NATURE BASED PLAYGROUND

DESIGN FOR CHILDREN WITH AUTISM



SHRUTHI SELVAM, MLA 2018

Nature based Playground

Design for Children with Autism

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Abstract :

Recent studies and research demonstrate the importance of play and play based learning. There are many articles that have shown that play is a essential component of a child's development. Play based learning is even more important for children with disabilities. Without play, special needs children may develop learning deficits that complicate the disabilities they are already experiencing.

The benefits of play are inextricably related to the environments in which it occurs. Play environments need to be carefully designed to ensure that children are able to realize the full benefits of play.

In the United States public play areas are abundant. However, do these play areas stimulate development of children? Have they been designed to be inclusive to those with special needs? The need to have play areas that are truly accessible is further amplified by recent statistics, which show that there is an upward trend in number of U.S. students with disabilities. Consequently, there is a significant need for play spaces that are stimulating and inclusive to children of all abilities.

This paper highlights the importance of play, play environments, and disability play. It provides an overview of disabilities in children, and their effects on play. It critically examines the current state of play in America. Based on literature review, historical information, and critical analyses of existing play areas, this paper advocates for nature based playgrounds. Through design of a play landscape that is nature based and inclusive to children with Autism, this paper demonstrates significant advantages of nature based inclusive play space design, and advocates for such play spaces over traditional play spaces designed with man-made materials.

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Design for Children with Autism

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General Audience Abstract:

Play is often dismissed as something that children engage in when they are young. Play is actually extremely important to a child's development. Play contributes to physical, cognitive, emotional, and social well-being of children. This paper highlights the importance of play for all children, including those with disabilities, and underscores the significance of a well-designed play environment in a child's development.

Play areas are abundant in the United States. The goal of this research is to understand whether such play areas are designed to help children realize the full benefits of play, and whether such play areas are inclusive and accessible for children with disabilities. Given the rising prevalence of autism in children, a nature based playground design that is inclusive for children with Autism is presented in this paper. The framework and design considerations presented here can be replicated to any generic play site to create a much more stimulating and inclusive play environment.

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My family for their support and understanding through everything.

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Dedication

To Shrisha and all the other little gals and guys out there
who are just trying to have fun.

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C H A P T E R O N E

INTRODUCTION & RESEARCH

PLAY & ITS SIGNIFICANCE

"Play is often overlooked as the key that helps unlock the doors to learning" Mary Reilly

PLAY is a form of behavior which has many definitions, descriptions and developmental theories [1]. Play is a complex, multifaceted behavior that is relatively easy to observe but difficult to define theoretically [2]. Two characteristics that are considered by most to be essential to play are that it is intrinsically motivated and that it is pleasurable [3].



Figure 1 : Play is fun

We often associate play with fun. But we seldom consider play as being important for a child. Play is sometimes characterized as an activity that is trivial and lacking in purpose. It is seen as something children do when they are immature, and they will grow out of it as they get older. However, this view is mistaken.

Being fun is certainly the biggest attraction of play for children. However, play is much more than simple fun. Decades of research conclude that play is an essential and critical part of all children's development and health. Play is the very fuel children use to explore the world, develop their mind, relate to others, solve problems, acquire skills, and recognize their abilities to function in the world [4]. As children play, they develop critical cognitive, emotional, social, and physical skills.



Figure 2 : Repttion of experience

Play even contributes to brain development. According to Dr. Jaak Panksepp, a neuroscientist at Washington State University, play activates the whole neocortex. Of the 1,200 genes that he measured, about one-third significantly changed simply by having a half--hour of play [5]. This is significant because the Neocortex is the largest part of the brain. It is the neocortex that allows humans to perform many activities such as writing, speaking, thinking, and having social interactions.



Figure 3 : Exploring & experimentation

The American Academy of Pediatrics states that childhood play is essential for helping children reach important physical, social, emotional, and cognitive developmental milestones as well as helping them manage stress and become resilient [6].

In fact, play is such an instrumental component to healthy child development that the American Academy of Pediatrics issued a white paper on the topic, the National Association for the Education of Young Children named play as a central component in developmentally appropriate educational practices, and the United

Nations High Commission on Human Rights recognized play as a fundamental right of every child [7] [8].

Play also helps children conquer their fears. Contemporary studies of natural and other man-made disasters show that play and some forms of work are therapeutic, helping children understand and cope with traumatic circumstances – diminishing the trauma inflicted by brutality or extreme destitution [9].

On the other hand, play deprivation fosters depression, aggressive behavior, and social isolation while lowering quality of life and a child's ability to read social cues.

Research shows that when children engage in free, spontaneous play outdoors, they adapt more readily to their culture, to society, and to the world. They build fine gross motor skills. They learn to negotiate and solve problems. They stretch their imagination. They become more flexible in their thinking, and they develop creative and aesthetic appreciation [10].

Development through play is a cumulative process, with learning from earlier forms lending power, intellect, and motivation for engaging in later forms. The value of play is increasingly recognized, by researchers and within the policy arena, for adults as well as children, as the evidence mounts of its relationship with intellectual achievement and emotional well-being [11].

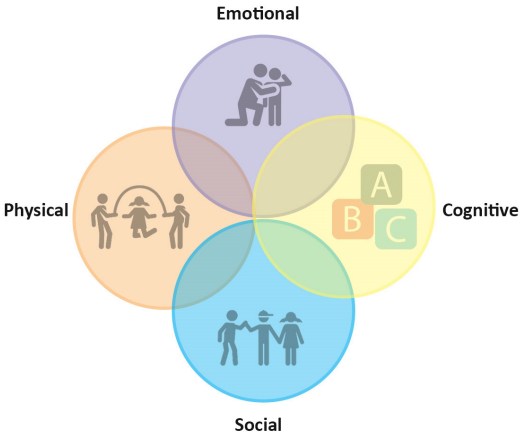


Figure 4 : Benefits of play

SIGNIFICANCE OF PLAY ENVIRONMENTS

Not all play is equal. Not all play environments are the same. To understand play, we need to understand the importance of play environments. PLAY AND PLAY ENVIRONMENTS are inextricably interrelated.

Children's play and learning are dependent on the quality of spaces and play environments they inhabit [12]. The benefits of play are highly susceptible to the environments in which it occurs. Children play an active role in the development of their own skills, and their development is also influenced by interactions with their environment [13]. The physical environment influences everybody's behavior and supports the formation of self-identity during childhood years. Children obtain information about environment and interact socially as a result of their experiences in the physical environment. If an environment meets the psychological needs of children, it provides satisfaction, if it does not meet them, it provides dissatisfaction[14].

Neurological data by Huttenlocher, Sutton-Smith, and Gould, suggests that early enriched play experiences may have a lasting effect on children's development, and their capacity to think and process information. Impoverished experiences have the reverse prognosis [15][16][17]. When children's play experiences are negatively impacted, there are consequences for their health, development and well-being [18].

If a play environment contains complexity and diversity, this environment will continue to attract the attention of children over time. The environment for play should offer a richness of opportunity that allows each child to exercise choice and to grow safely at their own rate [18] [19].

It is important to note that even the most playfully inclined children will not be able to play sufficiently for them to reap the benefits in terms of their learning and development, if they are not given the time, space and independence to develop their own spontaneous and self-initiated play activities [20]. Hence, the play environment, in addition to being complex and diverse, needs to be designed to be conducive to Free Play.

Free play provides a forum for children to explore their own capacities, to experiment with objects, to make decisions, to understand cause-and-effect relationships, to learn, to persist, and to understand consequences. Free play has been proposed as a vitalizing element in the development of the whole child [21]. Free spontaneous play is associated with improved memory, problem solving, creativity, imagination, and formation of synapses. When play is allowed to be child driven, children practice decision--making skills, move at their own pace, discover their own areas of interest, and ultimately engage fully in the passions they wish to pursue [22].

In summary, play environments have a significant influence in helping children realize the full potential of play. A well designed play environment is necessary to ensure children reap all of the benefits of play. Play environments need to be thoughtfully designed so that it encompasses a much broader realm of child's play needs including physical, cognitive, social, and emotional aspects. Play environments need to be conducive to exploration and free play.

Research suggests that play environments designed with natural materials contribute towards development of children much more than play environments with man made materials. Nonetheless, natural materials need to be selected carefully to support children's activities, provide a play environment that is conducive to free play, and create an overall richness of experience that is diverse, variable, complex, and challenging to children.

DISABILITY PLAY

When we think about play, we seldom think about how and/or whether disabled kids play. The general perception is that children with disabilities are not interested in play. Several journal papers refute this statement. Play is a critical part of the physical, emotional, mental and social development of every child, including those with disabilities.



Figure 5 : Play is fun (pixbay.com)

CHILDREN WITH DISABILITIES may need help to learn their individual capacity to use the facility, and to develop new ways of playing. Play for such children may not emerge so naturally and informally as it does with other children and may need to be encouraged [23]. Nonetheless, a child with disability is a life-long learner, just like his or her peers. Therefore, learning is restricted only by a lack of learning opportunities in a poor learning environment.



Figure 6 : Reptition of experience (Inculsiveplay.com)

Children with physical disabilities are often more dependent on their caregivers and other people than are nondisabled children. Brown and Gordon, in a study of the activity patterns of children with physical disabilities, found that disabled children spent more time in self-care and passive activities in their own homes than did nondisabled children [24]. Research suggests that a child who is unable to experience normal childhood play because of a physical disability may encounter secondary social, emotional, and psychological disabilities that may arise as an indirect result of play deprivation.



Figure 7 : Exploring & Experimentation (pxhere.com)

Three significant findings are reported in a review of play research over the last 2 decades: 1) Children with disabilities demonstrate delays in play compared to typically developing children 2) Play is a functional goal for children with disabilities and 3) Interventions to increase play skills of children with disabilities are effective [25].

Play research shows that even trained adults have great difficulty in understanding children's play, and often the real meaning of play to the child is different from the meaning which the adult gives to play. This is the problem of designing for play. Difficulties in designing for play are increased when designing for disabled children as designers have the added problem of understanding the impairment and its effects on how children play [26].

In order to understand more about how to design for disability, we need to start by understanding what are the different categories of disabilities in children, and how this affects their ability to play.

DISABILITY

DISABILITY is an umbrella term, covering impairments, activity limitations, and participation restrictions. As per the World Health Organization, it is a physical or mental condition that limits a person's movements, senses, or activities.

Overcoming difficulties faced by children with disabilities requires us to remove environmental and social barriers.

Some children are born with a disabling health condition or impairment, while others may experience disability as a result of illness, injury or poor nutrition. Children with disabilities include those with health conditions such as cerebral palsy, spina bifida, muscular dystrophy, traumatic spinal cord injury, Down syndrome, and children with hearing, visual, physical, communication and intellectual impairments. A number of children have a single impairment while others may experience multiple impairments. It is important to acknowledge that children with disabilities rarely think of themselves as disabled [27].



Figure 8 : Major types of special needs children (masters-in-special-education.com)

Disability only becomes a tragedy when society fails to provide the things needed to lead one's daily life. "Judith Heurmann"

According to the US Census Bureau's population estimates, approximately 4% of the US population under 18 years of age (73,475,378 individuals) have a disability [28]. Recent estimates in the United States show that about one in six, or about 15%, of children aged 3 through 17 years have one or more developmental disabilities [29].

In the United States, The Individuals with Disabilities Education Act (IDEA) is a law ensuring services to children with disabilities throughout the nation. IDEA governs how states and public agencies provide early intervention, special education and related services to more than 6.5 million eligible infants, toddlers, children and youth with disabilities [30].

Infants and toddlers with disabilities (birth-2) and their families receive early intervention services under IDEA Part C. Children and youth (ages 3-21) receive special education and related services under IDEA Part B.

The IDEA includes 14 primary terms under the main definition of "a child with a disability." They are Autism, Deaf-blindness , Deafness, Developmental delay emotional disturbance, Hearing impairment, Intellectual disability, Multiple disabilities, Orthopedic impairment, Other health impairment, Specific learning disability, Speech or language impairment, Traumatic brain injury, Visual impairment, including blindness [31].

Autism Spectrum Disorder

Autism spectrum disorder (ASD) is a neurodevelopmental disorder defined by persistent deficits in social communication and social interaction, generally evident before age three, that adversely affects a child's educational performance and other characteristics often accompanied with autism are repetitive patterns of behavior, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences, interests, or activities.

Deaf- blindness

The term actually describes a person who has some degree of loss in both vision and hearing that together cause severe communication, development, and educational needs that they require

significant and unique adaptations in their educational programs. The amount of loss in either vision or hearing will vary from person to person. The majority of children who are deaf-blind also have additional physical, medical and/or cognitive problems.

Deafness

Deafness / Hearing loss is generally described as slight, mild, moderate, severe, or profound, depending upon how well a person can hear the intensities or frequencies most strongly associated with speech. Hearing is one of our five senses. Hearing gives us access to sounds in the world around us.

Developmental delay

It means a delay in one or more of the following areas: physical development; cognitive development; communication; social or emotional development; or adaptive [behavioral] development.

Emotional disturbance

It's a condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree that adversely affects a child's educational performance:

An inability to learn that cannot be explained by intellectual, sensory, or health factors.

(B) An inability to build or maintain satisfactory interpersonal relationships with peers and teachers.

(C) Inappropriate types of behavior or feelings under normal circumstances.

(D) A general pervasive mood of unhappiness or depression.

(E) A tendency to develop physical symptoms or fears associated with personal or school problems."

Hearing Impairment

It means an impairment in hearing, whether permanent or fluctuating, that adversely affects a child's educational performance but is not included under the definition of "deafness."

Intellectual disability

It means significantly sub average general intellectual functioning, existing concurrently [at the same time] with deficits in adaptive behavior and manifested during the developmental period, that adversely affects a child's educational performance.

Multiple disabilities

Having multiple disabilities means that a person has more than one impairment or disability. It means simultaneous impairments (such as intellectual disability-blindness, intellectual disability-orthopedic impairment, etc.),The term does not include deaf-blindness.

Orthopedic impairments

This category of disability covers a wide range of disabling conditions that cause a bodily impairment. The term includes impairments caused by a congenital anomaly, impairments caused by disease (e.g., poliomyelitis, bone tuberculosis), and impairments from other causes (e.g.,cerebral palsy, amputations, and fractures or burns that cause contractures).

Other health impairment

It means having limited strength, vitality, or alertness, including a heightened alertness to environmental stimuli, that results in limited alertness with respect to the educational environment, that is due to chronic or acute health problems such as asthma, attention deficit disorder or attention deficit hyperactivity disorder, diabetes, epilepsy, a heart condition, hemophilia, lead poisoning, leukemia, nephritis, rheumatic fever, sickle cell anemia, and Tourette syndrome.

Specific Learning disability

It is a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations. The term includes such conditions as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term does not include learning problems that are primarily the result of visual, hearing, or motor disabilities; of intellectual disability; of emotional disturbance; or of environmental, cultural, or economic disadvantage.

Speech or language impairment

This category of disability applies to children who have speech or language impairment that is usually part of communication disorder. A communication disorder such as stuttering, impaired articulation, a language impairment, or a voice impairment that adversely affects a child's educational performance

Traumatic brain injury

An acquired injury to the brain caused by an external physical force, resulting in total or partial functional disability or psychosocial impairment, or both, that adversely affects a child's educational performance. The term applies to open or closed head injuries resulting in impairments in one or more areas, such as cognition; language; memory; attention; reasoning; abstract thinking; judgment; problem-solving; sensory, perceptual, and motor abilities; psychosocial behavior; physical functions; information processing; and speech.

Visual impairment

It means an impairment in vision that, even with correction, adversely affects a child's educational performance. The term includes both partial sight and blindness.

THE EFFECT OF DISABILITIES ON PLAY SKILLS

Children with disabilities will have distinct differences in their play. A disability, handicapping condition, or developmental delay can affect how a child plays, the kinds of play the child engages in, and the child's ability to use play as an avenue to learning and generalizing new skills or concepts 32[35].

Although a great deal is known about medical and physical effects of different kinds of disability, very little attention has been given to the way the nature of children's play is changed by a disability [18]. Some key studies include those from Ayers, Blakely, Lang and Hart, and Cratty [33][34][35] .

Children with disabilities continue to describe playgrounds as environments where they experience tremendous exclusion 36[31]. Children with developmental disabilities feel that existing playground equipment are too complicated for them to understand and they did not want to use the playground when other children were present because they were afraid they might use it wrong and get teased. In studies interviewing children with disabilities about their perception of playgrounds, many remarked that they have felt excluded at playgrounds, often feeling like spectators, watching other children play and interact, but not being able to participate themselves [37]. Children with disabilities feel this lack of inclusion on playgrounds due to their decreased ability to use the available equipment and materials and to engage in playground activities [38].

One study found that children are more likely to choose a child with a physical disability to join a play activity when the disability interferes minimally with participation [39]. This finding suggests that children's inclusion decisions may be influenced by the demands of the play setting. Simply stated, children will engage in play with children with disabilities if they can engage in activities together without significant changes to the play environment. Hence, the environment plays an important role in accessibility to play for children with disabilities. The environment needs to be designed to accommodate children with different disabilities. Especially important are modifications of space and accessible location of materials for children using wheelchairs and other mobility aids.

Children can experience a variety and/or combination of disabilities that can affect their ability to play, as explained below [32].

Physical Disabilities: Physical disabilities may affect the child's play in a variety of ways, depending on how the disability limits movement. The child may have difficulty moving around the play area due to use of improper surfacing materials or to the areas available for play. She may have difficulty manipulating materials in a constructive or meaningful way[32].

Cognitive Disabilities: Delays or impairments in cognitive functioning may also delay the development of play skills. Children may need many opportunities to imitate and learn specific play skills before they are ready to put skills to work in the more generalized nature of play. They may also find it difficult to engage in high levels of socio-dramatic play because of difficulty thinking abstractly. Children with cognitive delays may also engage in more exploratory behaviors than in direct play behaviors [32].

Communication Disabilities: Difficulties with speech and/or language may inhibit the child's ability to enter into or initiate play with others, explain or comment about her own play, or play with the effects of words and language. The child may have trouble being understood by other children and adults and this may limit her/his ability to express desire for play materials or dislike of a play activity ("I don't wanna") Because language is closely related to cognition, problems with communication may interfere with ability to describe, extend, or control play with others [32].

Sensory Disabilities: Children with sensory problems such as visual or hearing impairments may experience a variety of play problems. Orientation to play areas and materials can be a major difficulty for the child with limited vision. This child may also lack exploratory or imitative skills. She may not understand the use of materials or objects because of limited experience in watching models or in manipulating objects. Facilities which encourage repetitive activity and practice of motor skill could be valuable for building up experience and confidence in children with a visual impairment. The use of colored, tactile and auditory warning systems may be encouraged to cater for the needs of site users with reduced vision [32].

Consistent color coding may be used to identify particular activities and facilities, such as toilets and exits. However, for children with autism, bright, primary colors can cause difficulties [40]. Hearing impaired children may lack language and speech skills and, may not be able to respond to initiations by others and may be perceived by other children as not wanting to play 32[35]. Hearing impairment is in itself less visually disabling than some other disabilities but measures can be taken to help the child. Safety related audible effects may be designed into the playground, such as gravel surrounds. Physical barriers may also be needed.

Social, Emotional and Behavioral Disabilities: Children's behavior often interferes with engagement in play and with the development of play skills. Constant withdrawal from others or from materials and activities restricts the child from social play and from manipulation of objects. Aggressiveness may limit the types of activities that the child is invited to join in by others and may lead to misuse and destruction of materials. Many children may have difficulty using play as a tool for generalizing skills because of their focus on repetitive or stereotypic use of materials. Other children may have difficulty concentrating on specific play activities long enough for real involvement to occur. Some children may be extremely fearful of new things and may be unwilling to risk exploration of materials with differing textures, size, or functions. The development of interactive play skills in handicapped children, which moves from being adult oriented to object or toy oriented to peer oriented can inhibit the development of social interactions with peers and delay the sequence of social play development [32]. Learning difficulties may include behavioral problems, such as running away or the lack of an awareness of danger. Apart from supervision, special measures might be needed including a single rather than two access points to an enclosed play space and a secure gate fastening system. Pictograms explaining how play items may be used could be useful.

Medical Disabilities: Health problems may be serious enough to hinder the development of play skills or inhibit the use of play learning new skills. A child whose movement is restricted by a health condition such as severe cardiac problems or asthma may tire easily and may engage in motor play in only very limited ways. Children who have been hospitalized frequently may lack the ability to initiate social or play interaction with other children [32].

New techniques in care and programming for hospitalized frequently may lack the ability to initiate social or play interaction with other children. New techniques in care and programming for hospitalized children which focus on opportunities for learning, play, and interaction within the care setting are beginning to address the lack of stimulation in medical settings for young children [32].

