Chapter 4
Surfacing

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Asphalt | Vehicular
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Wood Chips and Mulches

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Aggregates

Purpose

Aggregates shall be used as a porous surface for pedestrian and vehicular use.

General Information

Aggregate shall be tested according to ASTM standards including particle size, standard proctor potential and sieve analysis.

Material shall have a containment edge or border.

Materials and Finish

Materials shall be washed processed aggregate.

Acceptable aggregates include washed gravel fines, such as #10 stone for pedestrian use, and #57 gravel for vehicular use.

Material shall be clean and free of organic materials.

Installation

Aggregates shall be installed on non-woven geotextile filter fabric over compacted subgrade.

Prior to installation, subgrade shall be consistent in grade and free of weeds, trash and other debris.

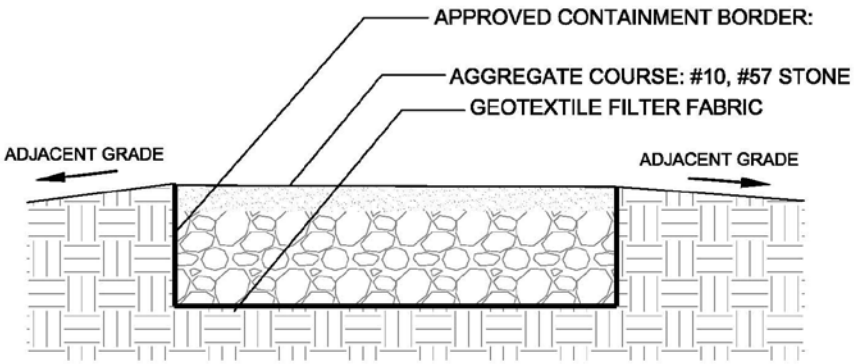
Finer aggregates shall be compacted with a vibrating plate.

#10 stone shall be installed at 4 inches minimum vertical depth.

Life Cycle Expectations

Aggregates are anticipated to require annual replacement based on normal and ordinary use.

Stone dust trail



Aggregate cross section

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Asphalt | Pedestrian

Purpose

Asphalt paving materials shall be provided for non-vehicular circulation where a smooth and a joint free surface is desired.

General Information

Asphalt material shall be dense, hot-laid and plant-mixed.

Materials shall meet ASTM standards for asphalt cement and aggregates.

Materials and Finish

Asphalt paving sections for pedestrian traffic may typically include 2 inches of asphalt on top of 6 inches of crushed stone, over subgrade compacted to 95% proctor density.

Asphalt surface shall be smooth, continuous and free of pulls, tears and deflections.

Paving strips shall be 10 feet horizontal dimension minimum, or full width of the travelway.

Paving shall be flush to adjacent grade.

Design mixes shall be appropriate for project conditions, weather, test results and materials.

Features

Striping shall meet the requirements of Manual on Uniform Traffic Control Devices (MUTCD) Standards, and shall be retroreflective thermoplastic.

Asphalt paths shall include a 6 inch wide concrete shoring band.

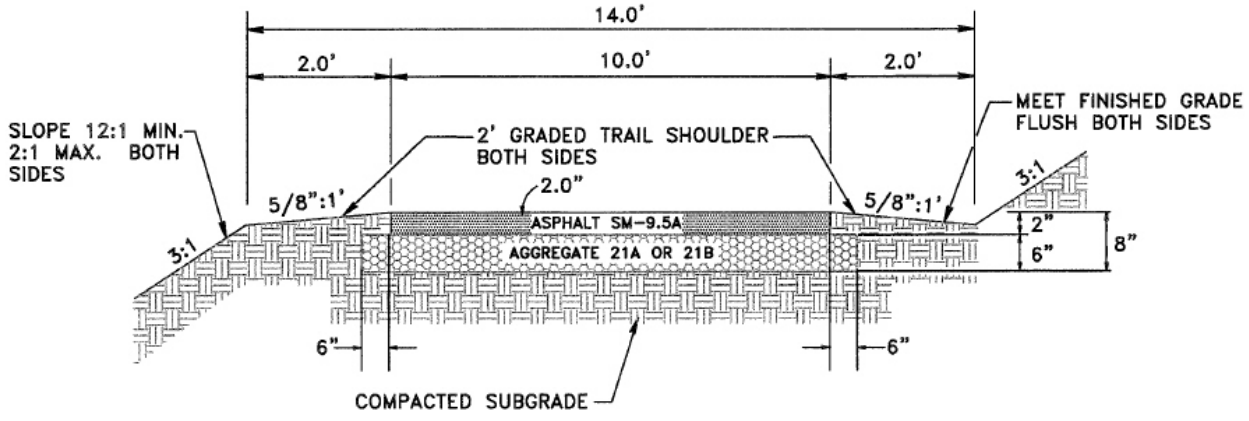
21B material may include an underdrain dependant upon the geotechnical analysis and soil conditions.

