"Marsh was very good about working with me on all maintenance issues," Tipton says. "We were able to see potential problems and take care of them during construction. Water flow was a concern in some places. Generally the holes were so natural that we could see where the water flowed naturally and shaped them with that in mind. But we're on such a big slope that in a few areas we had to make longer runs with outlet pipes."

Throughout construction, Tipton was most intimately involved in construction of the unique bunkers. Crews took native grass from areas that were going to be cleared for fairways and placed them around all the bunkers. The effect is bunkers abutting native areas that look like they were always there.

Left: A par-3 for the stouthearted, the 206-yard 9th hole features gnarly, natural bunkers to swallow balls struck shallow and to the right.

Design-build flexibility

"We started this project quickly," Kubly says, "and the design-build process allowed us to do that. Design-build is very flexible. On most design-build projects you do a lot of upfront preparations and make decisions on many specifics. But because you have a set cost, you can also accomplish a feat like Sutton Bay, where we took the challenge and drove the project as we went."

Amundson estimates the Sutton Bay partners saved at least 10 percent by building it using the design-build method.

"Because we have 25 to 40 projects under construction at any one time, we can negotiate lower prices on many materials," Kubly says. "Plus we value-engineer every phase of the job, and if you're an experienced design-build contractor, there are savings to gain in those arenas."

Landscapes was able to negotiate better fees from the clubhouse architect, then negotiated with the clubhouse contractor. "Instead of hard-bidding the job, we told them we needed 10-percent potential savings," Kubly says. "You make decisions like switching to asphalt shingles instead of a standing seam roof. You get all the options out on the table, and it's rare to have a contractor play a role in that."

Whether the developer needs to do the major pre-planning for design-build depends on the client, Kubly adds. "Many clients need to know the absolute cost. But for Sutton Bay we had a very good idea. We budgeted everything. We always had a few things in our hip pocket that we could make changes if necessary. For instance, the change to asphalt shingles saved more than $80,000."

Photo: John Henebry

The 447-yard par-4 16th hole presents spectacular views of Lake Oahe. The carry on the drive can be startling.

Ongoing teamwork allowed the developers to add amenities. The most significant was building a nine-hole executive course rather than the three-hole practice loop in the original scope. A wine room was also added to the clubhouse, and eight acres of native grass was sodded around the clubhouse to give it a natural, more finished look.

"The addition of the sod amounted to a $40,000 to $50,000 change-order, but it looks so natural," Amundson says. "The entire project is stunning." GCN

At A Glance: Sutton Bay

Location:	Agar, South Dakota	Tees:	Blend of SR 1119 bentgrass and SureShot (low-mow bluegrass)
Course type:	Resort		
Cost:	$18 million		
Construction began:	April 2002	Slope:	147
Course opened:	June 2003	Rating:	74.9
Yardage from Skull Tees:	7,245	General manager:	Mark Amundson
		Superintendent:	Bryan Tipton
Par:	72	Designer:	Graham Marsh, PGA Tours
Number of bunkers:	72		
Average green size:	6,700 square feet	Builder:	Landscapes Unlimited
Greens:	SR 1119 bentgrass		

Centralized decision-making, in combination with a set project budget and scope, speeds decision-making in design-build projects, and reduces change orders.

Design-build: Delivering more for less

FASTER CONSTRUCTION, LOWER COSTS, HIGHER QUALITY AND LESS LITIGATION ARE ALL PROVEN BENEFITS OF DESIGN-BUILD

by MARK LESLIE

While design-bid-build dominates golf course construction, builders like Landscapes Unlimited are increasingly turning to design-build to provide course owners and developers with significant benefits.

"It was like going out and buying a car. Landscapes finished the project and handed the owner the keys," says John Colligan, architect for the Mansfield National Golf Club. Completed in 2001 in Mansfield, Texas, the course was the first design-build project done by Landscapes for a third party.

In June 2002, ArborLinks Golf Club in Nebraska City, Neb., was also constructed using design-build. "It is a great concept, and we hope to do a lot more of them," said Palmer Design Vice President Erik Larsen, who worked with Landscapes and the National Arbor Day Foundation on the course.

"Design-build makes every dollar count," adds Jeffrey D. Brauer, who served as architect with Landscapes to build the WestRidge Golf Club in McKinney, Texas, for Terrabrook, a mixed-use community developer. While private developers are most likely to see the value of design-build, Brauer says cities could also benefit from the process to reduce the typical heavy load of paperwork they face.

Back to the future

Design-build had been the standard in construction for millennia – all the great churches and cathedrals of Europe were constructed using the method – until bid-

ding became the norm about 100 years ago.

At the heart of design-build are two principles: setting a firm price for the project, and hiring a design/construction team to complete the work for that price. Usually a golf course design-build team will consist of a builder, golf course architect and building architect, with one of the entities taking the lead to streamline management and serve as a single contact for the course developer or owner.

Dave Shelton, senior vice president of Design Sense in Olathe, Kan., which consults developers and municipalities on design-build, says the advantages of the method include:

- A marked reduction in change orders
- Cutting claims and litigation in half (according to the Design-Build Institute of America)
- Lower administrative burden for the developer by managing one contract instead of two
- Selection of the contractor on qualifications, not lowest price

Because traditional design-bid-build is sequential, the design must be completed before going on to the next step. With design fees averaging 5 to 12 percent of the total cost, a $1 million design-bid-build project with an 8 percent design fee would require an $80,000 investment before a contractor could even make a bid. In contrast Shelton says, "Design-build can actually allow the builder to begin construction before the design is complete."

A study done by Pennsylvania State University showed that, on average across the United States, design-build speeds up construction by 30 percent while decreasing project costs by eight percent.

Bill Kubly, CEO of Landscapes Unlimited, says the Penn State study figures are borne out in the golf construction world.

