Hunnewell Track and Field Renovation

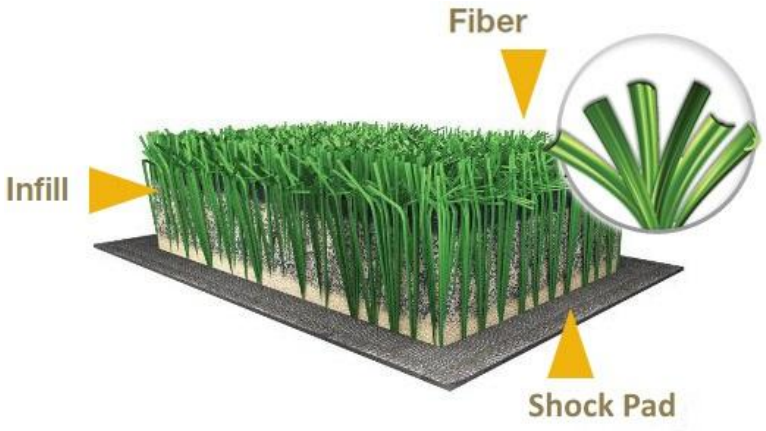
Proposal and Technical Specifications

Introduction

As the number of our communities children involved in athletics has steadily increased over the past 20 years, the demand on Wellesley's existing playing fields has created a shortage in rectangular field areas. In 2003, and again in 2014, studies focusing on the needs of athletic field users primary recommendations were to rehabilitate Hunnewell track & field. The track itself is in disrepair, and is readily deteriorating into an unsafe running surface. The Hunnewell rehabilitation was initially delayed due to environmental concerns at Sprague, which currently has both synthetic and grass fields. For the past year, Town employees from the DPW and Natural Resources Commission, and volunteer representatives from the School Board, Playing Fields Task Force and Recreation Commission have been involved in schematic design plan with consultants from Gale Associates to rehabilitate the track and field to improve safety and usability issues arising from the poor condition of both. The goals also include increasing the utilization capacity of the field to help alleviate the shortage of rectangular fields and allow the DPW to better rest some of the overused grass fields in town. Specific design considerations are listed below.

1. Field material

The project will utilize a synthetic turf surface to improve the durability of the field and allow for use in inclement weather conditions. The project will also utilize infill that has required performance characteristics and that is safe for use. The carpet and infill will be installed on top of a shock pad, which will make the playing surface safe for a range of activities. Furthermore, the existing rubber track surface will be replaced with a permeable surface of material similar to the existing surface.



a. Why are we replacing the grass with artificial turf?

The Track and Field project team is recommending the installation of synthetic turf at the Hunnewell complex for the following reasons:

- Increased playability. A synthetic field can be used in all weather conditions, is not susceptible to the overuse issues of grass fields or the damage issues associated with using a grass field in inclement weather.
- Field surface consistency. A synthetic field has a more consistent and even surface than grass which is particularly important for sports such as field hockey and lacrosse.

- Safety. A synthetic field provides a safer playing surface for the user groups than does a natural grass field due to the elimination of divots, potholes and mud.

a. What are the problems with grass that will be alleviated by artificial turf?

Active uses such as regular sports activity require a dedicated maintence regime, that includes regular mowing and watering as well as turf stabilization efforts such as slice seeding, fertilization and sod replacement. Equally problematic are that healthy grass requires some rest periods as well as weather shut downs. This makes grass at the most heavily used field more costly and resource consuming and can lead to safety concerns.

A synthetic field provides a near-perfect surface for years, and with limited maintenance and no customer expertise needed. Natural grass athletic fields often do not have healthy stands of grass due to over-use. The lack of healthy stands of grass can increase the amount of sediment present in storm-water runoff, degrading the surrounding environment.

b. What are the benefits of artificial turf?

In general, safety, extended hours of use of the fields (no down time, no recovery time, and playing longer into different seasons), lowered maintenance costs (no watering, no mowing, no chemicals). The synthetic fields can be used during or immediately after most rain events, virtually eliminating the need to reschedule games due to weather. Synthetic turf reduces the peak storm-water flow into the existing natural storm-water system which can reduce erosion in the existing natural waterway. The drainage system acts as a filter, capturing small amounts of physical and chemical contaminants. The installation of synthetic turf fields eliminates the need for seeding and turf maintenance, fertilization, pesticides, mowing or irrigation systems, saving precious fuel and water resources and reducing nutrients and pesticides entering the watercourse.

c. What carpet and infill options were considered?

Carpet options for this type of project are limited to Polyethylene materials. Customization of the carpet is limited to pile height, filament type, and stitching pattern. The carpet recommendation is outlined below and in **Attachment 3**.
Several infill types were evaluated for this project and are explained below. In response to previous infill assessments and resident feedback, any black crumb rubber infill option was not explored. Please see the range of options for infill in **Attachment 1.**

d. What are the pros and cons of those options?

Please refer to **Attachment 1** for the pros and cons of the various infill options.

e. What is the recommended carpet? What exactly are the benefits, potential flaws?

The carpet options are all largely made from polyethylene. The particular recommendation for this project is a 2¼" pile dual fiber carpet, which includes slit film fibers to give it structure and monofilament for more realistic grass-like texture and that lay over and encapsulate the infill. Dual-fiber carpets (A mixture of mono-filament and slit-film) are recommended for multi-use fields that will host small ball sports (field hockey and Lacrosse) as well as soccer and football. The use of this carpet and the recommended fill material described below will also require a shock pad that will meet impact

safety standards. The product that leads the market is FieldTurf and they can provide a carpet that fits the Town of Wellesley's criteria. The ideal product will be made from polyethylene with a reasonable MDI polyurethane backing.

f. What is the recommended infill? What exactly are the benefits, potential flaws?

The recommended infill for this project is TPE, Thermoplastic Elastomer, which will be mixed with sand. TPE is a round, cylinder shaped pellet made of plastic/rubber composite using virgin based resins (not recycled materials). The product is environmentally friendly as it contains no heavy metals and few Poly-aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs), and has minimal leaching potential. The material is recyclable, reusable and can be disposed of regularly at a landfill.

TPE is available in a variety of colors, minimizing concerns about high temperatures on playing fields. During the design process for Sprague, TPE was approved as a significantly safer alternative to tire crumb rubber by the Natural Resource Commission, Wellesley Cancer Prevention Project, and the Wellesley Health Department.

Prior to selecting TPE the task force also considered Organic and Coated Sand infill options. Based on our review these were dismissed as less appealing for the following reasons;

Organic Infill – this is a relatively new product made with recycled cork and coconut husks. While it is considered good for play with low abrasiveness, it is less stable then TPE. It also requires an optimum moisture range that will require the installation of an irrigation system for dry periods and can in some instances require fungicides during prolonged moist periods. Reports on life expectancy and UV degradation were inconsistent. Lastly our engineers had recommended against it in flood plain locations due concerns with cork.

Coated Sand – This is a polymer coated silica sand. While the cost is less than TPE, there have been reports that the product's somewhat un-firm and circular particle size can lead to high product migration and increased abrasiveness.

It should be noted that both the organic fill and coated sand systems require a shock pad beneath the carpet, and, for the selected TPE a shock pad is recommended. We have decided to include the shock pad because it maximized player safety and has worked well at the Sprague facilities.

g. What is the life cycle (source to final disposal) of the materials? How will they be disposed of at the end of their life cycle?

Traditionally, the TPE infill can be vacuumed from the carpet and reused when the carpet reaches the end of its lifecycle. The carpet, when it reaches the end of it lifecycle can either be disposal of at a landfill without any special handling requirements or can be recycled.

h. Please provide the safety data sheet for the carpet, infill, shock-pad and track surface materials.

The Material Safety Data Sheets are listed in **Attachment 2** and **4 and 5**. Need track surface and Shock Pad.

i. How sustainable is the infill material?

One thing that TPE materials have in common is that they are completely recyclable. Due to its molecular structure, it is possible to melt down the thermoplastic elastomers again and again. The chemicals used in the composition of TPE's are unaffected by UV rays therefore even after years of exposure its chemical composition remains unchanged. Certain TPE has uncured molecular chains and contains no plasticizers, and is therefore unaffected by UV light resulting in an estimated life expectancy in excess of 40 years.

j. What is the likelihood that the carpet and infill materials will deteriorate over time and contaminate groundwater and Fuller Brook?

The turf carpet is polyethylene and will degrade both form UV and general wear. It is waranteed for eight years and the expected usefulness in our application is expected to be about 12 years. The remainder of the system including the drainage stone, the shock pad can remain in place and will have an extended application. As discussed above the TPE has a life cycle in excess of the turf carpet and will either be reclaimed or will be removed and recycled.

All of the products chosen for this project either present no contamination potential or are essentially sealed to minimize and degradation concerns. Further the project plans include a substantial drainage system that includes approximately 8100 cubic yards of stone beneath the synthetic field surface which will infiltrate clean storm water into the ground. Drain tiles will be installed beneath the stone base to provide positive drainage for more extreme weather events. Additionally a trench drain along the inside perimeter of the track will collect any runoff from the track and end zone areas. These two systems are equipped with structures to allow for inspection, maintenance and cleaning. Paved areas beyond the track are graded toward catch basins and then to shallow grass swales that provide water quality treatment and solids trapping. On the West side of the site where there is the biggest increase in impermeable area, the runoff is filtered through Stormceptors, which are the last line of defense for trapping solids or floatables, before discharging to Fuller Brook. The drain system was designed by a registered professional engineer and reviewed by the town's Wetland protection commission and has been designed to improved peak site runoff and volumes rates.

k. What is known about the health risks for users of the field—either related to the plastic material or to increased temperatures on the field?

In the 10-year history of a similar surface at Sprague field, there have been no complaints of field specific heat or impact-related injuries from any of the coaches, athletes, Playing Field Task Force representatives, or athletic staff.

According the proposed infill MSDS, the product "poses no health hazard if it is properly handled and used in accordance with the provided indications." Specific human health exposure considerations for TPE are as follows:

Inhalation: Solid material: negligible hazard at ambient temperature. Inhalation of fine particles of dust may cause mild irritation.
Contact with skin: Solid material: no danger.

Contact with eyes: Solid material: Irritation may result from the physical presence of any particles in the eye. Flush with plenty of clear water. When irritation persists, get medical attention.
Ingestion: Solid material: the material is inert and not digestible.

A comprehensive study commissioned in 2011 by the University of Medicine and Dentistry and Environmental and Occupational Health Sciences Institute at Rutgers was conducted to examine what could be extracted (metals, organic compounds) through normal inhalation, dermal and ingestion routes of entry into the body. The results obtained for metals, poly-aromatic Hydrocarbons and semi-volatile compounds found all classes of materials to be at very low concentrations, and as a result for all compounds listed in the main report there would be de minimus exposures and risk among anyone using fields with the materials listed [including TPE].
UMDNJ- EOHSI Crumb Infill and Turf Report – October 31, 2011. http://www.nj.gov/dep/dsr/publications/turf-crumb-infill-study.pdf

More information about the material's safety is located here:
http://www.fieldturf.com/en/fieldturf-difference/artificial-turf-safety-proven-with-science

2. Anticipated use of the new facility

In addition to existing use by Wellesley Track and Field, Football (limited), and members of the public of all ages, the new field configuration will open the field to Soccer, Field Hockey, and Lacrosse. The track and field facilities will also be upgraded allowing for official events. The new track configuration and carpet will allow for a flexibility and versatility that is not available with the current layout and grass surface.

a. How will the use of the field change with the renovation?

There will still be a great demand for field space around town, but this will allow a greater number of high school sports to be played at the renovated field as opposed to offsite elsewhere in Town, and will reduce the need to cancel and re-schedule games due to inclement weather. The current and proposed schedules are listed on the following page.

b. What does the actual scheduling look like?

The schedule below outlines what a typical 2-week High School athletic schedule looks like, and what the proposed one might look like after renovation. While this list is not comprehensive, no other significant scheduling and use changes are expected (Recreation, private groups).

FALL **SPRING**

Typical 2-Week Period		New Stadium		Typical 2-Week Period		New Stadium	
Day	**Grass Field**	**Day**	**Turf Field**	**Day**	**Grass Field**	**Day**	**Turf Field**
M	3:45 JVFB	M	JV Football	M	GFLax	M	GFLax
T		T	Boys V Soccer	T	MS Track	T	MS Track
W		W	FB practice	W	BJV Lax	W	BJV Lax
Th	3:45 MSFB	Th	V/JVFH	Th	prac.	Th	GV/JV Lax
F	3:45 FFB	F	Fresh Football	F	GFLax	F	GFLax
S	1pm VFB	S	10am V Football	S		S	BV Lax
			1pm V Soccer				
			3pm V FH				
SU		SU		SU		SU	
M	3:45 JVFB	M	JV Football	M	MS Track	M	MS Track
T		T	Boys V Soccer	T		T	F GLax
W		W	V/JVFH	W	HS Track	W	HS Track
Th	3:45 MSFB	Th	MS Football	Th		Th	BV Lax
F		F	V/JVFH	F	GFLax	F	GFLax
S	1pm VFB	S	10am GV Soc	S		S	GV/JV Lax
			1pm Var Football				
SU		SU		SU		SU	

Indicates new activity

c. Will the field be used more after the renovation than it was before the renovation? If so, how much will the use increase and what will that increase look like?

Based on the preliminary schedule outlined above, the new field will be used for 5 additional time-slots throughout the week during the fall season, and 4 additional times during the spring. The additional time slots will be on Tuesdays and Wednesdays and additional times on Saturday in the fall, and on Tuesdays, Thursdays and Saturdays in the spring. Recreation does not host activities at the track or field, and consequently, any additional activities would be permitted through the athletics department.

3. Lighting

Due to feedback from residents and Town boards, no permanent athletic field lighting is proposed on this project.

a. What is the plan for permanent athletic lighting on the site?

Based on feedback from neighbors, there is no proposed permanent athletic field lighting for this project. There will be additional lighting along the pathways and to light the ticket booths.

b. What electrical conduits are being installed?

To avoid having to dig up the track and field in the future, the plans incorporate the addition of underground utilities (electrical, water, sewer, and data) that may possibly be desired in the future. The new conduits will include electrical lines to support a new sound system (described later), power and lighting to 2 ticket booths, pathway lighting, the scoreboard, and any lifesaving equipment.

c. What is the plan for temporary lighting during night games? Will temporary electric lights be used (rather than diesel-powered lights)? If so, what will they look like? [Note: Temporary electric lights might be a substantial improvement over diesel-powered lights. Has this been discussed by the committee or with the neighbors?]

The athletics department will continue to rely on lighting that is available for rental. Currently, local rental companies only rent tow-behind diesel options. There are limited options for solar powered lighting, and the towers for solar options only extend 20' compared to the 30' diesel options. Furthermore, the solar options produce less light, making them far less suitable for football games.

d. What is the plan for lighting the paths leading up to the field?

The entrance from the High School parking lot to the track and field will be lit by 6 bollard lights that will be directed away from the residences on Smith and State Street and shine light down on the path. The lights will also be controlled by a timer and only illuminated during active times at the field and during the School year.