Accessible paved areas shall be graded at 1.5% minimum to 4.5% maximum, with a 2% cross slope.

Stamped asphalt patterns shall be approved by the Director of Recreation, Parks and Cultural Activities and the Director of Transportation and Environmental Services.

Pavement surface may be crowned in the middle or sloped to one side. Valley drainage shall not be permitted.

Bicycle and multi-use trails require a 10 feet minimum pavement width. Pedestrian trails require a 6 feet minimum pavement width.



Asphalt cross section

Not to scale

Asphalt | Pedestrian

Installation

Geotechnical analysis is required to establish a pavement section.

Life Cycle Expectations

Pavement is anticipated to require replacement after 15-20 years of normal maintenance and ordinary use.

Pedestrian use application

Asphalt | Vehicular

Purpose

Asphalt paving materials shall be provided for exterior vehicular circulation and staging where a smooth and a joint free surface is desired.

General Information

Asphalt material shall be dense, hot-laid and plant mix.

Materials shall meet ASTM standards for asphalt cement and aggregates.

Materials and Finish

Asphalt paving sections shall be designed by a licensed geotechnical/professional engineer.

The thickness of sub-base, base, and wearing course shall be designed using "California Method" as set forth on page 3-76 of the second edition of "Data Book for Civil Engineers, Volume One, Design" by Elwyn E. Seelye.

Values of California Bearing Ratios used in the design shall be determined by field and/or laboratory tests.

Asphalt surface shall be smooth, continuous and free of pulls, tears and deflections.

Paving strips shall be 10 feet horizontal dimension minimum.

Paving shall be flush to adjacent grade.

Design mixes shall be appropriate for project conditions, weather, test results and materials.

Features

Striping shall meet the requirements of Manual on Uniform Traffic Control Devices (MUTCD) Standards and shall be retroreflective thermoplastic.

Asphalt paving shall include a 6 inch wide concrete shoring band.

Accessible paved areas shall be graded at 1.5% minimum to 4.5% maximum, with a 1.5% cross slope.

Stamped asphalt patterns shall be approved by the Director of Recreation, Parks and Cultural Activities and the Director of Transportation and Environmental Services.

Installation

Asphalt shall be installed by trained and certified crews

Life Cycle Expectations

Pavement is anticipated to require replacement after 15-20 years of normal maintenance and ordinary use.

Vehicular use application

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Concrete | Pedestrian

Purpose

Concrete paving materials shall be provided for non vehicular circulation where a rigid system is desired.

General Information

Concrete materials including Portland cement, admixtures, aggregates and reinforcement shall comply with ASTM C-150 standards for Type I concrete.

Materials and Finish

Design mixes shall be appropriate for project conditions, weather, site test results and materials.

Exterior concrete pavement shall be finished with a light broom finish perpendicular to travel direction unless otherwise specified.

Concrete shall be tested for compressive strength, slump and air content.

Features

Reinforcement shall be included as determined by the design engineer for strength. Reinforcement shall be synthetic fiberglass material.

Concrete pavement may include lamp black pigment per District of Columbia standards.

Concrete pavement may include integral color throughout the entire pavement section or decorative aggregate as determined by the Director of Recreation, Parks and Cultural Activities.

Installation

Concrete pavement shall be designed with expansion and troweled or saw-cut control joints.

Control joints on concrete curbs 6 inches wide or less shall be saw cut.

Forms and form release agents shall be appropriate to the concrete mix and finish, and shall not impair subsequent treatment of the concrete surfaces.

Concrete pavement shall be designed with 2% minimum to 4.5% maximum slope, with a 1.5% cross slope.

