NATURAL SCHOOLYARDS:

BRINGING NATURE TO CHILDREN THROUGH OUTDOOR CLASSROOMS AND PLAYSCAPES

by

BREANNE MEGAN PESIS

(Under the Direction of John Crowley)

ABSTRACT

Children gain numerous benefits from interacting with the natural environment including increased focus, dexterity, and problem-solving skills. In recent decades, however, a loss of interaction with nature has separated children from this vital human experience. This thesis looks at the suburban American schoolyard as a potential realm for increasing childhood contact with nature and fostering healthy human-nature relationships. Utilizing educational models from around the world the intersection of environmental education, landscape architecture, and child development is explored. The history of the American relationship with nature and playground design is also reviewed. Overlaying this information provides rationale for creating outdoor classrooms, natural playscapes, and naturescapes. Finally, elements for a successful natural schoolyard are provided and applied conceptually through the use of opportunities and constraints maps to Merion Elementary School in a suburb of Philadelphia, Pennsylvania.

INDEX WORDS: Landscape architecture, Human nature relationship, Schoolyards, Outdoor classroom, Forest schools, Education, Child development, Play, Environment

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BA, Kent State University, 2007

A Thesis Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

MASTER OF LANDSCAPE ARCHITECTURE

ATHENS, GEORGIA

2014

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DEDICATION

This thesis is dedicated to Elnatan and his future siblings.

ACKNOWLEDGEMENTS

Looking back I never would have expected that a high school environmental science project would lead me to my future career. To Joe Burwell for taking his students outdoors and having us get our hands dirty.

I would like to thank all of the professors who helped guide me and grow my love of design. Beginning at Kent State University, then at Ball State University, and culminating at University of Georgia, the amazingly creative and inspiring faculty in each university's design programs helped shape who I am today. To the members of my committee: John Crowley (Jack), Jon Calabria, Sara Schuh, and Deborah Tippins, I am forever grateful for your assistance, encouragement, and thoughtful commentary. Jack, thank you for taking me under your wing after my previous thesis topic was derailed; this thesis would never have been written if not for you. Sara, I cannot thank you enough for the guidance and encouragement you have given me. You have gone above and beyond starting from my first tentative phone call asking if we could meet.

Last but not least, all of my love and thanks to my family: my parents, husband, son, and brothers; for the constant support and faith. Avi, you held me up when I needed it and pushed me even when I didn't want to be pushed. Elnatan, I hope to always be an inspiration in your life as you have already been in mine.

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CHAPTER 1

INTRODUCTION

Man has explored the human-nature relationship for countless generations. This connection begins during childhood, which many believe to be the most essential time to experience nature. Nature can be defined as features, products, and forces of earth which exist and change of their own accord despite human intervention. In recent decades there has been a loss of interaction with nature, causing a separation of children from this vital human experience. Children lack natural play and education areas, yet it can be difficult to take them to natural environments.

Early and middle childhood education should nurture the nature relationship as it provides numerous benefits such as increased focus, dexterity, and problem-solving skills. In a 2012 article Julia Toquati, an expert in the influence of nature on child development wrote, “Engagement with the natural world is perhaps the most powerful way to support the investigation process—observation, experimentation, data collection, prediction, analysis, and reporting discoveries.”[1]

School grounds should support the educational goals and encourage diverse forms of play. Instead, current American schoolyards are sterile, formally

[1] Julia Torquati, "Environmental Education: A Natural Way to Nurture Children's Development and Learning," *Young Children* 65, no. 6 (2010).

designed spaces devoid of the ethereal qualities of more informal natural landscapes. The purpose of this thesis is to address the question: Can the missed opportunity for nature interaction in a schoolyard be rectified?

In the United States, children are mandated to attend school. This means schools are in a unique position when it comes to children interacting with nature. Although the child may not have natural landscapes easily accessible at home, having one at school provides daily contact opportunities. In recent decades, children have spent an increasing number of hours at school. The National Wildlife Federation (NWF) notes that “the schoolyard is a critical habitat--for children. By the time they finish sixth grade, most children have spent close to 2000 hours of their lives in schoolyards.”[2]

Therefore, instead of having rigidly designed landscapes, schoolyards can be made to resemble natural environments, bringing nature to the children. This thesis will explore how school grounds can provide needed childhood interaction with nature, foster a connection with nature, and the benefits of doing so. By looking at the school landscapes through the lens of child development and American culture, one can better understand how to simultaneously provide a dynamic teaching space while stimulating the senses, creativity, and development of students. Landscape architecture principles can be used as a tool for childhood education when applied to schoolyard designs.

[2] Stephen R. Coffee, "Down by the Schoolyard," *Virginia Journal of Education*(1998), http://www.nwf.org/how-to-help/garden-for-wildlife/schoolyard-habitats/benefits/down-by-the-schoolyard.aspx.

Nature has a different connotation depending on whether one is in an urban, suburban, rural, or wilderness environment. This thesis focuses on suburban schoolyards, which have their own advantages and challenges in comparison with rural and urban sites. In a suburban setting, nature is defined as features of earth that exist of their own accord or resemble such features. Therefore, on a spectrum ranging from urban to wilderness, nature in a suburban context connotes an environment closer to that of wilderness.

To demonstrate the potential applications of these findings, opportunities and constraints maps for an example school will be made. An opportunities and constraints map is an analysis which translates technical information into a helpful guide for identifying potential influencing further planning and design. These will be at both a local and a site scale. A major limitation to this thesis was the inability to form a true stakeholder group in order to pursue a natural schoolyard project. For that reason, an outdoor classroom, playscape, or naturescape design will not be undertaken.

CHAPTER 2

THE INTERFACE OF NATURE AND THE CHILD

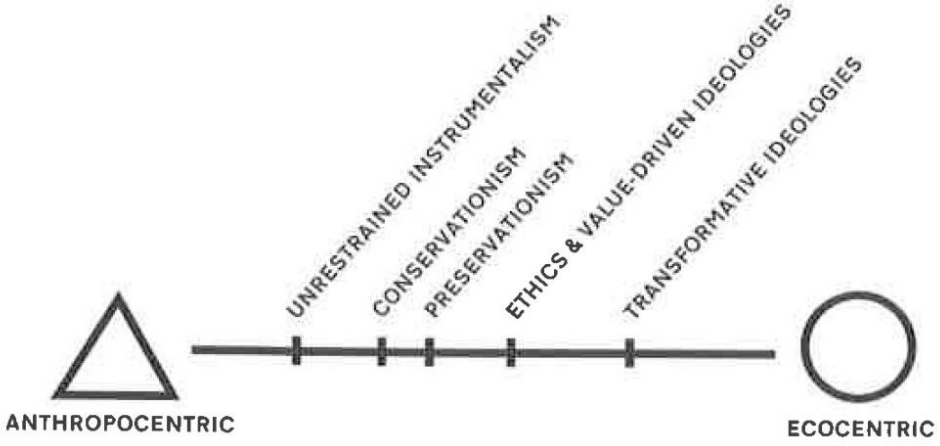
Countless generations have explored the relationship between humans and nature. The exploration of reality and perception through human senses by Greek philosophers such as Plato and Socrates dates back to the fifth century BCE. In the nineteenth century, American transcendentalists like Ralph Waldo Emerson and Henry David Thoreau explored what the connection between humans and nature meant. Most recently, this relationship has been tested under twenty-first century scientific practices and explored by academics while discussing issues such as ethics, values, and human health.

The human relationship with nature is an interdisciplinary subject including human behavior, education, and biology. Morals, values, and ethics are often researched to determine how people form their "loyalties, affections, and convictions."[3] One of the main questions is the yet undetermined question of whether nature is a human construct or whether nature exists on its own standing. The understanding of this question impacts the moral terms on which one views nature. If one sees nature as a human construct with no intrinsic value, then there is no motivation to protect nature. Whereas, if one views nature

[3] Peter H. Kahn, *The human relationship with nature : development and culture* (MIT Press: Cambridge, Mass., 1999); ibid.

as having inherent worth then it follows his actions would be affected by this moral understanding.

The environmental ethics question of mastery versus stewardship has baffled western culture for centuries. There are two main opinions when it comes to humans and nature: humans have dominion over nature and humans are part of nature. In both circumstances there are two outcomes. One, humans must take care of nature, or two, humans must master nature. The vast majority of people do not view the answer as so clear cut, instead falling on a spectrum of beliefs between the two dichotomies. Julia Corbett diagrams this spectrum in her book *Communicating Nature: how we create and understand environmental messages*.[4]



A spectrum of environmental ideologies, by Julia B. Corbett, 2006. *Communicating nature: how we create and understand environmental messages*, p.29.

Figure 1. A spectrum of environmental ideologies.

[4] Julia B. Corbett, *Communicating nature : how we create and understand environmental messages* (Washington, DC: Island Press, 2006).

Research shows that values and morals impact one's relationship with nature. As such, a person's values and morals in conjunction with the natural environment are pivotal to his relationship with nature. The vast majority of people feel that nature is important to their lives, whether it takes the form of plants, animals, elements, or other natural elements.

Research by Stephen Kellert asserts, "that nature… remains an indispensable, irreplaceable basis for human fulfillment."[5] Much of this claim is based on the biophilia hypothesis, by Edward O. Wilson, which posits the notion that humans have evolved with an inherent attraction to other forms of life on Earth. This hypothesis suggests that both fear and enjoyment of nature is derived from the human experience and evolutionary history. According to this theory, changes in human behavior in recent history, such as a lack of interaction with nature and decrease in appreciation for nature, may be a contributing cause of the current rapid species extinction taking place. This indifference to nature could result in a collapse of systems on which humans rely, such as agricultural and hydrological, and has the power to negatively affect the future of human health.[6] Since Wilson first coined the term 'biophilia' in 1979, it has been explored by countless other scientists and environmentalists. David Orr, another prominent environmental scientist says, "My hypothesis about the biophilia hypothesis, then, is that whatever is in our genes, the affinity for life is now a *choice* we must

[5] Stephen R. Kellert, *Building for life : designing and understanding the human-nature connection* (Washington, DC: Island Press, 2005). 3.
[6] Stephen R. Kellert and Edward O. Wilson, *The Biophilia hypothesis* (Washington, D.C.: Island Press, 1993).

make…. If we are to preserve a world in which biophilia can be expressed and can flourish, we will have to decide to make such a world."[7]

The field of environmental psychology has to date shown that nature is beneficial to mental health. Although attributed to various reasons, the outcome of human interaction with natural environments has been documented as having healing and restorative properties.[8] In addition, natural environments result in greater focus, attention, and cognitive abilities.[9] These benefits have been extensively studied, for example, in the article "What are the Benefits of Interacting with Nature?" the authors look at 57 different papers examining the multitude of benefits nature imparts. The authors found that, "there is mounting empirical evidence that interacting with nature delivers a range of measurable human benefits, including positive effects on physical health, psychological well-being, cognitive ability, and social cohesion." [10] The findings support that nature plays an important role in happy and healthy lives.