Various studies have suggested that children with disabilities, especially those who have visual impairments, demonstrate play behaviors that are predominantly exploratory in nature [41]. Children with intellectual disabilities and language impairments struggle to participate in social play, and participate in less conversation with their peers on the playground [42]. Children with disabilities also tend to engage in less variety of play and spend less time in spontaneous functional play than do children without disabilities [43].

The U.S. Department of Health and Human Services recommends that children engage in a minimum of 60 minutes of vigorous physical activity daily. Unfortunately, many children with disabilities have limited access to environments that would encourage physical activity, such as playgrounds [44]. Not only would an inclusive playground help combat the obesity rate, which is 38% higher for children with disabilities according to the Center for Disease Control, but it would also provide an opportunity for children with disabilities to engage in social play with their typical peers.

Despite significant evidence supporting the benefits of play for differently abled children, and the positive effect that playgrounds have on the instances of peer interactions, most playgrounds that exist today are not inclusive [45]. On the other hand, recent statistics have shown that there is an upward trend in number of U.S. students in special education. According to the 2010 U.S. Census, there are 2.8 million school-aged children, ages 5 to 17, living with a disability. Consequently, there is a significant need for play spaces that are designed to be accessible by disabled children.

INCLUSIVE PLAY GROUNDS

As shown in the chart to the below physical disability is the least common, and cognitive disability is the most common category of disability in children. However, physical disability is often the only disability that most people tend to think of and design for when considering disabilities. This could be because limitations of physical disability are more obvious.

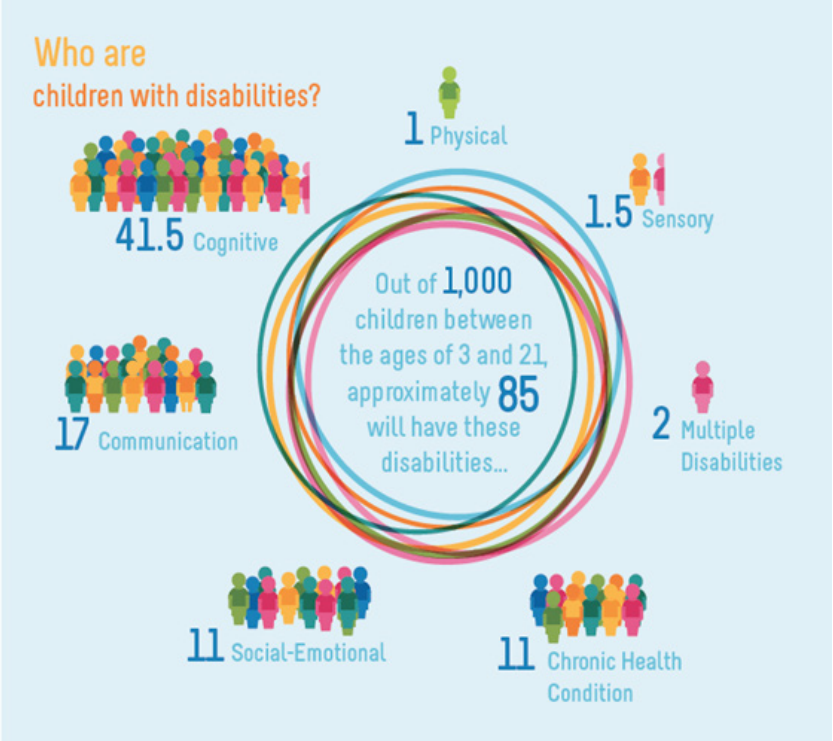


Figure 9 : Utah State University, Center for Persons with Disabilities (gametime.com)

Regulatory design guidelines such as the ADA focus primarily on making the play environment accessible to those who use a wheelchair. An accessible play environment is created when a person with a disability can enter and physically access the components within. However, playgrounds not only provide physical opportunities for play, but also social opportunities [46]. Removing the physical barriers to play does not necessarily mean that the social barriers are removed. Thus, making an environment accessible may not always address the wide spectrum of disabilities that are affecting children, including mental, visual, auditory, and physical.

The message here is not that we should not be designing play spaces for physical disabilities. Rather, we should be designing play spaces that are accessible by children with a wider range of disabilities, including physical disabilities.

Play areas that are accessible and provide a conducive environment to children with a wider range of disabilities than just physical disabilities are often referred to as inclusive play areas. Various architects have attempted to develop more inclusive designs, but the concept and implementation of "inclusivity" is still open to interpretation depending on how it is understood by the designer [47]. Inclusive play is a way of bridging the gap between abled and disabled children. Both of them can benefit & learn a lot from mixing with those different to themselves.

There are benefits for children with disabilities in inclusive settings. Research shows an increase in their social skills as compared to children in segregated settings [48]. The stimulation of an inclusive environment increases social interaction with peers, and promotes more complex play with toys and materials [49].

Designing an inclusive play area is challenging becaus children with disabilities have a wide variety of needs, and satisfying one group of children may make a playground inaccessible for others [50]. For example, the use of colored, tactile and auditory warning systems may be encouraged to cater for the needs of site users with reduced vision. Consistent color coding may be used to identify particular activities and facilities, such as toilets and exits. However, for children with autism, bright, primary colors can cause difficulties. It is therefore important to design an inclusive play area with a target set of disabilities in mind. Care needs to be taken to ensure that the disabilities that the designer is focusing on have requirements that are complementary to each other and not conflicting with each other.

In my opinion, having a one hundred percent accessible playground is not possible. In order to make play facilities inclusive, we need to ensure that the types of play experiences available broadly encompass different types of disabilities than just physical disability.Play spaces need to provide a conducive environment that encourages play interactions than just being merely accessible to a person in a wheel chair. Consequently, in designing an inclusive play area, the designer needs to identify target disabilities, and

design play areas considering requirements of children with such disabilities.

Among the various disabilities affecting children in the US, Autism is the fastest growing developmental disorder. According to the CDC website, the prevalence of ASD among children in the United States has steadily increased from 1 in 150 children in 2000 to 1 in 59 children in 2014. More people than ever before are being diagnosed with ASD. Despite these statistics, play areas are generally not designed to accommodate needs of autistic children.

Autistic kids are often confined to indoor spaces and clasrooms. Research shows that outdoor natural environments play a huge role inencouraging Autistic children to engage,learn,play and be much happier and healthier. However, children with Autism experience multiple issues with tradional playgrounds and find them to be difficult or impossible to use.

In summary, play is of significant importance to a child's development. Play is even more important for children with disabilities. Given the statistics on autism, there is a significant need for play spaces that are designed to help autistic kids play, learn, and develop skills they need to function in this world. Consequently,my thesis is focussed in designing a play space that is inclusive to children with Autism.

In the next few sections, I have analyzed how playgrounds have evolved through time in the United States, and summarized the current state of play. Through case studies of different types of play areas in the US, I have critiqued the richness of play environments, and analyzed their suitability for children with autism. From this study, I argue that nature based adventure style playgrounds are most suited to meet the developmental needs of all children, including children with autism. Finally, I present a nature based adventure style design for a play space in DC that is also inclusive to children with Autism.

HOW DID WE GET HERE?

The concept of a specifically designed “ground” for American play outdoors is a nineteenth-century phenomenon that developed along two distinct theoretical paths—one of them emphasizing development and learning, and the other one emphasizing recreation and physical fitness [51]. Prior to this, children played outside presumably making up games or engaging with the world in whatever ways they discovered or learned through their family and community.

The first organized playgrounds in America were introduced in 1821. They were “outdoor gymnasia” influenced by the German fitness culture. They were reserved primarily for older boys, and they were essentially sets of indoor gymnastic apparatus transported to the out-of-doors. They never gained widespread popularity [52].

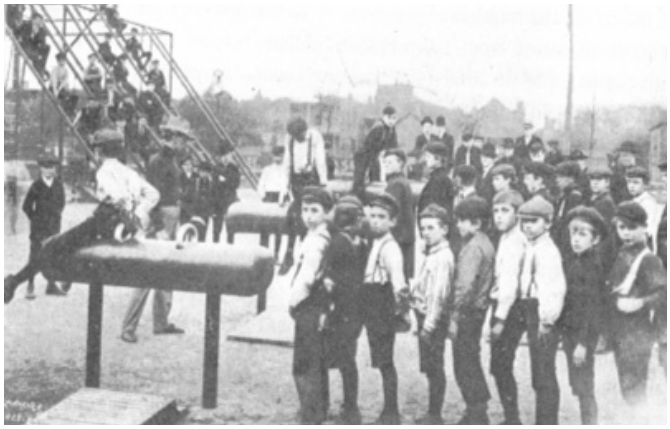


Figure 10 : The first playground " outdoor gymnasia"
(Frost, Joe L. A History of Children’s Play and Play Environments)



Figure 11 : Sand garden
(Frost, Joe L. A History of Children’s Play and Play Environments)

Half a century later, the founder of the New England Hospital for Women & Children, Marie Zakerzewska, saw German children playing outside in sand piles. She initiated the American “sandgarten” movement for younger children when she placed piles of sand in the yards of the Boston Children’s Mission [51]. These became very popular and were integrated into organized or built playgrounds at many city parks.

During the industrial revolution of the nineteenth century and into early decades of the twentieth century, immigration from many countries and from rural America resulted in massive pockets of poverty in America's largest cities. In these ruthless slums, thousands of homeless children lived and fought to survive in streets under demeaning and sadistic conditions [53].

The plight of these children eventually became so destructive that social reformers, charitable groups, and other organizations formed a movement for play and playgrounds – part of a much wider initiative (some productive and some destructive) known as the child saving movement [53]. The introduction of sand gardens was a primary factor in the movement.

By 1891, playgrounds were increasingly diversified and growing at a rapid rate. Manufacturers saw financial opportunities in them, and huge steelstructures or "manufactured apparatus"—slides, seesaws, swings, jungle gyms, merry-go-rounds—began to dominate play spaces in city parks and schools [51][53].

Massachusetts required all towns of 10,000 people or more to build public playgrounds, because of concern about criminal activity and risks of injury from children playing in dangerous vacant lots. By 1917, American cities were operating nearly 4,000 playgrounds [51].

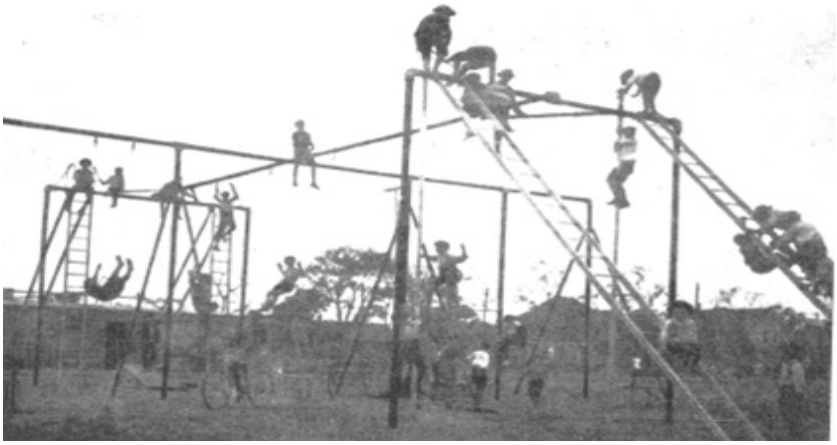


Figure 12 : Steel pipe playground, 1900 (play-scapes.com)

On the development and learning side, the great early nineteenth century German philosopher-educator Friedrich.Froebel exerted perhaps the greatest influence. Froebel believed play was not only essential for children's development but should be the foundation of education. So he established the first kindergarten, infused it with play and work in natural settings, and held that every school should have a playground encompassing nature. His work greatly influenced the introduction of kindergartens and nursery schools in America and is still felt today [51][53].



Figure 13 : The Lollard adventure playground on the site of a bombed school. (architectureofearlychildhood.com)

The concept of a "junk playground" was first proposed by Carl Theodor Sorensen (1936) a Danish landscape architect. The central idea of Sorensen's junk playgrounds was to make play and playgrounds the imagination of the child - not the imagination of the architect or builder [51].

Generally, junk playgrounds were built of found materials and junk, and featured trained play leaders or play workers who facilitated play. Children built dens, huts, and houses with tools and scrap materials, cared for animals, cooked over open fires, tended gardens, played in water, sand, and dirt, and engaged in a wide variety of other creative and challenging play activities [51]. Lady Allen introduced junk playgrounds to the UK in 1945, and coined the term "adventure playground". She established several adventure playgrounds for handicapped children [53].



Figure 14 : Rocket Ship, Boulder, CO. Photo by Brenda Biondo, from the book "Once Upon a Playground (designmuseumfoundation.org)

So-called "novelty" playgrounds came about after World War II. Architects and artists joined manufacturers and recreation specialists in designing and installing big, expensive, and often hazardous, concrete play structures [51]. There were stagecoaches, space rockets, pyramids, animals, fantasy figures, geometric shapes, and other forms. The novelty structures were mostly free standing, fixed creations that were lifeless. Many adults viewed them as art forms and in general liked them more than kids did. These structures were intended to enhance imaginative play, and promote learning by representing significant historical and cultural events. However, these structures didn't appear to spark imagination as much as the ever-changing natural and scrap materials that children discovered for themselves [51]. Eventually the Consumer Product Safety Commission banned such apparatus as they caused serious injuries and in some cases fatalities.



Figure 15: Adventure Playground in Berkeley, California (commons.wikimedia.org)

During this time, adventure playgrounds spread throughout Europe and, in lesser degree, to Asia and America. By the mid-1970s, dozens were scattered around the United States. In 1976 the American Adventure Playground Association (AAPA) was formed [54].

In 1977, the AAPA identified sixteen adventure playgrounds in the country. Many others, patterned after the concept by American visitors to Denmark, Sweden and England, were operational in California, Texas, New York, Pennsylvania and Georgia – few with trained play leaders yet rich in child and community involvement [55].

Unlike Europeans, Americans generally regarded adventure playgrounds as unsightly and unsafe. Plus, there was too little recognition of the value of creative free play and too little funding to keep them going [51]. As a result, the number of adventure playgrounds significantly diminished in the United States.

During this same period, there were increased concerns about playground injuries. At that time, the Executive Director of the International Playground Safety Institute authored the most comprehensive reference addressing current playground safety data in the U.S. The Consumer Product Safety Commission, influenced in part by petitions by citizens and reports of extensive injuries on playgrounds, commissioned the National Recreation and Park Association to develop playground safety standards. These were published as voluntary standards in two volumes in 1981 and supplemented in 1993 by a set of more technical playground safety standards prepared by the American Society for Testing and Materials. Initially, manufacturers resisted guidelines and standards because of the cost of retooling factories to ensure compliance, but they came around as orders came in for standards-compliant equipment [51].

Demand for standardized equipment increased as lawsuits mushroomed due to expanding opportunities to win financial settlements and judgments over playground injuries [51]. Specific safety standards became very influential in litigation and trial judgments. National standards and the threat of litigation fortunately led to the removal of several types of antiquated, severely hazardous, and life-threatening equipment, and made playgrounds safer [56]. However, this also led to playgrounds becoming mundane. Most playgrounds started looking pretty much alike. Equipment manufacturers produced modular wooden units with decks and added options or events intended to conserve space and encourage children to move rapidly from one type of motor activity to another. These structures allowed for flexibility in form and function. They enabled variation in design for different age groups. They provided a range of challenge and complexity. And they provided private places for symbolic or make-believe play [51]. Such standardized playgrounds were safer but had other problems—a lack of open spaces, natural features, found materials, and loose parts - all of which are considered to be essential to children's creative, spontaneous play [51].

In the last decade, modern playgrounds have become so predictable, cushioned, and programmed that they are now coming under attack as a symptom of everything that's wrong with contemporary childhood [57]. The Atlantic magazine lamented the "safety paranoia" that has robbed playgrounds—and children themselves—of opportunities for independence and thrills. Susan Solomon, an architectural historian and playground consultant who published the book "The Science of Play: How to Build Playgrounds that Enhance Children's Development", has called today's default playground "the McDonald's model": an unchallenging, standardized unit of tunnels, slides, and decks. According to Susan's book, things like taking risks, learning to fail, learning to master something, to plan ahead, to develop deep friendships etc. do not take place on most playgrounds today [53].



Figure 16 : Kolb Elementary School, Dublin, CA, OneDublin.org. (designmuseumfoundation.org)

The American playground today is very much a stock playground with few opportunities for personal exploration or social development. The equipment is predictable. Almost every child can maneuver easily on it. There is no struggle or sense of accomplishment. No kid can really alter the environment. There is little chance that anyone will ever have a scraped knee or bruised elbow, minor injuries that used to indicate that a child had tried something new [53]. Concerns about costs, including liability, drive many decisions about American playground design. Park departments and school boards purchase standard equipment, which they replace when it "looks old," because it meets their most pressing requirements: it has easy upkeep and it limits their liability [53].

However, the tide is beginning to turn. A number of promising events and innovations are starting to reshape playgrounds around the country thanks to unfortunate consequences that are so painfully visible, such as the growing rate of child obesity and other health problems. The public is now more concerned and better informed. Growing interest in nature is having a huge impact. An increasing number of scholars, landscape designers, and other professionals have published their research and experiences in helping transform various sterile, fixed playgrounds into integrated play spaces that feature natural environments and accommodate a wide range of developmental needs [51].

NEED FOR NATURE BASED INCLUSIVE PLAY SPACES

There is a need to break the monotonous sequence of standardized play spaces. Modern play spaces need to be redesigned to encourage spontaneity, risk taking, creativity, and unstructured play so that children are able to truly reap benefits of play.

If we look back at play spaces over time, the concept of adventure playgrounds is certainly something that is worth revisiting. Thousands of playgrounds throughout Europe, especially in England, Germany, and the Scandinavian countries, are adventure based play spaces. These are more challenging, more fun, and more developmentally beneficial than most in this country, but most Americans see them as messy and hazardous. As Edmund L. Andrews once wrote in the New York Times, the notion of a riskless society is peculiarly American. Compared to Europeans, for example, Americans are very risk averse in regard to playgrounds. However, adventure playgrounds provide children extensive opportunities to engage in challenging play, which leads to improved cognitive and physical performance and, consequently, improved ability to recognize and cope with potentially hazardous conditions [51].

A more realistic way to incorporate challenging aspects of adventure playground is to create playgrounds that are patterned after nature, and integrated into the playground's environment.

According to Ellen Sandseter, an associate professor at Queen Maud University College in Norway, who has studied the importance of risky play for children, "Nature has challenges that suit all children, in all ages and all sizes". Moreover, many studies have shown that play, and especially play in natural spaces outdoors, is an essential component in child development. Nature itself, many experts say, is the ideal playground. Research materials indicates that when human beings are in dynamic environment containing natural areas, neural connections in the brain increase and start to be more complex [53].

Lester and Russell provide a very useful review of the now quite extensive literature studying children's use of spaces for playful purposes [58]. What emerges from this is that, in their play, children appropriate different spaces and features within their environment which are quite unpredictable by adults, and that the richest play environments are mostly natural and unplanned.

Nature's contributions to the development of children are frequently mentioned in different literatures. In general, benefits of nature play can be broadly summarized as follows [59];

Nature contributes in terms of psychological, cognitive, and emotional health, treatment of attention deficit and hyperactivity disorder, motor development, play quality, increased sensitivity to the environment, socialization

Nature develops the imagination, creativity and social play

Nature evokes positive emotions, sense of place

Nature has a stimulating effect

Nature allows thinking, observation and research

Natural environments are rich, tutorial, educational and informative environments

Studies show that children have a tendency to move towards natural materials, and these materials provides a positive contribution to their healthy development [60].

Despite the inherent benefits of nature and nature based play, children of entire industrialized nations, especially American children, are losing their natural outdoor grounds [61]. The vast majority of the population has begun to live in urban and suburban areas, where opportunities for interaction with nature and natural experiences are limited [62]. Moreover, current research suggests that play in a natural environment has a positive effect on children with Autistic disabilities [63]. Consequently, there is a need to re-introduce nature based play environments and encourage children to engage with nature.

PLAY NEEDS FOR KIDS WITH AUTISM & AUTISTIC RELATED DISABILITIES

Autism or Autism spectrum disorder is a pervasive neurological development disorder characterized by impairments in social interactions, verbal and non-verbal communication, and repetitive behaviors.

