
A GUIDE TO

PLAYGROUND PLANNING



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SECTION 1 INTRODUCTION



Photo Courtesy of National Playground Safety Institute

A. PURPOSE

This guide provides information and assistance in the planning, design, installation, and maintenance of public playgrounds. The goal is to develop playgrounds that are fun, challenging, and safe. As part of a comprehensive planning process, this guide will assist local governmental agencies that have minimal or no permanent staff, as well as community groups with limited knowledge or experience in developing a public playground that meets the safety, developmental, and recreational needs of playground users.

Another reason for developing this guide is to help reduce the frequency and severity of injuries and lawsuits involving public playgrounds. Although the State of Illinois has been among the nation's leaders at providing compliant public playgrounds, and in certifying Playground Safety Inspectors through the National Playground Safety Institute since 1993, children are still being seriously injured on Illinois playgrounds.

The Illinois Department of Natural Resources (IDNR) supports comprehensive recreation and park master planning by every local government. A companion publication, [A Guide to Community Park & Recreation Planning](#)¹ has been developed by IDNR to assist local agencies in these efforts.

B. BACKGROUND

All children experience life and growth through a series of physical, emotional, intellectual, and social stages. Playgrounds provide an environment for learning and developing through the activity of play. A playground must allow children to develop progressively and test their skills and abilities by providing a series of graduated challenges. Since all playgrounds present different challenges, and children play in unintended and unanticipated ways, planning is critical in developing a safe playground.

C. KEY ISSUES

This guide uses a step-by-step approach for developing public playgrounds. There are four key issues that must be considered in every phase of the development process, including...

- Safety
- Age Appropriateness
- Maintenance
- Accessibility

1) Safety

Safety concerns and issues must be the highest priority throughout the playground planning and development process. According to the United States Consumer Product Safety Commission, nearly 70% of the more than 200,000 injuries associated with playground equipment each year result from falls to the underlying surface. To reduce the number of injuries due to falls, the installation of protective surfacing and the creation adequate play equipment use zones under and around playground equipment is essential.

The major causes of the 10-12 deaths that occur in public playgrounds each year are entanglement of clothing, strings, and ropes; falls to underlying surfaces; head entrapment in equipment openings; and impact by moving swings or by tipped / loose equipment. In a continuing five-year study to determine why playground injuries occur, most injuries were found to be the result of 1) user misuse or failure / lack of supervision (44%), 2) inadequate maintenance (40%), 3) inappropriate design (7%), and 4) installation issues / failure to follow plans and instructions (6%), and site planning issues (3%)². Many factors, including surfacing material, maintenance, appropriate design and layout, and proper installation should be considered when developing a public playground.

Despite the fact that there is no national playground safety law in this country, the courts have determined that two documents represent “the standard of care” for playground safety in the U.S. The first document is the Consumer Product Safety Commission (CPSC) Handbook for Public Playground Safety³ (current version), which is a Federal Guideline written for owners and users of public playgrounds. If not already available, the CPSC Handbook can be downloaded at no cost by accessing CPSC’s website at www.cpsc.gov. The second document is the American Society for Testing and Materials International (ASTM) Playground Safety Standard F1487 (current version), Standard Consumer Safety Performance Specification for Playground Equipment for Public Use⁴. Each of these documents should be utilized throughout the playground development process in order to develop playgrounds that comply with the national “standard of care”.

2) Age Appropriateness

In the playground planning process, it is important to determine the age of the playground users. Public playgrounds are generally intended for children between 2-12 years of age. Preschool (ages 2-5) and school age children (ages 5-12) differ dramatically not only in physical size and ability but also in their problem-solving and social skills. As a result, children aged 2-5 are not safe on equipment designed for children aged 5-12. The playground design process needs to address these differences by identifying equipment that is age appropriate in regard to the type, scale, and layout of equipment.

3) Maintenance

Maintenance must also be considered in all phases of the playground planning and development process. If proper design is the key to developing an effective playground, then routine and preventive maintenance is the key to keeping it that way. A comprehensive maintenance program must be developed for the playground. Generally, all equipment must be inspected frequently for hazards and other items that do not comply with the CPSC Handbook and ASTM F1487. The maintenance program should also incorporate a process to complete repairs identified during the inspection, as well as address custodial maintenance tasks such as the removal of broken glass or other litter and debris. Throughout this document a variety of maintenance checklists, procedures, and requirements will be presented.



Photo Courtesy of National Playground Safety Institute

4) Accessibility

The Americans with Disabilities Act (ADA) is a comprehensive law that took effect in January 1991. As a result of the ADA, access to recreation and play settings is now a guaranteed civil right for all Americans. Basically, the ADA is a national law that requires all newly developed and altered playgrounds to be accessible to persons with disabilities. The Architectural and Transportation Compliance Board (Access Board) has recently developed rules and regulations for determining what is to be accessible and how to achieve accessibility, that address the technical requirements for accessible routes, elevated and ground level play components, ramps and transfer stations, and surfacing. An overview of the Access Board rules and regulations regarding playgrounds is attached in Appendix A.⁵

All children have a need to play, and diverse play opportunities are a key to both a quality play experience and the integration of all children. An accessible play experience provides diversity in both the physical and social environment and an opportunity to the child to make choices, take on challenges, learn, and have fun.

By definition, an accessible playground is an area that, when viewed in its entirety may be approached and entered and provides a range of play opportunities or experiences to users of varying abilities. It is important to note that the definition does not necessarily mean that every feature in the play area or every piece of equipment must be accessible. When viewing the entire play area, a combination of play opportunities, surfacing, and other features should provide an opportunity for children of varying abilities to be physically challenged and to socially interact with other children on the playground.

Another consideration is the requirement that the surfacing material be accessible to children and adults of varying abilities. The Access Board advises that an accessible surface comply with ASTM Standard F1951, Method to Test Accessibility of Safety Surfacing for Playgrounds⁶ that requires a play area surface to be firm, stable, and slip-resistant. Accessible surfacing also must be impact absorbing and meet the surfacing requirements of ASTM F1292⁷ within the play equipment use zone. If engineered wood fiber, a loose-fill surfacing material that is considered accessible by the Access Board if properly maintained, is used, it must comply with ASTM Standard F2075, Standard Specification for Engineered Wood Fiber for Use as a Playground Safety Surface Under and Around Playground Equipment⁸.

SECTION 2 DEFINITIONS AND TERMINOLOGY

A. DEFINITIONS AND TERMINOLOGY

Both ASTM F1487 and the CPSC Handbook contain playground safety related terms and definitions. The following terms and definitions are used in this guide.

Accessible Playground - A playground area that, when viewed in its entirety, may be approached and entered, and provides a range of play opportunities or experiences to users of varying abilities.

Accessible Route - A continuous, unobstructed pathway from the use zone perimeter to the equipment.

Composite Structure - Two or more play structures attached or functionally linked, to create one integral unit that provides more than one play activity (e.g., combination climber, slide, and horizontal ladder).

Designated Play Surface - Any elevated surface for standing, walking, sitting, or climbing; or a flat surface larger than 2 inches wide by 2 inches long having less than 30° angle from horizontal.

Engineered Wood Fiber – Processed wood that is ground to a fibrous consistency, randomly sized, approximately 10 times longer than wide with a maximum length of 2 inches, free of hazardous substances, and meets the criteria of ASTM F2075.

Entanglement – A condition in which the user's clothes or something around the user's neck becomes caught or entwined on a component of playground equipment.

Entrapment – Any condition that impedes the withdrawal of a body or body part that has penetrated an opening.

Fall Height - The vertical distance between a designated play surface and the protective surfacing beneath it.

Loose-Fill Surfacing Material – A material used for protective surfacing in the use zone that consists of loose particles such as sand, gravel, wood fibers, or shredded rubber.

Preschool-Age Children - Children from 2 years of age to not more than 5 years of age.

Preventative Maintenance - A planned program of inspections and maintenance intended to keep equipment and surfacing material functioning properly and to forestall equipment failures.

Protective Surfacing - Material(s) to be used within the use zone of any playground equipment. (*Note: All protective surfacing must meet the minimum impact absorbing requirements of ASTM F1292.*)

Public Use Playground Equipment - A play structure anchored to the ground or not intended to be moved, for use in play areas of schools, parks, child-care facilities, institutions, multiple family dwellings, private resorts and recreation developments, restaurants, and other areas of public use.

School-Age Children - Children over 5 years of age but not more than 12 years of age.

Unitary Surfacing Material – A manufactured material used for protective surfacing in the use zone that may be rubber tiles, mats, or a combination of rubber-like materials held in place by a binder that may be poured in place at the playground site and cures to form a unitary shock-absorbing surface.

Use Zone - The area beneath and immediately adjacent to a play structure or equipment that is designated for unrestricted circulation around the equipment and on whose surface it is predicted that a user would land when falling from or exiting the equipment.

SECTION 3 PLANNING CONSIDERATIONS

Planning should be the primary focus when initiating a playground construction project. This section describes important considerations to be addressed during the planning process. A Project Team is recommended when planning a playground. The mixture of ideas and backgrounds generated by the team greatly enhance the planning process. A typical team may include representatives from... the owner, planning or engineering department, maintenance staff, neighborhood or school groups, a playground equipment manufacturer, and playground users.

A. INFORMATION GATHERING

Information pertinent to the playground project may be obtained from many sources, including existing files and records, public hearings, surveys, children's classroom projects, staff recommendations, and professional consultants.

B. BUDGET

The first step in the playground planning process frequently involves the determination of a budget or a maximum budget number for the project. Ideally, the playground should be designed to address the needs and wants of the potential users without regard to a particular budget. The playground development costs should then be compared to the project budget. If development costs exceed the budget, it is almost always better to devise a plan to phase in the project over a period of several years rather than reducing the scope of the playground.

When determining a project budget, it is most effective to make decisions based on the life cycle costs of the playground. Life cycle costing involves looking at all costs that may be incurred for the playground over its effective life, including not only the expense to design, purchase, and install the equipment, but also the costs to inspect, maintain, and repair both equipment and surfacing, as well as other factors. The type of surfacing material, in particular, may have a tremendous impact on the cost of the playground over its life cycle. Surfacing will be discussed in greater detail in Section 5 - Design.

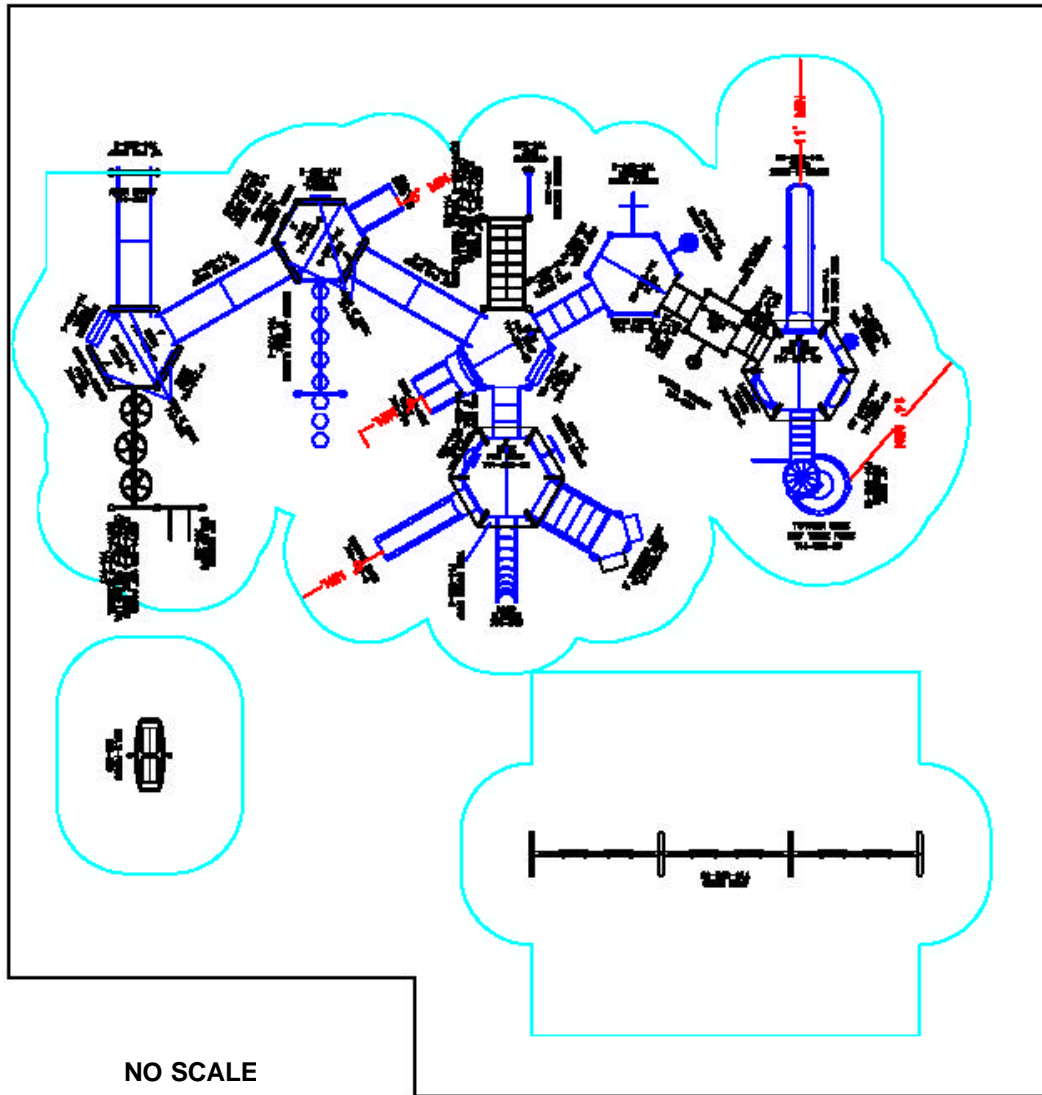
C. DEVELOPMENT COSTS

Development costs associated with any project vary widely across the state and by region. Three examples of playground development costs are provided (See Figure 1A, 1B, and 1C). A typical playground development project should include costs for:

- Equipment
- Surfacing
- Containment Border
- Installation
- Site Work (drainage)
- Utilities
- Shipping
- Accessible Routes
- Site Amenities
- Design Services / Engineering

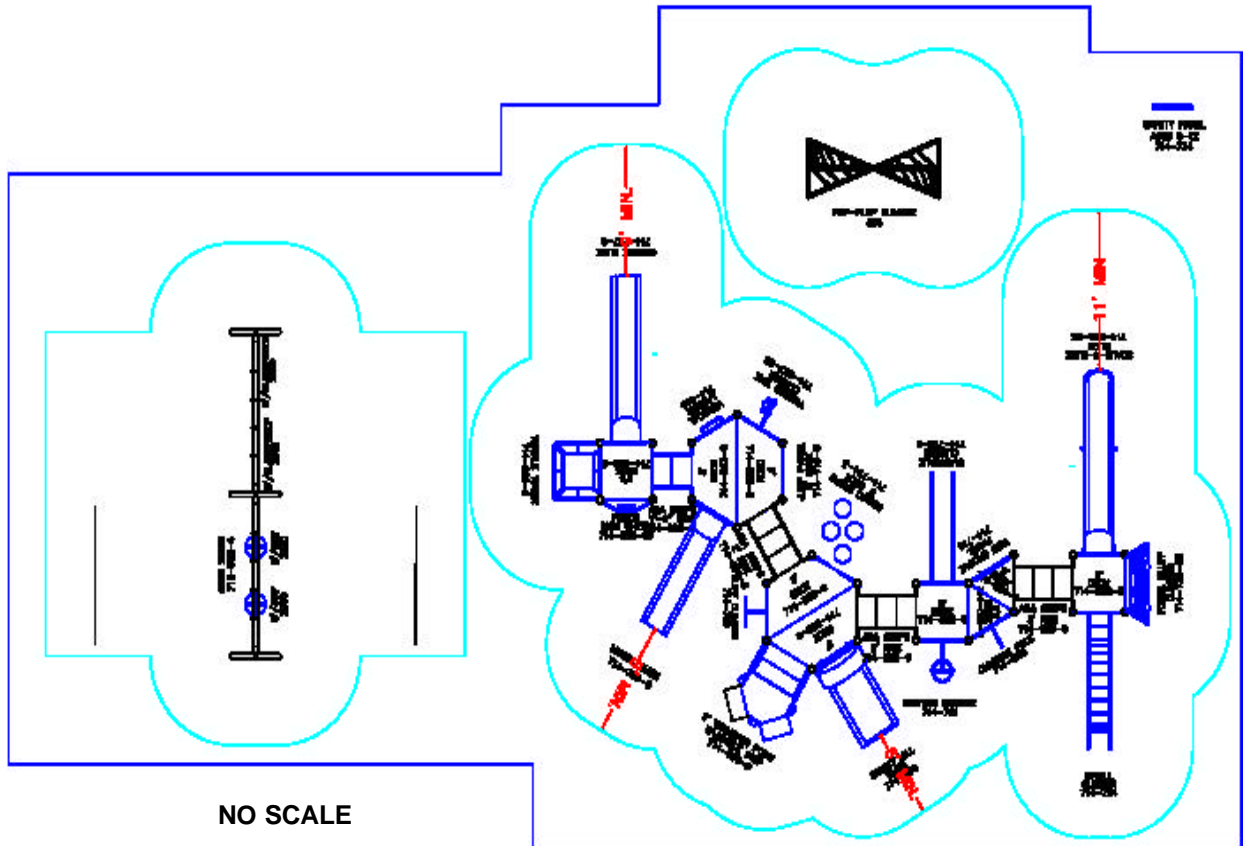
It should be noted that site amenities are important but can be costly additions to the playground project. Important site amenities to consider include water fountains, litter receptacles, benches, tables, security lighting, signage, fencing, landscaping, parking facilities, bicycle racks and restrooms.

