at the end of each month. He uses paper checklists to track all maintenance procedures for each field daily and enters the data into his computer maintenance program to develop both an easily accessible record and a case history for future planning.

A Unique Agreement

"I work for the Michigan Battle Cats," Varner says. "We have a unique lease agreement with the City of Battle Creek. The city pays us a set amount each year for maintenance of the 10 fields outside the stadium. We maintain only the playing fields, that area inside the fences. This frees us from all the red-tape jobs, allowing us to maintain all 11 fields at a higher level. The city maintains all other areas of Bailey Park in addition to the other parks around the city and the athletic fields in those parks."

The city's Parks and Recreation Department arranges the game and practice schedules for the fields outside the stadium. Park supervisors are on hand for every game.

While Varner's crew members aren't required to be at the field during games, they are constantly on call in case problems develop. Varner and City Recreation Supervisor Pete Baum meet every Friday to go over the next week's schedule so Varner can plan field preparation and maintenance.

Nation's Largest Tournament

"Field activity begins as soon as the fields are playable," Varner says, "generally in mid-March — with practices for the local junior college and one of the high schools."

Adult softball practices kick in during mid-April. Leagues start three weeks later and run through mid-August. Adult leagues play four games each weeknight. Industrial leagues play Monday and Wednesday mornings. These third-shift workers hit the fields at 8:30 a.m. for two doubleheaders each day.

The infield surface is made of crushed limestone screenings, called "stone dust," which is relatively inexpensive. Photo courtesy: Mike Varner.

Fall practice begins in mid-August. Fall leagues run from the last week of August to the third week of October.

Fourteen tournaments were held in 1996, including the American Softball Association Men's 35+ National Slow-pitch Tournament over Labor Day weekend.

For two four-day weekends during the summer, all eight softball fields are fitted for baseball (four with portable mounds) for the annual Mayor's Invitational, the nation's largest amateur round-robin baseball tournament. Teams are invited from across the nation to participate. Every field in the area is used, including all high school fields and all the fields in other city parks. Four baseball games are played on each of the complex's fields during the day. The fields then are refitted for the evening softball leagues.

"In 1996, 493 games were played on Jim Drikakis Field in the 190-day

Stadium

Location: Battle Creek, Mich., in Flannery Complex (2 softball complexes, 4 fields each in cloverleaf pattern), in John Bailey Park, which also includes C.O. Brown Stadium, 2 full-size baseball fields, 12 shuffleboard courts, 2 sand volleyball courts, 40 picnic tables and a boat ramp.

Seating: 1,000 permanent, 500 temporary.

Dimensions: 8 ft. permanent outfield and sideline fences. Right and left fields, 300 ft.; center, 320. Portable fencing converts field to 200 ft. for fast-pitch games on 5 fields at one time or to 250 ft. for 3 fields. Warning track, 15-ft. wide, around field.

Amenities: Lights for night games. Building with concessions, rest rooms, officials' area, and a covered press box open on four sides for optimum viewing for PA announcer and scoreboard operator.

Turf: Kentucky bluegrass on native-soil base of silty-loam, with 1-percent grade for drainage.

Irrigation: 4-in. mainline feeds each field, allowing simultaneous irrigation of 2 fields. Toro 640 series heads with Toro 2-in. electric valves. Toro Vision II series 9-station controller per field. Two 1-in. quick couplers in front of dugouts per field.

Maintenance

Mowing: 3-4 times/week, at 1.5 in. with 5-gang reel mower, cutting each field in 30 min.

Daily: Infield — shoveling, raking to fill holes in batters box, pitcher's rubber, around bases; dragging with Kromer conditioner drags behind utility vehicle. Other — sweeping off grass edges, dragging warning track, picking up trash in dugouts and on field, chalking batters boxes and lines, and setting out the bases park supervisors have removed and stored at end of each day.

Weekly: Raking out crushed limestone surfaces of dugouts. Painting outfield lines, filling a 12-gal. line striper and doing all 10 fields in succession. Edging (alternated so each field gets attention every 2 weeks) with walk-behind edger, followed by hula hoe or diamond-blade hoe to eliminate stray grass.

Herbicides: Glyphosate as-needed. Sprayed along fence lines, and other areas where unwanted grasses pop up, from 25-gal. tank with electric pump attached to battery of utility vehicle. Also from hand-held 3-gal. sprayer for spot treatment of occasional outbreaks of dandelions and white clover.