"You have virtually no change orders with design-build because the project scope is set before you start. And if that scope changes, you make adjustments through the remainder of the project to stay on schedule and on budget. You don't wait until the end of the project. And there is rarely litigation for the same reason – the ownership team makes all the decisions."

Kirk Kyster, president and COO of Landscapes, discovered the advantages of design-build several years ago when building courses for its ownership group. The company realized it could pass on those same benefits to clients. "We saw that owners, developers and municipalities were looking for a way to have their entire project executed with the minimum risk,"

'DESIGN-BUILD SPEEDS CONSTRUCTION 30 PERCENT WHILE DECREASING COSTS...'

Kyster says. "Because you are sole-sourcing the project, the scope becomes all-encompassing. Elements don't fall through the cracks. Offering design-build also created opportunities to showcase our capabilities to architects and others used to doing design-bid-build."

Palmer Design's Larsen points out that the reducing construction time means generating revenue faster. "It's a big deal when you can be open one half a year earlier by avoiding the entire design-bid-build process," he says. "The time savings alone is a positive and accountable number that adds credence to this method."

"Cities and developers that may be hesitant to push ahead on their projects could proceed with confidence using an experienced design-build firm," says Kurt Huseman, executive vice president for Landscape's project development division. "That has been a missing piece of the puzzle since the late 1990s and part of the reason some in the golf industry are struggling. We have now built more than 20 design-build courses and know where to spend the money and where not to. Pulling in the design element, along with other consultants and contractors, produces a truly collaborative process."

Design-build is being able to put a number on the table and have the peace of mind that everything's going to get built, agrees Corson. The key on the developer's side is to be very specific in the scope of work and avoid change orders.

According to Colligan, design-build works "particularly on a golf course where you're very cost-conscious." When Mansfield National was built, for example, several high-end clubs with "limitless budgets" were under construction in the Dallas market. "I guarantee ours will be as profitable as theirs and our greens fees are just $39," he says.

The key to design-build is pre-planning, says Corson.

"Before construction, we spent a lot of time with Kurt Huseman, being very specific on the project scope – everything from width of the cart paths to number of irrigation heads to the amount of topsoil base in the fairways. That specification removes a lot of the guesswork and conflict. When you have a piece of paper stating precisely what you're getting, it becomes clear whether it's been done or not. When you have four inches of topsoil and you thought you were getting six, that's when you have problems."

At WestRidge, Brauer says, "We sat down cooperatively with Landscapes and Terrabrook and set out a scope and budget. Terrabrook was comfortable that the prices were in line and they wouldn't gain anything from competitive bidding and would get help and efficiency from Landscapes' project management capabilities. It fit into their comfort zone. They understood how much you could spend on the golf course and clubhouse. Having worked with the team members before, it came together pretty quickly."

Miles Presteman, who was with Terrabrook at the time and is now senior vice president, operations, for the Texas division of Newland Communities, which later bought Terrabrook, agreed. "Linking an experienced golf course builder, like Landscapes Unlimited with an architect like Brauer, helped us build the course on time, even with a tight time schedule."

Colligan calls Landscapes Unlimited's design-build efficiency "value engineering."

"They used their experience and expertise to save money without cutting one corner," he says.

"Comfort level" is another tribute paid to the design-build process.

"I've reached the level of comfort with the process," said Sutton Bay's Amundson. "There are always things afterward that you might consider changing, but I wouldn't change the overall design-build process. My advice is to choose your team well. You have controls, but you are going to be much more comfortable if you know who the team members are and the kind of work they are capable of doing." GCN

Design-build can be considered an option on any new golf course construction or multi-faceted renovation project.

Constructed on a closed landfill, the 16th green of Oakland's Metropolitan Golf Links reflects the golf industry's potential to improve the environment.

Environmental leadership

GOLF STARS IN AN AWARD-WINNING ROLE AS THE ENVIRONMENTAL HERO

by PETER BLAIS

Combine a closed municipal dump with environmental problems, the City of Oakland, Calif., and CourseCo, a Petaluma, Calif.-based golf course management and development company, and what do you get? The answer is an environmental success story with golf playing the role of hero.

That's the story behind the 2003 opening of Oakland Metropolitan Golf Links, an 18-hole golf course that helped solve environmental issues, make a landfill site beautiful and useful for area residents, and was one of the facilities that led to CourseCo becoming the first-ever golf business to win California's top environmental award.

Gov. Arnold Schwarzenegger recently presented CourseCo with the 2003 Governor's Environmental and Economic Leadership Award (GEELA). Established in 1993, GEELA is the state's highest and most prestigious environmental honor. It recognizes individuals, organizations and businesses that have demonstrated exceptional leadership in building public-private partnerships while making notable contributions to conserving California's environment.

"The award affirms that our work has public value, which is deeply gratifying," says CourseCo President Tom Isaak. "It further affirms that the expense and tremendous leadership effort of our superintendents, the primary implementers of these programs, is worthwhile."

Award recipients are selected for promoting excellence in compatible, sustainable economic development while protecting the environment and conserving natural resources. Criteria considered for the award include economic progress, innovation, uniqueness, results, transferability, environmental impact, resource conservation im-

pact and environmental justice.

According to a state press release announcing the award, CourseCo "follows sustainable practices through the use of reclaimed water, development and cultivation of disease-resistant grasses, delineation of environmentally sensitive areas within course boundaries, promoting the use of native plant life and minimization of pesticides."

Raymond Davies, CGCS, CourseCo's director of golf course maintenance and construction and partner in the firm, says the minimization of chemical pesticides is a philosophy at all of the 13 facilities the company manages. Achieving that goal is possible through an Integrated Pest Management/Chemical Application Management Plans (IPM/CHAMPs) program – and was a significant factor in the state's decision to recognize CourseCo.