FIGURE 1A
TYPICAL PLAYGROUND DEVELOPMENT COSTS
 Drawing and Cost Estimates Courtesy of Park and Recreation Supply Inc.



PLAYGROUND 1	
Surface Area: 8,460 square feet	Border Length: 380 linear feet
ITEM	ESTIMATED COST
Playground Equipment	\$81,856
Installation	\$32,743
Excavation	\$8,460
Surfacing - 12" engineered wood fiber over 4" of gravel	\$16,920
Border (Alt. 1) - 6" x 6" timbers stacked 3 high	\$6,840
Border (Alt. 2) - 6" x 18" concrete curb	\$8,360
Total Installed Cost (Wood Borders)	\$146,819
Total Installed Cost (Concrete Borders)	\$148,339

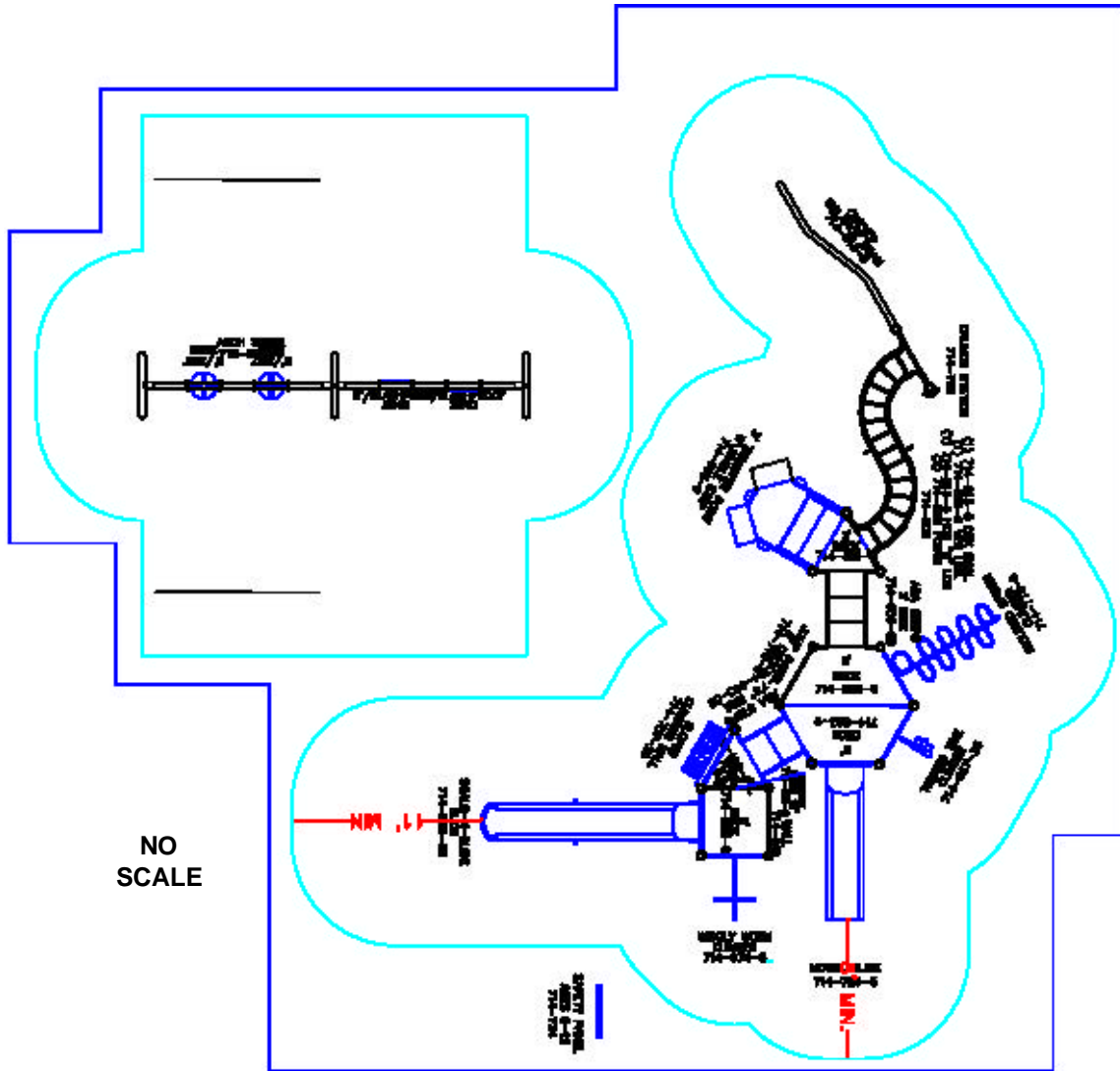
FIGURE 1B
TYPICAL PLAYGROUND DEVELOPMENT COSTS
 Drawing and Cost Estimates Courtesy of Park and Recreation Supply Inc.



NO SCALE

PLAYGROUND 2	
Surface Area: 4,763 square feet	Border Length: 306 linear feet
ITEM	ESTIMATED COST
Playground Equipment	\$36,512
Installation	\$14,605
Excavation	\$4,763
Surfacing - 12" engineered wood fiber over 4" of gravel	\$9,526
Border (Alt. 1) - 6" x 6" timbers stacked 3 high	\$5,508
Border (Alt. 2) - 6" x 18" concrete curb	\$6,732
Total Installed Cost (Wood Borders)	\$70,914
Total Installed Cost (Concrete Borders)	\$72,138

FIGURE 1C
TYPICAL PLAYGROUND DEVELOPMENT COSTS
 Drawing and Cost Estimates Courtesy of Park and Recreation Supply Inc.

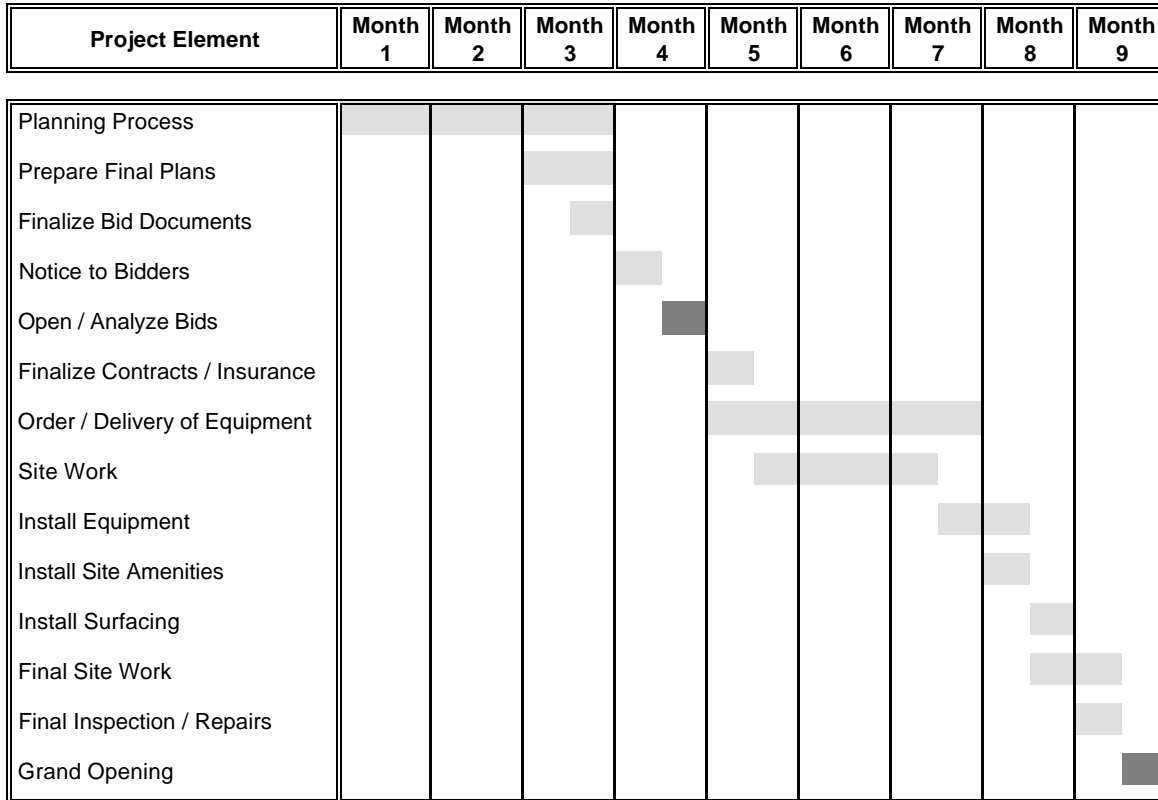


PLAYGROUND 3	
Surface Area: 3,492 square feet	Border Length: 259 linear feet
ITEM	ESTIMATED COST
Playground Equipment	\$20,306
Installation	\$8,123
Excavation	\$3,492
Surfacing - 12" engineered wood fiber over 4" of gravel	\$6,984
Border (Alt. 1) - 6" x 6" timbers stacked 3 high	\$4,662
Border (Alt. 2) - 6" x 18" concrete curb	\$5,698
Total Installed Cost (Wood Borders)	\$43,567
Total Installed Cost (Concrete Borders)	\$44,603

D. PROJECT TIMELINE

Chart A details a typical timeline for a playground development project. It is important to note that factors such as weather, equipment production and delivery difficulties, or site problems can affect this schedule. The initial schedule may need to be modified to reflect changing conditions. Many times it is best to develop a timeline working in reverse from the playground grand opening.

**CHART A
SAMPLE PROJECT TIMELINE**



E. MAINTENANCE

One of the most critical considerations of the playground planning process involves maintenance of the new playground. Regular and continuous inspections and maintenance are required to keep the new playground functional, safe, and attractive and in compliance with the CPSC Handbook and ASTM F1487. Vandalism, weathering, heavy use, and other factors have a tremendous impact over the life of the playground. A comprehensive maintenance program must include regular inspections, a procedure for repairing components that break, wear out, or are vandalized, raking or sweeping of the surface, and custodial tasks such as removal of litter and glass. In addition, annual playground renovation elements may include adding surfacing material, painting equipment, and completing major repairs. A good rule of thumb for developing a playground is "If you can't maintain it...don't build it!"

During the planning process, it is important to recognize that some playground designs translate into higher maintenance costs than other designs. For example, a wood playground structure will require more maintenance over its life than a metal structure. Similarly, loose-fill surfacing materials (engineered wood mulch, sand, gravel) will require considerably more maintenance than unitary surfacing materials (rubber mats, poured-in-place rubber or composite surfacing) over the life of the playground. The Project Team needs to factor in future maintenance costs when looking at the life cycle costs of the playground.

F. PRELIMINARY PLANNING CHECKLIST

- Establish a Project Team
- Gather pertinent information
- Develop a tentative budget and funding sources
- Begin developing estimated life-cycle development costs
- Create a tentative project timeline with start and finish dates
- Consider inspection, maintenance, repair, and other lifecycle costs

SECTION 4 SITE ANALYSIS

Site analysis involves the gathering of relevant information and data about the play area site and adjacent properties. The purpose of site analysis is to "find a place for a particular use or find a use for a particular place."⁹ This section describes the natural, man-made, and aesthetic elements that should be considered before developing a playground, and where the data can be found.

A. SOURCES OF DATA AND INFORMATION

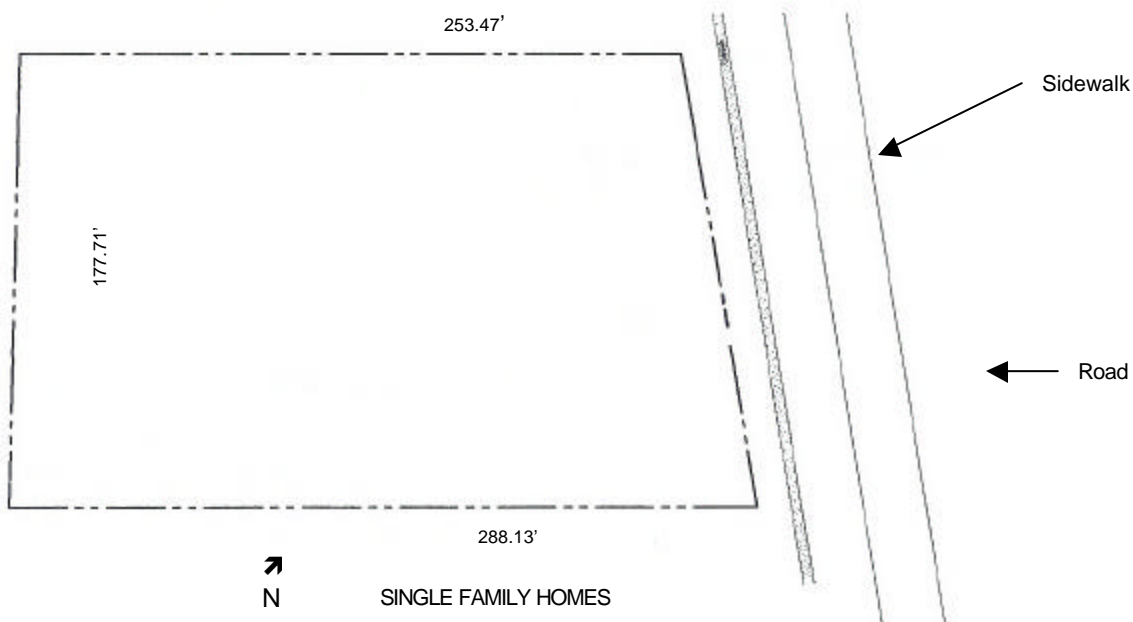
There are a wide variety of sources available to the Project Team, however, personal inspections of the site are essential, and a good place to start the information gathering process. Personal site visits enable the Project Team to see how the area is used and how it relates to surrounding land uses. A site visit should be completed even if the members of the Project Team are familiar with the area.

Other sources of information about the site include topographic maps, aerial photos, and photographs. Topographic maps are particularly useful because they include contour lines that identify slopes, drainage patterns, and other useful site-related information.

A scaled base map, showing existing boundaries, easements, roads, buildings and other man-made objects is essential. This map can then be used as a base on which site inventory information can be drawn including soil types, topography, drainage patterns or structures, views, and other data pertaining to the site (see Figure 2). Depending on the complexity of the site, multiple drawings may be necessary. If not already in the agency files, this information can often be found on the original plat of survey.

While gathering information, it is important to check local building codes and legal requirements of other public agencies that may have ownership, planning, or zoning authority over the site.

**FIGURE 2
SAMPLE BASE MAP**



B. SITE INVENTORY

The site inventory addresses those natural, man-made, and aesthetic elements that may affect the playground (See Figure 3). Characteristics of the site and adjacent properties should be included. The focus of the site inventory should be to consider the effect of the site and surroundings on the playground, and to consider the effect of the playground on the site and surroundings.

The key to this part of the process is to gather relevant data and information on those elements that will be impacted by or will impact on the playground. As an example, it may be more important to gather information about drainage and traffic patterns rather than geologic features and wildlife habitat. The Project Team should continually ask... Why? What is the purpose of gathering this data? How does it effect the playground development? If the answers to these questions are not obvious, the Project Team should probably move on to another information-gathering area. Site inventory considerations that should be addressed include environmental elements, man-made elements, hazardous conditions, and appearance.

1) Environmental Elements

Environmental elements that should be considered include soils, geology, drainage, topography, vegetation and any other physical characteristics that may have an impact on the playground development process. A brief description of each element follows:

a) Soils and Geology. Soil type is an important environmental consideration because it is directly related to drainage. The playground must be constructed on well-drained soils. Installation on heavy clay, peat, or bedrock will almost certainly lead to future drainage problems. Try to avoid areas in which water stands or ponds after rainfall. Compacted or eroded areas may also be a sign the soil type is inappropriate for playground development. Soil surveys for most counties are available from your local Agricultural Extension office.

b) Drainage. Proper drainage is one of the most critical factors in the development of a safe and successful playground. In general, water should drain away from the playground. Most playgrounds will hold water without proper drainage. If rainfall does not flow naturally away from the playground, additional grading or underground drainage lines may be necessary.