Insecticides & Fungicides: None needed last two years.

Aeration: 4 times/year with 6-ft.-wide coring aerator behind tractor, followed by a pass with rotary mower to break up cores.

Fertilizers: 5 times per growing season. Formulations based on soil tests performed each April. Formulations for 1996 (all applied at ≤ 0.75 lb. of N or K per 1,000 sq. ft.) included: 18-6-12; 30-0-15; 19-19-19; and 15-0-30. Granular fertilizers supplemented with foliar applications of iron, magnesium, manganese and potassium before big events or in instances of extremely high field usage.

Personnel

Crew: 6 full-time seasonal. Scheduled from end of March to May through mid-Sept. to mid-Nov. This year's staff — Craig Grestini, Mike Ireland, Dan Cretsinger, Willis Vaughn, and two interns, Bill Wilson (Hawkeye Comm. Coll., Waterloo, Iowa) and Scott Dobbins (Washington St. Univ., Pullman, Wash.)

Varner: 8th season as a head groundskeeper; 2nd with Michigan Battle Cats and Drikakis field. B.S. in recreation and parks administration, Texas A & M Univ. Prior experience — construction, renovation and consulting on sports fields. Family — wife, Christine, and 19-mo.-old son, Trey. Associations — STMA, Certification Committee.

period from April 15th to October 23rd," says Varner.

And that's not all. Besides the regular game and practice schedule, any team can "walk on" an open field for practice.

Contagious Attitude

Varner is the only full-time, year-round member of the maintenance staff. Everyone else is seasonal.

"I had a super crew in 1996," Varner says, "and this year's staff is coming together extremely well. Three of the regular 1996 crew members — Greg Lough, Craig Veeder, and Steve Whitehead — have moved on to other positions. Jim Haun, the Michigan State student who interned with us in 1996, has graduated and is now head groundskeeper for the Beloit (Wisconsin) Snappers.

Head Groundskeeper Mike Varner holds the STMA 1996-1997 Softball Field of the Year award he and his crew won for Jim Drikakis Field. Photo courtesy: STMA.

"Two crew members are assigned to the softball complexes for regular duty, and we all chip in during tournaments and heavy-use times. Crew members are rotated so everyone gets experience on the softball complexes, baseball fields and in the stadium."

Varner's enthusiasm for sports turf management and commitment to pro-level quality are contagious. Staff members quickly adopt his "do it right" attitude and attention to detail.

According to Varner, earning a B.S. degree in park & rec administration seemed like what he was supposed to do after working with sports fields starting in his Little League days. When an arm injury took him out of the player ranks after high school, he shifted his focus more strongly to the maintenance aspects of the game.

He's quick to credit the commitment and cooperation of city personnel, Battle Cats management and his grounds crew. Special praise goes to his wife, Christine, who encourages his efforts during the long and unpredictable hours of the season.

"Every athlete," he says, "deserves the best possible playing surface. We strive to keep all our fields in such great shape that every amateur athlete has as good a shot at a great play as any pro." ❐

Bob Tracinski is the manager of public relations for the John Deere Company in Raleigh, North Carolina, and public relations co-chair for the national Sports Turf Managers Association.

p.m. on July 9 at the Little League Fields in Ottumwa. The workshop will include presentations by Bill Perry of the City of Ottumwa, Gary Peterson of the Iowa Extension Service and Dr. Dave Minner of Iowa State University.

The Iowa Chapter will hold a Baseball Workshop on August 8 from 1 p.m. to 4:30 p.m. at Sec Taylor Stadium in Des Moines. Sessions will cover daily and post-season maintenance of the mound, plate and infield; fertility; building your own low-cost equipment; and repair of turf areas, including overseeding, seed pre-germination, sod and plugs.

The Iowa Turfgrass Field Day will be held August 14 at Iowa State University's Turf Farm. Details will be announced soon.

For more information, contact Lori Westrum at The Turf Office at (515) 232-8222 (phone) or (515) 232-8228 (fax).

Southern California: For information on the Southern California Chapter or pending activities, contact Chris Bunnell at (619) 432-2421.

Florida Chapter #1: For information on upcoming events or the Florida Chapter, contact John Mascaro at (954) 938-7477.

STMA Chapters on the Grow

MAFMO: The Mid-Atlantic Athletic Field Managers Organization (MAFMO) is an active group currently working toward STMA affiliation.

