

FROM RE-USE TO MULTISENSORY OUTDOOR PLAY:
INCREASING DEVELOPMENTAL OPPORTUNITIES FOR TODDLERS AND INFANTS IN
THE CHILD CARE CONTEXT

by

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ABSTRACT

This thesis explores the ways in which an outdoor play space can provide developmental opportunities for children aged twelve to thirty-six months. This exploration begins by observing one group of toddlers at play in two contrasting types of child care spaces and analyzing the children's play. The observations, together with a description of influential studies, a literature review, field observations, and an interview with caregivers, all support the premise that the outdoor space does have a significant impact on child development. The final outcome of the study is the design of an outdoor play space that reflects the research and promotes the child's social, cognitive, physical, and emotional growth.

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1. Introduction

A growing number of families in British Columbia depend on child care. The population of children in licensed centre based care is increasing rapidly, especially for those under three years of age. According to British Columbia Provincial Child Care Surveys, in 1997 there were 2,965 spaces for children under three and in 2001 it increased to 3,744 spaces (Friendly et al., 1998, 2001). The important role of child care in a family's life becomes even more evident when the number of children in care is considered together with the number of hours each individual child could potentially spend in a child care setting. For an infant entering into child care, he or she could spend a total up to 12,000 hours in a centre, which is more than time spent in elementary and high school combined (Greenman, 2001). Given these numbers, it is critical to understand how the physical child care environment supports a child's development.

It is understood that the physical environment has an important influence on child development (Wachs, 1989). However, research based literature on the role of the outdoors in child development is sparse (Striniste and Moore, 1989). In addition to the lack of research on the outdoors, existing outdoor spaces in child care centres fail to stimulate children over the days and years that they spend in care. According to the executive director of one of the largest providers of child care in Vancouver, many of the existing outdoor play spaces, do not challenge the children and are unable to sustain their interest over time (Menzer, 2003).ⁱ It is clear there is a need for more research and better design grounded in an understanding of children's play and development.

2. Thesis Goal

This thesis aims to contribute to a growing body of research concerning the relationship between child development and the outdoor play space. The goal of this paper is to design an outdoor play space that provides additional opportunities for child development than what currently exist in the space. I ask, how can the outdoor play space at a child care centre be designed to offer more varied types of development? Other studies have asked a similar question and have shown that the outdoor play space in child care centres can have a significant impact on the child's development.

2.1 Influential research

Influential research that explores the relationship between a child's development and their outdoor play space include The Infant Garden (1997), the From Yard to Garden Project (1998), and the Outside Criteria Study (2005). Varying in method and contexts, these projects ask how can the child's outdoor play space provide additional opportunities for child development and what developmental opportunities

exist for children in their outdoor play space. These studies support the goal of this project as well as guide the development of the site selection criteria and methodology framework.

2.1.1 Infant Garden

The Infant Garden Project at the University of California Davis compares the play of infants before and after the construction of a design by Susan Herrington. The yard is designed based on “the premise that a landscape can comprehensively support the four domains (physical, cognitive, social, emotional) essential to the development of young children”(Herrington 1997, p.152). Plant material and landforms were used to create an outdoor play space that would provide additional opportunities for the children then what their current conditions provided. Sarah Jane Neville (Department of Applied Behavioral Science) compared where the infants played, the types of manipulation and locomotion, and interactions with objects, peers, and caregivers (Herrington 1997, p.157) before and after the implementation of the design. The comparison of the infants play before and after construction, found that statistically there were “significant differences between the use of the previous play yard and the Infant Garden” (Herrington 1997, p.157). “Children used more of the space, more varied, more complex manipulations took place, there was less sitting, more associative play with the caregiver, and more interaction with natural material” (Herrington 1997, p.157).

2.1.2 From Yard to Garden

Similarly, the From Yard to Garden Project showed significant differences in children’s play before and after permanent landscape elements were installed. Two yards at the Child Development Laboratory at Iowa State University were the study sites for Susan Herrington and Ken Studtmann. This qualitative study asks “What natural materials and conditions of the outdoor environment can contribute to the development of young children ranging from 2 to 6 years old?” (Herrington & Studtmann 1998, p.191). To explore this question, two phases of temporary and permanent landscape interventions were introduced to the existing equipment based yards. As with the Infant Garden Project, children were observed both before and after each phase of the landscape installation. The designers and researchers found that using a ‘landscape-based’ approach did encourage different types of development, especially when permanent interventions were introduced to the yard (Herrington & Studtmann, 1998).