The temperature of new concrete shall not be allowed to fall below 50 degrees Fahrenheit (10 degrees Celsius) during the curing period.

Life Cycle Expectations

Pavement is anticipated to require replacement after 20-30 years of normal and ordinary use with regular maintenance.

Pedestrian use concrete

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Concrete | Vehicular

Purpose

Concrete paving materials shall be installed for vehicular circulation and staging where a rigid system is desired.

General Information

Concrete materials including Portland cement, admixtures, aggregates and reinforcement shall comply with ASTM C-150 standards for Type I concrete.

Materials and Finish

Concrete paving sections shall be designed by a licensed geotechnical/professional engineer.

Design mixes shall be appropriate for project conditions, weather, site test results and materials.

Exterior concrete pavement shall be finished with a medium broom finish unless otherwise specified.

Concrete shall be tested for compressive strength, slump and air content.

Features

Steel reinforcement shall be included as determined by the engineer for strength. Rebar and welded wire fabric shall meet ASTM standards.

Concrete pavement may include lamp black pigment per District of Columbia standards.

Concrete pavement may include integral color throughout the entire pavement section or decorative aggregate as determined by the Director of Recreation, Parks and Cultural Activities.

Installation

Concrete pavement shall be designed with expansion or saw-cut control joints per industry standards.

Forms and form release agents shall be appropriate to the concrete mix and finish and shall not impair subsequent treatment of the concrete surfaces.

Concrete pavement shall be designed with 2% minimum to 4.5% maximum slope, with a 1.5% cross slope.

The temperature of new concrete shall not be allowed to fall below 50 degrees Fahrenheit (10 degrees Celsius) during the curing period.

Life Cycle Expectations

Pavement is anticipated to require replacement after 20-30 years of normal and ordinary use with regular maintenance.

Vehicular use concrete

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Court Surfacing | Color Coat

Purpose

Tennis, basketball and multi-purpose courts shall be finished with textured slip resistant surfacing.

General Information

Surfacing material and lining shall meet United States Tennis Association standards and National Federation of State High School Associations.

Related Standards: Court Diagram | Tennis, Court Diagram | Basketball.

Materials and Finish

Courts shall be installed on a base course consisting of 4 inches minimum vertical depth VDOT 21b stone, compacted to 95% proctor density.

Surfacing shall be a hot mix asphalt with 9.5mm aggregate size.

Surfacing shall be full depth asphalt with 3 inches minimum vertical depth.

Paving strips shall be 10 feet minimum horizontal width.

Primers or resurfacers shall be used to fill and seal the asphalt. Air pockets, holes, cracks, seams, depressions and other blemishes are not acceptable.

Color coating shall consist of a mix of 100% acrylic resins, water, sand and Portland cement.

Color coating shall be a minimum of two coats.

Lines shall have solid, consistent, sharp edges and corners.

Features

The standard colors are US Green and Dark Green, with white lines.

Tennis courts shall be lined for both singles and doubles play.

Installation

Court surfacing shall be installed by trained and certified crews. Color coating shall be performed by professionals with 5 years minimum experience installing color coating.

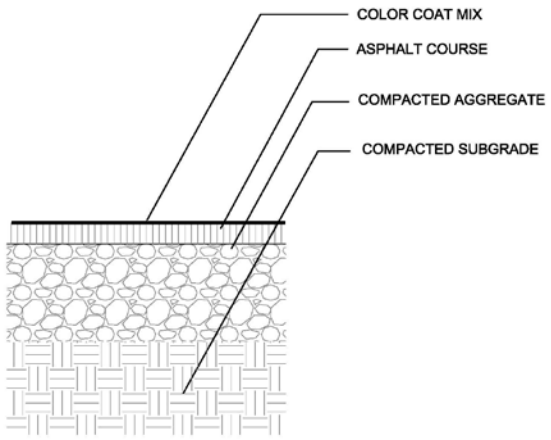
Courts shall be installed to drain end-to-end at a 1% slope.

Surfacing shall not pond or hold water.

Life Cycle Expectations

Color coating is anticipated to require re-application after 5 years of normal and ordinary use.

Ball court color coating



Ball court lining Not to scale

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Infield Mix

Purpose

Infield mix shall be provided for safe athletic play at diamond ball fields.