4. Scoreboard

The project will include replacing and relocating the existing scoreboard with a higher efficiency model.

a. How does the proposed scoreboard compare in size and height to the current scoreboard?

The existing scoreboard onsite is 18'x10.' The new scoreboard will also be 18' wide, but 16' high. The illuminated part of the scoreboard will be 18'x12', with two 2' panels on top and bottom. The scoreboard will incorporate anti-glare LED lighting.

b. What will the illumination of the scoreboard look like? How visible will it be from the street?

A schematic of the scoreboard is located in **Attachment 6.** The scoreboard will not look very different from what it does now. From the street it will probably not be visible at all due to the natural screening from the trees.

5. Sound system

The project will include a new sound system that will minimize sound spillover into the neighborhood by directing the sound waves away from Smith Street towards the field and Home bleachers.

a. What is the sound engineering? Where will the speakers be placed and how much is the sound likely to travel into the neighborhood?

The proposed system will include 4 speakers placed on poles behind the visitors bleachers, aimed directly down onto the field and into the grandstand. These speakers will provide sound to players on the field, and spectators in both the home and visitor stands, while limiting the sound being broadcast out into the neighborhood. See **Attachment 7** for more specific information.

b. Are there any plans to restrict when the sound system will be used and what it will be used for?

Currently, the sound system upgrades are intended to improve sound conditions for athletes, coaches and referees on the field, cheerleaders on the sidelines, spectators in the stands, and the surrounding neighborhood. The Natural Resources Commission and Athletics Department will be developing reasonable restrictions for the use of the amplification system to reduce unnecessary noise pollution.

6. Landscaping

The design team has made every effort to provide a plan that provides a landscaping plan that incorporates many of the existing mature trees, improves screening and aesthetically fits in with the surrounding landscape, residential neighborhood and Fuller Brook area.

a. What are the final landscaping design considerations?

The landscaping plan has been reviewed and customized after careful review by a landscape architect and Wellesley's landscape planner. The overall planting plan involves removal of some hazard trees, protection of many existing trees, as well as planting of 9 native woody, tree and perennial species. LDD Collaborative, Inc. are the licensed landscape architects of record for the planting design for this project. They have worked extensively with the project team, neighboring residence, nurseries, and the Town horticulturalist, Cricket Vlass, to develop a landscape plan that incorporates readily available native plant species that will provide low maintenance, proper screening and create a diversified planting palate that will blend in seamlessly with the existing vegetation.

b. What trees will be removed along Smith Street? What is the plan for screening the neighbors?

LDD Collaborative, Inc's licensed landscape architect and the Towns Horticulturalist, Cricket Vlass conducted an onsite meeting to tag the trees to be removed along Smith Street. The evaluation of the existing trees health and the impact to the existing trees based on the proposed site improvements were taken into consideration for the removal of some of the existing trees between the existing fence and the new, wider sidewalk along Smith Street.

All existing trees between the existing fence line and the proposed visiting stands will be saved. In addition, the design team is incorporating a narrow and longer proposed visiting stand with a permeable base in order to provide a better growing environment for the existing trees to remain.

The design team will incorporate a new black chainlink fence in the exact location of the existing chainlink fence and will install a hedge row of 6'-7' height arborvitae shrubs adjacent to the new chainlink fence. Additional native evergreen and deciduous shrubs will be installed between the arborvitae hedge row and the back of the new sidewalk along Smith Street.

The proposed landscaping plan along Smith St. includes the use of existing trees and tiered plantings of Arborvitae and Deciduous shrubs to create a visual buffer along Smith Street.
The plan currently calls for the addition of the following plants:

Species	**Quantity**
Henry Red Rhododenderon	65
Mission Arbovitae	105
Blue Shadow Fothergilia	17
Red Sprite Winterberry	54
Northern Bayberry	36
Summer Wine Ninebark	34
Rastrahlbush Switch Grass	23
Tassel Fern	286
Black Eye Susan	135
TOTAL	**755**

c. What is the landscape plan for the area along Fuller Brook in back of the existing bleachers?

The current plan calls for a series of Rhododendron and Bayberry to provide additional screening behind the home seating to screen the bleachers from users of Fuller Brook Park. In response to a request from the Wetlands Protection Committee, the plan will also include small gaps under the perimeter fencing to allow passage by wildlife.

7. Pavement

The project will provide pathways that improve pedestrian safety around the approaches to the track and field and are designed to encourage use of high school parking lot and eliminate on street parking. The path and walkway surfaces in the complex and leading up to the complex will be a mixture of surface types. Wherever possible, permeable surfaces are proposed.

a. What is the material being used for the pathways? Is it permeable or impermeable?

Roughly 440 square feet of walkways within the perimeter fencing will be paved with bituminous material. The roughly 1,200 square foot entrance pathway from the High School parking lot to the entrance will be permeable pavement similar to the existing pavement along the roadway and in the State Street lot, and roughly 3,000 square feet of permeable pavers will be installed at the entrance plaza. As noted previously, the track and field are permeable and will drain into subsurface stormwater system.

Conclusion

The aforementioned design considerations outline the consultant and project team's effort to create a safe, durable and environmentally sensitive design that also strives to meet the needs of the users and address the concerns of the neighbors. It is widely acknowledged that the current playing surfaces in Town do not meet the community's needs, and the rehabilitation of the Hunnewell Track and Field has been a long-standing priority. This project will significantly expand and improve playing conditions for hundreds of athletes in Town, and will do so in a financially responsible manner that reflects the neighborhood's concerns.

Attachments

1. Infill Options
2. Infill MSDS
3. Carpet Options
4. Carpet MSDS
5. Shock Pad MSDS?
6. Track Surface Spec Sheet
7. Scoreboard Schematic
8. Sound System Design proposal
9. Landscape Schematic

Attachment 1: Infill Options

Prepared by: Gale Associates Inc.
3/17/2015

Alternative Infills for Synthetic Turf - Properties as Infill Summary

Type of Alternative Infill	Material[1]	Color	Shape	Abrasiveness	UV Stability	Typical Turf Pile Height	Availability[2]	Resilient Shock Pad Recommended	Irrigation Recommended	Expected Life Span	Typical Mixture (By weight)	Approximate Cost[3]	Comments[1,2]
Crumb Rubber	Styrene butadien Rubber (SBR) Recycled tire rubber shreded	Black	Angular shaped granules	Low	Stable	2.25" - 2.50"	Readily Available	No	No	Life of Carpet	50% Sand 50% Rubber	$50,000 per field	1. SBR Rubber and sand is the typical infill system used in the majority of synthetic turf fields installed since 1990's. 2. SBR rubber maintains its resiliency over a wide range of temperature and environmental conditions.
Silica Sand	Rounded Silica Sand	Tan/Brown	Rounded Particles	High	Stable	1.50" - 2.0"	Readily Available	Required (See Comments)	No	Life of Carpet	100% Silica Sand	+$0 net for additional sand +$130,000 for resilient pad	1. Shock pad is required to provide shock attenuation (G-max) 2. Sand stays hard under cold/frozen conditions (regardless of shock pad) 3. Use turf stitch gage of 5/8" or less. 4. Consider turf thatch layer for fly up prevention.
Organic	Cork or Cocunut Husk or rice hulls	Natural appearance (tan/brown)	Angular shaped granules	Low	Low Stability	1.50" - 2.50"	Limited Availability	Yes (See Comments)	Yes[6]	Unknown[4] ability to decompose	10%-15% Organic 90% to 85% Sand	+$180,000 for materials +$130,000 for resilient pad +$15,000 for Irrisation +$325,000 total net add	1. Reports of early degredation and floating of particles 2. Organics can stay hard under frozen conditions (regardless of shock pad) 3. Shock pad reccommended to provide shock attenuation over warranty period 4. Consider increased maintenance
Coated Crumb Rubber	SBR (Styrene butadien Rubber) Recycled tires shreded and coated with acrylic or EPDM	Custom colors available	Angular shaped granules	Low	Medium stability	2.25" - 2.50"	Readily Available	No	No	Life of Carpet	50% Sand 50% Coated Rubber	+$220,000 materials	1. Still contains SBR Rubber 2. Manufacturers claim coating encapsulates outgasing of SBR rubber 3. Shock pad is not required, consider a combination of shock pad and other infill material to reduce quantity of needed material
EPDM (Ethylen Propylene Diene Monomer) Rubber	Virgin rubber produced for infill of ahtletic fields only	Custom colors available	Angular shaped Granules	Low	Medium stability	2.25"-2.50"	Limited Availability	No (See Comments)	No	Not proven long term	50% Sand 50% EPDM	+ $360,000 materials	1. Similar material to SBR rubber 2. Shock pad is not required, consider a combination of shock pad and other infill material to quantity of EPDM needed 3. EPDM is a generic term and quality can vary greatly. Proven source and propriety formulations are recommended.
TPE (Thermoplastic Elastomer)	Extruded plastic pellets	Custom colors availalble	Typically Uniform pellets Shape depends on manufacturer	Low to Medium	Stable	1.5" -2.50"	Limited Availability	Recommended	No	Not proven long term	50% TPE 50% Sand	+$360,000 materials +130,000 resilient Pad +490,000 total net add	1. Turf thatch layer is suggested to help reduce fly up/displacement of material 2. Shock pad is not required, some owners have used combination of shock pad and TPE to reduce quantity of infill needed. 3. TPE is generic term - Quality can vary greatly. Proven source and propriety formulations are recommended
Coated Sand	Polymer Coated Silica Sand	Green	Fairly Round Particles	Med	Stable	1.50" - 2.0"	Limited Availability	Required (See Comments)	No	16 Year Warrentee (See Comment)	100% Coated Silica Sand Particles	+$150,000 to $250,000 for materials +130,000 resilient pad +380,000 total net add	1. Coating has been reported to last shorter than warrantee period 2. Shock pad is required. Some manufacturers suggest a mix with TPE to obtain required resiliency (Gmax). 4. Turf stitch gage of 5/8" or less is recommended to prevent displacment. 5. Turf thatch layers should be considered to
Nike Grind	Nike's Environmentally Perferred Rubber (Meets or exceeds restricted substance standards set for wearable consumer goods)	Mutiple Colors	Angular shaped granules	Low	Stable	2.25" - 2.50"	Very Limited Availability	No	No	Per Nike, Expected life 10 years of play at 40 hours per week	50% Sand 50%Nike grind	+$130,000 materials	1. Proprietary. 2. Reports that infill is not asthetically pleasing. 3. Has occasionally been used as a supplement to SBR rubber or in lieu of SBR to provide 'renewable' label since 1990's

Notes:

1. Information provided was compiled by available online data, manufacturers literature and conversations with turf and infill distributors. Gale has not conducted any independent testing of infill materials and does not guarantee the accuracy of information provided here in.
2. Installations of fields with alternative infill material (other than SBR Rubber and Sand) are somewhat limited and many have not been proven long term. Gale does not guarantee performance of any turf system.
3. Few older installations in U.S. More common in Europe. Only one supplier warranties for life of turf (geoturf) in U.S.
4. May become more or less available as demand and popularity fluxuates. Cost fluxuates with availability
5. Costs are generalized approximations. Costs are NET addition to cost of a typical sand/SBR turf infill system. Actual costs will vary based on depth of infill/turf depth, type of resilient pad used. Market costs can vary greatly due to materials demand and availabilty.
6. Organic Infill suppliers recommend keeping infill moist to aid with resiliency, improve longetivity, prevent compaction and material displacement

Prepared by: Gale Associates Inc.
3/17/2015

Alternative Infills for Synthetic Turf - Pros and Cons

Type of Alternative Infill	Material	Brand/Trade Names	Pros	Cons
Crumb Rubber	Styrene butadien Rubber (SBR) Recycled tire rubber shreded	None SBR rubber Ambient or Cryogenic	Low Cost / Recycled Material Highly Analyized and Tested for safety, environmental and health concerns when as turf infill. Good Drainage Does not float Low Maintenance, High UV Stability - Maintains Resiliency Manufacturers Warranties Warm fields in freezing climates Readily available	Poor Reputation / Perception as 'trash' Perception as Hazardous to Human Health 'Heat' of play, Hot Fields / Concern in Warm Climates Static Cling - gets in Uniforms and Equipment
Silica Sand	Rounded Silica Sand	Sand None	Low Cost Highly Analyized as Infill Low Maintenance Good Drainage Common Mineral Manufacturers Warranties Adds Wieght/Stability to Infill Systems	Relative 'hardness' Abrasive Cost (Requires Resilient Pad if used alone)
Organic	Cork or Cocunut Husk or Rice Hulls	ProGeo - Geoturf Purefill - Field Turf Geofill - Shaw Sports Natrafill	Natural Material / Renewable Perception as Natural Material Reported to reduce Heat Concerns as Infill Natural Color & appearance Good Resiliency Reported Common Use in Europe	High Cost - High materials Costs Cost - Resilient Pad Recommended Cost - must be kept moist - Requires Irrigation System Cost - Higher Maintenance costs/Shorter Life Cycle[a] Potential to Plug/affect drainage Freezes-Hard fields in freezing climates Potential for weed and mold growth Limited availability Floats - Should not be used in Flood Prone Areas
Coated Crumb Rubber	SBR (Styrene butadien Rubber) Recycled tires shreded and coated with acrylic or EPDM	Polytan RPU - Polytan Cushionfill Sport Coolfill - SprintTurf	Low Maintenance Good Drainage High UV Stability - Maintains Resiliency Coating reported to encapsulate SBR rubber outgassing & improve heat concerns Manufacturers Warranties Does not Float Variety of Colors - Reported to reduce heat concerns Does not require Resilient pad or Irrigation	High Cost - High materials Costs Same chemical make-up & potentials as SBR Rubber Relatively little analysis as Turf Infill Limited availability
EPDM (Ethylen Propylene Diene Monomer) Rubber	Virgin rubber produced for infill of ahtletic fields only	EPDM Melos EPDM ST - APT Melos Bionic EPDM - APT Gezofill - Gezolan corp.	Low Maintenance Good Drainage High UV Stability - Maintains Resiliency Manufacturers Warranties Does not Float Variety of Colors - Reported to reduce heat concerns Does not require Resilient pad or Irrigation	High Cost - High materials Costs Very Similar chemical make-up & potentials as SBR Rubber Relatively little analysis as Turf Infill Generic Material - Must use Proven - Proprietary formulations for quality Limited availability in quantities needed for fields
TPE (Thermoplastic Elastomer)	Extruded plastic pellets	EcoGreen - Field Turf Eco Max - Field Turf BionPro - Polytan FutrFill - Target indust.	Low Maintenance Good Drainage High UV Stability Manufacturers Warranties Variety of Colors - Reported to reduce heat concerns Does not require Irrigation Common plastic used widely in medial, food and toy manufacture Some Older U.S. Installations	High Cost - High materials Costs Cost - Use of Resilient Pad Recommended Relative hardness - Needs Resilient Pad Generic Material - Must use Proven - Proprietary formulations for quality Limited availability in quantities needed for fields Limited analysis for use as Infill
Coated Sand	Polymer Coated Silica Sand	Flexsand Envirofill	Low Maintenance Very Good Drainage Manufacturers Warranties Variety of Colors - Reported to reduce heat concerns Does not require Irrigation Does not float Can add wieght/stability to infill systems	High Cost - High materials Costs Cost - Use of Resilient Pad Recommended Relative hardness - Needs Resilient Pad Generic Material - Must use Proven - Proprietary formulations for quality Limited availability in quantities needed for fields Limited analysis for use as infill Unproven - Limited use as infill
Nike Grind	Nike's Environmentally Perferred Rubber (ground sneakers) (Meets or exceeds restricted substance standards set for wearable consumer goods)	Nike Grind Eco-grind - Field Turf	Low Maintenance Very Good Drainage Good resiliency & Life cycle Recycled Material Does not require Irrigation or Resilient Pad Has been used for years with SBR or as stand alone infill additive	High Cost - High materials Costs Very Limited Availability No color choices - Poor aesthetics - can look 'trashy' Very Similar chemical make-up & potentials as SBR Rubber Static Charge - sticks to equipment and clothing

Notes:

This Summary is assembled from available information some of which was obtained from materials vendors literature
This summary is intended as a general reference, is not specific in nature, and is not intended as a stand alone docment.