If the playground site is near a river, stream or other body of water, a floodplain map should be consulted to ensure that the playground is not in a floodplain. Floodplain maps may be obtained from by the Federal Emergency Management Agency (FEMA)¹⁰ or from your local planning agency. Check with the appropriate public agency to determine whether stormwater storage (detention or retention basin) is required for the project.

c) Topography. Playground developments work best within a narrow range of slopes. As a general rule, slopes around and beneath playgrounds should conform to the following guidelines:

- Slopes between 1-4% are most suitable for playgrounds (a 1% slope rises 1 foot for every 100 linear feet).
- Slopes less than 1% may result in drainage problems.
- Slopes greater than 4% may require site modifications to install and level the equipment and playground surfacing.

In order to provide playground access for everyone, regardless of physical capabilities, the accessible route into the playground must have a maximum slope of 5% (1 foot of rise for every 20 linear feet) and a maximum cross slope of 2%. On the other hand, providing some slope and change in topography adds to the appeal of the playground.

d) Vegetation. Shade is an essential ingredient for every playground. On hot and sunny days, shade can reduce the temperature within a playground by 15°. In the Midwest, trees should be present on the south and west sides of the playground to create shade during the heat of the day. For most tree species, a minimum of 10 years is required before even a moderate amount of shade can be generated. If mature trees are not available, it may be necessary to provide artificial shade. Many playground equipment manufacturers now include colorful, man-made shade shelters in their catalogs. If the playground is to be constructed in a shade-free area, the cost of shade shelters should be built into the project budget.

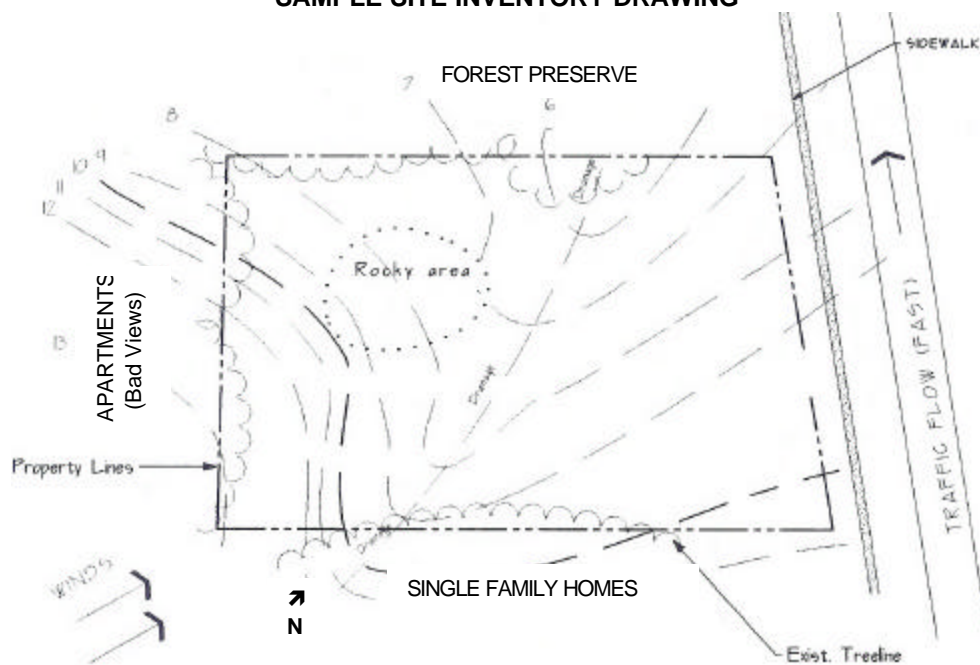
While trees are desirable for shade, avoid planting where overhanging limbs may interfere with play activity. In particular, trees planted inside the playground must be carefully located because they will be used for climbing. ASTM F1487 requires that tree branches and other overhead objects be located a minimum of 84" from the nearest piece of playground equipment.

Avoid choosing tree and shrub species that are hazardous, toxic¹¹ or messy. For example, hawthorn, thorny locust, or fruit-bearing crabapple trees should not be located near playgrounds. Careful placing of vegetation can also minimize the amount of leaves, litter, and debris that must be regularly cleaned out of the playground.

e) Other Environmental Considerations. The direction of the sun is a particular concern when developing a playground. Surfaces such as slide beds and platforms that absorb heat from the sun should be installed facing north or east wherever practical. If a north /east layout is not possible, natural or man-made shade should be considered.

The direction of the prevailing winds (typically from the southwest in the Midwest) should also be determined. The playground should not be located downwind from baseball infields, farm fields, or other bare areas from which the wind is likely to blow dust. If there are no other site options, every effort should be made to reduce the negative environmental impact.

**FIGURE 3
SAMPLE SITE INVENTORY DRAWING**



2) Man-Made Elements

Man-made elements to be considered include utilities, roads, buildings, adjacent land use, accessibility and transportation patterns, or anything else that could affect or be affected by the playground.

As a general rule, a playground should not be developed over or under utility lines. However, it may be advantageous for certain utility lines to be located close to the playground (i.e. water lines for drinking fountains, drainage lines, electrical lines if electricity is required). Utility easements should also be identified. Such easements generally give the utility company the right to install and maintain lines as necessary, and occasionally may disrupt the operation of the facility. If possible, overhead power distribution lines should be buried to improve site appearance and safety.

Buildings, structures and other man-made features should also be located and shown on the scaled drawing. Building uses, access routes and patterns, parking areas and other elements should be noted to determine whether they will impact or be impacted by the playground development.

Neighboring land uses need to be considered because they may affect or be affected by the playground - as a source of noise, traffic, access, streams or waterways, drainage, hazardous conditions, and visual pollution. An analysis of existing transportation patterns also may help the Project Team determine how users will get to the proposed site, where they will park, and highlight any safety concerns.

3) Hazardous Conditions

There are a variety of hazardous conditions that must be considered before finalizing a playground location. Visibility and security of the user is a primary consideration. Large shrubs should not be planted around a playground, and low tree branches (below a height of 7 feet) should be removed to prevent climbing. Overhanging tree and shrubs are potentially hazardous if they conflict with playground activities. Branches can poke children in the eye, and tree climbing can become a problem if not controlled.

The playground should not be situated too closely to streets, highways, parking lots and other sources of traffic, nor should children be required to cross busy or unprotected streets and roadways to reach a playground. Railroad tracks are a similar hazard. Fencing or natural barriers may be necessary if alternative solutions are not feasible.

Ponds, streams, and drainage ditches attract children and can also be a safety concern. Signs alone are not effective in keeping smaller children who cannot read away from the water. While fencing or other barriers may be an alternative, it is important to note that it is virtually impossible to keep children out of the water if they want to be in it. Barriers should be constructed so that children cannot inadvertently fall into a stream or pond, tumble down a steep slope, or get into patches of toxic vegetation such as poison ivy.

Conflicts with other types of recreational uses can also produce hazardous conditions. A baseball diamond or golf course located too close to a playground is a safety concern because of foul balls and errant shots that may injure playground users. Locating a playground adjacent to basketball courts, active play fields, and similar recreation facilities can also create conflicting access patterns and uses.

4) Appearance

Although appearance and attractiveness are subjective concepts, there are numerous aesthetic elements that should be considered when designing a playground, including color, texture, size, and scale.

Play equipment is currently available in both earth tones and an assortment of bright colors. The selection of bright colors for playground equipment is a more important factor for preschool children than for older children. Preschool children seem to prefer red, orange, yellow, and blue colors. Although bright colors may conflict with the natural setting of many parks, one of the purposes of playground equipment is to enable children to have stimulating and fun experiences. A playground composed of various bright colors may still fit into the site aesthetically through the thoughtful use of landscaping.

Size and scale of the playground are also important. The size and amount of equipment should be proportionate to the area available for the playground and other recreation facilities planned for the site. Avoid locating the playground where it may block a desirable view.

Sources of noise such as airports, railroad lines, roadways, heavy machinery and factories can also detract from the recreational experiences of playground users, and noise from playground users can also be a concern to adjacent property owners. If a playground must be located adjacent to residential property, the strategic and thoughtful placement of trees and shrubs may help to minimize the noise impact. Odors from factories, sewage treatment facilities, and stagnant ponds can have the same effect. Locating a playground adjacent to such detractors should be avoided.



Photo Courtesy of National Playground Safety Institute

C. SITE ANALYSIS CHECKLIST

- Review information sources
 - Topographic maps, aerial photos, zoning maps
 - County plat maps, photographs
- Locate or develop base map for playground site
- Check building codes and zoning requirements
- Inventory drainage elements
- Consult FEMA Floodplain Map to ensure site is out of floodplain
- Review local stormwater storage requirements
- Inventory topographic elements
 - Slopes between 1-4%
 - Slopes less than 1%
 - Slopes greater than 4%
- Inventory and locate all trees and shrubs
- Develop scaled site inventory plan of proposed playground site
- Analyze man-made elements
 - Utilities
 - Buildings and structures
 - Adjacent land uses
 - Existing transportation patterns
- Analyze aesthetics
 - Color, size and scale
 - Distractions such as noise, odors
- Identify potentially hazardous conditions (if any)
 - Streets and parking lots
 - Railroads
 - Ponds, streams, and drainage ditches
 - Use conflicts
 - Overhanging trees and branches
 - Visibility and security
- Complete scaled site analysis plan using all information outlined above

SECTION 5 DESIGN

A. PRELIMINARY DESIGN

Design is an extension of the site analysis and planning processes and combines all the information into a comprehensive scheme that provides alternative solutions. These issues are continually evaluated during the final design process until the best overall solution is found. Ideally, the Project Team will utilize the features of the site to enhance the recreational experience, minimize maintenance, and provide a playground that is accessible, safe, challenging, and fun.

1) Evaluation of Existing Equipment

The first step in the design process is to evaluate existing playground equipment for compliance with the CPSC Handbook and ASTM F1487. Occasionally, a piece of older play equipment can be modified to bring it into compliance. However, any modification must be permanent and approved in writing by the manufacturer in order to maintain the manufacturer's product warranty and liability coverage. If the manufacturer will not approve the modification, the removal of the piece in question may be necessary.

The remainder of this section assumes that all existing equipment has been removed or repaired and complies with all appropriate safety guidelines, including proper use zones and protective surfacing.

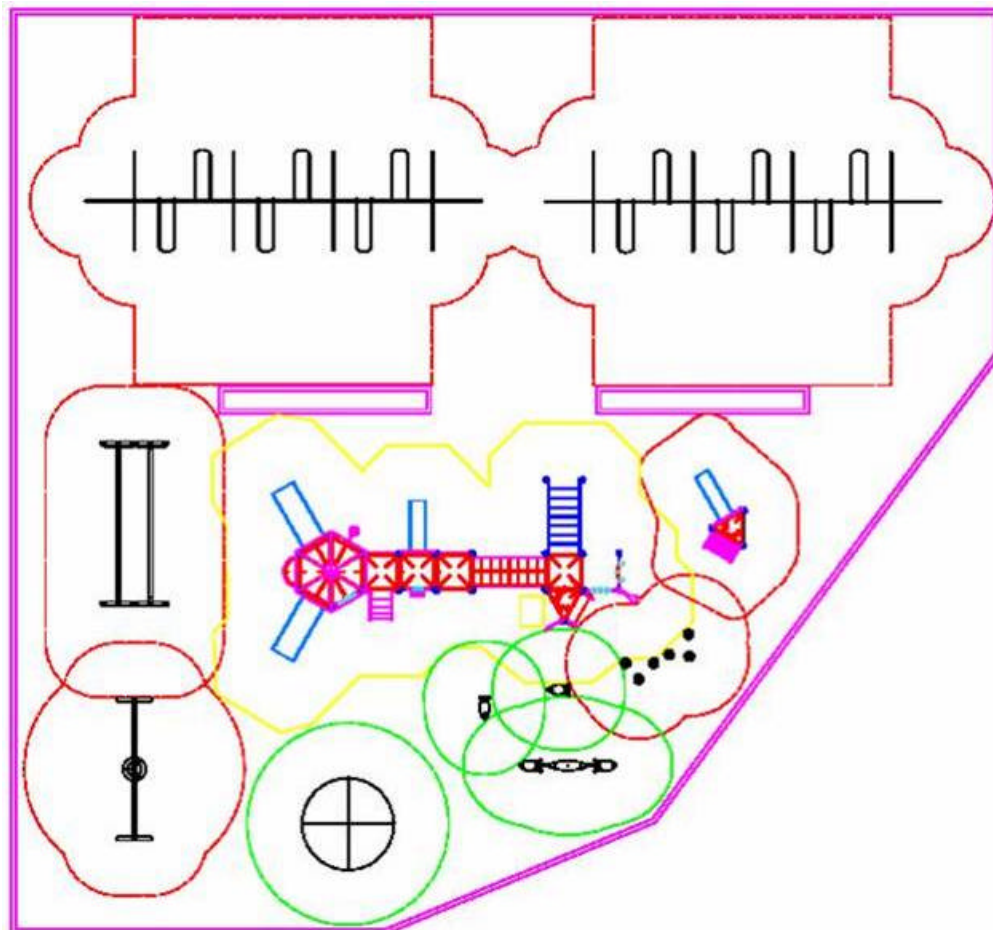
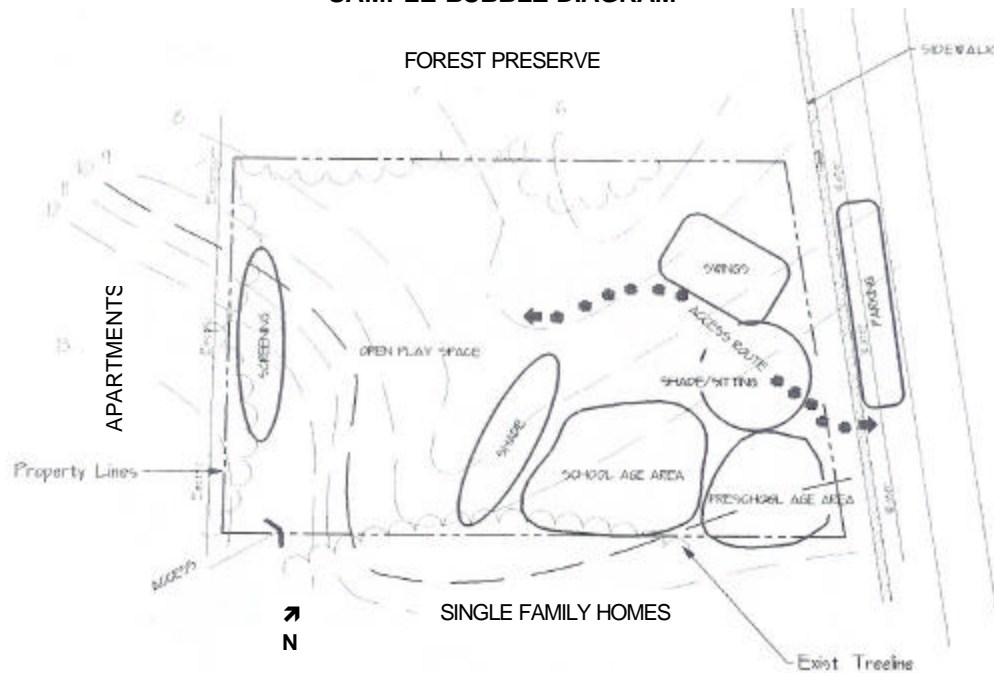


Photo Courtesy of National Playground Safety Institute

2) Layout of Equipment

General layout of the playground begins with the information from the site analysis described in Section 4. Start by using a scaled site analysis plan (1" = 10'-0" as an example) showing in bubble format the shape of the playground and the location of walks and access points (see Figure 4). These bubbles show how the pieces fit together, and where use conflicts may exist. Take advantage of natural features shown in the site analysis such as tree lines and hills. Try to eliminate any proposed or existing physical or visibility barriers that may affect supervision from inside and outside the playground perimeter.

FIGURE 4
SAMPLE BUBBLE DIAGRAM



The next step is to place equipment by type and purpose. Separate areas should be provided for preschool children (aged 25) and school age children (aged 512). The CPSC Handbook recommends age separation of equipment because of the different skill levels and physical abilities of the two age groups, and that all equipment within a specific age-related play area should be appropriate for that age group. Equipment that is not recommended for pre-school children aged 25 by the CPSC (Handbook Section 6.3, page 8) is as follows...

- Chain or Cable Walks
- Free Standing Arch Climbers
- Fulcrum Seesaws
- Log Rolls
- Long Spiral Slides (> 1 turn or 360°)
- Free Standing Flexible Climbing Components
- Overhead Rings
- Parallel Bars
- Swinging Gates
- Track Rides
- Vertical Sliding Poles

In addition, moving equipment such as swings and merry-go-rounds should be located away from other structures at the edge of the playground out of anticipated circulation patterns. Organizing equipment by type and purpose also helps to prevent user conflicts and accidents.

User input, obtained during the information gathering process described in Section 3 should provide information regarding the number of children that may be expected to use the playground. There are no rules for how many children will "fit" onto a playground, but manufacturers can provide estimates.