MAFMO will team up with Toro for an Irrigation Seminar, which will be held on Wednesday, May 21, from 8 p.m. to 3 p.m. at Cedar Lane Park in Columbia, Maryland. Sessions will cover how to assess your irrigation needs, design your system, calculate cost, install it and troubleshoot problems.

The seminar will include both classroom instruction and hands-on demonstrations and troubleshooting. Space is limited to ensure top quality instruction, so act now.

MAFMO will also be holding a dinner meeting on Thursday, June 19, from 6:30 to 9 p.m. at Joe Theisman's Restaurant in Elkridge, Maryland. The topic of the meeting will be "Turfgrass Seed Certification."

For more information, contact the Hotline: (410) 290-5652.

Arizona: For information on the Sports Turf Managers Association of Arizona or upcoming events, contact Bill Murphy, City of Scottsdale Parks and Recreation Department, at (602) 994-7954.

Great Plains: For information on the Great Plains Sports Turf Managers Association or upcoming events, contact Mark Schimming, City of Wichita, at (316) 337-9123. ❐

Disney Constructs a Wide World of Sports

Imagine a year-round sports complex encompassing nine venues filled with state-of-the-art facilities where athletes young and old, amateur and professional, compete and train for more than 30 sports. The Walt Disney Company did and, in August 1995, began constructing Disney's Wide World of Sports, a 200-acre complex that opened this past spring in Orlando, Florida.

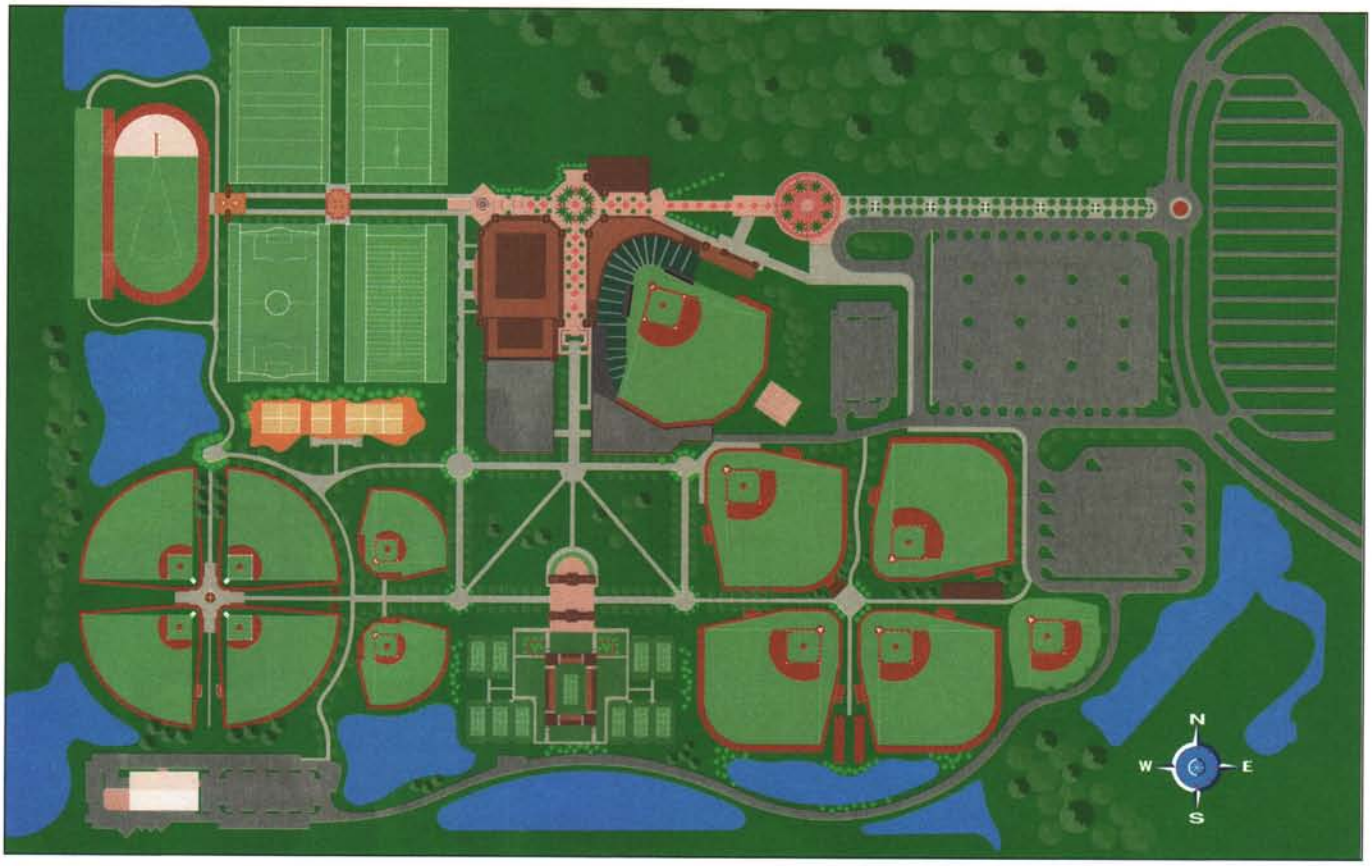
"It's all top-of-the-line," says STMA member Murray Cook, manager of the complex's baseball stadium. Everything at Disney's Wide World of Sports testifies to that statement:

- the Tifway 419 bermuda throughout all turfgrass venues, offering 7 to 10 inches of drainage per hour;
- the picturesque Mediterranean architecture by David M. Schwarz, who created The Ballpark in Arlington for the Texas Rangers; and
- the agreements Disney reached with Toro to provide its finest turf equipment and with Musco to supply its best lighting. Toro will assume a maintenance role for 80 acres of turf throughout the complex and will put its name on the 4 1/2-acre Town Green, where award ceremonies and other public events will be held.

Thirty-two sports can be held in tournaments and festivals 365 days a year: aerobics, archery, badminton, baseball, basketball, beach volleyball, body building, boxing, fencing, field hockey, football, gymnastics, in-line skating, judo, karate, lacrosse, martial arts, power lifting, roller hockey, rugby, running, soccer, softball, table tennis, tae kwon do, team handball, tennis, track and field, tumbling, volleyball, weight lifting, and wrestling. The complex hopes soon to add a 10th venue for a 33rd sport, cycling. Disney bought the velodrome built at Stone Mountain Park near Atlanta for the 1996 Summer Olympics and plans to have it installed by the end of this year.

Recently, Disney's Wide World of Sports became the official training camp of the Harlem Globetrotters and the new home of the Amateur Athletic Union (AAU), hosting over 25 of its national championships this year and 50 by the year 2000. Disney also signed an agreement of cooperation with South Africa that is bound to bring to the complex many of the country's soccer, cricket, rugby and other events.

That's for starters. As the following listing illustrates, much more is planned.



A multi-colored walkway leads visitors from the complex's main entrance between the baseball stadium and fieldhouse to the Town Green, where paths branch out to other ball fields. Photos courtesy: Disney's Wide World of Sports.

The Baseball Stadium

Home of the Atlanta Braves spring training beginning in 1998, the double-decker baseball stadium is the tallest of all spring-training sites and was designed to replicate the best professional stadiums. It encompasses a deep seating bowl with over 7,500 extra-wide, permanent seats, 80 percent of them between first and third base, as well as 1,300 additional spaces on the lawn, four luxury sky boxes and two open-air suites.

Equipped with four batting tunnels, spacious locker and training rooms, suite-level executive offices, and a conference room that overlooks the field, the baseball stadium is, as Braves General Manager John Schuerholz put it, "the finest baseball spring-training facility in the world — bar none." A 20-year agreement with Disney's Wide World of Sports guarantees the Braves will celebrate 50 years of spring training in Florida.

The stadium will be managed and maintained under the leadership of turf specialist Murray Cook, former baseball manager for the Braves and Montreal Expos West Palm spring-training site. Murray brings his internationally recognized expertise in 21 years of sports turf maintenance to the baseball stadium.

The double-decker baseball stadium was designed to replicate the best any professional stadium has to offer.

Dimensions: left field, 330 ft.; right field, 330 ft.; right/left field alleys, 380 ft.; center field, 400 ft.; home plate to backstop, 60 ft.; baseline to dugout step, 41 ft. **Program Manager**: Sharon Swainson.

Baseball Quadraplex

Located in the shadow of the baseball stadium, the baseball quadraplex features four professional fields and one half field — each constructed on native soil and eight inches of rootzone mix, with infields of 80 percent sand and 20 percent clay and 20-foot warning tracks embellished with crushed brick. Field C is equipped for night play with six light poles and 174 1,500-watt metal halide fixtures.