Davies notes that for a golf course firm to receive an environmental award is particularly difficult in California because the environmental bar is higher than in most of the rest of the country. "This award helps recognize golf's ability to be sound environmental stewards," Davies says. "We've demonstrated that we can manage environment issues extremely well."

Creating Oakland's Metropolitan Golf Links

Davies says the goal at all CourseCo facilities is to benefit the game, the communities in which the courses are located, progressive golf-industry research and the superintendent profession. The public-private partnership created to build Oakland's Metropolitan Golf Links serves as a prime example.

According to its GEELA application materials, the city of Oakland and Port of Oakland selected CourseCo in early 2000 to build a course on a city landfill. The overall project had three major objectives: Seal an urban landfill to protect water quality; affordably dispose of 1.3 million cubic yards of dredge soils removed from port channels to ease shipping; and construct an economically viable championship golf facility on portions of the landfill property being closed by the city and port authority.

Closing the landfill and disposing of the bay-dredged soils in an environmentally acceptable manner were potentially expensive problems. Using synthetic material or importing clay soils to seal the 100-acre landfill would have been extremely costly. Additionally, the port authority was facing a cost of $10 million or more for remote disposal of the channel's dredge spoils, a task that would have required more than 50,000 truck and trailer loads hauled at least 40 miles to an approved depository. Undertaking both projects and building a new course on the former landfill, which at one time had accommodated a very basic course, was a formidable challenge.

The solution required a working partnership to overcome complex technical, political and logistical problems. Numerous legal agreements had to be worked out and those involved included multiple contractors and scores of technical and environmental consultants, engineers, designers, architects and lawyers.

The plan called for pumping dredged bay mud, mostly clay, from the nearby shipping channel to cap the landfill. The capped landfill then was shaped to the rough grade of a golf course. The rough grade was thinly plated with permeable sandy loam soils. Finally, drainage was created and irrigation installed to grow turfgrass. Irrigation water is a blend of reclaimed water and groundwater.

The course, which opened in April 2003, solved all the environmental problems while providing a critically acclaimed course that is environmentally sustainable through site specific and stringent IPM/CHAMPs and runoff controls.

All three partners shared in the capital cost of a project that saved taxpayers tens of millions of dollars. In addition, the facility generates $500,000 per year in rent to the city and port authority.

Davies noted Metropolitan has benefited the environment in other ways, for example:

- Nitrogen applications are limited and consist primarily of slow-release products that have lower losses to leaching and volatilization.
- Green waste from the golf course is recycled on the property, as well as some waste brought in from elsewhere in the city.
- A recycling program is in place.
- A bird dog controls birds on the course that otherwise pose a hazard to planes at a nearby airport.

Agronomic advances

The spoils dredged from the channel bottom to cap the landfill originally contained as much as 35,000 parts per million of salt. This has improved in the sandy soils where much of the salt has washed out. Sandy loam material used to plate the fairways was leached with 14 inches of water to reduce the total salts to an acceptable level, but sodium levels continue to be high. Naturalized areas between fairways were not plated and those heavy clay soils have resisted leaching. They will improve over time, but can only support a small number of plant species. This led to the development of a salt-tolerant grass trial.

> 'COURSECO IS THE FIRST GOLF INDUSTRY-RELATED BUSINESS TO WIN CALIFORNIA'S TOP ENVIRONMENTAL AWARD.'

"The salty and shallow soils on this site posed tremendous agronomic challenges, which CourseCo has successfully met," wrote Dr. Ali Harivandi, an environmental horticulturist at the University of California (UC), in a letter recommending CourseCo for the award. "This course has become a significant asset for the City of Oakland, developed in a location previously reserved for only industrial use. We have established a research study on this unique site to identify turfgrass species that can be successfully grown in high-salt conditions. Results of this study, generously funded by CourseCo, will benefit every horticultural project in the Bay Area looking for plant material adapted to a saline environment."

A UC Cooperative Extension program at Metropolitan, hosted by CourseCo, attracted more than 100 Northern California course managers to learn about renovation and enhancement of a landfill. Attending the workshop was Gary Carls, CGCS, a past president of the California Golf Course Superintendents Association, and a recently-elected member to the Golf Course Superintendents Association of America (GCSAA) board of directors.

"I was pleased to learn of the challenges faced in the complex nature of closing the landfill according to new standards of encapsulation, and using dredged spoils from the San Francisco Bay to provide soil above the encapsulation so that a golf course could be developed where few alternatives of equal environmental value could be considered," Carls wrote. "Our members have learned a great deal from the agronomic challenges faced by this golf course. Other cities and private entities could learn from this example."

Patrick Gross, southwest director of the United States Golf Association (USGA) Green Section, has consulted on CourseCo properties for the past 11 years. In his letter of recommendation, Gross noted that Metropolitan also is the home of the Oakland Turfgrass Education Initiative, where students from inner-city schools have an opportunity for job training and exposure to the fields of horticulture and turf management.

John Briscoe, an attorney with Stoel

Rives, a western United States law firm that worked on the Metropolitan project, summed up the efforts of the development team at Metropolitan. "This project is an example of excellent environmental planning," he wrote in his letter of recommendation. "The effort was unique, innovative and took many years to accomplish. It sets a wonderful example for public-private partnerships."

Environmental positioning

Founded in 1989, CourseCo manages facilities in northern California that are primarily owned by municipalities or counties. The company's environmental commitment is important to clients and their communities.

> THE PROJECT SAVED TAXPAYERS MILLIONS AND GENERATES ANNUAL RENT FOR THE CITY AND PORT AUTHORITY.

"CourseCo is the only management company I know that has made a commitment to have all their courses become fully certified in the Audubon Cooperative Sanctuary Program for Golf Courses," Gross said. Five of the 13 courses managed by CourseCo currently are fully certified.

