

**Footprints in the Snow:
Playground Design as a Facilitator of Winter Play**

by
Amy Kludt

*A practicum submitted
in partial fulfillment of the requirements
for the degree of
Master of Landscape Architecture
School of Natural Resources and Environment
University of Michigan, Ann Arbor*

August 2009

Faculty advisors:

Chair, Dr. David Michener, Associate Curator, Matthaei Botanical Gardens
Co-Chair, Professor Bob Grese, Director, Matthaei Botanical Gardens and Nichols
Arboretum

Abstract

Winter presents play opportunities unique to the season; these opportunities inherently support the engaged, high quality play that lends itself to the development of healthy, balanced children. Despite this, little attention has been given to playground function in winter months. In a culture that has come to allow safety concerns and fear of litigation drive the decisions behind playground composition, the enhancement of winter play opportunities has gone essentially unaddressed resulting in a gross underutilization of valuable play space. This project examines the ways in which seasonal considerations can be infused into the design process so that play environments can better facilitate winter activity.

The project begins with a review of existing literature on design for winter play and an overview of the evolution of playgrounds in the United States. Next, exploration into the role of play in child development provides insight on how design can create a play environment supportive of developmental needs. To supplement all collected information, three Ann Arbor area elementary schools were visited in late winter; observations of recess activities and interviews of playground monitors provided focused inquiry targeted at winter play patterns and playground function allowing a direct account of winter playground activities. Insights gained were coupled with fundamental tenants of design and child development needs to inform a set of guidelines for the design of a winter play environment. Guidelines were then applied in a schoolyard design scenario.

Research indicated topography, micro-climate, and vegetation were the most influential instigators of winter play. Topography introduces an extended range of open-ended winter play opportunities and activates the space while the strategic placement of vegetation moderates climate conditions in the site's interior creating a more comfortable play environment. When incorporated into the underlying fabric of the site layout during the early design phases, these winter considerations provide the foundation for a playscape that inherently facilitates winter play. The presented design demonstrates how seamlessly these considerations can be integrated into the site layout phase of the design process. Developmental goals overlaid onto this initial framework will result in an enriched play area that instigates engaging and challenging free play year round.

Table of Contents

Abstract

1.0. Designing for Winter Play	1
2.0. History of Playground	4
2.1. Traditional Playgrounds.	4
2.2. Adventure Playgrounds	5
2.3. Designer Playgrounds	6
2.4. Creative Playgrounds.	8
3.0. Role of Play in Child Development.	10
3.1. Physical Development.	10
3.2. Socio-emotional Development.	10
3.3. Cognitive Development.	11
3.4. Nature Play.	13
3.5. Safety and Risk Taking.	13
3.6. Winter Play.	14
4.0. Guiding Design Principles	15
4.1. Winter Design Considerations	15
4.2. Spatial Organization	17
4.3. Access.	19
4.4. Play Settings and Components	21
4.5. Planting Strategies.	23
4.6. P's & Q's	25
4.7. Maintenance	26
4.8. Safety as a Design Constraint	27
5.0. Case Studies.	30
5.1. Introduction to Study Area.	30
5.2. Methodology.	32
5.2.1 Case Study Template.	33
5.3. Allen Elementary School.	34
5.3.1. Observations.	38
5.3.2. Interviews.	39
5.4. Eberwhite Elementary School.	40
5.4.1. Observations.	43
5.4.2. Interviews.	45
5.5. Dicken Elementary School.	46
5.5.1. Observations.	48
5.5.2. Interviews.	51
5.6. Case Study Conclusions.	52
5.6.1. Landscape/Playscape.	53
5.6.2. Play Patterns and Equipment	54

5.6.3. Playground Rules and Recess Monitors.	55
5.6.4. Winter	56
6.0. Design Application.	58
6.1. Demonstration Site.	58
6.2. Design Process.	59
6.2.1. Site Inventory and Analysis.	59
6.2.2. Site Design.	63
6.3. Design Reflection	68
7.0. Report Summary	69
8.0. References	70

List of Figures:

Figure 2.1. Playground, Dante School, Chicago, Illinois, 1910.	4
Figure 2.2. Adventure Playground, Berkeley, California, 2009	5
Figure 2.3. 1950’s Playground, Disneyland Hotel, Anaheim, California	6
Figure 2.4. “Agget” (The Egg); Tessin Park, Stockholm, 1951.	6
Figure 2.5a. Timberform Custom Play Structure, 1966.	7
Figure 2.5b. Timberform Custom Play Structure, 1966.	7
Figure 2.6. Pierce Park, New Bern, North Carolina, 2009	8
Figure 5.1. Context Map, Ann Arbor, Michigan	30
Figure 5.2. Case Study Site Context Map	33
Figure 5.3. Allen Elementary Playground Layout.	37
Figure 5.4. Eberwhite Elementary Playground Layout	42
Figure 5.5. Dicken Elementary Playground Layout	49
Figure 6.1. Existing Conditions, Design Example Site	58
Figure 6.2. Site Inventory	61
Figure 6.3. Sun/Shade Analysis	60
Figure 6.4. Site Analysis.	62
Figure 6.5. Functional Diagram	64
Figure 6.6. Drumlin Character Sketch	65
Figure 6.7. Site Plan.	66
Figure 6.8. Windscreen Diagram.	67

List of Tables:

Table 5.1. Monthly Weather Averages, Ann Arbor, Michigan. . . .	32
Table 5.2. Inventory Summary, Case Study Sites.	57
Table 5.3. Equipment Cart Inventory, Case Study Sites.	57

Appendices

Appendix A. Allen Elementary Equipment Images	74
Appendix B. Eberwhite Elementary Equipment Images	76
Appendix C. Dicken Elementary Equipment Images.	85

1.0. Introduction - Designing for Winter Play

Play in the outdoors¹ provides the opportunity for the type of active and engaged activity that supports the growth of healthy, well-balanced children. The outdoors inherently contributes to the imaginative, interactive, and unstructured play critical to a child's physical, cognitive, and socio-emotional development. The need to provide for quality² play does not stop when it gets cold, nor do the offerings of the outdoors; winter landscapes present distinct occasions for highly imaginative play through interaction with natural elements such as ice and snow. The exclusion of winter's offerings from design considerations and winter play agendas is a missed opportunity and an underutilization of valuable play space. Attention given to the importance of the role of high value³ play environments and the developmental benefits active and engaged outdoor play supports can be extended into winter months through more comprehensive design decisions. If the design of a play environment approaches the development phase of the project with a goal of facilitating the winter activities that engage children, then the completed play-space can better serve to maintain high activity levels through the winter months and capture the benefits of outdoor winter play.

Discussion on winter use of playgrounds, and even outdoor winter play in general, is limited. A literature search of both foreign and domestic academic research as well as writing for a more general public audience yielded only a handful of findings addressing the

1 In the context of this report "outdoors" refers to any outside spaces children recreate in. These spaces include, but are not limited to, schoolyards, daycare centers, community parks, backyards, urban streets, and natural areas. Discussion on the *design* of outdoor spaces is oriented more specifically towards schoolyard and community park play environments.

2 Quality play refers to play that is developmentally beneficial. Criteria that can be used to evaluate play experiences might include "physical fitness; intelligence; creativity and imagination; emotional stability and initiative; social assurance and co-operation; self confidence and competence; individuality; a sense of responsibility and integrity" (Hill, Polly. "Toward the Perfect Play Experience," in Paul Wilkinson's *Innovation in Play Environments*, 1980.)

3 High value play refers to play that is developmentally beneficial. See quality footnote for suggestions of play evaluation criteria.

design of winter playscapes⁴ (Keeler, 2006; Pepper, 1987; Wilkinson, 1980). Conversation within the design profession and other related fields on the design of play areas for four-season function and value consistently abandoned the importance of creative free play in the outdoors during winter, merely offering suggestions of nature-oriented indoor recreational activities for the winter months instead. This shift in focus from the important and special opportunities supported by active, engaged outdoor play towards the recommendation of more structured indoor activities seems contradictory. While indoor play provides opportunities for imaginative, engaged, and developmentally beneficial activities, a child's temptation to "plug-in"⁵ – or a parent's, teacher's, or other caregiver's temptation to plug a child in-- can easily override inclinations towards higher quality play. The failure to promote outdoor winter play activities is noteworthy as many regions in both the United States and abroad experience long winter seasons.

Explanations as to why physical outdoor winter play has gone largely unaddressed might be attributed to several factors. As demonstrated in the case studies, traditional play environments very often do remain functional to some capacity during winter months. Additionally, the creative and adaptive nature of children allows them to capitalize on winter's unique offerings in such settings to an extent without additional environmental design support. Despite this, to overlook the winter use of designed play environments because the space remains useable is a significant oversight with real societal costs.

This report suggests that sensitive site design can create a landscape that better facilitates winter play. Through the application of the same design principles considered when laying out play environments in general, and with special attention paid to microclimates, topography, and vegetation, the winter activities that engage children can be better supported and even enhanced. The design recommendations presented are applied

4 A playscape is a play setting designed to include the whole landscape as an inter-connected, play environment. Emphasis is placed on utilizing natural elements as open-ended play features. Unlike traditional playgrounds, playscapes do not have a designated central play area.

5 A "plugged-in" child typically refers to a child that is connected to, and completely absorbed in some technological device such as a television, computer, video game, ipod, etc.

in a schoolyard retrofit design scenario but could equally be applied to community parks, larger public parks, and other outdoor play settings. Important themes to understand include the general history of playgrounds; the role of play in child development; basic site design principles applied in the creation of play environments; and issues of safety and liability. These themes are all addressed in the following chapters.

2.0. Brief History of American Playgrounds

The evolution of the playground⁶ is punctuated by four identifiable models: the Traditional Playground, the Adventure Playground, the Designer Playground and the Creative Playground (Brett et al., 1993). Influenced by social movements and trends in child development theory, each model has evolved over time and adapted to the changed expectations, materiality, and trappings of modern day playgrounds. Still viable, functional, and accepted, these different playground models continue to be used today to varying degrees in both the United States and abroad and have left a visible imprint on the form of newly emerging playgrounds.

2.1. Traditional Playgrounds

Playgrounds first appeared in America in 1821 in Salem, Massachusetts; influenced by German fitness culture, these play areas essentially consisted of indoor gymnastic equipment placed outside (Frost, 2006). The financial opportunity presented by the development of these outdoor gymnasias resulted in the manufacturing of the equipment that by 1880 had become synonymous with playground facilities—swings, slides, see-saws, jungle-gyms, and merry-go-rounds (Playground Association of America, 1910). Referred to as traditional playgrounds and standardized by the early 20th century, the fixed metal equipment had



Figure 2.1 Playground, Dante School, 1910
Source: playgrounddesigns.blogspot.com

evolved to become an expected element of the urban landscape by the 1930s and 1940s. Traditional playgrounds followed the theoretical standing that playground activities were important not only to the physical development of children but were also “critically shaping

⁶ Playground in this context refers to any space designated and designed as a children’s play space. These spaces include, but are not limited to, schoolyards, city parks, and community parks.

the personalities and morals of the child” (Brett et al., 1993) and played an important role in the molding of children into better citizens (Solomon, 2005). The traditional playground remains the dominant playground model today.

The design of playgrounds in the US pre-World War II emphasized individual pieces of equipment but typically failed to consider the playground space as a whole. Post-World War II culture saw a shift in playground design as architects, sculptors, artists, landscape architects, and planners began thinking more innovatively about the interactive nature of playgrounds and the unique experience a thoughtfully planned, intentionally designed space could create. With Europeans leading the way, professional designers engaged in an influential evolution of children’s play spaces.

2.2. Adventure Playgrounds

Danish Landscape Architect C. Th. Sorensen developed the concept of adventure playgrounds in 1943. Designed to engage children in a variety of challenging and creative games and play activities, these



Figure 2.2 Adventure Playground, Berkeley, California, 2009

Source: <http://www.ecometro.com>

playgrounds emphasized the developmental and learning value of both social and solitary play by providing opportunities to interact with surroundings and with other children in an unstructured, self-motivated way. Children were encouraged to build dens, huts, and houses with tools and scrap materials, care for animals, tend gardens, and play in water, sand and dirt; these playgrounds featured trained play-leaders or play-workers to provide both hands-off supervision and assistance to children when called upon (Frost, 2006). While adventure playgrounds became popular throughout Europe and into Asia, the United States failed to adopt the principles and practices of the concept. Though found to be safer than

the more traditional playgrounds (Heseltine, 1998) and developmentally appropriate, the messy appearance, unsubstantiated safety concerns, lack of understanding of the value of spontaneous free-play, and a lack of funding have kept adventure playgrounds from truly taking hold in America (Frost, 2006). To date, only two public adventure playgrounds remain open in the US, one at the Berkeley Marina in Berkeley, California and the other in Huntington Beach, California; both are run by the city and are open year-round.

2.3. Designer Playgrounds

In the early 1950s a split in the theoretical thinking about playground design led to



Figure 2.3 1950's Playground, Disneyland Hotel
Source: magicalhotel.blogspot.com

the development of a new playground model.

To most park and school administrators, a playground's value was in the recreational opportunities it provided; the programming formula of traditional playgrounds was sufficient as the model maximized efficiency, allowing the integration of schoolyard and park playgrounds

and thereby decreasing the duplication of equipment within an area (Solomon, 2005). To

critics of the recreation movement, playgrounds presented an opportunity to enhance children's "aesthetic awareness and individual creativity" (Solomon, 2005). Embraced by the art world,

and fueled by design professionals, designer playgrounds were built with architectural

sculptures created to kindle a child's sense of space and form. Advocates of these playgrounds

cited the wide range of function and flexibility, the

inspirational attributes supported by the sculptural elements, and the more holistic design of the space as developmentally beneficial improvements to the traditional playground



Figure 2.4 "Agget" (The Egg), Playable sculpture by Egon Moller-Nielson, 1951; Tessin Park, Stockholm
Source: <http://playgrounddesigns.blogspot.com>

model. Decision-makers tended to reject proposals for such play-spaces citing safety and cost as reasons of concern thereby leaving designer playgrounds available to a select few.

In the wake of prevalent social urban reform movements in the mid-1960s, new images of playground spaces once again began to take shape. The physical form of playgrounds continued to change as traditional equipment was supplemented with structures of raised connecting platforms affixed with play obstacles and mounted on wood columns; interspersed throughout the play space were

additional wood columns that stood independently as play features in their own right. By the late 1970s manufacturers were mass producing these modular systems of wood decks and sturdy log posts that were linked together to create an uninterrupted stream

of activities for playground users. During this time Americans (who have historically been safety and liability conscious) began to show a “pronounced difficulty in assessing risk and lost the ability to distinguish between real and perceived danger” (Solomon, 2005). As safety guidelines took hold, commercial products became the dominant playground feature. With a decreasing number

of design professionals willing to expose themselves to the liability affiliated with the design of playgrounds, communities were left with few alternatives to the static designs and repetitious pre-fabricated structures. As computer generated, “customized” products became available in the early 1980s, Americans lost sight of the developmentally beneficial offerings of a uniquely and holistically designed playground space and began to define a playground once again by its component parts. With the increasing fixation on perceived safety, wood equipment was replaced with metal, which was eventually replaced with plastic; groundcover, appropriate activities, and issues of liability became obsessions. Soon,



Figures 2.5a and 2.5b Timberform Custom Playgrounds

Source: <http://timberform.com>

only large companies could sustain the possibility of legal defense – even the government was not immune to litigation. The first instance of a law suit filed over the injury of a child due to playground equipment dates all the way back to 1917 when the school board in Tacoma, Washington was sued by the parents whose son had sustained an injury on a playground (Curtis, 1917/1977); the incidence of playground accidents resulting in legal action increased steadily from this time forward. Out of concerns of liability, playgrounds that were unable to keep up with a deluge of safety regulations and rapidly changing equipment standards⁷ were closed.