Attachment 2: Infill MSDS (TPE)

So.F.TE.R.

MATERIAL SAFETY DATA SHEET
In compliance with the Directive 1907/2006 /CE

M.S.D.S.: S304	*Issue date: 03/2010*	*Last update: 18/10/2010* *Version 2 English*

1. IDENTIFICATION OF THE PREPARATION AND OF THE COMPANY

1.1 IDENTIFICATION OF THE PREPARATION:

Trade name: ***TERRA XPS*** ™ **101103-601103-801703**
TERRA BASIC ™ **801750**
Material : **SEBS**

1.2 USE OF THE PREPARATION:
Use as infill for artificial fields

1.3 COMPANY IDENTIFICATION
SO.F.TER S.p.A.
Via Mastro Giorgio, 1
47122 Forlì - Italia
Tel. +39 0543 790411- Fax +39 0543 473119
e-mail: softer@softerspa.com
e-mail of the competent person responsible for the MSDS leonardo.bellomo@softerspa.com

1.4 EMERGENCY TELEPHONE
Tel. +39 0543 790411. Available only in office time.

---

2. HAZARDS IDENTIFICATION

The mixture was not tested. The provided information regarding the effects in the widest sense of this product on health and in plants are obtained from the information about individual components using the conventional method of calculation described in the Preparations Directive 1999/45/EC and its adaptations.

Classification of the mixture:
This product is not classified as dangerous according to EC directives, but may contain hazardous components, yet listed as ingredients in this tab, which alone or considered in a mixture can cause reactions not fully tested at the time.
Safety standards and good practices in protection, treatment, handling and use of chemicals must be observed.

---

3. COMPOSITION / INFORMATION ON INGREDIENTS

Principal components*: polyolefin elastomeric blends*

Substances to be mentioned

Substances for which occupational exposure limits have been fixed by European Community:

Chemical name	Concentration Range wt%	EC N°	CAS N°	Classification Symbols	R phrases
Calcium carbonate	<70%	215-279-6	1317-65-3	none	none

Note: The powders possibly present as components in the mixture are completely incorporated and embedded in the polymeric matrix, so that the potentially correlated exposition and risk fail.

Components presenting a significant hazard: NONE

The preparation contains substances which, with regard to concentration and typology, belong to the dangerous categories below specified:

Chemical name	Concentration Range wt%	EC N°	CAS N°	Classification Symbols	R phrases
None					

---

4. FIRST AID MEASURES

4.1 INHALATION

Solid material: negligible hazard at ambient temperature. Inhalation of fine particles of dust may cause mild irritation. .
Molten material: exposure to vapours released at high extrusion and moulding temperatures may cause irritation to the respiratory tract. In case of abnormal inhalation of fumes or vapours, remove the affected person to fresh air. In case of breathing problems obtain medical attention.

4.2 CONTACT WITH SKIN

Solid material: no danger.
Molten material: Immediately cool the affected area by means of large amounts of water or ice and obtain, if necessary, medical assistance. Do not remove molten product form burned skin. This should be done by a physician.

4.3 CONTACT WITH EYES

Solid material: Irritation may result from the physical presence of any particles in the eye. Flush with plenty of clear water. When irritation persists, get medical attention.
Molten material: vapours produced during extrusion and moulding may cause slight eye irritation. In case of contact with molten material immediately cool the affected area by means of large amounts of water or ice and consult a physician.

4.4 INGESTION

Solid material: the material is inert and not digestible. No known health hazard appears to be posed by the ingestion of small amounts of this material. A physician should be consulted if large Amounts are ingested.

---

5. FIRE FIGHTING MEASURES

5.1 SUITABLE EXTINGUISHING MEDIA

Water spray, foam, carbon dioxide, powder.

5.2 EXTINGUISHING MEDIA WHICH SHALL NOT BE USED FOR SAFETY REASONS
None.

5.3 SPECIAL EXPOSURE HAZARDS
In case of fire carbon dioxide and, failing oxygen, carbon monoxide develop and other dangerous, irritating and/or toxic combustion products can be released.

5.4 SPECIAL PROTECTIVE EQUIPMENT FOR FIRE-FIGHTERS
Fire-fighters should use standard protective equipment and in enclosed spaces a self-contained breathing apparatus (SCBA).

---

6. ACCIDENTAL RELEASE MEASURES

A slipping hazard may be created if the material is spilled.

6.1 PERSONAL PRECAUTIONS:
Special measures are not required.

6.2 ENVIRONMENTAL PRECAUTIONS:
Avoid releasing into environment.

6.3 CLEANING UP METHODS
Repackage uncontaminated product. Contaminated material should be collected and preserved in closed containers and handled as an inert material.
For disposal, follow instructions of section 13.

---

7. HANDLING AND STORAGE

7.1 HANDLING
The material handled at room temperature is not dangerous for operator's health. Normal industrial procedures should be followed.
During the melting process avoid fume and vapour inhalation, consequently a suitable suction apparatus is needed.

7.2 STORAGE
The product can be stored in bags, octabins, big bags, containers, silos. Keep the product away from heat sources and direct light. Do not smoke or use open flames where the product is stored.

7.3 SPECIFIC USES
N.A

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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 EXPOSURE LIMIT VALUES

Chemical name	Exposure limit	Notes
Calcium carbonate	10 mg/m^3(PNOS)	TLV-TWA ACGIH – USA Total powder
	3 mg/m^3(PNOS)	TLV-TWA ACGIH – USA Respirable powder
	4 mg/m^3	OEL (8h) – UK Respirable powder
	0.05 mg/m^3	OEL (RCS) Italy
	0.4 mg/m^3	OEL (RCS) Ireland

PNOS= Particulates Not Otherwise Specified

The powders possibly present as ingredients in the mixture are completely incorporated and embedded in the polymeric matrix, so that they cannot come out in any way. For this reason the potentially correlated inhalation and exposition risks fail.

8.2.1 OCCUPATIONAL EXPOSURE CONTROLS

(see also point 7.1)

During thermal processing, especially at very high temperatures, traces of monomers can develop. Working environment should be provided with adequate aspiration system.

8.2.1.1 RESPIRATORY PROTECTION

Solid material: no protections

Molten material: in default of a local aspiration system, wear adequate masks with filters for organic vapours

8.2.1.2 HAND PROTECTION

Solid material: wear appropriate gloves.

Molten material: wear appropriate heat-resistant gloves.

8.2.1.3 EYE PROTECTION

Solid material: no protections.

Molten material: with no aspiration system wear adequate safety glasses.

8.2.1.4 SKIN PROTECTION

Wear appropriate protective coveralls and suits

8.2.2 ENVIRONMENTAL EXPOSURE CONTROLS

Make sure that the concentration of organic volatile substances collected by the aspiration system is in compliance with the authorized emission limits.

---

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 GENERAL INFORMATION

Appearance : solid cylindrical pellets (colour according to the request)

Odour : light and characteristic

9.2 IMPORTANT HEALTH, SAFETY AND ENVIRONMENTAL INFORMATION

pH	*N.A.*
Boiling point / range	*N.A.*
Flash point	*N.D*
Flammability (solid)	*N.D*
Explosive properties	*N.D*
Oxidising properties	*N.A*
Vapour pressure	*N.A*
Relative density	*1,39 ÷ 1,55 g/cm^3*
Solubility : water solubility	*Insoluble*
fat-solubility	*N.A*
Partition coefficient: n-octanol/water	*N.A*
Viscosity	*N.A*
Vapour density	*N.A*
Evaporation rate	*N.A*

9.3 OTHER INFORMATION

Self-flammability	*N.D*
Decomposition temperature	*≥ 300 °C*
Melting point / range	*140 ÷ 190 °C*

---

10. STABILITY AND REACTIVITY

10.1 CONDITIONS TO AVOID

The product is stable at common use conditions. Do not heat product over the decomposition temperature.

10.2 MATERIALS TO AVOID

None.

10.3 HAZARDOUS DECOMPOSITION PRODUCTS

At processing temperature some degree of thermal degradation can occur. Although it is highly dependent on temperature and environmental conditions, traces of toxic and/or irritating gases can be released.

See point 5.3

---

11. TOXICOLOGICAL INFORMATION

No written specific information on the product is available

According to our experience, the product poses no health hazard if it is properly handled and used in accordance with the provided indications.

INHALATION: N.A.

INGESTION: N.A.

SKIN CONTACT: N.A.

EYE CONTACT: N.A.

12. ECOLOGICAL INFORMATION

The product is not dangerous, but it can be poisoning for aquatic and terrestrial organisms when ingested.

12.1 ECOTOXICITY: N.A.

12.2 MOBILITY: the material is considered inert, no dangerous diffusion is expected

12.3 PERSISTENCE AND DEGRADABILITY: the product is non biodegradable
12.4 BIOACCUMULATIVE POTENTIAL: N.A

12.5 OTHER ADVERSE EFFECTS: N.A

13. DISPOSAL CONSIDERATIONS

The material can be recovered or recycled, disposed in incinerator or dump according to regulations in force and local dispositions. Be aware of combustion products which may be produced during incineration.

14. TRANSPORT INFORMATION

The product is not dangerous according to national and international regulations governing road, railway, sea and air transport. No special precautions during transport need to be taken.

ADR	*N.A*
RID	*N.A*
IM DG	*N.A*
ICAO/IATA	*N.A*

15. REGULATORY INFORMATION

The preparation is not dangerous according to European regulations in force concerning hazardous substances and preparations

Labelling:	*Not required according to EC regulations*
Symbol:	*Not required*
Risk phrases:	*Not required*
Caution advices:	*Not required*

Additional regulations:
Directives 88/379/EC, 67/548/EC, 91/156/EC, 91/689/EC, 94/62/EC, 1999/45/EC and 2001/60/EC
Regulation (EC) No 1907/2006 (REACh)
Italian dispositions
DPR 303/56, D.Lgs 81/08, D.Lgs 106/09, D.Lgs 22/97, D.Lgs 52/97, D.Lgs 65/03

16. OTHER INFORMATION

The present safety data sheet has been drawn up according to EC Directive 2001/58/EC and Regulation (EC) No 1907/2006 (REACh)

Complete text of risk phrases: none

Professional considerations:refer to internal training plans of the company.

Data sources.

A.C.G.I.H.
Decree of Italian ministry for Health 14/6/02 (received Directive 2001/59/EC)
Directive 2000/39/CE.
Internal analysis
Raw materials MSDSs

Other information:

Definitions
TLV-TWA = Threshold Limit Value – Time Weighted Average: Time Weighted Average: average concentration calculated based on a time of 8 hours (working day) and on 40 hours a week to which workers can be exposed without negative effects
TLV-STEL = Threshold Limit Value – Short-Term Exposure Limit: Limit: concentration to which workers can be exposed for a short time (15 minutes) and for no more than 4 times a day.
TLV-C = Threshold Limit Value – Ceiling: concentration that must not be exceeded whilst working, even for extremely short periods.

Abbreviations
ACGIH = American Conference of Governmental Industrial Hygienists
OEL = occupational exposure limit
N.A.: not applicable.
N.D. : not available.

Modified paragraphs with references to previous compilation:

3. COMPOSITION / INFORMATION ON INGREDIENTS
8. EXPOSURE CONTROL / PERSONAL PROTECTION
16. OTHER INFORMATION

The information and recommendations contained in this MSDS are based on our best available knowledge and belief, and are intended to provide indications concerning safety regulations and to aid the user in controlling the handling risks. Therefore they cannot be considered as a warranty or specification of the product quality.
N.A : not applicable
N.D : not available

Attachment 3: Carpet Info

morton extrusionstechnik gmbh

Material safety data sheet

Nummer: xxx
Datum: 06.04.2010
Version: 1

LLDPE-Filaments

1. Substance/preparation and company identification

Filament consisting of LLDPE
Use: Filament for artificial turf

Company:
Morton Extrusionstechnik GmbH
Im Pfarrgrund 5
69518 Abtsteinach
GERMANY
Telephone: +49 6207-92395-0
Fax: +49 6207 92495-39
e-mail: info@morton-extrusionstechnik.de

2. Composition/information on ingredients

Chemical characterization of polymer:
LLD Ethylene/1-Hexene Copolymer, CAS-No: 25213-02-9

Physical characterization:
Monofilament with different yarn-count, different colours, wound-up on capable spools

3. Hazard identification

According to Regulation (EC) No. 1272/2008 on classification, labelling and packaging of substances and mixtures:
Label elements and precautionary statement:
The product does not require a hazard warning label in accordance with GHS criteria.

Classification of the substance and mixture:
No need for classification according to GHS criteria for this product.

Possible Hazards (according to Directive 67/548/EWG or 1999/45/EC):
No particular hazards known.

4. First-aid measures

Inhalation
No specific treatment is necessary since this material is not likely to be hazardous by inhalation.
If exposed to excessive levels of dusts or fumes, remove to fresh air and get medical attention if cough or other symptoms develop.

Skin contact
Product, at ambient conditions, is not expected to be hazardous by skin contact. Should irritation occur, rinse with water.
In case of contact with molten product, cool rapidly with water and seek immediate medical attention. Do not attempt to remove solidified polymer from skin.

Eye contact
Flush eyes with water as a precaution. If irritation persists get medical attention.
In case of contact with molten product, cool rapidly with water and seek immediate medical attention.

Ingestion
If swallowed, do NOT induce vomiting. Consult a physician if necessary.

Notes to physician
Contact with molten polymer can cause significant tissue damage. Provide general supportive measures and treat symptomatically.

5. Fire-fighting measures

General fire hazards
Polymer can burn if exposed to a fire. Acetaldehyde vapors form explosive mixtures in air and can spontaneously ignite at temperatures above 347F (175C).

Industrial handling of polymer pellets or chips has the potential to generate dust. Polymer dust can accumulate over time on buildings and equipment. After a significant amount of dust accumulation and disturbance, dust may form explosive mixture in air. Ensure that good housekeeping practices are followed.

Hazardous combustion products
Irritating and toxic gases or fumes may be released during a fire.
Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.
Molten polymer or prolonged air drying of polymer at temperatures above 195 ℃ will release small quan tities of acetaldehyde (CAS# 75-07-0).