Other examples of CourseCo environmental innovations that help meet community, environmental and industry goals include the following:

• **Crystal Springs**. Harivandi and UC collaborated with CourseCo on a five-year USGA turfgrass research project evaluating new bentgrasses in Burlingame. The research identified cultivars with water and pesticide requirements lower than those of turfgrass varieties currently used on golf course greens. "Located on the watershed for the City of San Francisco, Crystal Springs is a model for what progressive management can accomplish on a sensitive site," Harivandi wrote.

UC hosted a program at Crystal Springs in 1999 that introduced area superintendents to innovative approaches to wildlife habitat, water conservation and pest control. Gross says many projects have been implemented at the environmentally sensitive facility, including minimal use of fertilizers and pesticides, waste recycling, wildlife habitat enhancements and water-conservation programs.

Davies said CourseCo has worked to educate golfers at Crystal Springs about wildlife that lives on the course, including using displays featuring stuffed animals. In addition, brochures describe the environmental program, and Hole-View yardage books include environmental notes regarding wildlife and water consumption.

Superintendent Tim Powers, CGCS, the Northern California GCSA chapter winner of the 2002 GCSAA/Golf Digest Environmental Leaders in Golf Award (ELGA) and GCSAA's ELGA Merit award in 2003, led Crystal Springs' re-certification by Audubon International and the Wildlife Habitat Council. CourseCo also was a national winner of the Golf Digest ELGA in 1998.

• **Callippe Preserve Golf Course**. The municipal course in Pleasanton, is being developed by the city and named after an endangered butterfly, is expected to open in November. CourseCo will manage grow-in, opening and operations under a five-year management contract.

"We have over 20 environmental management plans, including three endangered species, riparian corridors, nitrogen control, ground water quality, bullfrog control, butterfly habitat, wetland mitigation, creek revegetation, specimen tree preservation and more," Davies said. "Our niche, in terms of environmental issues, is to be able to do construction that complies with stringent permit restrictions and puts additional measures in place to allow sites to meet their full potential for environmental benefits. We try to reflect our client's values. Our success has to do with how we manage these sensitive environmental issues in communities that are subject to these stringent permits."

• **Eureka Golf Course**. Davies created and leads a coalition that includes the city, county, environmental organizations, local landowners and area officials who secured $160,000 in planning grants aimed at restoring the natural conditions of a sub-watershed of the Humboldt Bay watershed that surrounds the course. The multi-year project is designed to naturalize the creek slough, enhance plant and wildlife habitat with the creation of brackish-water habitat, encourage the return of Coho salmon and steelhead trout, and minimize siltation at the oft-flooded and environmentally sensitive course. The project shows that even low-cost courses like Eureka, which charges as little as $6 per round, can become environmental stewards.

"A major benefit is that the project would provide better playing conditions on a course that typically floods following heavy rains," said Don Roller, Eureka Golf Course superintendent for the past 19 years. "It would also establish a brackish water habitat in the lower portions of the course and below us. By creating high-value wildlife habitat through the course, we become better environmental stewards of the land."

Davies said Eureka's success inspired another creek-restoration project as part of the reconstruction of Foxtail Golf Course, a CourseCo-managed facility the company restored in Rohnert Park.

• **Los Lagos Golf Course**. Riparian habitat, heritage trees and endangered species were all part of the package the San Jose community wanted protected at Los Lagos, which opened in April 2002. CourseCo responded with 13 separate environmental management plans to address fertilizer and pesticide environmental concerns, while also preserving and enhancing wildlife habitat, according to Gross.

"The city of San Jose had two IPM/CHAMPs written that we had to follow," remembered Davies of Los Lagos and Rancho del Pueblo, another CourseCo-managed facility in San Jose. "We are unique in that all our courses operate under IPM-CHAMPs. It is difficult to get permits for course construction in California without one."

Los Lagos head superintendent Alan Andreasen, CGCS, said the development team re-established about three acres of native habitat, including trees and shrubs to improve wildlife habitat, and constructed a regional trail allowing people to hike and bike through the course property. In addition, 75 acres were set aside for riparian habitat – which is scarce in the San Jose area. Signage in the clubhouse and on the course informs golfers about the facility's unique features and how it benefits the environment.

"We've joined with the Wildlife Center of Silicon Valley and are in the process of using the riparian habitat as a release area for rehabilitated animals, primarily raptors," Andreasen said. "We are also meeting with the local grade school to help conduct field trips through the property that will show students how a golf course is built and display some of our environmental projects."

In the meantime, Andreasen added, the course has more than met its financial projections, hosting 70,000 rounds its first full year and an anticipated 72,000 rounds in its second season.

"What inspires me as a member of the golf course industry is that CourseCo not only talks the talk, but they walk the walk," Gross concludes. "Their commitment to sustainable environmental practices is not just window dressing, but a core value that guides their business practices. In my opinion, CourseCo is clearly a leader in this area, and I applaud their efforts to demonstrate that sustainable resource management is not only a good environmental practice, but is also a good business practice." GCN

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Systematic maintenance

A PROVEN MAINTENANCE SYSTEM GIVES PGA TOURNAMENT PLAYERS CLUBS MAXIMUM EFFICENCY AND PRODUCTIVITY

by A.D. HORN

Every minute spent in planning saves four minutes in execution. If that maxim is true, the planning and forethought that Cal Roth, Director of Maintenance for the PGA Tour and its Tournament Players Club (TPC) courses has put into setting up golf course maintenance facilities saves many man-hours every day.

With nearly 25 years to hone and fine-tune his maintenance facility format, Roth has put together a formula for a smooth, efficient operation. His time-tested plans are a required element on every TPC course.

"It's been an evolutionary process," he says, "and we've found that our advanced planning makes the facilities more efficient right from the beginning, and that translates into saving both time and money."