As outlined in the CPSC Handbook and ASTM F1487, individual pieces of playground equipment may have different spacing requirements. In particular, the **use zone** may vary depending upon the type of equipment. The use zone is the area under and around the equipment where protective surfacing is required (see Section 2 – Definitions). Other than the equipment itself, the use zone should be free of obstacles that children could run into or fall on top of and thus be injured.

For stationary equipment, the use zone should extend a minimum of 6 feet in all directions from the perimeter of the equipment. The use zones of two stationary pieces of equipment that are positioned adjacent to one another may overlap if the adjacent designated play surfaces of each structure are no more than 30 inches above the protective surfacing (i.e. they may be located a minimum distance of 6 feet apart) (see Figure 5A). If adjacent designated play surfaces on either structure exceed a height of 30 inches, the minimum distance between the structures should be 9 feet. It is important to note that these use zone requirements are minimum dimensions. In heavy use areas or busy circulation areas, it is perfectly acceptable to increase the use zone dimensions in order to add an extra margin of safety.

Within the playground, there are five situations where overlapping of use zones is prohibited, as follows:

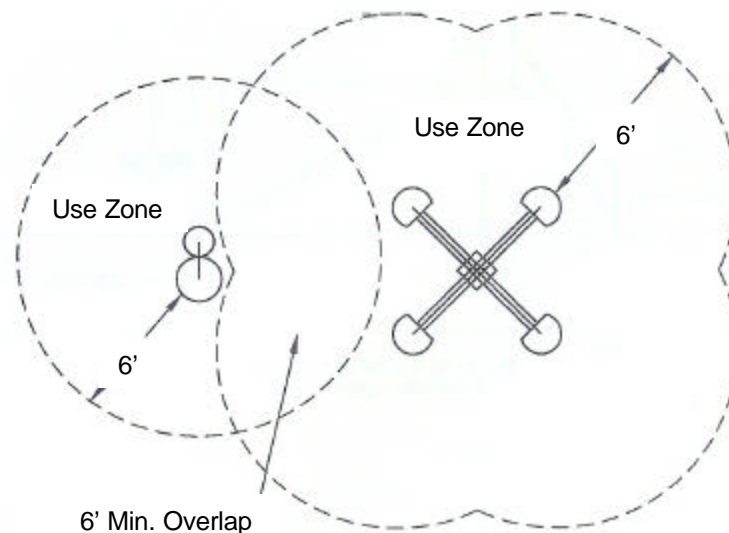
- The area around the perimeter of spring / rocking equipment intended for standing (see Figure 5B).
- The area in front of the exit region of a slide (see Figure 5C).
- The area to the front and rear of single-axis swings (see Figure 5D).
- The motion area of rotating swings in all directions (see Figure 5E).
- The area around the perimeter of a merry-go-round (see Figure 5F).

Both the CPSC Handbook (Section 5) and ASTM F1487 (Section 9) further address use zone requirements for all types of play equipment. Check these documents, or with your playground equipment manufacturer's representative, for information about specific pieces of equipment.

FIGURE 5 SPACING REQUIREMENTS

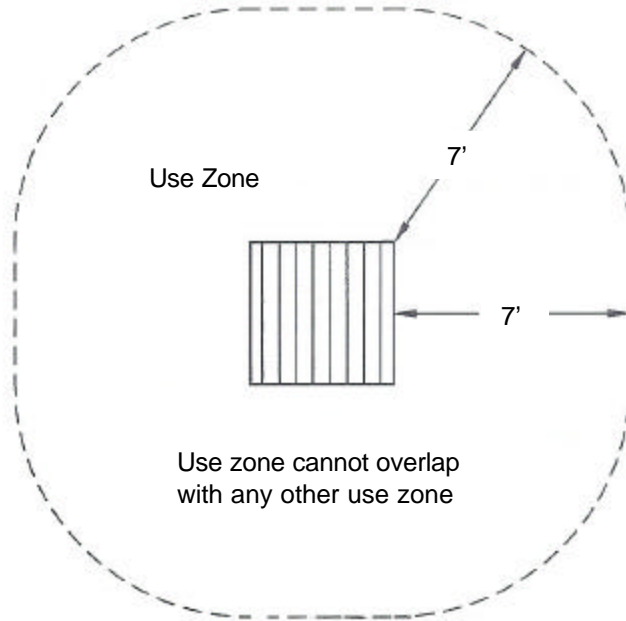
5A – Springing / Rocking Equipment Intended for Sitting

Use zones for Springing / Rocking Equipment must be a minimum of 6 feet. The use zones may completely overlap with a minimum of 6' between the components if the sitting platform of both components is no higher than 30".



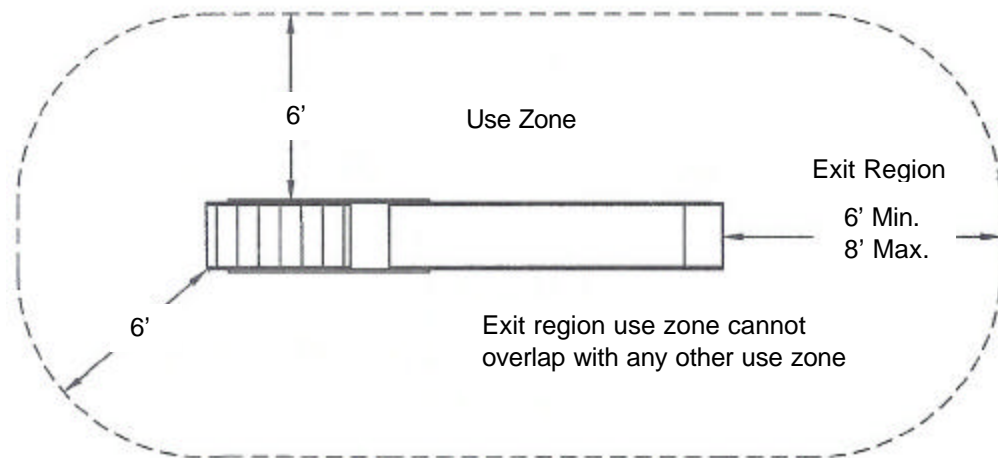
5B –Standing / Rocking Equipment Intended for Standing

Nothing may overlap the use zone extending a minimum of 7 feet from the perimeter of spring / rocking equipment intended for standing.



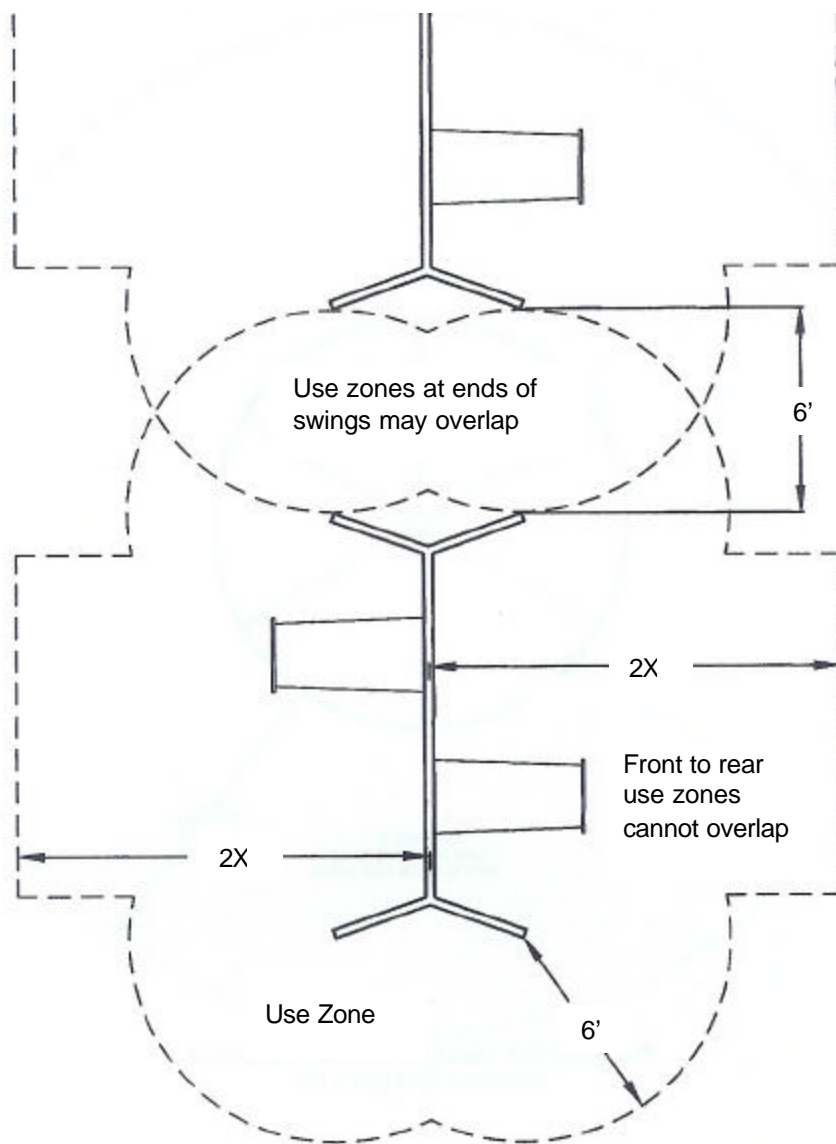
5C - Slides

The use zone around the rear and sides of slides is treated the same as other stationary equipment, and is a minimum of 6 feet. The use zone at the exit region of a slide is a minimum of 6 feet and a maximum of 8 feet depending on the height of the slide.



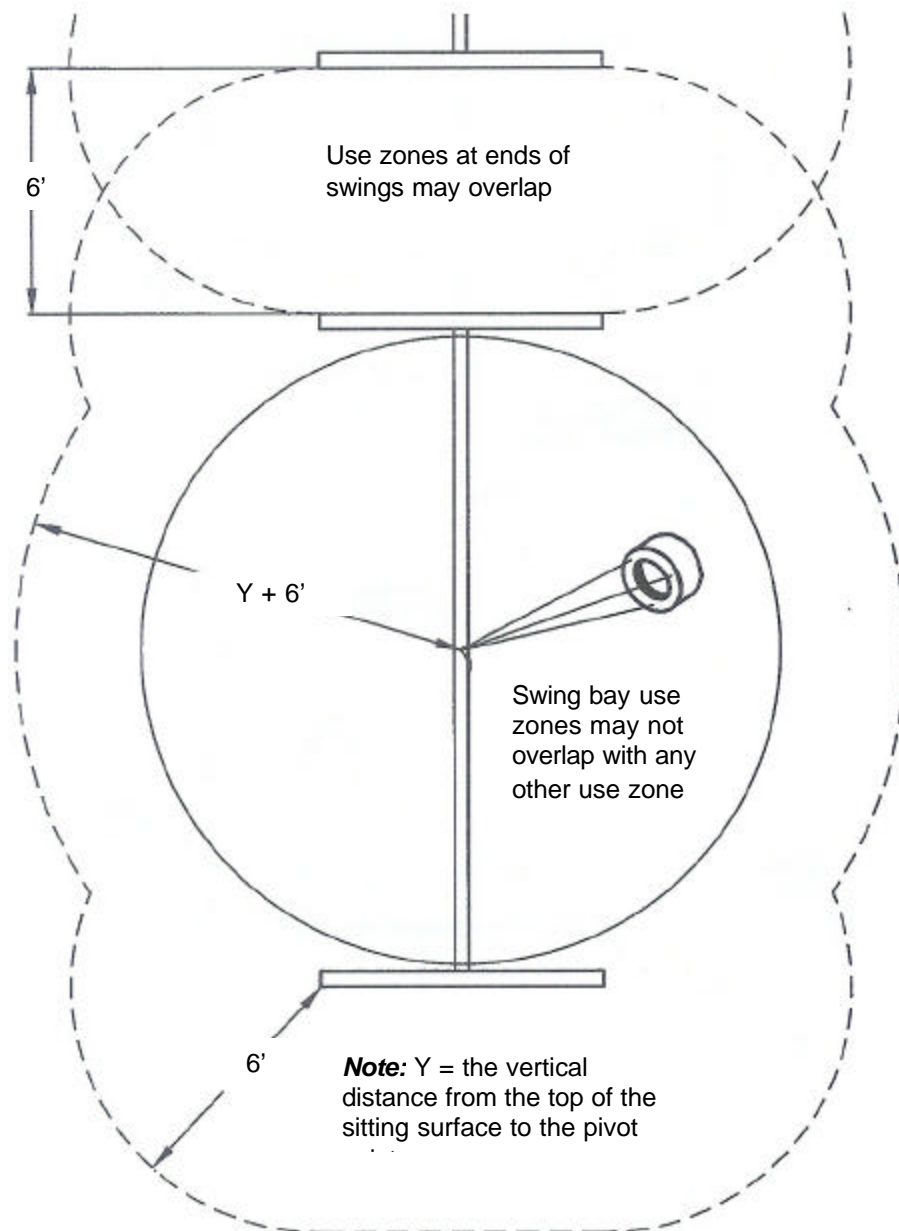
5D – Single-Axis Swings (To-Fro or Belt Swings)

The use zones of the swing support structure may overlap with other swing support structures and with other equipment. Nothing may overlap the use zone within the swing's to-fro area extending a minimum of 2X to the front and rear (where X = the vertical distance between the pivot point of the swing to the protective surfacing).



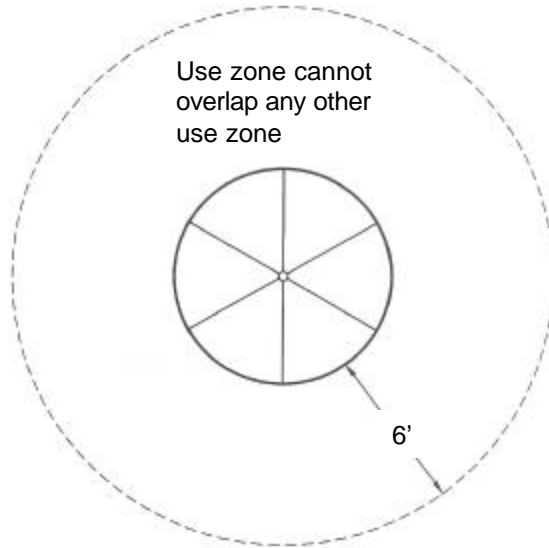
5E – Multi-Axis Swings (Tire Swings)

Multi-Axis (Rotating) Swings - The use zones of the swing support structure may overlap with other swing support structures and with other equipment. Nothing may overlap the use zone extending a minimum of $Y + 6$ feet (where Y = the vertical distance between the pivot point of the swing and the top of the swing seat) in all directions.



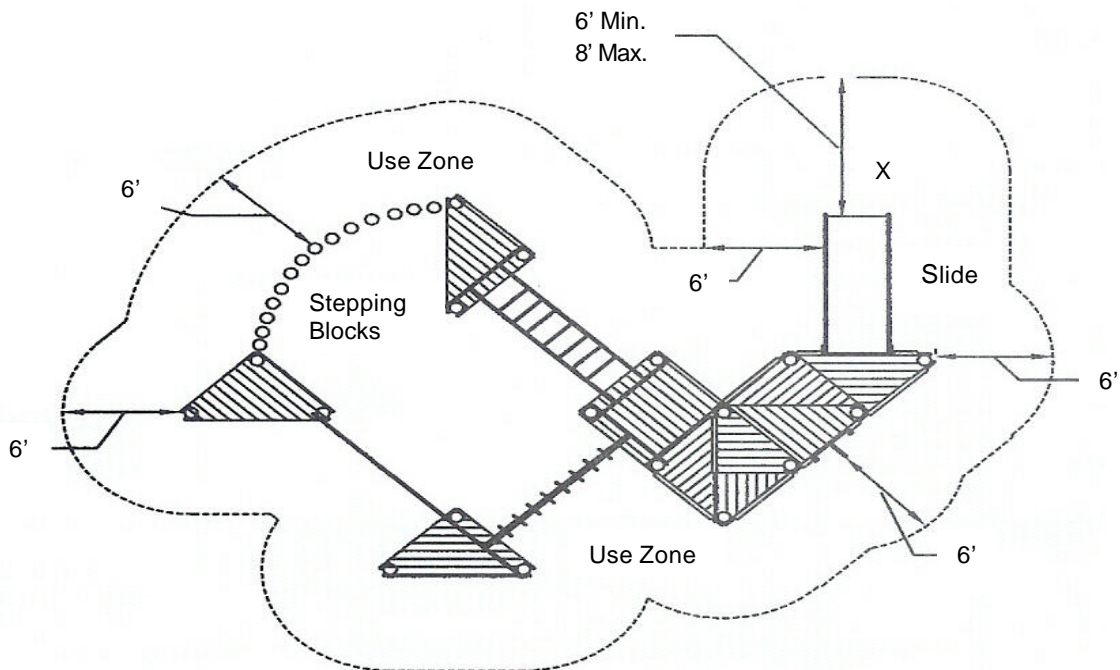
5F – Rotating Equipment

Nothing may overlap with the use zone extending a minimum of 6 feet beyond the perimeter of a merry-go-round platform.