The Role of Play in Child Development:

Before understanding the interface of children and nature, one must understand children and their development. For the purposes of this thesis, focus will be given to middle childhood, ages five through eleven. According to the Centers for Disease Control and Prevention (CDC), children at this age are

[7] Ibid., 416.
[8] Elizabeth Nisbet, John Zelenski, and Steven Murphy, "Happiness is in our Nature: Exploring Nature Relatedness as a Contributor to Subjective Well-Being," *Journal of Happiness Studies* 12, no. 2 (2011).
[9] Marc G. Berman, John Jonides, and Stephen Kaplan, "The Cognitive Benefits of Interacting With Nature," *Psychological Science (Wiley-Blackwell)* 19, no. 12 (2008).
[10] "What are the Benefits of Interacting with Nature?," Multidisciplinary Digital Publishing Institute, http://dx.doi.org/10.3390/ijerph10030913.

beginning to have to deal with and react to the larger world around them. “Physical, social, and mental skills develop quickly at this time. This is a critical time for children to develop confidence in all areas of life, such as through friends, schoolwork, and sports.”[11] In addition, friendships are becoming increasingly important as children develop their independence, sense of responsibility, and understanding of another’s point of view.[12] Children of this age are beginning to think about the future and have an increasing understanding of their place in the greater world. Their increased mental skills mean better descriptive abilities of thoughts and emotions as well as increased empathy.[13]

Play is necessary for child development. In addition to constantly improving motor skills and maintaining physical health, it improves strength, flexibility, and coordination.[14] Children who do not engage in the recommended 60 minutes of physical activity a day are more likely to be obese, suffering from additional health issues including diabetes and cardiovascular disease.[15][16]

Beyond the physical manifestations, play impacts numerous social skills. Valuable skills learned through outdoor play include cooperation, problem solving, self-control, and perseverance.[17] Both the American Academy of

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[11] CDC, "Positive Parenting Tips for Healthy Child Development: Middle Childhood (6-8 years of age)," ed. Centers for Disease Control and Prevention.
[12] CDC, "Positive Parenting Tips for Health Child Development: Middle Childhood (9-11 years of age)," ed. Centers for Disease Control and Prevention.
[13] CDC, "Positive Parenting Tips for Healthy Child Development: Middle Childhood (6-8 years of age)."
[14] Joe L. Frost and Association for Childhood Education International, *The developmental benefits of playgrounds* (Olney MD: Association for Childhood Education International, 2004).
[15] Fran P. Mainella, Joel R. Agate, and Brianna S. Clark, "Outdoor-based play and reconnection to nature: A neglected pathway to positive youth development," *New Directions for Youth Development* 2011, no. 130 (2011).
[16] Ramstetter C. Council on School Health American Academy of Pediatrics Murray R, "The crucial role of recess in school," *Pediatrics* 131, no. 1 (2013).
[17] Ibid.

Pediatrics and the Association for Childhood Education International have released papers citing the numerous benefits of playtime during school hours, calling it “crucial”[18] and “essential”[19] to children’s happy and healthy development. It is such an important part of development that when children are denied play opportunities, they may experience increased levels of depression, hostility, and worry.[20] Children who have been deprived of access to free play have higher rates of mental health issues, such as anxiety and depression. Children who are given the opportunity to play, on the other hand, have higher self-esteem than their peers.[21] In addition, play allows children to take risks. Risk is critical to developing judgment skills; the same spaces that provide risk provide challenge, allowing for continual growth of a child’s abilities.[22] Playing allows children to explore their world, make decisions, and experiment with ideas. This exploration explains findings supporting a connection between play, learning, and overall development as children apply concepts from the classroom to their surroundings.[23]

A common misconception about recess is that the primary purpose is to expend excess energy, when in fact, it allows a break from the cognitive tasks of the classroom. Backed by numerous studies, the American Academy of

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[18] Ibid.
[19] Joan Packer Quisenberry Nancy Isenberg, "Play: Essential for All Children. A Position Paper of the Association for Childhood Education International," *Childhood Education* 79, no. 1 (2002).
[20] Frost and Association for Childhood Education International, *The developmental benefits of playgrounds*.
[21] Mainella, Agate, and Clark, "Outdoor-based play and reconnection to nature: A neglected pathway to positive youth development."
[22] Susan G. Solomon, *American playgrounds : revitalizing community space* (Hanover, Md.: University Press of New England, 2005).
[23] Frost and Association for Childhood Education International, *The developmental benefits of playgrounds*.

Pediatrics found that children of all ages were better able to refocus cognitively after an interruption to classroom instruction.[24] “Researchers have discovered that play is related to greater creativity and imagination and even to higher reading levels and IQ scores. Based on the research evidence, a new equation, put forth by child development scholar, Dr. Joe Frost, is in order: PLAY = LEARNING.”[25]

Benefits of Outdoor Play for Child Development:

It has been established that play, specifically outdoor play, is an invaluable tool in child development, especially during the critical period of middle childhood.[26] Nature also plays an important role in child development and the human-nature relationship is equally important to the child as to the adult, if not more so. Nature inspires curiosity and can stimulate an interest in learning. Natural environments provide stimulation, encouraging children to learn across all spectrums of development: physical, cognitive, social, and emotional. The same environments simultaneously provide respite.[27] Children enjoy spending time in the natural world, as it engages them and provides them opportunities for necessary individual growth.

Numerous studies have shown that children with access to green environments experience fewer symptoms of attention deficit/ hyperactivity disorder (ADHD) than those without. This was found across multiple settings including schoolyards, woods, and home. The findings are applicable across age

[24] Murray R, "The crucial role of recess in school."
[25] Frost and Association for Childhood Education International, *The developmental benefits of playgrounds*.
[26] Kellert, *Building for life : designing and understanding the human-nature connection*.
[27] Torquati, "Environmental Education: A Natural Way to Nurture Children's Development and Learning."

groups from early to middle childhood and did not differ based on family income level or gender. One study even found that a wooded environment was preferred to a town environment by ADHD children.[28] [29] Nature allows children suffering from ADHD to focus and better cope with their daily challenges.

In addition to children suffering from ADHD, most children benefit psychologically from time in the outdoors. Recently this fact has garnered attention as author Richard Louv's book *Last Child in the Woods* has spread the notion of Nature Deficit Disorder.[30] The term he coined has even attracted the notice of the New York Times.[31] Nature Deficit Disorder suggests that behavioral and emotional disorders result from a loss of time and connection to the natural world.

In one study by Cecily Maller it was found that "hands-on contact with nature" had a positive effect on children. "'Hands-on contact with nature' is defined as any activity that involves children physically engaging with plants, soil or animals…. experiential engagement with nature is likely to be deeper and more meaningful than theoretical or vicarious experiences." Additionally, she writes from an educator's perspective, "Children's mental health and wellbeing impacts directly on their ability to learn; that is, children with poor mental health usually have learning as well as other difficulties." [32]

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[28] Ibid.
[29] Children and Nature Network, Cheryl Charles, and Alicia Senauer Loge, "Health Benefits to Children from Contact with the Outdoors and Nature," (2012).
[30] Richard Louv, *Last child in the woods : saving our children from nature-deficit disorder* (Chapel Hill, NC: Algonquin Books of Chapel Hill, 2005).
[31] Timothy Egan, "Nature-Deficit Disorder," *New York Times*(2012), http://opinionator.blogs.nytimes.com/2012/03/29/nature-deficit-disorder/.
[32] Cecily Jane Maller, "Promoting Children's Mental, Emotional and Social Health through Contact with Nature: A Model," *Health Education* 109, no. 6 (2009).

Cognitive development and creativity is fostered with nature. Nature allows for unstructured play which in turn allows children to determine their own activities. Play in natural areas is more diverse than in other play areas because it utilizes creativity and imagination. These skills are developed as children carry their imaginative play from day to day. The hierarchy of play is also surprisingly affected. Louv notes that, “when children play in an environment dominated by play structures rather than natural elements, they establish their social hierarchy through physical competence” while in green spaces, “Children used more fantasy play, and their social standing became based less on physical abilities and more on language skills, creativity and inventiveness.” This results in more egalitarian play between boys and girls.[33]

Nancy Wells, an American researcher studied over 300 students in upstate New York in an effort to determine the effect of natural settings on students’ health. She found that nearby nature helped to “buffer” life stress and adversity on children. Wells goes on to postulate that there are two mechanisms by which nature buffers stress. One is social support; children develop friendships when drawn together to natural areas. The other is the restorative properties of nature where children are given a chance to refocus. [34]

Physically, findings suggest that children who play outside are less likely to be sick as exposure to nature may boost the immune system.[35] According to the American Academy of Ophthalmology time spent outside is inversely related

[33] Louv, *Last child in the woods : saving our children from nature-deficit disorder*.
[34] Nancy M. Wells and Gary W. Evans, "Nearby nature: a buffer of life stress among rural children," *Environment & behavior* 35, no. 3 (2003).
[35] Egan, "Nature-Deficit Disorder".

to the rate of myopia, or nearsightedness, in children. Their research has found that there has been an increase in the prevalence of myopia in the United States in the past 40 years; findings suggest that "exposure to natural light and/or time spent looking at distant objects may be key factors."[36] Teachers of a preschool at Kent State University in Ohio observed that children were more careful with their bodies while working on a project outside than they were inside the classroom. [37] Increased bodily awareness in conjunction with enhanced motor skills may lessen the incidence of injury.

Children's preference for natural environments has been documented by numerous studies. Robin C. Moore had children draw maps of their favorite locations in 1986, an astonishing 96% were of outdoor spaces.[38] Another study conducted by Rachel Sebba of Israel found that 97% of adults describe an outdoor site when asked about the most significant place in their childhood.

> There is a connection between the quality of the child's experience and the way it is engraved in memory as he or she matures: (a) An experience in which the child is actively involved, with his body, his senses, and his awareness, is likely to be etched in memory for a long time; and (b) the sympathetic attitude the child displays toward nature is likely to accompany the experience even when recalled in memory.[39]

Given this context, the positive effects of nature on children's well-being can be better understood:

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[36] American Academy of Ophthalmology, "More Time Outdoors May Reduce Kids' Risk for Nearsightedness," (Orlando, FL2011).
[37] Carolyn Galizio, Julia Stoll, and Pamela Hutchins, "Exploring the Possibilities for Learning in Natural Spaces," *YC: Young Children* 64, no. 4 (2009).
[38] R. C. Moore, *Childhood's domain: play and place in child development* (Berkeley, Calif.; United States: MIG Communications, 1990).
[39] Rachel Sebba, "The landscapes of childhood: The reflection of childhood's environment in adult memories and in children's attitudes," *Environment and Behavior* 23, no. 4 (1991).

> The documentation of children's preference for green natural spaces is neither frivolous nor insignificant. From an evolutionary perspective, it is reasonable to expect that humans will have an affinity for settings that are beneficial, therapeutic, or healthful. As S. Kaplan and R. Kaplan pointed out, "An organism must prefer those environments in which it is likely to thrive". Thus, preference in this context is an expression of human needs. Preferred environments are likely to afford long-term survivability and are likely to be the settings in which humans are more likely to function.[40]

The research shows that children have an affinity for nature and landscapes which further their development. Unfortunately, that is not translated into their school environments.

Current American Schoolyards:

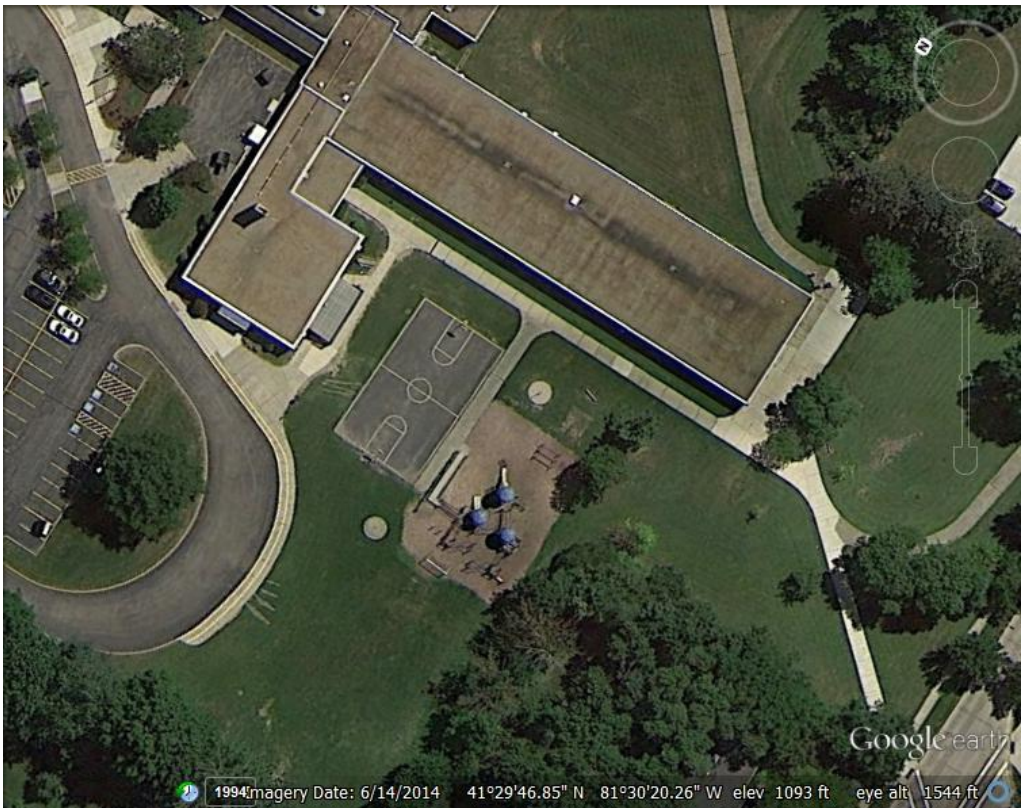
Playground design in America can be traced back a full century. During the early 1900s, playgrounds were gaining popularity throughout the United States. The end of the Second World War and beyond saw playground design and manufacturing continue to expand. By the latter part of the century, "monolithic play structures intended to link play activities and events within confined spaces" were the norm across America. "Thus, the early manufactured playground equipment efforts established patterns that, to some degree, endure to the present time in city parks and public schools." American schoolyards often follow the same mold, that which was developed in prior times has remained the status quo. Sharon Gamson Danks, an expert in the field of environmental planning, describes this model succinctly:

> Many ordinary schoolyards are characterized by a fairly predictable pattern of wide asphalt surfaces, large sports fields, and uninspiring commercial play equipment….A schoolyard found in New Jersey looks very much like a schoolyard in Ohio, Kansas, or California, despite the

[40] Wells and Evans, "Nearby nature: a buffer of life stress among rural children."

differences in climate, local history, and context. These types of schoolyards are ubiquitous.[41]

This is exemplified in Figure 2, an aerial view of an elementary school with grass, asphalt, and commercial play areas. The “uninspired” commercial play equipment found throughout the United States is shown in Figure 3.