Three building blocks

Central to the maintenance plan are three buildings to separate the various maintenance disciplines and accommodate the work.

"We like separate buildings for a couple of reasons," Roth points out. "First, it allows us to fit the facility into the space available easier than if you use one big building. It used to be very common to place the maintenance facility on whatever piece of land was available after the course, clubhouse and other facilities were positioned, so making it work efficiently was a challenge. With our system we can control the fit on a square piece of ground or on a triangular patch."

"We try to put new buildings on an acre of land, but we've done it with as little as one-half acre," adds Michael Johnson, vice president of PGA Tour Construction Services, and the man who translates Roth's ideas into finished structures. "Costs vary from region to region but land is always extremely valuable. Building codes and local regulations vary a lot, too. We've found that it can actually be less expensive to build two or three buildings on a site than trying to build just one large one that can meet all the codes and regulations. It's often easier to manage the workflow and traffic – people and machines – with more than one building, too."

Roth says any course considering expanding, remodeling or creating a new maintenance center can adopt PGA Tour's maintenance philosophy. The ultimate goal is getting people and machines in the right places at the right time with no wasted effort. Safety and security are key considerations as well.

The maintenance building

The main maintenance building is the center of activity and the most expensive to build and finish. It is equipped with heat and air-conditioning, plumbing, telephones, computers and all the finishing touches of today's modern office. It houses the office of the superintendent, assistant superintendent, managers and support staff, as well as the employee areas where they take their breaks and get their assignments.

"One of the first things I noticed was the noise – or rather the lack of it. This was a business setting, a professional's office. It didn't have the 'garage' feel that some superintendents' offices have," says Chris Hague, CGCS, superintendent at the TPC at Deere Run, near Moline, Ill. "Beyond the main offices, the building is 'zoned' into individual work areas for the spray technicians, the maintenance manager, irrigation technicians and others."

Hague is no stranger to well-organized, top-flight facilities with tournament venues such as the Baltimore Country Club, Crooked Stick Golf Club and Hazeltine National Golf Club on his resume. Yet, he's seen immediate advantages with the system.

"Small things make a big difference, and the best way to describe the layout is user friendly, especially for the technicians and mechanics," he adds. "I'm spoiled, but if I went back to another course, I'd take a lot of this organization system with me."

In addition to the offices, the maintenance building houses the equipment repair bays – at least two for an 18-hole course – the parts department, all the reel grinding equipment, small tools and related supplies, and small equipment like walk-behind greens mowers and all the hand-held power tools.

Each section has its own "room," usually outlined by walls made of chain-link fencing on metal support frames. The walls are 8- or 10-feet tall.

The design helps control the movement of people, parts and equipment. "We try to eliminate wasted steps and wasted time, so we've considered people's moves from the time they park their cars," Roth explains.

There are two main entrances, one to the staff area and one to the offices. Crew members, once they get their assignments, go into the yard right from the employee area, not by cutting through the shop. All the individual areas of specialty – parts, irrigation, small tools, chemicals and equipment for example – have separate access doors from the outside.

"Having separate access makes it easier for people to get what they need and get on with the job without traffic jams," Roth says. "The layout inside the building is kept simple. There's plenty of light and the walls double as hangers for equipment. If you want to enlarge an area, the walls are pretty easy to rearrange.

"The fenced-in areas also provide good security because it's easy to see what's going on, while resources can be kept under lock and key," he adds.

Equipment storage building

The second building is the most basic. It's designed for large equipment storage. While little more than a glorified shed, it protects the investment in machinery.

"In the south, where we don't have to deal with winter weather, the storage building is usually about 150-feet by 30-feet, with only three walls. It's a metal shell on a concrete slab. We don't have to have heat or plumbing, so that keeps the costs down. In the north, where we do have to protect against the elements, we add a fourth wall and doors, so it expands to about 150-feet by 40-feet," explains Johnson. "The size is somewhat determined by the number and size of the machines that we'll have to cover."