General Information

Mix shall be tested according to ASTM standards including particle size, standard proctor and sieve analysis.

Mix shall comply with the National Federation of State High Schools or other governing authority.

Soil stabilizers or other additives shall be approved by the Director of Recreation, Parks and Cultural Activities.

Mix shall be free of organic matter.

Related Standards: Field Diagrams | Baseball, Field Diagrams | Softball, Fence| Backstop, Fence | Chain Link.

Materials and Finish

The soil classification range shall be: Sand (2.0-0.05mm) 65-70%, Silt (0.05-0.002mm) 15-20%, and Clay (less than 0.002) 10-15%.

USDA soil classification shall be Sandy Loam.

Moisture Rate shall be between 14-17%.

Mix shall be installed at least 4 inches in depth.

Color shall be Red/Brown.

Features

Mix may include a calcified clay conditioner. Preferred: one metric or unit ton of calcified clay conditioner per 20-25 tons of infield mix.

Installation

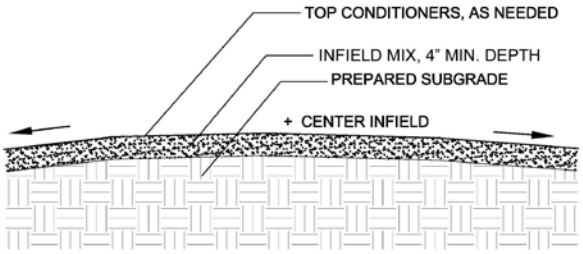
Prior to installation, existing subgrade shall be consistent in grade and free of weeds, trash and other debris.

Infield shall be crowned from the middle equally on all sides.

Life Cycle Expectations

Infield mix is anticipated to require replacement annually based on normal and ordinary use.

Infield mix



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Engineered Wood Fiber

Purpose

Engineered wood fiber shall be used on a limited basis with approval by the Director of Recreation, Parks and Cultural Activities. This material shall be used in outdoor playgrounds and areas where an impact absorbing surface is desired at current facilities. Surface is not recommended for new facilities.

General Information

Safety surfacing shall meet or exceed the most current ASTM and CPSC safety standards for public playgrounds.

Surfaces shall be International Playground Equipment Manufacturers Association certified or equivalent.

Surfacing shall be ADA compliant.

Safety surfacing shall be installed with a subsurface drainage system.

Materials and Finish

Wood fiber pieces shall be comprised of Virginia softwood or hardwoods that do not exceed 1 ½ inches in length.

Material shall be non-toxic. Chemicals, additives, recycled wood products, wood pallets or waste wood are not permitted.

Material shall be free of soil, leaves, bark and twigs.

Installation

Prior to installation, existing subgrade shall be consistent in grade and free of weeds, trash, and other debris.

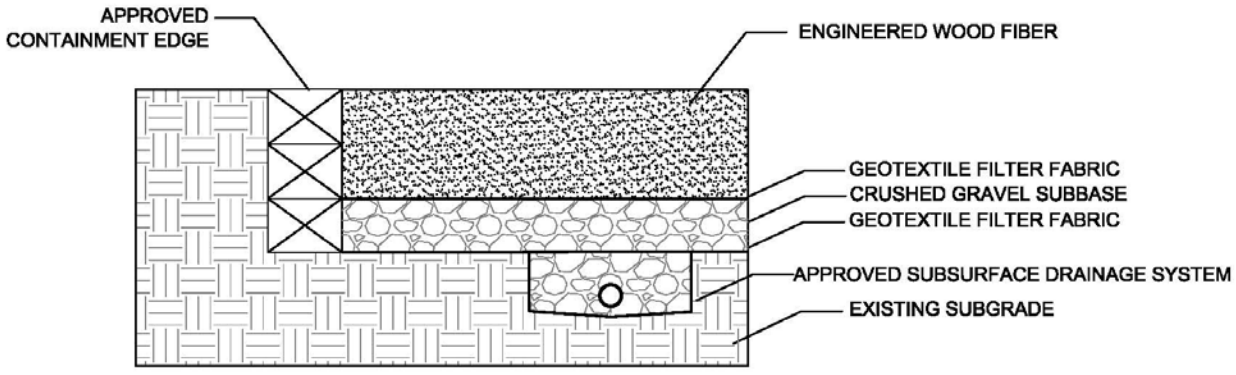
Install material according to depths specified by the manufacturer and CPSC guidelines.