41°29’46.85” N 81°30’20.26”, Google Earth, June 14, 2014.

Figure 2. Hilltop Elementary School in Beachwood, Ohio.

The 1970s saw many changes to the American playground landscape. During that time, the recognizable commercial play structure design, “Based on

[41] Sharon Gamson Danks, *Asphalt to ecosystems : design ideas for schoolyard transformation* (Oakland, CA: New Village Press, 2010).

linkage of posts and platforms, a new concept became the model." It was around this time that large corporations began buying their smaller counterparts while advertising their mass-produced equipment nationally. The wooden systems of the 1970s gave way to metal and plastic throughout the 1980s, quickly becoming the standard still in use today.[42]

Accessible Playgrounds, by Versageek, 2007. Photograph licensed under Creative Commons Attribution-Share Alike 3.0 via Wikimedia commons.

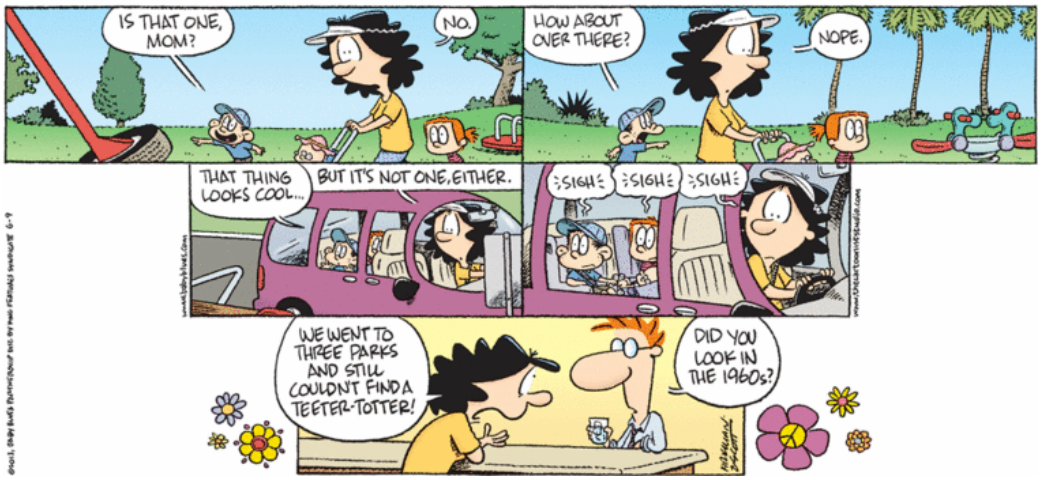
Figure 3. Commercial play structure comprised of posts and platforms

In 1993, the American Society for Testing and Materials (ASTM) released national playground safety standards. Numerous other organizations have also published guidelines and standards. Since that time, these standards have been

[42] Solomon, *American playgrounds : revitalizing community space*.

applied beyond the intended manufactured products to all playground features. A major cause of this over application is the litigious nature of American society. [43] [44] Countless lawsuits against schools and municipalities have occurred nationwide as the result of child injury during play at public facilities. “For example, a court judgment in a 2004 lawsuit compensated a child who tripped over a *stump* in a schoolyard *forest area.”* [45] In order to avoid the costly litigation process, many have taken to designing to the strictest standards available; often that of the youngest children who may play at the site. As discussed earlier, this can have developmental consequences for older children. In fact, it has become so common for the equipment deemed most dangerous including seesaws, high slides, and monkey bars to be removed from playgrounds that a recent comic strip of “Baby Blues” showed the mother driving her children to multiple parks in pursuit of a seesaw as shown in Figure 4.[46] Meanwhile, according to David Ball, a professor of risk management in England, “There is no clear evidence that playground safety measures have lowered the average risk on playgrounds…. If children and parents believe they are in an environment which is safer than it actually is, they will take more risks.”[47]

[43] Ibid.
[44] Frost and Association for Childhood Education International, *The developmental benefits of playgrounds*.
[45] Ibid.
[46] Rick Kirkman and Jerry Scott, "Baby Blues," ed. 2013 June 9 (Philadelphia Inquirer: King Features Syndicate, 2013).
[47] John Tierney, "Can a Playground Be Too Safe?," *New York Times*, July 18 2011.



Baby Blues by Rick Kirkman and Jerry Scott, June 9, 2013.

Figure 4. *Baby Blues* comic strip.

Designs Abroad:

In other nations, not as overly concerned with child safety and litigation, playground design is much more variable and creative. European and Asian designs include a diverse blend of materials, shapes, and designs to capture and hold a child's attention. In an online blog of an American family overseas, the mother writes:

> I've long admired the European playground. They are designed to be used in a multitude of ways, allow some risk (and responsibility on the part of the parents), and don't dictate the ways in which children must use the equipment. Many of the playgrounds include rope-related equipment, that requires the children to use balance and core muscle strength. You see rope-based equipment frequently in German playground, and it really does demonstrate the German idea of "survival of the fittest"! You will also find balancing logs and platforms, teepees, basket-style swings and water features. I know that many communities in the U.S. have fabulous playgrounds, but having living a sort of off-the-beaten path, peripatetic lifestyle, it wasn't until we arrived in Germany that we actually found these creative play places for children. Watching our risk-adverse child scale a rope web or jump off of pylons is a delight, and as parents, we appreciate the child-centered design of the playgrounds in Europe. Also, there is little

plastic in the equipment, which provides a certain aesthetic quality to their *spielplatzes*. (*sic*)[48]

Wasserspielplatz, by Peng, 2005. Photograph licensed under Creative Commons Attribution-Share Alike 3.0 via Wikimedia commons.

Figure 5. Wasserspielplatz, a water-based playground in Germany.

This captures what many scholarly authors have written about, but, from a parent's perspective. Even without having extensively researched the matter, this mother picks up the way in which American single-mindedness on safety has limited the benefits children gain from interacting with playgrounds. While it is possible that these parents have learned from the less-litigation-prone Germans with which they reside, Americans on the whole could benefit from following suit.

Luckily, due to an increase in knowledge about child development as well as a surge in environmentally sound practices, American playgrounds are beginning to change from the previous mold. Adventure playgrounds, natural

[48] JunebugJones, "European Playgrounds," Blogger, http://afterschoolexpat.blogspot.com/2011/06/european-playgrounds.html.

playscapes, and children's gardens are popping up all over the United States. Playscapes are landscapes supporting open-ended play and interaction, often simulating natural environments. Firms that specialize in projects of this nature are also becoming more common. For example, Planet Earth Playscapes and Bay Tree Design are two firms that specialize in natural schoolyards; offering services ranging from workshops, master planning, and leading community design and installations. These firms are so experienced with natural playscapes that both their founding principals, recognizing the need for dissemination of information, have authored books on the topic.[49] [50] While this trend is on the rise, these playgrounds are often placed at sites such as botanical gardens and private pre-schools. Sadly, this style of design is still more often than not, missing from public elementary school landscapes.

Forest Schools:

The forest school movement began in Europe in the 1950s. In Nordic countries, where it has become extremely popular, the movement grew out of constructivist and didactic educational theories. [51] Meanwhile in Germany, Friedrich Froebel began establishing the kindergarten, translated as children's garden, movement in the 1960s. This movement focused on using toys, games, and outdoor experiences for activity based learning.[52] Since that time, forest schools have spread extensively to the United Kingdom and Australia while

[49] Planet Earth Playscapes, design.earthplay.net.
[50] Danks, *Asphalt to ecosystems : design ideas for schoolyard transformation*.
[51] Peter Bentsen and Frank Søndergaard Jensen, "The nature of udeskole : outdoor learning theory and practice in Danish schools," *Journal of Adventure Education & Outdoor Learning* 12, no. 3 (2012).
[52] Bruce Watson, "Friedrich Froebel created Kindergarten," www.froebelweb.org.

remaining popular in Scandinavia. In the United Kingdom in particular, it has gained much notoriety in recent years. Each locale has its own spin on forest schools and the models in Scandinavia and the United Kingdom are quite different.

The model most common in the United Kingdom, is that students spend part or a whole day outside the classroom in a forested area. The sites they visit for this purpose vary from school grounds to wooded areas requiring vehicular transportation from school. These sessions happen approximately once a week or every two weeks, continuing for a duration of 2 to 12 months.[53] [54] In England, forest schools are a component of the curriculum, treated as a separate entity from traditional learning opportunities and the rest of the school day.

Pen Green Centre by Tony Hardacre, 2010.
'All about…Forest Schools', *Nursery World.*

Figure 6. Children at forest school in England.[55]

[53] Nicola D. Knowles Zoe R. Sayers Jo Ridgers, "Encouraging play in the natural environment: a child-focused case study of Forest School," *Children's Geographies* 10, no. 1 (2012).
[54] Liz O'Brien, "Learning Outdoors: The Forest School Approach," *Education 3-13* 37, no. 1 (2009).
[55] Annette Cummings, "All about…Forest schools," *Nursery World* 110, no. 4218 (2010).

In Scandinavia, on the other hand, forest schools integrate the landscape into the regulatory curriculum. For example, while Denmark *udeskole*, meaning 'outdoor school', also takes place weekly or biweekly, the activities are closely tied to the students' academic studies. In Scandinavia, *udeskole* has grown from the work of Jordet, who wrote on the didactic and pedagogical aspects the model. It is currently estimated that 14% of teachers practice *udeskole* with their students in Scandinavia.[56] Children in Denmark participate in *udeskole* in all weather conditions; "there is no such thing as bad weather, only bad clothes," is a common mantra in Scandinavian countries. Instead of keeping children inside during inclement weather, they are just taught to wear climate appropriate clothing. During rain, for example, children can be found splashing and wading through puddles in their Wellington boots and raincoats. The images below show children engaging in child-led activities and inquiry at a Norwegian forest school. They are allowed to challenge themselves with appropriate risk while bundled up for the winter weather.

[56] Bentsen and Jensen, "The nature of udeskole : outdoor learning theory and practice in Danish schools."

Figure 7. Children playing in a den at Birkebeiner Outdoor Nursery.[57]

Figure 8. Children spend their entire day outside, even eating and sleeping.

[57] Figures 7-9. Photographs courtesy of Andy Mitchell. *Birkebeiner Outdoor Nursery*, Lillehammer, Norway, 2014.