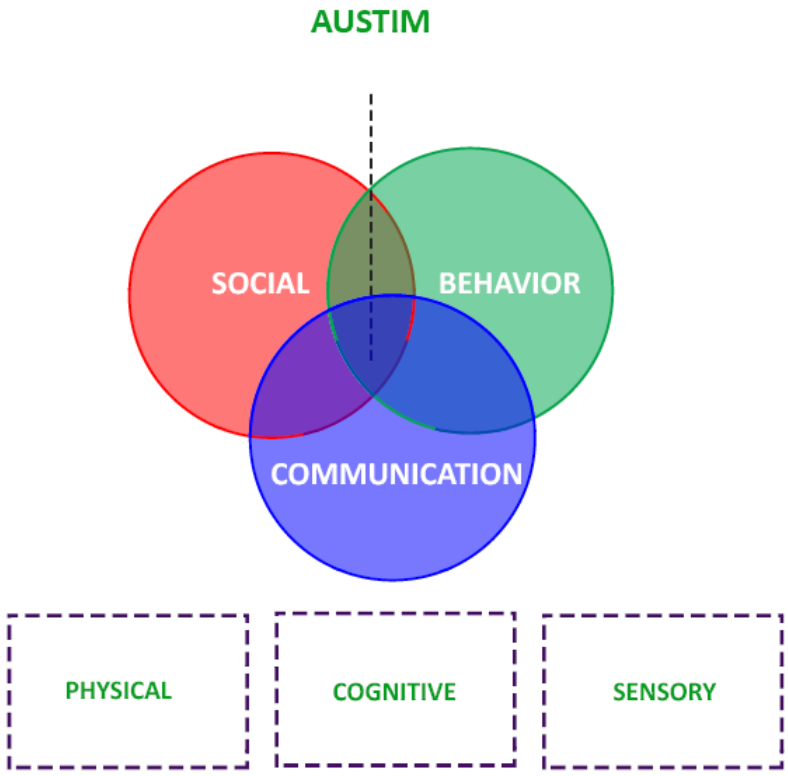


Figure 17 : Autism primary challenges.

Many children with autism are in highly structured indoor learning environments during their day and may experience significant benefits from having meaningful play experiences outdoors. Research suggests that outdoor play and learning environments for children with autism and special needs help children have fun in a safe and accepting outdoor setting, connecting them with the restorative benefits of nature while building on skills learned in the classroom [64].

Typically, accessibility is the primary design issue addressed when designing outdoor spaces for children with special needs [64]. However, needs of autistic children require spaces to be specially designed to meet their requirements.

Forty to fifty percent of children with autism have difficulty expressing their needs and are often solitary and detached. Therefore, outdoor environments for this population needs to be both comfortable and supportive, and encourage skill-building [64].

Many children with autism also have some form of Sensory Integration Dysfunction (SID), a condition shared by many other children with special needs. This includes a hypo- or hyper-sensitivity to sensory stimuli including sound, sight, smells, tastes, and textures. For example, some children may be hypersensitive (over--sensitive) to the texture or feel of fabric on their skin, a pavement surface, or the grass beneath their feet. On the other end of the spectrum, children may be hypo-sensitive (under-sensitive) to pain and unable to understand how to protect themselves from physical injury. It can be difficult for them to filter the amount of information coming at them all at once in outdoor, public spaces [64]. Hence, play spaces need to be designed to ensure that the materials, color, elements, and play structures are suitable for autistic children. The overall play space has to be carefully designed to ensure that the play experience is challenging and varied. At the same time, the layout needs to be carefully thought through to ensure that it is not overwhelming for children [64].



C H A P T E R T W O

CASE STUDIES



Figure 18 :Aerial View of clemyjontri Park location (googlemaps.com)

CLEMYJONTRI PARK - “Where every child can play”

CONTEXT: Clemyjontri is a park located in McLean, VA – a suburb of Washington, DC. The park is the dream of Mrs. Adele Lebowitz, who envisioned this playground and park and generously donated the 18-acre property [65]. The name CLEMYJONTRI is derived from the Mrs. Lebowitz’s four children: Carolyn (Cl), Emily (Emy), John (Jon), and Petrina (Tri). It is the first inclusive play spaces that opened in Washington, DC.



Figure 19 : Location Map (googlemaps.com)

Clemyjontri is a must see park for adults and children. The playground opened in October 2006. Within the first 25 days, nearly 12,000 kids and parents visited. The playground now hosts about 200,000 visitors a year [66]. Clemyjontri has been designed to be an inclusive play area – the first of its kind in the DC Metro region. The Park has been featured in the Washington Post, Washingtonian Magazine, and NBC Nightly News.

DESIGN: The play area of the park occupies roughly two acres. G.E. Fielder & Associates (GEF) of Columbia, Md. developed the concept plan, master plan and the playground design, creating many new pieces of equipment and play ideas [66]. The site plan was developed and designed in a manner that preserves existing trees.


Figure 20 : Aerial view (googlemaps.com)

The best way to describe the park is to visualize a rectangle with edges that are not necessarily a straight line. At the center of the rectangle is a carousel, which is the focal point of the park. The area around the carousel is divided into 6 unequal sections. The first 2 sections have picnic shelters and tables that can be rented for events. The remaining 4 sections are play areas that have been designed based on different play themes – The rainbow section (focusing on colors) , School house section (focusing on music and helping children learn how to read a clock, understand different time zones, read maps), Fitness section (Swings, slides, etc. for physical development), and Transportation section (mimics roadway situations and signage, and includes transportation themed equipment such as planes, trains, school buses).

From a landscape design perspective, Clemyjontri Park has been designed to minimize impact to the natural surroundings. The planting design for the park has a very natural feel to it.


Figure 21 : Transportation theme play area

ANALYSIS: Clemyjontri park has been well designed to ensure play spaces and play equipment are accessible to physically challenged kids. The play equipment in the park is wide enough to allow children with walkers, wheelchairs and braces to play.



Figure 22 : Fitness theme play features

Accessible walkways continue within the play area as there are ramps that connect ground level play components (components that can be approached and exited at ground level such as rockers, swings, diggers, and stand-alone slides) and elevated play components. Amenities including waste receptacles, picnic benches, drinking water fountains, restrooms, carousels etc. are all wheelchair accessible.



Figure 23 : Rainbow theme play features



Figure 25 : View of play space



Figure 24 : Maze with interchangeable

The four different themed sections of the park provide diversity of play. Signage with large fonts, and braille signs help the visually impaired to navigate the park. Use of bright colors for each of the four play sections are helpful for the visually impaired, but might pose challenges for children with Autistic Sensory Disabilities. Use of outdoor musical instruments provide a conducive play environment for children with sensory disabilities. And the use of transportation themed play spaces will enable children with cognitive impairments to play.

The play area of the park is primarily made of man-made materials. There are trails that go around the park. However, the play area itself does not incorporate natural elements. There are not many pieces of play equipment that kids can move or manipulate. The equipment in the fitness themed section may not be suitable for children with autistic disabilities because it is quite complex for them to comprehend, process and navigate. There are no quiet areas for kids with heightened sensory issues.

ADVENTURE PLAYGROUND (Berkeley, CA)

CONTEXT :

The Adventure Playground is a playground that is situated on the Berkeley Marina in the San Francisco bay area. It is run by the city's parks and recreation department, and funded largely by docking fees from the adjacent marina.



Figure 26 : Aerial View (googlemaps.com)

The Adventure Playground at the Berkeley Marina was opened in 1979. It is designed for children seven years and older. Younger children are welcome as long as they are within arm's reach of a participating adult. Parents of older children are encouraged to participate and help out with safety for all children [67].

This playground is ranked among the most innovative and creative places for kids to play in the U.S. It was voted as the Best play space by San Francisco magazine in 2016.

DESIGN:

The playground is a wonderfully unique outdoor facility where staff members encourage children to play and build creatively. Children can climb on the many unusual kids designed and built forts, boats, and towers, ride the zip line or hammer, saw, and paint. Through such activities, the Adventure Playground creates opportunities for children to learn cooperation, meet physical challenges and gain self-confidence [67].


Figure 27 : Picture of the fort building project (commons.wikimedia.org)



Figure 28 : Kids painting, the most enjoyed activity (commons.wikimedia.org)



Figure 29 : Can ride zip line, slide & swing (commons.wikimedia.org)



Figure 30 : Children build their own play environment

(commons.wikimedia.org)

From a design stand-point, there is actually nothing much to design for an adventure play space. The formula for Adventure Playgrounds includes earth, water, and lots of creative materials. Kids are provided with tools and materials to design their own play environment. The flexibility created by all the "loose parts" in the environment, teaches them to test themselves and to discover what they can and cannot do. This supportive and encouraging environment, can lead to a real sense of achievement together with growth in confidence and self-esteem for all kids [67].

ANALYSIS :

The playground is open only during weekends. On weekdays, the playground is only available with advanced reservations for large groups. When open, the playground is staffed by 5 adult members. Hence, usage of the play environment is quite restricted.

There are no special features in the park provided for children with disabilities. Although a child with physical disability might be able to engage in building something with tools, children with other disabilities may experience difficulty playing in such an environment. Painting activities in the park can have a calming influence on autistic kids. However, noise from other activities could overwhelm children with heightened sensitivity issues.

CENTRAL PARK PLAYGROUNDS

CONTEXT: On July 21, 1853, the New York State Legislature enacted into law the setting aside of more than 750 acres of land central to Manhattan Island to create America's first major landscaped public park; they would soon refer to it as "the Central Park." Frederick Law Olmsted and Calvert Vaux, the winners of the 1858 design competition for Central Park, along with other socially conscious reformers understood that the creation of a great public park would improve public health and contribute greatly to the formation of a civil society. Immediately, the success of Central Park fostered the urban park movement, one of the great hallmarks of democracy of nineteenth century America [68].

DESIGN:

Central Park is unique in offering 21 playgrounds set in a 834 acre landscaped park in the center of the city. These 21 playgrounds can be categorized into 3 broad categories as shown in the table. Most of the playgrounds in Central Park were what is called as Traditional playgrounds. Over time, some of these traditional playgrounds were converted to Contemporary play spaces. And some of these play spaces were transformed into Adventure/ Creative play spaces. Of the play spaces in central park, Billy Johnson & the Adventure playground are more related to my thesis topic.

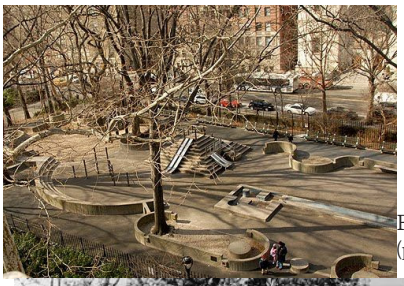


Figure 32 : Adventure Playground
(pinterest.com)



Figure 33 : Billy Johnson playround
(pinterest.com)



Figure 31 : Central park playground map
(commons.wikimedia.org)

ADVENTURE PLAYGROUND - Central Park

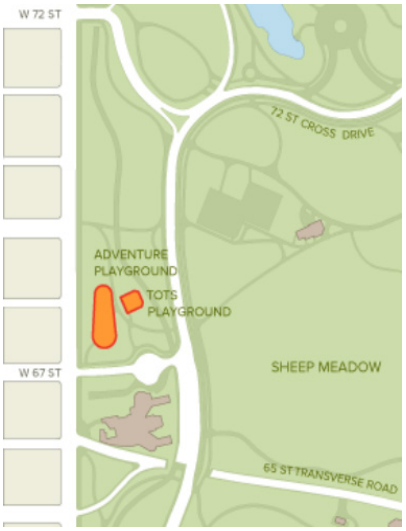


Figure 34 : Location map
(planforplay.org)

CONTEXT : Adventure Playground is located on a small hill just north of the West 67th Street entrance to the Park [69]. The playground was built in 1936 during the moses era. Reconstructed in 1966, the playground became the first adventure style playground in Central Park.

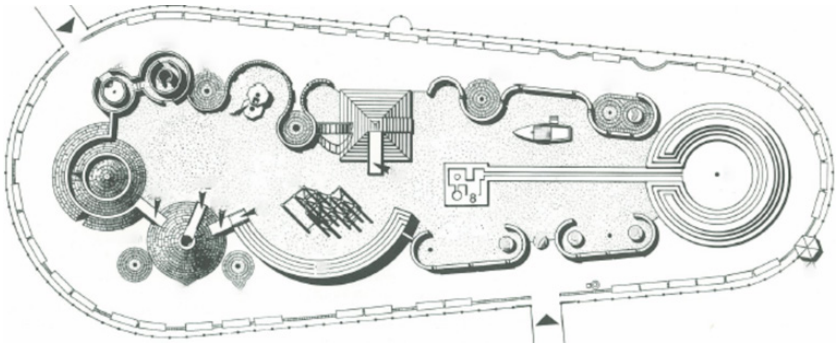


Figure 35 : Adventure Playground plan (Datner, Richard. Design for Play).

DESIGN :Designed by architect Richard Dattner, the playground features are interconnected by a low concrete wall that undulates around the play space, winding around the trees at the perimeter. An open feel and small-scaled play structures make this playground appealing to younger children [69].



Figure 36 : Interior view of playarea (archpaper.com)

In addition to demarcating the play zone as separate from the area for adults, the meandering wall is integral to the play environment [69].

ANALYSIS: The adventure playground has been designed to be accessible for physical disabilities. The play equipment is nature based and diverse. The play equipment has been designed with natural elements such as sand and water, which can be easily molded and encourage creativity and exploration. The path from the park entrance to the playground, the water feature and the sand-surfaced areas are all wheel chair accessible. There are different sections of the park, which are interconnected by a low concrete wall. The park has an open feel to it. At the same time, design elements have been used to create secluded areas. For example, The tree house and space below the pyramid like structure gives autistic and behavioral problem kids quiet space to relax. This helps kids with cognitive and intellectual disabilities experience quite play time.

The undulating wall divides the playground Into two different zones - play zone and adult zone. This separation gives kids their own spaces and freedom to play under an indirect adult supervision. The wall in the play zone sets a limit for kids with behavioral problems and acts as a boundary. This is beneficial for children with behavior problems as their perception of objects and spaces may be distorted. There are no bright colors or special signs for the visual or hearing impaired – which could pose challenges to kids with such disabilities but creates a calming environment for autistic kids.



Figure 37 : Connectivity, flow and movement through spaces
(archpaper.com)

BILLY JOHNSON PLAYGROUND



Figure 38 : Location map
(planforplay.org)

CONTEXT : Billy Johnson Playground was built in 1936 and reconstructed in 1986 on the approximate site of one of the original Moses-era playgrounds. Its located near the East Side at 67th Street. In 1990 , The redesign of Billy Johnson Playground was inspired by the landscapes of Central Park, making it one of Park's most distinctive play spaces [69].

DESIGN : The playground was designed by M. Paul Friedberg, who created the first adventure-style playground in New York City. Friedberg's concept was to create a playground that blends with the Park. Friedberg responded with an adaptation of his approach of designing playgrounds without perceived equipment, using topography, natural materials, and the rustic vocabulary of the Park to blend the playground into its context and foster an experience of play in the landscape. The play features, such as the bridge and rustic structures, invite exploration, allowing children to go inside, underneath, and on top of them [69].



Figure 39 : Interior view of playground

Friedberg created multiple levels and types of circulation through the playground, including bridges, stepping stones, and rustic trails through raised planting beds, and provided opportunities for exploration and play in the landscape [69].

ANALYSIS: The Billy Johnson playground is a landscape focused playground that has been designed primarily with natural elements. Availability of materials like stone, water, and sand, help kids with autism and other sensory processing disorders to play. Providing an environment with materials that kids can manipulate helps to simulate their senses, and assist in the development of a child's brain.

Play features are integrated into the landscape. Kids spend most of their time going up and down the 45 feet long, slightly spiraled granite slide, which is built into the bedrock. The park provides a conducive environment for children to challenge themselves and encourages risk taking. The location of the slide and water features encourage social interactions. Elements such as bridges and rustic trail structures invite exploration and play.

The entire play area is accessible for kids with physical disabilities. Unlike other traditional playgrounds, Billy Johnson Playground's lush plantings create ample shade and divides up the space creating small private play "rooms", which are apt for Autistic kids. The play area is conducive to games such as hide-and-seek, and imaginative play. Different sections of the park are connected via landscape, which creates a unified play environment.



Figure 40: Granite slide on hill



Figure 41 : Stone bridge near central waterfeature

CASE STUDY CONCLUSION

Of all the play areas, I like the design of Billy Johnson the most. The design of this play area is landscape based, which contributes toward development of children much more than play spaces designed with man-made materials. Landscape based play spaces are relatively cost effective and easier to construct than a play space that is primarily equipment based. Use of natural elements provides variability over seasons and provides an environment that will continue to attract attention of children over time. The play space is also manipulative, which provides a much more varied experience.

Kids of all abilities can explore Billy Johnson park at their own pace, engage in play, and grow safely at their own rate. An important design aspect of Billy Johnson is that the natural and free flowing layout encourages free play. Adults can supervise their kids without hindering their ability to experiment and learn on their own. Nonetheless, I find that the manner in which boundaries have been incorporated in the design of the adventure playground in Central Park is better than that of Billy Johnson. This is because, the boundary in the adventure playground at Central Park creates a kid safe space which is also visually connected to the adult space. The interconnected undulating low wall creates a physical boundary around the kid space without compromising the ability of parents to monitor and supervise their children. This is important especially for autistic children who have an underdeveloped sense of danger. In fact, from my analysis of the adventure playground at central park, I recognized the significance of boundaries for autistic children.

It is important to note that both play spaces mentioned above have areas that are not accessible by children with autism and other disabilities.

C H A P T E R T H R E E

SITE SELECTION

3

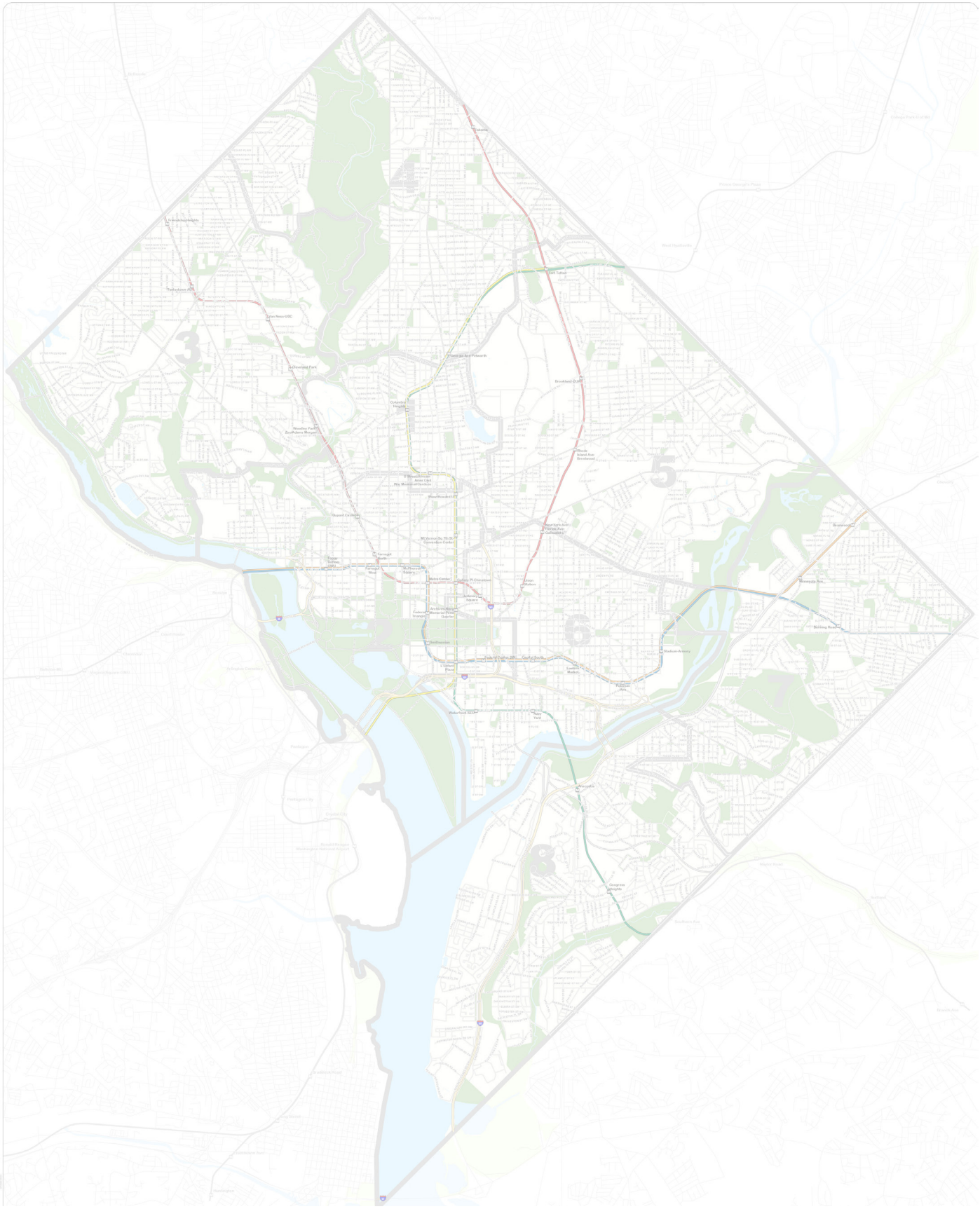


Figure 42 : Washington DC map

SITE SELECTION

To select my site, I began by mapping natural areas and playgrounds in DC. I found that most playgrounds are associated with schools and parks. One playground, in particular, caught my attention. This playground is not associated with a park or school. It is a Recreational center that is part of DC's Therapeutic Recreation division.