Suitable extinguishing media
Dry chemical, CO2, water spray or regular foam.

Extinguishing media which must not be used for safety reasons
Do not use a solid water stream as it may scatter and spread fire.

Protection of fire-fighters
Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

Specific methods
In the event of fire and/or explosion do not breathe fumes.

6. Accidental release measures

Personal precautions
Surfaces may become slippery after spillage.

Methods for cleaning up
Clean up in accordance with all applicable regulations.

Other information
Sweep up or gather material and place in appropriate container.

7. Handling and storage

Handling
Use care in handling/storage.
Molten material can cause burns. Handle molten material with care.

Storage
Keep away from heat, sparks, and flame.

Further information
Use good housekeeping methods to keep accumulation of dust to a minimum

8. Expose controls and personal protection

Addition Exposure Data
No exposure limit value known

Engineering measures
Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

Personal protective equipment

Respiratory protection
When dusts or thermal processing fumes are generated and ventilation is not sufficient to effectively remove them, appropriate respiratory protection must be provided.

Hand protection
Not normally needed under ambient conditions.
For molten material use heat resistant gloves.

Eye protection
Wear safety glasses with side shields.
If handling molten material, additional protection may be needed, which may include face shield.

Skin and body protection
It is a good industrial hygiene practice to minimise skin contact.
When material is heated, wear gloves to protect against thermal burns.

Hygiene measures
Use good industrial hygiene practices in handling this material. Wash hands before breaks and at the end of workday.

9. Physical and chemical properties

Colour	Based on specification.
Form	Solid.
Odour	Slight to none.
Auto-ignition temperature	> 300℃
Boling point	not determined
Decomposition temperature	> 300 ℃
Flashpoint	closes cup: > 300 ℃
Melting point	115 to 132 ℃
Octanol / H2O Coeff	not determined
Odour threshold	not determined
pH	not determined
Solubility (H2O)	insoluble

10. Stability and reactivity

Stability
This is a stable material.

Conditions to avoid
Heat, flames and sparks.

Hazardous polymerisation
Not expected to occur.

11. Toxicological Information

Toxicological information
Due to this material's high molecular weight, this material is considered to be of little to no toxicological concern.

Acute toxicity

LD50/oral/rat: >5.000 mg/kg

Mutagenicity
No known significant effects or critical hazards.

Teratogenicity
No known significant effects or critical hazards.

Developmental effects
No known significant effects or critical hazards.

12. Ecological Information

Ecotoxicity
This material is not expected to be harmful to aquatic life.

Persistence and degradability
Based on the physical properties of this product, significant environmental persistence and bioaccumulation would not be expected.

13. Disposal consideration

Disposal Instructions
Dispose in accordance with all applicable regulations.

14. Transport Information

ADR Not regulated as dangerous goods.

IMDG Not regulated as dangerous goods.

IATA Not regulated as dangerous goods.

15. Regulatory Information

Regulations of the European union (Labelling) / National legislation/Regulations

Directive 1999/45/EC ('Preparation Directive')
The product does not require a hazard warning label in accordance with EC-Directives

16. Other information

This MSDS is related to Regulation (EC) No. 1907/2006, even though the product is not hazardous and there is no duty to issue a MSDS.

The data contained in this safety data sheet are based on our current knowledge and experience and describe the product only with regard to safety requirements.
The data do not describe the product's properties (product specification). Neither should any agreed property nor the suitability of the product for any specific purpose be deduced from the data contained in the safety data sheet.
It is the responsibility of the recipient of the product to ensure any proprietary rights and existing laws and legislation are observed.

Attachment 4: Carpet MSDS

ForeverLawn® INC.

Grass without limits.

MATERIAL SAFETY DATA SHEET

FOREVERLAWN PRODUCTS CONTAINING POLYETHYLENE AND NYLON FIBERS

A. IDENTITY

Chemical name:	Polyethylene fibers/Nylon fibers with polyurethane backing
Distributor:	ForeverLawn, Inc., 4500 Bogan Ave. NE, Albuquerque, NM 87109
Emergency Telephone Number:	505.217.0177

B. HAZARDOUS INGREDIENTS

This product is considered to be a non-hazardous chemical under the Federal Occupational Safety and Health Administration Hazard Communication Standard 29CFR1910.1200

C. PHYSICAL DATA

Melting Point:	Polyethylene yarn 221° – 249°F/105° – 115°, Nylon yarn 428° – 436°F/220° – 230°C
Specific Gravity:	(H20=1) 0.94 turf
Appearances:	Solid
Odor:	None

D. FIRE HAZARD DATA

Unusual fire and explosion hazards:	None
Flashpoint:	>600°F
Extinguishing Method:	Water, Foam, Carbon Dioxide
Fire Fighting Equipment:	Wear protective pressure, self-contained, breathing apparatus. This product is resistant to damage and spreading of ignition in typical exposures such as lighted cigarette dropped on the surface.

E. REACTIVITY DATA

Stability:	(Conditions to avoid) Polymer may decompose under fire conditions to give off hazardous products
Dissolution:	Softening or discoloration may occur with yarn, phenol, formic acid, other acidic exposures below PH5
Hazardous Decomposition Products:	Carbon Dioxide, Carbon Monoxide, Nitrogen Oxides, Traces of Hydrogen Cyanide
Hazardous Polymerization:	Will not occur

F. HEALTH HAZARD INFORMATION

No health hazards are evident from MSDS documentation of constituents of this product, in the form presented when installed and used for its intended application as a synthetic turf product.

G. ENVIRONMENTAL & DISPOSAL INFORMATION

Environmental Impact:	This product is in compliance with the EPA RCRA backing standard TCLP in US Federal register to CRF261 for all heavy metals on that list.
Disposal Procedures:	Safe for landfills; Can be processed and used as a combustible fuel where proper recycling facilities are available.

H. LEGAL DISCLAIMER

While the information set forth herein is believed to be accurate and complete as of the date hereof. ForeverLawn Inc. makes no warranty with respect thereto and disclaims all liability and release thereon.

I. DATE OF ISSUE

April 2, 2007

4500 Bogan Avenue NE, Albuquerque, NM 87109 | Phone 505.217.0177 | Fax 866.212.1925 | www.foreverlawn.com

Attachment 5: Shock Pad

Schmitz Foam Products

Safety Data Sheet

Version 1.0 (USA), as per June 1, 2015

SCHMITZ
FOAM PRODUCTS

All products in this Safety Data Sheet are regarded as the same product, because they contain the same raw materials and are produced under the same conditions, with the same auxiliary materials.

Within OSHA HCS [*] it is not mandatory to prepare a Safety Data Sheet for this kind of product, because it is defined as an article: "an object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition". Within OSHA HCS this is only mandatory for substances and mixtures (of substances).
Note that in the polymer processing industry, the transition from mixture to article is defined after the conversion of the polymer pellets; the conversion process is what transforms the mixture into an article!

[*] the Hazard Communication Standard (HCS) 29CFR1910.1200 of the Occupational Safety & Health Administration (OSHA) from the US Department of Labor

For clarity this Safety Data Sheet contains the same sections as specified in Appendix D of OSHA HCS:

SECTION 1 - IDENTIFICATION OF PRODUCTS AND COMPANY
SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS
SECTION 3 - HAZARDS IDENTIFICATION
SECTION 4 - FIRST AID MEASURES
SECTION 5 - FIRE FIGHTING MEASURES
SECTION 6 - ACCIDENTAL RELEASE MEASURES
SECTION 7 - HANDLING AND STORAGE
SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION
SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES
SECTION 10 - STABILITY AND REACTIVITY
SECTION 11 - TOXICOLOGICAL INFORMATION
SECTION 12 - ECOLOGICAL INFORMATION
SECTION 13 - REMARKS ON DISPOSAL
SECTION 14 - TRANSPORT INFORMATION
SECTION 15 - REGULATORY INFORMATION
SECTION 16 - OTHER INFORMATION

SECTION 1 - IDENTIFICATION OF PRODUCTS AND COMPANY

Products

ProPlay, RecyTop, *S-foam* and *FloraMat.*

Use

Layer for drainage and/or protection and/or shock absorption.

In case of *ProPlay* - typically used directly underneath synthetic turf for sports fields or playgrounds; in case of *RecyTop* and *S-foam* - typically used underneath sand, soil or crushed stone for roof gardens or landfills; in case of *FloraMat* - typically used underneath a (geo)textile in horticulture. A variety of other applications are possible, e.g. *RecyTop* used underneath a layer of sand for horse arena's or *S-foam* used inside a cover as cow mattress.

Company

Production:
Schmitz BV
Produktieweg 6
6045 JC Roermond
The Netherlands
t : +31 475 370 270
f : +31 475 340 212
e : info@schmitzfoam.com

Sales:
Schmitz Foam Products BV
Produktieweg 6
6045 JC Roermond
The Netherlands
t : +31 475 370 270
f : +31 475 340 212
e : sales@schmitzfoam.com
w : www.schmitzfoam.com

Emergency phone number : +31 475 370 270

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

The product is made of closed cell cross-linked polyethylene (XLPE or PEX) foam flakes, thermally bonded to a polyester (PES) textile, and - in case of *FloraMat* - to an additional high density polyethylene (HDPE) net. The polyethylene foam flakes can be mixed - up to 10% by volume - with polypropylene (PP) foam flakes.
Both PE (and PP) and PES are inert, biologically and chemically inactive and regarded as harmless.

Chemical Abstracts Service (CAS) registry numbers:
- PE: 9002-88-4
- PP: 9003-07-0
- PES: 113669-97-9

The product can contain compounds (i.e. additives) that are added to the foam - during foam production - for producibility (e.g. the foaming agent azodicarbonamide) or for functionality (e.g. fire retardants on the basis of chlorine or bromine and enhanced by antimony).
Some of these compounds can be regarded as hazardous chemicals (as per National Toxicology Program - Report on Carcinogens from the US Department of Health and Human Services), or as 'Toxic and Hazardous Substances' within OSHA's HCS.
According to the best of our knowledge (at the time of revision), the concentrations of these compounds will not exceed OSHA's cut-off values/concentration limits (c.q. the Health Hazard Criteria from Appendix A of HCS); and in fact, these compounds are enclosed in the closed cell cross-linked polyethylene (or polypropylene) foam and so they will not be released (e.g. leach) under normal conditions of use!

SECTION 3 - HAZARDS IDENTIFICATION

Eye contact
Fine dust when mechanically transformed may cause irritation.
Fumes generated when heated above 433 K (160 °C / 320 °F) may cause irritation.

Skin contact
Unlikely to cause irritation.
When heated, contact can cause a thermal burn.

Inhalation
Fumes generated when heated above 433 K (160 °C / 320 °F) may cause irritation to respiratory organs.

SAFETY DATA SHEET

SECTION 4 - FIRST AID MEASURES

Eye contact
When irritation by fumes occurs, move away from source and flush eyes with plenty of water; get medical attention if irritation consists.

Skin contact
When a thermal burn occurs, cool skin down as quickly as possible by means of cold water; do not try to remove parts from skin and get immediate medical attention.

Inhalation
When irritation by fumes occurs, move away from source and into fresh air as quickly as possible; get medical attention if irritation consists.

Ingestion
Regarded as harmless.

SECTION 5 - FIRE FIGHTING MEASURES

Suitable extinguishing media
- Water spray,
- Foam extinguisher,
- CO_2 extinguisher.

Unsuitable extinguishing media
None.

Special hazards
Avoid inhaling fumes.

Protection to the fire fighters
Do not approach fire in confined space without positive pressure self-contained breathing apparatus and full bunker gear, bunker coats, helmet with face shield, gloves and rubber boots.

SAFETY DATA SHEET

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal precautions
- When dust is released, use eye protection until source of dust is eliminated.
- When fumes are released, use respiratory protection until source of fumes is eliminated and area is sufficiently ventilated.

Environmental precautions
None.

SECTION 7 - HANDLING AND STORAGE

Handling
Practice reasonable care as a normal safety precaution.
Use eye protection as a precaution if dust may occur while handling product.
Do not handle product near any source of flame or heat.

Storage
Practice reasonable care as a normal safety precaution.
Do not store product near any source of flame or heat.

SAFETY DATA SHEET

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limit values
No limit values are necessary.

Exposure controls (occupational/environmental)
No other controls than stated in section 7 ('HANDLING AND STORAGE') are necessary.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance	
- Physical state	solid
- Color	mix of different colors foam flakes, white/grey textile, green net (if applicable)
Odor	odorless
Melting point/range	383-433 K (110-160 °C / 230-320 °F)
Decomposition temperature	>433 K (>160 °C / >320 °F)
Auto-ignition temperature	>573 K (>300 °C / >572 °F)

SECTION 10 - STABILITY AND REACTIVITY

Conditions to avoid
- temperatures above 433 K (160 °C / 320 °F),
- electrostatic discharges.

Substances to avoid
- oxidizing chemicals.

Hazardous decomposition products
- fumes when heated above 433 K (160 °C / 320 °F) or in case of fire.

SAFETY DATA SHEET

SECTION 11 - TOXICOLOGICAL INFORMATION

The product is inert and biologically/chemically inactive and therefore poses no toxicological (health) danger.

SECTION 12 - ECOLOGICAL INFORMATION

The product is inert and biologically/chemically inactive and therefore poses no ecological danger.

Ozone depletion potential

The product does not contain, and is not produced with, any of the substances mentioned in the 'Montreal Protocol on Substances That Deplete the Ozone Layer' (and in the corresponding US Clean Air Act per US Environmental Protection Agency).

SECTION 13 - REMARKS ON DISPOSAL

The raw materials PE (and PP) and PES are inert, biologically and chemically inactive and regarded as harmless, so no remarks on safe disposal are necessary.

Due to the high durability of it's raw materials (i.e. more than 25 years, with predictions up to 100 years) and the versatility of it's use, it is possible to re-use the product once it's specific end-of-life is reached, e.g. a ProPlay-Sport shock pad used in a high-end synthetic turf system (e.g. a stadium pitch) can be re-used as a shock pad in a low-end synthetic turf system (e.g. a Multi-Game area) or as a drainage pad in a roof garden.
When re-use is not directly possible, Schmitz can take the product back for in-direct re-use, or for re-cycling (as raw material).
Disposal as a solid waste is not a good solution, due to it's low volume to weight ratio combined with it's high durability. A better solution is incineration under controlled conditions (i.e. energy recovery): Due to it's high caloric value (~45 MJ/kg) it acts as a catalyst during waste incineration and it can even feed waste incineration. Note that this incineration should be performed in a controlled situation to prevent incomplete combustion!

SAFETY DATA SHEET

SECTION 14 - TRANSPORT INFORMATION

The product is inert and biologically/chemically inactive and therefore poses no danger during transport (i.e. a specific 'transport hazard class' is not relevant).

SECTION 15 - REGULATORY INFORMATION

All raw materials are inert, biologically and chemically inactive and regarded as harmless, therefore no regulatory information is necessary. This is supported by the fact that for none of the raw materials a 'Chemical Safety Assessment' has been carried out by the suppliers, which is mandatory for articles that contain 'Toxic and Hazardous Substances' as per OSHA's HCS!