The area between Field C and Field D is equipped with 10,000 square feet of batting tunnels, pitching mounds, four hitting tunnels and four masters pitching machines. A pitching area sporting 10 bullpens lies between Field A and Field B.

The Atlanta Braves organization will use the baseball quadraplex during extended spring training and the Gulf Coast League season in 1997. The Braves' Major League players will use the facility full-time beginning with the 1998 spring-training season. In addition a number of top-level baseball tournaments, training sessions, clinics and fantasy camps will use the facility year-round.

Dimensions: Fields A & C — left, 335 ft.; right, 330 ft.; center, 400 ft. Field B — left and right, 325 ft.; center, 390 ft. Field D - left and right, 325 ft.; center, 380 ft. **Sports Operations Manager**: Sharon Swainson.

The Beach

The playing area, large enough to accommodate five volleyball courts, contains 4,000 tons of white asphaltic mix sand with a 24-inch depth. An underground drainage system removes six inches of rainfall per hour. Landscaping offers a variety of foliage, including split leaf philodendron, smooth congrass, dwarf yaupon holly, wax myrtles and live oaks. **Program Manager**: Flo Bryan.

The Fieldhouse

With over 30,000 square feet of competition space on the bottom floor alone, the fieldhouse is a model multi-purpose arena with great flexibility, new-age playing surfaces and custom athlete training areas, including a 3,000-square-foot strength and conditioning room. Of the 5,000 seats, the highest row in the fieldhouse is only 35 feet off the ground of the 80-foot-high space.

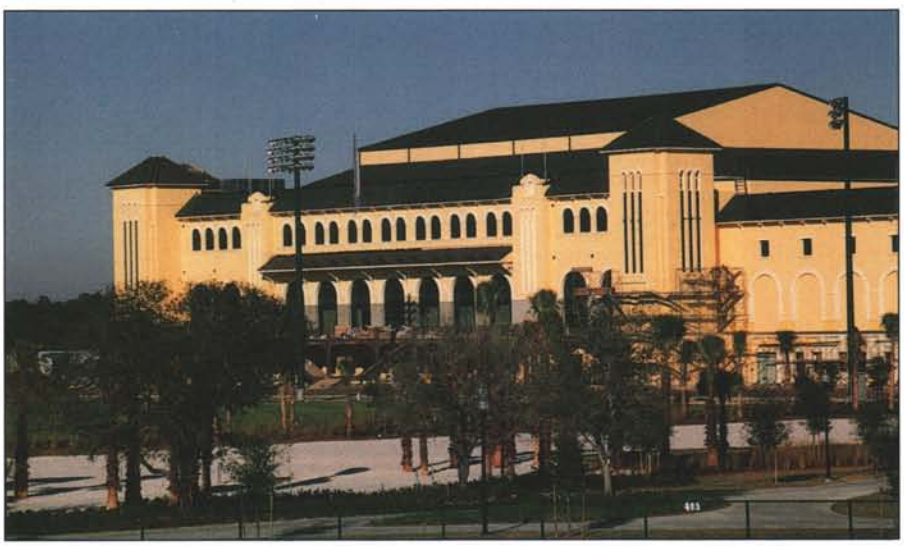
The built-in wood Connor playing surface holds up to four regulation basketball courts and has a minimum tested resistance of 270 pounds per square inch. An auxiliary area, with an additional 17,000-plus square feet, holds two more courts. A Porter curtaining system with 18 feet of mesh, topping the 10-foot temporary vinyl wall and acoustic wall throughout the arena, allows tournaments to run efficiently. **Program Manager**: Jeff Sturgeon.

Softball Quadraplex

The softball quadraplex encompasses four softball diamonds in a giant circular pattern. Outfield fences measure 305 feet in a perfectly symmetrical configuration, although temporary fences are available for games when shorter distances are required. Each field accommodates fast and slow pitch softball and features bullpens for both teams as well as spacious dugouts and 16 helmet/equipment boxes per dugout.

The facility is scheduled to host 27 events this year featuring 10 different softball organizations. One centrally located tower overlooking all four diamonds offers press facilities, concession stands and an area for scorekeepers and officials. **Sports Operations Manager**: Ken Hackmeister.

The outfields of the softball quadraplex measure 305 feet in a perfectly symmetrical configuration, but can be shortened when required.



The fieldhouse displays the complex's Mediterranean style architecture, which principal architect David Schwarz dubs "Florida Picturesque."