Life Cycle Expectations

A 10 year limited warranty is required.

Engineered wood fiber is anticipated to require replenishment annually based on normal and ordinary use.

Engineered wood fiber



Cross section

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Poured in Place Rubber

Purpose

Poured in place rubber shall be used in outdoor playgrounds and areas where an impact absorbing surface is desired.

General Information

Safety surfacing shall meet or exceed the most current ASTM and CPSC safety standards for public playgrounds.

Surfaces shall be International Playground Equipment Manufacturers Association certified or equivalent.

Surfacing shall be ADA compliant.

Materials and Finish

Surface materials shall be manufactured from recycled tires and rubber materials.

Binders shall be 'aliphatic' 100% polyurethane with UV stabilizers.

Safety surfacing shall have a containment border constructed from concrete, wood timbers, or other approved material. Containment borders shall be wide enough to protect surfacing from mowing and other maintenance equipment.

Compacted gravel is the preferred sub-base material. Concrete or asphalt shall be used for poor or unstable soils. Gravel shall be 8 inches minimum vertical depth.

Minimize use of light or bright colors. Colors ratios should incorporate between 40%-60% black ethylene propylene diene monomer (EPDM).

Surfacing shall be a two layer system consisting of EPDM and styrene butadiene rubber (SBR).

EPDM shall have ¼ inch minimum vertical depth.

SBR shall have a 3 inch minimum vertical depth or greater in compliance with CPSC and ASTM fall heights for adjacent equipment.

Installation

Coordinate installation with play equipment.

Ensure subgrades are properly draining.

Safety surfacing shall be installed with an adequate subsurface drainage system.

Installation shall be performed by qualified professional with 5 years minimum experience installing poured in place rubber.

After installation, surfacing shall be Gmax tested according to ASTM standards by a qualified third party.

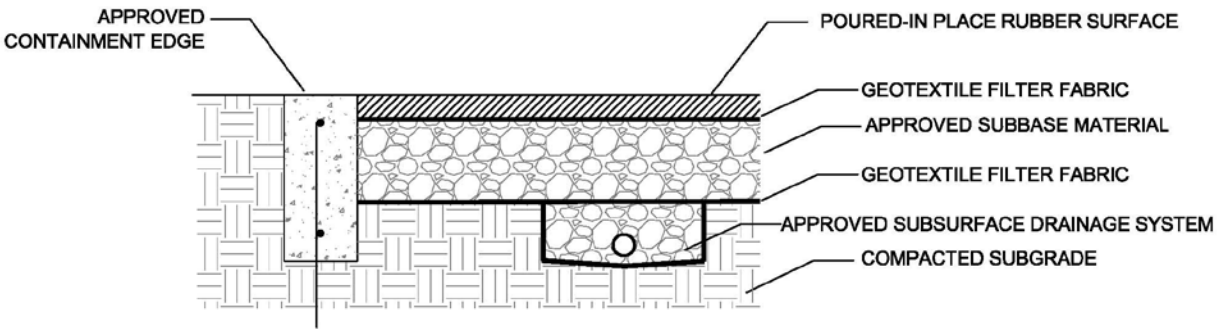
Life Cycle Expectations

A 5 year limited warranty is required.

Poured in place rubber is anticipated to require replacement after 10 years based on normal and ordinary use.

Poured in place rubber surfacing

Poured in Place Rubber



Cross section

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Rubber Tile System

Purpose

Rubber tiles shall be used for outdoor playgrounds and areas where an impact absorbing surface is needed.

General Information

Safety surfacing shall meet or exceed the most current ASTM and CPSC safety standards for public playgrounds.

Surfaces shall be International Playground Equipment Manufacturers Association certified or equivalent.

Surfacing shall be ADA compliant.

Safety surfacing shall be installed with an adequate subsurface drainage system.

The standard interlocking tile system is " SofTILE KrosLOCK" manufactured by SofSurfaces, Inc., or City approved equal.

Materials and Finish

Tile thickness shall be 3 inches minimum, or greater in compliance with CPSC and ASTM standard.