2.4. Creative Playgrounds

Today, excessive and often unrealistic safety concerns continue to plague playgrounds and drive the design process.

Traditional playgrounds with equipment modified for safety remain the norm; the brightly colored pre-fabricated plastic structures that emerged in the 70s have become synonymous with playgrounds today. An increasing amount of attention is being given to the developmental deficiencies of these play-spaces as psychologists,



Figure 2.6 Typical playground, 2009; Pierce Park, New Bern, North Carolian
Source: www.new-bern.nc.us

sociologists, and child development experts all voice concerns about children growing up in environments that are too safe and too structured to allow the quality of play so important to a child’s physical, socio-emotional, and cognitive development. In response to this, a new movement has emerged that seeks to re-activate playground space and create playscapes that better feed the developmental needs and imaginations of children. The creative playground model couples the increased understanding of the important role of engaged and unstructured play in child development with a more holistic approach to the design

⁷ Safety regulations and equipment standards have been put forth by multiple, independent organizations including the Consumer Product and Safety Commission, the American Society of Testing and Materials, and the National Program for Playground Safety.

of the playground space. Elements of traditional, adventure, and designer playgrounds are merged to provide children with a “maximum range of play possibilities” (Brett et al., 1993) while responding to reasonable concerns of safety and the desire for an aesthetically pleasing space. Larger public institutions including botanical gardens, arboreta, children’s museums, and well-funded city parks have begun to call upon design professionals to foster the idea of “playscape” in permanent child-oriented settings which very often result in the incorporation of natural elements into a themed play area. At the smaller scale, community initiatives fueled by a participatory design process work to build and maintain creative playgrounds that combine both traditional and natural elements at a low cost.

Susan Solomon’s *American Playgrounds, Revitalizing Community Space* (2005) is the definitive work to-date on playground design as it thoroughly chronicles the history of, philosophies behind, and pivotal characters influencing the evolution of public play spaces. The book proceeds to move through a series of case studies, providing contemporary examples of play areas that have successfully coupled principles of good design with innovative thinking and practicality. The selected sites illustrate a growing trend towards the return of aesthetic and developmental value to playground design. Solomon argues that American culture’s inability to differentiate between real and perceived safety has left playgrounds limited and sterile; readers are encouraged to think critically about risk assessment and its impact on the design of play spaces. Throughout “*American Playgrounds*” the author forwards the idea that play areas need to be acknowledged as public gathering spaces that serve more than just children and therefore should be designed as such. The book concludes with an overarching recommendation by the author for context specific playground design solutions that respond to each individual community’s needs, resulting in unique and fitting public play spaces. Many of the sentiments and arguments put forth by Solomon reverberate throughout this report.

3.0. Role of Play and Play Environment in Child Development

Play is critical to a child's physical, socio-emotional, and cognitive development, yet the design of children's outdoor spaces has become driven largely by liability concerns and by parents' generalized fear of strangers. Significant opportunities for the active, stimulating, and creative play that were once commonplace have been replaced with sterile play environments that offer limited engaging and challenging experiences. These environments haunt an unfortunate majority of institutions where children spend time including schools, daycare centers, and community parks. The need to re-engage children in physical and dramatic play has become progressively more apparent as the effects of a "plugged-in" childhood reverberate. Reflective of an increasingly sedentary lifestyle, rates of child obesity, attention disorders, and depression are on the rise (CDC, 2009). In the absence of active, spontaneous, imaginative play children's social and cognitive development suffers (Carlsson-Paige, 2008; Frost, 2006/2004; Moore, G.T., 1983; Moore, R.C. 1986; Pellegrini, 2006).

3.1. Physical Development

Traditionally defined as child's work or the principle business of childhood, play intrinsically aids in the development of the whole child. Play initiates a cycle of risk-taking by fueling the initiative and self-confidence a child needs to test limits and by introducing children to the feeling of accomplishment when new limits are reached. At its simplest, play is a physical activity. Play prompts the exercise that builds strength, endurance, coordination, and balance. Basic large muscle activities such as climbing, swinging, crawling, and jumping build the physical foundation and general fitness level needed to support more complex physical activities.

3.2. Socio-Emotional Development

Social and emotional development are closely intertwined and are interdependent. When children play in social contexts they learn how to cooperate, negotiate, and compromise; children learn how to form interpersonal relationships and begin to learn how to navigate the formal and informal rules of peer interaction. An important and influential

means of skill development, peer interaction teaches behavioral flexibility and strengthens communication skills (Pellegrini, 2006). A well-documented example of behavioral flexibility can be seen in the “self-handicapping” bigger and stronger children impose on themselves when playing with a smaller peer – for instance, a right-handed child may agree to play left-handed, or a larger child may wrestle a smaller child from a kneeling position (Pellegrini, 2006).

The various types of play -- structured and unstructured, social and solitary-- all provide children with an opportunity to act out and explore the emotional facets of different situations; children begin to learn how to deal with anger, inhibit aggression, and experience joy. As social and emotional function develops, children begin to gain the self-control and emotional stability required to better manage real world situations (Pellegrini, 2006; Thomson, 2003). Adults can play a beneficial role in this process of exploration and growth. Acting as catalysts, adults can enforce, encourage, stimulate, and inspire children during play; adults can encourage integration and help adapt environments to all ability levels (Hill, 1980).

3.3. Cognitive Development

Play that is active and engaged inherently supports the trial-and-error risk-taking and creativity that stimulates cognitive function. Through self-initiated cause and effect experimentation during play, children become their own teachers; as a child modifies his/her environment, feedback begins to inform relationships and associations develop (Hill, 1980; Moore, G.T., 1983; Thomson, 2007). Problem solving skills, mathematical relationships, even scientific principles can be learned through play (Carlsson-Paige, 2008; Moore, G.T., 1983). Malleable environments that are rich and diverse, challenging and stimulating reinforce skills acquired and establish links between a child’s own world and the larger world. Play that is informal, unstructured, unrestrained, and spontaneous increases the likelihood of a child relating to world around them (Thomson, 2007). However, structured, organized play is not to be overlooked; traditional games such as tag, or hide-

and seek not only prompt physical development but also stimulate cognitive function. As in unstructured play, problem solving skills are used to achieve goals; language and symbolism are used to communicate with others; and abstract and independent thinking is rewarded. The value of learning relationships and developing skills, confidence, and competence in the context of play stems from the child-initiated, self-directed nature of play. Through play, children learn to become actively engaged in an undertaking and develop the ability to focus their attention.

The capacity to actively focus attention is subject to fatigue as a normal outcome of everyday functioning (Kaplan, Kaplan & Ryan, 1998; Kaplan, S. 1995). While the basic restoration of the ability to direct attention requires extended time spent in settings that allow for the rest of the inhibitory mechanism, micro-restoration of the capacity to focus attention can be achieved through time spent away from the distraction; by simply changing tasks and introducing a feeling of being in another world, the ability to direct attention can be restored for the short-term (Kaplan, Kaplan & Ryan, 1998; Tennessen, C.M., 1995). Directed attention fatigue is of particular relevance to children in an academic setting. Recess represents a changing of tasks, a break from the confines of the classroom. While adults may consider recess as simply an opportunity to “blow off steam,” it is in fact serving as, or can serve as, an opportunity for students to recharge their ability to focus their attention on classroom lessons. Studies of academic performance have found breaks incorporated into the daily routine actually increase productivity and mental effectiveness (Pellegrini, 2006) and have a positive influence on classroom behavior (Barros et al., 2009). These breaks from study provide the brain an opportunity to reset, refresh, and allow the child to regain the ability to pay attention, yet in 2005 the International Play Association reported that 40% of American schools have drastically reduced recess time or eliminated recess from the schedule all together in order to increase the amount of time dedicated to test preparation (Frost, 2006).

3.4. Nature Play

The role of natural settings⁸ in the promotion of the unstructured, spontaneous, child-initiated play so important to a child's development is an area of increased focus in play and play environment theory and research. The opportunities for free play presented by such settings allow for children not only to explore, test, and learn from the environment but also to participate actively in the imaginative and creative play that fosters the growth of balanced, fit, healthy, and happy children (White, 1997). Children's play environments offering landscape and vegetation as the backdrop and nature as the play instigator serve to connect kids to their surroundings, building an emotional attachment to nature that can later develop into environmental sensitivity (Louv, 2005; Gill, 2005). Attention given to the benefits of extending nature into children's play has prompted the incorporation of nature-oriented children's play environments into the permanent programming of a variety of larger public institutions including botanical gardens, arboreta, and museums. The lessons of the natural world and the canvas it provides has encouraged the incorporation of environmental education programs and natural elements⁹ into school curricula. Unfortunately, the legal, logistical, and even financial realities of bringing more than just natural elements back into smaller public play environments such as community parks and schoolyards— particularly those in urban areas – can be daunting and even deterring. In response to this, design professionals have begun to creatively include natural elements into the more traditional playground model.

3.5. Safety and Risk-Taking

Physical and emotional safety are essential components in all play environments. From the child development perspective, children need to feel safe to engage in the stimulating and creative play that supports physical, social, emotional, and cognitive growth. Feeling safe supports a child's desire to explore and engage with an environment

8 Natural settings here are environments not designed or cultivated by humans.

9 Natural elements in a playground setting might include logs, boulders, earth forms, or water and also natural processes; ultimately "objects" from the natural world, i.e. not man-made.

and the natural inclination to test limits (Moore, G.T, 1983). As childrens' confidence grows, so does their readiness to take risks. Because risk-taking is an important element in child development, a safe play environment needs to allow for the risk and support the resilient nature of children.

3.6. Winter Play

Winter presents play opportunities unique to the season; these opportunities inherently support the engaged, high quality play that lends itself to the development of healthy, balanced children. Through maintained activity levels, exposure to new challenges and enhanced interaction with natural elements such as ice and snow, a well thought-out playscape that capitalizes on winter's offerings can cultivate the physical, cognitive, socio-emotional growth of playground users. Design that genuinely considers winter activity on the playground can manage realistic safety concerns without compromising the risk-taking and fun that are both important components of play.

4.0. Guiding Design Principles

This project looks to couple child development theory and research with fundamental landscape design principles to inform the design of a winter playscape. Creating a play environment built on a foundation of basic design tenants including form, movement, and context adds an inherent richness and complexity to the experience of the place. Landscape design aims to holistically shape a space by establishing for each site a sense of place connected to its surroundings (natural, cultural, and/or historical) while working within the existing conditions and natural framework of each site. Design criteria from a child development perspective consider the need for challenge; variety; open-endedness; accessibility, and; safety (Walsh, 2008; Moore, R., 1992). The connection between informed landscape design and developmentally beneficial goals is of particular importance because “... a child develops through feedback from interactions with the environment” therefore, “the character of the physical setting becomes influential over the type and degree of interaction in which a child engages” (Moore, G.T, 1983). Winter considerations incorporated into the underlying fabric of the site layout during the early design phases shapes the space into one that inherently facilitates winter play. Developmental goals overlaid onto this initial framework will result in an enriched play area that instigates engaging and challenging activity year round. Outlined below are physical translations of design principles informed by child development criteria; the combined application of the two serves to enhance play opportunities within a playscape. The concepts guiding design are closely interconnected and entwined within one another; design responses are repeated in multiple instances but under different contexts throughout the following sections.

4.1. Winter Design Considerations

The primary factors influencing outdoor winter recreation are local topography, vegetative cover, and climate (Wilkinson, 1980). The introduction of even a small amount of topography changes the character of the space in all seasons, but the opportunities

shifts in elevation create during the winter months can serve to truly activate the space and enhance play. Vegetative cover and climate are closely linked, as the strategic incorporation of vegetation on a landscape can greatly influence the micro-climate of the site. Wind protection and sun exposure are central to winter site design -- plant placement can alter the effects of both (Wilkinson, 1980).

1) Massings of evergreen trees and shrubs should be placed on the west and northwest region of the site to screen winter winds creating protected areas on the opposite side of the wind. Studies have shown wind velocities across open areas can be reduced by up to 60 percent on the leeward side of vegetative wind screens for a distance that is 10 to 20 times the height of the tree mass (Robinette, 1972).

2) Evergreen massings should be planted in a continuous band to maximize buffering efficiency. Scattered in smaller groups, coniferous trees create openings for the wind to move through that can actually increase the wind's velocities through the area (Booth & Hiss, 2004).

- Densely branched deciduous plants can provide some of this same wind buffering value while also enriching habitat in the play area.
- Walls and fences can serve as effective wind screens as well, provided some air flow through the screen is permitted to maintain the uplift needed to move the wind over the adjacent area.
- Groundcover beneath and adjacent to conifer massings should be monitored closely as these dense groupings often become havens for many weed species such as garlic mustard and poison ivy.

3) Play areas intended for more sedentary activities should be stationed on the south side of a site to maximize exposure to the sun's warming rays during the day. Importantly, nearby shade must be provided for refuge in the summer months.

- On the south side of a site, heat reflected away from a building exterior and adjoining ground plane creates a pocket of warmth; dark-colored pavement can add to the heat created by absorbing the sun's rays.

4) The pairing of topography and thoughtfully placed barriers should be utilized to encourage snow buildup in desired areas while reducing accumulation in others.

- Snow buildup tends to be greater on the leeward side of a slope or barrier.
- North-facing slopes will receive the least amount of sun exposure, and therefore retain snow cover the longest.

5) When hills or mounds are created they must meet existing grades at the edges of the property.

4.2. Spatial Organization/Layout

As a basis for the design of outdoor play settings, playgrounds should be considered a “collection of spaces with the potential for play, and planning considered the process by which spaces are arranged to maximize play” (Kritchevsky and Prescott, 1977). Design consideration of the play environment as a whole promotes a full range of developmental skills and incorporates the larger context of the surrounding landscape; holistic design accounts for the interconnectedness of the collection of spaces and the interaction that occurs between them. The design of each unique, individual play space provides more specifically for the different developmental needs of play environment users. The spatial organization of an environment or elements in an environment can significantly influence people's ability to make sense of their surroundings and support their desire to explore (Kaplan, Kaplan & Ryan, 1998). A well thought-out layout of space can foster a feeling of security through understanding that not only supports the inclination to explore, but in the context of a playscape instigates engaged free play.

1) Different play areas should be designed to provide for a range of developmentally-based needs and personal/social experiences. Playgrounds must accommodate both open areas for high energy activity and spaces for more sedentary social interaction. A play composition that responds to a range of cognitive, physical, and socio-emotional developmental needs provides quiet spaces for sedentary, focused activities; active spaces designed for physical, concentrated play that can accommodate a range of skill levels; and open spaces targeted towards running, cross playground access, and early group games (Walsh, 2008). Private, semi-private, and public spaces can be articulated through degree of enclosure, real or perceived, and accessibility.

2) Design should shape each space to define the area without separating it from the whole. The loose definition of the different spaces better promotes a balance of play activities (Walsh, 2008); open-endedness in the design of spaces and forms offer characteristics that suggest different meanings but leave room for a child's imagination to fill in the full connotation of the environment (Talbot and Frost, 1989).

- Spaces need an identity of their own and can be differentiated via size and physical character.
- Changes in scale of both landscape and playthings can work to define and shape a space while activating the imagination and engaging the child (Talbot and Frost, 1989).
- Layering within the design introduces complexity to the environment, facilitating exploration through visual access and enriching the experience of the place through the unfolding sequencing of spaces (Talbot & Frost, 1989).

3) Design should consider the compatibility of adjacent uses among each designed space. A well thought-out design supports degrees of graduated challenge and elicits interaction while minimizing interference between different activities.

- Immediate exposure to a next level of challenge facilitated through visual and physical access fosters developmental growth by encouraging movement into nearby spaces.
- Play areas and access routes should be organized to facilitate functional linkages between the spaces and equipment without disrupting play within the spaces. (Wilkinson & Lockhart, 1980).
- High density play areas should be placed to limit any negative impacts on areas intended for low density play.
- Activities oriented towards the development of large muscle groups should be located away from areas oriented toward small-muscle manipulative play.