Track & Field Complex

Designed under the specifications of the International Amateur Athletic Federation (IAAF), the world governing body for track and field, Disney's complex is a modern Olympic-quality facility. The track has nine 48-inch lanes and consists of a double-layer Martin Surfacing ISS-1000 Encapsulated Finish Polyurethane Surface.

The Tifway 419 is protected by Toro's DR2 5000 irrigation system. Other equipment throughout the complex includes countdown timers, performance measurement indicators, and state-of-the-art wind gauges. Grandstands offer a base seating capacity of close to 2,000 with the ability to expand. **Sports Operations Manager**: Brooks Johnson.

Tennis Complex

The 11 clay-court venue, including a centre court stadium, is designed to attract world-class tennis, beginning with the 1997 U.S. Men's Clay Court Championships. Built to drain water rapidly, the courts' playing surfaces incorporate a CAL CAP sub-surface irrigation system consisting of Fast Dry ISP materials. The centre court stadium contains more than 1,000 permanent seats and can be expanded up to 10,000 for larger events. **Program Manager**: Flo Bryan.

Youth Baseball Fields

Many of the features built into the professional baseball facilities are also found at the two youth baseball fields: Tifway 419 bermudagrass, Major League infield mixes of 80 percent sand and 20 percent clay, and eight-feet-wide warning tracks made of crushed red brick. Other features include two dugouts per field, enclosed bullpens, six-foot outfield fences and bleacher seating for 250 spectators per field. Fields are wired for power pitching machines, and portable batting cages are available. The youth baseball fields will host Disney-created youth tournaments, AAU championship events and local tournaments.

Dimensions: 200 ft. to all fields. **Sports Operations Manager**: Sharon Swainson.

Sports Fields

Located near the fieldhouse, the four sports fields provide a setting for football, soccer, lacrosse, archery, field hockey, cricket, ultimate frisbee and other sports. Four separate events can be contested on each of the fields simultaneously, or all four may be combined for the same tournament. The Tifway 419 bermudagrass is crowned with a one percent slope to enhance drainage.

The field adjacent to the fieldhouse is equipped with six light poles and 144 Musco fixtures for night play. Each field can seat 10,000, while all four fields combined allow a maximum capacity of 30,000 spectators.

Dimensions: each field is 105 by 68 meters (international soccer dimensions). **Sports Operations Manager**: Charles Davis. ❐

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Giants Stadium Tests a New Field-on-Wheels

If the ITM system survives the test at Giants Stadium this year, the New York Jets and Giants will consider adopting the "field on wheels" for their home games next year. Photo courtesy: Chris Scott.

What do the New York Giants, New York Jets, rock concerts, and New York/New Jersey MetroStars all have in common? And what sets the MetroStars apart?

The common denominator is they are all tenants of Giants Stadium, owned and operated by the New Jersey Sports Authority. The distinguishing factor is the MetroStars require a natural-grass playing surface, while the playing field in Giants Stadium is AstroTurf.

This presented a dilemma for the Empire Soccer Club, owner of the MetroStars. How would they meet the natural-grass requirements of Major League Soccer in a venue housing an artificial playing field?

They're trying a portable turfgrass system, and if their experiment at Giants Stadium works out, turf managers will have a new, flexible tool for effectively accommodating a wide range of activities. Managers can rely on a hard surface for turf-torturing events like rock concerts and tractor pulls, then turn the venue around and serve up the soft natural-grass field that most athletes prefer.

Exploring Possibilities

In December of 1995, the Empire Soccer Club authorized the Clark Companies of Delhi, New York, to study the possibilities of installing a permanent natural-grass field in Giants Stadium. A month later, John Hilson of the Clark Companies organized a research conference — hosted by the State University of New York at Delhi Turfgrass Division — to explore and discuss the possibilities available in natural-grass systems. Several days of meetings and phone conferences included discussions with Dr. Norman Hummel, president of Hummel & Co. Inc.; Charles Dixon of Turf Diagnostics & Design; Dr. John Rogers III of Michigan State University; and David Potts of SubAir Inc. Subsequently, Scott Clark, president of Clark Companies, returned to the MetroStars with the opinion that no grass-reinforcing system, even combined with climate control, could stand up to the rigors of Giants Stadium.

Based on the conclusions of this study, the Empire Soccer Club hired Clark Companies to construct a temporary grass field in Giants Stadium for the 1996 MetroStars' season. The field was constructed in the spring and removed prior to the NFL pre-season schedule.