Tile weight shall be 25.85 pounds minimum, based on tile dimensions of 2 feet by 2 feet.

Tiles shall have a concrete containment border.

Tiles shall be installed on concrete or asphalt.

Minimize use of light or bright colors. Colors ratios should incorporate between 40%-60% black ethylene propylene diene monomer.

Installation

Follow manufacturer installation recommendations.

Installation shall be performed by qualified professional with 5 years minimum experience installing rubber safety tiles.

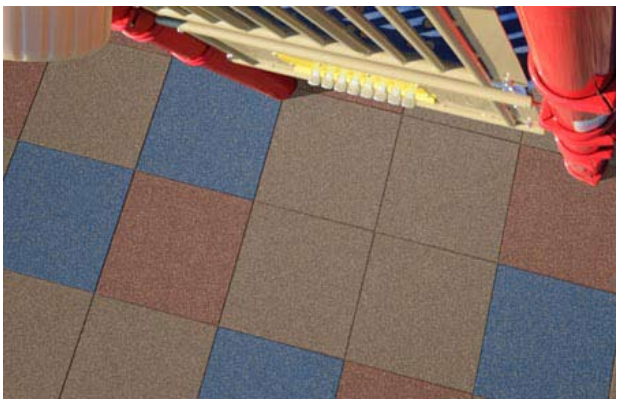
Install material according to manufacturer recommended depths and CPSC guidelines.

After installation, surfacing shall be Gmax tested according to ASTM standards by a qualified third party.

Life Cycle Expectations

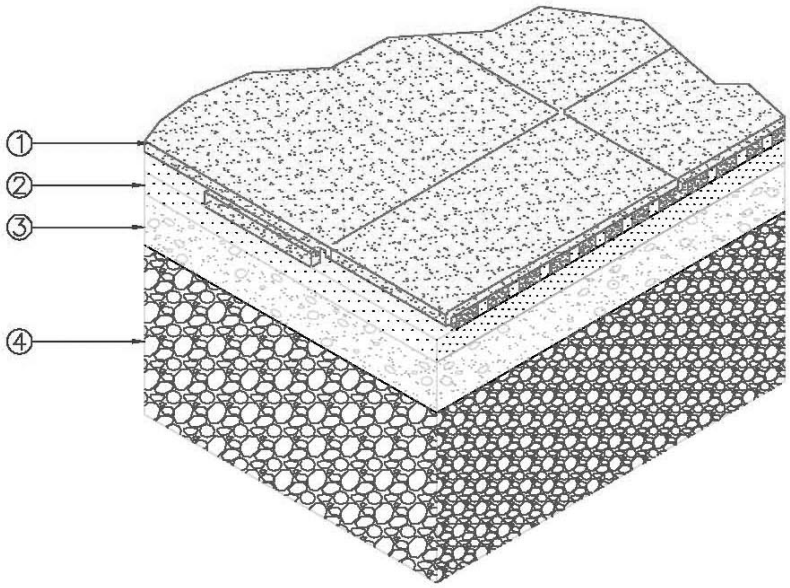
An 8 year minimum warranty is required.

Rubber tile systems are anticipated to require replacement after 15 years based on normal and ordinary use.



Rubber tile system

Rubber Tile System



LEGEND:

① SofTILE®

② Concrete Depth and Strength to Specifications

③ Compacted Granular A (Type I) To 95% S.P.D.

④ Compacted Subgrade.

Diagram (1) Not to scale

Image Footnotes

(1) http://www.sofsurfaces.com/

Sand Mixes | Volleyball

Purpose

Sand mixes shall be provided for safe athletic play at outdoor volleyball facilities.

General Information

Volleyball sand shall be contained with a concrete border or other containment system approved by the Director of Recreation, Parks and Cultural Activities.

A subsurface drainage system shall be provided.

USDA soil classification analysis shall be provided.

Materials and Finish

Volleyball sand shall be high quality sand, fast draining, free of shells, rocks and other debris. Sand shall have low clay content.

Volleyball sand shall be 1 foot minimum continuous vertical depth.