Figure 9. Students engage in age appropriate risks.[58]

The forest school model is also gaining interest in America, with an increase in recent years from schools embracing outdoor education. In fact, this has become so prevalent that a woman from the San Francisco Bay area wrote her Master's thesis on using the forest school model for an early childhood education center in May 2013.[59] In other locations, a model known as EIC, or Environment as an Integrating Context, has been adapted. This model, developed by State Education and Environment Roundtable (SEER), is based on constructivist approaches and focuses on utilizing a school's surroundings and community. An inter-disciplinary approach, EIC's constructivist method employs

[58] Figures 7-9. Photographs courtesy of Andy Mitchell. *Birkebeiner Outdoor Nursery*, Lillehammer, Norway, 2014.
[59] Abigail Peterson, "A Forest Preschool for the Bay Area: A pilot study for a new nature-based curriculum" (Dominican University of California, 2013).

student initiated learning as well as Environment-based education (EBE). SEER, founded in 1995, is a “cooperative endeavor of 16 state departments of education.”[60]

In America, the tradition to date has been for students to interact with nature through the use of overnight sessions at nature centers between fourth and eighth grade. These programs are often approximately 4 days in length with the children residing in dorms on a nature center campus while being immersed in environmental education experiences. This type of nature exposure is limited to these specific field trips occurring once in a child’s curriculum. Programs are run nationwide; examples include IslandWood, a 255-acre campus located outside of Seattle, Washington devoted to outdoor education and Cuyahoga Valley Environmental Education Center located in the Cuyahoga Valley National Park in Ohio.

These programs, while a great start toward outdoor education, are too limited. Children are not exposed to nature on a regular basis; the programs are not tied into the entire curriculum, being almost exclusively science education; and children often participate in these programs once well into their educational career, missing out on nature education during formative early years.

[60] State Education and Environment Roundtable, "The EIC Model," www.seer.org.

CHAPTER 3

RISE AND FALL OF THE AMERICAN GREAT OUTDOORS

Americans' relationship with their landscape is a complex one differing not only from individual to individual, but also by region. For example, those who live in the Pacific Northwest are stereotyped as being more connected to the natural environment than those in New England. These regional differences may be explained by looking at America's history and settlement.

Although inhabited by approximately 54 million Native Americans, Europeans believed they had discovered a previously unknown land when they first encountered America.[61] Being unknown to them, the land was christened New World. The European model at the time was one of conquest in the name of kingdoms and Christianity. Despite the existence of Native American cultures, the American landscape to which the explorers arrived was vastly different than the landscape of the Eastern hemisphere— a seemingly unaltered state. Early European settlers, religious Christians who closely followed the bibles and the book of Genesis, held the view that humans had dominion over the earth and all its creatures, and that god had commanded man to cultivate the land. They also believed that land was a commodity to be owned and developed. Due to this belief, the forests of North America were viewed as the antithesis of civilization;

[61] George B. Handley, *New world poetics : nature and the adamic imagination of Whitman, Neruda, and Walcott* (Athens: University of Georgia Press, 2007).

the woodlands were wild and even frightening. As a result, the forests were clear-cut to accommodate the agricultural practices familiar to the settlers, as well as for development of Western building types.

These notions of man's domination over the land, known as the dominion mandate, and that of land as a commodity have persisted in American culture to the present. Since colonial times, Americans have experienced several revolutions in the way they view nature. Among those who have had a great deal of influence on the American relationship to nature are Theodore Roosevelt, Gifford Pinchot, John Muir, and Aldo Leopold.

Roosevelt, Pinchot, and Muir were all instrumental in conservation and preservation of undeveloped land in the country. Roosevelt and Pinchot were in agreement on American land management and human's relationship to it. They felt that nature existed in order to benefit humans. For example, Americans obtained timber from forests and water from streams for irrigation. Both Roosevelt and Pinchot felt management of natural resources included more invasive procedures like construction of dams and irrigation ditches; that it was not in conflict with conservation.[62] Muir, however, felt that nature had intrinsic and transcendental value which was not always in agreement with utilitarian uses.

Aldo Leopold, while alive at the same time as his compatriots, was not focused solely on conservation efforts, but also, environmental ethics. The father of environmental ethics, he published the still popular *A Sand County Almanac* in 1949, promoting wildlife management and diversity. He also influenced the shift

[62] PBS, "Theordore Roosevelt and the Environment," http://www.pbs.org/wgbh/americanexperience/features/general-article/tr-environment/.

in the idea of wilderness solely as prime real estate for hunting to including a broader view of wilderness as land containing healthy and diverse biota.

Being a capitalist nation has had a great effect on the American environment. Denis Cosgrove stated in his essay “Landscape as Cultural Product”, that “In a capitalist economy it is a relationship between owner and commodity, an alienated relationship wherein man stands as outsider and interprets nature casually.”[63] Since land and natural resources are commodities, they are often viewed in terms of monetary value instead of intrinsic value. In fact, when Roosevelt was president and created the Bureau of Forestry to manage timber production, the lumberjacks protested on the basis of economic losses forcing Congress to amend the bill. America has a long history of choosing the most economically beneficial option over more long term intangible goals.

The American dream of being a land owner with a single family house has also impacted the American landscape. Regardless of where in America one may go, subdivisions of neatly arranged single family houses are found. Often called sprawl, this spreading out of developed land, resulting in the loss of woodland and agricultural land, has become a common sight in America. This results in a lack of nature as well as the fragmentation of land to which Americans once had access. Sprawl and development have contributed to the disconnect of the American people from their natural environment.

[63] Denis Cosgrove, "Landscape as Cultural Product," in *Theory in Landscape Architecture: a Reader*, ed. Simon Swaffield (Philadelphia, Pennsylvania: University of Pennsylvania Press, 2002).

America's Great Outdoors:

In 2011 the United States government introduced America's Great Outdoors (AGO), an initiative that is dedicated to bringing the historic interest in conservation back to the citizens. To develop this initiative, a comprehensive study was undertaken, with over 10,000 citizens taking part in community sessions and over 105,000 comments received from various methods. American youth were deemed so important to the overall success of the project that a pull-out report, which is a self-standing section of the full document, addressing the topic was created. "The message was clear: Americans care deeply about our outdoor heritage and want to enjoy and protect it."[64]

They found that Americans wished to broaden the idea of "great outdoors" to include local parks, gardens, and schoolyards. Many session participants noted that their experiences in nature took place during childhood through both formal and informal education. "Cultivating a stewardship ethic through education will produce the next generation of scientists, conservationists, naturalists, farmers, ranchers, forest landowners, anglers, rangers, entrepreneurs, and community leaders who value nature and outdoor experiences."[65] This land ethic idea, popularized by Leopold, is fundamental to the American view of nature.

Cut-backs to environmental education programs were repeatedly mentioned throughout the report. Tight budgets were often cited as a primary cause of the current removal of environmental education programs. Other factors

[64] Dept of the Interior United States, Dept of Agriculture United States, and Environmental Protection Agency Council on Environmental Quality United States, "America's great outdoors : a promise to future generations," (Washington, D.C.: U.S. Dept. of the Interior, 2011), 2.
[65] Ibid., 21.

mentioned include the increasing lack of connection to our natural settings due to development, pollution, and climate change. In fact, “One out of three acres that has been developed in the United States was developed from 1982 to 2007.”[66] Taking these challenges into account was the task this initiative undertook. Almost 80% of Americans live in or near cities, this immense portion of the population “find it particularly difficult to connect with the outdoors”. Children today spend half the amount of time outside that their parents did. American children instead spend an average of seven hours per day using electronics. When seen through that light, it is not surprising that disconnected Americans choose to drop environmental education programs when budget restrictions require something change.

The report states that although there are a multitude of organizations and institutions trying to tackle these same issues, they do not have the breadth of coverage that school programs would have. Multiple Action Items were drawn up to address these issues. Action Item 3.2b is particularly relevant:

> In partnership with local school districts, the private sector, and non-governmental organizations, expand connections to public schools and youth organizations through existing web-based programs, service learning, teacher training, field trips, and residential and other programs. These could include, but are not limited to, the NPS Teacher-Ranger-Teacher, Electronic Classroom, and Citizen Science programs; USFS Pollinator Live program; National Oceanic and Atmospheric Administration (NOAA) Bay-Watershed Education and Training Program (B-WET) program; and USDA Know Your Farmer Know Your Food program. Special emphasis will be placed on engaging underserved communities. (DOI, USDA, DOC)[67]

[66] Ibid., 43.
[67] Ibid., 24.

The pull-out report, 'Youth and America's great outdoors' takes a detailed look at children and their relationship to the American landscape. When first beginning the project, President Obama requested that "special attention… be given to bringing young Americans into the conversation." It was found that children are more likely to frequent sites closer to home while with others, but that overall, the relationship to the outdoors was very individualistic. Sessions and comments with young adults revealed, "In the end, most of you agreed on the paramount importance of environmental education to illuminate the multiple meanings and intrinsic value of nature—and to explain the responsibility we share to protect it."[68] Desires uncovered during these sessions developed four key goals to connect America's youth to the great outdoors:

> A. Make the outdoors relevant to today's young people: make it inviting, exciting, and fun;
> B. Ensure that all young people have access to outdoor places that are safe, clean, and close to home;
> C. Empower and enable youth to work and volunteer in the outdoors;
> D. Build upon a base of environmental and outdoor education, both formal and informal.[69]

Reasons why the outdoors is not always accessible or fun included changing social values, lack of knowledge about what to do or where to go to access the great outdoors, and a lack of familial interest. Other issues were full schedules and costs associated with visiting green spaces. Transportation issues and a lack of locations near the home limit the access youth have to the outdoors. Many participants described the outdoors as being something remote

[68] Ibid., 83.
[69] Ibid., 84.

and even fear inducing. Indeed, parents often actually exacerbated these fears instead of quelled them. “More importantly, you said that nobody ever took you outside. Indeed, those of you who had spent a lot of time outside attributed your familiarity with—and appreciation for—nature to the parents, caregivers, teachers, mentors, or camp instructors who had instilled these values in you as young children.”[70]

Looking for ways to rectify these issues and create a sense of connection between American youth and their environment revealed, “One of [the] most common complaints was the lack of environmental education built into school curriculum and the cutbacks in field trips to the outdoors.” In a similar vein, the report mentions, “given the stringency of statewide testing and evaluation requirements, many teachers may not have the time or incentives to incorporate outdoor education into their lesson plans.” Among the ideas for furthering environmental and outdoor education, the youth suggested that it was necessary to, “Provide more opportunities for kids to get outside during the school day, through curriculum-based activities, service-learning projects, and outdoor recess and P.E.”[71]

Other Governmental Programs:

One of the governmental departments and initiatives partnering with AGO is *Let’s Move!* Michelle Obama created the *Let’s Move!* initiative which has a subsidiary program *Let’s Move Outside!* the purpose of which is to reduce child obesity through outdoor activities. Childhood obesity rates have tripled in the last

[70] Ibid., 85.
[71] Ibid., 93-96.

thirty years leading to an epidemic. Almost a third of American children are overweight or obese. Research and statistics point to a future where a third of those born in 2000 or later will develop diabetes during their lifetime. Additionally other health complications arise as a result of obesity such as “heart disease, high blood pressure, cancer, and asthma”. *Let’s Move Outside!* has the goal of getting children physically active by having them explore their outdoor surroundings. The *Let’s Move!* website showcases where to go and what to do for those interested in getting outside more often. The site even recommends local playgrounds and nature events through third party websites.[72]

Among the many initiatives and programs there are also proposed federal legislation measures concerning American children and the outdoor environment. Healthy Kids Outdoors Act of 2011 is a bill that was introduced to Congress but not enacted. It was referred to a committee and stagnated there. As Congressional bills follow the same cycle as elections, it will need to be reintroduced in order to ever become law. The bill was to implement a five-year strategy for encouraging Americans to be physically active outdoors with special attention to children. Many of the findings which were the basis for the bill are the same as those encountered in the AGO report.[73]

Also introduced to Congress but never enacted is the No Child Left Inside Act of 2009. This act would amend the Elementary and Secondary Education Act of 1965 to require states to develop environmental education standards and

[72] "Let's Move!," www.letsmove.gov.
[73] Congress United States, "S. 1802--112th Congress: Healthy Kids Outdoors Act of 2011," ed. Senate (www.GovTrack.us, 2011).

teacher training. Environmental education curricula would have been made more demanding by including interdisciplinary courses.[74]

The very fact that two bills concerning American children and the outdoors never came to fruition is exemplary of the current state of American priorities. Although general consensus is that it is important to get our children outside and into nature, very little has been done to rectify the situation on a broad scale. The issue does not get the attention it deserves and gets put on the back burner. When one considers that children are the future of our nation, and our world, the connection between them and our surroundings and their general well-being should be tantamount. It is apparent there is a lack of accessible natural outdoor spaces for children. Utilizing schoolyards to change that fact would meet two, both B and D, of the four key goals for youth created by AGO.