5G – Composite Structures

The composite structure use zone is composed of those use zones that have been established for each individual play structure that, when joined together, form the composite structure. Except where prohibited in the 5 situations listed above, composite structures may overlap with other freestanding equipment. Most manufacturers will provide guidance and recommendations for composite playgrounds, and should review and sign-off on all playground designs and layouts for their equipment.



3) Access and Circulation

a) Access To and Through the Playground. As an accessibility requirement, all new and altered playgrounds must be located along an accessible route beginning at the perimeter of the park or parking lot. In accordance with the Americans With Disabilities Act Accessibility Guidelines for Buildings and Facilities; Play Areas (ADAAG)¹², each accessible route must comply with the following requirements:

- The accessible route is a minimum of 60 inches wide with a maximum slope of 5% (1 foot of rise for each 20 feet of run), and a maximum cross-slope of 2%.
- The accessible route complies with ASTM F1951 and is firm, stable, and slip resistant.
- Within the playground use zone, the accessible route meets the safety surfacing requirements of the ASTM F1292. If engineered wood fiber is used as the safety surfacing, the material must also meet the requirements of ASTM F2075.
- Any parking lot serving the play area complies with the Americans With Disabilities Act Accessibility Guidelines (ADAAG) requirements.
- If site amenities, such as picnic tables, drinking fountains, and litter barrels, are provided along the accessible route, at least one of each type is accessible.
- The playground entrance is signed appropriately and meets ADAAG requirements.
- Playground use areas are designed to encourage and maximize interaction between people with and without disabilities.
- The playground area is visible to and accessible by parents or caregivers who have a disability and want to interact with their child.
- If the slope of the accessible route exceeds 1:20, it is a ramp. A ramp on the ground plane shall not exceed a slope of 1:16. All other ramp conditions found in ADAAG apply except for the handrail requirements. Ramps onto play equipment shall not exceed a slope of 1:12.
- If the accessible route is adjacent to loose fill material or there is a drop off, the edge of the pathway will be designed to minimize the possibility of a wheelchair tipping over. If the route is within the use zone, it is also subject to the surfacing requirements of ASTM F1292.
- If an accessible play activity exits into loose fill which is not firm, stable, and slip-resistant, a means of returning to the point of access for that play activity must be provided. The surface material cannot splinter, scrape, puncture, or abrade the skin when being crawled upon.
- Where there is a seating or activity area, there must be a minimum clear width of 36 inches for passing in order to prevent obstructing the path.
- Auxiliary pathways with a minimum width of 36 inches are permitted. If this path is longer than 20 feet, there must be a turnaround every 20 feet. For play purposes, an auxiliary path may be textured or bumpy for a maximum length of 5 feet. Any texture may be used, and grades can be extreme. Bumps will be limited by safety requirements and not accessibility.

b) Accessible Playground Surfacing. In accordance with the playground accessibility rules and regulations developed by the Access Board, all new and altered playgrounds must have accessible surfacing material to and from and within the use zone of each accessible component, although the entire playground surface does not have to be accessible. In order to be considered accessible, a surfacing material must comply with ASTM F1951 and be firm, stable, and slip resistant. Engineered wood fiber systems must also meet the requirements of ASTM F2075. When purchasing surfacing materials, the Project Team should require the surfacing manufacturer to provide test results to insure that the material is in compliance. Currently there are several materials that have passed the test described in ASTM F1951 and ASTM F2075, and have been approved as accessible by the Access Board. As new surfacing materials are developed, the list of accessible materials will certainly increase.

Most unitary surfacing materials, including rubber mats, tiles, and poured-in-place surfaces are considered to be accessible if properly installed. However, it is the responsibility of the Project Team to verify that any unitary surfacing material being considered for purchase complies with ASTM F1951 by asking the manufacturer to provide test results. If the manufacturer cannot or will not provide such documentation, do not purchase the surfacing material.

Currently, only two loose-fill materials, engineered wood fiber and engineered rubber fiber, have passed the ASTM F1951 test and are determined to be accessible under certain conditions. Each of these materials are accessible only if the play area is well-drained and without standing water, if the surfacing material is compacted when installed, and if the surfacing material is regularly and continually maintained. Again, the Project Team must verify accessibility by asking the manufacturer for test results. It is important to note that wood chips and shredded rubber tires are not accessible and should not be used in new or altered playgrounds. In order for wood and rubber mulch to be considered accessible, it must be engineered to meet specified requirements. Other common playground surfacing materials such as sand and pea gravel are also not considered to be accessible and also should not be used in new or altered playgrounds.

An accessible route within the use zone must not only be firm, stable, and slip resistant, but must also meet the impact-absorbing requirements of ASTM F1292. The accessible route can meander through the playground, but must connect the entrance and exit points for each accessible component. In addition, all ADAAG requirements for width and slope must be met. Sand or another inaccessible surfacing can surround the route.

c) Access Onto Equipment. In accordance with the playground accessibility rules and regulations developed by the Access Board, specific numbers of accessible play components must be provided depending on the size and type of the playground. An overview of the specific playground equipment accessibility requirements is attached in Appendix A. For a more detailed look at the specific rules and rationale, go to the Access Board website (www.access-board.gov). Entry to accessible play equipment can be met in two ways: 1) ramp, or 2) transfer platform that consists of a deck complemented by steps.

When a RAMP is used to provide access, the following requirements must apply:

- It is a minimum 36 inches wide, cannot have a slope greater than 1:12 or a cross slope greater than 1:50, and cannot have a ramp run longer than 12 feet without a landing.
- Landings at the top and bottom of each ramp run are a minimum of 60 inches wide.
- Landings that contain play activities include a minimum 30-inch x 48-inch clear space, off of the accessible route, where a wheelchair user may park and play.
- The edges of ramps and landings must have a means of preventing wheelchairs from tipping.

- Handrails must be provided on each side of the ramp between 26-28 inches above the ramp surface.
- Where ramp access is provided to an elevated play component, wheelchair parking spaces may overlap turning space.

When a TRANSFER PLATFORM is used to provide access, the following requirements must apply:

- The platform used as a transfer point must have a level surface a minimum of 24 inches wide by 14 inches deep, and be between 11 and 18 inches above the surfacing. .
- A means of support for transferring (a grab bar or handrail) must be provided.
- Adjacent platforms or steps or from the transfer point should be fully enclosed and have a maximum rise of 8 inches.
- A transfer system must be made of a material that will not cut, scrape, or burn the skin.
- A minimum of one 30-inch x 48-inch wheelchair parking space should be provided adjacent to the transfer point. The parking space should accommodate at least one wheelchair and not reduce the circulation path to less than 36 inches. Wheelchair parking space may overlap turning space.
- A space that allows a wheelchair to turn around must be provided at the base of the transfer point. The turning space should be off the accessible route and a clear space of 60 inches in diameter, or a T-shaped area.

The Project Team should require written verification from the equipment manufacturer that the playground design complies with these ADA requirements.



Photo Courtesy of National Playground Safety Institute

4) Age Appropriateness and Challenge

As discussed previously, the CPSC guidelines and ASTM standards recommend separate play areas for preschool and school age children. Manufacturer's representatives can help the Project Team make choices about equipment that is suitable for the two age groups. The following chart illustrates the play and developmental values that may be associated with different types of equipment.

CHART B
PLAY AGE APPROPRIATENESS CHART

(Source: Jay Beckwith, 1992)

DESCRIPTION / ACTION	PRESCHOOL AGE				SCHOOL AGE								May Be Accessible
	2	3	4	5	6	7	8	9	10	11	12		
Constructive													
Sand Diggers													♻️
Sand Play Tables / Houses													♻️
Play Workshops													♻️
Social													
Play Houses													♻️
Mazes													♻️
Storefronts / Counters													♻️
Play Panels													♻️
Talking Tubes													♻️
Slides													
Double Slide													♻️
48" Spiral													♻️
Tot Tunnel													♻️
64" Slides													
48" Tunnel													
Fire Pole													
84" Tunnel													
Climbers													
Transfer Deck													♻️
Ramp													♻️
Stairs													
Arch Climber													
Curly Climber													
Hoop Climber													
Chain Nets													
Nets													
Upper Body / Strength													
Turning Bar													♻️
Parallel Bars													♻️
Horizontal Ladder													♻️
Challenge / S Ladders													
Ring Ladders													
Track / Cable Rides													
Balance													
Suspension / Moving Bridge													
Balance Beam													
Curved Beam													
Chain Bridge													
Moving													
Spring Riders													♻️
Enclosed Infant Swing													♻️
Belt Swing													
Tire Swing													♻️
Spring Platforms													♻️
Seesaw													♻️
Multi Seesaw													♻️
Log Roll													
Pretend													
Ships / Trucks / Trains													♻️

5) Site Amenities

There are a wide variety of site amenities that can be used to complement a playground. In particular, amenities such as drinking fountains, benches, shade trees, and restrooms that are attractive to adults and families should be considered. Site amenity considerations include:

- Locate a drinking fountain in a central use area. The fountain must be on an accessible route and have a drinking faucet available for people with disabilities. Jug fillers or spigots can be added to drinking fountains to encourage water/sand play.
- Place benches in shady areas with clear site lines that allow supervision of the playground. Some of the benches should have arms and backs on them and be located on an accessible route.
- Install annual and perennial flowers to add to the sensory interest and learning value of a playground. Utilize items that are not found readily in back yards.
- Provide small grassy hills for resting and supervision by adults if room is available. Place trees where they provide shade during the heat of the day but far enough away that falling branches and other tree litter do not affect the playground.
- Place bicycle racks adjacent to playgrounds to avoid having bikes in the play area.
- Put trash and recycling cans near the playground. Lids will discourage animals and vandalism.
- Security lighting should be considered, although lighting may attract nighttime users. If uncertain about whether to provide lighting, or about the location or type of lighting, contact your local law enforcement agency for advice.
- Hard surface play areas can be located near a playground if space is available. Games such as hopscotch or foursquare can increase social interaction on the playground. Tricycle and Hot Wheels tracks are also popular, and can be incorporated into perimeter walkways.

6) Appearance and Attractiveness

Many times the selection of one piece of equipment over another is based on appearance and attractiveness. Personal preferences are fine as long as those choices do not outweigh the safety and durability of the equipment. It may be desirable to have matching colors for a nearby building, or blend into a natural woodland area. Bright colors are especially good for young children but may create visual conflicts with neighboring areas.

7) Signage

A sign that contains information about the age of the intended users (preschool age 2-5 or school age 5-12), the proper use of the playground equipment, and the need for adult supervision should be placed at the entrance to each playground or in other highly visible areas along an accessible route. Make sure that any rules that address appropriate ways to play (i.e. children may go down slides in sitting position only) are actually enforceable. It may also be helpful to put an agency telephone number where people can call to report problems on the sign. The agency's insurance carrier or legal counsel should review sign wording. Signs can easily be overdone and usually require more maintenance because of their susceptibility to vandalism. A sample playground sign is attached in Appendix B.

B. EQUIPMENT AND MATERIAL SELECTION

1) Type of Equipment and Characteristics

Materials for playground equipment must have a demonstrated record of durability, and should be designed for easy maintenance. Fasteners should be corrosion-resistant or treated with a corrosion-resistant coating. Fasteners should also not be removable without tools. Play components must have no protrusions or projections that can impale or entangle clothing or strings, or openings that can entrap a child's head or neck. Play equipment should also be free of crush or shear points and sharp edges. The CPSC Handbook and ASTM F1487 define these potential playground hazards in detail and describe test methods to determine compliance. Prior to purchasing playground equipment or components, the Project Team should obtain a letter of compliance from the manufacturer stating that the equipment and layout complies with ASTM F1487 and the CPSC Handbook. This document, along with other compliance letters for surfacing and installation should be placed in a playground file and kept permanently.

a) Wood Components. Wood must be naturally rot and insect resistant, or be chemically treated, especially where it contacts the ground. The chemical wood preservatives used must be approved for contact with humans. Do not use wood that has been treated with Creosote, Pentachlorophenol, or Tributyl Tin Oxide. Also, the CPSC and manufacturers of Chromated Copper Arsenate (CCA) recently agreed to end the manufacture of CCA-treated wood for most consumer applications, including play equipment. Wood is also subject to splitting and checking which may eventually weaken the structure. Sanding and other treatments may be required to avoid injuries from splinters.

b) Steel Components. Steel should be galvanized or have a protective coating (i.e. powder coating, paint) that inhibits rust. Even with a protective coating, scratches, wear areas, and construction defects are subject to rust. Surface rust is not necessarily a sign that the equipment's structural integrity has been affected. However, if left uncorrected, surface rust can lead to deterioration of the metal and eventually become a safety hazard. Occasional touch-up painting of rusted components may be necessary. It is also important to note that steel components may heat up to dangerous levels with direct exposure to the sun.

c) Aluminum Components. Aluminum offers rust resistance and lightweight installation. Aluminum is sometimes more costly to purchase, but the reduced maintenance is often worth the extra cost. Shipping charges may also be reduced because of the lighter weight. Quite often, recycled materials are used in manufacturing - an environmental benefit.

d) Plastic Components. Plastics can be molded, cut, or formed into a wide variety of shapes for playground use. Recycling of plastics for playground use is an emerging technology that provides good community relations. However, most plastics do not have the strength of natural lumbers and metals, and can sag and bend. Make sure that plastic components have been tested and meet safety standards. It is recommended that UV inhibitors be added to the plastic to extend the life expectancy and color. Plastic components must meet safety standards.

2) Surfacing

All playground equipment must have an appropriate resilient surfacing material that protects against injury due to falls installed within the use zone. **NEVER** place play equipment directly over asphalt, concrete, earth or other hard surfaces. There are numerous types of protective surfacing that may be utilized within the use zone of a playground. They vary tremendously in terms of resiliency, cost, thickness, needed maintenance, ease of installation, accessibility, and drainage effectiveness.

Different types of surfacing may be combined in the same playground, although a separation barrier may be required between different materials to keep them from mixing and affecting their function. Whatever the type of surfacing that is chosen, it must comply with ASTM F1292 and ASTM F1951. The Project Team should require the surfacing manufacturer to provide test results that indicate compliance with both standards as part of the bid specification process. If a manufacturer cannot or will not provide successful test results, do not purchase the material.

There are four items that should be considered before selecting a safety surface - fall height, maintenance, accessibility, and cost. Fall height is the vertical distance between the highest designated play surface (such as a slide transition platform or the pivot point of a swing) and the protective surface below. Playground plans often show a platform height, such as 48 or 56 inches, which translates into the required fall height. Once the fall height is determined, a surfacing material can be selected that provides the resiliency necessary for that height.

Loose-fill surfacing materials such as sand, wood chips, pea gravel, and engineered wood mulch require significantly more routine maintenance than unitary surfacing materials. If not regularly and continuously maintained, loose-fill materials may also lose much of their resiliency. For example, a wood chip surface installed at a 12-inch depth may not provide protection from falls off a high platform if allowed to decompose or become compacted or rutted. As discussed previously, the surfacing materials in all new or altered playgrounds must be accessible. In order to be considered accessible, the material must be firm, stable, and slip-resistant in accordance with the requirements of ASTM F1951. Within the use zone, materials must also comply with ASTM F1292.

Finally, cost is always a major factor in the final analysis. Initial costs vary widely and should be prorated over the life of the playground. As an example, poured-in-place rubber surfacing may cost more than 4 times that of loose-fill materials initially, but the long-term maintenance costs are significantly lower so the life cycle cost of the unitary surfacing may actually be lower. The following charts detail some of the advantages and disadvantages of various surfacing materials.

CHART C

LOOSE ORGANIC MATERIALS (WOOD CHIPS, BARK MULCH, ENGINEERED WOOD FIBER)

ADVANTAGES	DISADVANTAGES
Low initial cost; readily available	Subject to environmental conditions
Easy to Install	Combines with dirt; breaks down over time
Drains well	Subject to fungus / biologic growth
Not attractive to pets	Easily displaced
Attractive appearance	Requires containment borders
Engineered wood fiber may be accessible	Requires continuous maintenance

CHART D

LOOSE SYNTHETIC MATERIALS (SHREDDED RUBBER, PLASTICS)

ADVANTAGES	DISADVANTAGES
Easy to install	May be flammable
Slow to decompose	Unless treated, may cause soiling of clothing
Superior shock-absorbing capability	Can contain contaminants from processing
Not subject to fungus / biologic growth	May be swallowed
Non-abrasive	Not accessible
Readily available	Requires containment borders
Less compaction than other loose-fill materials	Requires continuous maintenance

CHART E
LOOSE INORGANIC MATERIALS (SAND, GRAVEL)

ADVANTAGES	DISADVANTAGES
Low initial cost; readily available	May be affected by environmental conditions
Easy to install	Combines with dirt or may compact
Does not pulverize or decompose	Easily displaced
Not ideal for microbial growth	May be blown, thrown, or swallowed
Non-flammable	Conceals animal excrement and litter
Less attractive to animals	Not accessible
	Requires continuous maintenance

CHART F
FIXED SYNTHETICS (RUBBER TILES, POURED-IN-PLACE COMPOSITIONS)

ADVANTAGES	DISADVANTAGES
Low maintenance	High initial cost
Easy to clean	Needs uniform, level undersurfacing
Consistent shock-absorbancy	May be flammable
Not displaced	Requires skilled installation
Generally low life cycle cost	Subject to vandalism
Accessible	May be susceptible to frost damage
Does not require containment borders	Subject to vandalism

It is important to note that extreme temperature changes, particularly extreme heat or sub-zero conditions, affect all surfaces. Compaction, wet conditions resulting from poor drainage, and winter freezing and thawing may have a significant impact on surfacing, particularly loose-fill materials, and most closely represent a typical playground installation. A chart detailing the Critical Heights of various surfacing materials is shown in Appendix C.