According to the website of DC Department of Parks and Recreation (DPR), the Therapeutic Recreation division provides recreation and athletic programs for residents of all ages, including adaptive programs and facilities for persons with disabilities. The goal of this division is to address needs of individuals living with disabilities through a continuum of specialized therapeutic recreation program services.

The Therapeutic Recreation Center that I had mapped was focused on children with disabilities. However, when I visited the site, I felt that the play area was not designed to meet needs of special needs children. The play space was more of a traditional play space with play equipment that you typically find in a park. The equipment itself was quite old and appeared to be not much used or cared for. The site of the playground had a lot of potential but was not incorporated into the design.

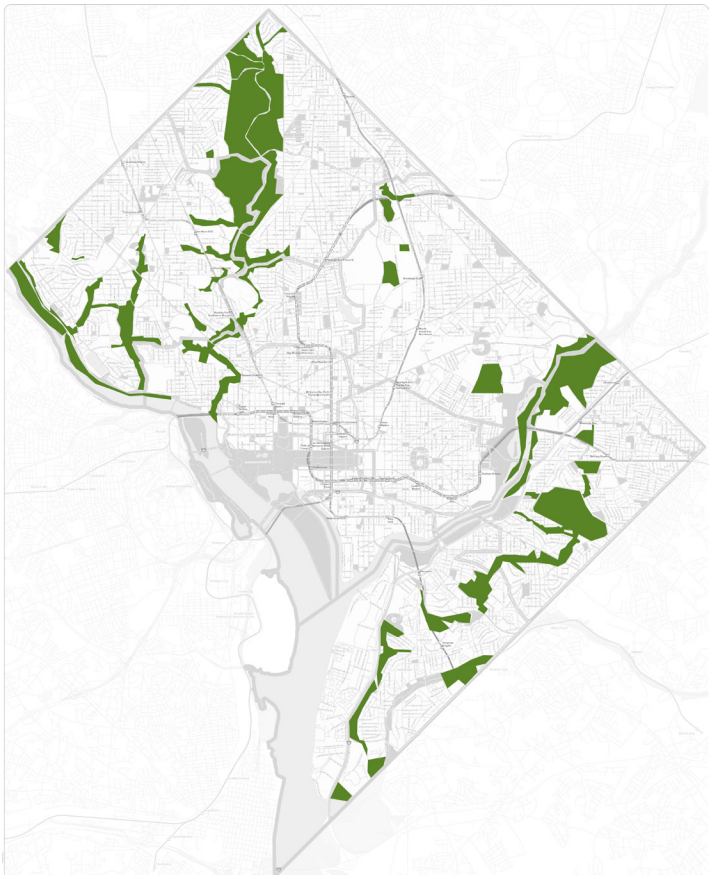


Figure 43 : Natural areas in DC

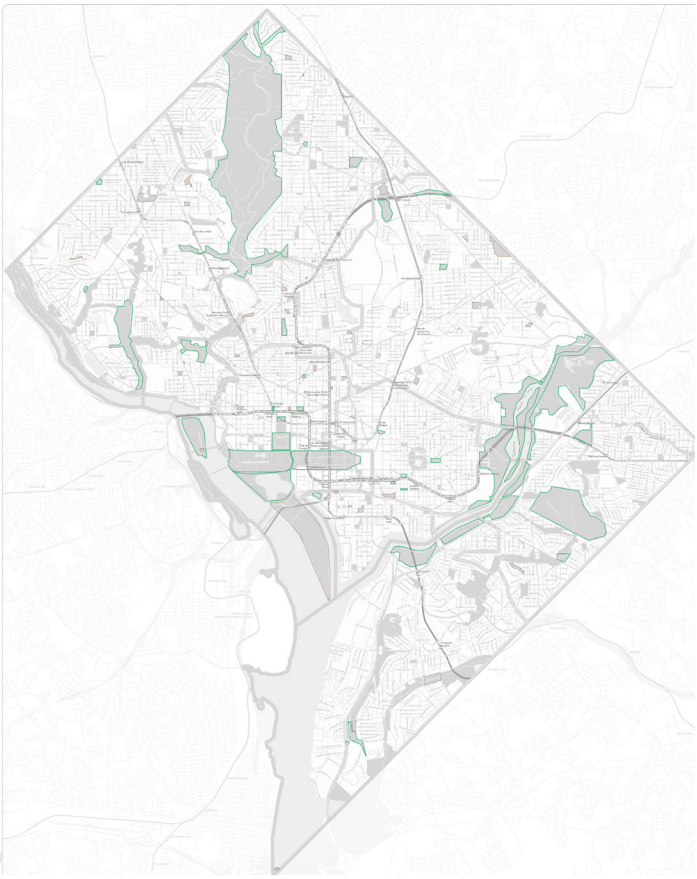


Figure 44 : Parks in DC

Upon further analysis of the area, I found two schools nearby that focused on children with special needs, including autism.

Given that the play space is part of a therapeutic REC center that focuses on special needs children including children with autism, there are 2 special needs schools nearby, and the therapeutic play space is not designed to accommodate needs of children with autism, I decided that this play space is a suitable site for my thesis.

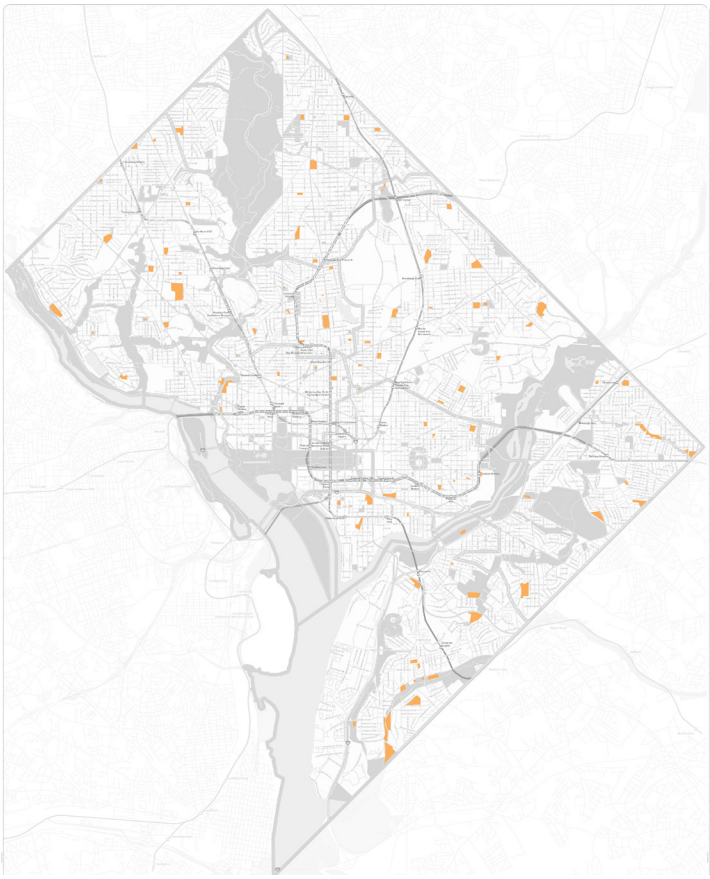


Figure 45 : Playgrounds in DC

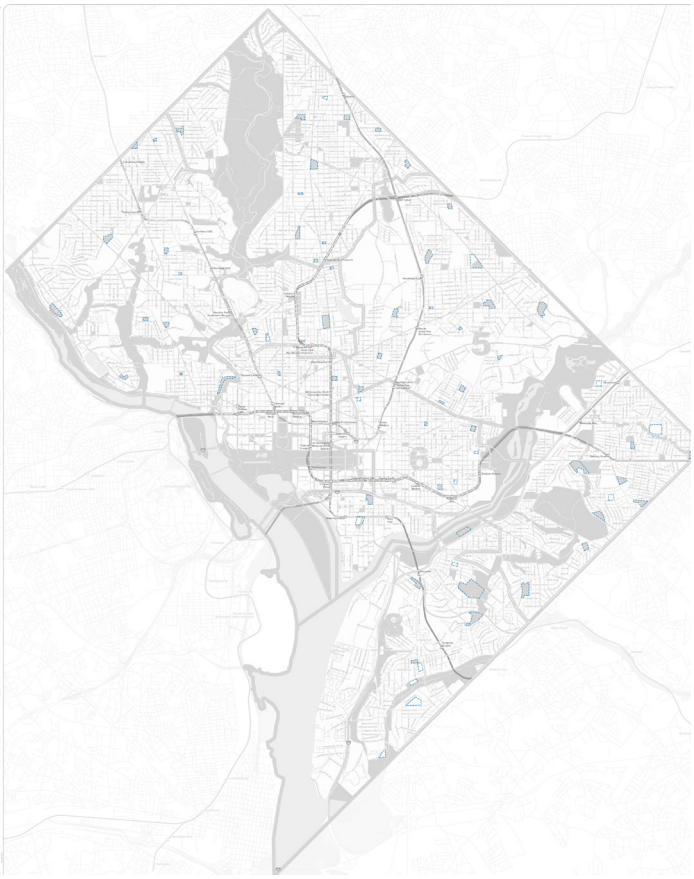


Figure 46 : Rec center in DC

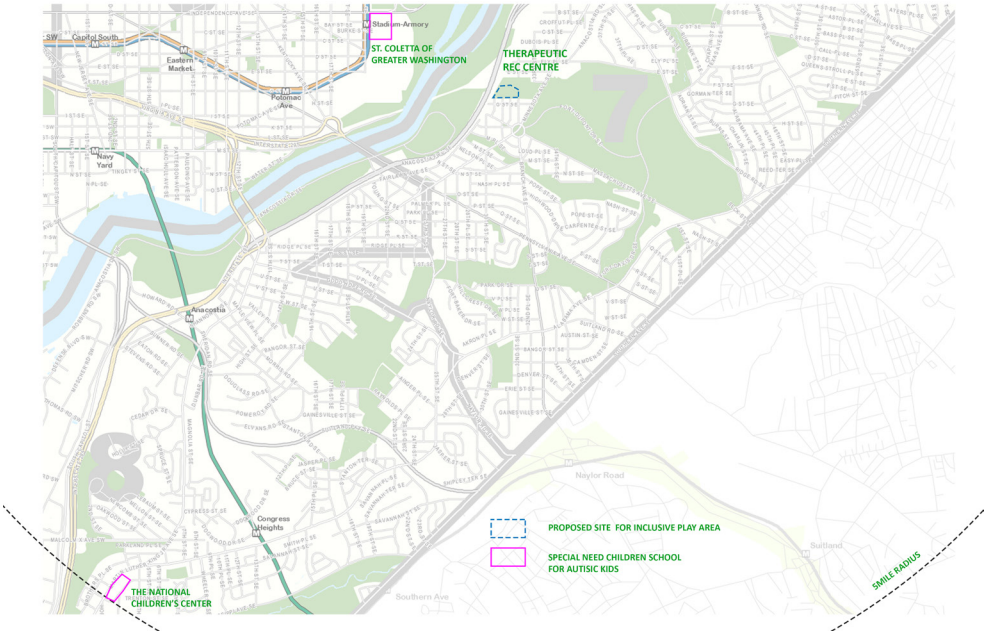


Figure 47 : South East portion of D.C.

4

C H A P T E R F O U R

SITE ANALYSIS

SITE LOCATION



Figure 48 : Regional Context - Therapeutic Rec center

The therapeutic rec center park in DC is located in Ward number 7 in the South East portion of D.C. The park is South East of the National Mall across the Anacostia River. From the US capitol, if one drives two miles South on Pennsylvania Avenue, makes a left onto Minnesota Avenue and continues for about a mile, the park will be on your left. Major highways including the Anacostia freeway, Baltimore-Washington Parkway,and I-495 are close by. The Park is less than 2 miles from the DC Maryland border.

The nearest metro station is the Minnesota Avenue metro station, which is a 15 min bus ride using the V2 or V4 buses. The park is in a residential neighborhood with single family homes and apartments. There is also a children day care center nearby. In addition to being right next to the Therapeutic Rec Center, this park is also within 5 miles of two schools for special needs kids – The National Children's center, and St. Coletta of Greater Washington.

SITE ANALYSIS

The overall site area of the Therapeutic REC center is 9 acres. The existing play area is around 3.75 acres. The entire site has the shape of a four sided figure and is only accessible from G street. The other 3 sides are enclosed by natural areas. There is a wetland that runs behind the site.

The entire site has one entry/exit path from G street. There is no separate entrance or parking space for the play area. There is a path that begins from the parking lot, and traverses the entire park. Along this path are fitness equipment. Most of the play area is covered by grass. There is one superstructure, which is not accessible by children with disabilities. The site has 3 large open areas. One is a picnic area, and the other two are open fields.