4.3. Access

1) To facilitate movement between and within play spaces, access should be safe,

unrestricted, convenient, and understandable. Design that allows unimpeded access to the next level of challenge encourages interaction and risk taking.

- Visual access around primary intersections should be open to prevent the incident of collisions between children.
- Primary entrances into the play environment should be highly visible, clear, easily identifiable, and connect to important areas.
- Secondary entrances into and between different play spaces can be designed more discretely to prompt discovery through exploration.
- Plants and play elements can serve as landmarks, orientating children to their place in the playscape and lending to the legibility of the space.

2) Circulation patterns should be designed to encourage interaction, promote safety,

and support the aesthetic environment (Wilkinson, 1980).

- Primary routes from entrance points to high activity large group areas should be designed to be straighter, allowing for faster movement and higher volumes of child traffic.

- Secondary routes can be soft meandering paths designed to evoke a sense of mystery and encourage exploration.
- A looping form to circulation pattern promotes a steady progression through the different play areas (Moore, R.C, 1992).

3) Design should provide a comprehensive, continuous network of universally accessible routes linking accessible entrances and all activity centers on the site

(Moore, R.C, 1992). Play can be a place where abilities and disabilities blur – a well thought-out design is able to capitalize on that. Unobstructed access to different play areas supports the seamless integration and inclusion of all users. Open-endedness and complexity of design features translate across all developmental abilities and enrich the experience of the play space for all.

- Accessible pathways require a minimum width of 44 inches.
- Maximum allowable slope on accessible routes is 5 percent; slope greater than 5 percent is considered a ramp and must follow ADA guidelines for ramp installation.
- Cross slope on paths cannot exceed 2 percent.
- Surface material must be nonslip.

4) Visual access within, between, and across play areas should allow for the

“unobtrusive observation of different forms of play” (Walsh, 2008). Visual access to adjacent activities stimulates a child’s curiosity and acts as an invitation to voluntarily move into a new area.

- Two directions of visibility into all play spaces should be possible; views into and through the defined area as well as views across surrounding area exposes children to different forms of play. This level of visual access also responds to need for unimpeded visual access for supervisors/caregivers in regards to safety.

5) Design should create areas of perceived privacy and seclusion, without compromising safety.

- Low barriers such as plants, topography, and seat walls can define a space and provide a feeling of seclusion without impairing visual access across the larger space.
- Placement of more intimate pockets off secondary routes allows for uninterrupted, concentrated play.

6) Careful thought must be given to the interface between play areas and access routes for the general public.

- Access along the play environment boundary should be designed to minimize child/car interaction—physical barriers placed to separate the spaces must not impair visibility.
- Public access routes should be located along the edge of the play area and have visible entrance and exit points.

4.4. Play Settings and Components

Echoing much of the discussion presented in section 3.0 of this report addressing the role of play in child development, the design of play environments and the play components incorporated into the design must respond to needs of different skill levels; provide opportunities for risk-taking; stimulate the imagination through a degree of open-endedness; and promote interaction between children as well as between children and the surrounding environment. Play components must create opportunities for motor skill development; decision making; learning; dramatic play; and social development (Moore, R.C., 1992). Natural elements incorporated into a play area inherently support to many of the recommendations outlined below.

1) Play components should be multi-functional, allowing for different levels of interpretation and offering multiple layers of complexity.

- Design should incorporate objects ranging in manipulability and open-endedness – from found objects and loose parts to fixed-but-moving objects and fixed objects.

2) Play settings should be designed to provide levels of graduated challenge and

enable safe risk taking. Graduated challenge allows a child to test his/her skills and builds self-confidence through trial-and-error risk-taking. A well thought-out design presents the illusion of risk without exposing a child to any real threat to bodily harm.

- Safe risk taking supports risk but also allows withdrawal through retreat and break away points.
- Entrance and exit points at intermediate levels allow for low risk exploration of the play element and developing ability levels while building self confidence.
- Safe challenge should foster the physical development of upper body strength, as well as balance and coordination.
- Each play element should include several levels of difficulty (for example: steep, steeper, and steepest).
- Components should provide multiple levels of accomplishment (for example, high, higher, and highest) demarked by clear indicators of achievement.
- Components should present challenge as mastery of the body and not as an increased exposure to danger (Moore, R.C., 1992).

3) The spatial experience of different play components should support a range of physical movement alternatives in all three dimensions.

- Opportunities for movement such as up/down, over/under, and right/left teach spatial concepts that aid in the understanding of physical abilities and limitations; understanding physical limitations allow children to

cognitively measure the risks of jumping, reaching, and falling (Moore, R.C. et al., 1992).

4) The play environment should allow for interaction between children and natural processes and utilize natural elements as equipment and play props. Children are inherently interested in natural processes and elements – design can make the natural world more tangible.

- The juxtaposition of complimentary natural and manmade objects adds complexity and diversity to the space.
- The incorporation of natural elements such as water, sand, rocks, logs, plants, and stumps as play props introduce open-ended features subject to the imagination of children into the playscape.
- Placement of natural elements can direct circulation within and between spaces and enrich the three-dimensional spatial experience.

4.5. Planting Strategies

Vegetation is all too often a valuable element left out of playground design. The inclusion of plants in a play area can wholly enrich the space and fulfill a dual role of form and function within a play environment. Plants shape space, direct movement, help establish a sense of place, and inherently add layers of complexity to a playscape.

1) Plant selection should consider four season presence, capacity to stimulate the five different senses, and the overall durability of the species.

- Plants selected for seasonal contrast mark seasonal changes that help connect children to natural rhythms.
- Plants with strong spatial and textural qualities add complexity, sensory variety, and aid in orienteering and area identification.

- Plants selected should have low maintenance requirements, tolerate foot traffic, and be quick to establish and quick to heal.
- A plant palette that favors the native plants of the region creates an opportunity to better acquaint children with the natural history of the surrounding region.

2) Placement of trees and other vegetation should provide protection from the elements, particularly sun and wind.

- Conifers and shrubs grouped along the northwest and west portions of the site act to buffer the playground from biting winter winds. Foliage density of 60 percent creates the most efficient wind screen as it allows some wind to move through the tree mass, upholding the wind being pushed up over the buffer. Density exceeding 60 percent forces the deflected wind over the mass where it is then pushed back down to the ground quickly (Booth & Hiss, 2004).
- Play areas oriented on the east or northeast side of the tree mass create the ideal location for activities by providing shaded areas for relief from summer sun without blocking the sun's warming rays during winter months.
- Plant materials of low height planted on the south and southwest sides of a site maximize exposure to prevailing summer winds.

3) Plant selection and placement can deter movement into undesirable areas and elicit movement into, and exploration of, other areas.

- Plants with a dense branching, multi-trunk, or shrub-like substructure can act as barriers and add to the perception of safety.

- Vegetation in high activity areas should have soft, flexible branching to reduce risk of injury from falls.
- Plant selection and placement can be used to add the perception of depth to boundaries; establish a variety of enclosed spaces; frame views; and promote exploration and dramatic play.

4) Protective measures should be creatively incorporated into the design to preserve the health of on-site vegetation.

- Protective elements that physically separate vertically and/or horizontally should do so without completely restricting interaction with the vegetation.
- Protective barriers around the bases of trees help to minimize damage.
- More passive lines of protection such as planters, grouped plantings, and plant staking translate as cues to play area users that someone is caring for the plantings which can in turn deter abusive actions.

4.6. P's and Q's

- Sustainable practices should be employed at every opportunity. Design should utilize low impact stormwater collection and treatment methods and carefully consider environmental costs of material selection, plant palette, and maintenance regimes. The exposure of children and caregivers to sustainable practices in highly visible places such as playgrounds fosters environmental awareness within the community. The application of sustainable practices at this scale provides educational opportunities that make concepts of sustainability more tangible to the general public.
- Site design should account for issues of drainage particularly as they relate to safety; grading should work to move water away from play areas and low points should be located to prevent the development of wet/icy patches in actively used spaces.

- Design must acknowledge the societal role of playgrounds as intergenerational public gathering spaces and respond accordingly.
- Groundcover selection must balance the need for an energy absorptive capacity to cushion falls without compromising mobility, durability, and affordability; maintenance requirements should also be considered.
- Design should provide shaded seating areas for caregivers, particularly in spaces intended for younger children needing supervision.
- Design should incorporate some form of shelter into the layout to offer relief from seasonal elements such as wind, rain, and sun.
- When appropriate, the provision of a storage area for loose play objects adds to the life of the objects while teaching children responsibility.
- Lighting in play areas should be given careful consideration on a site by site basis; while lighting allows for after hours use of the space, lit areas can enable undesirable after hours activities particularly if visual access into the space is limited.
- The need for access to drinkable running water should be assessed on a site by site basis.
- Trash receptacles should be provided throughout the site, particularly at main gathering areas to encourage proper disposal of waste.

4.7. Maintenance

As in every landscape design, issues of maintenance must be considered in the development phase of play environments.

1) All playscapes must be resilient.

- Demands on groundcover and other vegetation require a plant palette that is quick to establish and regenerates easily.

- Demands on equipment require a material of lasting durability.

2) Material selection on all accounts needs to consider budgetary constraints and maintenance requirements.

- Design must account for maintenance vehicle access.
- Design layout must consider mowing realities -- a maximum 3:1 slope is allowed for mowable grass areas; design layout should not be so complicated as to hinder mowing efficiency and accuracy.
- Plant palette should consist predominately of low maintenance species.

4.8. Safety as a Design Constraint

Issues of safety and concerns of liability have become primary drivers of playground design; all too often high quality designs are modified or rejected completely based on “misconceptions about what is needed to provide a safe environment and how safe a playground should be to provide sufficient value to children” (Wilkinson, 1980). Playground designers must balance safety concerns-- both real and perceived-- with children’s developmental need for risk taking; achieving this balance is particularly challenging due to the litigious nature of US culture. Playground design must respond to safety expectations not only through the eyes of parents and administrators, but also through the eyes of children, other adults, and society at large.

The two primary goals of any safety program are to: 1) eliminate serious injuries and; 2) minimize the occurrence of minor injuries (Wilkinson, 1980). These goals can be achieved through the elimination of obvious sources of danger (sharp edges, hard surfaces, etc); use of safe, durable materials; proper and regular maintenance, and; education about safety and proper supervision (Wilkinson, 1980). Unintended misuse of equipment, brought on by boredom and the need to test limits is a leading cause of playground accidents and has therefore become a focus of many accident prevention programs (Wilkinson & Lockhart,

1980). Fixed, one-dimensional equipment lacking in complexity invites the boredom that leads to risk-taking which can readily escalate into unsafe activity; if interactions with a play element can no longer change, children begin to lose interest in the object as a plaything—the object becomes boring. Over 200,000 children were admitted to the emergency room in 2001 as a result of playground equipment injury (NPPS, 2009; McGinnis, 2001). Two primary organizations in the US have taken the lead on playground safety standards, the Consumer Products Safety Commission, and the National Program for Playground Safety.

Consumer Products Safety Commission (CPSC) publishes *Handbook for Public Playground Safety* presenting the current “standard of care” for play area safety from a legal point of view. Requirements set guidelines addressing issues playground design must account for including:

- Entrapment
- Sharp edges or corners
- Fall and no-encroachment zones
- Multiple exits
- Children with motor abilities
- Protrusions
- Crush, pinch, and shearing points
- Shock-absorbing surface
- Guardrails and protective barriers

National Program for Playground Safety (NPPS) serves as advocates for children on issues related to playground safety before government and regulatory agencies. NPPS helps the public “create, renovate, and maintain safe and developmentally appropriate play environments for children by providing professional, well-researched, highly informative, practical and user-friendly services, and programs” (NPPS, 2009). NPPS serves as a national resource for the latest educational and research information about playground safety. Established in 1995, NPPS created the National Action Plan for the Prevention of Playground Injuries to provide a blueprint for playground safety at the national, state, and local level. The National Action Plan is based on four goals that provide the foundation for playground safety.

1. Provide proper supervision of children on playgrounds.

2. Design age-appropriate playgrounds.
3. Provide proper surfacing under and around playgrounds.
4. Properly maintain playgrounds.

Translated into **S.A.F.E.** (**S**upervision, **A**ge-appropriate, **F**all surfacing, **E**quipment maintenance), these goals are organized into a checklist of measures that can be taken to create safer play environments. A multitude of other organizations oriented towards playground safety exist and while these organizations draw heavily on the standards put in place by the CPSC and the NPPS, the introduction of their own additional standards can make navigating up-to-date playground safety requirements daunting.

Quality design can provide the diversity and complexity needed to lessen the incidence of boredom; unfortunately, it is too often simply the perception of danger in designed features that leads administrators to turn to equipment catalogs for playground “design.” Perceived danger in the eyes of adults begins to restrict playground design possibilities; limitations placed on designed elements including height allowances, material selection, and use of water and loose parts quickly stifles the creativity that enriches a playscape and supports high quality, engaged play. Informed, well thought-out design draws on the guidelines discussed above to infuse play environments with the range of opportunities and different levels of challenge needed to create a dynamic play environment without compromising real issues of safety.

5.0 Case Studies

To gain further insight on playground activities, three case studies were explored within the Ann Arbor Public School System in late winter. Schoolyard playgrounds were used as study sites primarily because recess provided a designated time for playground observations, a time when the researcher knew children would be present and active on the site. While the case studies and design application examine the venue of schoolyards, conversation throughout the paper is meant to consider play environments in general (public and community parks, daycare centers, backyards, etc.).

5.1. Introduction to study area

Social Context

Located 45 miles west of Detroit and situated on the Huron River, Ann Arbor is Michigan's seventh largest city with a population of 114,000. The median family income is \$82,000 annually with a median home cost of \$312,000; 73% of Ann Arbor's residents hold a bachelor's degree or higher, and the top employers in the area are in the health and education sector (U.S. Census Bureau, 2005-2007 American Community Survey). Home to the University of Michigan Wolverines, Ann Arbor's economy is greatly influenced by the university's presence, including the school's medical center, and university affiliated research and development programs. Ann Arbor public schools served approximately 17,000 students in the 2007/08 school year, 7200 of which were in grades K-5. This number is expected to decrease in the immediate future as growth projections predict an 8% drop in school age population within the district by 2015; 2035 projections suggest an overall increase of 0.01-10% in Ann Arbor's school age population (SEMCOG, 2009).



Figure 5.1 Context map, Ann Arbor, Michigan

Natural History/Open Space

Southeastern Michigan's landscape has largely been defined by the Wisconsin glaciation which began its retreat from the area 14,000 years ago leaving behind a rolling kettle and kame topography. Pre-settlement vegetation consisted predominantly of oak-hickory forests interspersed with beech-sugar and mixed-oak forests, as well as oak barrens. Surrounded by lakes, rivers and forests the landscape of Ann Arbor today has been largely transformed into an urban/suburban area 28 miles square, though agricultural persists on its periphery. The city has demonstrated an ongoing commitment to open space exemplified in its dedication of more than 2000 acres of parkland distributed among 156 municipal parks; park programming includes a riverfront greenway system, canoe liveries, and the typical active and passive recreation opportunities associated with city park systems. Complementing the city's commitment to accessible green space, the University of Michigan's Matthaei Botanical Gardens and Nichols Arboretum manages over 700 acres of gardens, research areas, and natural preserves around the Ann Arbor area devoted to the education about, and preservation, restoration, and enjoyment of the area's natural history.