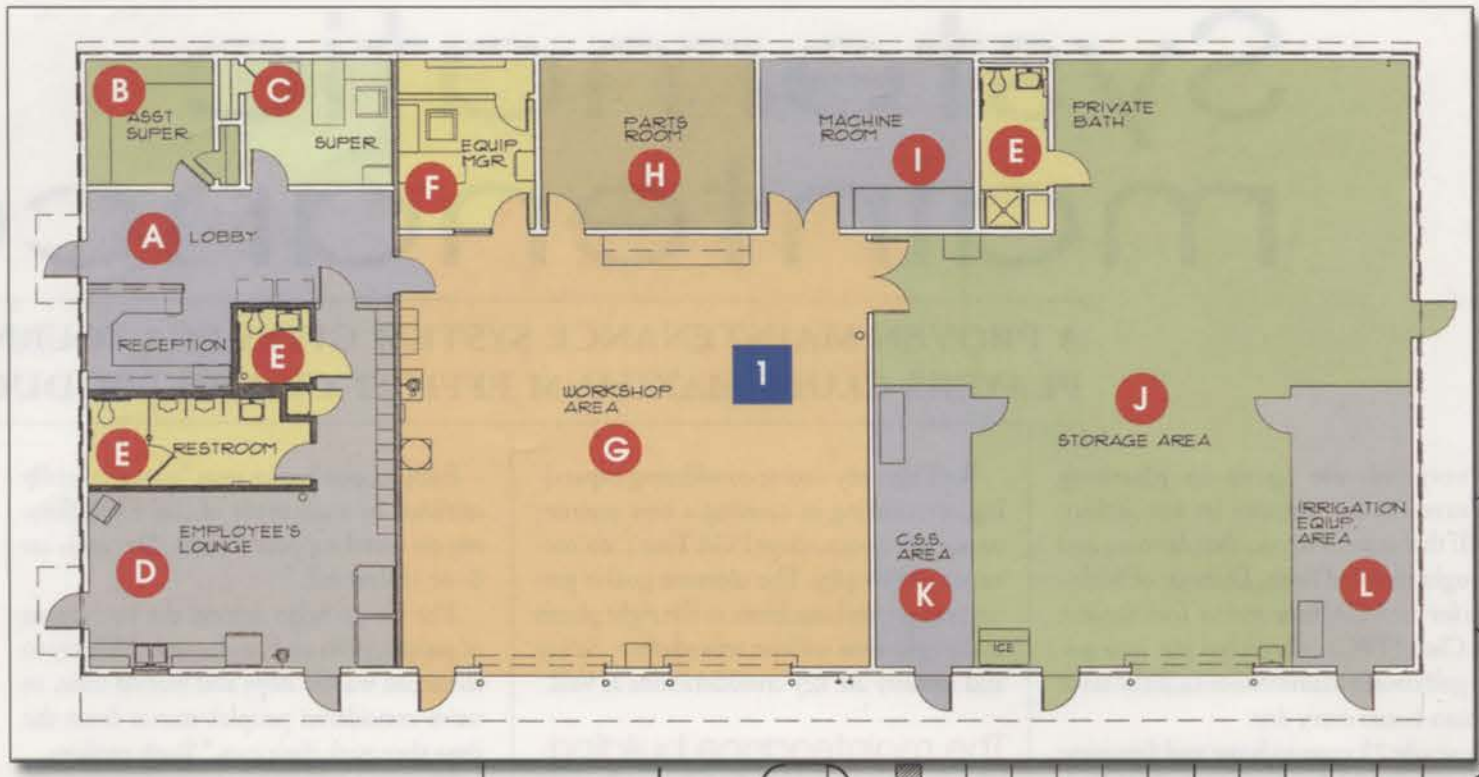
Outside, against one wall are six open stor-

1. MAINTENANCE BUILDING

Designed to house a staff of 25 to 30, this 110' x 50' building separates administrative and shop functions for quiet office work and maintenance work that is grouped logically. All office areas will be carpeted and have finished walls and ceilings. The lounge, restrooms and janitorial closet floors are tiled and also have finished walls and ceilings. The office and lounge areas are air-conditioned. The building includes a computer area, janitorial closet and lockers for employees.

The shop and small equipment area floors are sealed and painted with epoxy/polymer paint. The maintenance area is heated. In the hot, dry southwest, swamp cooling will be included. The entire maintenance area uses louvered-type exhaust fans or similar outside ventilation.

Parking is located close to the building and 2-4 stalls near the entry door are reserved for visitors and vendors.



The entire building is protected by a monitored security system.

A. Lobby/reception area is 10' x 26'
B. Assistant superintendent office is 8' x 8'
C. Superintendent's office is 10' x 15'
D. Employee lounge is 26' x 14' and includes two vending machines, a kitchen countertop, kitchen sink and cabinets, a refrigerator and an independent telephone
E. Restrooms
F. The mechanic's/equipment manager's office is 15' x 11' and includes a window for observation of the workshop area
G. The shop is 35' x 38' and is accessed from the outside by two 10' x 10' roll up doors
H. Shop parts area is 12' x 15'
I. The machine room is15' x 19.5'
J. The storage/small equipment area includes a private bath and is accessed from the outside by an 8' x 10' overhead door
K. The golf course supplies storage area is 8' x 16.5'
L. The irrigation equipment area is 22' x 12' and is assessible from the outside

2 . ENVIRONMENTAL BUILDING (OPPOSITE PAGE)