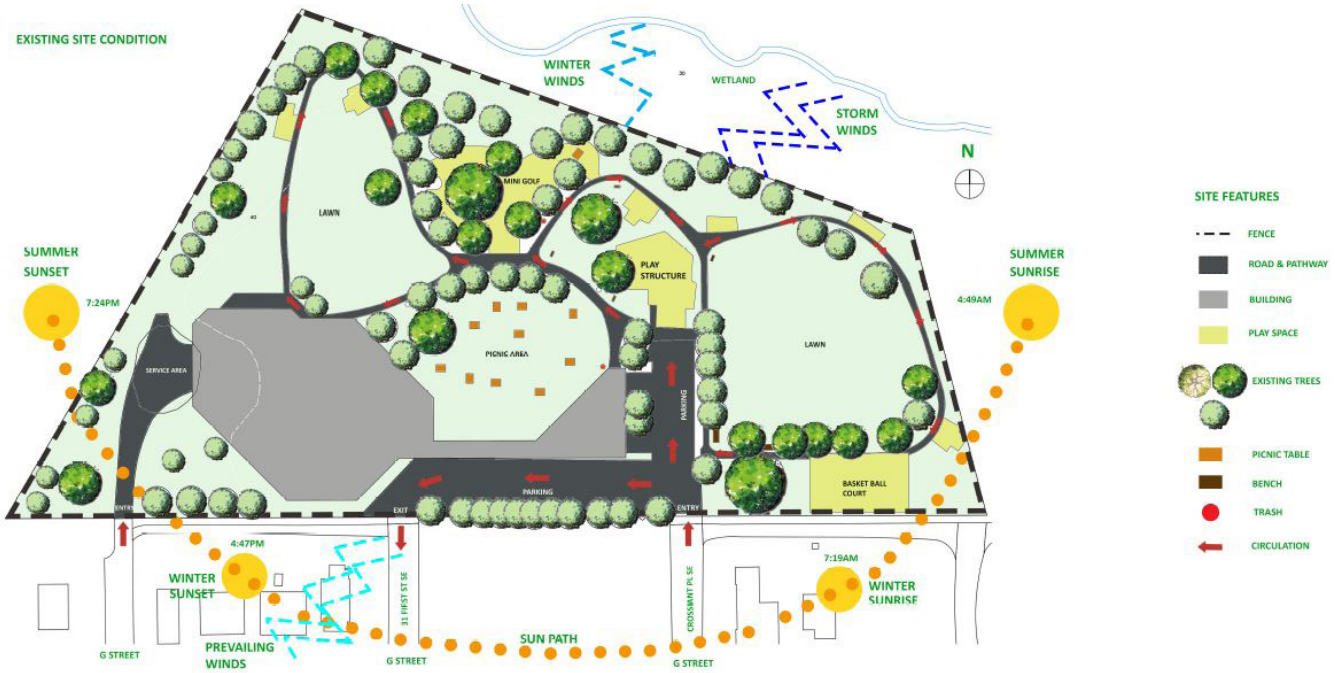


Figure 49 : Existing site plan

EXISTING SITE PLAN & SECTION

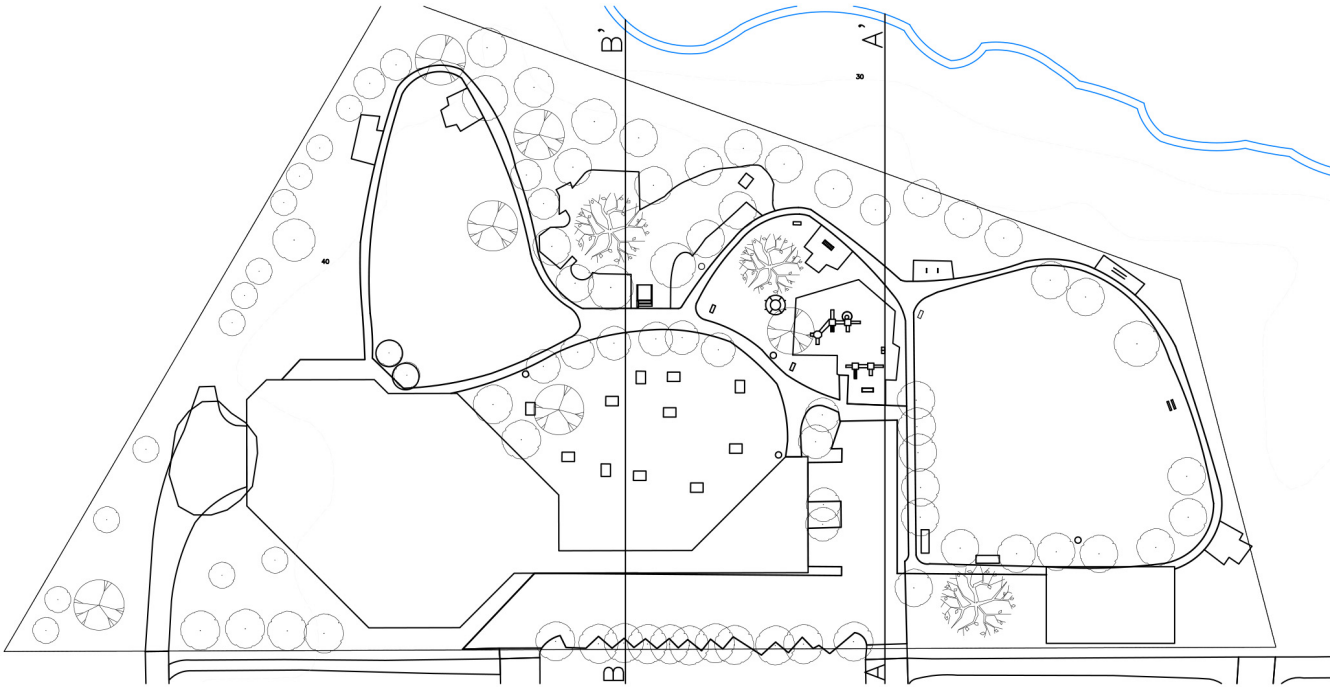


Figure 50 : Therapeutic rec center playground plan

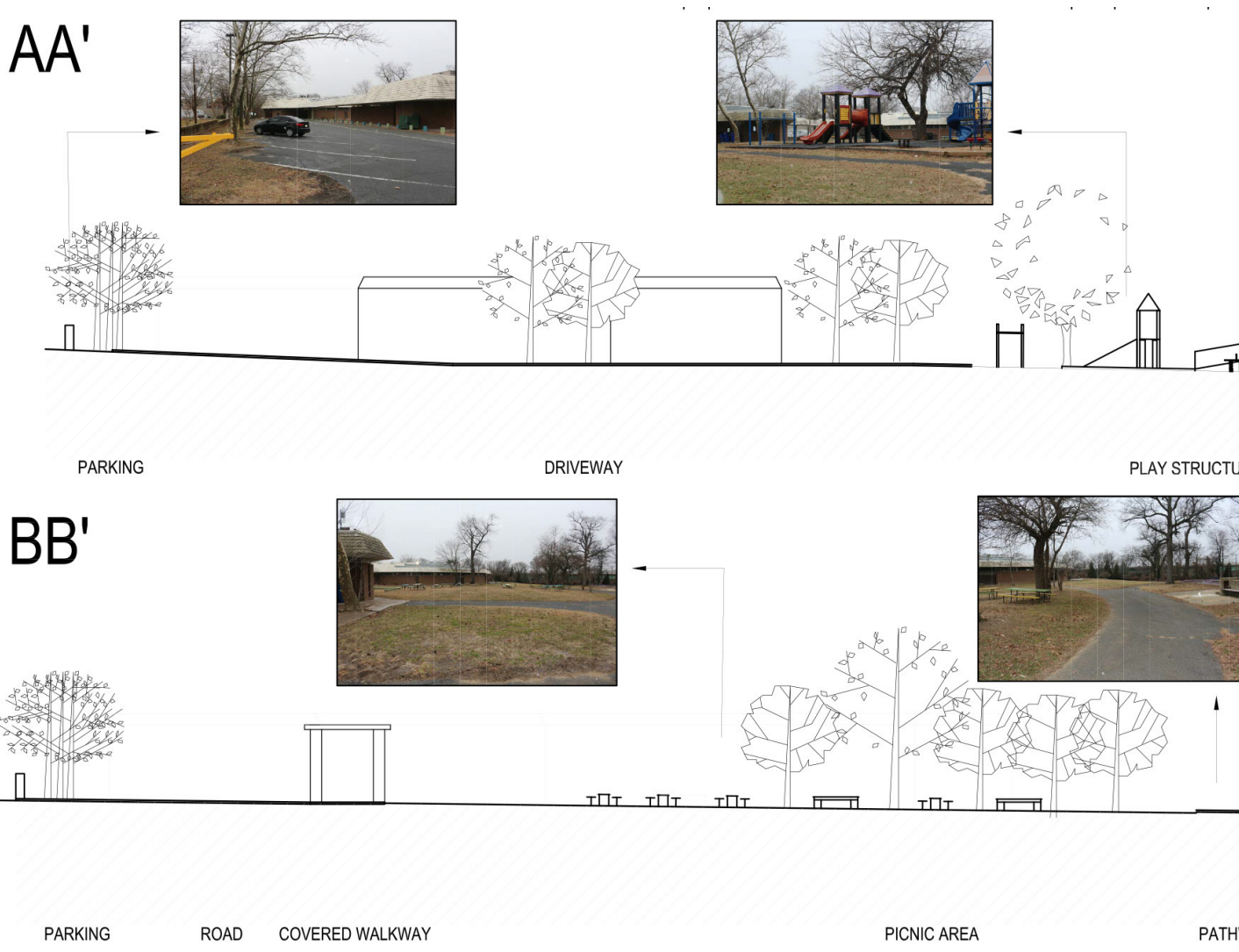
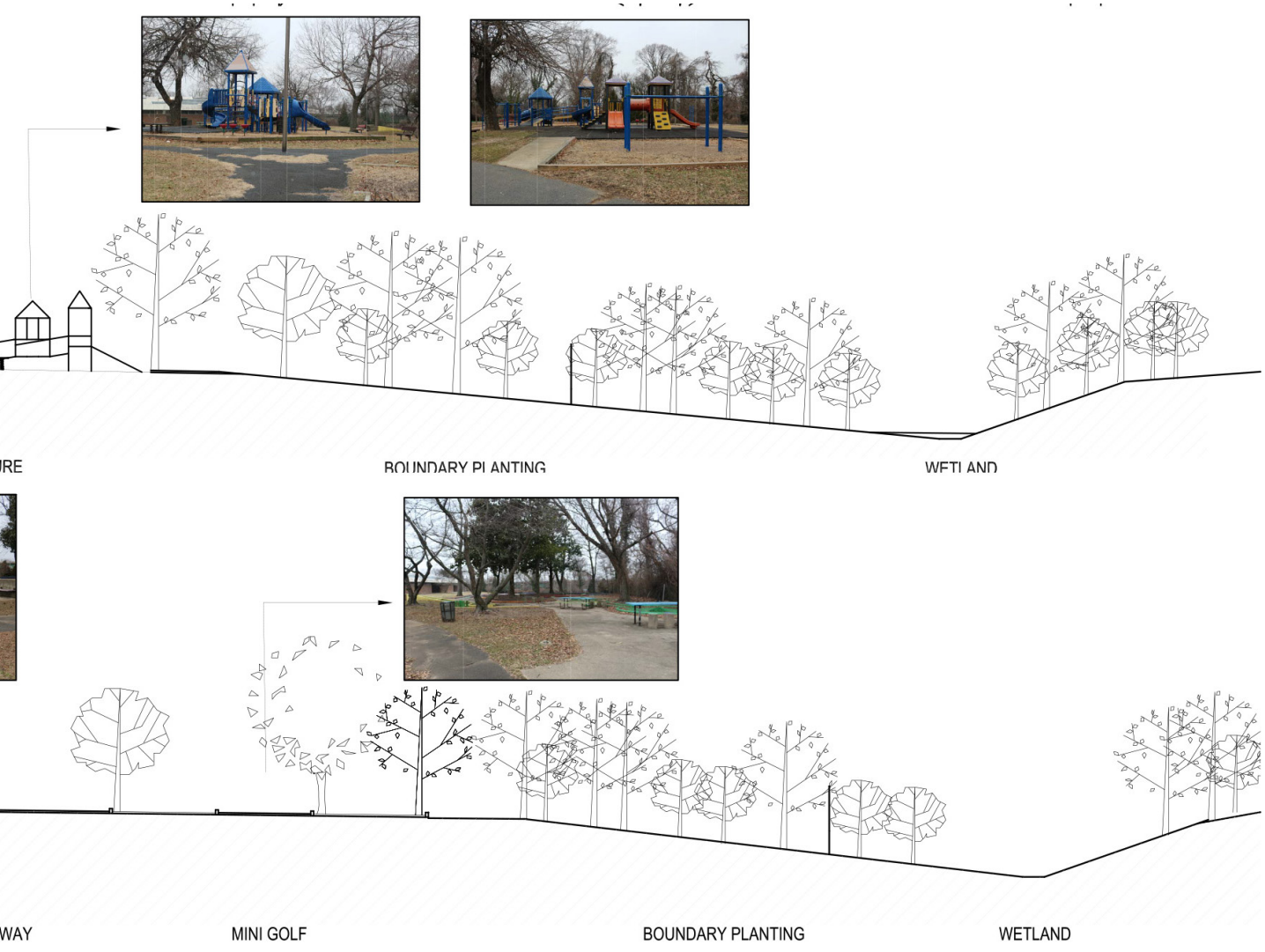


Figure 51 : Therapeutic rec center playground sections

Section of the existing site shows that the majority of the focus area is flat. There is a Grade level changes across the site of about 31 feet. Further studies reveal that the topography does not change much from the entry of the site to the north edge of the play area. Beyond the north edge, the topography has a 25 feet gradient towards the wetlands.

In general, I felt that the layout and design of the play space appeared to be more suitable for use by adults than special needs children.



SITE ISSUES

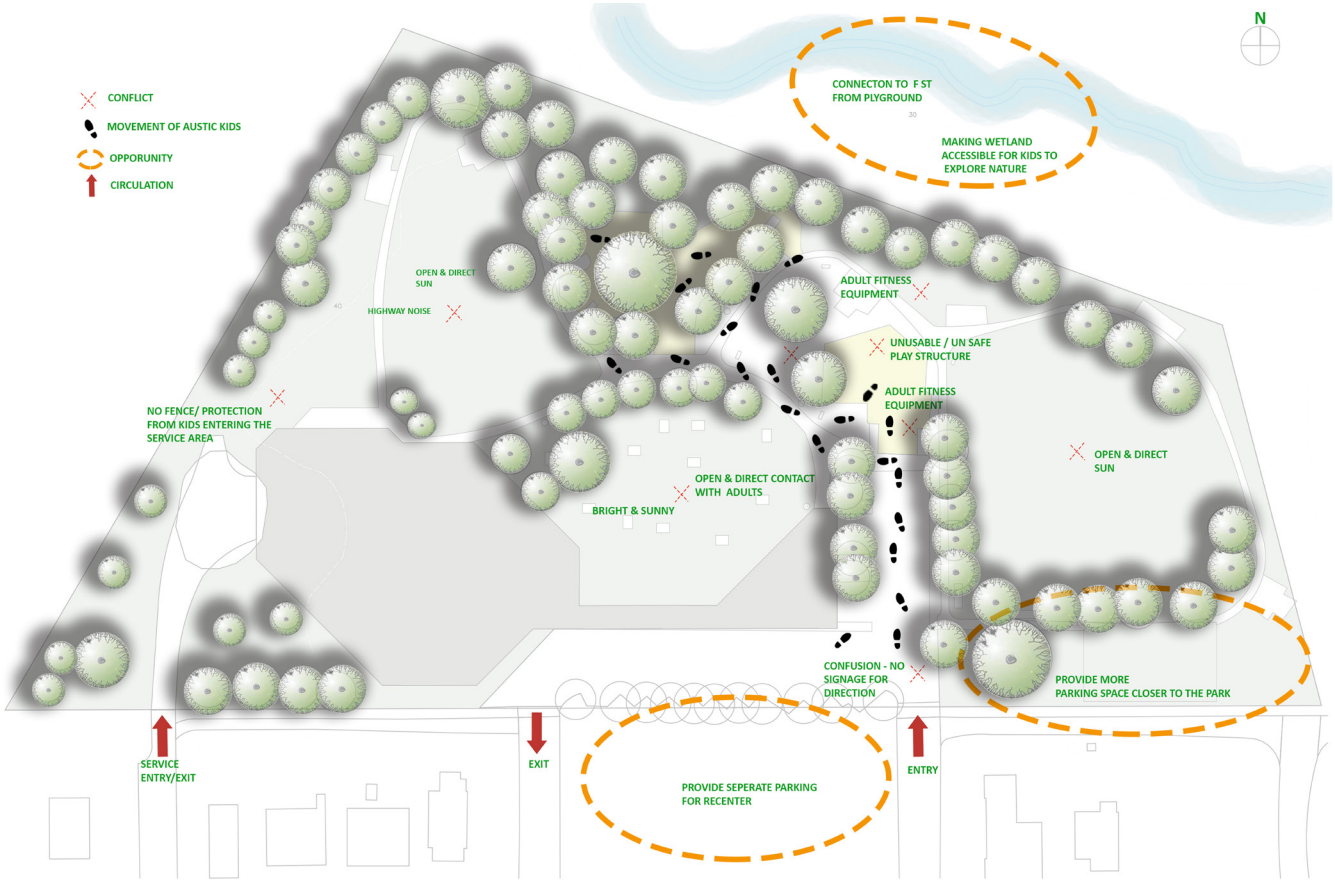


Figure 52 : Movement , conflict and opportunities

In above drawing, I have identified opportunities and conflicts with the site. The access points for the site need to be well defined and separate from the REC center to ensure that autistic children have a level of privacy they need to not get overwhelmed. There is no signage throughout the park for kids with autism to navigate the play space. Parking area is limited. However, there are options to provide more parking and bring parking spaces closer to the play area for easy access by both children and parents.

Play equipment is not suitable for autistic children. Lack of manipulative materials provides a restricted learning environment. Most of the play area is open, which is not suitable for autistic kids as they have a heightened sensory response and do not sense danger.

There are no quiet areas in the play space for autistic children to unwind.

As mentioned, the park is only accessible from one side. Behind the park, there is a wetland. There are homes on the other side of the wetland on F street. User group analysis shows that there are many homes with children on the other side of the wetland. A connection to the play area from F street will improve accessibility to the site and help children connect with nature.

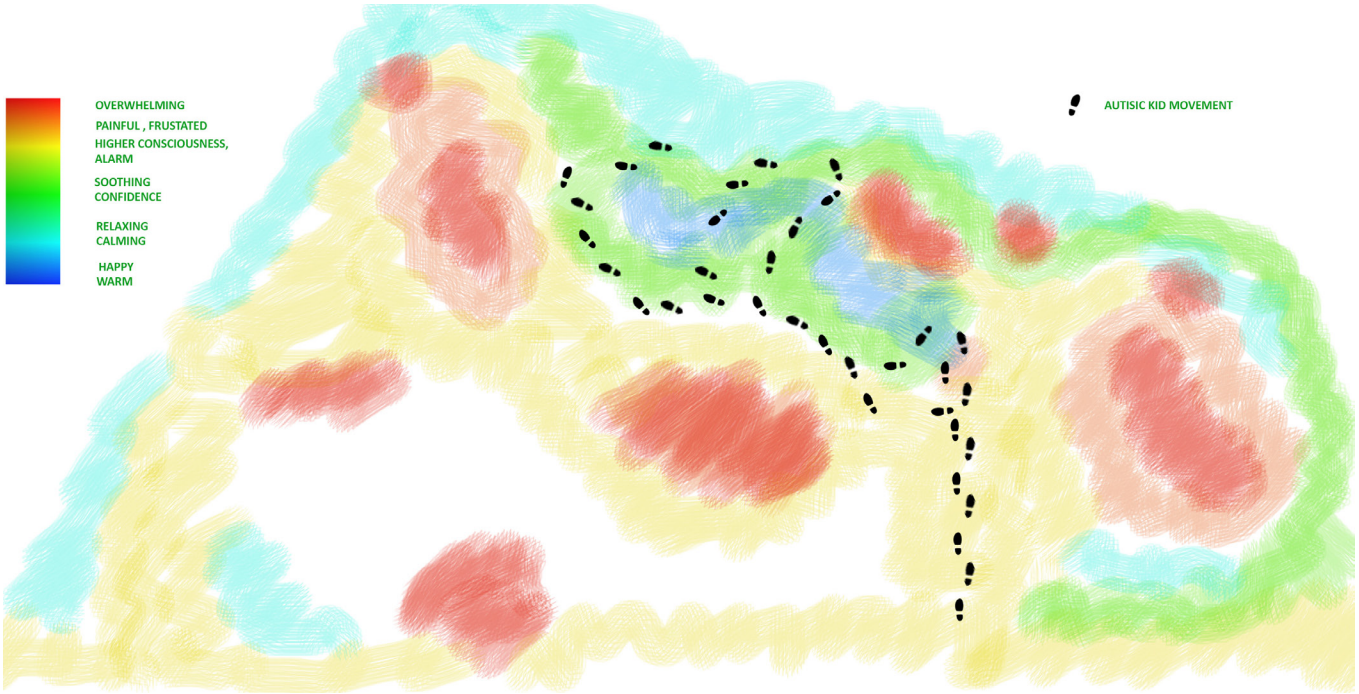


Figure 53 : Movement & Emotions of autistic kid in existing playground

Based on my research, I have generated an emotion map imagining the movement of autistic kids and their associated emotions throughout the existing play space. As shown in the above drawing, there are many areas where Autistic children would likey feel overwhelmed, confused, frustrated, and alarmed. This is because these areas are open and bright, the space is typically invaded by adults from the REC center, and the equipment and superstructures are too complex. However, there are a few areas that would be soothing to Autistic kids since these areas are shaded, and the play materials are conducive to manipulation and exploration.

SITE PHOTOS



Figure 54: View of parking & play area



Figure 55 : View of open field on right



Figure 56 : View of play area



Figure 57 : View of play equipment



Figure 58 : View of Picnic area



Figure 59 : View of mini golf

C H A P T E R F I V E

CONCEPT & DESIGN PROCESS

5

DESIGN GOALS & CONSIDERATION



Figure 60 : Gardening activities are a great way to get kids familiar with the different textures and scents of plants in a controlled manner.

My design goal is to create an outdoor environment that helps children with autism and other special need children play. Based on my review of research materials and literatures, personal interviews, and observations, I have summarized the following guidelines below for designing an outdoor environment for children with ASDs [64][70]. Many of these ideas can be creatively integrated into existing outdoor play spaces so that they are much more user friendly and inclusive towards children with ASDs. Several of these ideas have been incorporated in my thought process, and in my redesign of the Therapeutic Rec Centre playground.

1. Context & Location –Play space layout needs to be in a tranquil and quiet area with exposure to natural environments as much as possible. Noise can be overwhelming for kids.

2. Safety & Security – Boundaries need to be incorporated into the design to ensure children with hyposensitive issues do not get hurt .

3. Provide Transition Between Spaces/ Activities – To allow autistic children to orient themselves before experiencing something new as they are uncomfortable with change [70].

4. Sequence activities to introduce elements - Introduction of elements and ideas slowly to build upon skills and comfort levels [70].

5.Communication & Socialization – encourage activities that provide opportunity to connect with nature and improve social skills such as gardening .

6. Soothing Areas to re-center - To escape and re-center when overwhelmed, and to enable kids to watch activities from a distance so that they can learn from other children and become comfortable to participate.

7. Plenty of Shade – provide trees and shade structures since children with ASDs are often photosensitive [70]

8. Exercise, Coordination & Balance - Include activities to increase fine and gross motor skills, body awareness, and motion in addition to providing a calming connection to nature [70].

9. Over Come Sensory Issues - Many kids with ASDs have an over or under-responsive sensory system and react differently to sounds, textures, or visual stimuli. Familiarize them with different color, textures and scents of plants in a controlled manner [70].

COLOR PALETTE - Use of mute colors are typically calming



GREY - A neutral color for autistic children as long as the tone does not get dark

IVORY - A darker shade of white. White is wild card in autistic children either causing relief or discomfort. A warm shadeof white is received well by both groups.

GREEN - One of safest colors. Creates a sensation of calm,recommended as one of the best colors for autistic children.

ORANGE - Represents warmth and fun, making it a good choice as long as the color is toned down.

BLUE - Light or a shade of carribean sea water, seems to have a soothing, tranquil effect.

SITE CONCEPT

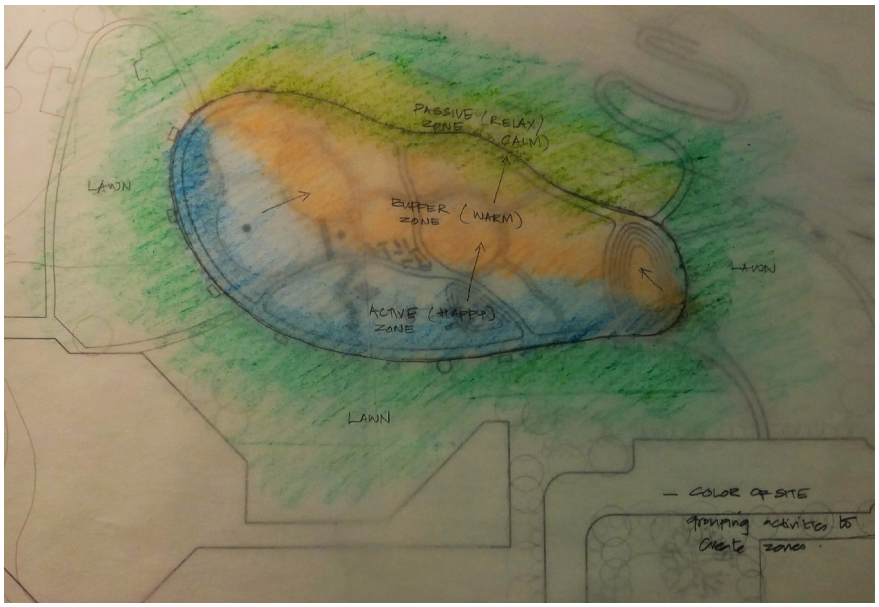


Figure 61 : Play area Zoning

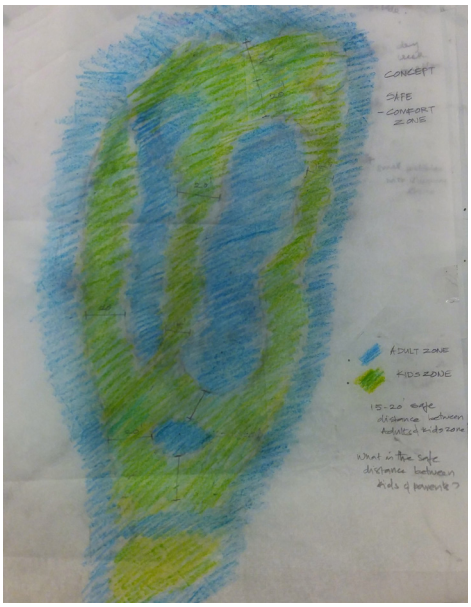


Figure 62 : Adult & kids comfort Zones

Based on my research, I developed design concepts to transform the play area at the Therapeutic REC center into a nature based play space that is inclusive to children with autism.

I began my design by observing the site i.e. location of the site in context to the REC center, parking space, and the undisturbed areas behind the play space.

I divided the site into three different zones – Active zone, Buffer zone, and Passive zone. I designed the active zone close to the REC center, the passive zone close to the undisturbed areas, and the buffer zone to create a transition path between the active zone and passive zone. Each of these zones in my design concept are defined by their unique identities. For example, sand play area in the active zone, orientation space and play garden in the buffer zone, and quite areas in the passive zone. By dividing the site into zones, I am providing options for autistic and abled children to select and explore the area of their choice depending on their ability and skill level. I am also creating a balanced play space with high-level and low-level activity areas.

Since free play is important in a child's development, I also wanted to create a layout that would be conducive to free play. From my case studies and observations, I concluded that parents are comfortable allowing their children to play in an unsupervised fashion as long as they are visible and within reach. A comfortable distance is 15-20 feet.



Figure 63 : Design Option 1



Figure 64 : Boundaries - Option 1



Figure 65 : Design Option 2



Figure 66 : Boundaries - Option 2



Figure 67 : Design option 3

I created 3 design options – as shown above. While working on these options, I realized the importance of boundaries in the design of a play space for autistic children. In fact, boundaries are necessary to define and differentiate among the different play zones. Boundaries ensure autistic kids with a hyper responsive sensory system are not overwhelmed. Boundaries are also important to ensure hyposensitive children do not run at the same time encourage free play.