3) Purchasing Considerations

There are several factors to consider prior to purchasing playground equipment, including compliance with standards, age appropriateness, product liability insurance, product warranty, durability, ease of installation, and equipment that is not recommended for public playgrounds.

a) Compliance with Standards. The most important purchasing consideration is to insure that equipment, components, and surfacing materials comply with all applicable standards. All public playground equipment must comply with ASTM F1487, and all surfacing materials must comply with ASTM F1292. As discussed previously, the Project Team should require compliance documentation from the equipment manufacturer (ASTM F1487), and from the surfacing manufacturer (ASTM F1292 and ASTM F1951 when accessibility is an issue).

b) Age Appropriateness. The playground equipment that is to be purchased should be appropriate to the age of the intended users (Preschool Age 2-5, or School Age 5-12). Make sure that the ages of the intended are included in the bid specification, or that the manufacturer is otherwise notified in writing in regard to the ages of the intended users.

c) Product Liability Insurance. It is recommended that Product Liability Insurance be obtained for any playground equipment intended for public use. Product Liability Insurance is coverage carried by the manufacturer against accidents generally due to the design of the equipment. However, this insurance will not cover the buyer if an accident is caused by lack of maintenance or unauthorized equipment modification. Contact your agency's insurance consultant to determine the proper type and amount of Product Liability Insurance to be specified. The equipment vendor should furnish your agency with Certificates of Insurance (see Appendix D) with original endorsements (if applicable) affecting the coverage. A person authorized by the insurer to bind coverage on its behalf must sign the certificates and endorsements for each insurance policy. Don't take someone's word for it – get it in writing! The Project Team should also verify the Best Rating of the insuring company to determine its financial stability.

d) Product Warranty. Many manufacturers warrant their products against defects, the length of which may be an indication of the product's life expectancy. Make sure to require warranty information in the bid specifications, and retain this information in the permanent playground file throughout the life of the playground.

e) Durability. The materials used in the manufacture of the specified playground equipment, whether wood, steel, aluminum, plastic, or some other material, must have a demonstrated record of durability in accordance with ASTM F1487. If unsure about equipment durability, ask the manufacturer to provide you with test data.

f) Ease of Installation. The playground equipment must also be easy to install. Equipment that is difficult to install will typically result in higher costs from the installer. To obtain information about ease of installation, it is probably best to ask several installers for their recommendations.

g) Equipment That Is Not Recommended. Both ASTM F1487 and the CPSC Handbook discuss equipment that is not recommended for use on a public playground. The following is a list of equipment to avoid primarily because they fail to meet safety guidelines.

- Spinning equipment without speed governors
- Swings that are attached to composite play structures
- Heavy swings (metal, wood, animal-type)
- Ropes/cables that are not attached at both ends
- Swinging exercise rings and trapeze bars
- Multiple occupancy swings
- Trampolines
- Residential play equipment
- Swinging gates

C. FINAL DESIGN

1) Construction Drawings - In House Design

Once equipment has been selected, the final design can be finalized. If the playground is being designed in-house, a scaled drawing of the final design should be created showing equipment layout, spacing, use zones, site amenities, landscaping, access points and other construction details (See Figure 6).

2) Vendor Designed

Some communities have had success in requesting design proposals for their playgrounds from equipment vendors. Vendors may submit alternatives based on a not-to-exceed cost, or on their knowledge and experience with the desired user group.

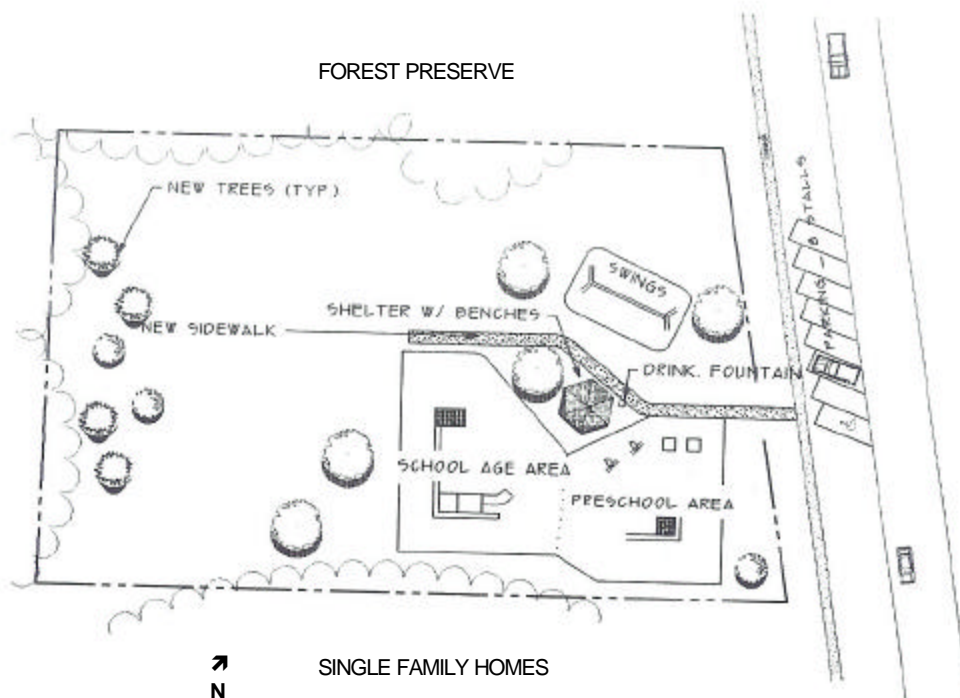
3) Budget and Timeline

Analyze final costs for installation and miscellaneous construction. It is not advisable to skimp on safety issues such as surfacing or borders. If there is a budget problem, explore ways that the project can be phased in, perhaps over two or three years. Additional funding sources can also be researched. The final budget should include funds for unexpected expenses. A good "rule of thumb" regarding unexpected expenses is to provide at least 10% of the total project cost as a contingency fund. Additionally, the Project Timeline should be adjusted as necessary to keep the project on track and provide a guide for the common question; "When will it be finished?"

4) Final Design Approval

Most often, the proposed final design will need to be approved by the manufacturer of the equipment. In addition, the owner of the playground site as well as any other agencies with ownership, planning, or zoning responsibilities must approve the final plan.

FIGURE 6
SAMPLE FINAL DESIGN



D. DESIGN CHECKLIST

- Evaluate existing equipment for compliance with current standards
 - Remove equipment that does not comply
- Determine preliminary playground equipment location
 - Consider site analysis information
 - Separate preschool and school-age equipment
 - Determine use zones for each piece of equipment
 - Confirm that all overlapping use zones are appropriate
- Evaluate accessibility and circulation requirements
 - Complete accessibility checklist
- Identify appropriate preschool (2-5 yrs.) and school age (5-12 yrs.) equipment
 - Include ages of intended users in bid specifications, or
 - Notify manufacturer about user ages in writing
- Identify and locate appropriate site amenities
 - Drinking fountains are accessible and centrally located
 - Benches are placed in shady areas with clear site lines
 - Landscaping is installed in appropriate locations
 - Bicycle racks and litter and recycling receptacles are provided
 - Consider security lighting and other safety improvements
- Consider appearance and attractiveness of the equipment
- Determine location and wording of appropriate signage
- Determine type of equipment to purchase
 - Wood, steel, aluminum, or plastic components
- Determine type of surfacing
 - Surfacing is resilient within the use zone and complies with appropriate standards
 - Surfacing is firm, stable, and slip-resistant
 - Obtain test results confirming compliance with ASTM F1292 from the surfacing manufacturer
- Obtain manufacturer's certification that equipment complies with ASTM F1487 and CPSC Handbook
- Confirm that equipment manufacturer has adequate Product Liability Insurance
- Ask equipment manufacturers to provide warranty information in the bid specification
- Determine whether to complete final design drawings in-house or by vendor
- If designed in-house, develop scaled construction drawings that show layout, use zones, site amenities, access points, and other construction details

D. DESIGN CHECKLIST (CONTINUED)

- Review final costs for construction, installation, and site amenities
- Adjust Project Timeline as necessary
- Obtain final design and construction approval from the playground owner, manufacturer, and any other agencies with ownership, planning, or zoning responsibilities

E. ACCESSIBILITY CHECKLIST

- There is an accessible route that meets ADAAG requirements from the perimeter of the park or parking lot to the play area
 - Route is minimum 60" wide w/ a maximum slope of 1:20 and a maximum cross-slope of 1:50
 - Route complies with ASTM F1951 and is firm, stable, and slip-resistant
 - Within the use zone, route complies with surfacing requirements of ASTM F1292
- Site amenities along the path of travel are accessible
- The playground entrance is signed appropriately and meets ADAAG requirements
- Use areas are designed to encourage and maximize interaction between people with and without disabilities
- Playground area is visible and accessible by parents / care-givers with a disability
- If route is adjacent to loose-fill material or there is a drop off, the pathway edge must be treated to minimize wheelchair tipping
- Where there is a seating or activity area, pathways must have a minimum clear width of 36 inches
- Auxiliary pathways with a minimum width of 36 inches are permitted. If the path is longer than 20 feet, there must a turnaround every 20 feet
- Surfacing material within the use zone complies with ASTM F1951, ASTM F1292, and ASTM F2075 if engineered wood fiber is being used as the surfacing material
- Within the use zone, an accessible route must connect the entrance and exit points for each accessible play component
- Accessible ground level and elevated play components are provided in accordance with Access Board playground rules and regulations

E. ACCESSIBILITY CHECKLIST (CONTINUED)

- When ramps are used to provide access, they must meet ADAAG requirements
 - Ramp is a minimum 36 inches wide with a slope no greater than 1:12 and a cross-slope no greater than 1:50
 - Ramp has a landing every 12 feet if total length exceeds 12 feet
 - Landings are a minimum 60 inches wide
 - Landings w/ play activities include a minimum 30 x 48 inch clear space for wheelchair parking
 - Ramp edges protect wheelchairs from falling off landing
 - Ramp has handrails on each side between 26-28 inches high

- When transfer platforms are used to provide access, they must meet ADAAG requirements
 - Platform is level and minimum 24 inches wide x 14 inches deep, and be between 11-18 inches above the surfacing
 - There is a means of support for transferring from a wheelchair to and from the platform
 - Adjacent platforms or steps have a maximum rise of 8 inches
 - Platform is made from material that will not cut, scrape, or burn the skin
 - A minimum 30 x 48 inch parking space is provided adjacent to each platform
 - A space that is a minimum 60 inches in diameter that allows a wheelchair to turn is provided adjacent to the transfer platform

SECTION 6 INSTALLATION

A. INSTALLING THE PLAYGROUND

The playground can be installed by one of four groups - in-house staff, a contractor, volunteers, or a combination of the three. While it may be desirable to retain a contractor, there are many functions that can be completed by staff or volunteers, including spreading surfacing material, installing signs and benches, and planting trees. The advantages and disadvantages of each method are outlined below:

**CHART G
INSTALLATION BY IN-HOUSE STAFF**

ADVANTAGES	DISADVANTAGES
Greatest control and flexibility over installation	Timing may conflict with other priorities
Lower costs	May increase agency liability
Greater convenience	Longer time to install
	Must train staff

**CHART H
INSTALLATION BY CONTRACTOR**

ADVANTAGES	DISADVANTAGES
Greater expertise and experience	Higher costs
Liability for installation assumed by contractor	May lose some control
Less time than in-house installation	Need a qualified and experienced contractor
	Public bids required

**CHART I
VOLUNTEER INSTALLATION**

ADVANTAGES	DISADVANTAGES
Lowest cost	Must recruit volunteers
Positive public relations	Reliability of workforce
Develop community pride	Lack of experience
	Liability exposure
	Requires close supervision

Choose those options that best fit the needs of available resources and of the project. An Installation Guide is attached as Appendix E. If a contractor is chosen, they should be reputable, experienced, and certified by the equipment manufacturer or at least be familiar with the manufacturers equipment. The installer should be asked to provide a list of references for projects with an equivalent or greater scope than the specified playground project. The contractor should also be asked to verify in writing that the equipment has been installed according to plans, specifications, and instructions provided by the manufacturer, consultant, or site planner.

B. PLANNING AND COORDINATION

As with every other aspect of the play area development process, the more initial planning that is done, the fewer problems there will be. The installer should be familiar with the equipment to be installed and should be given information about drainage, soil, utility locations, and other site conditions that may affect how the equipment is installed. If the play area is part of a large park development project, the installation must be coordinated with other site work.

C. LIABILITY AND INSURANCE

Unfortunately, the growing number of lawsuits filed against public agencies requires that every public agency be covered in the event of an accident or injury. The agency should have a comprehensive Safety and Risk Management Program in place. Contact the agency's insurance carrier or risk manager to determine what types and amounts of coverage are needed. Listed below are several types of insurance to be considered:

- General Liability coverage for staff, contractors, and volunteers
- Contractor's and Owner's Auto / Equipment Liability coverage
- Indemnification / Hold-Harmless Agreement from the installer for the installation period
- Medical accident coverage for volunteers
- Contractor's Workers' Compensation coverage - State statutory limits with \$1 million employer's liability
- Installer's certificate of insurance naming owner as additional insured

D. INSTALLATION DOCUMENTATION

The installation process should be extensively documented. The owner should keep all blueprints, specifications, manufacturer's instructions, parts lists, warnings, and other playground related documentation in the permanent playground file.

If the playground is installed contractually, and before the site is opened to the public, a final inspection should be completed by the Project Team, a manufacturer's representative, and the contractor to insure that the playground has been installed correctly. Any problems discovered during the final inspection should be corrected before the playground is opened. Both the manufacturer and the contractor should be asked to provide written documentation that the installed playground complies with ASTM F1487 and the CPSC Handbook. These documents can be extremely important in the event of a loss caused by improper design or installation.

E. INSTALLATION CHECKLIST

- Complete Installation Guide (Appendix E)
- Determine who will install the play area
 - Staff, contractor, volunteers, combination
- Assign agency staff person to coordinate project
- Coordinate installation with other site work
- Insure that proper insurance coverage is provided for staff, contractors, volunteers, vehicles and equipment

IF A CONTRACTOR WILL BE INVOLVED...

- Insurance coverage for contractor is in place (general liability, auto liability and workman's compensation)
- Develop Hold-Harmless Agreement and have it signed by agency and contractor
- Obtain documentation from manufacturer that playground installation complies with ASTM F1487 and the CPSC Handbook
- Obtain documentation from installer that playground installation complies with ASTM F1487 and the CPSC Handbook
- Installation documentation is added to permanent playground file or record

IF VOLUNTEERS WILL BE INVOLVED...

- Volunteer medical and liability insurance coverage in place
- Waivers signed by volunteers (See Appendix F – Sample Volunteer Waiver)¹³

SECTION 7 MAINTENANCE / REPAIR / SAFETY INSPECTIONS

Before disbanding the Project Team, it is important to gather all the important documents including project meeting minutes, letters, bills, vouchers, plans, specifications, bid documents, letters of compliance, certificates of insurance, volunteer waivers, and other playground related documentation (See Appendix I – Documentation Checklist). This information should be inventoried and turned over to the playground owner. If someone else is responsible for daily maintenance they too should have a complete copy of this file.

A. MAINTENANCE AND INSPECTION PROCESS

With the actual construction completed, an additional commitment for regular and continuous maintenance and repair of the new playground will be needed to provide a safe and challenging play experience throughout the lifecycle of the playground. As discussed in Section 1 – Introduction, inadequate maintenance was determined to be a major cause of playground injuries.

The purpose of a comprehensive maintenance and inspection program is to maintain the “standard of care” (compliance with ASTM F1487, CPSC Handbook, and any other pertinent local, county, or state requirements), and to identify all new hazards on existing playgrounds resulting from changing conditions. As an example, playground conditions can change due to vandalism, normal wear and tear, exposure to the elements, and natural disasters. The inspection process is pro-active rather than reactive – the intent is to find problems when they are small and **before** someone is injured. Inspections should be performed by trained staff and documented with easy-to-use checklists. Inspection forms should be based on the manufacturer’s recommendations, as well as agency policies and procedures. Inspection forms should also be tailored to the equipment and conditions found locally.

There should be two levels of inspection – high frequency and low frequency - based on the amount of use the playground receives. Low frequency inspections focus on preventive maintenance, and are in-depth looks at every play component and condition in the playground. Low frequency inspections usually need to be performed only 3-4 times each year, depending on the amount of use. Low frequency inspection checklists should include every play component, surfacing, border, signage, site amenities, and all other aspects of the playground environment, and therefore need to be performed by trained staff.