Climate

Southeastern Michigan's climate¹⁰ is classified as Midwestern humid continental/cold temperate continental; the area experiences four distinct seasons. Summers are short and humid with temperature¹¹ highs typically in the mid-80's and lows in the 60's; autumn is crisp and colorful with average temperature highs in the 60-70° range and lows in the 40's. Ann Arbor winters are variable, both in both temperature and snowfall; recorded average temperature highs from November to March hover in the low 30's to mid-40's with lows dropping into the 20° range. While numbers presented are averages, the area experiences regular spells of bitter cold and mid-season thaws. Snowfall in the Ann Arbor area averages 40" each winter; season-long snow-cover is atypical leaving residents in a brown frozen

10 Climate data source: National Climatic Data Center; retrieved March 2009.

11 Temperatures are reported in degrees Fahrenheit.

landscape through much of winter. The Ann Arbor Public School’s winter weather policy requires children stay indoors when temperatures drop below 0°F, and school is canceled when temperatures drop below -20°, or when snowfall inhibits safe travel. In the 2008-2009 school year, there were three instances of school closings due to inclement winter weather. While average temperatures in April begin to show signs of spring, it is not unusual for winter’s chill to linger through early May. Expected annual precipitation is 35 inches, distributed evenly throughout the year. For Ann Arbor average climate data, see Table 5.1.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Year
Avg. High (°F)	30	34	45	59	71	80	84	81	74	62	48	35	59
Avg. Low (°F)	16	18	27	38	49	58	62	61	54	43	33	22	40
Precipitation (inches)	1.7	1.7	2.6	3.2	2.9	3.5	3	3.4	3.1	2.2	2.8	2.8	32.8

Table 5.1: Monthly Weather Data for Ann Arbor, Michigan

Source: National Climatic Data Center; retrieved March 2009.

5.2. Methodology

Three Ann Arbor elementary schools were selected as study sites based on the potential of each site to offer insight on the design recommendations presented in this paper. Site visits were made in early March to observe students during recess hours; activities were loosely monitored to give a sense of general winter/cold weather play patterns and preferences. Equipment use, nature of peer interaction, and level of recess supervisor contact were noted. Because of the compressed time-frame of this project, only one site visit per school was possible. Interviews were conducted with recess monitors to supplement observations; questions addressed a range of topics including winter play activities and issues of safety. When possible, interviews with the school principal provided an overall picture of the school’s philosophical view of the role of play in child development particularly in an academic setting and the functional role of the schoolyard in the curriculum larger. Student interviews were not within the scope of this project. Results of each case study were synthesized and insights gained were used to guide the recommendations offered in concluding sections.

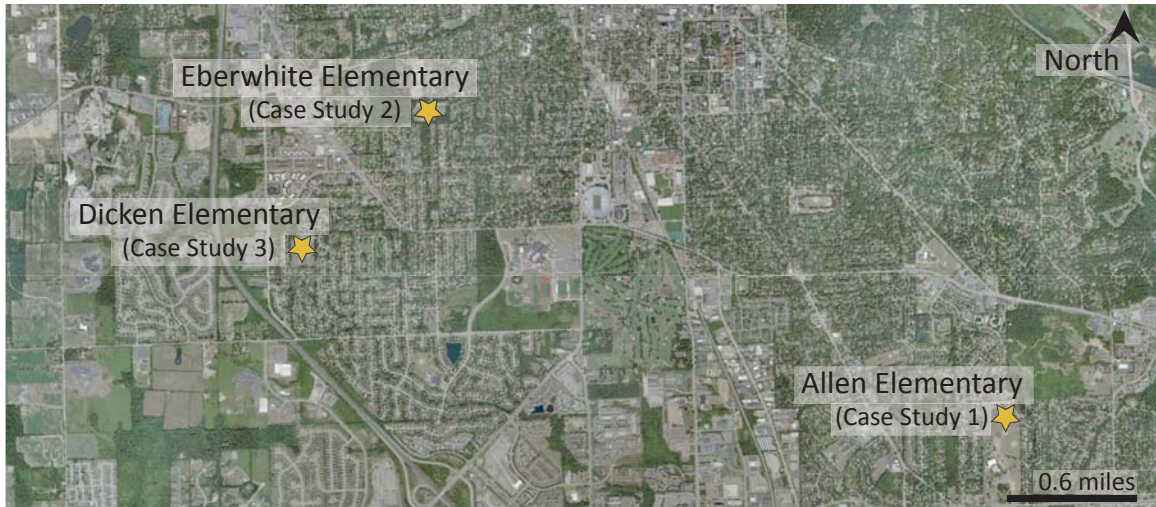


Figure 5.2 Case Study Site Context Map

5.2.1. Case Study Template

Case study write-ups were formatted using the following template to ensure thoroughness and maximize readability.

- I. School Background
 - a. Location in Ann Arbor
 - b. School size
 - c. Site description
 - i. Spatial context
 - ii. Natural features
 - d. Playground description
 - i. Playground layout
 1. Playground history
 2. Spatial layout
 3. Natural features inventory
 - a. Environmental education
 - ii. Equipment inventory
 1. Fixed equipment
 2. Supplemental equipment
- II. Recess Scheduling and Supervision
 - a. Rotation schedule
 - i. Class size, distribution
 - ii. Recess duration
 - b. Recess Monitor Introduction
 - i. Number

- ii. Role
 - iii. Qualifications/training
 - iv. Hiring process
 - c. Recess rules
- III. Schoolyard usage, other

5.3. Case Study 1: Allen Elementary

Located in southeast Ann Arbor and opened in February 1961, Allen Elementary enrolled 380 students in the 2008/09 school year, grades K-5. (See Figure 5.2 for site map.) In its almost 50 year history the school building has seen multiple renovations and expansions, the most recent of which occurred in 1991 and included the addition of 4 classrooms, a large multipurpose room with a stage, and a new art room. The school is situated on 10.65 acres of rolling terrain and is framed on 3 sides by single-family homes in residential neighborhoods; the eastern boundary of the property is fronted by a residential street that accommodates all school traffic. Adjacent to Allen Elementary is 39-acre Buhr Park, a park oriented towards sports activities and includes softball diamonds, soccer fields, outdoor tennis courts, an open-air ice rink, and an outdoor pool. Buhr Park is managed by the city. The school's playground is situated on the south/southeast portion of the property and backs onto Buhr Park.

Native grasses and wildflowers grace the eastern property border while large trees line a portion of the residential street front and the school/neighborhood property lines. A small stormwater detention pond planted with a plethora of native species sits at the entrance to the school grounds. The schoolyard itself is free of vegetation, with the exception of a cluster of young trees planted by the children in the playground area. Allen students are actively involved with a wet meadow re-introduction project on adjacent Buhr Park, as well as a 600 sq. ft. community garden plot on a hill to the west of the school building; a second garden plot will be added next year. In addition to Physical Education (P.E.), the schoolyard is incorporated into science and art classes; a "Pride Team" enlists students to assist with grounds cleanup and individual classes move through a litter patrol

rotation. Before and after hour care is provided through the city's Recreation and Education Department; students can be dropped off as early as 7:15am and picked up as late as 6pm. A school official cited the program participation rate is consistently high and noted some children are at school for the entire duration of the care hours available.

The school is placed on a slope within the rolling topography and the playground is divided into 2 play areas, a small fenced in playground for kindergarten classes and larger, primary playground; they are spatially separated by an outdoor seating area and a large retaining wall. (See Figure 5.3 for detailed playground layout.) Equipment on the primary playground is comprised of 18 swings; 1 tire swing; 2 plastic modular play structures, one climbing/swinging oriented, the other a series of platforms and slides; and 3 older metal "climbers" including a geo-dome nicknamed "The Nest." (See Appendix A for detailed equipment images.) Groundcover under all equipment is woodchips, while turf grass covers the remaining schoolyard areas. A blacktopped area with 4 basketball hoops/2 half-courts is situated at the back of the building; beside this area is a set of 2 swings, one of which is designed for students with special needs. A baseball diamond and backstop informally delineate the southern boundary of the playground and the subtle terracing of the schoolyard creates two levels of flat playing fields. During recess hours an equipment cart with soccer balls, basketballs, kickballs, plastic baseball bats and whiffle-balls, hula hoops, jump ropes, cones, and jerseys is rolled out for the children to use; the equipment cart is available year-round. Equipment on the primary playground was installed 5 years ago as part of a renovation package the school received – though some pieces were replaced separate of the package due to simple wearing out.

Play equipment in the smaller play area is 3 years old and consists of 1 large plastic modular structure with climbing ladders, platforms, and multiple slides; 8 swings; 1 low set of monkey bars; 1 chain climbing "wall"; 1 chute ball "hoop"; 1 spring-based teeter-totter; and 1 sandbox which is covered during winter months but remains functional.

Equipment selection in both instances involved parents, teachers, the principal, and

a “playground specialist”; detailed information on the specialist including qualifications and who the specialist was contracted through could not be ascertained. General recommendations made at the time of the renovations on the school’s equipment needs were made by the “specialist,” then parents and teachers were left to choose pieces from a catalog; students were not included in the decision process.

Lunch hour recess is a 4-cycle rotation broken down by grade level, with 2-3 classes per grade and class size ranging from 20-30 students each. Recess sessions run 20-minutes each and follow lunch for all but the first rotation; the first rotation of students play before eating. Five Recess Supervisors in bright orange vests station themselves across the playground to monitor the students, working as a team to redirect unsafe behavior and in some instances encourage the inclusion of all children in activities. Supervisors are paid city employees, hired through an interview process; interviews are conducted by both the school principal and the noon-hour coordinator who oversees lunch and recess rotations. All Recess Supervisors are CPR and First-Aid certified and most come from some child care or child education background or are parents themselves. Allen Elementary enjoys a low turn-over rate of monitors -- of the 10-person lunch/recess supervisor crew, 6 have been with Allen Elementary for more than 10 years. Recess rules are fairly straight forward and are oriented towards safety, no tag on structures and use the equipment only as intended.

In addition to lunch recess, student’s day includes 2 more outside breaks – a combination of P.E. and play or two play breaks; this time is allocated on a per individual class basis and is incorporated into the day as teacher sees fit. These, and other restoration breaks integrated into the day provide a more structured playtime oriented towards the socio-emotional, cognitive, physical development of the children whereas lunch recess is considered more of an opportunity for children to blow off steam.

5.3.1 Observations of Winter Activity

A site visit to Allen Elementary was made in mid-March on an overcast day; temperature was a cool 45 degrees; site was dry. Observations focused on the larger,



Figure 5.3 Allen Elementary Playground Layout

primary playground. Consistent across all class rotations, students appeared to stay actively engaged in play for the duration of the 20-minute recess period. Once released from the lunchroom, students immediately moved across the playground to “claim” a piece of equipment or area for themselves or for their group; no queuing for equipment was

observed. All rotations had one or two students engaged in solitary play – these students were unattached to a particular group; these students seemed to prefer the swings, but drifted amongst the equipment, even moving away from an activity to avoid the other children in some instances. With the exception of the balls, equipment from the equipment cart was unused; balls were returned to the cart at the end of every rotation.

Distinct differences in play patterns appeared to exist between the younger students and the older fourth and fifth graders. The young students tended to remain with same piece of equipment throughout, though students playing on the structures remained more loosely tied, moving between both structures and the surrounding open spaces. Play was gender segregated except on the play structures; play group sizes were relatively large (4+children.) Constantly in use by the younger children, the geo-dome “Nest” played a fort-like role for this age group; play on this particular piece of equipment was especially gender segregated as multiple instances of “the boys/girls are coming!” was overheard upon the opposite sex moving into “Nest territory.” The swings attracted smaller groups of students, typically sets of twos and threes. While the young students engaged in highly imaginative play (house, war, etc.) the older students gravitated towards more structured play – basketball and soccer were the most popular. Groups of boys and some girls started several different games on the soccer field and multiple basketball courts were used for the duration of recess. The groups of older kids not engaged in a team-sport-oriented activity were smaller, students separated into groups of two and three and appeared to just “hang out” and talk; the volume of conversation levels was too low to be overheard. Play structures were largely unused.

Recess monitors were always present, but were mostly able to remain hands-off. Two instances of inappropriate structure use required a monitor to step in; tone of voice in these cases was not harsh, monitor asked child to stop the inappropriate behavior and followed request with a simple reminder/explanation of why behavior was not allowed. Monitors also stepped in and attempted to engage solitary students; one monitor in

particular on multiple occasions initiated a game of basketball or soccer with any student that seemed to be on his/her own. The biggest observed challenge for monitors involved rounding students up at the conclusion of each recess rotation. Whistles blown called an end to recess and a reasonably prompt line up followed; an established jacket drop area on a set of benches by the play structures expedited the process though the occasional jacket and/or child had to be wrangled.

5.3.2 Interviews

Informal interviews of Recess Monitors were conducted directly following the last recess rotation during a staff meeting; monitors were interviewed as a group in an attempt to generate a more casual and fluid conversation. Allen Elementary's principal was interviewed individually two days after the site visit.

Monitors begin the school year by introducing all students to safety and establish playground rules; few behavioral problems arise, and disagreements between children tend to be limited to the soccer field. The largest safety issue experienced during recess involves the inappropriate use of playground equipment (example, walking on top of the monkey bars, using hula hoops to "rope" others); falls are the main cause of injury, but no "major" falls resulting in more than just cuts and scrapes could be recalled as occurring on this playground. Visual access into a brushy area beneath some large trees had become a problem resulting in the clearing of the area in the summer of 2008.

Play patterns during winter go essentially uninterrupted and all equipment remains useable in the absence of snow and/or ice. In the presence of snow, which can get quite deep due to the site's high degree of exposure, the children busy themselves making snow forts and snowmen. Sledding was disallowed several years ago because "children were going up in the same place they were coming down" causing safety concerns; snowball fights are not allowed. Ice becomes the largest safety issue during winter months; the proper clearing and salting of the blacktop basketball courts is an ongoing challenge between the city and the school, leaving the courts off limits at times. Icy patches on the grass are exploited to

the fullest as children slide on their bellies down the slopes in icy places. Compounding cold temperatures, strong winds moving across the exposed playground raise concern regarding appropriate outdoor gear during winter. Without proper coats, boots, hats, and gloves children are simply not allowed to go outside on cold wet days; a lost and found provides short-term backup for students without and a fund within the school has been established to provide assistance to families in need. It was noted that length of recess during winter months is shortened due to “gearing up” time; this time spent unbundling either shortens recess further or cuts into class time. The value of the high amount of effort for so short a time was brought to question.

5.4 Case Study 2: Eberwhite Elementary

Built in 1950, Eberwhite Elementary School is located in southwest Ann Arbor and housed 332 students in the 2008/09 school year. (See Figure 5.2 for site map.) Class sizes average 24 students per class with 2-3 classes per grade. The school is situated on a flat 41-acre L-shaped parcel of land 29 acres of which make up Eberwhite woods, a remnant oak-hickory forest owned by the school district and open to the public. This dense woodlot marks the western boundary of the schoolyard proper; wooded areas of varying depths extend around the south and east portions of the parcel. Placed in the midst of a residential area, the Eberwhite property larger is surrounded by single-family homes. A narrow strip of Fritz Park, a 5-acre wooded park managed by the city, abuts a small section of the school’s southern property line; a trail network linking Eberwhite Woods and Fritz Park crosses the back corner of the schoolyard and a sidewalk leading directly through the schoolyard acts as a thoroughfare to Fritz Park and adjacent residential neighborhoods. Two flat, treeless, turfgrass playgrounds frame the southeast and southwest sides of the school building; a building wing physically separates the two playgrounds.

While formal use of the woodlands in the school curriculum was not instigated until 1959, the opportunities presented by the adjacent oak-hickory forest have since been incorporated into lesson plans in both traditional and non-traditional ways. Teachers have

infused the woodlot, the schoolyard, and the outdoor classroom learning patios into the usual lessons of the standard subjects and have built special environmental programming into everyday class work. Additionally, the Parent Teacher Organization (PTO) hosts a series of annual work days set to involve students, parents, and the community in the care of their surrounding landscape.