3. EQUIPMENT STORAGE BUILDING

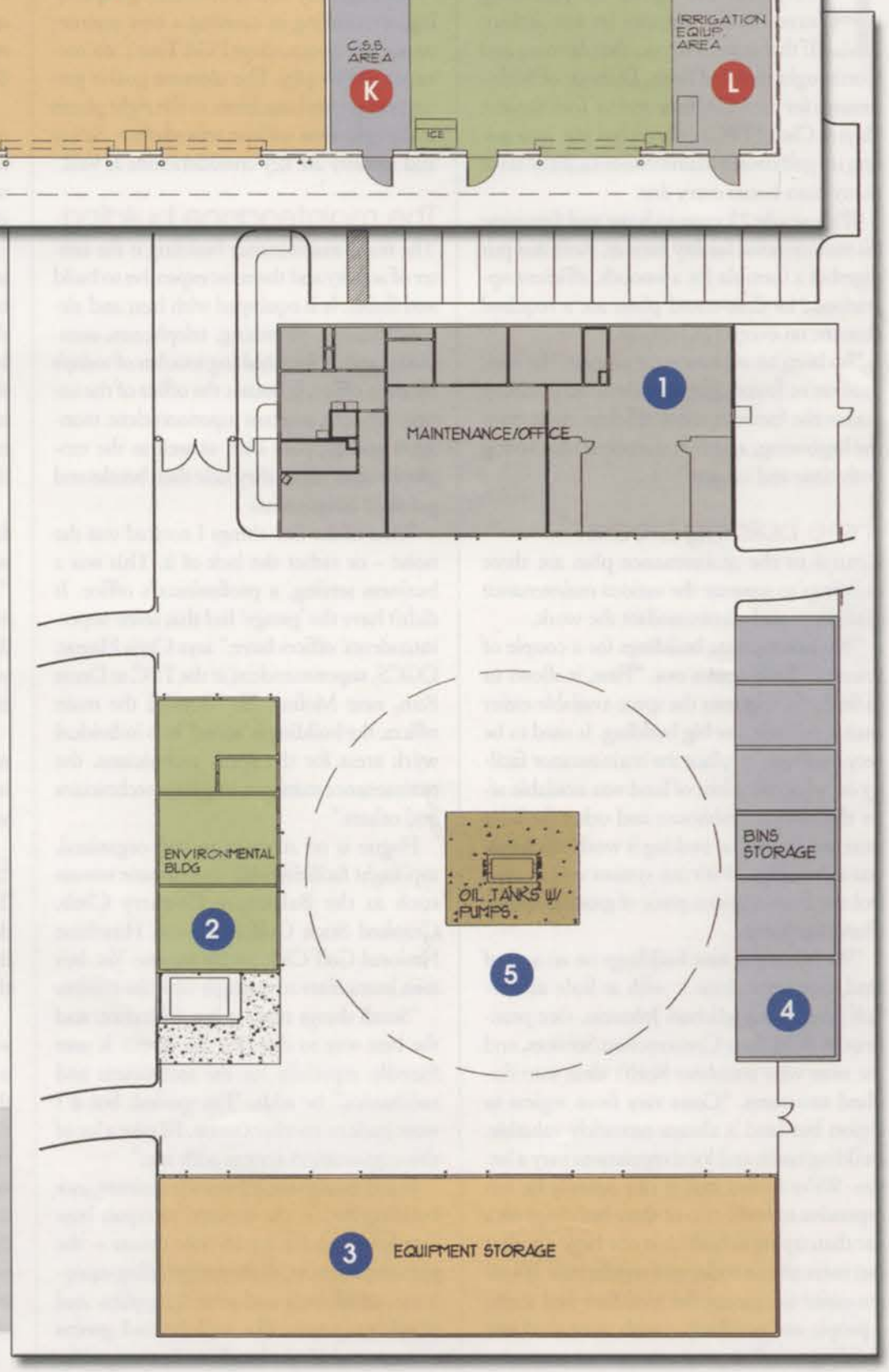
In southern climates this fully covered building is usually 30' x 150' and enclosed on three sides. In the northern climates it is 40' x 150' and fully enclosed, with 8' high x 10' wide and 10' high by 12' wide roll-up doors. Inside walls are protected with plywood or a similar material to a 6' height. No heating or cooling is required. Outside, corners of bay door openings are protected with steel bollards or guards. The area is enclosed with steel chain link fencing for security and a security system for the building is also required.

4. MATERIAL STORAGE BINS

Six bins are formed with 8' high concrete block walls and a concrete base that extends 3' in front of the walls. Two bins are 20' x 25' and four are 15' x 15'.

5. FUEL STORAGE AREA

A 500-square-foot concrete pad serves as a fuel island with a minimum of two above-ground storage tanks capable of holding 500 gallons of gasoline and 500 gallons of diesel fuel. A metered pump system accommodates up to five accounts for tracking department use. Bollards or block walls are necessary to protect the fuel tanks.



TPC's ideal maintenance compound

An ideal Tournament Players Club (TPC) maintenance facility is a compound consisting of (1) a maintenance building, (2) an environmental building with a waste disposal area and an equipment wash area, (3) an equipment storage building, (4) material storage bins and (5) a fuel storage area. For efficiency, safety and security, the compound can be arranged as shown. If a site does not make a compound possible, the individual buildings can be located on the course as space and needs require.

2. ENVIRONMENTAL BUILDING

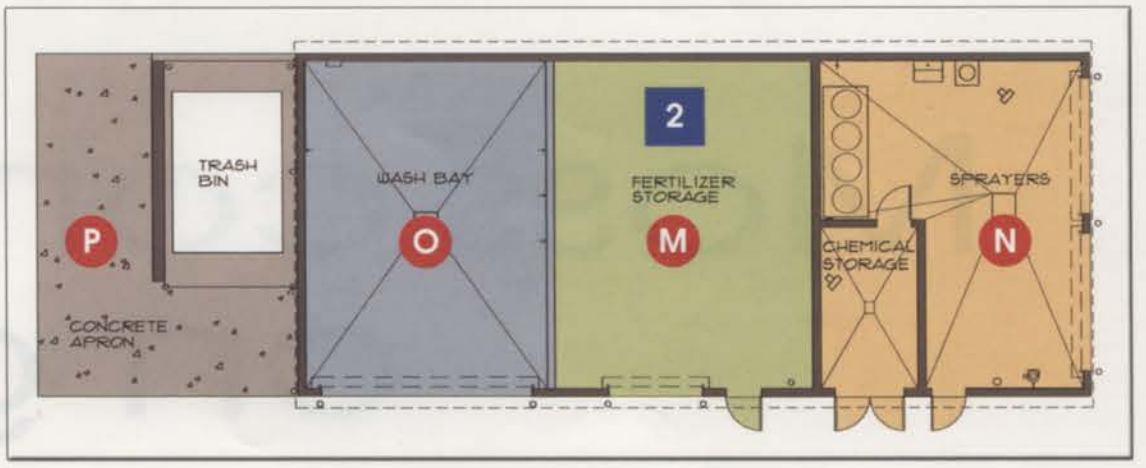
This building is designed to meet EPA standards.

M. The fertilizer storage area is usually 32' x 22' and is accessed from the outside by a 10' x 10' roll-up door.

N. The pesticide storage facilityhas a separate area for pesticide storage with outside access, a storage area for two sprayers, a mix/load bay and a self-contained recycling system for rinsate. Outside access to the mix/load bay is through a 10' x 14' wide roll-up bay door. The pesticide storage room requires heating to 50 F, but no cooling. A hot water heater provides heated water for mixing pesticides, and an air compressor for tank agitation. Concrete floors are painted with an epoxy/polymer floor paint.

O. The wash bay is a 20' x 30' concrete pad with containment curbing. The pad slopes to the center where rinsate is captured and filtered for grass clippings, debris, oil and water.