High frequency inspections, on the other hand, focus on conditions that change frequently, such as raking loose-fill surfacing materials and picking up litter. As the name implies, these inspections may need to be completed weekly, daily, or even several times each day, depending on the amount of use. Because high frequency inspections involve relatively simple tasks, they can be performed by almost anyone. High frequency checklists primarily address routine surfacing maintenance and custodial-type tasks.

Inspection frequencies are determined by a variety of factors, including use, development, and environmental considerations. Use factors relate to the type of use a playground receives. A playground located at a school will usually receive far more use than a campground playground. Play areas designed for children aged 2-5 are not as likely to need as much maintenance as ones designed for children aged 5-12, because younger children are not as hard on the equipment. Vandalism patterns also affect the inspection frequency.

Development factors relate to the type of equipment and surfacing that is chosen. Loose-fill surfacing requires considerably more maintenance, and therefore more frequent inspections, than unitary surfacing. Over time, wood equipment will require more routine maintenance than metal equipment. Older equipment needs more maintenance than newer equipment. Moving equipment needs more maintenance than stationary equipment.

Environmental factors also affect inspection frequencies. The most critical environmental factor is drainage. If a playground is not well drained, much more effort will be required to maintain the surfacing materials and its resiliency. Other environmental conditions such as salt air, excessive heat, and blowing sand can also impact the life of play equipment. A sample Inspection Frequency Process is attached in Appendix G.

When developing a maintenance and inspection program, the use of checklists is often the most easy and effective method available. Checklists should be set up to insure compliance with the manufacturer's recommendations. The checklist allows the inspector to systematically and thoroughly cover all features of the playground. Special attention should always be given to moving parts, safety surfacing, and other parts that are subject to wear. Space should be available on the checklist to document identified hazards and completed repairs. All problems identified in an inspection should be promptly added to the work schedule and repaired as soon as possible following the manufacturer's recommendations. Sample High and Low Frequency Inspection Forms are located in Appendix H. The publication Playground Safety Is No Accident¹⁴ is another tremendous resource that includes sample audit and inspection forms, as well as a process to determine inspection frequency.

B. DOCUMENTATION

Complete documentation of virtually everything related to the playground, including original specifications, bid documents, purchase orders, warranties, and insurance certificates, as well as manufacturers recommendations, parts lists, scaled drawings, audit records, completed inspection checklists, repair schedules and work orders should be retained permanently. In addition, reports of accidents and injuries that occur on the playground should also be added to the permanent playground file to assist in identifying problem areas and trends that may need attention. However, accident and injury reports should only be added to the permanent playground file after all personal information (name, address, phone number, etc.) has been removed from the report. This information should be stored in a safe yet easily accessible location throughout the life of the playground and beyond. This information can help defend against a lawsuit in the event of an accident. In Illinois, children have up to two years after they have reached the age of majority age to file a lawsuit. Therefore, records should be kept for many years after the playground is altered or removed.

When developing a permanent playground file, it is essential to include compliance letters from the equipment and surfacing manufacturers and the playground installer. The requirement to provide each of these compliance letters should be incorporated into the original specifications and bid documents. The equipment manufacturer should be asked to provide a letter stating that the equipment and layout comply with ASTM F1487. After completing a post-installation audit, the installer should provide a letter stating that the installation and layout complies with ASTM F1487. The surfacing manufacturer should provide a letter stating that the safety surfacing complies with ASTM F1292, ASTM F1951 if accessibility is required, and ASTM F2075 if engineered wood fiber is used as the surfacing material.

The average playground equipment purchased today may last between 15 - 20 years and generate a sizable amount of paper documentation. This documentation should be stored in an organized manner so that it can be retrieved for purposes such as contacting the manufacturer for replacement parts, evaluating the maintenance frequency for a site, locating maintenance inspection records and manufacturer's product liability certificate or other information. A playground documentation checklist that may help to organize the many forms that should be kept by public agencies after developing a new playground is provided in Appendix H. This checklist can be placed in the front of each playground file and be filled in as documentation is obtained. This form can also act as a reminder to obtain important documentation that should be included in the file.

C. MAINTENANCE AND INSPECTION CHECKLIST

- Determine the “standard of care” (ASTM F1487 or CPSC Handbook or both) to which playgrounds will be inspected
- Develop High Frequency and Low Frequency Inspection Checklists based on manufacturer’s recommendations and agency policies and procedures
- Determine the Low and High Frequency inspection schedule for each playground
- Develop a process to ensure that identified hazards are placed on the work schedule for repair
- Train staff to perform Low and High Frequency Inspections
- Establish a permanent playground file for each site
 - Complete the Document Checklist for each playground

APPENDIX A

ACCESSIBILITY GUIDELINES FOR PLAY AREAS: AN OVERVIEW

(Source: Access Board)

Under the Americans with Disabilities Act (ADA), the Access Board has developed guidelines for play areas that were previously made available for public comment. Presented here are highlights of the final version, which includes changes, made as a result of the Board's review of public comments.

The guidelines for play areas add a new section (15.6) to the Board's ADA Accessibility Guidelines (ADAAG), which cover access to the built environment in new construction and alterations. This section addresses only those play areas that are *newly built* or *altered*. (Generally, existing facilities, while subject to certain ADA requirements, are not addressed by ADAAG except where altered). The guidelines provide scoping requirements, which indicate *what* is to be accessible, and technical requirements, which explain *how* to achieve access. The guidelines cover play areas provided at schools, parks, childcare facilities (except those based in the operator's home), and other facilities subject to the ADA.

How the guidelines were developed

ADAAG and amendments to it, like most Federal regulations, are developed through a public notice and comment process. Public notice and the opportunity to comment is provided through publication in the *Federal Register*. These guidelines were proposed for public comment in April 1998 and are based on recommendations from a regulatory negotiation committee the Board established for this purpose. Based on the comments received, the Board revised the guidelines and published them in the *Federal Register* in final form.

Are these amendments enforceable at this time?

No. The ADA design standards are developed in a two-step process. They are first published as a minimum guideline by the Access Board for the Department of Justice (DOJ). DOJ is responsible for adopting enforceable standards that are consistent with the Board's minimum guidelines. Currently, these final guidelines are not yet part of DOJ's enforceable standard. However, people may wish to consult the guidelines in the interim since the current enforceable standard does not specifically address play areas. (The absence of specific provisions in the current standards does *not* mean that play areas are exempt from the provision of access under the ADA; rather, it means that play areas are not held to a specific level of access under the current standard).

Definitions

Several defined terms are key to understanding the guidelines. These include "play components," which are manufactured or natural elements used for play, socialization, or learning. Two types of play components are distinguished: ground level and elevated.

Ground level play components are those approached and exited at ground level, such as spring rockers, swings, and stand-alone climbers (left).

Elevated play components are approached above or below grade and are part of composite structures that provide a variety of play activities (right).

Minimum Number

The guidelines require looking at play areas as a collection of individual play components to determine the minimum amount required to be accessible. Minimum requirements are based on the number of components provided for a play area.

Ground Level Play Components (15.6.2)

There are two criteria for ground level play components that must be met, although the same accessible components can be used to satisfy both:

- Access is required to at least one of each type provided.
- The minimum number and variety is determined by the number of elevated play components provided.

This second requirement recognizes that not all portions of elevated structures will be accessible. Access to ground level components is used to offset this. The number of elevated components provided sets the minimum number and variety of ground level components required according to a chart. This requirement does not apply where no elevated structures are provided or where greater access to elevated components is provided (ramp access to at least half of the total and to at least 3 different types).

Elevated Play Components (15.6.3)

At least half the number of elevated play components provided are required to be accessible (by ramp or transfer platform). **Example:** *If a play area has 10 elevated play components, at least 5 must be accessible. In addition, at least 3 accessible ground level components are required, each of a different type.*

Ramps (15.6.4) and Transfer Systems (15.6.5)

The guidelines allow two methods of providing access to elevated play components: ramps and transfer systems. Design specifications are provided for each type. A transfer system provides a platform onto which children using wheelchairs can transfer (right). Transfer steps from the platform provide a means of access from the platform to play components. Generally, access can be provided by either method, although ramp access is required where play structures with 20 or more elevated play components are provided.

Play Components	
Number of Elevated Components Provided	Ground Level Components Required
2 - 4	1
5 - 7	2 (at least 2 types)
8 - 10	3 (at least 3 types)
11 - 13	4 (at least 3 types)
14 - 16	5 (at least 3 types)
17 - 19	6 (at least 3 types)
20 - 22	7 (at least 4 types)
23 - 25	8 (at least 4 types)
over 25	8 + 1 for each additional 3 over 25, or fraction thereof (at least 5 types)

Elevated Play Components		
Total Provided	Ramp Access	Ramp or Transfer System Access
less than 20	not required	50% min.
20 or more	25% min.	25% min.

Technical Requirements for Play Components (15.6.6)

The guidelines provide design criteria for play components considered essential for accessibility, including:

- space for wheelchair maneuvering to and from the play component
- wheelchair space at the play component
- height and clearances of play tables
- height of entry points or seats
- provision of transfer supports (such as a grippable edge or some other means of support)

Advisory (non-mandatory) information on reach ranges is provided.

Forward or Side Reach	Ages 3 & 4	Ages 5 - 8	Ages 9 - 12
High (maximum)	36"	40"	44"
Low (minimum)	20"	18"	16"

Accessible Surfaces (15.6.7)

The guidelines tackle the tricky issue of providing surfaces at play components that are soft enough to limit injury from falls but that are also firm and stable enough for wheelchair maneuvering. The guidelines rely on two standards from the [American Society for Testing and Materials](#) (ASTM). For wheelchair access, surfaces are required to be "firm, stable, and slip resistant" as specified in ADAAG and to meet the ASTM standard F1951 (current version), which is based on a measurement of the physical effort to maneuver a wheelchair across a surface. Accessible surfaces within the use zone (the ground level area beneath and immediately adjacent to a play structure) are also required to be "impact attenuating" in compliance with ASTM F 1292 (current version) requirements for drop testing.

APPENDIX B
SAMPLE PLAYGROUND SIGN
(Source: Playground Safety is No Accident)
© NRPA, PDRMA, NPSI

PUBLIC PLAYGROUND SAFETY GUIDELINES

Welcome. For your play enjoyment, please obey the following or you may cause injury to yourself or others around you.

No pets allowed.

No bicycles, roller skates, or skateboard use within play area.

Inspect play area before starting to play and remove litter.

Children 7 and under should be accompanied by an adult.

This playground is designed for children ages ____ to ____.

CAUTION

Bare feet may cause injury.

Throwing sand or any other objects within play area may cause injury.

Playing on this equipment when wet may cause injury.

SWINGS

Hold on with both hands.

Standing on swings can cause injury.

Stop swinging before getting off.

Never swing or twist empty swings.

Stand clear of moving swings to avoid contact and possible injury.

SLIDES

Slide feet first only.

No running or walking up slide.

CLIMBERS

No pushing, running, or shoving.

Play safely and be courteous of others.

If you notice broken equipment or anything that requires immediate attention, call (YOUR TELEPHONE NUMBER). We appreciate your cooperation.

YOUR ORGANIZATION NAME

\$500 fine for damaging or defacing public property.

(Actual Sign: 11" x 17"; Recommended Colors, Yellow with Black Letters)¹⁵

APPENDIX C
COMPARISON OF CRITICAL HEIGHTS FOR
VARIOUS SURFACING MATERIALS

(Source: CPSC Handbook for Public Playground Safety. Pg 5. 1997)

The following table illustrates materials and potential safe fall heights. New materials are being tested continuously in accordance with ASTM guidelines. Ask your playground representative for the latest information.

CRITICAL HEIGHT (in feet) OF TESTED MATERIAL				
MATERIAL	UNCOMPRESSED DEPTH			COMPRESSED DEPTH
	6 inch	9 inch	12 inch	
Wood Chips	7	10	11	10
Double Shredded Bark Mulch	6	10	11	7
Engineered Wood Fibers	6	7	>12	6
Fine Sand	5	5	9	5
Coarse Sand	5	5	6	4
Fine Gravel	6	7	10	6
Medium Gravel	5	5	6	5
Shredded Tires*	12-Oct	N/A	N/A	N/A

* This data is from tests conducted by independent testing laboratories on a 6-inch depth of uncompressed shredded tire samples produced by four manufacturers. The tests reported critical heights that varied from 10 feet to greater than 12 feet. It is recommended that persons seeking to install shredded tires as a protective surface request test data from the supplier showing the critical height of the material when it was tested in accordance with ASTM F 1292.

The values shown in each column represent the *Critical Height*, which is the maximum height from which a test instrument (ASTM F1292) can be dropped and provide a peak deceleration of less than 200g's and an HIC of less than 1000. These values translate into the highest safe fall height for each material listed. ***Purchasers of surfacing should ignore the data in the sections entitled UNCOMPRESSED DEPTH since uncompressed surfacing material becomes compressed almost immediately after installation by children playing on it. In addition, extreme temperature and excessive moisture will effect the impact-absorbing effectiveness of most playground surfacing materials.***

As an example, if compressed wood chips were used at a depth of 9 inches, the maximum safe fall height allowed would be 6 feet. Nine inches of compressed Fine Sand, on the other hand, would only provide a safe fall height of 5 feet. Notice the difference between compressed and uncompressed values. The compressed values most closely represent loose fill materials in actual outdoor and varying conditions. The depth of any loose fill material may be reduced during use, so an additional margin of safety should be considered in selecting any material for a specific use.

Additional loose-fill and unitary materials may have shock absorbing qualities similar or better than those listed above. The owner should always request test data from the manufacturer of any synthetic man-made product prior to use.

APPENDIX D
SAMPLE CERTIFICATE OF INSURANCE
 (Source: Park District Risk Management Association)

ACORD. CERTIFICATE OF INSURANCE		ISSUE DATE (MM/DD/YY) 6-1-95	
PRODUCER XYZ Insurance Agency P.O. Box 000 Anytown, USA		THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.	
		COMPANIES AFFORDING COVERAGE	
INSURED ABC Construction Co. Anytown, USA		COMPANY LETTER A A-1 Insurance Co.	
		COMPANY LETTER B	
		COMPANY LETTER C	
		COMPANY LETTER D	
		COMPANY LETTER E	
COVERAGES THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED, NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.			
CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY) - POLICY EXPIRATION DATE (MM/DD/YY)
	<input type="checkbox"/> GENERAL LIABILITY <input type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS MADE <input type="checkbox"/> OCCUR. <input type="checkbox"/> OWNER'S & CONTRACTOR'S PROT.	(No) #	1-1-95 - 1-1-96
	<input type="checkbox"/> AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> NON-OWNED AUTOS <input type="checkbox"/> GARAGE LIABILITY		1-1-95 - 1-1-96
	<input type="checkbox"/> EXCESS LIABILITY <input type="checkbox"/> UMBRELLA FORM <input type="checkbox"/> OTHER THAN UMBRELLA FORM		1-1-95 - 1-1-96
	<input type="checkbox"/> WORKER'S COMPENSATION AND EMPLOYERS' LIABILITY		1-1-95 - 1-1-96
	OTHER		
DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS Project: Downtown Park Playground Project Additional Insured: Anytown Park District, Anytown, USA			
CERTIFICATE HOLDER Anytown Park District Attn: Parks Superintendent 100 Park Drive Anytown, USA		CANCELLATION SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL ENDEAVOR TO MAIL _____ DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, ITS AGENTS OR REPRESENTATIVES.	
		AUTHORIZED REPRESENTATIVE	
ACORD 25-8 (7/90)		GACORD CORPORATION 1990	

APPENDIX E INSTALLATION GUIDE

The decision regarding which installation approach is most suitable should be based on a variety of factors. The following matrix will assist you in determining which installation method is most appropriate for your project. For each rating item that is beneficial, place a (+) in the box. For each rating item that is not beneficial, place a (-) in the box. For each rating item that is neutral, place a (0) in the box. The installation method that has the most (+) boxes will probably be most appropriate.

RATING ITEM	STAFF	CONTRACT	VOLUNTEER
Control over project			
Cost			
Convenience			
Experience			
Liability during construction			
Liability after construction			
Recruitment			
Public Relations			
Amount of time needed			
Training			
Timing of project			
Availability of tools and equipment			
SUMMARY			

APPENDIX F
SAMPLE VOLUNTEER WAIVER FORM

(Source: Park District Risk Management Association)

The (Park District/SRA) is committed to conducting its recreation programs and activities in a safe manner and holds the safety of volunteers in high regard. The Park District/SRA continually strives to reduce such risks and asks that all volunteers follow safety rules and instructions that are designed to protect the volunteer's safety. However, volunteers must recognize that there is an inherent risk of injury when choosing to volunteer for any activity or program.