[74] Congress United States, "S. 866--111th Congress: No Child Left Inside," ed. Senate (www.GovTracks.us2009).

CHAPTER 4

CURRICULUM- LANDSCAPE INTERFACE

Given the numerous benefits for children of interacting with nature delineated previously as well as the desire of American citizens to forge meaningful relationships with the land, it follows that schoolyards are an ideal location to begin to introduce children to natural environments. This requires that schools adjust their landscapes in order to promote nature play as well as for use as an outdoor classroom. Outdoor classrooms are landscapes which nurture the whole child by fostering academic success, healthy development, and skill mastery while working seamlessly with the indoor classroom experience. Cheryl Wagner of the National Clearinghouse for Educational Facilities (NCEF) has said that, “Once we accept that education naturally occurs both indoors and out, the term ‘outdoor learning’ will begin to seem as strange as the never-used ‘indoor learning.’" Yet, outdoor learning is a relatively uncommon practice in America, often being limited to the sciences.

The number of resources available to educators, communities, and parents on the topic of outdoor learning are plentiful. Non-profit organizations, federal government departments, and private design firms all provide recommendations, tools, and assistance with bringing nature to schoolyards. For

instance, there are schoolyard habitat how-to guides from both the NWF and the U.S. Fish and Wildlife Service (USFWS). And yet, implementation remains low.

Why are Natural Schoolyard Landscapes Needed?:

While fragmentation of the American landscape has affected the number and size of undisturbed natural areas accessible to the American people, roads have caused fragmentation of land available to children's play on a small scale. The range a child is allowed to venture has decreased in recent decades and children are more likely to be bussed to school than walk.[75] In addition, as land is developed, ecosystem services like the water cycle have been buried away from curious child eyes; literally. Water sources have been culverted below ground so that those living in a given area are completely unaware that entire systems lay under their feet.

Another benefit of natural schoolyards is the impact on children's emotional relationship with nature. As future leaders and decision makers, children's connection to the world around them can have untold influence on the future of the American landscape. The lack of outdoor play and learning also sets conditions for a continuation of the natural environment problems seen today including urban sprawl, fragmentation, and loss of biodiversity. Research

[75] M. Rivkin, "The schoolyard habitat movement: what it is and why children need it," *Early Childhood Education Journal* 25, no. 1 (1997).

supports that a connection to nature and a strong environmental ethic are formed through regular contact with natural environments.[76] [77] [78]

A school whose traditional schoolyard was converted to incorporate natural elements had fewer interpersonal conflicts. At this particular site, the children had specifically requested natural resources during the design process. Upon design implementation, both girls and boys favored biotic elements over abiotic, the girls even more so. “An overall impression based on informal observations of Yard behavior, was that completely abiotic settings generated more conflict and stress (particularly between the sexes), compared to biotic settings which, by comparison, engendered a more harmonious relationship between children of all types.” A quote from one student reveals that children previously fought out of boredom and that injuries decreased after the natural elements were introduced. This would be due to both the softer surface materials and as the child says, “because everyone is careful with everyone else”. It was noticed by researchers that as the natural play area began to be developed a wider range of activities took place as well as an increase in intermixing of the sexes. The author of the study also points out that traditional schoolyards are very sex-differentiating environments and that schoolyards that allow for more

[76] Peter H. Kahn Jr and Stephen R. Kellert, *Children and Nature: Psychological, Sociocultural, and Evolutionary Investigations* (Cambridge MA: MIT Press, 2002), Monograph.
[77] Louise Chawla, "Children's Concern for the Natural Environment," *Children's Environments Quarterly* 5, no. 3 (1988).
[78] Judith Chen-Hsuan Monroe Martha C. Cheng, "Connection to Nature: Children's Affective Attitude toward Nature," *Environment and Behavior* 44, no. 1 (2012).

balanced play may result in more equitable expression of masculine and feminine values. [79]

This is not the only discrepancy between the sexes concerning schoolyards. Research into learning styles shows that girls are better able to sit still and multitask than boys, resulting in a better fit for conventional classroom learning. Boys on the other hand are more kinesthetic learners. A study conducted in Southeast United States looking into environmental education of fourth and fifth grade students found that action-oriented activities taking place outdoors increased both boys' and girls' knowledge and behavior in comparison with traditional classroom conditions. Boys, however, had significantly higher increases than girls in environmental attitudes and behavior in the outdoors. Opportunities for outdoor action-based learning can increase boys' skills and achievement significantly.[80]

Example School Models:

A study published in the *Journal of Science Teacher Education* looked at a third grade teacher's use of an outdoor classroom for meeting standards in the science and language arts curriculum. It found that,

> In nature-study students' own sense of wonderment and curiosity about the natural world was a motivational tenet for the inquiries or explorations into learning that ensued. These explorations required the application of science process skills, or the tools of inquiry, to carry out. These process skills for investigating nature included observation, measurement, drawing, classification, prediction, and inference, among others.

[79] Robin C. Moore, "The Power of Nature: Orientations of Girls and Boys Toward Biotic and Abiotic Play Settings on a Reconstructed Schoolyard," *Children's Environments Quarterly* 3, no. 3 (1986).
[80] Sarah J. Carrier, "Environmental Education in the Schoolyard: Learning Styles and Gender," *Journal of Environmental Education* 40, no. 3 (2009).

The teacher, called Susan in the study, found that outdoor learning can be connected and followed through from year to year, providing coherency between grades and across subjects. “For example, in second grade children study the life cycle of butterflies that connected with the third grade study of butterfly plants. In third grade children study native plants that connected with fourth grade state history and the study of pioneer and Native American gardens.”

The outdoor learning sessions were in conjunction with her indoor lessons, following the mandated curriculum. Susan utilized the outdoor classroom for her language arts studies by incorporating content from her science lessons. “For example, during the investigations of plants and how plants are classified, the researcher continued a lesson on tree identification and leaf color change, incorporating content area reading with a hands-on chromatography activity using leaves already collected from the trail.” She also used passages related to the science curriculum to teach reading comprehension and had students write about their outdoor experiences while teaching writing skills.

“Susan felt strongly that science and language arts connected to the outdoor classroom was especially a big motivator for her lower achieving children, whose self-esteem was boosted through outdoor experiences: ‘This is an area where they [lower achieving children] can shine, and have positive experiences.’” In addition, she encouraged children to use the outdoor classroom during recess, and although the majority played on the traditional equipment, those who explored the natural areas did so regularly.

Her students had a 94% passing rate on state reading tests. While these scores matched those of the rest of the school system, a greater percentage of Susan's students were on free-and-reduced lunch than the overall school system's third grade. "High-stakes test results affirmed this approach through comparable high reading scores to other third grade classrooms. This case study is a strong narrative example of how the outdoor classroom and science education can be integrated in today's elementary schools."[81]

Wissahickon Charter School:

Wissahickon Charter School, taken from the school's website.

Figure 10. A native garden and mural are street level in front of Wissahickon Charter School which is located on a higher grade.

[81] Charles J. Eick, "Use of the Outdoor Classroom and Nature-Study to Support Science and Literacy Learning: A Narrative Case Study of a Third-Grade Classroom," *Journal of Science Teacher Education* 23, no. 7 (2012).

The Wissahickon Charter School is located in Philadelphia, Pennsylvania in close proximity to the example elementary school to be showcased later in this thesis. The school was founded with three main elements in mind:

> An environmental focus recognizing the importance of active learning that allows students to experience the curriculum, recognition of service learning projects as a key element in students' academic success, an emphasis on family involvement at all levels of the school organization, with special emphasis on parents as partners in the learning experiences of their children.

It offers classes of small size from kindergarten to grade eight and their mission is to provide an environmental focus through the curriculum, service learning, and diversity. The curriculum is based on inquiry-oriented learning to encourage active engagement as students take ownership of their learning and acknowledge different learning styles. The students focus on a core topic each year that provides a bridge between all subjects. For example, first graders learn about waste. The first grade class of 2010 took on the task of composting school food waste by means of vermicompost bins after finding significant amounts of lunch waste were natural products. The administrators found the program so successful and to be so in sync with the goals of the school that they continued to compost food waste albeit through a commercial entity. The interconnectivity of the human and natural environments is explored and showcased through a learning atmosphere which is harmonious with the natural environment.

Although the school grounds are small, the school makes use of the land with a native garden and an apiary. The Fern Hill Park, located directly across

the street, provides additional and convenient outdoor space access. On a larger scale, the students and staff utilize the Wissahickon Valley of Fairmount Park as an extended classroom. “[Wissahickon Charter School’s] outdoor program introduces students to the natural world starting in Kindergarten with weekly nature hikes in Fern Hill Park, building to monthly hikes in the Wissahickon Park in 4th grade to overnight camping trips in 5th and 6th, a backpacking trip in 7th and culminating in a week long Outward Bound expedition in 8th grade.” [82] [83]

Wissahickon Ave. street view, Google Earth, 2014.

Figure 11. Google Earth image of Fern Hill Park and Wissahickon Charter directly across the street from each other.

Green Woods Charter School:

The Green Woods Charter School, from kindergarten to eighth grade, is another example of environment based learning in Philadelphia. Green Woods

[82] Juanita Nyce, March 5, 2014 2014.
[83] "Wissahickon Charter School," www.wissahickoncharter.org/wp/.

utilizes SEER's EIC model to great success, it has even been used as a model to replicate by educators. Environmental science is incorporated into the curriculum for math, writing, and reading, providing a base across academic subjects, the arts, and social skills. Through field study, the students learn a thorough "understanding of the environment, their place in it, and their responsibility to it."

Green Woods Charter School, taken from the school's website.

Figure 12. The newly constructed landscape and school building of Green Woods Charter School showcasing a water feature.

The schools' two goals: academic excellence and development of environmental stewards, is supported by the institution's teachers who continually revise their self-developed curriculum. Each year students use a specific environmental topic as the core foundation of their studies for that academic year. The teachers utilize outdoor learning opportunities in conjunction

with traditional indoor learning, which provides the students exposure to experiential and inquiry based learning opportunities.[84]

The EIC learning is integrated seamlessly into the student's studies at the new Green Woods facility which opened in January 2014. Floor to ceiling windows and multiple entrances, and observations deck blend the indoor and outdoor environments. [85] The school grounds' three and a half acres are specifically designed to meet the needs of the curriculum. The property, a remediated brownfield site due to high levels of lead and arsenic from an industrial past, includes multiple water features, rain gardens, and an "outdoor learning laboratory". [86] Eight outdoor classrooms are integrated into the water features.[87] In addition to the school grounds, multiple field study trips are taken to the John Heinz Wildlife Refuge and other area sites. [88]

Boston Schoolyard Initiative:

The Boston Schoolyard Initiative (BSI) is a partnership between the City of Boston, Boston Public Schools, and the Boston Schoolyard Funders Collaborative. Encompassing many schools throughout the Boston area it focuses on renovating neglected schoolyards into engaging recreational and educational spaces; to date it has reclaimed 130 acres of asphalt. Since the founding in 1993 it has transformed 88 schoolyards and is continually working on

[84] "The Green Woods Charter School," www.greenwoodscharter.org.
[85] Alan Jaffe, "Green Woods Charter School opens $13.5 million Roxborough location ", (2014), http://www.newsworks.org/index.php/local/nw-philadelphia/63550-green-woods-charter-school-opens-135-million-roxborough-location.
[86] Terri Akman, "Schools Take Classes Outside," *MetroKids*, no. May 2013 (2013), http://www.metrokids.com/MetroKids/May-2013/Schools-Take-Classes-Outside/.
[87] Jaffe, "Green Woods Charter School opens $13.5 million Roxborough location ".
[88] "The Green Woods Charter School".

future projects. BSI is unique in that the scope has grown to incorporate development programs and educational materials for use by the Boston Public Schools. Feedback from “Principals report that BSI schoolyards lead to increased physical activity (100%); improved student behavior (63.2%) and improved relationships with parents and community (73.7%).”

BSI now offers numerous resources to assist those interested in taking on similar schoolyard revitalization efforts including design workbooks for outdoor classrooms and for schoolyards. These outdoor classrooms are designed to be utilized across all subject matter from science to art. They even provide information on how to get started and form a committee. Also offered is a range of materials for educators on how to teach in a schoolyard or outdoor classroom based on information garnered over the last decade.