FINAL SITE DESIGN

Among the three design concepts, I liked design option three. This option is simple to understand and easy to explore. It creates a better connection between the REC center and the play space. There is clarity in the overall layout. The main path is well defined through use of materials and connects various spaces together. The different zones are clear from the use of landscape elements as boundaries. There are viewing areas for autistic kids to observe other kids play. In addition to the quiet zone there are alteration spaces that have been created to help autistic children slip away from activities if they are overwhelmed, and get back when they are ready.

The existing play space had a separate entry point and exit point. In my proposed design, I have one entry and exit point that is well defined and easier to secure. The play area is also easily accessible from the parking space.

The main path from the parking space leads visitors directly to the play space. Visitors to the park are greeted by an alteration space in the center with observation mounds on either side. The mounds help autistic kids observe the layout of the park and avoid surprises, which can cause anxiety among children with Autism. The alteration space in the center helps autistic kids to orient to their new environment and interact with other kids and parents. To the left of the space is the natural play area with a large sand pit. To the right of the path is a play garden where kids can interact with nature, explore different textures, and enjoy different flower colors. The play garden is designed to connect with nature, learn, and interact with other children in a controlled manner.

Opposite to the sand area is the Quiet area with a butterfly garden and a rain garden. Beyond the sand pit is a water play area with interactive jets. Water from the jets flows into an open channel where kids can walk and feel the texture of water.

By incorporating boundaries, various landscape elements, and segregating play activities, the park provides opportunities for autistic children to be exposed to different sensory elements in a controlled manner. Overall, the design maximizes the play space, encourages social interaction, creates opportunities for free play, and is inclusive to all children including those with Autism.



C H A P T E R S I X

FINAL DESIGN

AERIAL VIEW OF SITE DESIGN



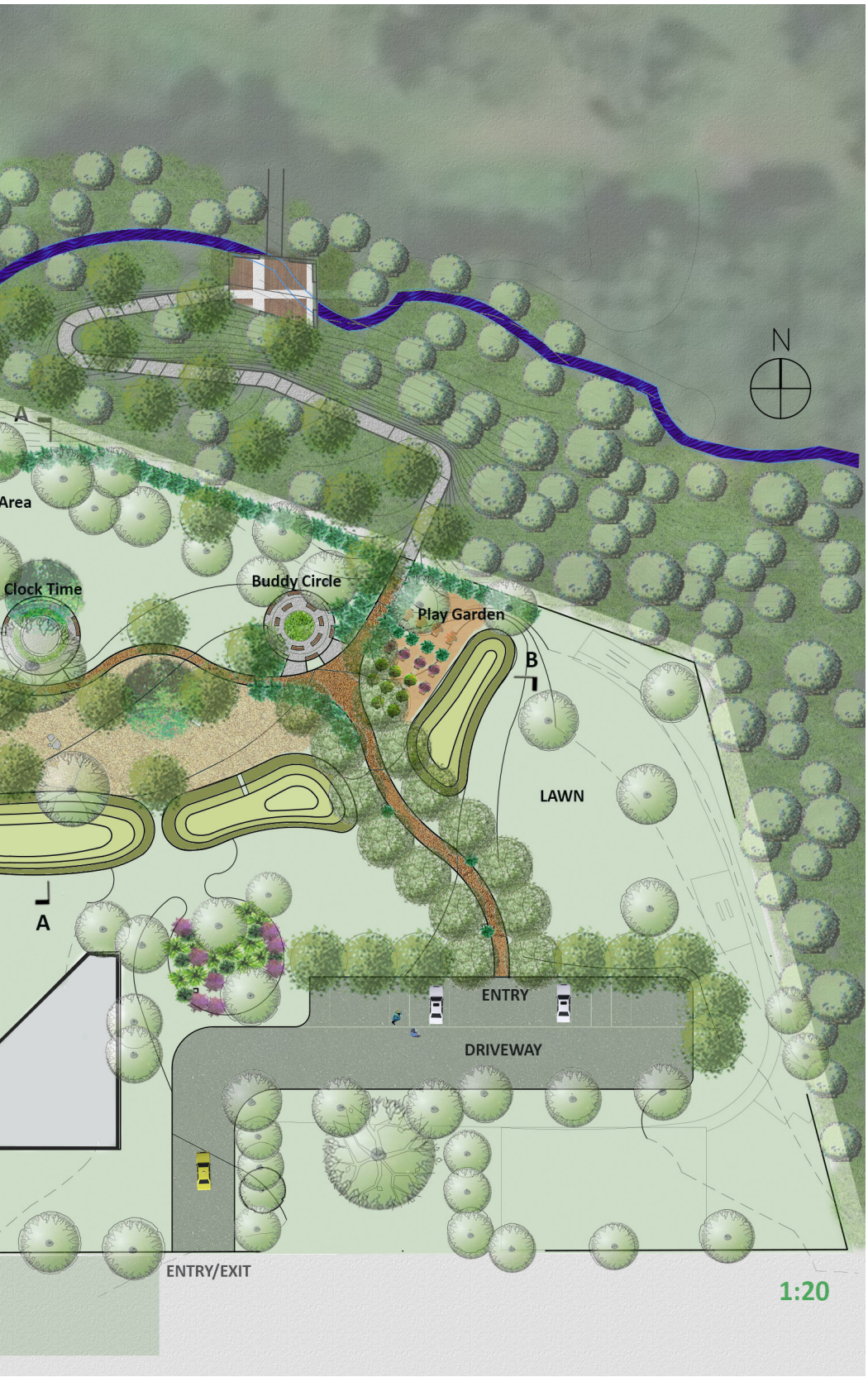
Figure 68 : Aerial view of the site & surrounding area


MINNESOTA ROAD

PROPOSED SITE DESIGN



Figure 69: Over all site plan


N
A
Area
Clock Time
Buddy Circle
Play Garden
B
LAWN
A
ENTRY
DRIVEWAY
ENTRY/EXIT
1:20

SITE SECTIONS

SECTION A



Figure 70 : Section thru play & quiet area

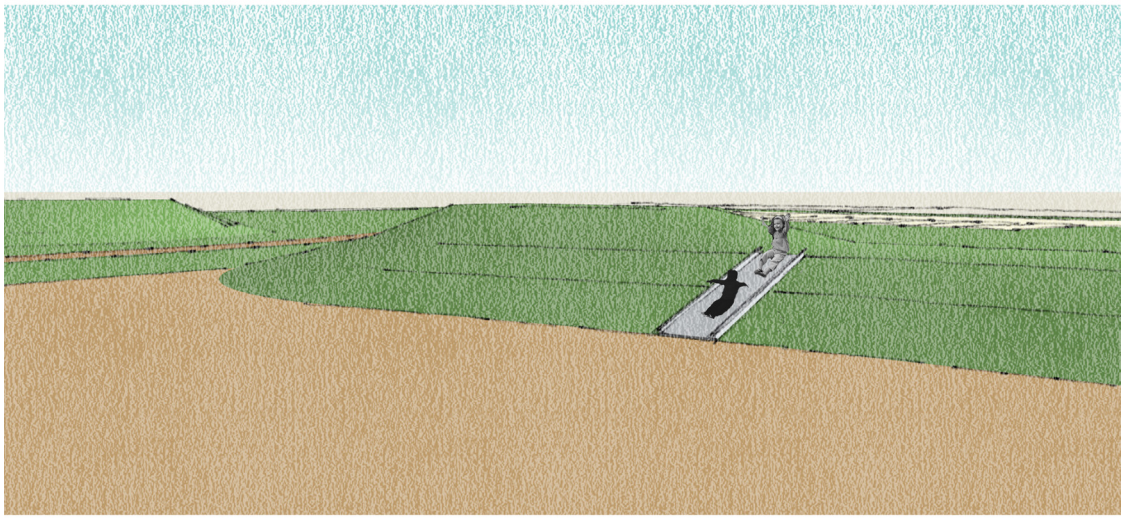
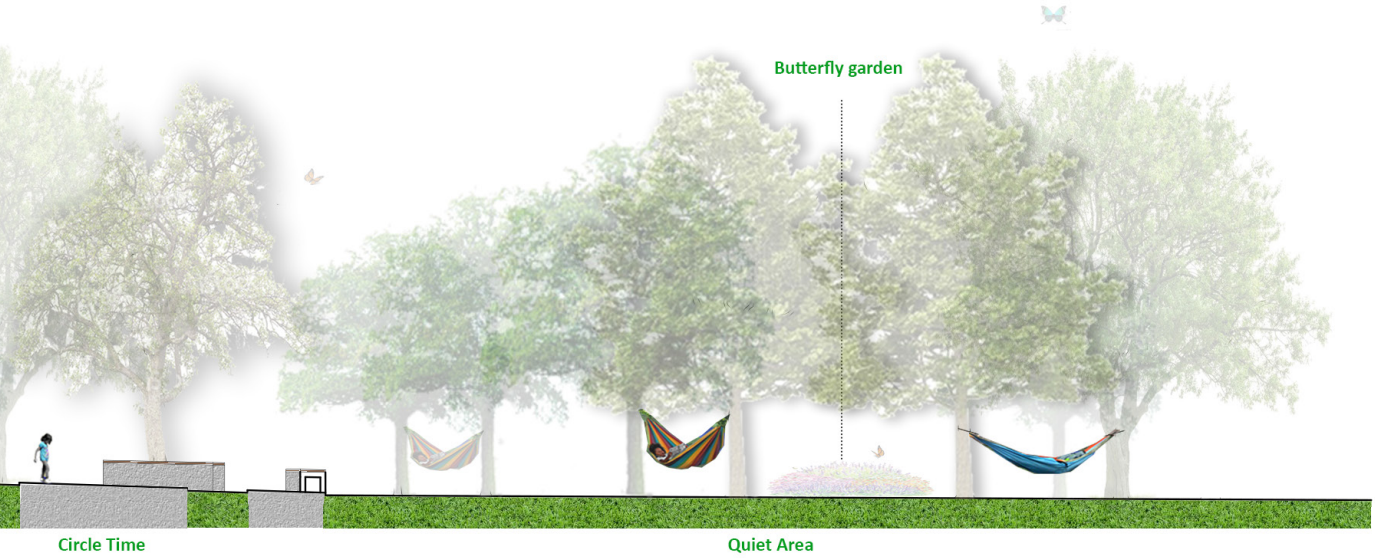


Figure 71 : Sketch of observation mound slide



From the site sections, one can clearly see that the play area sits on a flat surface which is easily accessible. Major changes in grade level have been created using mounds at the front edge of the play space. These mounds clearly define the edge between the play space and the rec center. These mounds also provide opportunities for children to observe activities in the play space.

The section shows different materials that have been employed in the site. Materials for autistic children need to be carefully selected to serve as sensory elements that help autistic children play and learn.

Overall, the play area has landscape elements that naturally blend both play and learning.

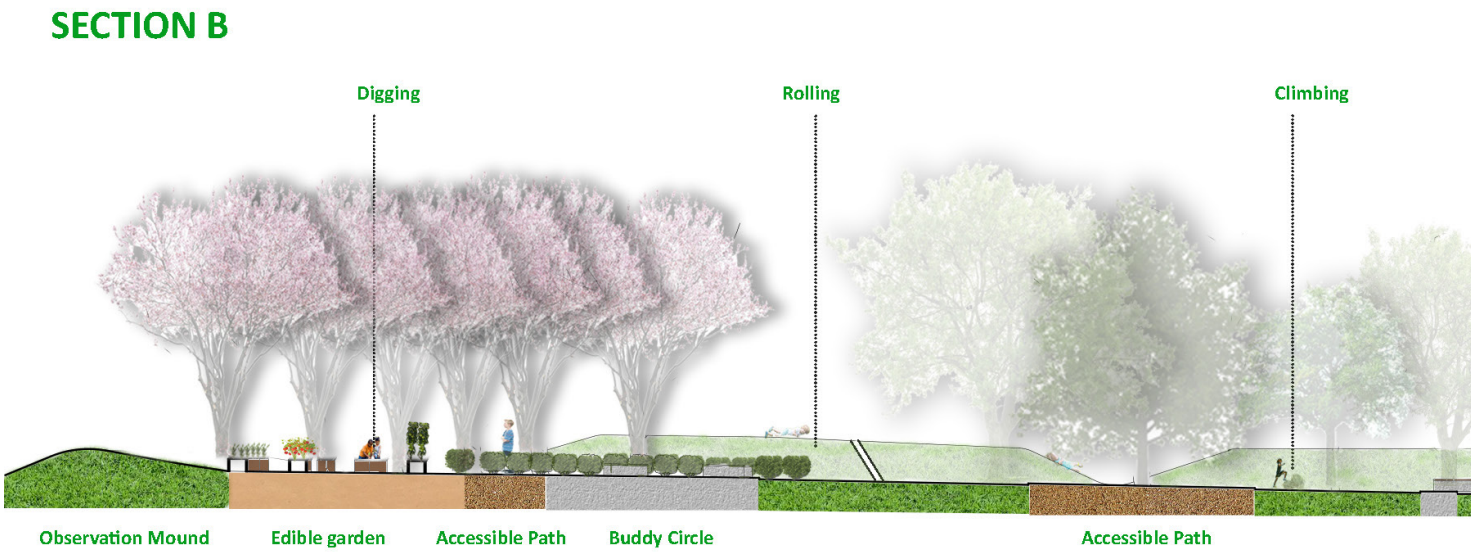
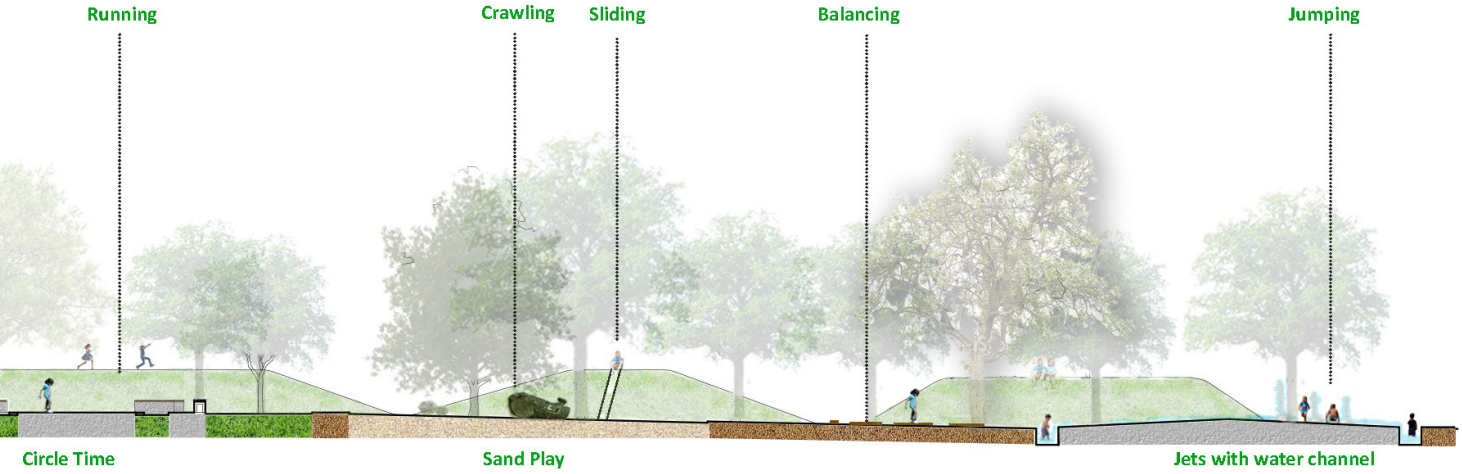


Figure 72 : Section thru play areas

The above section illustrates how landscape element have been utilized to allow children to engage in different activities such gardening, rolling,climbing,sliding & walking in stione runnel.

Land form seen in the background of the section creates an stronger boundary for the playground.



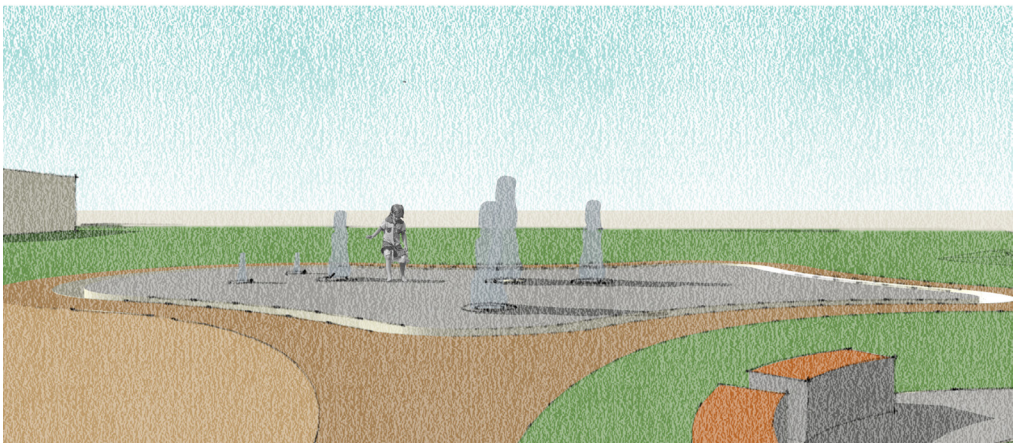


Figure 73 : Sketch of water play area

CROSS THE THRESHOLD

ASD children have their routine and order that they prefer to follow. Transitioning from one space to another or from one space to another or moving into a new environment can be overwhelming. In particular, transition between inside and outside and between 'class time' and 'play time'.

Transitions can be difficult with ASD children if their transition into a new space is not gradual and also if the boundaries are unclear.