Imposing though the woods may be, the dominant features in the schoolyard are two sprawling, wooden castles, one on each playground. Planned and built by the community in 1990, the castles stand as a creative alternative to the pre-fabricated plastic structures typically found on playgrounds. A maze of platforms, ladders, tire features, and nooks lead students over multiple levels of decks and offer a range of physically challenging obstacles; wide, shiny metal slides provide by far the fastest means to ground level. In addition to the castle, the east playground contains 8 swings, a small blacktopped area beside the building painted for four-square, 1 sandbox, 1 arced set of monkey bars, and 1 small plastic structure targeted at balance. The west playground, used by the older students grades two thru five, holds a similar but much smaller castle, 12 swings, 1 metal climber, 1 set of monkey bars, and a three-story tire tower; a large blacktopped area with 6 basketball hoops (3 half courts) and 4 four-square courts, a baseball diamond with backstop, and a "fitness park" sit in the back corner of the playground. (See Appendix B for detailed equipment images.) Groundcover under all equipment is woodchip, with the remainder of the schoolyard covered in turf-grass. (See Figure 5.4 for detailed playground layout.) An equipment cart of a variety of balls is rolled for the lunch hour recess; this cart once contained Frisbees and jump-ropes but these contents were stolen in the spring of 2007 and as of yet have not been replaced.

Recess rotations run 24-minutes each and are broken down by class; all but the first rotation of students play after eating lunch. Three to four recess supervisors circulate around the playground for the duration of the rotation. Monitors are responsible for the safety of the children and are expected to step in and redirect any unsafe behavior. Currently, there



Figure 5.4 Eberwhite Elementary Playground Layout

are 10 monitors employed at Eberwhite; most monitors are parents and 6 of the 10 have been with the school 2 years or less. Recess rules center on inappropriate use of equipment, but also address the school's "no bully" focus; keeping your hands and feet to yourself is emphasized. Tag is allowed in the grass areas only and balls are not allowed on the play-structures. Students are not to enter the woods. A rule established for the monitors to follow guides procedure if a playground injury occurs; monitors are not to move an injured child but should instead send for someone in the office to come and assist. This was the only school visited to identify this "injury clause" as protocol; this might be attributed to the level of training of monitors – only the Noon-hour Coordinator is First-Aid/Cardio-Pulmonary Resuscitation (CPR) certified. This might also be a response to the high number of injuries seen on this particular playground, relative to other sites visited.

5.4.1 Observations of Winter Activity

A site visit was made mid-March on a chilly 40-degree day; skies were blue and a crisp breeze blew constantly across the playground. The site was dry. Observations on both playgrounds were made, as the researcher moved through all rotations with the students/monitors; first graders were observed on the east playground and second thru fifth grades on the west playground. Group sizes among all rotations were small, typically consisting of only a pair of students and rarely exceeding three students with the exception of those playing sports; groups were well spread out across the whole of the playground. All rotations had a high number of solitary students (5-6 per rotation) relative to other sites visited (1-2 per rotation); these students spent a large amount of their recess time on the swings. Students in general were more sedentary/less active during the 24-minute recess and a small number of students remained close to the building entrance.

The sprawling castle play structure on the east playground contained many nooks, pockets, and other blind spots – monitoring the children playing on the structure was difficult and required a constant circling of the area which resulted in sides/sections of the castle unobservable; further, the layout of the playground space larger made visual

access across the whole area difficult. All equipment was used over the course of the recess and students tended to stay in one location throughout; no queuing for equipment was observed. Many of the small groups of girls were completely sedentary, sitting on benches, tires, or a particular platform—the level/form of play engaged in could not be determined. Active play appeared to be highly imaginative as games of horse, restaurant, and explorer were all observed. All play was gender segregated.

Play patterns on the west playground were distinct between the second graders and the third/fourth and fifth graders. Observations of the second grade class found some similarities to those of the younger students on the other playground, though the castle structure played a lesser role in the students' activities. This may be explained by both the smaller size of the fixture and the stronger connection between the structure and the other equipment and surrounding open space. Monitoring activity within this castle structure was less difficult as there were fewer blind spots. Group sizes tended to be small, ranging from two to three students and were gender segregated; the groups of students floated between equipment steadily throughout the recess rotation. Swings attracted multiple pairs of students. Balls were popular and were used for a variety of games but never basketball. The third/fourth grade rotation and the fifth grade rotation spent little time on the castle structure, moving to it only towards the end of the recess; solitary students spent much of their time here. Large groups of students initiated structured games of tag and ball games. An informal and boundless soccer game encompassing the whole playground space also drew in a large group of students; the game appeared non-competitive as no goal areas appeared to be established, though unspoken/pre-established marks quite possibly exist. Both games involving balls were gender mixed. All rotations playing on the west playground had a large congregation of students in the "fitness park" area by the end of the recess rotation. These students seemed to be engaged in conversation, using the equipment as seating only. While a monitor was present in this corner during the third/fourth grade rotation, none was present during the fifth grade session. Recess monitors were difficult to

readily identify as they were clothed in personal outdoor attire.

Concentrating on the supervision of students on the castle, monitors on the east playground stationed themselves in quadrants to cover the bulk of the structure; one monitor was positioned to cover a corner of the structure but had visual access to the other areas of the playground. On several occasions students had to be called back out of the woods (east playground.) Monitors on the west playground were able to spread out more as the castle structure was less interesting to the students. Student/monitor interaction regarding inappropriate use of equipment was observed on multiple occasions; tone of voice was not harsh and interaction was directive (“don’t do [behavior]”). The end of recess was indicated by a blow of the whistle and students were quick to line up; a position at the front of the line was coveted and awarded to quiet students. Balls were collected and put away only at the end of the final rotation.

5.4.2 Interviews

Informal interviews of 2 recess monitors (both in their first year as monitors) were conducted on the same day but prior to observations; the lunch hour supervisor was interviewed at the conclusion of all recess rotations. Eberwhite Elementary’s principal was unavailable for an interview.

Falls are the largest safety concern of monitors as multiple broken bones and a dislocated shoulder have all occurred on the playground. Behavioral problems associated with the “no touching” rule and inappropriate use of equipment, particularly with the slides, are the main causes of interaction with students. Eberwhite policy emphasizes “no bullying” and monitors are instructed to be especially mindful of bullying behavior. Issues of visibility were also brought up; as noted by the observer and again by the monitors, the structures are dense and contain many nooks that are difficult to see in to. Visibility along the fence-line is limited in places and a grape arbor at the wood’s edge creates a blind spot for monitors. Concern with the children playing in the immediate woods centered on the use of stick as weapons and on unseen dangers including wasp nests, poison ivy, and broken sticks

to fall on. The public paths have not caused any problems as passers through tend to move around the children and vice versa.

Wet and icy weather results in the closing of both castle structures as the wood gets slippery; the children are accustomed to this and are able to adjust their play with little duress. Snow initiates play and excitement at the beginning of winter, but by mid-winter monitors see its novelty wear off and students return to the equipment and structured activities. Snowball fights are not allowed, but forts and snowmen are. "Ownership" of the snow instigates a number of disagreements as the waning of the amount of snow available leads to the stealing snowballs from rival forts. Ice bowls formed underneath equipment and at the bottom of slides was reported as being particularly attractive to the more bold students who enjoy "launching" themselves off the equipment and across the ice. Sledding was allowed one winter on a short, steep slope on the southern property line, but its incompatibility with the re-vegetation efforts of the slope led to its prohibition.

5.5 Case Study 3: Dicken Elementary

Opened in 1959, Dicken Elementary is located on a 12 acre parcel of land in southwest Ann Arbor. (See Figure 5.2 for site map.) Dicken enrolled 355 students in the 2008/09 school year; currently there are 3 classes per grade, grades K-5, with an average of 20 students per class. Tucked away in the middle of a residential neighborhood, the school is surrounded predominantly by single-family homes. Abutting the northwest corner of the parcel is Dicken Woods, a 10 acre woodland with rolling terrain and a string of wetlands running throughout. The schoolyard at Dicken has 2 playgrounds, one on the west side of the building and the other in the southeast corner of the property; a large playing field separates the areas.

The school grounds are relatively flat, with the exception of the southeast corner which is mildly sloped (5-10% slope). A small grove of mature oak trees sits at the street entrance to the school while a string of large deciduous trees line the property's edge. Along a section of the north property line is the Dicken Habitat Garden, a small garden plot

filled with native plantings and cared for by the students. Dicken Woods creeps onto the northwest corner of the schoolyard providing students with a glimpse of the woodland and wetland habitats within; vegetation composition and man-made water-crossings suggest this corner experiences standing water a large portion of the year, and is too wet for unsupervised exploration during school hours. While use of the school grounds is currently limited to recess, P.E., and art classes, parents and teachers are collaborating with the Friends of Dickens Woods Stewardship Group and the City of Ann Arbor to better incorporate environmental education and the use of the woods into the curriculum at Dicken.

The school's playgrounds provide students with a fair amount of unstructured open space; play structures are smaller in size than those observed at the two other case study sites and are placed on the periphery of play area "boundaries." (See Figure 5.5 for detailed playground layout.) The playground to the west of the building includes a blacktopped basketball court with 4 hoops (2 half courts) and 6 four-square courts, and a playing field used for soccer and volleyball. Ten swings, 1 arced set of monkey bars, 2 metal structures oriented toward upper body strength and balance, and 1 small structure with a platform and 2 slides make-up the extent of the area's equipment.

The southeast playground includes 9 swings; 1 wood/plastic platform structure; 1 plastic structure of platforms and slides; 1 metal climber; 1 arced set of monkey bars; 1 metal climbing/swinging structure; and 1 chute-ball basket. (See Appendix C for equipment images.) Most equipment was replaced 5-6 years ago when the district had to remove old, unsafe equipment; the PTO selected new equipment based on funds available and on suggestions of what students might like. Groundcover under all equipment is woodchips while the remainder of the schoolyard is turf grass though there were many bare, muddy areas – particularly along the sidewalk paths. Equipment carts were rolled out during recess rotations, contents included balls and (for the southeast playground) jump-ropes, and hula hoops.

Lunch-hour recess is made up of two 20-minute rotations; the first rotation of students playing before eating, and the second playing after lunch. A team of (ideally) 10 monitors, 5 on each rotation, move through the cycle with the children. Monitors are hired by the city on a 30 day trial period at the end of which, the school makes recommendations as to whether or not the match is appropriate. The current noon-hour coordinator has been with Dicken five years and has a multi-functional role within the school, working as a teacher's aide during non-lunch hours. Other recess monitors are relatively new, some as new as only a few days on the job. With the exception of the lunch-hour coordinator, no monitors were First-Aid or CPR certified. Recess rules address appropriate use of equipment, but center on the treatment of other children (be respectful, don't play too rough, be kind, etc.) Students are not allowed to play in the woods. Outdoor play opportunities beyond lunch-hour recess are left to the discretion of the individual teachers; classes get anywhere from 2 additional play periods to no additional play periods depending on the day and class schedule.

5.5.1 Observations

Site visit was made mid-March on a cool, overcast day; temperature was 42 degrees with a light breeze; site was damp from the previous day's rain. Observations were made on both playgrounds for the duration of each rotation – fourth and fifth graders played on the grounds to the west of the building in the first rotation then grades one through three were released on the playground on the southeast side of the property. Dicken posed a challenging school to observe as the students tended to play in large groups (5+), with sets of individuals moving in and out of different groups thus making the tracking of individual play patterns and equipment use difficult. All equipment was used throughout the recess cycles and balls were popular with all classes; no queuing for equipment was observed. Students in the first rotation congregated in packs of 5-8 students. Within each group, there seemed to be a “core” of students who remained in one place through the recess cycle. Four solitary students were observed, two of which were engaged in an activity on their own and



Figure 5.5 Dicken Elementary Playground Layout

two sat watching the groups of students play or roaming around. Approximately one half of the students in the first rotation played soccer for the whole of the recess; of the remaining half, the boys played basketball or tag, while the girls played on the swings or perched themselves on the equipment and busied themselves with conversation. With the exception of the soccer game, play was gender segregated.

The younger students (grades one thru three) played in hordes of 12 or more students -- these children played hard, laughing and yelling for the entire 20-minutes. There did not appear to be any students left out; play was gender mixed in the more open areas and gender segregated on the play equipment. Interestingly, the students seemed to be less territorial than students observed at other schools -- multiple groups of children immersed in different activities played side by side on the same piece of equipment further lending to the perception of large group play. Children playing on the open sloped area spent their time moving up and down the hill engaged in highly imaginative games¹². Play on the equipment was also highly imaginative but tended to be more sedentary; some more structured games were observed including tag and chute ball. Several smaller sets of 2-3 students made use of the jump-ropes in the equipment cart or found pockets of unused space on the edge of the playground to play more intimately.

Recess monitors were difficult to readily identify as they were clothed in personal outdoor attire. Four monitors were present during each rotation. Stationing themselves predominately in pairs at the periphery of the play area, monitors in the first rotation remained entirely hands-off. Play appeared to be loosely monitored as multiple instances of what had been considered inappropriate use of equipment on visits to other school sites went uncorrected; these activities included crawling across the top of the monkey bars and swinging on stomach using two swings. Students were very slow to come in at the end of recess but equipment (balls) was returned to the equipment cart without incident. Monitors

12 The determination of "highly imaginative" play was made utilizing observer's eavesdropping skills; children overheard as being engaged in games of pretend were identified as students using their imaginations.

of the second rotation spread themselves evenly across the playground and circulated through the whole of the space. While several instances of inappropriate and unsafe use of equipment went unaddressed, monitors were actively managing behavior problems. A “time-out” bench was established and used more than once over the 20-minute recess, and on several occasions students were observed approaching a monitor with a complaint about another student. On these occasions, students were asked to talk through their differences while a monitor mediated. Children were quick to line up at the end of recess, but had to be called back to put equipment from the equipment cart away.

5.5.2 Interviews

An informal interview of the noon-hour coordinator was conducted prior to the first recess rotation, with follow-up questions posed following the second recess. Informal interviews of two Recess Monitors who had been with the school more than 2 years were given at the end of the lunch/recess cycle. Because the staffing of the noon-hour crew appeared to be in transition, many of the recess monitors were teaching staff and were therefore immediately unavailable for interview. The principal was also unavailable for interview.

Lunch recess was viewed as an opportunity for the children to blow off steam. Safety concerns centered on inappropriate use of equipment and behavioral problems were the primary reason for student/monitor interaction. Students typically initiate the interaction by approaching the monitor with a complaint as witnessed during observation. Monitors reported a range of reasons lead to conflicts between the younger students, but felt disagreements between the older students tended stem from activity on the soccer field. Altercations between students and brought to the attention of the monitors are documented in written form and passed on to the principal. The only serious injury that could be recalled as occurring on the playground during recess hours involved a wrist cracked in an ice-related fall.

In the absence of snow, the children’s play patterns in the winter are largely

uninterrupted and all equipment remains useable; some areas of severe pooling of water leave areas too wet and muddy to move through. Monitors felt students were always adequately dressed for winter weather and both commented on the children's high tolerance to cold temperatures. Activities shift on snowy days and fort building takes main stage. The equipment cart is supplemented with sand shovels, buckets (like those used for building sand castles), and other objects that can be used to move snow. Older students voluntarily use shovels to clear the basketball court. Snowball fights are not allowed; sledding on the southeast playground was permitted until a child at a different school suffered a concussion while sledding, leading to the prohibition of the activity. Sleds are now used to shuttle snow between locations. Consistent with feedback from other case study sites, sliding on ice was an entertaining past-time with the children but raised some safety concerns with the monitors.

5.6 Case Study Conclusions

The observations and interviews conducted provided focused inquiry targeted at winter play patterns and playscape function. Conclusions drawn nicely supplemented the review of literature and allowed an on-the-ground first-hand account of playground activities that better informed the design response offered in the following sections. Viewed collectively, case studies saw broad stroke consistencies among all three schools though differences uncovered proved equally insightful. Summarized categorically, conclusions presented below consider issues of the physical play environment; play patterns and equipment; and regulatory presence. Finally, implications of conclusions on winter playscapes are discussed.