Winship Elementary School, taken from the Boston Schoolyard Initiative website.

Figure 13. Winship Elementary, an example of a BSI school, before retrofit.

Winship Elementary School, taken from the Boston Schoolyard Initiative website.

Figure 14. Winship Elementary after BSI retrofits.

CHAPTER 5

APPLYING ENVIRONMENTAL EDUCATION TO SCHOOLYARD DESIGN

Interest in bringing children to nature and vice versa has increased dramatically in recent years. The movement is so rapid that Joe Frost, author of numerous books on child development, addresses the growth in recent publication writing:

> Now, with the exploding interest and action on getting children back to nature labels such as “naturescapes” and “playscapes” are becoming more common. We cannot bring back to urban bound children the expansive “wildscapes” for play enjoyed by most children for centuries but we can bring back little pieces of nature to complement their contemporary playthings and enrich their lives.[89]

Due to this interest, the number of resources available to do so has also increased. As discussed in Chapter 4, there are many resources available for a party interested in creating an outdoor classroom. These include the research and guidelines of numerous non-profit organizations as well as publications ranging from brochures to books by experts in their respective fields. The authors of these documents span such diverse occupations as educators, psychologists, designers and wildlife activists. The topics of these resources also span a wide variety: from toolkits for teachers to best practices for long term management.

[89] Joe L. Frost, *A history of children's play and play environments : toward a contemporary child-saving movement* (New York: Routledge, 2010).

For example, the NWF has a How-To Guide for Schoolyard Habitats, the Natural Learning Initiative (NLI) offers invaluable design assistance, the Green Schoolyard Network provides a publications list, and Children & Nature Network's (C&NN) guides and toolkits are available in a variety of languages. It is not limited to American organizations, either; the Scottish Learning through Landscapes provides training materials, toolkits, and lesson examples; and Focus on Forests based in Canada provides guidelines for fundraising. The many non-profits providing these resources are all invested in getting children outdoors, forming lasting connections to nature, and bringing about change through the next generation.

In addition to the many national organizations there are regional and local groups providing information on place-based design choices. Governmental agencies such as state fish and wildlife services or water management departments also provide useful resources to their constituents.

The number and quality of resources available to those interested in both new construction and retrofit natural schoolyard designs is rapidly increasing. In the last decade numerous books have been published, including *Asphalt to Ecosystems* by Sharon Gamson Danks, *Natural Playscapes* by Rusty Keeler, *Cultivating Outdoor Classrooms: Designing and Implementing Child-Centered Learning Environments* by Eric Nelson, and two books by Herbert Broda *Moving the Classroom Outdoors: Schoolyard-Enhanced Learning in Action* and *Schoolyard-Enhanced Learning: Using the Outdoors as an Instructional Tool, K-8*. In 2014, alone, several publications have been made available for free. Among

those is the electronic book *National Guidelines for Nature Play and Learning Places*, a joint effort by the NLI and NWF which goes into immense detail.

Elements of Successful Natural Schoolyards:

There are several main concepts which need to be incorporated into an outdoor classroom or natural playscape. Lists of the elements suggested or required are found in several sources, among them the books and guides previously mentioned.

One of the most integral is that of stakeholder involvement. Stakeholders for outdoor classrooms include not only the teachers and students but also administrators, maintenance crews, and local residents.[90] Another key concept is that of context-based design. This means that each project will be unique to fit not only the education goals of the classroom, but, also the history, topography, soil, etc. of the site. The design also needs to allow for the varied uses of passive and active users both physically and mentally. Among these uses are structured classroom activities, rest and contemplation areas, and gross motor skill development.

Getting stakeholders involved in the design process can be a challenge as the stakeholders are ever changing in a school community. It is important to take this into consideration when designing a schoolyard. Since each academic year the students and parents invested in the project change, it is recommended that multiple grades be included in any focus groups, charrettes, or other planning strategies. In addition to students and parents always being in a state of flux, the

[90] Danks, *Asphalt to ecosystems : design ideas for schoolyard transformation.*

educators are often changing as well. Teachers and administrators need to work closely with the landscape architects to ensure that the design works with the curriculum and educational goals.

Neighborhood residents being on board as a constant is extremely important to counteract the high rate of stakeholder turnover. Community stewardship is essential to maintaining the schoolyard once it is implemented as this ensures that the landscape is cared for through all seasons while giving continuity to the project from year to year. [91]

Another key element to a successful design is to develop the project slowly and never truly finish. [92] Each student that comes through the school should be able to participate in shaping the site. Having a project constantly being worked on keeps the current stakeholder involved, excited, and invested. Keeping the pace manageable allows for each goal to be fully completed before moving on to the next. For this reason both short and long term goals should be set. Lastly, working slowly provides time to fundraise for the next project.[93]

Fundraising is also essential to a natural school ground. [94] Unlike a traditional school landscape the constant projects require funding. Additionally, as it may be difficult to get key players such as the school principal on board, the

[91] Ibid.
[92] National Wildlife Federation, "Schoolyard Habitats: How-to-Guide," http://www.nwf.org/pdf/Eco-schools/SchoolyardHabitatsHowToGuide_Part1.pdf.
[93] Danks, *Asphalt to ecosystems : design ideas for schoolyard transformation.*
[94] Carolyn Kolstad, Karleen Vollherbst, and Karen Kelly Mullin, "Schoolyard Habitat Project Guide: A Planning Guide for Creating Schoolyard Habitat and Outdoor Classroom Projects," ed. U.S. Fish and Wildlife Service (Washington, D.C.2011).

fundraising will help to allay any concerns. Buy in from the principal, faculty, and school board is necessary to making the project function well. [95]

Other elements of a successful natural schoolyard are more tangible than forming a strong stakeholders group and building the project slowly. Perhaps the most obvious is a diverse variety of native plants.[96] [97] Plants can help to provide other components such as shade and animal habitat. [98] Native plants add to the context-based design, taking into consideration soil type, sunlight, and precipitation. A water source is necessary but does not need to take a naturalized form; a nearby outdoor spigot for watering is sufficient.[99] [100] Gathering areas, ideally for both large and small groups are necessary.[101] [102] This can take the form of more structured outdoor amphitheaters or less structured boulders and logs. There can even be built work stations if desired for students to use during class.[103]

Another essential is a program base and storage location, a place for the volunteers, students, or even a paid trained gardener to keep the equipment necessary for site maintenance. Some schools may find that to best meet their goals, employing a trained staff member to oversee maintenance, continuing

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[95] Danks, *Asphalt to ecosystems : design ideas for schoolyard transformation*.
[96] Boston Schoolyard Funders Collaborative, "Boston Schoolyard Initiative," http://www.schoolyards.org/about.over.html.
[97] Robin. C. Moore, Nature Play & Learning Places, (Raleigh, NC
Reston, VA: Natural Learning Initiative
National Wildlife Federation, 2014).
[98] National Wildlife Federation, "Schoolyard Habitats: How-to-Guide".
[99] Boston Schoolyard Funders Collaborative, "Boston Schoolyard Initiative".
[100] Kolstad, Vollherbst, and Mullin, "Schoolyard Habitat Project Guide: A Planning Guide for Creating Schoolyard Habitat and Outdoor Classroom Projects."
[101] Boston Schoolyard Funders Collaborative, "Boston Schoolyard Initiative".
[102] Moore, *Nature Play & Learning Places*.
[103] Boston Schoolyard Funders Collaborative, "Boston Schoolyard Initiative".

design projects, and host outdoor classes is crucial to project success. [104] Moveable parts are vital to a natural landscape and are a distinguishing factor from current static playgrounds on school grounds. Moveable parts include twigs, logs that can be rolled over, and pebbles on pathways. [105] They allow children to interact with the site in innumerable ways encouraging creative play and discovery. This is an example of when caretaker training is necessary as most gardeners would remove scrap such as fallen sticks from the landscape.

The way in which pathways are created is critical to a natural schoolyard design. They should be made of natural materials and have organic winding forms in order to best simulate nature. [106] While the landscape must remain accessible to all via a primary pathway, secondary pathways give it charm and captivate children.[107] Another way to bring charm to the site is through gateways. [108] A gateway will not only help differentiate the natural landscape from the greater school grounds but will create a unique sense of place.[109] Signage is often a component of pathways for way-finding and is incorporated into gateways but can also be used for learning opportunities or as an art project with the students. Art made by the children or local artists can be sprinkled throughout the site.[110]

To recap, the non-design elements required to create a successful natural schoolyard:

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[104] Moore, *Nature Play & Learning Places*.
[105] Ibid.
[106] Boston Schoolyard Funders Collaborative, "Boston Schoolyard Initiative".
[107] National Wildlife Federation, "Schoolyard Habitats: How-to-Guide".
[108] Moore, *Nature Play & Learning Places*.
[109] Boston Schoolyard Funders Collaborative, "Boston Schoolyard Initiative".
[110] Ibid.

1. Involve stakeholders in all steps from the beginning.
2. Never finish and work slowly to foster stakeholder relationships.
3. Fundraise.

Design elements of a successful natural schoolyard:

1. Create a context-based design
2. Design should allow for passive and active use.
3. Use native plants.
4. Incorporate water.
5. Include a gathering area, both large and small if space permits.
6. Primary and secondary pathways should meander.
7. Have a program base or storage location.
8. Include moveable parts.
9. Gateway to the site.
10. Signage.

Suburban Versus Urban Schoolyards:

Although the previous examples showcase urban schoolyards, much can be learned and applied to suburban schoolyards. On the nature spectrum, urban sites are further removed from nature than suburban sites are. Children living in urban areas often have little opportunity to experience any form of nature in comparison with children in suburban and rural areas, therefore to date, greater effort has been put towards bridging that gap. Many schoolyard greening retrofit examples are urban as a result. Urban examples provide a basis for educators

on how to best utilize the landscape on hand. Elements such as native plants found at urban examples can easily adapted and applied to schoolyards.

In comparison to urban schools, suburban populations tend to be at a socio-economic advantage and have greater resources at their disposal. The parents in suburban areas also tend to be a more educated and more involved in their children's education than their urban counterparts. As such, the children in suburban schools are often already excelling educationally. Although that is the case, the schools are not utilizing their grounds to the fullest extent and are missing the great educational benefits doing so provides.

While students in urban areas benefit from the removal of asphalt and the addition of vegetation, in suburban environments, that is not sufficient. The suburban schoolyard requires a more naturalistic landscape to juxtapose the mature tree canopy and extensive vegetation in order to deliver the greatest benefit to the students. Additionally, suburban schoolyards are likely to be larger than urban schoolyards therefore able to support more complex and naturalistic designs. This thesis is focusing on the suburban schoolyard as it has been largely overlooked by previous research and schoolyard greening projects.