Please recognize that the (District/SRA) carries only limited medical accident coverage for volunteers. It is strongly urged that all volunteers review their own health insurance policy for coverage. Also, each volunteer is solely responsible for determining if he/she is physically fit and/or properly skilled for any volunteer activity. It is advisable, especially if the volunteer is pregnant, disabled in any way or recently suffered an illness, injury or impairment, to consult a physician before undertaking any physical activity.

WARNING OF RISK

Despite careful and proper preparation, instruction, medical advice, conditioning and equipment, there is still a risk of serious injury when providing volunteer services. Understandably, not all hazards and dangers can be foreseen. Volunteers must understand that depending upon the volunteer services, certain risks, dangers and injuries due to acts of God, inclement weather, slip and falls, inadequate or defective equipment, failure in supervision or instruction, premises defects, horseplay, carelessness, lack of skill or technique, and all other circumstances inherent to the particular volunteer services exist. In this regard, it must be recognized that it is impossible for the Park District/SRA to guarantee absolute safety.

WAIVER AND RELEASE OF ALL CLAIMS AND ASSUMPTION OF RISK

Please read form carefully and be aware that in consideration for providing volunteer services, you will be expressly assuming the risk and legal liability and waiving and releasing all claims for injuries, damages or loss which you may sustain as a result of participating in any and all activities connected with and associated with your volunteer services (including transportation services/vehicle operations if provided).

As a volunteer, I recognize and acknowledge that there are certain risks of physical injury to volunteers in this program/activity, and I voluntarily agree to assume the full risk of any and all injuries, damages or loss, regardless of severity, that I may sustain as a result of my volunteer services. I further agree to waive and relinquish all claims I may have (or accrue to me) as a result of my volunteer services against the (District/SRA), including its officers, officials, agents, volunteers and employees (hereinafter collectively referred as "Parties").

I do hereby fully release and forever discharge the Parties from any and all claims for injuries, damages, or loss that I may have or which may accrue to me and arising out of, connected with, or in any way associated with my volunteer services.

I have read and fully understand the above important information, warning of risk, assumption of risk and waiver and release of all claims. If registering on-line or via fax, my on-line or facsimile signature shall substitute for and have the same legal effect as an original form signature.

PLEASE PRINT Volunteer's Name: _____
 Volunteer's Signature: _____
 Date: _____

PARTICIPATION WILL BE DENIED If the signature of the volunteer and date are not on this waiver.
--

APPENDIX G SAMPLE INSPECTION FREQUENCY FORM

(Source: Playground Safety Is No Accident)
© NRPA, PDRMA, NPSI

Site: _____ Completed By: _____ Date: _____

FACTORS	SCORE
A. Use Factors (30 points)	
1. Vandalism: (<i>high = 10; moderate = 5; low = 2</i>)	
2. Use Level: (<i>high = 10; moderate = 5; low = 2</i>)	
3. Design Age: (<i>preschool age 2-5 = 2; school age 5-12 = 4; all ages 2-12 = 10</i>)	
Subtotal Use Factors	0

B. Materials (34 points)	
1. Resilient Surfacing: (<i>loose materials = 12; synthetic materials = 2</i>)	
2. Primary Material: (<i>wood/painted steel = 4; plastic/alum/galvanized steel = 2; stainless = 0</i>)	
3. Equipment: (<i>moving = 6; static = 2; both = 6</i>)	
4. Age of Eqpt: (<i>1-2 yrs = 0; 3-4 yrs = 3; 5-9 yrs = 6; 10-14 yrs = 9; >15 yrs old = 12</i>)	
Subtotal Materials	0

C. Environmental Factors (36 points)	
1. Acid Soils / Rain / pH: (<i>none 6-9 = 0; moderate 4, 5, 10, 11 = 4; high 1-3, 12-14 = 8</i>)	
2. Salt Air / Coastal Exposure: (<i>none = 0; moderate = 4; high = 8</i>)	
3. Sun Exposure: (<i>none = 0; moderate = 4; high = 8</i>)	
4. Drainage: (<i>underground = 0; moist surface = 4; seasonal flooding = 8; standing water = 12</i>)	
Subtotal Environmental Factors	0

Site Total (100 points)	0
--------------------------------	----------

KEY TO INSPECTION FREQUENCY CHART		
POINTS	HIGH FREQUENCY INSPECTIONS	LOW FREQUENCY INSPECTIONS
> 71	2 or more times per week	2-3 Times per month
56-70	Weekly	Monthly
41-55	Bi-Weekly	Bi-Monthly
<40	Monthly	Seasonal

IMPORTANT: This information has been prepared to assist the District's attorney in defending potential litigation. Do not release to any person except a District official, PDRMA representative, or an investigating police officer.

APPENDIX H SAMPLE INSPECTION AND MAINTENANCE CHECKLISTS

(Source: Elmhurst Park District)

HIGH FREQUENCY PLAYGROUND INSPECTION FORM

Site: _____
 Inspector: _____ Date: _____ Start/Finish Times: _____
 Repairer: _____ Date: _____ Start/Finish Times: _____

Use the following codes: 1 = Okay 2 = Needs Mtc 3 = Request for Repair
 O = Supervisor Notified and W/O Written X = Corrective Action Completed

Inspection Items	Code	Inspection Comments	Repair Comments
Vandalism: damage, graffiti, glass, trash			
Remove Foreign Objects: rope, litter, wood			
Loose or Missing Hardware			
Chains: kinked, twisted, broken			
Guardrails / Handrails Secure			
Seats: cut, cracked, missing			
Wood: rotten, cracked, missing			
Sweep Walkways, Platforms, Steps			
Footers Exposed			
Standing Water			
Objects in Surfacing Material			
Rake / Level Surfacing Material			
Need Surfacing Material For...			
Swings			
Climbers			
Slide			
Fire Pole			
Other			
Other			
Other Items (please specify)			
Other Items (please specify)			

For Office Use Only:
 Reviewed by Maintenance Supervisor: _____ Date: _____
 Reviewed by Manager of Park Operations: _____ Date: _____
 Reviewed by Director of Park Services: _____ Date: _____

NOTE: This information has been prepared to assist the Elmhurst Park District's attorney in defending potential litigation. Do not release to any person except a District official, designated PDRMA representative, or an investigating police officer.

USE BACK OF FORM FOR ADDITIONAL COMMENTS
 REPORT VANDALISM TO THE MANAGER OF PARK OPERATIONS OR YOUR MAINTENANCE SUPERVISOR

LOW FREQUENCY PLAYGROUND INSPECTION FORM

(Source: Elmhurst Park District)

Playground: Pioneer Park Inspector: _____ Date: _____ Supervisor: _____ Date: _____ Repairer: _____ Date: _____	Composite Structure (A) Spring Toys (3) (B) Spring Se-Saw (C) Tire Swing (D) Tot Swing (E) Benches (F) Basketball Court	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;">NOTE:</p> <p><i>This form has been prepared to assist the District's attorney in defending potential litigation. Release ONLY to EPD officials, PDRMA representatives, or investigating police officers.</i></p> </div> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 25%;"></td><td>Logs / Boards: <i>cracks, splinters, decay</i></td></tr> <tr><td></td><td>Seats / Slats: <i>cracks, splinters, decay, rust, paint</i></td></tr> <tr><td></td><td>Platforms / Decks: <i>loose, gaps, rust, protruding bolts</i></td></tr> <tr><td></td><td>Sharp Edges: <i>corners, edges, bolts, burrs, splinters</i></td></tr> <tr><td></td><td>Endcaps: <i>missing, exposed piping, bees & wasps</i></td></tr> <tr><td></td><td>Bolts / Hardware: <i>protruding, loose, missing</i></td></tr> <tr><td></td><td>Welds: <i>pitting, rust, cracks</i></td></tr> <tr><td></td><td>Paint: <i>chipping, peeling, rust</i></td></tr> <tr><td></td><td>Footings: <i>loose, exposed, cracked</i></td></tr> <tr><td></td><td>Support Posts: <i>loose, protruding bolts, collars</i></td></tr> <tr><td></td><td>Bars / Pipes / Rails: <i>loose, missing, protruding bolts</i></td></tr> <tr><td></td><td>Collars / Brackets: <i>loose, missing, drive pins</i></td></tr> <tr><td></td><td>Rungs / Handholds: <i>loose, protruding bolts</i></td></tr> <tr><td></td><td>Guardrails / Barriers: <i>loose, missing, protruding bolts</i></td></tr> <tr><td></td><td>Ramps / Transfer Deck: <i>access, gaps, surfacing</i></td></tr> <tr><td></td><td>Ladders / Steps: <i>loose, rust, protruding bolts</i></td></tr> <tr><td></td><td>Overhead Eqpt: <i>loose, vertical projections</i></td></tr> <tr><td></td><td>Sliding Poles: <i>loose, footings</i></td></tr> <tr><td></td><td>Talk Tubes: <i>bees, wasps</i></td></tr> <tr><td></td><td>Bedways / Tunnels: <i>cracks, gaps, protruding bolts</i></td></tr> <tr><td></td><td>Suspension Bridge: <i>gaps, protruding bolts, pinching</i></td></tr> <tr><td></td><td>Swing Seats: <i>cracks, missing, replace</i></td></tr> <tr><td></td><td>S-Hooks / Clevis: <i>25% wear, open, replace</i></td></tr> <tr><td></td><td>Chains / Ropes / Cables / Nets: <i>loose, rust, wear</i></td></tr> <tr><td></td><td>Bearings / Fittings: <i>grease, wear, replace</i></td></tr> <tr><td></td><td>Tires: <i>damage, mounting, drainage</i></td></tr> <tr><td></td><td>Track Rides: <i>track, hanger, bearings</i></td></tr> <tr><td></td><td>Springs: <i>support, worn, replace</i></td></tr> <tr><td></td><td>Panels: <i>loose, missing, damaged</i></td></tr> <tr><td></td><td>Balance Beams: <i>hardware, surface</i></td></tr> <tr><td></td><td>Rubber Surfacing: <i>holes & depressions</i></td></tr> <tr><td></td><td>Mulch Surfacing: <i>depth, holes & depressions</i></td></tr> <tr><td></td><td>Sand Surfacing: <i>remove debris, sweep walks</i></td></tr> </table>		Logs / Boards: <i>cracks, splinters, decay</i>		Seats / Slats: <i>cracks, splinters, decay, rust, paint</i>		Platforms / Decks: <i>loose, gaps, rust, protruding bolts</i>		Sharp Edges: <i>corners, edges, bolts, burrs, splinters</i>		Endcaps: <i>missing, exposed piping, bees & wasps</i>		Bolts / Hardware: <i>protruding, loose, missing</i>		Welds: <i>pitting, rust, cracks</i>		Paint: <i>chipping, peeling, rust</i>		Footings: <i>loose, exposed, cracked</i>		Support Posts: <i>loose, protruding bolts, collars</i>		Bars / Pipes / Rails: <i>loose, missing, protruding bolts</i>		Collars / Brackets: <i>loose, missing, drive pins</i>		Rungs / Handholds: <i>loose, protruding bolts</i>		Guardrails / Barriers: <i>loose, missing, protruding bolts</i>		Ramps / Transfer Deck: <i>access, gaps, surfacing</i>		Ladders / Steps: <i>loose, rust, protruding bolts</i>		Overhead Eqpt: <i>loose, vertical projections</i>		Sliding Poles: <i>loose, footings</i>		Talk Tubes: <i>bees, wasps</i>		Bedways / Tunnels: <i>cracks, gaps, protruding bolts</i>		Suspension Bridge: <i>gaps, protruding bolts, pinching</i>		Swing Seats: <i>cracks, missing, replace</i>		S-Hooks / Clevis: <i>25% wear, open, replace</i>		Chains / Ropes / Cables / Nets: <i>loose, rust, wear</i>		Bearings / Fittings: <i>grease, wear, replace</i>		Tires: <i>damage, mounting, drainage</i>		Track Rides: <i>track, hanger, bearings</i>		Springs: <i>support, worn, replace</i>		Panels: <i>loose, missing, damaged</i>		Balance Beams: <i>hardware, surface</i>		Rubber Surfacing: <i>holes & depressions</i>		Mulch Surfacing: <i>depth, holes & depressions</i>		Sand Surfacing: <i>remove debris, sweep walks</i>
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<p><i>Use the Following Codes:</i></p> <p>1 = OK 2 = Needs maintenance 3 = Request for Repair O = Supervisor Notified; W/O written X = Corrective Action Complete</p> <p style="text-align: center;">Site Conditions</p> <p>Vandalism: graffiti, glass, trash, damage</p> <p>_____</p> <p>Drainage: standing water</p> <p>_____</p> <p>Borders: damage, missing, protrusions SPIKMA</p> <p>_____</p> <p>Landscaping: damage, broken, missing</p> <p>_____</p> <p>Site Amenities: tables, benches, grills picnic tables, bike rack</p> <p>_____</p> <p>Signage: broken, missing, damage</p> <p>_____</p> <p>Drinking Fountain: broken, drainage</p> <p>_____</p> <p>Additional Comments (use back as needed)</p> <p>_____</p> <p>_____</p>	
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**APPENDIX I
DOCUMENTATION CHECKLIST**

(Source: Playground Safety Is No Accident)
© NRPA, PDRMA, NPSI

Site Name:

Date Eqpt Installed:

Date Checklist Completed:

Checklist Completed By:

Item on File		Checklist Item
Yes	No	
		1. Project Team Minutes
		2. Play Area Bid Specifications
		3. Copy of PO or Invoice
		4. Insurance Certificate <i>(including product's liability limits)</i>
		5. Manufacturer's Compliance Letters <i>(w/ ASTM 1487, 1292, 1951, CPSC)</i>
		6. Manufacturer's installation drawings and instructions
		7. Manufacturer's Installation Verification
		8. Site Plans / Construction Details
		9. Itemized List and Quantity of Play Components
		10. Parts List
		11. Initial Play Area Safety Audit
		12. Recommended inspection frequency checklist
		13. Inspection History and Checklist Copies
		14. Remedial Action History:
		a. Telephone Complaints:
		b. Work Orders
		15. Accident / Injury Reports
		16. Other

IMPORTANT: *This information has been prepared to assist the agency's attorney in defending potential litigation. Do not release to any person except an agency official, risk management representative, or an investigating police officer.*

ENDNOTES

- ¹ Illinois Department of Natural Resources. The Community Park and Recreation Planning Guide. One Natural Resources Way, Springfield, IL 62702-1271. 1994. (217) 782-7481. www.dnr.state.il.us
- ² King, Steven. Unpublished Analysis of Playground Accident and Injury Data. Landscape Structures, Inc. Delano, Minnesota. 2004.
- ³ Consumer Product Safety Commission (CPSC). Handbook for Public Playground Safety. Washington D.C. 20207. 1997. (301) 504-0494. www.cpsc.gov
- ⁴ American Society for Testing and Materials International (ASTM). F1487. Standard Consumer Performance Specification for Playground Equipment for Public Use. 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959. 2001. (610) 832-9585. www.astm.org
- ⁵ U.S. Access Board. Suite 1000, 133 F Street NW, Washington, D.C., 20004-1111. (800) 872-2253. www.access-board.gov
- ⁶ American Society for Testing and Materials International (ASTM). F1951. Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment. PO Box C700, West Conshohocken, PA 19428-2959. 1999. (610) 832-9585. www.astm.org
- ⁷ American Society for Testing and Materials International (ASTM). F1292. Standard Specifications for Impact Attenuation of Surface Systems Under and Around Playground Equipment. 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959. 1993. (610) 832-9585. www.astm.org
- ⁸ American Society for Testing and Materials International (ASTM). F2075. Standard Specification for Engineered Wood Fiber for Use as a Playground Safety Surface Under and Around Playground Equipment. 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959. 2001. (610) 832-9585. www.astm.org
- ⁹ Molnar, Donald J. and Rutledge, Albert J. Anatomy of a Park. Second Edition. McGraw-Hill Book Company, New York. 1986. ISBN 0881336998.
- ¹⁰ Federal Flood Map Distribution Center, Federal Emergency Management Agency (FEMA). 6930 San Tomas Road, Baltimore, MD 21227. (800) 358-9616. www.fema.gov
- ¹¹ Esbensen, Steen B. Early Childhood Playground: An Outdoor Classroom Toxic and Non Toxic Vegetation. High/Scope Educational Research Foundation. 1987. ISBN 0931114403.
- ¹² Architectural and Transportation Barriers Compliance Board. Americans With Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities: Play Areas. 36 CFR Part 1191. Published in the Federal Register on Monday, November 20, 2000. (202) 272-5434. www.access-board.gov
- ¹³ Park District Risk Management Association. Sample Volunteer Waiver. PO Box 4320, Wheaton, IL 60189-4320. (630) 769-0332. www.pdrma.org
- ¹⁴ Kutska, Kenneth S., Hoffmann, Kevin J., and Malkusak, Antonio. Playground Safety Is No Accident. 3rd Edition. National Recreation and Park Assn. Ashburn, VA 20148. (703) 858-2148. www.nrpa.org
- ¹⁵ Birren. Faber. Color Psychology and Color Therapy – A Factual Study of the Influence of Color on Human Life. Pg 244. Carol Publishing Group, New, NY. 1992. ISBN 0806506539.