P. A waste disposal area holds a 30-cubic-yard low-profile waste receptacle that is usually located on a concrete slab with a 3' or 4' high wall to separate it from a concrete slab dumping site that can be used for scooping up debris with a front-end loader.



age bins for raw materials such as sand, topsoil and mulch.

Environmental building

Building three is the most unique, serving as the "mix/load" building where chemicals, fertilizers and related equipment are kept. With more and more state, local and federal regulations dictating how chemicals must be stored, handled and used, this building can become the focal point of the facility – and it's the one many superintendents would add to their courses, if given the budget.

"We provide heat and plumbing in this building because some chemicals have to be stored and mixed at specific temperatures, and this is also where all the mixing and clean up is done," Roth explains.

The "mix/load" building houses all the spraying equipment – usually room for at least two spray rigs – and all the loading, mixing and cleaning facilities. A drive-through wash bay is a standard feature.

"Two relatively small details are particularly important" adds Johnson. "We use removable drains in the wash-out area so any grass clippings and other debris can be dug out to prevent clogs and overflows. And, we install a small hot water heater so we can mix warm water with the chemicals. On cold mornings, that helps them dissolve more evenly for a more efficient mix."

Local or state regulations usually dictate how to handle chemicals, but increasingly these codes mandate a separate building for pesticides. To comply with standards, or to exceed them, Roth and Johnson say this facility includes a containment curb or lip around the entire area – at a minimum a 4-inch concrete curb around the entire chemical area to contain any accidental spills.

"We also recommend using metal shelves rather than wooden ones," Roth adds. "Wood can absorb chemicals and moisture, while metal will not. But you have to be careful around metal, too. Some chemicals can be corrosive, so you have to keep the shelves clean. You also may have to repair, sandblast and repaint, and replace them eventually, but not as often as ones made of wood."

The concept of the environmentally friendly building is another that can be adapted to most courses.

"The environmental building is one of the smartest parts of the whole organizational plan," says Pat Franklin, CGCS, from The Tournament Club of Iowa, near Des Moines.

"When I was first introduced to it, I thought it might be excessive and not really necessary," he says. "But once I saw how it worked and what it can mean to the facility, it made a believer out of me."

Franklin stepped into his role in Iowa when the course was in the initial design stages, coming to his post after serving as superintendent at both the TPC of the Twin Cities (Minneapolis/St. Paul) in Minnesota and at the TPC at Deere Run.

"This building is set up not only to be efficient for the staff, but to protect the environment and everything around it," he adds. "I think of it as being a 'neighborly' building – it's safe, efficient and good for community relations. This kind of attention to detail not only shows that we know what we're doing, but that we're aware of the impact we can have on the community."

The bottom line for superintendents is an emphasis on organization.

"It's the overall organization that sticks with you," Franklin continues. "Everything has a place and everything is in its place. When you get into that habit, and your people get into that habit, you do eliminate wasted time and wasted effort. At my new course, the staff has really taken to the idea and they have found it has made them more efficient — fewer wasted movements, less time preparing for a job and more time getting the job done right."

Planning, from the beginning, for every aspect of a superintendent's day has led to facilities that raise the overall quality and performance of the staff to that magic "next level." Thinking in terms of specific disciplines within the job, and making each as efficient as possible has led to savings in time and money. In today's budget-crunching atmosphere, that's critical to success. And these concepts can be adapted to an existing facility, put into a remodeling plan or imprinted on a new design. GCN

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Improving a single maintenance building

It's possible to gain many of the advantages of Roth's system within a single building. The key is to bring people and machines together in the right place at the right time, eliminating wasted actions, making the whole operation safer and more secure. To accomplish this, consider the following:

- Offices for the superintendent, assistants, managers and support staff should be isolated from noise and as many distractions as possible.
- Consider "zoning" your work areas for various specialties – areas for your spray technicians, your irrigation technicians, your mechanics, and all the tools each needs on a daily basis. These areas can be divided by partitions, or marked off by simply painting different colored lines on the floors with specified walkways.
- Organize by need – put parts and mechanics' tools close at hand and centralized so people aren't zigzagging through the shop.
- Divide space creatively using chain link-style wall sections for secure storage.
- Use logical parking arrangements for equipment to get the day off to a smooth start, rather than an unplanned "first-in, last-out" scenario.
- Plan pesticide storage and handling areas to improve safety and handling, and to meet federal, state and local regulations. Store all pesticides within an area having special drains, ventilation and containment curbing to protect against leaks or spills.

By observing your traffic patterns by function, and by documenting where work bottlenecks occur, you can increase efficiency in an existing maintenance facility. While separating functions into dedicated buildings is an ideal situation, any maintenance facility can be improved with planning and some investment.

Moss control on greens

IS HOPE ON THE HORIZON FOR THIS EPIDEMIC PROBLEM?

by KEVIN J. ROSS, CGCS

Moss control on golf greens has moved to the forefront of golf course management concerns in recent years. Many have now considered this problem an epidemic. There are many theories on how moss has become such a problem and the various control options available. One thing is certain when discussing moss, very few can totally agree on why it is suddenly so prevalent and how to control it.

The moss plant affecting greens has been identified as Silvery Thread moss or *Bryum argenteum* (although this is still being debated). Moss is classified as a bryophyte, which has no roots, no vascular system, and reproduces vegetatively and/or by spores. Again, some researchers are debating whether or not moss can actually reproduce by spores. Chemical control is difficult because moss lacks the vascular system necessary to translocate an active ingredient throughout the plant.

Moss also has the physiological ability to endure extensive drying periods, and then regenerate. Some literature states moss can dry out as much as 80 percent for a period of two years and still remain viable. Each

Photo: Kevin Ross

Drenching moss with diluted dishwashing soap provided inconsistent results and is an illegal use of the product.