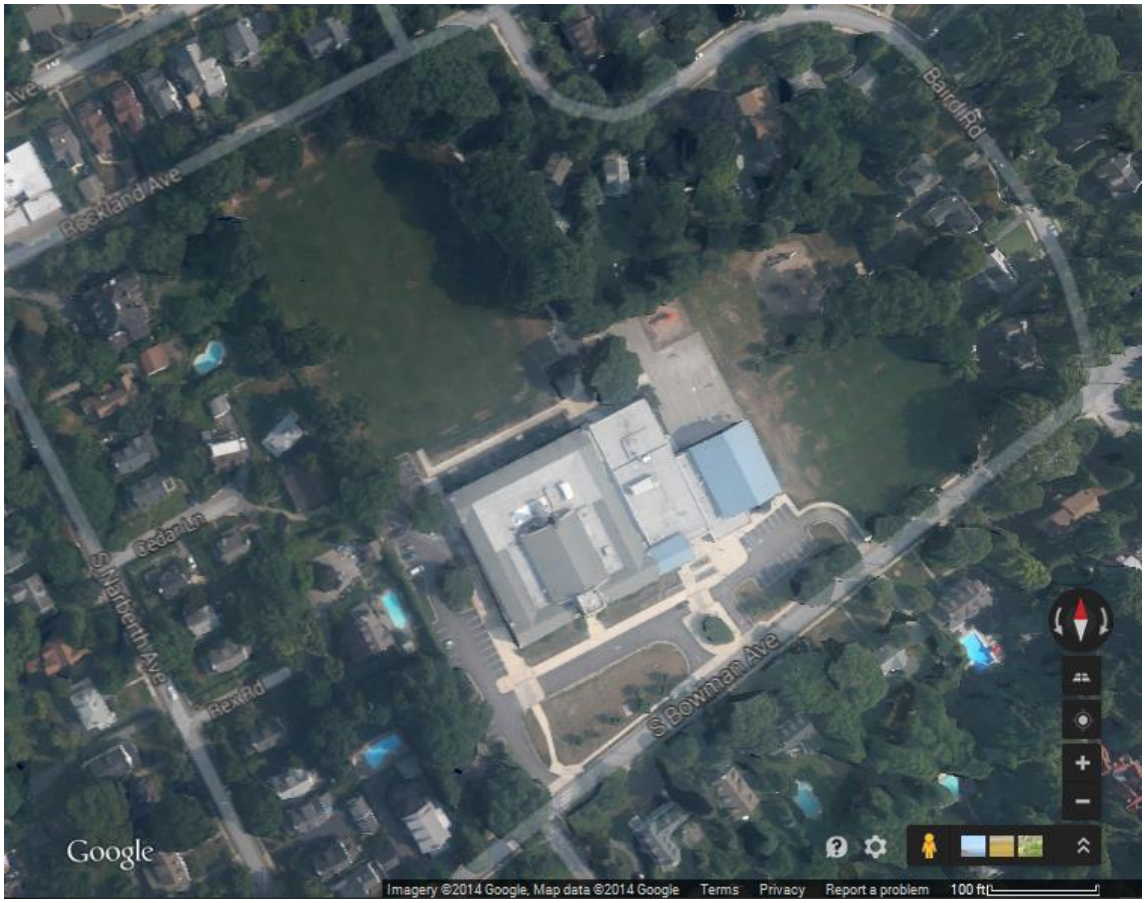
Conceptual Outdoor Classroom Design:

To exemplify the concepts exhibited throughout this thesis, conceptual opportunities and constraints maps for Merion Elementary School in suburban Philadelphia were undertaken. These recommendations utilize the ideas of the Forest School and EIC model to create a joint outdoor classroom and play space. As this natural landscape area will function for both purposes, it can be referred

to as a playscape. The landscape will go beyond that, however, being designed with the intention of bringing nature to children, it will illustrate a method of landscape design which emulates wilderness as much as possible. This is known as a naturescape. Opportunity and constraint maps were chosen in place of a design for the property due to several limitations. Ideally in a design to be implemented, the designer should not only consult with educators and students, but the community in order to create a sense of ownership and stewardship. Programs which involve the community in addition to the school administrators find that they have greater respect and care for the end products. This type of program can help to ensure that there will be continued maintenance of the design regardless of the academic school year, maintenance budgets, and student/ teacher turnover. For the purposes of this thesis, due to numerous limitations, the author has decided to showcase opportunities available instead of creating a design without consultation of the aforementioned parties.

Merion Elementary School:

Merion Elementary School was chosen as a model site for a conceptual design due in part to the proximity to the author and the ease of access to architectural plans of the property. More so, the school was chosen as the layout of the grounds is representative of many suburban American schools.



40°00’05.48” N 75°15’23.89”, Google Maps, 2014.

Figure 15. Aerial view of Merion Elementary School grounds

The land available for student use is divided into four distinct sections. Directly behind the school is a small fenced- in playground of plastic and metal components designed for children of young age, approximately 5-6 years old. Beyond this is a large open field used for sports and outdoor physical education classes.

Figure 16. Fenced in play structure[111]

Figure 17. Grass field to rear of school

To the east of the building is the area used by the children for recess. In one section is a large paved rectangle of land with basketball hoops and painted lines for games like hopscotch as well as several plastic play structures surrounded by woodchips. South of the more eastern play structure, separated from the play structures by a hill down, is the final segment of the grounds, a second large grassy field.

[111] Figure 16-21. Photographs by Author.

Figure 18. Eastern play structures

Figure 19. Grade change separating play areas

Figure 20. Paved game area

Figure 21. Eastern grass field

The school is located in a suburban residential neighborhood less than 10 miles from Center City Philadelphia. Housing 550, kindergarten through fifth grade students, 5-11 years of age, the school is located on an 8.5 acre campus. Although the original building was built in 1925, the most recent renovation took

place in 2005. The school is a Blue Ribbon School of Excellence and has received other awards and achievements.[112] When compared with other schools throughout the United States, Merion Elementary students have quite an advantage in education and socio-economically. Even though the school is highly ranked and the students are known to excel, there is still something missing.

40°00’05.15” N 75°15’22.00” W, Google Earth. October 7, 2011.

Figure 22. A residential neighborhood surrounds Merion Elementary.

For over 20 years the Lower Merion School District has participated in Project CHANGE (Children Helping and Nurturing Growth in the Environment). Based out of the Riverbend Environmental Education Center the program

[112] Lower Merion School District, "Merion Elementary School Stats and Facts," https://www.lmsd.org/merion/about/facts/index.aspx.

seasonally brings kindergarteners out of the classroom and into nature. The kindergarteners are encouraged to use all of their senses and strengthen critical thinking skills.[113] While this is a great program, the students take a 20 minute journey on a school bus each way in order to explore a natural environment. If a naturescape was integrated into the school grounds, such field trips would be unnecessary and additional. The on-site classroom would allow for outdoor lessons to be daily instead of seasonally. Critical thinking and other skills could be constantly strengthened by utilizing lesson plans similar to that employed at the Riverbend Environmental Education Center.

Opportunities and Constraints for the Merion Elementary Campus:

Utilizing the concepts found throughout this thesis, opportunity and constraint maps were developed for an outdoor classroom and playscape on Merion Elementary School's 8.5 acre parcel.

The first map shows the lot in context to the greater neighborhood and surroundings. Within a one mile radius of the school are two township parks. Shortridge Memorial Park to the west and Merion Botanical Park to the east.

Shortridge Memorial Park is a great local asset for the school to utilize because the East Branch of Indian Creek runs through it.[114][115] This waterway can be used to tie into lessons about watersheds, aquatic organisms, and water quality. The creek is only day-lit for a short stretch of land, including this park,

[113] Lower Merion School District, "Merion kicks off Project CHANGE," https://www.lmsd.org/merion/about/newsroom/article/index.aspx?LinkId=2886&ModuleId=91.
[114] Lower Merion Township, "Shortridge Park," http://www.lowermerion.org/Index.aspx?page=739.
[115] Philadelphia Water Department, "Darby-Cobbs," http://www.phillywatersheds.org/your_watershed/darby_cobbs.

and is culverted under roads at both ends of the park. This can be used to demonstrate to the children the often unseen human impacts on the land. A stream bank restoration project by the township is currently underway.[116]

Construction of the first phase of Stream Bank restoration. "Shortridge Memorial Park Master Plan," Township of Lower Merion, 2014, p.24.

Figure 23. First phase of the Indian Creek stream bank restoration.

Created and maintained by the Botanical Society of Lower Merion, Merion Botanical Park showcases a variety of plants, shrubs, and flowers. When looking for assistance with maintenance of any natural playscape on the school grounds, the Botanical Society would be a good place to begin. They are experienced not only in maintaining a public property but in organizing volunteers. This park can be tied into numerous lesson plans, not only botany. The park is a Certified

[116] Township of Lower Merion, "Shortridge Memorial Park Master Plan," (Montgomery County, Pennsylvania2014).

Wildlife Habitat registered with the NWF, and has a certified Monarch Way station registered with Monarchwatch.

A small stream flows the length of the park for possible comparison projects with the creek at Shortridge Park. A stream bank stabilization project and a forest restoration project provide additional opportunities for student collaboration. In addition to the natural areas, Merion Station, a stop on the regional SEPTA rail is adjacent to the park and the rail line can be used to discuss transportation in relation to the landscape and the environment with students.[117]

Stream Bank Erosion, "Merion Botanical Park Master Plan," Township of Lower Merion, 2014, p.21.

Figure 24. Eroded stream bank at Merion Botanical Park.

[117] Botanical Society of Lower Merion, "The Botanical Society of Lower Merion," http://www.botanicalsocietylm.org/index.html.

Both parks can be looked to in order to determine which native species in the parks may thrive at the Merion Elementary site. Information on invasive species in the area, and how to combat them, can be obtained from the parks as well. The Merion Botanical Society commissioned a “plant inventory for the natural area- a first step in the forest restoration project”.[118] This information would be extremely pertinent and helpful when determining plants for the schoolyard. The plant and animal species at these locations may be appropriate choices for a future naturescape in the Merion Elementary schoolyard.

On a site scale, the property faces a few constraints but offers many opportunities. Grade changes are minimal on the site with two main areas presenting any significant slope. A gentle hill surrounds the large playing field in the rear of the school while another slightly steeper hill bisects the recess area between the play structures and the open field. These slopes are ideal locations for future naturescapes. The topography lends itself to a naturescape as it showcases water movement, utilizes an infrequently used area of the property, and simplifies maintenance as turf slopes are more difficult to mow. The area in the rear of the school is quite small in square footage; however, it has its own opportunities and constraints due to the fact that it is enclosed by retaining walls on two sides with a set of stairs on a third. This means it can be easily differentiated from the rest of the site with a simple barrier on one side. It is limited in the scope of what can be provided for both educational and play opportunities. The second proposed naturescape location on the west wing of the

[118] Ibid.

property is in an ideal location for child play. Due to its proximity to the existing play structures and game area, children will be easily able to choose the activity that is best for them. This site also takes advantage of existing mature trees on the property and provides sufficient room for any programming the stakeholders may want.

Existing vegetation is primarily limited to the periphery of the campus. Two raised planters to the rear of the school separate the two wings of the property. Opportunities to increase vegetation exist along the periphery where screening and decorative plantings can be enhanced in addition to future naturescape implementations. Hardscape makes up a significant portion of the site. This is a constraint moving forward with a naturescape as it limits feasible locations and increases water runoff from impermeable surfaces. Gateway opportunities exist along pedestrian access points both at the front of the school and rear of the property. The gateway at the front of the school is not located on the street, paralleling the rear entry, due to the sidewalk abutting the driveway which prohibits any form of archway. The front of the school, however, allows for gateway construction as there is a small planter as one enters the sidewalk along the side of the building which. This can entice local residents to explore and utilize the grounds, create connections with local artists, and add to the sense of place for the school. Further gateways can be added with naturescape implementation.

Stakeholders should be brought together with designers at community-wide charrettes, collaborative sessions which generate solutions to planning

problems, in order to further develop the goals for the site. Bringing the stakeholders into the project early, as previously discussed, these charrettes can also be used to begin the design process. In order to facilitate stakeholder feedback example drawings can be used to begin discussions and garner interest. As such, Figure 29 is an example of a possible naturescape design for the Merion Elementary site has been included to showcase potential opportunities.