While successful, this seemed a temporary solution. Investigation continued into developing a more perma-

A new mold developed last winter produced a much improved version of the polyethylene ITM module. In the background are two modules aligned and locked with foot locator pads. Photo courtesy: Chris Scott.

The modules were filled with a growing medium and sodded in the parking lot prior to installation in the stadium. Photo courtesy: Chris Scott.

nent and cost-effective solution, rather than to continue building and discarding a temporary field year after year.

Toward the end of 1996, discussions centered around using a modular natural-grass field. This idea had been discussed at the January conference but was dismissed at that time. However, improvements made to the Integrated Turf Management (ITM) system, marketed by the GreenTech Company of Richmond, Virginia, led to reconsidering this concept.

A transportable natural field, the ITM system consists of square, interlocking plastic modules, commonly called "Grass Squares," containing a prescribed growing medium and turfgrass. In December of 1996, GreenTech received word from its European distributor, Bryan Wood, that a new high-density mold for manufacturing the polyethylene plastic modules had just been completed.

The new mold design produced a much-improved version of the ITM module. That same month, Scott Clark contacted Chris Scott of GreenTech to investigate the possibility of placing the ITM system in Giants Stadium for the soccer season beginning in mid-April. As negotiations ensued, the new module began testing. In February 1997, the Empire Soccer Club and Clark Companies struck a deal — Giants Stadium would become the first commercial installation of the ITM system.

The GreenWay "brainstorming team" that proposed the concept of the transportable turfgrass modular system display the first model, a one-square-foot aluminum version. Front row: Dr. Henry W. Indyk, turfgrass consultant (left); Dr. Richard Caton, coordinator of Consulting Services. Back row: Steve Cataldo, Greenway V.P. (left); Tom Ripley, Greenway president. Photo courtesy: Henry Indyk.

Tiling the Floor

The process turned into an adventure. The modules had to be manufactured, shipped, filled with the sand/soil medium, sodded and rooted, and ready for the first MetroStars home game in 10 weeks. Even with a well-established system, meeting the deadline would have been tough. With the young, redesigned system being installed on an unprecedented scale, it presented a real challenge. It all had to be done in February, March and April when Mother Nature hammered the Northeast with harsh winter weather.

You've Come a Long Way, Baby

The ITM system has come a long way in a relatively short time. In 1990, inventors Tom Ripley, president of Greenway Services, and Dr. Henry Indyk, formerly of Rutgers University, began working on the concept of grass squares and soon developed a design consisting of metal connecting trays. Dr. James Beard and Arthur Millberger of Millberger Sod in Bay City, Texas, studied the design during a research project and concluded the modular system would be an effective way of converting synthetic playing surfaces to natural turf. A successful installation of portable grass modules in the Pontiac Silverdome for World Cup Soccer in 1994 bore out their conclusion. About the same time, Ripley and Indyk installed a new plastic-wooden version of modular turf at Baltusrol Golf Club as a practice tee for USGA's U.S. Open in Springfield, New Jersey. That too proved successful. Modular turf was ready for the next level.

To take it there, Greenway Services and Enterprise Developers Inc. (EDI), a Richmond, Virginia-based firm, created a new company, GreenTech, which was founded and is partly owned by a group of Major League Baseball and NFL football players. With Tom Ripley as president and Chris Scott (executive vice president of EDI) as managing partner, GreenTech took control of all domestic and international patent and trademark rights, then began to build a high-density plastic mold that would produce the ITM module. Bryan Wood, of Systems Matrix in England, joined GreenTech as a distributor and contributed to the time-consuming, frustrating process of perfecting the mold.

The first batch of 336 modules — each 48 inches square and 11 inches deep — was molded and shipped directly to Giants Stadium. John Hilson and his crew from the Clark Companies unwrapped and aligned the empty modules in a staging area in the stadium's parking lot, then locked the sides of the modules in their upright positions for the rootzone-component loading phase of the project.

Crews filled the modules with a sand/organic rootzone mix over a graded, pea-stone aggregate designed to provide efficient drainage. Excess water flows at a rate of 8 inches per hour through channels molded into the modules' pallet-style bases and out the stadium through the current drainage system. The design also allows the rootzone to be ventilated with forced air from below the field for aeration and for cooling the turf in summer and warming it in winter.

With the modules filled, the