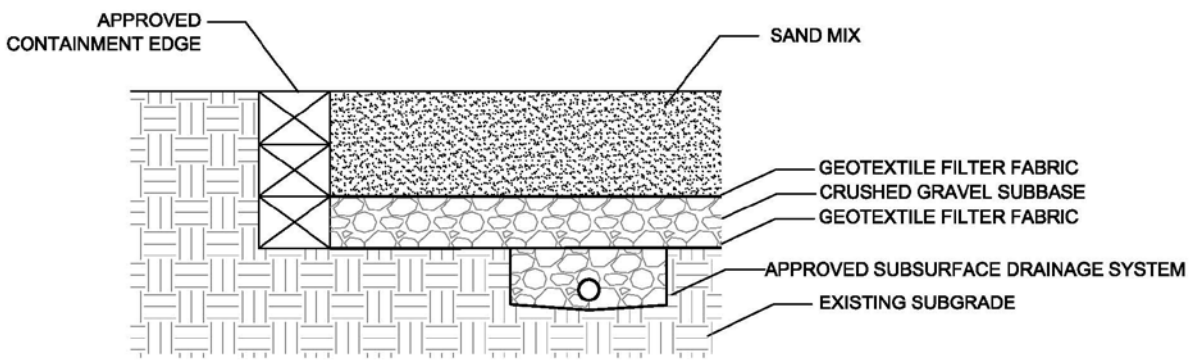
Installation

Prior to installation, existing subgrade shall be consistent in grade and free of weeds, trash and other debris.

Life Cycle Expectations

Sand is anticipated to require replacement annually based on normal and ordinary use.

Outdoor volleyball court



Cross section

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Synthetic Infill Turf System

Purpose

Synthetic infill turf systems shall be provided where all weather facilities are desired.

General Information

Synthetic infill turf systems shall comply with all ASTM rules and regulations for play surfaces.

Vendors/manufacturers and products approved on the most current City prequalified synthetic infill turf system field list shall be considered for use.

Materials and Finish

Synthetic infill turf shall be extruded monofilament polyethylene fiber.

Fiber pile weight shall be 36 ounces/square yard minimum, and pile height shall be 2 ¼ inches minimum vertical height.

Infill system shall consist of resilient styrene butadiene rubber (SBR) or ethylene propylene dien polimerisat (EPDM) crumb rubber granules. Infill systems shall be 100% rubber. Sand mixes are not permitted.

Rubber shall be black in color, clean, and particles shall be consistent in shape and size.

Features

Turf markings shall conform the current National Federation of State High School regulations.

Adhesives used in bonding the system shall be resistant to moisture, bacteria and fungus.

Installation

Systems shall be installed by personnel certified in installation for the turf system selected.

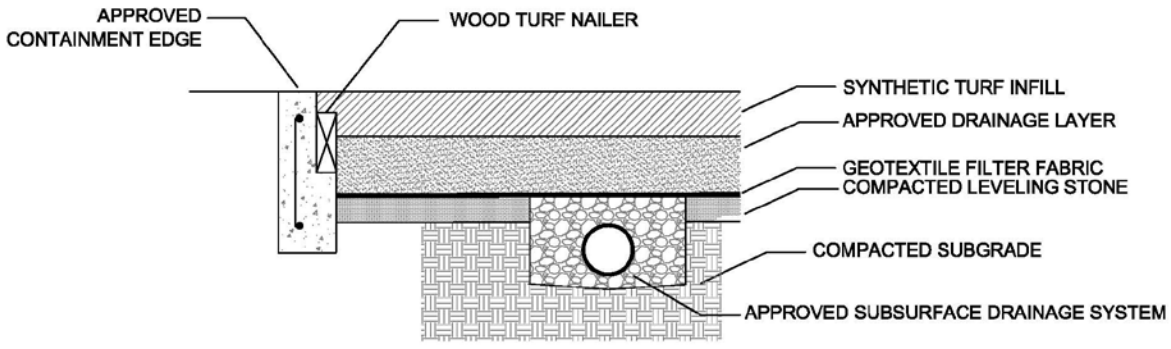
Systems shall be installed over an engineered base of stone or stone plus impact board.

Life Cycle Expectations

An 8 year minimum warranty is required. The warranty shall cover all repairs to the turf through its duration.

Synthetic infill turf systems are anticipated to require carpet replacement after 8-10 years based on normal and ordinary use.

Synthetic infill turf athletic field



Synthetic infill turf section

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Track/Warning Track

Purpose

Aggregates shall be used for track surfacing and in fields to provide a tactile transition from turf to the fence.