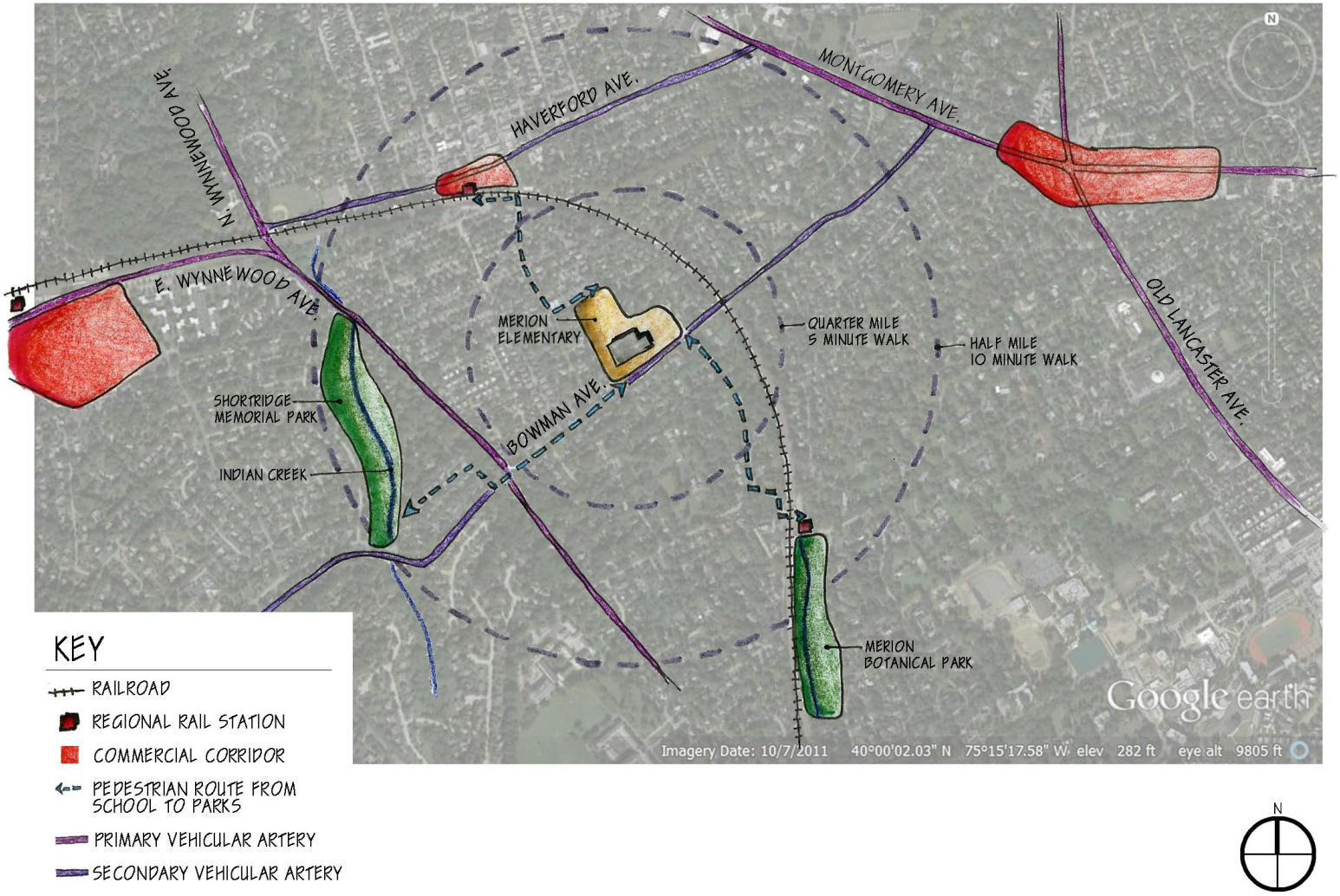


Figure 25. Local context opportunities and constraints map.

Figure 26. Pedestrian Routes from Merion Elementary School to local teaching opportunity sites.

Figure 27. Merion Elementary campus opportunities and constraints map.

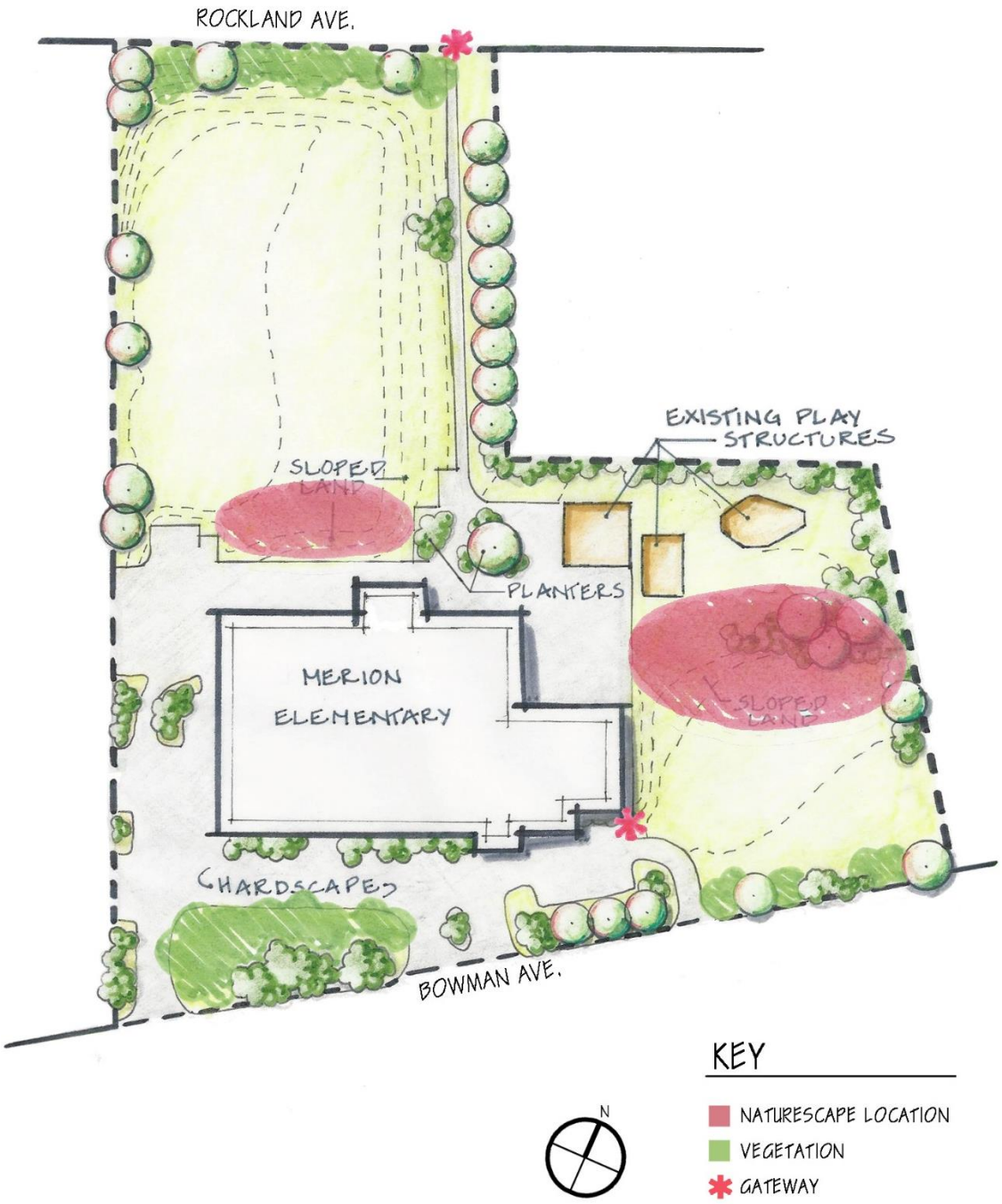


Figure 28. Proposal for site based on opportunities and constraints map.

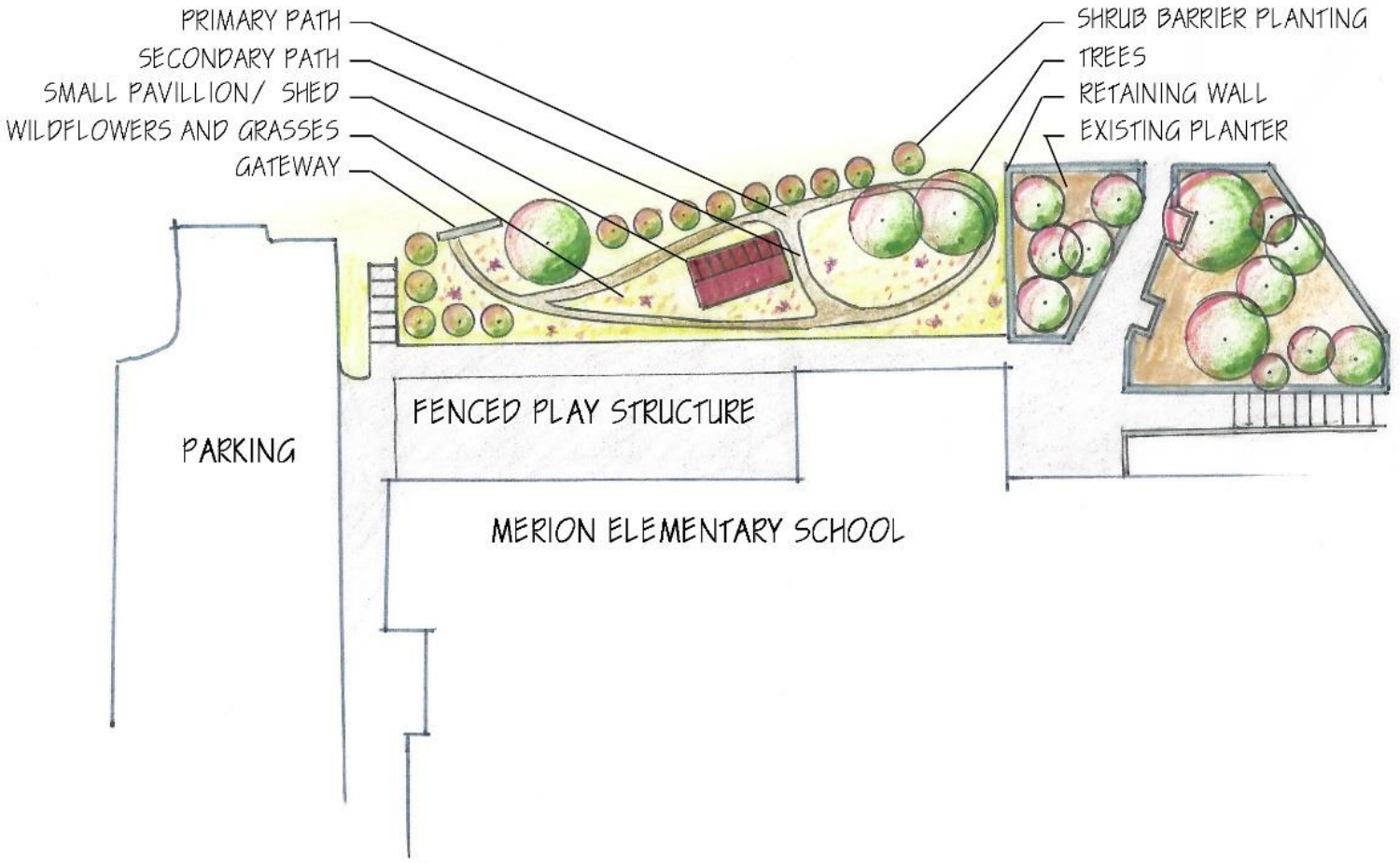


Figure 29. Example of a possible design of a naturescape in the proposed location to the rear of the school.

CHAPTER 6

CONCLUSION

This thesis has delved into the interface between child development, American schoolyards, and natural landscapes. Children are experiencing a disconnect from nature as the result of a lack of accessibility, urban sprawl, fear, and the litigious culture and sedentary lifestyle of America. Natural environments are diminishing and in order to stop this negative trend we must teach the next generation to care. A relationship to the land as a child can create life-long land ethics and a sense of stewardship. Children are the future; by investing in their connection to the outdoors the future landscape of America is impacted.

Children are mandated by law to attend school, putting the school landscape in a unique position to connect children to the outdoors. Additionally the hands-on learning utilized in natural environments combined with the benefits of nature, including increased focus, are ideal for a schoolyard. The American schoolyard has evolved to be an institutionalized realm that does not cater to child wellbeing as well as it should. Research has shown that natural environments provide a multitude of benefits for child development including social skills, problem solving skills, motor skills, and emotional and physical health. A new paradigm of “PLAY = LEARNING” should be used for child

development.[119] Playgrounds and schoolyards, however, are not utilized by educators as an extension of the classroom due to the lack of non-programmed space.

Awareness of ideas like nature deficit disorder is growing and as more attention is given to the problem more people are interested in finding solutions. This means that a movement has formed to rectify the situation and get children into nature. Numerous resources ranging from books and toolkits educating outdoors to design assistance are available for interested parties.

This thesis contends that combined playscapes and outdoor classrooms, termed naturescapes, should be implemented in schoolyards. These naturescapes would allow for children to take part in creative play, provides space for contemplation and respite, and helps develop problem-solving skills. The use of the outdoor classroom and integration with the curriculum provides children the ability to practice skills learned in the classroom in a hands-on environment.

Further action can be taken by pursuing a naturescape at Merion Elementary. Currently the greatest barrier to naturescapes is the lack of knowledge about how nature beneficially impacts child-development. Disseminating this information to educators, landscape architects, and parents can further promote the natural schoolyard concept.

[119] Frost and Association for Childhood Education International, *The developmental benefits of playgrounds*.

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