5.6.1. Landscape/Playscape

Case study sites saw a standard schoolyard formula: two distinct playgrounds intended for different age groups; a blacktopped area with basketball hoops; a baseball diamond; and a flat, open playing field. All playgrounds used woodchip ground cover

under play equipment and turf-grass everywhere else. I would attribute this choice in materiality under play structures to the high cost of synthetic cushioning materials. While environmental education was incorporated to varying degrees at all study sites, none provided natural features as playthings. Through interviews and observations, children were identified as having interest in natural elements found in their surroundings -- multiple instances of "cooking" with woodchips were observed; child built drainage channels re-routing water pooled under swings were discovered; and an attraction to wooded areas was reported by monitors at all schools. Drawing from this insight, increased access natural elements in a play setting would enrich play opportunities within the site; the open-endedness of natural features and the moveable or malleable of found natural objects become subject to the inklings of a child's imagination and purveyors of interactive play and are therefore developmentally beneficial. Research findings support this conclusion (Louv, 2005; Johnson & Hurley, 2002; Moore, R.C., 1997, 1992; Herrington, 1999; Talbot & Frost, 1989; Moore, G.T., 1983).

On-site vegetation was limited to the periphery of the school grounds leaving the playgrounds exposed to both wind and sun. Instances of impairments to visual access associated with brush and other understory along the playground edges were cited during the interview process. Allen Elementary responded to these concerns by simply removing the brush from the area; after doing this, the children lost interest in the space as the seclusion that had been offered by the brush was no longer there. All playground areas were devoid of vegetation in play area with exception of new tree plantings. While this is reasonable in some areas (open playing fields, baseball diamonds), the noticeable exclusion of plants in other areas left the spaces, in my opinion, rather dull.

Most of the tree plantings in playground areas were new -- particularly relative to surrounding landscape larger suggesting the site was leveled when the school was built; the preservation of existing trees lends greatly to the character of the spaces and provides a tangible link to the history of the site. This should be taken into consideration in the

planning phase of the development of future school sites. Of note, the health of the young trees in areas where students play was questionable as root systems were exposed, and the base of the trees appeared to have suffered some abuse by children (trunk kicked, bark peeled away). Dicken Elementary went as far as erecting orange construction fencing around the newly planted trees as protection from such abuse; while this added level of care appeared to be effective and is certainly worthy of applause, it is by no means a permanent or aesthetically appealing solution. The incorporation of vegetation into play environments can greatly enhance the quality of the space, but attention must be paid to the nature of child-plant interaction if the health and perhaps survival of the plants is to be achieved. The inclusion of vegetation on the interior of the play space, with attention paid to plant size and resilience, can respond to concerns of safety while providing children with the beneficial qualities of plants as part of play settings and as play settings in and of themselves.

5.6.2. Play Patterns and Equipment

As discussed in all literature reviewed, site visits found students played differently – play patterns and group sizes varied within each recess rotation, between recess rotations, and interestingly, between schools. Consistent across study sites, play that centered on structures was observed to be less vigorous than play in open areas. While pre-fabricated manufactured structures were present on all sites, none were used as the primary play feature of the playground. No queuing for equipment was ever observed suggesting the adaptability of children’s play intentions; the willingness of the students to change course so quickly might be attributed to the short duration of lunch hour recess. Sports were the only consistently gender mixed activity observed on the playground and were also consistently a source of conflict which I would attribute to the competitive nature of the games. As emphasized in the literature, play opportunities need to accommodate a range of play; variety not only responds to differences in developmental needs, but also accounts for the different interests of children. Diversity and open-endedness can be adapted to a child’s changing needs and deter the boredom that leads to unsafe activities.

5.6.3. Playground Rules and Recess Monitors

School playground safety programs were centered on the appropriate use of equipment and the respectful treatment of other students. Specific rules consistent among all sites visited prohibited playing tag on structures and designated periphery wooded areas as off limits. A playground design that includes hiding places, objects to run around, over, and through, and a landmark feature or features to act as “base” would enhance the game of tag and the associated developmental offerings. Attention must be paid, however, to material selection and placement of objects/adjacent uses for safety reasons. Monitor “presence” varied across study sites; training, hiring process, turnover rates, and level of engagement with the children ranged considerably. This level of variability suggests to me that in a schoolyard setting, during recess hours, the incorporation of monitors as an active and intentional part of play programming beyond a supervisory role should be given careful thought on a site by site basis.

Two study sites had unrestricted public access routes moving directly through the playground areas; the exception to this was Allen Elementary, which abutted a city park. Despite this interface, the issue of “stranger danger” was never brought up during interviews. When asked specifically about the topic, monitors showed little concern; this reaction may be the reflection of a feeling of safety (real or perceived) due to the profile of the area larger. Design can forward the concept of “Eyes on the Street”¹³ by placing access routes in visible areas, and by strategically thinking about and minimizing points of entry.

5.6.4. Winter

Case studies concluded that in absence of snow, play patterns continue unaffected by winter weather; equipment remains mostly useable with the exception of the wood

13 “Eyes on the street” is an idea first put forward in Jane Jacobs’ *The Death and Life in Great American Cities* in the 1960’s. The concept suggests easy visual access from buildings and homes onto the adjacent street creates a safer, more defensible space.

platform structures in wet conditions. In these instances, children simply shift their activities elsewhere. On snowy days, building snow forts presented itself as the primary activity with snow “ownership” consistently cited as an instigator of disagreements. A design tactic that encourages and directs snow buildup through barrier placement can serve to maximize snow availability and concentrate fort building activities in desired areas. Ice presented itself as a second component of winter to consider; safety issues associated with the ice seemed negotiable as in some places it was considered a hindrance and danger (ball courts, sidewalks, under equipment), while in other places it seemed to be of less concern (grassy areas). Proper drainage of water from play areas and placement of blacktopped areas in areas receiving maximum sunlight (south and west areas of playground) could decrease the accumulation of ice and/or decrease the length of time it remains on site. Finally, sledding was not allowed during recess hours, ultimately for liability reasons. Because of the highly active and inherently engaging nature of sledding, to exclude it from easily accessible play environments such as school yards and community parks seems an opportunity lost. While safety concerns cannot be entirely dismissed, thoughtful design can mitigate many of the apprehensions associated with the activity. For example, areas of “up” and “down” clearly demarked with “soft” vegetation that has a strong winter presence can mitigate the likelihood of collisions. Moderation in slope and consideration uses adjacent to the sledding area can further alleviate safety concerns.

	<i>Allen Elementary</i>	<i>Eberwhite Elementary</i>	<i>Dicken Elementary</i>
<u>Site Characteristics</u>			
Topography	Rolling	Flat	Mildly Sloped (<10%)
Vegetation on Playground	Young trees	---	Young trees interspersed
<u>Equipment</u>			
Swings	18/8	12/8	10/9
Metal Climber	3/2	2/1	3/3
Platform Structure	2/1		1/2
Chute ball	0/1	0/1	0/1
Tire Obstacles	1/0		---
Spring-based piece	0/1	---	0/1
Basketball Hoop	4/0	6	4
Baseball Diamond	X	x	x
Open Playing Field	x	x	X
Four-Square Court	X	x	x
Sandbox	X	X	

Table 2: Site Inventory at a glance¹⁴

	<i>Allen Elementary</i>	<i>Eberwhite Elementary</i>	<i>Dicken Elementary</i>
<u>Cart Equipment</u>			
Soccer balls	x	x	x
Basketballs	x	x	x
Kickballs/other	x	x	x
Jump-ropes	x	(stolen 05/08)	x
Hula-hoops	x	(stolen 05/08)	x
Frisbees		x	
Bats	x		
Whiffleballs	x		
Cones	x		
Jerseys	x		
Sand Shovels/Buckets			x

Table 3: Equipment Cart at a Glance

14 Equipment inventory indicates two numbers per school per equipment category to distinguish between play areas on each site. Allen Elementary numbers reflect primary playground/kindergarten playground; Eberwhite Elementary numbers indicate southwest playground/southeast playground; Dicken Elementary numbers represent west playground/southeast playgrounds. In each of these instances the first number indicates equipment on the playground used by older students and the second number corresponds to the equipment on the playground used by younger students.

6.0. Design Application

To show how the inclusion of winter considerations can shape a playground space, the report hypothesis was applied in a schoolyard retrofit scenario. The intent of this application is to demonstrate how including winter function in the preliminary phases of the design process results in a product that better facilitates winter play. Coupling micro-climate concepts and topography requirements with design guidelines addressing the tenants of spatial organization and access articulated in sections 4.2 and 4.3 of this report, the design presented provides a framework from which more specific design decisions regarding play elements can be made. While spaces were created with a designated function in mind, developing the playscape down to a level of detail that outlines specific play components was not within the scope of this project.

6.1. Demonstration Site

The demonstration site was selected at random from a pool of school sites similar to those observed in the case studies. Student population served and local context was consistent with previous schools examined. The selected school is located on a 7.5 acre site and abuts a 5 acre neighborhood park managed by the city. The school site shares



a baseball diamond and soccer/playing field with the adjacent park. Surrounding the site is a residential neighborhood of single family homes. Assumptions made regarding the playground retrofit requirements allowed for the removal, replacement, and/or relocation of existing equipment and the replacement or reshaping of all outdoor hardscape. The relocation of new plantings was permissible however, mature vegetation could not be removed; public access points could not be altered; and the park/school property line could not be breached with design interventions. Playground/building access points remained fixed. While cost realistically would function as an important factor in a scenario such as this, for the purposes of the demonstration, budget was considered to be unlimited.

6.2 Design Process

6.2.1. Site Inventory and Analysis

The design process began with the inventorying and analysis of existing site conditions. Site inventory collected and organized data on natural features and amenities including topography; existing vegetation composition and condition; sun movement and shade patterns; viewsheds; and any other environmental details deemed potentially relevant. Existing infrastructure including building layout, walkway, and utility placement was noted as were access points, visible use patterns, and potential hazards. A thorough site inventory will also explore the natural and cultural history of the site and/or area. The analysis phase then evaluated the value and importance of the gathered information to determine opportunities and challenges on the site created by existing conditions. Conclusions drawn and actions recommended in the site analysis inform the design solution offered in the phases that follow.

While the site as a whole sits in a shallow bowl, the schoolyard itself is mostly flat -- the most immediate topography being the low ridge framing the southern boundary of the kindergarten play area and wrapping around onto the playing field. With the exception of a large, mature oak tree in the school age play area and two young ornamental trees in the

kindergarten play area, the playground is free of vegetation. The oak tree is set in a 15'x15' timber frame planter and appeared to be in good health; the planter is in poor condition and in need of repair. The soil surrounding the planter is compacted and worn down leaving tree roots exposed. The lack of vegetation in the schoolyard leaves the site unprotected from cold winds blowing from the northwest, though a grouping of trees on the lower western edge of the site (visible in Figure 6.1) moderates westerly winds blowing across the lower portion of the schoolyard.

The sidewalk surrounding the building varies in width and is in poor condition. The asphalt in the basketball court area is also in poor condition and most of the court paint has worn away. Especially noticeable throughout the playground are patches of bare, compacted soil – particularly in the form of pathways cut along the sidewalk edge and adjacent to the building. These worn areas suggest use/circulation patterns. Neighborhood access points/walkways were identified on both the north and south ends of the site and foot traffic was observed during all site visits. (See Figures 6.2 and 6.3 for a complete site inventory.) The site analysis presented in Figure 6.4 provides an assessment of inventoried features.

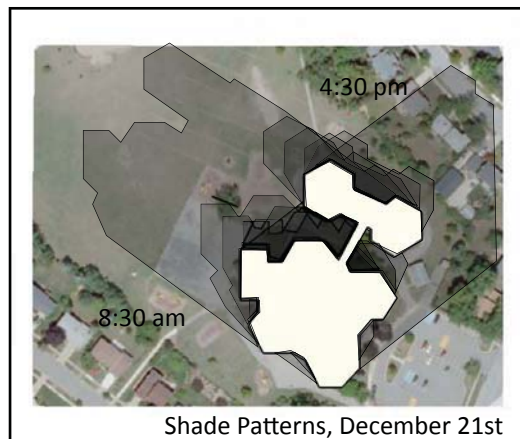
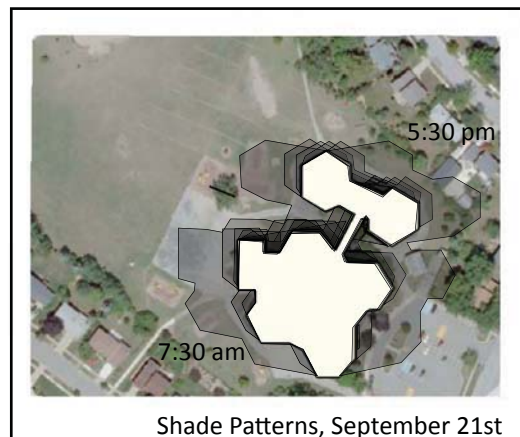
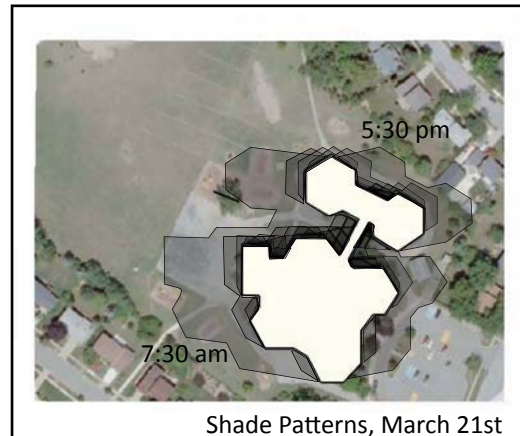
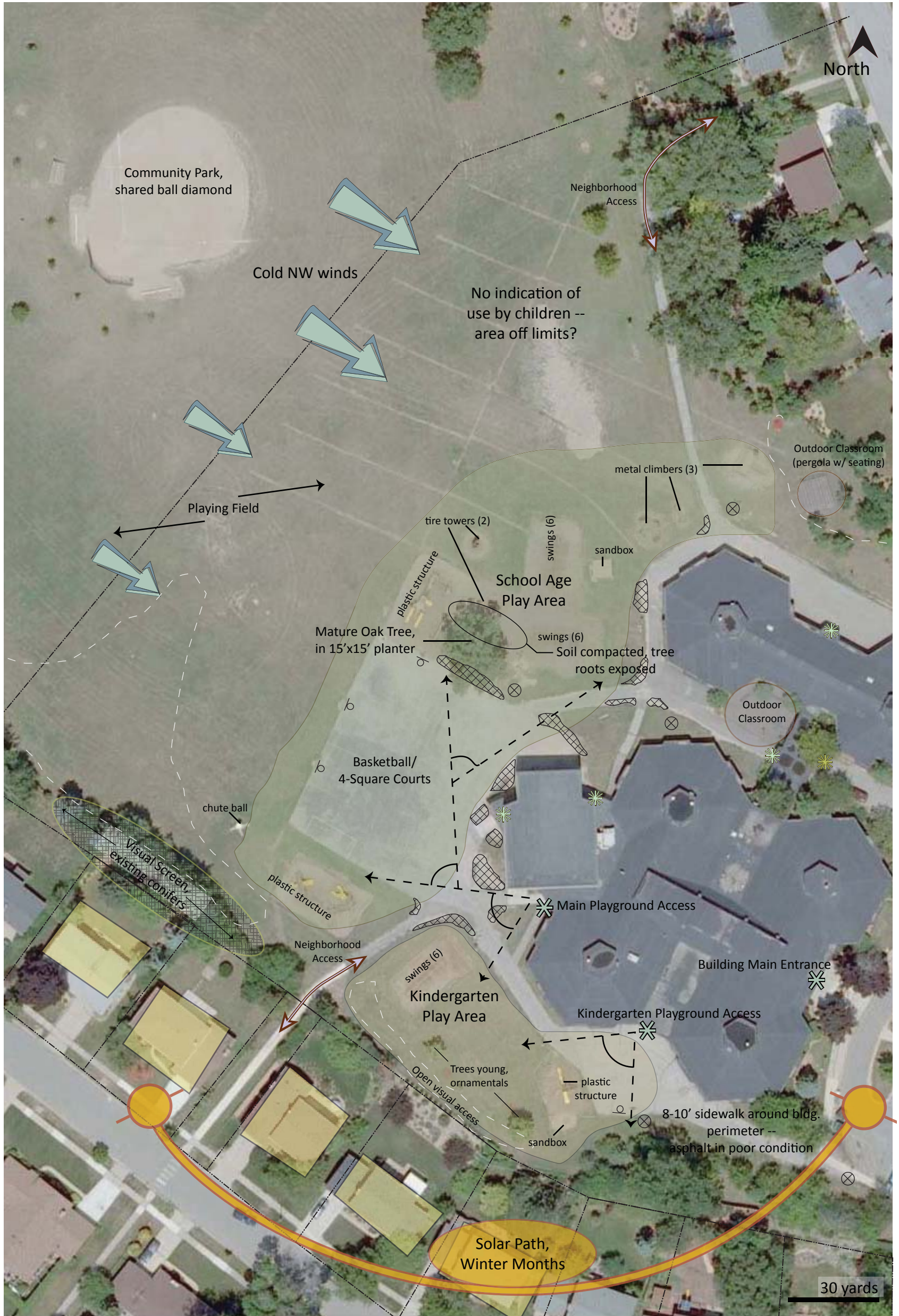