SAFETY DATA SHEET

SECTION 16 - OTHER INFORMATION

The provided information in this Safety Data Sheet is, to the best of our knowledge, true and accurate (at the time of revision).
This information is prepared only to allow the correct and safe use, handling, transport, storage and disposal of the product. This information must not be considered as a guarantee, or a proof of quality, of the product.

Reason of revision to version 1.0
Introduction of the Safety Data Sheet based on the OSHA regulations per June 1, 2015.

Attachment 6: Track Surface Info

Cape and Island TENNIS & TRACK

Prepared for Narragansett High School

Product Comparison: ***Outdoor track surfacing***

Based on 1/2" Red 6,900 sq. yard track over 20+ years 6925 sy

Product Type	Initial Cost*	Lifespan	Resurface After	Cost of Respray	Total Life Cycle Cost	Cost per year of use
Plexitrac Accelerator (permeable)	$ 237,527.50	20	8	$ 124,650.00	$ 486,827.50	$ 24,341.38
BSS-100 (permeable)	$ 252,762.50	22	8	$ 131,575.00	$ 515,912.50	$ 23,450.57
BSS-200 (impermeable)	$ 316,472.50	25	8	$ 131,575.00	$ 579,622.50	$ 23,184.90
BSS-300 (impermeable)	$ 412,037.50	28	13	$ 290,850.00	$ 702,887.50	$ 25,103.13
BSS-1000 (13mm) (impermeable)	$ 484,750.00	32	13	$ 290,850.00	$ 775,600.00	$ 24,237.50

*Budget Rates for prevailing wage projects in RI

	New	Respray
Plexitrac Accelerator	$ 34.30 per sy	$ 18.00
BSS-100	$ 36.50 per sy	$ 19.00
BSS-200	$ 45.70 per sy	$ 19.00
BSS-300	$ 59.50 per sy	$ 42.00
BSS-1000 (13mm)	$ 70.00 per sy	$ 42.00

Key Points:
Permeable systems (BSS-100 & Plexitrac Accelerator) historically do not last as long as impermeable systems (BSS-200, BSS-300, BSS-1000)
Athletic performance characteristics vary between systems. Track program needs should be considered when discussing surface product.
Full Pour systems will withstand abuses better (vehicle traffic, poor maintenance etc.)
BSS-300 & BSS-1000 systems will go longer between maintenance resprays.
These prices are for CIT&T installed products. Others may disagree with these estimates.

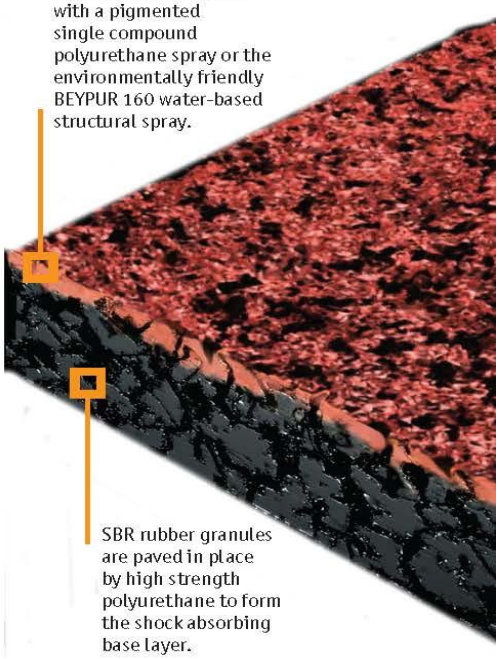
BSS 100

PAVED-IN-PLACE SYNTHETIC TRACK SYSTEM

Economical, durable and easy to maintain the BSS 100 is the cost effective track surface solution for local schools and communities who are in search of an all-weather track system.

The BSS 100 features a porous, **paved-in-place system**, utilizing a machine installed base of single compound polyurethane binder and SBR rubber granules. The surface is finished with multiple spray applications of 100% solids, pigmented polyurethane and EPDM granules or the environmentally friendly **BEYPUR 160 water-based structural spray** that only Beynon Sports Surfaces offers.

- Found in entry-level educational facilities and communities
- Environmentally friendly BEYPUR 160 water-based structural spray available
- Supported by a comprehensive five-year warranty
- Easy to maintain and water permeable



GET THE TRACK SURFACE that goes the distance-without going over budget

IAAF CERTIFIED PRODUCT

Information

Beynon Sports Surfaces
16 Alt Road Hunt Valley, Maryland 21030
(410) 771-9473 | www.beynonsports.com

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A Tarkett Sports Company

THE ULTIMATE SURFACE EXPERIENCE

Attachment 7: Scoreboard Schematic

DAKTRONICS FB-2018 PRODUCT SPECIFICATIONS

This outdoor LED football scoreboard displays period time to 99:59, HOME and GUEST scores to 99 and DOWN/TO GO/BALL ON/QTR (quarter) information. T.O.L. (time outs left) to nine are optional. Arrows indicate possession. When period time is less than one minute, the scoreboard displays time to 1/10 of a second. Scoreboard shown with optional striping and amber PanaView® digits.

DIMENSIONS	# OF SECTIONS
8'-0" H x 18'-0" W x 8" D (2.44 m, 5.49 m, 203 mm)	**Two Total**
4'-0" H x 18'-0" W x 8" D (1.22 m, 5.49 m, 203 mm)	One Top & One Bottom

		VINYL CAPTIONS (STANDARD)	TNMCS & VINYL CAPTIONS	TNMCS & ELECTRONIC CAPTIONS	BACKLIT CAPTIONS
POWER (120 VAC)*	Red/Amber Digits	300 Watts, 2.5 Amps	570 Watts, 4.8 Amps	1110 Watts, 9.3 Amps	690 Watts, 5.8 Amps
	White Digits	635 Watts, 5.3 Amps	905 Watts, 7.6 Amps	1445 Watts, 12.1 Amps	1025 Watts, 8.6 Amps
UNCRATED WEIGHT	Top Section	288 lb (131 kg)	368 lb (167 kg)	368 lb (167 kg)	328 lb (149 kg)
	Bottom Section	288 lb (131 kg)	288 lb (131 kg)	448 lb (203 kg)	368 lb (167 kg)
	Total	**576 lb (261 kg)**	**656 lb (298 kg)**	**816 lb (370 kg)**	**696 lb (316 kg)**

**Scoreboard requires a dedicated circuit. Models with 240 VAC power at half the indicated amperage are also offered (International Use Only).*

DIGITS & INDICATORS
- All digits are 24" (610 mm) high. Optional T.O.L. digits are 15" (381 mm) high.
- Select red, amber, or white LED digits and indicators. Scoreboard may instead have mixed LED digit colors (see DD1965467).
- Scoreboard features robust weather-sealed digits (see DD2495646).
- Digits may be dimmed for night viewing.

DISPLAY COLOR
Choose from 150+ colors (from Martin Senour® paint book) at no additional cost.

OPERATING TEMPERATURES
- Display: -22° to 122° Fahrenheit (-30° to 50° Celsius)
- Console: 32° to 130° Fahrenheit (0° to 54° Celsius)

CAPTIONS
- All captions are 12" (305 mm) high. Optional T.O.L. captions are 8" (203 mm) high.
- Standard captions are vinyl, applied to the display face.
- Optional backlit captions are 12" (305 mm) high and consist of white letters on a black background.
- Optional electronic captions change according to the sport mode, eliminating the need for caption panels. Electronic captions and TNMCs are 10.6" (269 mm) high.

CONSTRUCTION
Alcoa aluminum alloy 5052 for excellent corrosion resistance

PRODUCT SAFETY APPROVAL
ETL listed to UL 48, tested to CSA standards, and CE labeled

WWW.DAKTRONICS.COM E-MAIL: SALES@DAKTRONICS.COM

201 Daktronics Drive, PO Box 5128, Brookings, SD 57006
Phone: 1-800-325-8766 or 605-692-0200 Fax: 605-697-4746
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DAKTRONICS

DAKTRONICS FB-2018 PRODUCT SPECIFICATIONS

CONTROL CONSOLE	CONTROL OPTIONS
All Sport® 5000 (see SL-03991)	***Wired (standard):*** One-pair shielded cable of 22 AWG minimum is required. A cover plate with mounted connector and standard 2" x 4" x 2" (51 mm x 102 mm x 51 mm) outlet box is provided. Connector mates with signal cable from control console.
	Wireless (optional): 2.4 GHz spread spectrum radio features 64 non-interfering channels and 8 broadcast groups (see SL-04370).

SEGMENT TIMER MODE

The segment timer mode is ideal for keeping practices on schedule. The horn at the end of a segment allows coaches and athletes to focus on the practice and to listen for the horn when it is time to change drills (see SL-04004).

TIME OF DAY MODE

This scoreboard features a Time of Day (TOD) mode that allows it to act as a clock when the control console is unplugged or off. Refer to the scoreboard installation manual for instructions on how to enable the Time of Day mode.

MOUNTING

Scoreboard is typically mounted on two vertical beams or poles. Hardware to mount scoreboard on two beams is included; hardware for more beams is at additional cost. Standard mounting uses I-beam clamps. Optional mounting method using angle brackets is also offered; maximum beam width is 12" (305 mm) and maximum beam depth is 22" (559 mm). Refer to attached drawings for more information on mounting methods.

SERVICE ACCESS

Digit panels and electronics are serviced from the front of the scoreboard.

GENERAL INFORMATION

Scoreboard provides scoring capabilities for two teams. 100% solid state electronics are housed in an all aluminum cabinet. Scoreboard is shipped in two sections. Scoreboard power is to be provided on a dedicated circuit to prevent loss of game information due to failure of another component on the circuit. Specifications and pricing are subject to change without notice.

OPTIONS & ACCESSORIES

- Scoreboard border striping
- Multiple caption and striping colors (see DD2101644)
- Team name caption in place of HOME
- Team names on changeable panels *
- Programmable Team Name Message Centers (see DD1696958)
- Backlit team name captions
- Backlit or electronic captions
- T.O.L. digits with captions
- Two 2'-0.25" (616 mm) tall x 1'-9.75" (552 mm) wide logo/sponsor panels (not available with T.O.L. digits). Copy is applied to removable panels.
- Baseball, lacrosse/field hockey and soccer captions on changeable panels
- LED colon
- Horn
- Individual digit protective screens (see SL-04939)
- Protective netting (see DD2690927)
- Optional angle bracket mounting method
- Advertising/identification panels
- Decorative accents
- Electronic message centers and video displays in multiple sizes

** Not available with TNMCs or Backlit Team Names*

ADVERTISING/IDENTIFICATION PANELS

Backlit & Non-Backlit:

1'-6" H x 18'-0" W (457 mm, 5.49 m)
2'-0" H x 18'-0" W (610 mm, 5.49 m)
2'-6" H x 18'-0" W (762 mm, 5.49 m)
3'-0" H x 18'-0" W (914 mm, 5.49 m)
4'-0" H x 18'-0" W (1.22 m, 5.49 m)

For additional non-backlit panel sizes, see SL-03761.

FOR ADDITIONAL INFORMATION

- Installation Specifications: DWG-1157189 (attached)
- Standard I-beam Mounting: DWG-1052565 (attached)
- Optional Pole Mounting: DWG-1048184 (attached)
- Component Locations (Red/Amber Digits): DWG-1068840 (attached)
- Component Locations (White Digits): DWG-3025544 (attached)
- Architectural Specifications: See SL-10093

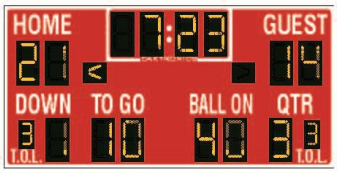
DAKTRONICS FB-2018 PRODUCT SPECIFICATIONS

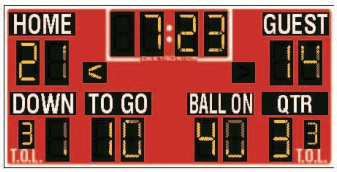
ALTERNATE CAPTIONS & SCORING MODES

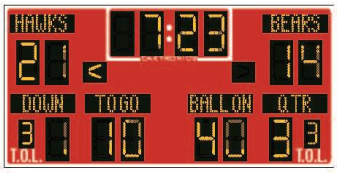
Segment Timer Mode

Standalone Time of Day Mode

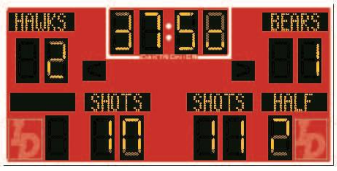
Football Mode –
Optional TNMCs shown







Football Mode with T.O.L. Option –
vinyl, backlit & electronic captions shown
(vinyl T.O.L. captions only)



Soccer Mode –
vinyl, backlit & electronic captions shown
(SHOTS displayed with electronic captions)

Lacrosse/Field Hockey Mode –
vinyl, backlit & electronic captions shown
(SHOTS & PER displayed with electronic captions)

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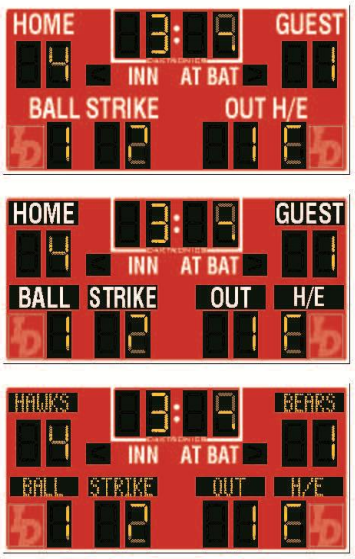
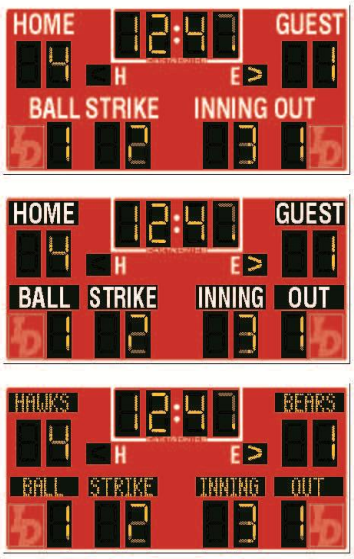
DAKTRONICS FB-2018 PRODUCT SPECIFICATIONS



Baseball Mode, without Clock –
vinyl, backlit & electronic captions shown
[10" vinyl INN/AT BAT captions only]



Baseball Mode, with Clock –
vinyl, backlit & electronic captions shown
[10" vinyl H/E captions only]