General Information

Aggregate shall be tested according to ASTM standards including particle size, standard proctor and sieve analysis.

Related Standards: Field Diagram | Baseball, Field Diagram| Softball.

Materials and Finish

Materials shall be washed processed aggregate.

Acceptable aggregates include washed gravel fines, such as stone dust and #10 stone.

Material shall be clean and free of organic materials.

Installation

Aggregates shall be installed on top of nonwoven geotextile filter fabric over compacted subgrade.

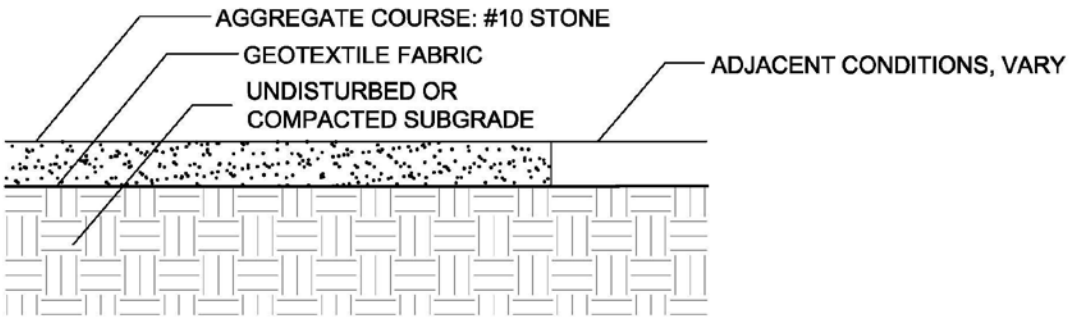
Prior to installation, subgrade shall be consistent in grade and free of weeds, trash and other debris.

#10 stone shall be installed at 4 inches minimum vertical depth.

Life Cycle Expectations

Materials are anticipated to require annual replacement based on normal and ordinary use.

Warning track



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Unit Pavers

Purpose

Unit pavers shall be designed and installed for pedestrian, bicycle and light vehicule traffic.

General Information

Unit pavers include brick, asphalt, concrete and stone pavers. Paver systems shall meet ASTM standards.

The standard brick paver shall be the Old Virginia #24 Brick or the #237 Cambridge by Redland Brick, or City approved equal.

Clay, concrete, stone and asphalt pavers shall be approved by the Director of Recreation, Parks and Cultural Activities.

Materials and Finish

Pavers for use in exterior areas shall include a slip resistant finish.

Paving patterns shall be approved by the Director of Recreation, Parks and Cultural Activities.

Installation

Unit pavers may be installed over flexible setting bed for pedestrian traffic. Flexible paving systems shall be installed with sand swept, hand tight joints.

Unit pavers shall be installed over asphalt or concrete base for pavement designed for vehicular traffic. Paving systems shall be installed with sand swept, hand tight joints.

Life Cycle Expectations

A 5 year minimum warranty is required.

Pavers are anticipated to be replaced after 40 years based on normal and ordinary use.

#237 Cambridge Modular Paver by Redland Brick

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Wood Chips and Mulches

Purpose

Loose wood chips and mulch materials shall be used for trail/path surfacing, erosion control and weed suppression.

General Information

The standard materials are double shredded hardwood and 1 inch-2 ½ inch sized wood chips.

Material shall have a containment edge or border when adjacent to manicured planted areas.

City supplied materials shall be acceptable based on the Standards requirements.

Materials and Finish

Wood shall be comprised of softwood or hardwoods.

Material shall be non-toxic. Chemicals, additives, recycled wood products, wood pallets or waste wood materials are not permitted.

Material shall be free of weed seeds, soil, leaves, bark, twigs, plastic, glass, metal, rock, or paper.

Color enhanced mulch shall not be acceptable.

Material created from recycled mulch shall not be acceptable.

Installation

Mulch shall be applied over non-woven geotextile filter fabric.

Prior to installation, existing subgrade shall be consistent in grade and free of weeds, trash and other debris.

Install mulch at 3 inches minimum continuous vertical loose depth.

Life Cycle Expectations

Mulch is anticipated to require replenishment annually based on normal and ordinary wear.

Wood chips

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