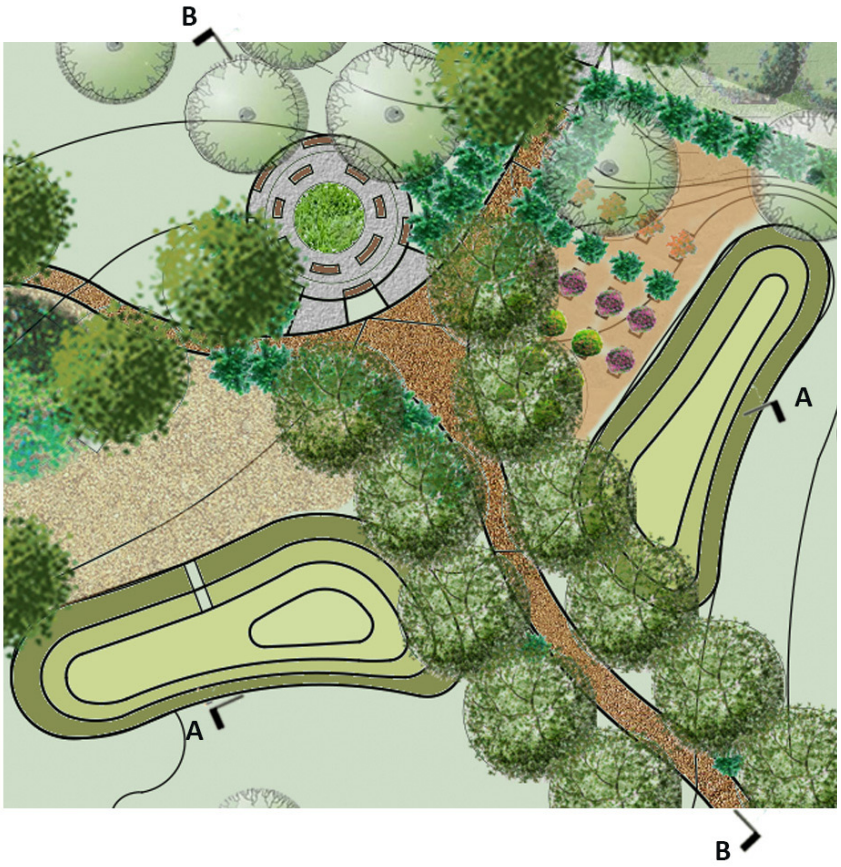


Figure 74 : Entry to play area plan

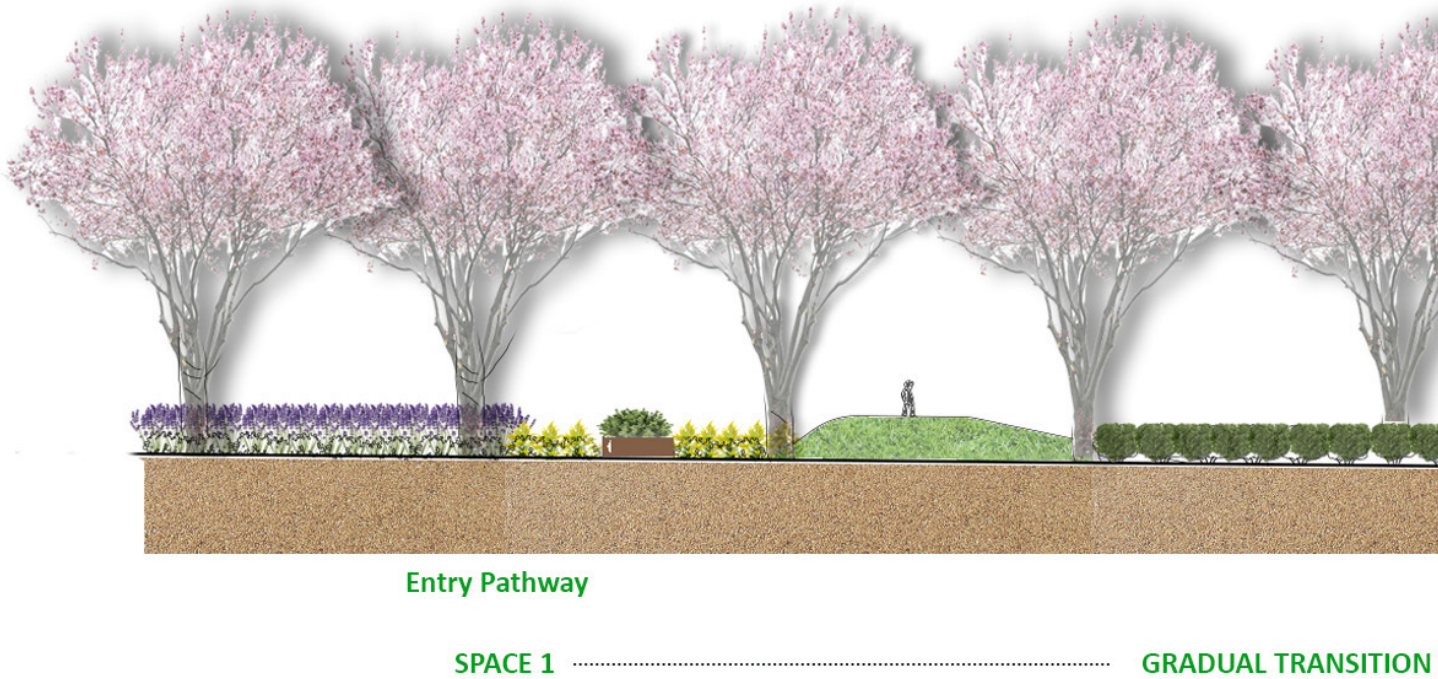


Figure 76 : Section thru entrance area to play area



Figure 75 : Section thru entry play mounds



SPACE 2

PLANTING PLAN & MATERIALS

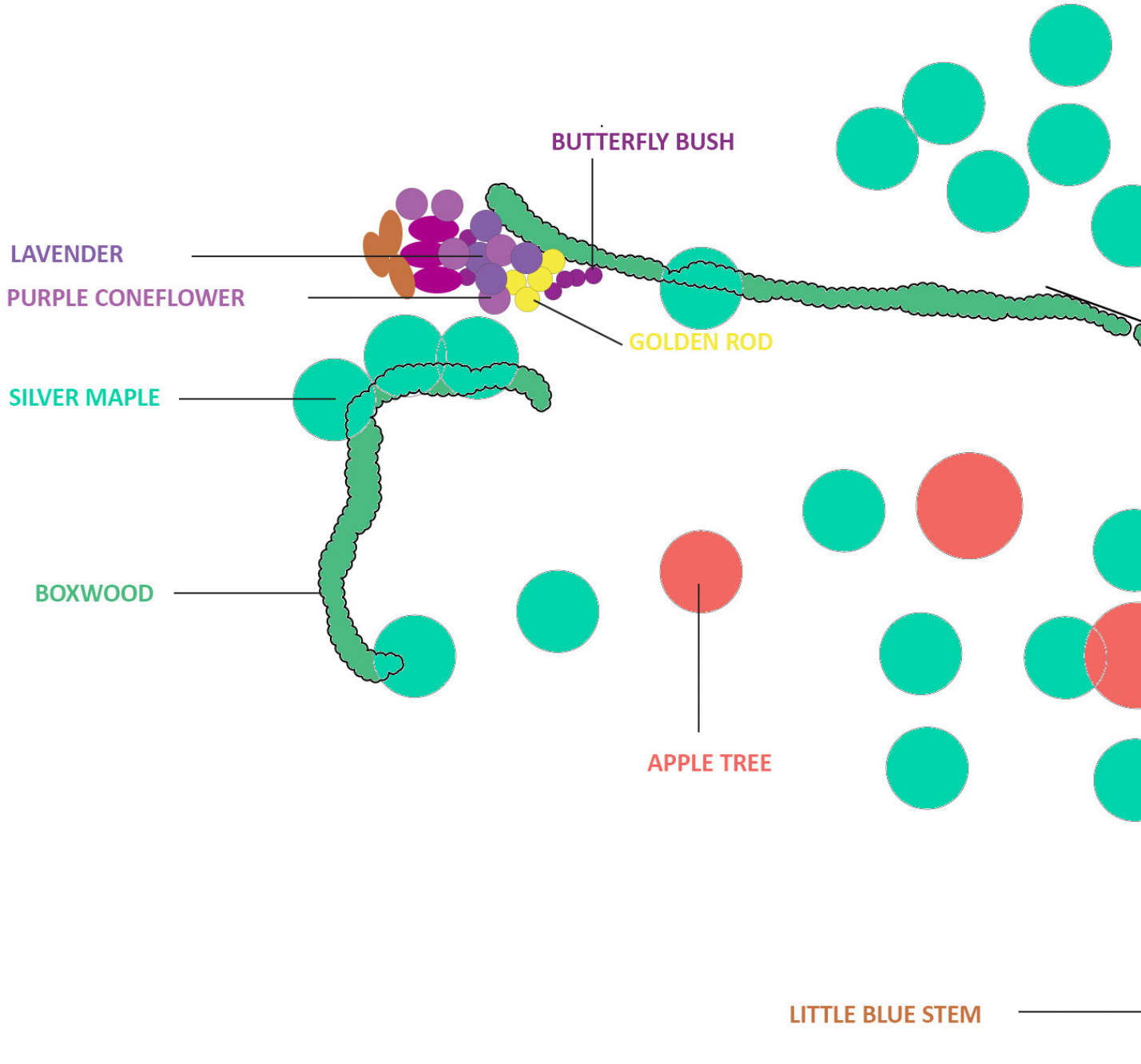
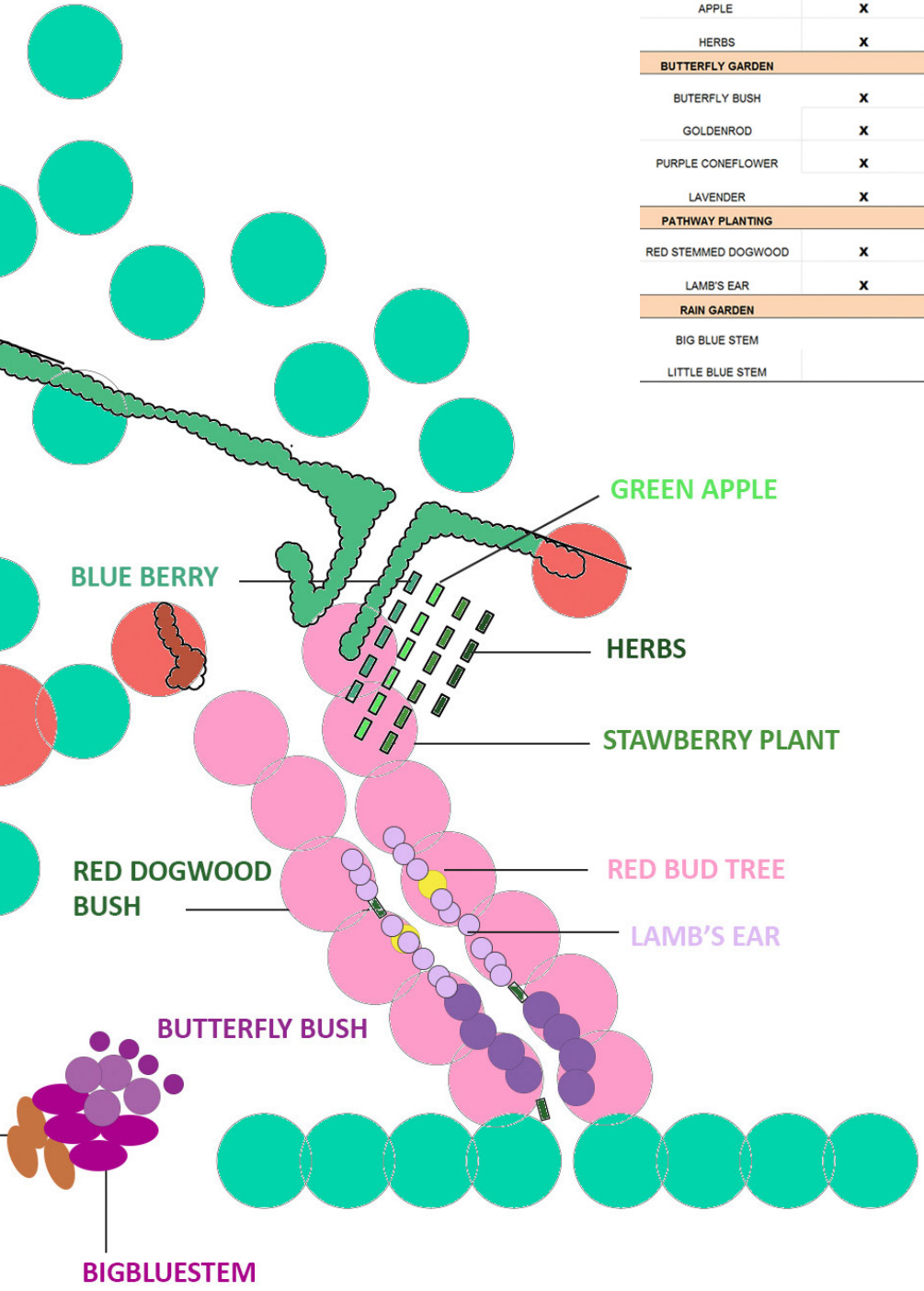


Figure 77 : Proposed planting design

PLANT MATERIAL

	SIGHT	TOUCH	SOUND	SCENT	TASTE
TREES					
RED BUD	X	X			
SILVER MAPLE	X		X		
APPLE	X			X	X
EDIBLE PLANTS					
STRAWBERRY	X	X		X	X
BLUEBERRY	X	X		X	X
APPLE	X	X		X	X
HERBS	X	X		X	X
BUTTERFLY GARDEN					
BUTERFLY BUSH	X	X	X	X	
GOLDENROD	X			X	
PURPLE CONEFLOWER	X			X	
LAVENDER	X	X		X	
PATHWAY PLANTING					
RED STEMMED DOGWOOD	X	X	X		
LAMB'S EAR	X	X			
RAIN GARDEN					
BIG BLUE STEM		X	X		
LITTLE BLUE STEM		X	X		



BOUNDARIES

Clear boundaries in a playground provide a balance between spaces, ensuring the transition between spaces are not abrupt for kids with ASD.

There are different boundaries options which includes the use of changes in levels, ground surface materials and colours. But important part is proper placement of boundaries which are vital to encourage free play which help both kids and adults to be comfort in their zone.

Drawing on the right shows the different boundaries and their location on the playground.

Defining clear boundaries encoiurages free play and a create safe environment for Autisic children to learn and grow.

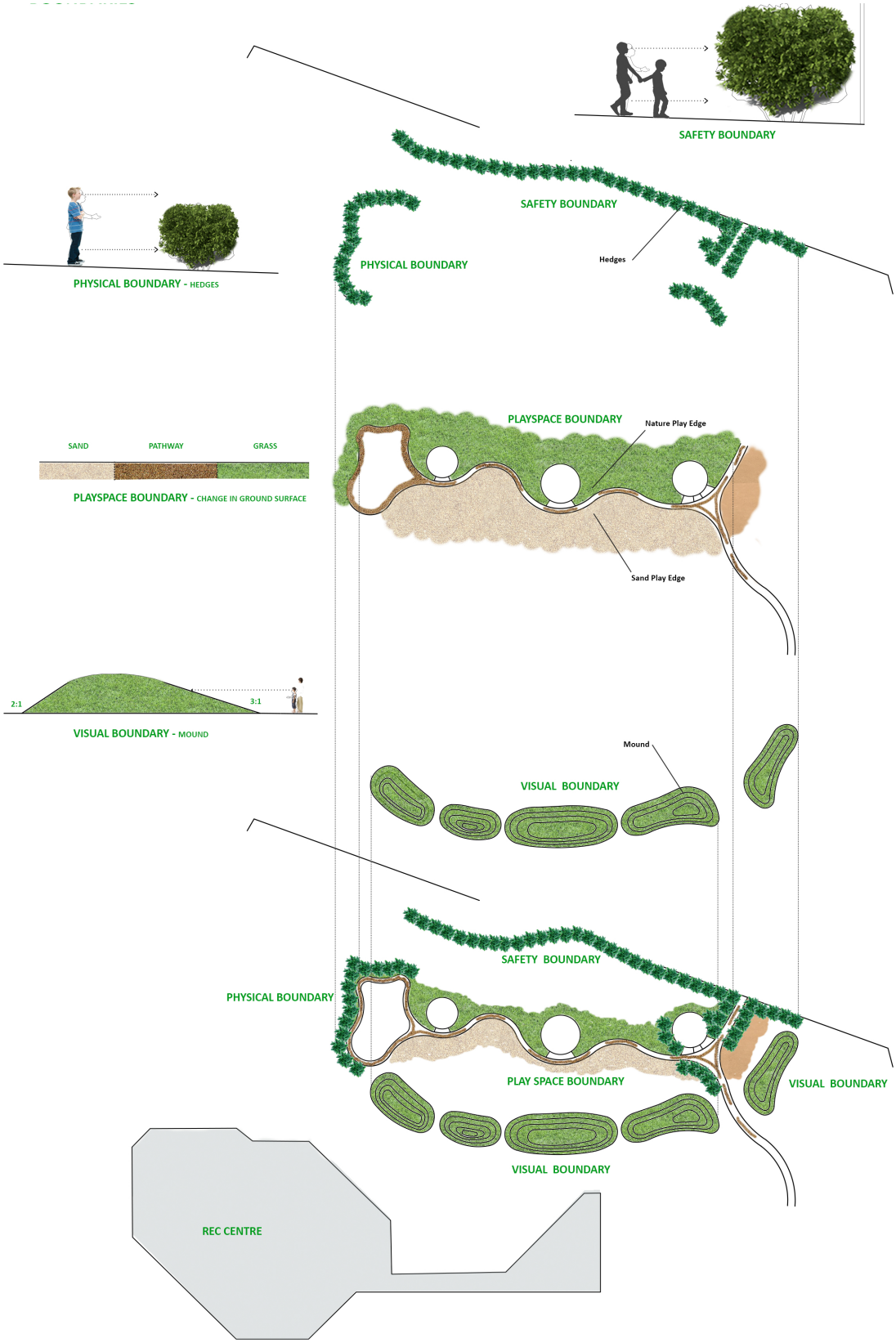


Figure 78 : Proposed different boundaries

ALTERATION SPACES

Alteration spaces provides opporunities to pause between activities and sit away from traffic movement when kids get overwhelmed.

There are three different alteration spaces located at the center of the playground which offers small opporunities to play and connect with other kids and also offers opporunities for localized views into adjacent spaces in the playground.