Figure 6.3 Sun/Shade Analysis



Key:







-  Primary Sight Lines
-  Neighborhood Access
-  2' Contours
-  Secondary Building Access
-  Outdoor Lighting
-  Worn Sidewalk Edge

Figure 6.2 Site Inventory

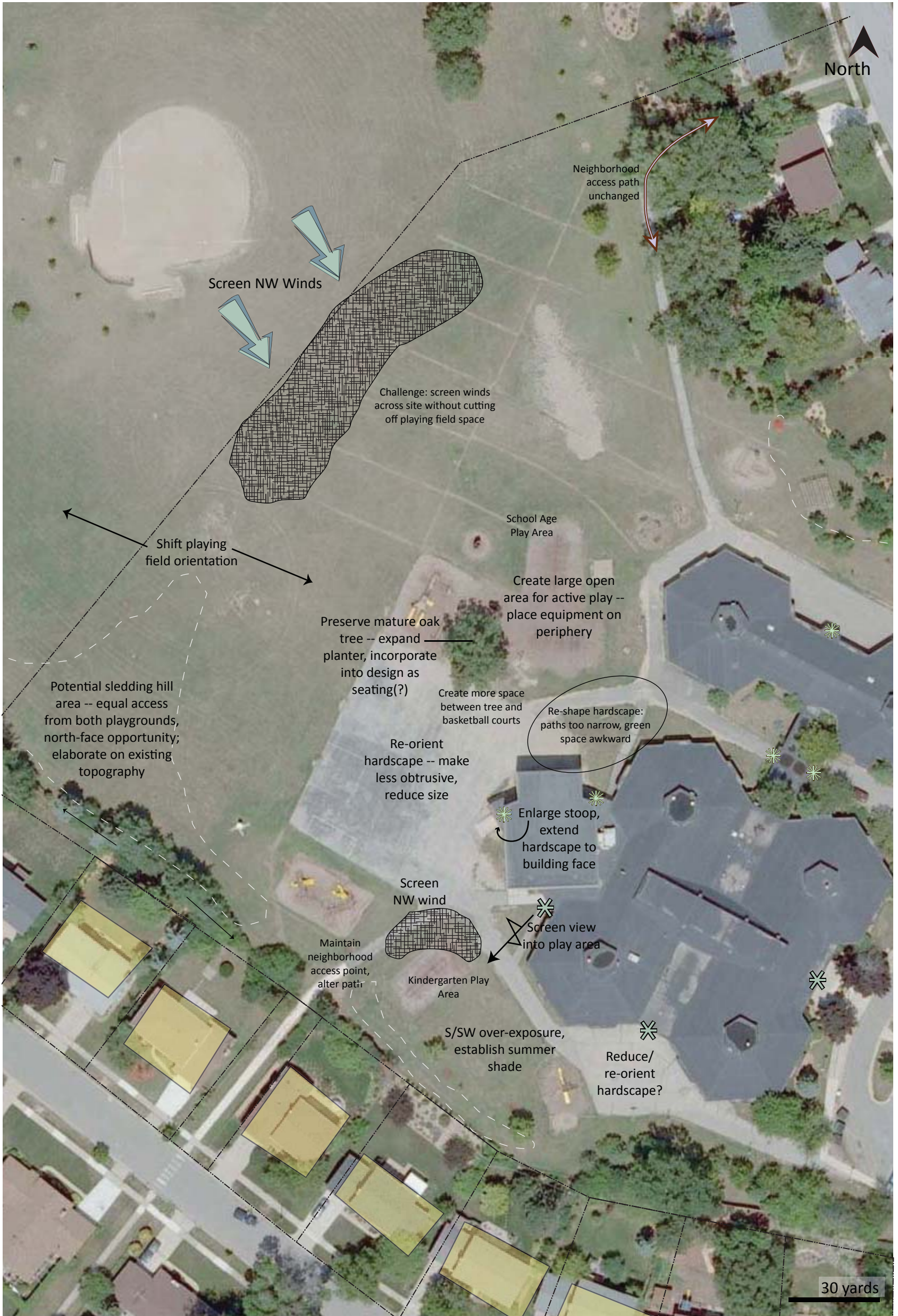






Figure 6.3 Site Analysis

Key:

-  Primary Playground/Bldg Access
-  Secondary Building Access
-  2' Contours
-  Proposed Wind Screen

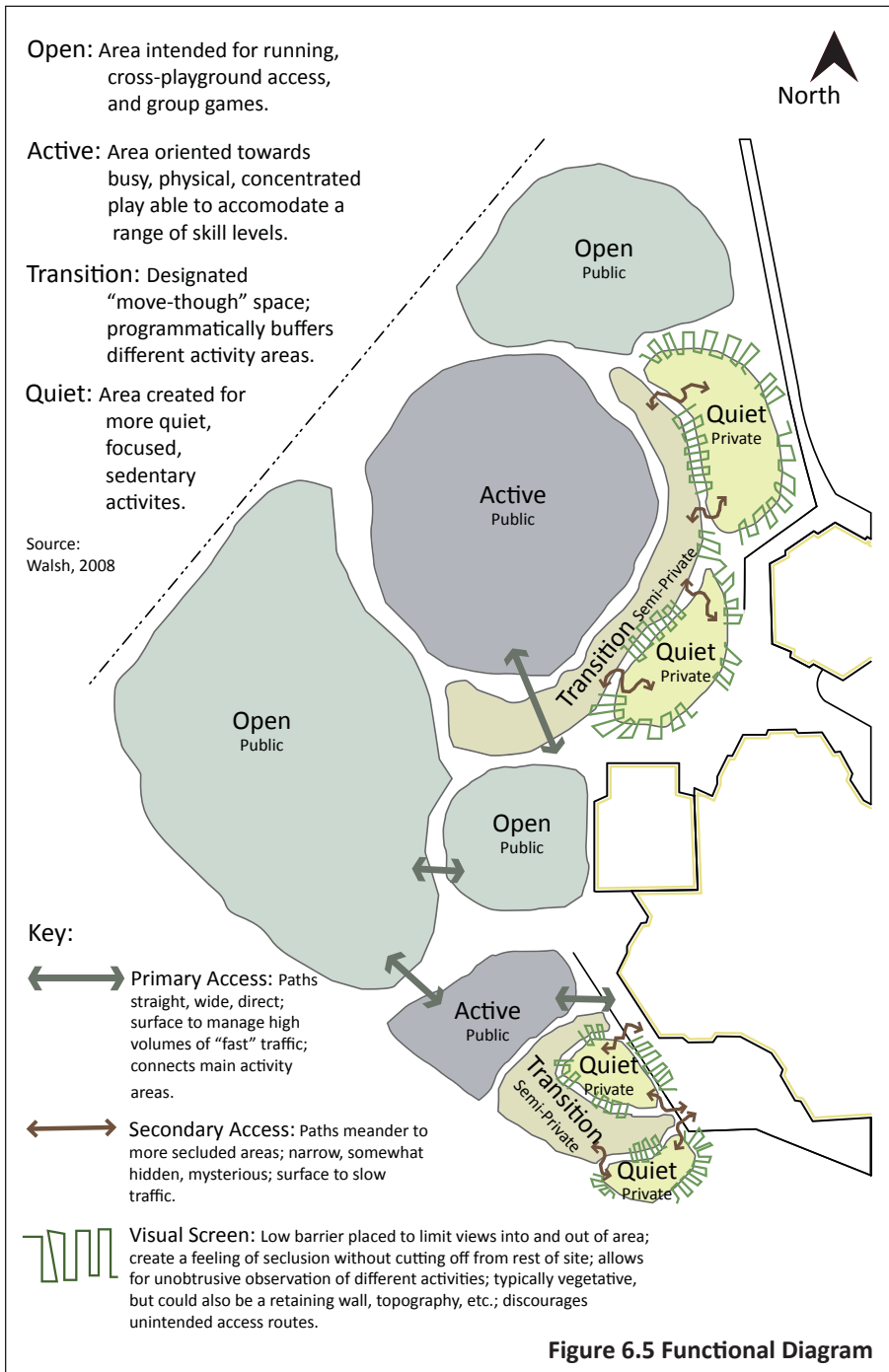
6.2.2. Site Design

The playground design presented in Figure 6.6 was formulated out of a need for practicality and used a deduced circulation pattern to shape the space. Topographic forms, material selection, and play element palette drew from the region's glacial history and are used to tie together the site as a whole and connect it to the larger landscape. Vegetation and topography play multiple roles within the design, serving to moderate climate within the site, provide visual screens, define space, and create a sense of enclosure.

Primary sight lines informed the placement of focal points and a hierarchy of paths were then placed linking the different spaces. A perimeter track was placed around the defined play areas creating a looping circuit connecting the exterior spaces, framing the interior space, and linking the two playgrounds. This primary path is intended to carry the highest volumes of fast moving foot traffic to focal points and so was designed to be wide and relatively straight with a firm crushed granite surface all as recommended in section 4.3 of this report. While it is understood this pathway would in all likelihood not act as the predominant route between spaces, children do enjoy running in circles; a wide path around the perimeter keeps these high-energy "runners" out of the slower traffic moving within and between interior spaces. Narrow, winding secondary paths leading to the more private playground pockets were set off of the primary pathway. Designated play pockets were located in relation to the set circulation pattern and were guided by the parameters laid out in section 4.2. A functional diagram was created to visually work through and illustrate how the general spaces would be organized and interact. (See Figure 6.5.) Space in the play area interior was left undesigned to accommodate additional play programming in future design phases.

Design responses to winter considerations focused on the placement of wind screens across the site and on the addition of topography as a play element. A mass of large conifers was placed along a portion of the northwest property line to buffer a bulk of the

School Age Play Area from incoming winds. Smaller groupings of medium-sized conifers were strategically offset in the interior spaces to create more specific sheltered pockets for play. Topography was also used to define particular pockets for play; for example, as an extension of the existing ridge in the Kindergarten Play Area, a small berm set on the northwest corner was added to frame the space and create an implied barrier between the play area for the younger children and



the immediate building access point used by the older children. The Drumlin Run, evocative of the teardrop shaped drumlins left in the wake of a receding glacier, was incorporated into the design as an open-ended play element in the landscape built to highlight concepts of scale and serve as a multi-functional space appealing to all age groups. The sledding hill, symbolizing a glacial kame, was located in the southwest corner of the site for several

reasons: 1) the location was equally accessible from both defined play areas and; 2) the location allowed for use of the north-facing slope of the hill – as discussed in section 4.1.4 of this report, north-facing slopes receive the least amount of winter sun and therefore retain snow cover for the longest amount of time. A long, flat, open stretch at the base of the hill provides an unobstructed landing zone for incoming sleds. Low vegetation clustered at the top of the hill is intended to delineate a “staging area” for sledders and is an attempt to separate children going down the hill from the children coming up. This vegetation also marks the top of the hill and can serve as an indicator of achievement (Section 4.4.2), and as a play prop. The tree mass planted on the backside of the large hill is intended to deter movement into the area and will eliminate the need for mowing on the slope.