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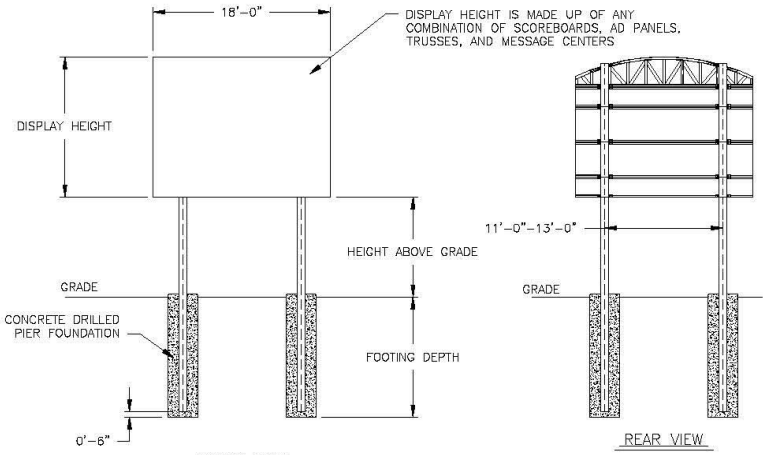
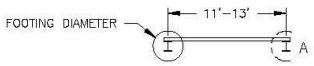
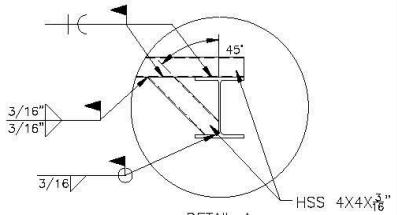
DAKTRONICS





LAYOUT VIEW

COLUMNS & FOOTING ONLY



DETAIL A
SCALE 1:32

TABLE A – MOUNTING

EXPOSURE B

HEIGHT ABOVE GRADE = 10'						HEIGHT ABOVE GRADE = 15'					
DISPLAY HEIGHT (FT)		DESIGN WIND VELOCITY				DISPLAY HEIGHT (FT)		DESIGN WIND VELOCITY			
		115 MPH	130 MPH	150 MPH	170 MPH			115 MPH	130 MPH	150 MPH	170 MPH
8	COLUMN FOOTING	W8X24 2.0'X8.0'	W12X26 2.0'X9.0'	W10X30 2.0'X10.0'	W10X33 3.0'X9.5'	8	COLUMN FOOTING	W8X31 2.0'X9.0'	W10X33 3.0'X8.5'	W10X39 3.0'X9.5'	W16X36 3.0'X10.5'
10	COLUMN FOOTING	W8X28 2.0'X9.0'	W8X31 2.0'X10.0'	W12X26* 3.0'X9.5'	W14X30* 3.0'X11.0'	10	COLUMN FOOTING	W12X26* 3.0'X8.5'	W14X30* 3.0'X9.5'	W12X40 3.0'X11.0'	W14X48 3.0'X12.0'
12	COLUMN FOOTING	W8X31 2.0'X10.0'	W10X39 3.0'X9.5'	W12X30* 3.0'X11.0'	W14X34* 3.0'X12.0'	12	COLUMN FOOTING	W14X30* 3.0'X9.5'	W16X36* 3.0'X11.0'	W14X43* 3.0'X12.0'	W21X48* 3.0'X13.0'
14	COLUMN FOOTING	W10X39 3.0'X9.5'	W12X30* 3.0'X10.0'	W14X34* 3.0'X12.0'	W16X40* 3.0'X13.0'	14	COLUMN FOOTING	W16X36* 3.0'X10.0'	W16X40* 3.0'X11.0'	W14X48* 3.0'X13.0'	W18X55* 3.0'X15.0'
16	COLUMN FOOTING	W12X30* 3.0'X10.0'	W14X34* 3.0'X11.0'	W16X40* 3.0'X12.0'	W21X44* 3.0'X14.0'	16	COLUMN FOOTING	W12X40* 3.0'X11.0'	W14X48* 3.0'X12.0'	W18X55* 3.0'X14.0'	W21X62* 3.0'X16.0'
18	COLUMN FOOTING	W14X30* 3.0'X10.5'	W16X36* 3.0'X12.0'	W21X44* 3.0'X14.0'	W21X48* 3.0'X16.0'	18	COLUMN FOOTING	W14X43* 3.0'X12.0'	W21X48* 3.0'X13.0'	W18X60* 3.0'X15.0'	W21X68* 3.0'X18.0'

FOOTING DIMENSIONS = DIAMETER X DEPTH
* DENOTES BUCKLING BRACE REQUIRED

EXPOSURE C

HEIGHT ABOVE GRADE = 10'				HEIGHT ABOVE GRADE = 15'			
DISPLAY HEIGHT (FT)		DESIGN WIND VELOCITY		DISPLAY HEIGHT (FT)		DESIGN WIND VELOCITY	
		115 MPH	140 MPH			115 MPH	140 MPH
8	COLUMN FOOTING	W12X26 3.0'X8.0'	W10X33 3.0'X9.5'	8	COLUMN FOOTING	W8X35 2.0'X11.0'	W16X36* 3.0'X11.0'
10	COLUMN FOOTING	W10X33 3.0'X9.0'	W12X30* 3.0'X10.5'	10	COLUMN FOOTING	W14X34* 3.0'X10.0'	W14X43* 3.0'X12.0'
12	COLUMN FOOTING	W12X26* 3.0'X10.0'	W14X34* 3.0'X12.0'	12	COLUMN FOOTING	W14X38* 3.0'X11.0'	W14X48* 3.0'X13.0'
14	COLUMN FOOTING	W14X30* 3.0'X10.5'	W16X40* 3.0'X12.0'	14	COLUMN FOOTING	W14X43* 3.0'X12.0'	W18X55* 3.0'X14.0'
16	COLUMN FOOTING	W14X34* 3.0'X11.5'	W21X44* 3.0'X14.0'	16	COLUMN FOOTING	W14X48* 3.0'X13.0'	W21X62* 3.0'X16.0'
18	COLUMN FOOTING	W16X40* 3.0'X12.0'	W21X48* 3.0'X15.0'	18	COLUMN FOOTING	W18X55* 3.0'X14.0'	W16X67* 3.0'X17.0'

FOOTING DIMENSIONS = DIAMETER X DEPTH
* DENOTES BUCKLING BRACE REQUIRED

NOTE:
-REFER TO NOTE 7 FOR EXPOSURE CATEGORY DEFINITIONS.

NOTES:

1. FOOTING AND COLUMN SIZES ARE SUGGESTIONS ONLY, PROVIDED TO ASSIST WITH ESTIMATING INSTALLATION COSTS AND ARE NOT INTENDED FOR CONSTRUCTION PURPOSES. THE DESIGN MUST BE CERTIFIED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF THE INSTALLATION BEFORE THEY CAN BE USED FOR FABRICATION Or ERECTION.

2. INTERNATIONAL BUILDING CODE 2012 USED IN DESIGN OF COLUMNS AND FOOTINGS WITH, IMPORTANCE FACTOR=1, Kzt=1.0, Kd=0.85, G=0.85. SEISMIC DESIGN WAS NOT CONSIDERED.

3. FOOTING DIMENSIONS ARE BASED ON ASSUMED SOIL CLASS 4 (ALLOWABLE LATERAL BEARING PRESSURE OF 150 psf).

4. STRUCTURAL STEEL IS GRADE A992 (50 ksi) STEEL. CONCRETE SHALL HAVE A MINNIMUM 28 DAY COMPRESSIVE STRENGTH OF 2500 psi.

5. THE AVERAGE DISPLAY WEIGHT FOR A LAYOUT CAN NOT EXCEED 8 PSF.

6. DAKTRONICS INC. IS NOT RESPONSIBLE FOR STRUCTURES DESIGNED AND INSTALLED BY OTHERS.

7. LOCAL BUILDING OFFICIALS SHOULD BE CONTACTED TO DETERMINE THE WIND SPEED AND EXPOSURE CATEGORY FOR THE PROPOSED SIGN LOCATION. THE EXPOSURE CATEGORY C IS DEFINED AS:

EXPOSURE B – URBAN AND SUBURBAN AREAS, OR OTHER TERRAIN WITH NUMEROUS SPACED OBSTRUCTIONS HAVING THE SIZE OF SINGLE-FAMILY DWELLINGS OR LARGER. THESE CONDITIONS MUST PREVAIL FOR A DISTANCE FROM THE SIGN OF AT LEAST 2,600 ft OR 20 TIMES THE SIGN HEIGHT, WHICHEVER IS GREATER

EXPOSURE C – OPEN TERRAIN WITH SCATTERED OBSTRUCTIONS HAVING HEIGHTS GENERALLY LESS THAN 30 FT. THIS CATEGORY INCLUDES FLAT OPEN COUNTRY, GRASSLANDS, AND ALL WATER SURFACES IN HURRICANE PRONE REGIONS.

8. FOR SPECIFIC PRODUCT DETAILS ON WEIGHT, MOUNTING, ETC. REFER TO THE INDIVIDUAL PRODUCT SPECIFICATION SHEETS.

REV	DATE:		BY:
02	27 OCT 15	UPDATED WIDE FLANGE AND FOUNDATION VALUES	AMP
01	23 JUL 14	UPDATED CLAMPS IN REAR AND SIDE VIEWS AND ADDED 170 MPH WIND SPEC COLUMN	TJT

DAKTRONICS, INC.
BROOKINGS, SD 57006
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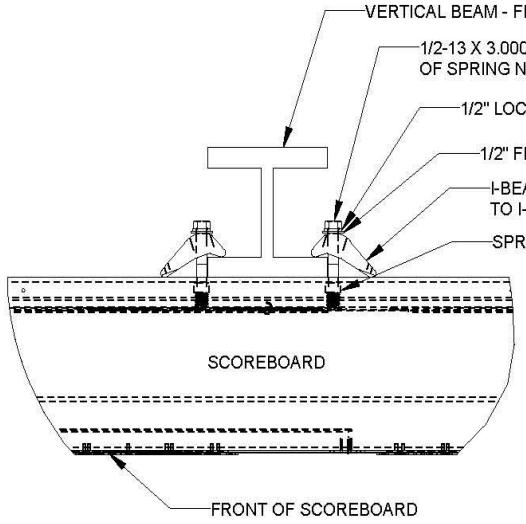
PROJ: OUTDOOR SCOREBOARD INSTALLATION
TITLE: 18' WIDTH SCOREBOARD INSTALLATION SPECS
DESIGN: RSCHWAR | DRAWN: RSCHWAR | DATE: 27 NOV 13
SCALE: 1/16"=1'

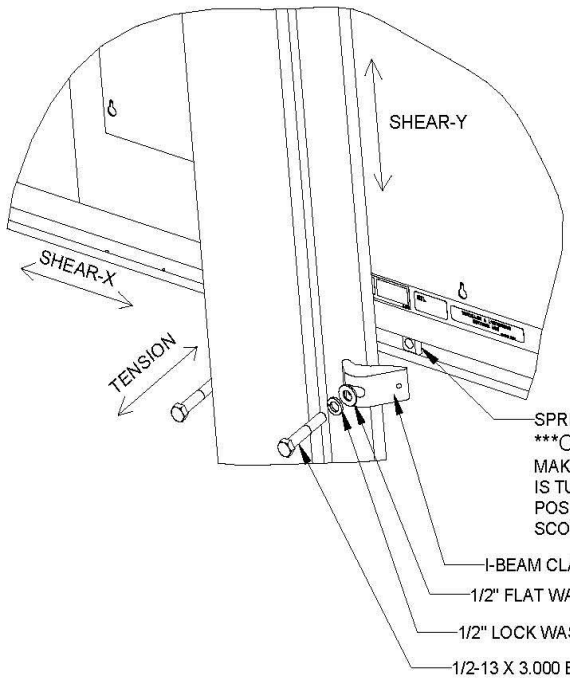
SHEET	REV	JOB NO:	FUNC-TYPE-SIZE	
	02	P1647	E-10-A	1157189



STANDARD MOUNTING METHOD

TOP VIEW

MOUNTING INSTRUCTIONS:
1. PLACE SPRING NUTS INTO SCOREBOARD CHANNEL IN APPROXIMATE LOCATION OF VERTICAL BEAMS
2. LIFT SCOREBOARD INTO POSITION
3. MAKE SURE THE 1/2-13 BOLTS ARE AS CLOSE TO THE I-BEAM FLANGES AS POSSIBLE
4. WHEN SCOREBOARD IS ADJUSTED TO FINAL DESIRED POSITION, TIGHTEN BOLTS FIRMLY
5. IF FLANGE THICKNESS IS MORE THAN 3/4" THICK LONGER BOLTS WILL BE REQUIRED AT THE CUSTOMER'S EXPENSE.



ALLOWABLE CAPACITY PER EACH CLAMP:
SHEAR = 160 LBS
TENSION = 2300 LBS

SHEAR AND TENSION LOAD DIRECTION ARE AS INDICATED ON REAR ISOMETRIC VIEW

EXPLODED REAR ISOMETRIC VIEW

REV	DATE:		BY:
04	6 JAN 14	ADDED ALLOWABLE TENSION AND SHEAR CAPACITY DETAILS	JAVA
03	23 OCT 13	CHANGED BOLT TORQUE FROM 30 FT-LB TO 40 FT-LB PER EC-12382	NJM
02	07 MAR 12	ADDED STADNARD MOUNTING METHOD NOTES	KDD
01	21 FEB 12	CHANGED ROCKER TO I-BEAM	KDD

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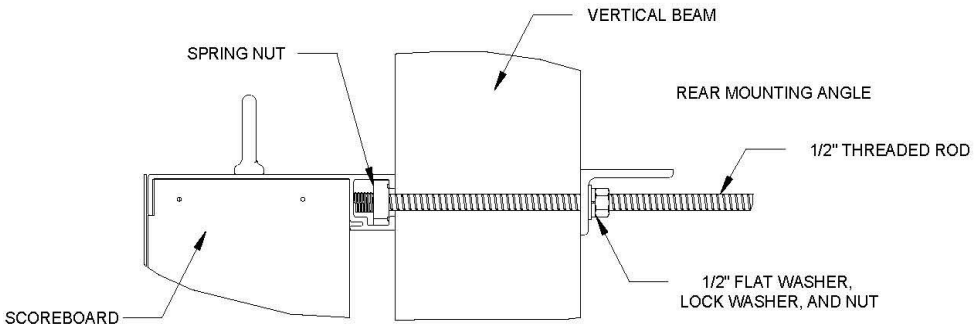
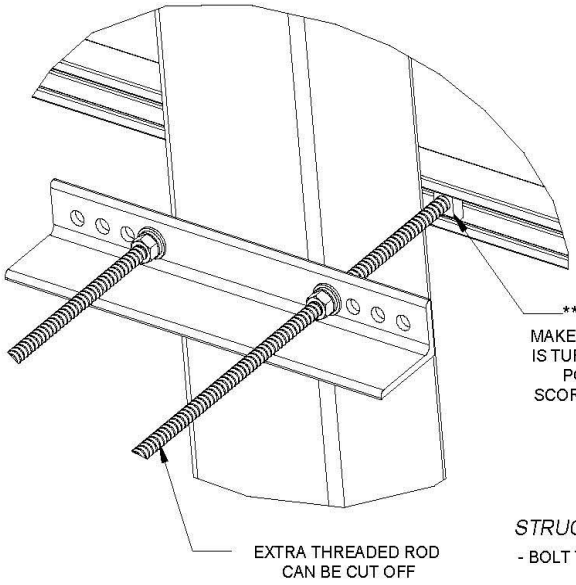
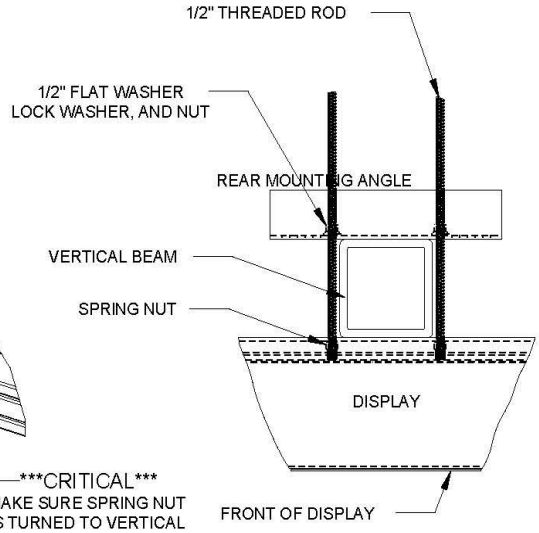
PROJ: OUTDOOR SCOREBOARD					
TITLE: P1647; I-BEAM CLAMP MOUNTING					
DESIGN: MCARSRU		DRAWN: MCARSRU		DATE: 06-JAN-14	
SCALE: 1/8					
SHEET:	REV	JOB NO:	FUNC-TYPE-SIZE	1052565	
1 OF 1	04	P 1647	E - 07 - A		