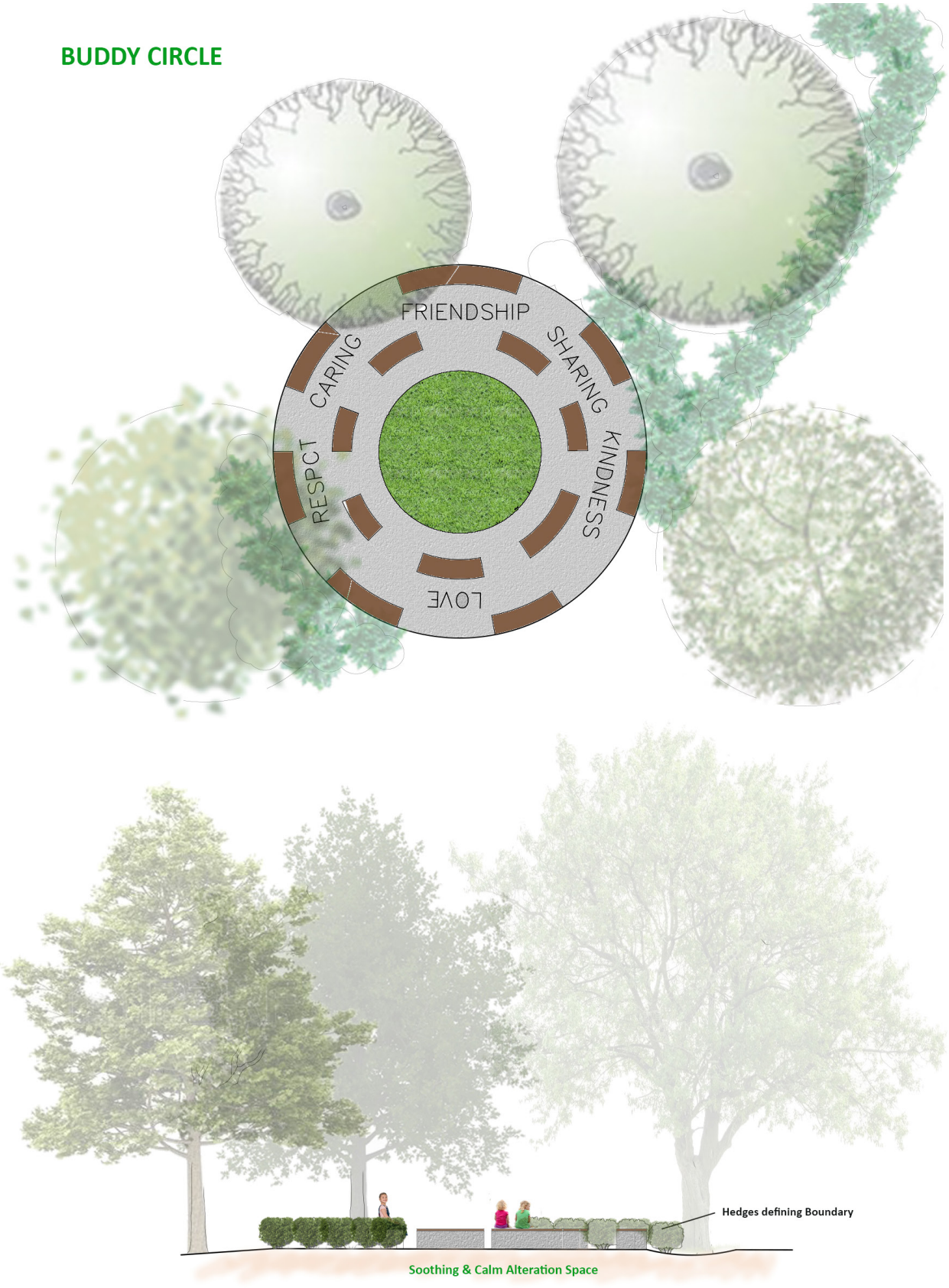


Figure 79 : Buddy circle - plan & section

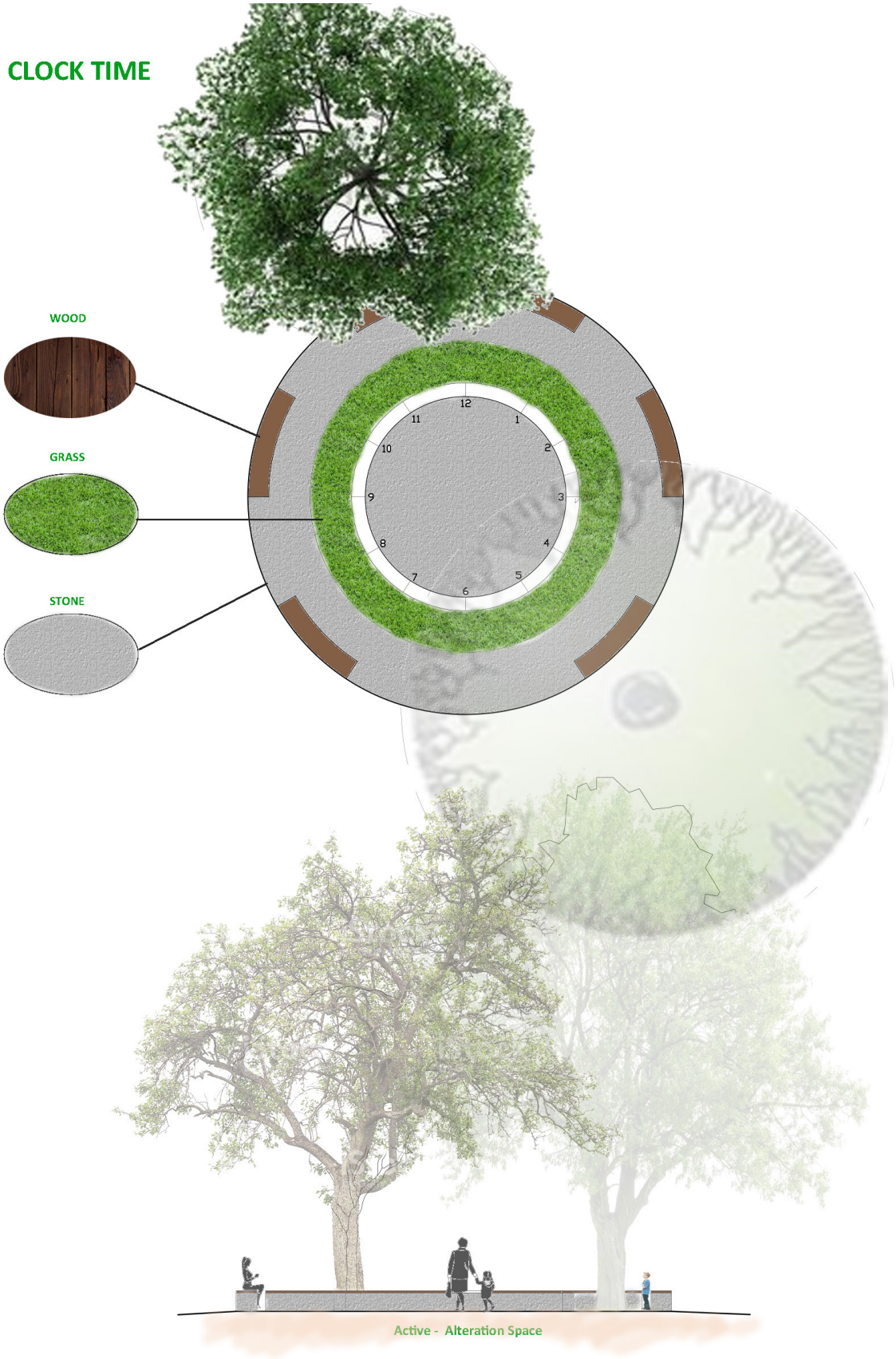


Figure 80 : Clock time - plan & section

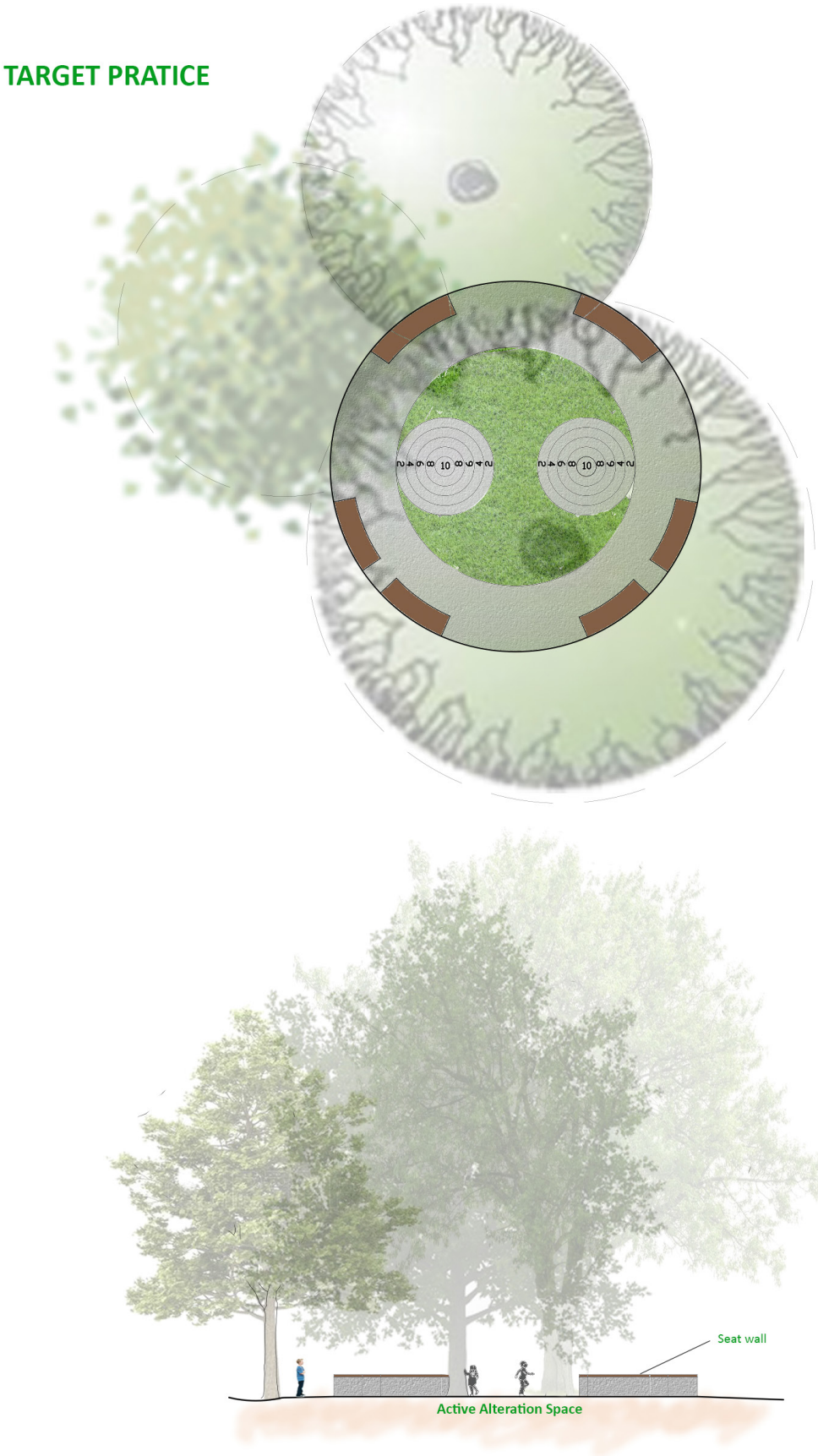
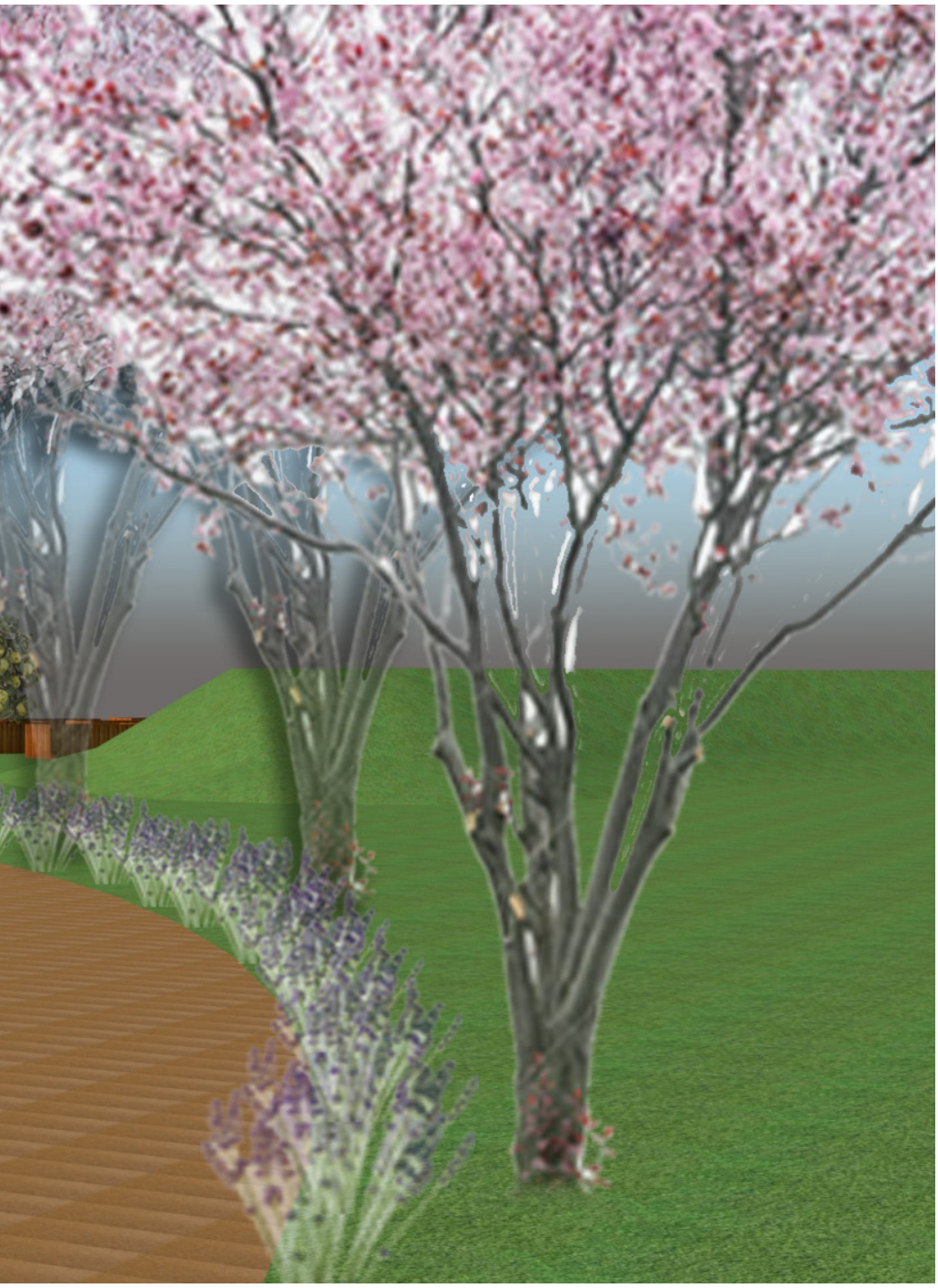


Figure 81 : Target Practice - plan & section

ENTRY PATHWAY



Figure 82 : View of Entry pathway to play area



There is a wide range of native plants on both sides of the entry pathway. This provides a sensory experience for Autisic kids

This design invites children to touch and feel the plants which distracts them from getting overwhelmed from things happening around them.

BUDDY CIRCLE & QUIET AREA



Figure 83 : View from the entry pathway to play area



Buddy circle is for kids who feel lonely and excluded can stand or sit within the space, signaling to other children that they need a buddy to connect.

The space is designed with different materials and with appealing graphics on the surfaces that express friendship, kindness, respect, sharing and love and turn them into social heroes.

NATURE PLAY AREA

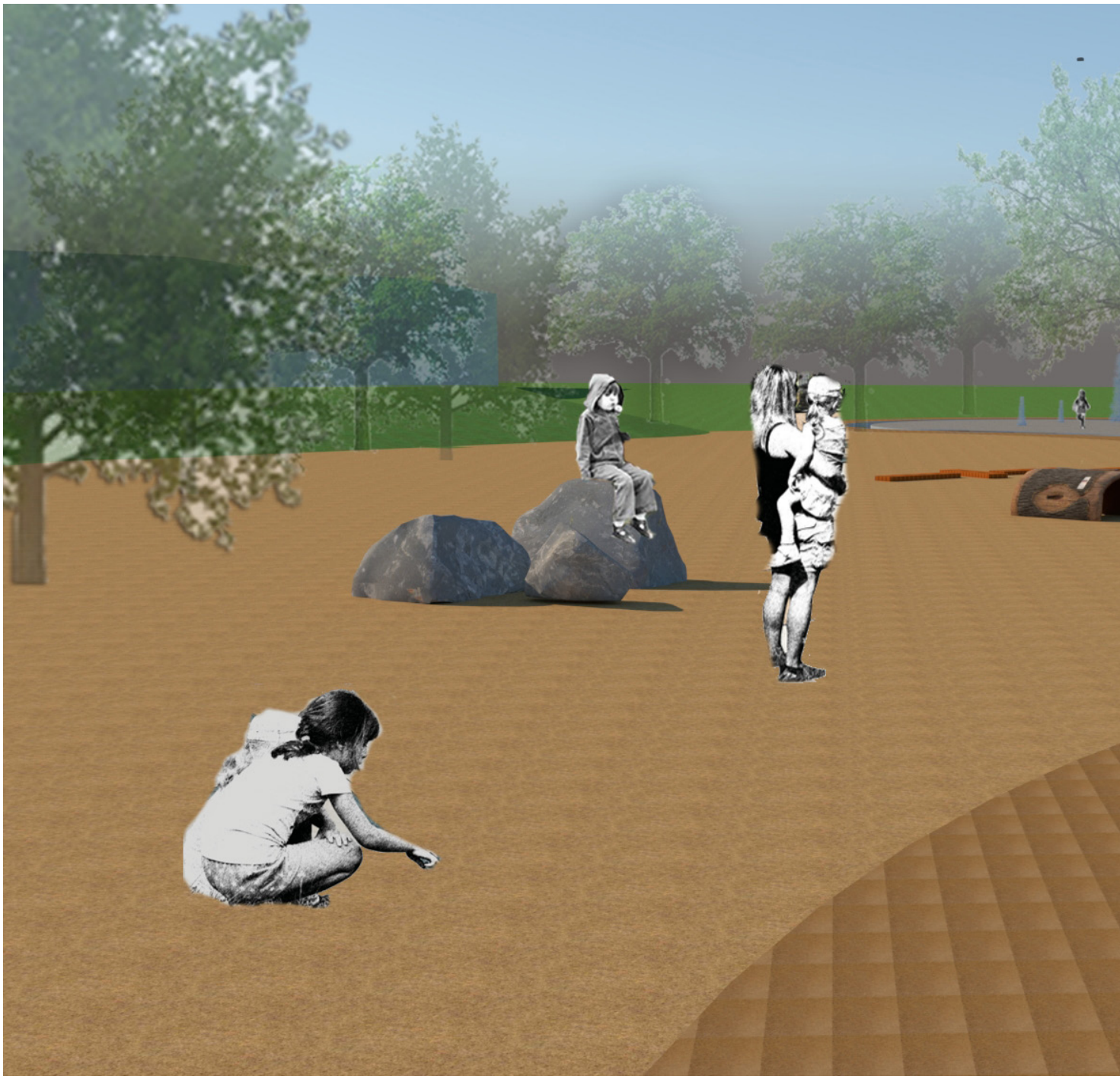


Figure 84 : View of the sand area



Sand play area is a natural play area that provides a multi sensory experience for children.

The play area provides Opporni-ties to touch, feel, climb, crawl and roll. Children can also have fun with interactive jets and the water channel.

RAINGARDEN

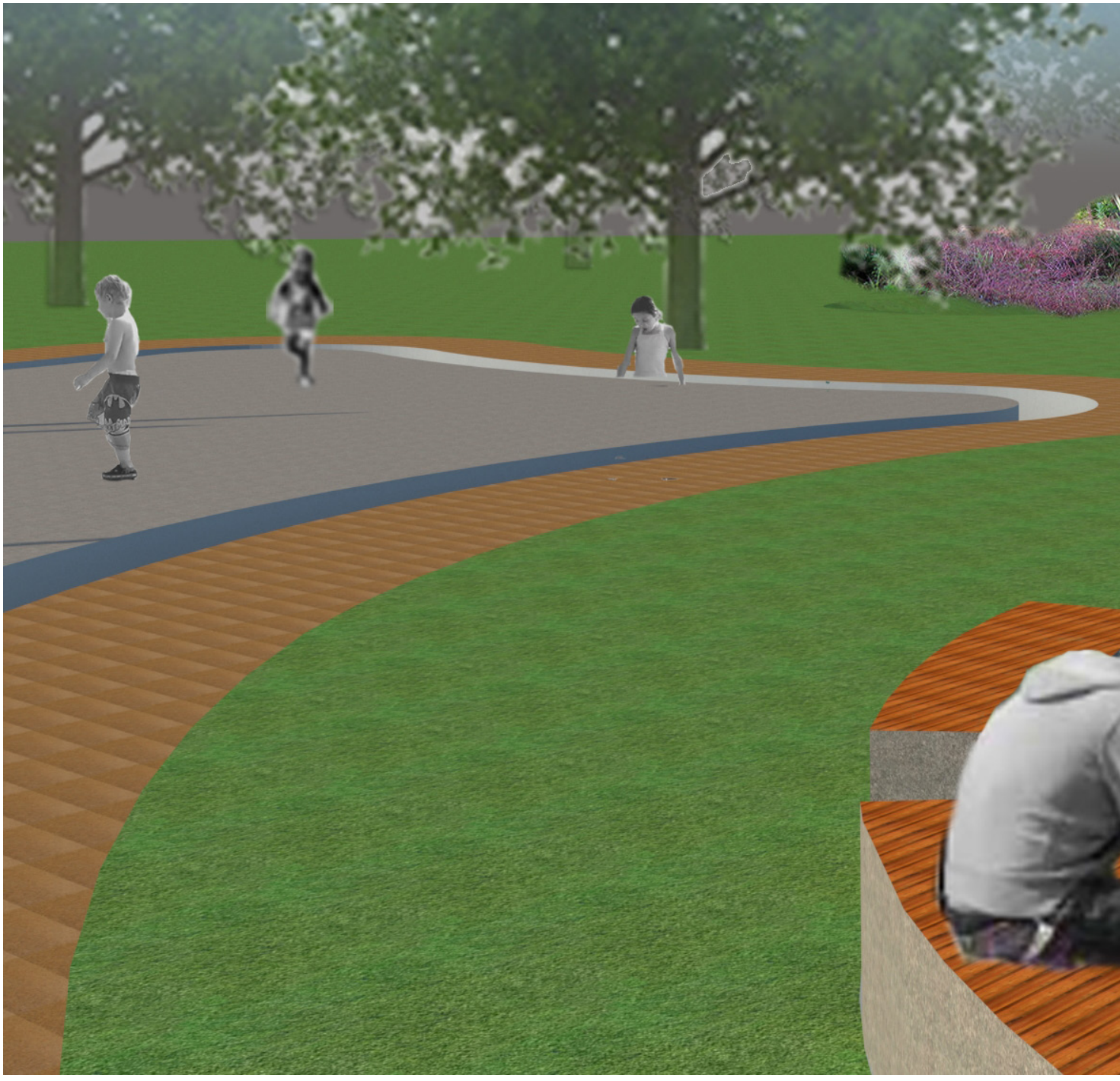


Figure 85 : View of rain garden from target practice space



Rain garden in the northwest corner of the playground provides opporunties for children to discover & learn about nature.

C H A P T E R S E V E N

CONCLUSION

7

CONCLUSION

Play is vital to a child's development. Play is even more important for children with disabilities.

I began my thesis work with the intention of designing a play space to help special needs children overcome their fear of using traditional play equipment. My initial goal was to help special needs children gain confidence with use of play structures so that they can transition to playing with children in community playgrounds. However, upon further research, I realized that the play environment provided by typical playgrounds in the United States is deficient in helping a child realize the full potential of play.

In this document, I argue that play spaces in the United States need to be reimagined. Play environments need to be redesigned to encompasses not just a child's physical needs but also cognitive, social, and emotional aspects. I find natural based play environments that are conducive to free play to be best suited in helping children realize the full potential of play. Nature based inclusive play spaces provide a much more challenging and diverse play experience than traditional play spaces designed with primarily man-made materials.

I challenge the notion that inclusive play spaces can be designed to be 100% inclusive to children of all disabilities. There are many disabilities affecting children. Needs of children with different disabilities are different. Designing a play space that is 100% inclusive is not possible. I recommend that designers of inclusive play areas begin by identifying target disabilities they are designing for, analyze requirements of children with such disabilities, and design play spaces according to these requirements.

For my thesis, I selected Autism as my target disability. Given requirements of Autistic kids, I wanted to design my play space by segregating different types of activities. I also wanted my play space to be comfortable and safe for free play. While working on design options for a nature based play space, I realized the significance of boundaries. By defining boundaries via use of landscape elements, I was able to successfully segregate different spaces while still maintaining a feeling of openness throughout the play space. Boundaries in my design are physical, visual, or transparent.

By selecting landscape elements to create boundaries and play structures, placing boundaries thoughtfully, and integrating the local landscape into my design, I have created a nature based play environment that is conducive to unsupervised free play, and is inclusive to Autistic children.

The framework and design considerations that I have presented here for design of nature based inclusive play spaces can be replicated to any generic play site. By employing a nature based design, and by thoughtfully integrating landscape elements, I believe that it is possible to create a rich and inclusive play environment.



CHAPTER EIGHT

CITATIONS

CITATIONS

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