Figure 6.6 Drumlin Run Character Sketch

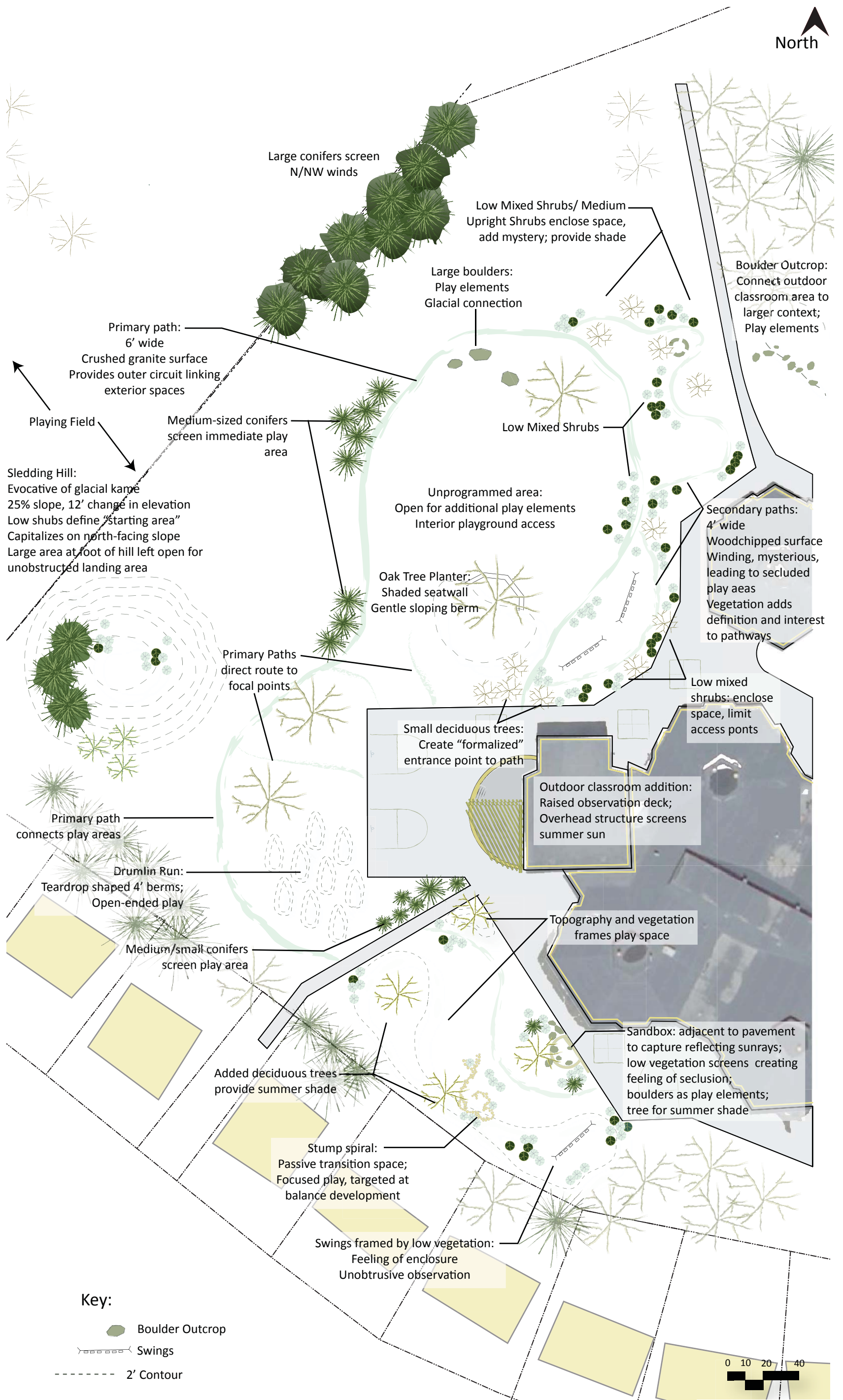
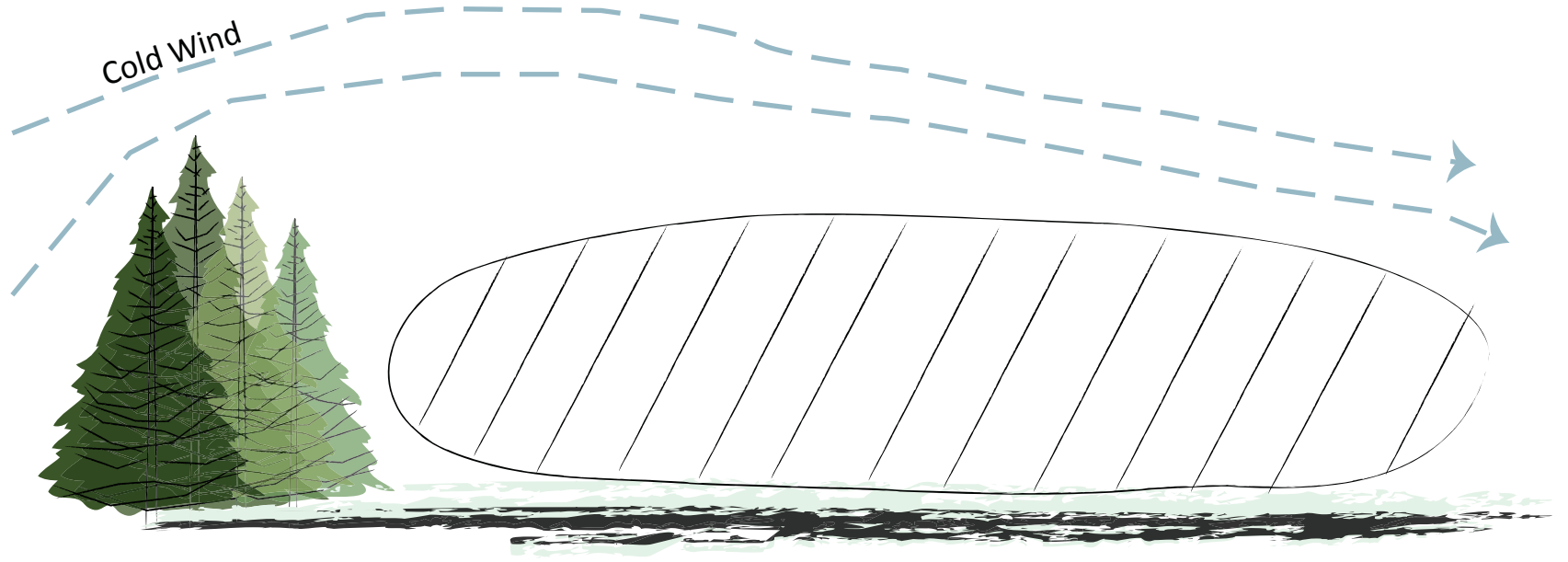


Figure 6.6 Site Design



Buffered Area
8-10 times height of tree mass

Not to scale
Graphic adapted from Booth & Hiss, 2004



Figure 6.7 Windscreen Diagram

6.3 Design Reflection

This design scenario demonstrates the straightforwardness with which winter considerations can be incorporated into the framework of site layout. With only a few simple gestures the character of the schoolyard was improved to better facilitate winter play. Further, the implications of including micro-climate and topography in preliminary design decisions will extend beyond enhancing winter play as both translate across all four seasons, altering the conditions of the environment and enriching the playscape year round.

Unsurprisingly, the most challenging aspect of the design was navigating the allocation of space. Tradeoffs between the addition of significant topography, massings of large trees as windscreens, and the need for a flat area designated for sports play had to be negotiated and a reasonable compromise found. While this particular design was able to take advantage of the adjacent community park as an extension of the playing field, this solution is a luxury school sites in more urban areas may not enjoy. Design responses in such scenarios will require not only more creative alternatives but will also benefit from the consideration of the larger local context. Drawing from the programming network of area play spaces will help to relieve tradeoff pressures.

On a smaller scale, the utilization of topography and vegetation for the definition of play pockets and the enrichment of the environment as a whole came with spatial expenses. Creating space costs space. In every site design the value of form and function must be weighed, and a context appropriate balance found. In this particular design solution, more weight was given to the need for open areas as a response to use patterns of a school playground (lots of kids, intense play for short spurts of time); sensitivity to maintenance requirements (budget restrictions, plant care knowledge, growing conditions); and the nature of supervision in schoolyards (supervisor: student ratio). The result of this decision was a large amount of relatively “undesigned” space.

7.0. Report Summary

The evolution of playground design has been stymied by unrealistic safety concerns and an overarching fear of litigation. In the wake of this fixation are sterile and repetitive playgrounds lacking in the challenging and engaging opportunities that foster the growth of healthy, balanced children. Without high quality outdoor play spaces, the physical, socio-emotional, and cognitive development of children suffers. If the design of play environments is to again move forward, the difference between real and perceived danger must be recognized. Design must move beyond blindly approved of, component-centric playground layouts and the seemingly benign plastic structures at the heart of such spaces.

Because the character of the surrounding landscape significantly influences the type and degree of interaction in which a child engages, the design of the places where children play should be given careful consideration. Informed, comprehensive design decisions made throughout the playground planning process will result in a well-thought out design that facilitates play that is both developmentally beneficial and fun. Winter landscapes present unique opportunities that inherently support such high quality play – landscapes in which engaged and active play thrives. When winter conditions are accounted for, a playground design can capitalize on these occasions and instigate imaginative and spontaneous free play. Unfortunately, this is where contemporary planning consistently falls short and the exclusion of winter from playground design is an underutilization of valuable play space that leaves winter play dependent on the adaptive nature of children. The design application of principles examined in this report demonstrates winter considerations can be fluently incorporated into the site design process resulting in a playscape that, by its very nature, better facilitates winter play.

8.0. References

- Barros R.M., Silver E.J., & Stein R.E. (2009). "School Recess and Group Classroom Behavior." *Pediatrics Journal*. Vol. 123:2; pg: 431-436. Elk Grove Village, IL: American Academy of Pediatrics.
- Booth, Norman & Hiss, James (2004). *Residential Landscape Architecture: Design Process for the Private Residence, 4th Edition*. Upper River, New Jersey: Pearson Education, Inc.
- Brett, Arlene, Moore, Robin C., Provenzo, Eugene F. (1993). *The Complete Playground Book*. Syracuse, N.Y: Syracuse University Press.
- Carlsson-Paige, N, Nancy (2008). "Reclaiming Play: Helping Children Learn and Thrive in School." *Exchange Magazine*. Issue: 180; pg: 44 -48. Redmond, WA: Exchange Press, Inc.
- Centers for Disease Control and Prevention. National Center for Health Statistics. Health Data Interactive. www.cdc.gov/nchs/hdi.htm. March 2009.
- Curtis, H.S. (1917/1977). *The Play Movement and Its Significance*. Washington, D.C: McGrath Publishing Company and the National Recreation Association.
- Fromberg, Doris Pronin & Bergen, Doris (eds). (1998). *Play from Birth to Twelve: Contexts, Perspectives, and Meanings*. New York: Garling Publishing.
- Frost, Joe L. (2006). "The Dissolution of Children's Outdoor Play: Causes and Consequences." Paper presented at Value of Play: a Forum on Risk, Recreation, and Children's Health. (Washington DC; May 31, 2006).
- Frost, J.L., Brown, P.S., Sutterby, J.A. & Thorton, C.D. (2004). *The Developmental Benefits of Playgrounds*. Olney, MD: Association for Childhood Education International.
- Gill, T. (2005). "If You Go Down to the Woods." *Ecologist*. Cited in *Exchange Every Day*, April, 17, 2006. <http://www.childcareexchange.com/eed/issue.oho?id+1440>
- Herrington, Susan & Studtmann, Kenneth (1999). "From Yard to Garden: Interventions in the Landscape of Play." *Places: Forum of Environmental Design*. Vol. 13:1. Berkely, CA: Design History Foundation.
- Heseltine, P. (1998). "Inspecting Children's Playgrounds," in Brown, F. (2003) *Playwork: Theory and Practice*. Philadelphia: Open University Press.
- Hill, Polly (1980). "Toward the Perfect Play Experience," in Wilkinson, P.F. (1980). *Innovation in Play Environments*. London: Croom Helm.
- Johnson, Julie M. & Hurley, Jan (2002). "A Future Ecology of Urban Parks: Reconnecting Nature and Community in the Landscape of Children." *Landscape Journal*. Vol. 21:1; pg 110-115.
- Kaplan, Rachel, Kaplan, Stephen, & Ryan, Robert (1998). *With People in Mind*. Washington DC: Island Press.
- Keeler, Rusty (2006). "Winter Playscape Dreaming." *Exchange Magazine*. Issue: 167; pg 82-83. Redmond, WA: Exchange Press, Inc.
- Kritchevsky & Prescott (1977). *Planning Environments for Young Children: Physical Space*. Washington, D.C.: National Association for the Education of Young Children.

- Louv, Richard (2005). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill, NC: Aloquin Books.
- McGinnis, Janet (2001). "Adventure Playgrounds and Outdoor Safety Issues." *Child Care Information Exchange Journal*. Issue: 150; pgs. 39-57. Redmond, WA: Exchange Press, Inc.
- Moore, Gary T. (1983). "State of the Art in Play Environment Research and Applications." Paper presented at the International Conference on Play and Play Environments (Austin, TX; June 30, 1983).
- Moore, R. (1992). *Plants for Play: A Plant Selection Guide for Children's Outdoor Environments*. Berkeley, CA: MIG Communications.
- Moore, Robin C. (1986). *Childhood's Domain: Play and Place in Child Development*. Dover, N.H.: Croom Helm.
- Moore, R.C, Goltsman, Susan, M. & Iacofano, Daniel (1992). *Play for All Guidelines*. Berkeley, CA: MIG Communications.
- Pellegrini, A. D. (2006). *Recess: Its role in development and education*. Mahwah, NJ: Erlbaum.
- Pellegrini, Anthony D. (1995). *School Recess and Playground Behavior: Educational and Developmental Roles*. Albany, NY: State University of New York Press.
- Pepper (1987). "Winter Adaptation of Outdoor Recreation Facilities. (Or please don't close it down this winter)." *Recreation Canada*. Vol: 45:5; pg: 46 -51.
- Playground Association of America. (1910). Report of the Committee on Equipment. *The Playground*. Vol. 4, 270-284.
- Robinette, Gary O. (1972). *Plants/People/Environmental Quality*. Washington DC: US Department of Interior.
- Solomon, Susan G. (2005). *American Playgrounds: Revitalizing Community Space*. Hanover, NH: University Press of New England.
- Southeast Michigan Council of Government (2009). SEMCOG 2035 Forecast Population Age Group by School District. Detroit: SEMCOG.
- Talbot, James & Frost, Joe (1989). "Magical Playscapes" in *Childhood Education*; Vol. 66: 1; pg 11-19.
- Tennessee, C.M. & Cimprich, B. (1995). "Views to Nature: Effects of Attention." *Journal of Environmental Psychology*, Vol. 15, pg. 77-85.
- Thomson, Sarah (2007). "Do's and Don'ts: Children's Experiences of the Primary School Playground." *Environment Education Research*. Vol. 13:4, 487-500.
- U.S. Census Bureau, Current Population Survey, Educational Attainment in the United States: 2005.
- Walsh, Prue (2008). "Planning for Play on a Playground." *Exchange Magazine*. Issue: 183; pgs. 88-92. Redmond, WA: Exchange Press, Inc.

White, Randy (1997). "Sometimes, You Just Gotta Make Mud Pies: Children's Adventure Play Gardens". *Tourist Attractions and Parks*. Kansas City, MO: White Hutchinson Leisure & Learning Group.

Wilkinson, Paul (1980). *Innovation in Play Environments*. London: Croom Helm.

Wilkinson, P.F. & Lockhart, Robert S. (1980). "Safety in Children's Formal Play Environments," in *Innovation in Play Environments*. London: Croom Helm.

Wilkinson, Paul, Lockhart, Robert, & Luhtanen, Ethel (1980). "The Winter Use of Playground," in *Innovation in Play Environments*. London: Croom Helm.

Appendices

Appendix A: Allen Elementary School, Grounds and Equipment Images



Main playground, looking south



Playground, east boundary slope down to street; looking south



Playground, eastern boundary looking southeast



Outdoor classroom, looking north from playground



Kindergarten playground, from main playground looking north



Tiered playing fields, looking south towards Buhr Park



Basketball/4-Square courts



Metal geodome climber,
"The Nest"



Metal climber



Metal climber



Plastic structure, ladders,
platforms, slides



Plastic structure, climbing/
swinging



Special needs swing, east of
basketball courts



Swings, eastern boundary



Tire swing

Appendix B: Eberwhite Elementary School, Grounds and Equipment Images

Southwest Playground



Playground entrance from parking lot



Castle structure, looking northeast across playground towards parking lot



Castle structure, looking east



Castle structure, looking south



Playground signage



Castle detail, platforms and tire obstacles



Castle detail, metal slide



Castle detail, platforms and swinging



Castle detail, limited visual access



Castle detail



Castle detail, rubber padded corners for knee protection



Castle detail



Castle detail, tire obstacle



Castle detail



Castle detail, hidden tire swing

Southwest Playground (continued)



Castle detail, balance oriented elements, looking west



Zip-line



Swings, southwest property line



Southwest playing field



Hardcourt and fitness park, view southeast from playground



Monkey bars



Tire tower



Metal climber



Southwest playground, looking east from playing field



Outdoor classroom



Outdoor classroom



Fence line, playground/woods boundary



Fence line, playground/woods boundary



Eberwhite Woods, access point



Fritz Park, access point

Eberwhite Elementary Fitness Park



Fitness park signage



Basketball/4-Square courts
and fitness park



Balance beams



Upper body obstacles



Climbing/Swinging



Balance



Parallel bars



Xylophone

Southeast Playground



Castle structure,
looking south



Castle entrance ramp



Castle detail, metal slide



Castle detail



Tire feature



Tire feature



Castle detail



Castle detail

Southeast Playground (continued)



Tire feature



Castle detail



Castle detail



Castle structure, looking northeast



Castle detail



Castle detail



Castle detail



Southeast playground,
SW corner looking northeast



Chuteball hoop



Monkey bars



Outdoor classroom



Outdoor classroom



Sandbox



Picnic table, between castle and playing field; looking south

Southeast Playground (continued)



Plastic structure



Plastic structure



Swings



Arced monkey bars



4-Square court



Playing field

Appendix C: Dicken Elementary School, Grounds and Images

Southeast Playground



Playground looking south down neighborhood access path



Playground looking north



Metal climbing/swinging structure



Wood/plastic platform structure



Metal climber



Swings



Plastic structure, platforms and slides



Plastic Structure, platforms and slides

Southeast Playground (continued)



Arced monkey bars



Swings, south end



Chuteball hoop



Playground topography,
looking north



Protective tree barrier



Ball diamond



Playing field between
playgrounds

West Playground



Basketball/4-Square courts
view looking south



Neighborhood access west



Metal structure



Plastic structure, climbing
and slides



Metal structure



Metal swinging bars



Swings

West Playground (continued)



Arced monkey bars



Monkey bars



Swings



Playing field looking north



Swings, north end playground



Dicken Woods wetland
entrance