SIDE VIEW



REAR ISOMETRIC VIEW



CRITICAL
MAKE SURE SPRING NUT
IS TURNED TO VERTICAL
POSITION INSIDE
SCOREBOARD CHANNEL

TOP VIEW
SCALE 1/10

STRUCTURAL NOTES:

- BOLT TORQUE: 30 FT-LB

NOTES:

- THREADED RODS RUN ALONG BOTH SIDES OF BEAM
- RODS DO NOT PASS THROUGH THE FLANGES OF THE BEAM
- NO DRILLING NECESSARY
- MAKE SURE SPRING NUT IS PERPENDICULAR TO CHANNEL OPENING ON SCOREBOARD

REV	DATE:		BY:
03	3 JULY 13	ADDED STRUCTURAL NOTE	TTF
02	20 SEP 12	REMOVED CHAMFER FROM 0M-133259 PER EC-7114	LMG
01	06 OCT 11	REPLACED VERTICAL I-BEAM WITH 6" X 6" SQUARE TUBE	JAVA

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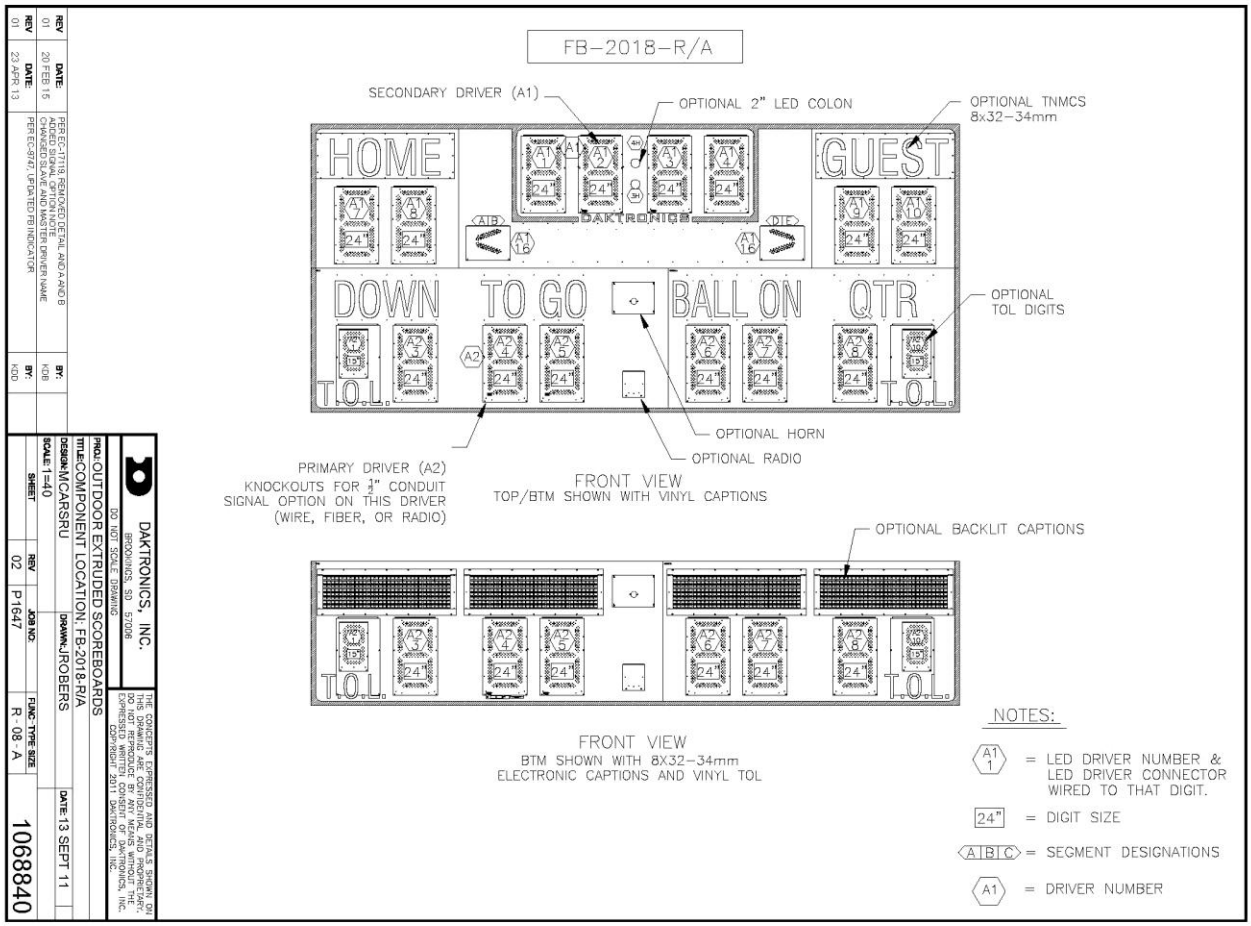
PROJ:	OUTDOOR SCOREBOARDS			
TITLE:	P1647; POLE MOUNTING OPTIONS			
DESIGN:	DOPPELT	DRAWN:	DOPPELT	DATE: 22 MAR 11
SCALE:	1/5			

SHEET:	REV	JOB NO:	FUNC-TYPE-SIZE	
1 OF 1	03	P1647	E - 10 - A	1048184



REV	DATE	
01	20-FEB-15	PER EC-17116: REMOVED DETAIL A AND A AND B ADDED SIGNAL OPTION NOTE CHANGED SLAVE AND MASTER DRIVER NAME
REV	DATE	
01	23-APR-13	PER EC-9747: UPDATED FBI INDICATOR

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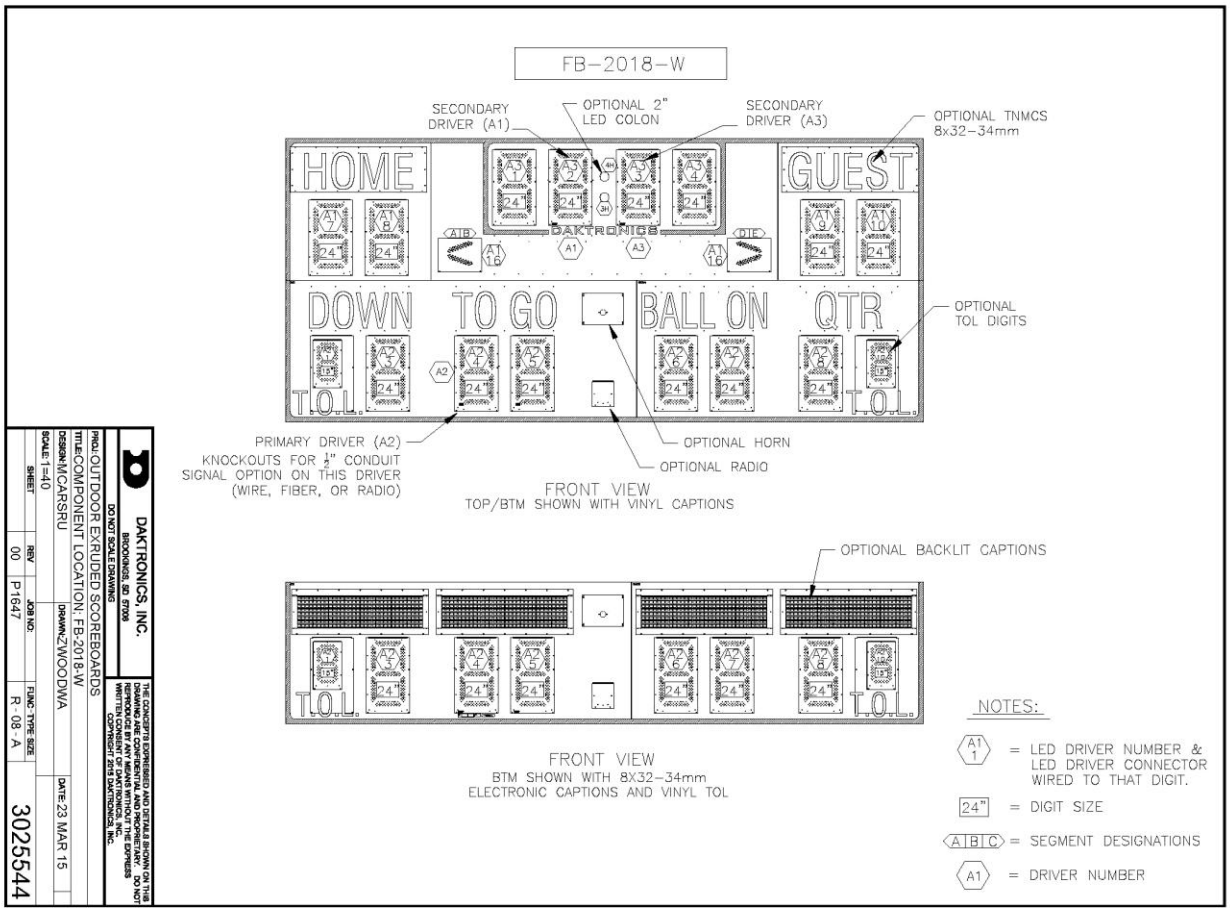
PRO: OUTDOOR EXTRUDED SCOREBOARDS
TITLE: COMPONENT LOCATION: FB-2018-R/A
DESIGN: M.CARSRU
DRAWN: J.ROBERS
DATE: 13 SEPT 11
SCALE: 1=40
SHEET: 02
REV: P1647
JOB NO: R 08 - A
FUNC TYPE SIZE: 1068840



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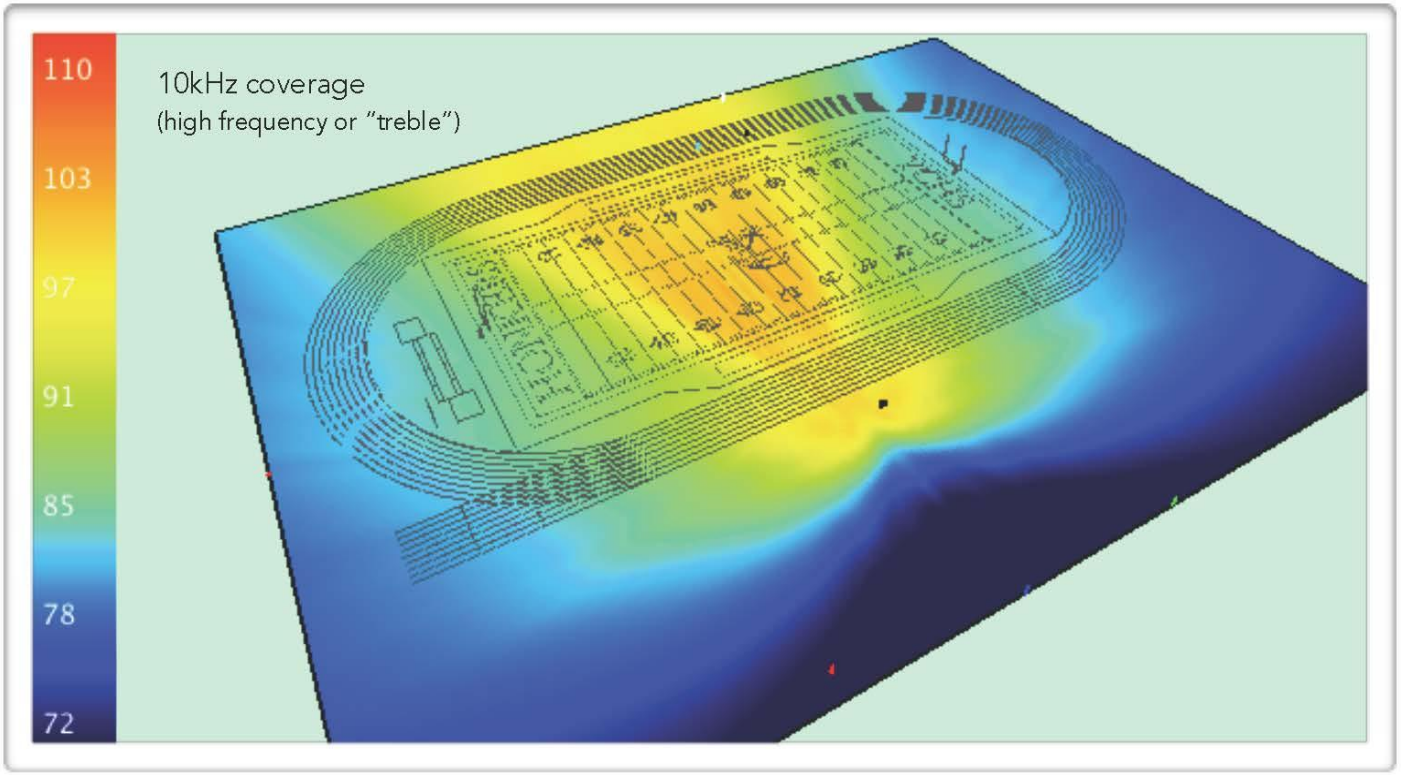
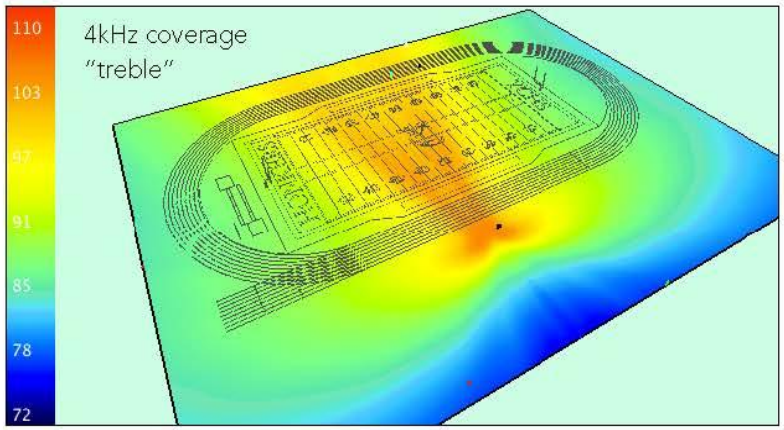
PROJ: OUTDOOR EXRUDED SCOREBOARDS
TITLE: COMPONENT LOCATION: FB-2018-W
DESIGN: M.CARSRU
DRAWN: ZWOODWA
DATE: 23 MAR 15
SCALE: 1=40
JOB NO: P1647
REV: 00
SHEET
FUNC. TYPE SIZE: R - 08 - A
3025544

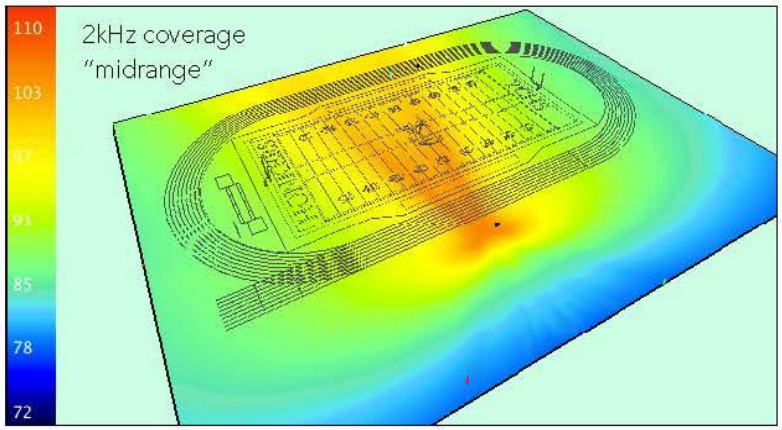
Attachment 8: Sound System Schematic

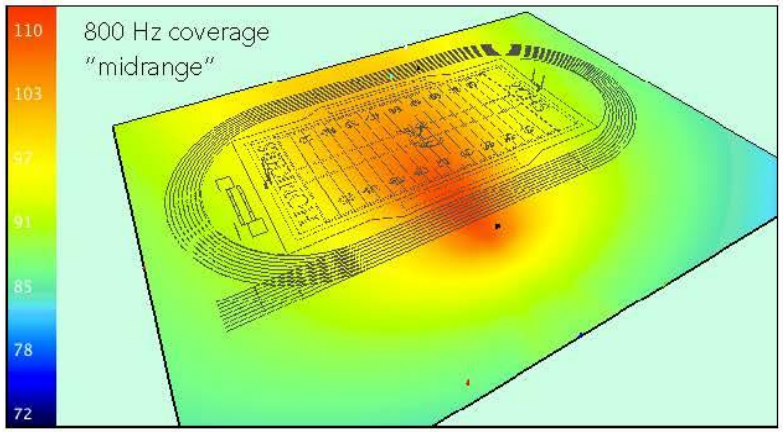
Wellesley High School
Wellesley, MA

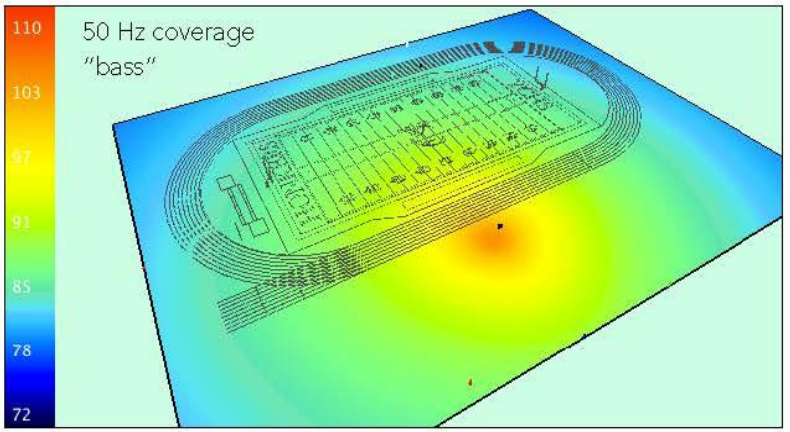


The sound system concept is to focus the sound away from the neighboring homes directly across the street from the facility. The loudspeakers chosen have a high directivity factor which means they focus sound like a spot light and do not flood the entire area with sound. By placing loudspeakers on the "away" side sound will be sent across the field to the "home" bleacher side. Neighboring homes will not have loudspeakers facing them which will effectively keep them to understand any announcements which will have a positive effect in reducing the spill from events.









Various frequency plots are pictured above from high frequency (treble) to low frequency (bass). The SPL (sound pressure level) plot is on the right hand side of the frame. The warmer colors show areas which are the loudest. As you can see as the frequency lowers the directivity of the loudspeaker also lowers, so we do have some spillage at lower frequencies into neighboring areas. Low (bass) frequencies are very difficult to control and this can even be limited to how much of that area of the spectrum is allowed by the sound system. In other words we can have the system reproduce less bass frequencies in the digital signal processing that is built into the amplifiers.

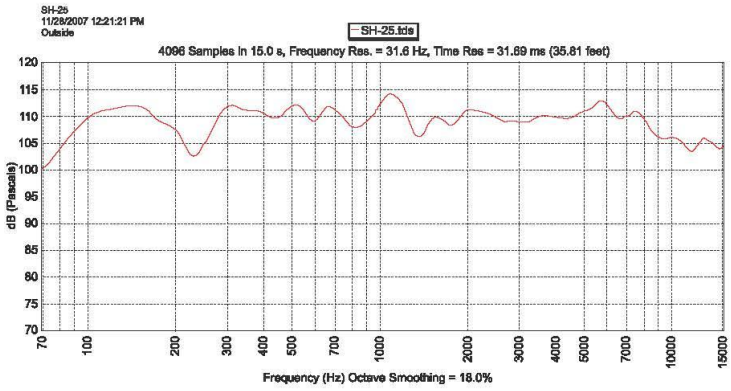
The SH25 is ideal where great fidelity; high output and pattern control are required in both horizontal and vertical arrays. With a coverage pattern of 25° x 25°, this Hi-Q box was designed for long-throw applications. A single SH25 has a frequency response of 90 Hz – 18 kHz, and four in an array will extend the low frequency down to 50 Hz. Driver compliment is 8 - 6.5" woofers, 4 - 4" midrange, and 1 - 1" high frequency.

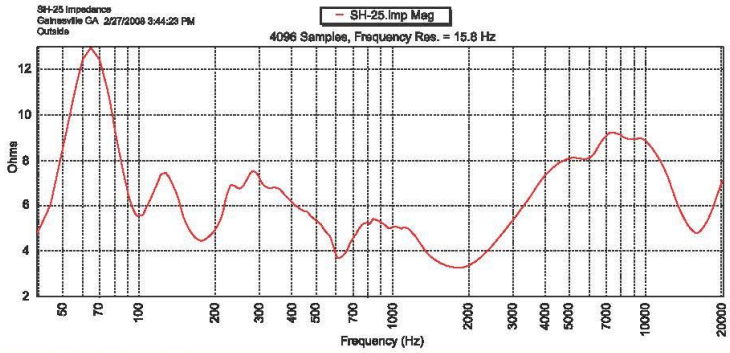
SH25

Long-throw full range loudspeaker with Hi-Fi Sound

Specifications

Coverage Pattern ..... 25° horizontal x 25° vertical
Operating Frequency Range ..... 90 Hz – 18 kHz +/- 3 dB
..... 70 Hz – 20 kHz -10 dB
Sensitivity @ 1M ..... 110 dBSPL
..... (Measured as 2.83V input, 1M whole space)
Maximum Output ..... 137 dBSPL Cont., 143 dBSPL Peak
Input Power Ratings ..... 1000W continuous, 4000W Peak
Nominal Impedance ..... 4 ohms
Recommended Processing ..... 70 Hz HP @ 24 dB/Butterworth
Drivers ..... LF 8 x 6.5", MF 4 x 4", HF 1 x 1"
Input Connections 2-NL4MP
Enclosure Material ..... 13ply, 18mm Baltic Birch, polyurea coated





Accessories

Powered version available
Mounting brackets for array
MB 60 Fly-ware
Weatherized options available

PERFORMANCE DATA

Model	Max SPL	Sensitivity	Magnitude Response	Beam Width	Power Rating	Dimensions (in.)	Weight
SH25	143 dB	110 dB	90Hz – 18kHz	25° x 25°	2,000 W	28 x 28 x 50.7	176 lbs

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Architect/Engineers Specs

The loudspeaker shall utilize the Synergy Horn/Tapped Horn patent-pending enclosure covering three pass bands. The coverage pattern shall be 25° horizontal x 25° vertical. The loudspeaker shall have an operating range of +/- 3dB 90Hz – 18 kHz. Sensitivity of 110 dBSPL @ 1M. Output of 137 dBSPL/143 dBSPL Peak. Power handling shall be 1000 W continuous, 2000W Program. The impedance shall be nominal 4 ohms.

The loudspeaker shall be constructed of 13 ply birch, water resistant Polyurea coated, properly braced for the intended use and a rugged steel grill. The connectors shall be Neutrik NL4. The loudspeaker shall be the Danley Sound Labs SH25.

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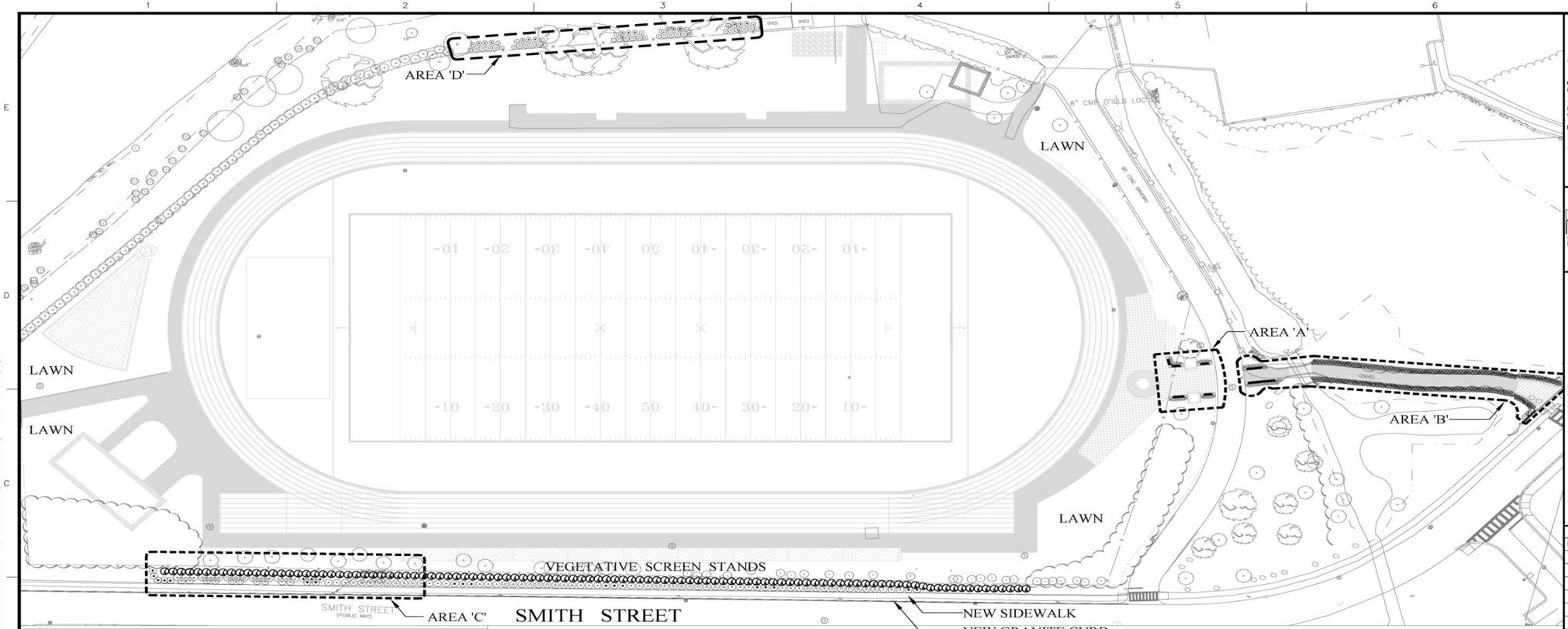
Attachment 9: Landscape Schematic



PLANTING PLAN LEGEND					
SYMBOL	QTY	SYMBOL	BOTANICAL NAME	COMMON NAME	DESCRIPTION
EVERGREEN SHRUBS					
	65	RCE	RHODODENDRON CAROLINIANUM 'HENRY RED'	HENRY RED RHODODENDRON	HT: 5' - RED FLOWERS
	105	IGE	THUJA OCCIDENTALIS 'TECHNY'	MISSION ARBORVITAE	HT: 12' - HEDGE-SLOW
DECIDUOUS SHRUBS					
	17	FBD	FORTHERGILLA MAJOR 'BLUE SHADOW'	BLUE SHADOW LARGE FOTHERGILLA	HT: 5' - BLUE LEAVES
	54	IVD	ILEX VERTICILATA 'RED SPRITE'	RED SPRITE WINTERBERRY	HT: 5' - RED BERRIES
	36	MPD	MYRICA PENSYLVANICA	NORTHERN BAYBERRY	HT: 6' - GREEN LEAVES
	34	POD	PHYSOCARPUS OPULIFOLIUS 'SUMMER WINE'	SUMMER WINE NINEBARK	HT: 6' - PURPLE LEAVES
ORNAMENTAL GRASSES					
	23	PRG	PANICUM VIRGATUM 'RASTRAHLBUSH'	RASTRAHLBUSH SWITCH GRASS	HT: 3' - PREMIUM - FULL
FERNS					
	286	PPF	POLYSTICHUM PLYBLEPHARUM	TASSEL FERN	HT: 2' - PREMIUM - FULL
PERENNIALS					
	135	RFP	RUDBECKIA FULGICA SULLIVANTI 'GOLDSTRUM'	BLACK EYE SUSAN	HT: 2' - YELLOW REBLOOMER

HENRY RED RHODODENDRON

MISSION ARBORVITAE

Evergreen Shrubs

BLUE SHADOW LARGE FOTHERGILLA

RED SPRITE WINTERBERRY

NORTHERN BAYBERRY

SUMMER WINE NINEBARK

Deciduous Shrubs

RASTRAHLBUSH SWITCH GRASS

Ornamental Grass

TASSEL FERN

Fern

BLACK EYE SUSAN

Perennial

0 30 60 90 120

scale: 1" = 30'-0"

N W E S

PERMIT SET

GALE

Gale Associates, Inc
Engineers and Planners

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www.gainc.com

Boston Baltimore Orlando San Francisco

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LDD Collaborative, Inc.

PROJECT
TRACK AND FIELD RENOVATION PROJECT
WELLESLEY HIGH SCHOOL
50 RICE STREET
WELLESLEY HILLS, MA

OWNER
TOWN OF WELLESLEY
525 WASHINGTON ST.
WELLESLEY, MA

REVISIONS

NO.	DATE	DESCRIPTION

CADD FILE	
DESIGNED BY	MDF/MM
DRAWN BY	
CHECKED BY	MDF/AL
DATE	12/15/2015
DRAWING SCALE	

GRAPHIC SCALE

SHEET TITLE
PLANTING PLAN

DRAWING NO.
PP-1.01

PROJECT NO. T.B.D.

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