2.1.3 *Outside Criteria Study*

The Outside Criteria Study describes and evaluates sixteen sample outdoor play spaces at child care centres within Vancouver with Susan Herrington being the principal investigator.ⁱⁱⁱ The sample centres are chosen according to geographic location, age of the outdoor space, and willingness to participate. The study is based on the principle that the outdoors has an important role to play in child development. The researchers ask, "What are the precise outdoor physical factors that contribute to early childhood development and quality play at child care centres, and to what degree do these factors currently exist at the centres under study?" (Herrington et al., 2004). The principal investigator and the graduate students have found that the physical conditions of the child care outdoor play space does have a significant impact on children's play and development.

Each of these studies uses comparative analysis to observe children's play in altered or contrasting outdoor play spaces. Given the central theme of comparison to illustrate the role of the outdoor play space in child development, I chose two sites that allowed for a comparison of a group of children playing in two different types of outdoor play spaces.

2.2 *Site selection criteria*

Below I list six key site selection attributes:

1. The study sites are licensed centres.
2. The centres are a lab type of environment similar to the Infant Garden and the Yard to Garden project. In this setting the children are accustomed to participating in research and the population of families and children would be consistent over the study period.
3. The study sites allow for a comparison of children playing in two different types of outdoor play spaces to minimize the chance of novelty by using two spaces familiar to the children.
4. Both programs have a philosophy of care that emphasizes developmentally and individually appropriate practice with the outdoors being a part of the daily routine.
5. Choose sites that are representative of the types of spaces and age groups that are studied by the Outside Criteria Study.
6. One site is the primary study site, which is the subject of the design. The children from the primary study site are observed in both their own setting and the secondary site space.

Sitka and Lilliput Child Care Centres on the University of British Columbia campus meet this criterion.

2.3 *Study sites*

2.3.1 *Licensed child care history on campus*

The child care centres at the University have a long history of providing licensed care for children on campus, beginning in 1967 with the first centre. Parents created a non-profit society under the Provincial Child Care Act called UBC Kindercare Society and operated four child care programs in the renovated World War Two Army Huts on Acadia Road. They operated independent of the university administration until the fire marshal declared the wooden structures a fire hazard and structurally deficient. Despite a struggle to raise the needed funds for a new facility, in 1989 the construction of the current facility was complete.

2.3.2 *Lab environment*

In 1991, after the new facility was built, UBC started managing the child care services and it is now an ancillary operation with Housing and Conferences. The child care centre maintains a policy to maximize access to care for university staff, students, alumni, and other families associated with the university. Also, students and professors at the university who are interested in young children and families often choose the Child Care Centre as a research site. UBC Child Care encapsulates a total of seventeen centre based licensed programs for children ages 4 months to 12 years which serve over four hundred university affiliated families per year.

2.3.3 *Two different types of outdoor play spaces*

During my initial tour of the child care centres it was clear that Sitka would be one of the sites for this project, because of its contrast to the other UBC spaces I visited. At first it appeared to be “blank slate” with an open grassy area and its minimal vegetation pushed to the edges of the space. During this first visit to Sitka, toys were scattered throughout and children were pushing cars back and forth along the cement sidewalk in front of the building. This lack of spatial definition and abundance of toys was not seen in other UBC spaces. The second study site is Lilliput, chosen as representative of the typical UBC outdoor space. These two sites create an ideal comparison because of the striking difference in physical landscape. In addition, the children from Sitka are accustomed to playing in Lilliput’s outdoor play space so the influence of novelty is low.

The majority of the UBC Child Care outdoor play spaces were built and designed by Robert DeGros in the late 1980’s. DeGros received a bachelor of Landscape Architecture from the University of British Columbia and his four children attended the day care at the old army hut site. He “was well acquainted

with the flavour and spirit of the old centers and familiar with staff and their partnership with the parents” (Warrner, 1995, p.7). In an article in Child Care Information Exchange, DeGros describes the design intent and materials:

“Our purpose was to create zones and play spaces, back-eddies for children to get into – so they can enter their own little world and get lost in a magical corner of the garden...Rocks, wood, and plants should be something for your eyes to feast on—to allow you to reflect. Natural materials have a calming effect, a meditative influence. They allow your eye to come rest, and your brain to slow down and focus inwards”(1995).

Although Rob DeGros provided the original designs and concepts, families and staff have rebuilt, maintained, and added to the centres. There has been a great deal of participation and commitment to develop the spaces into what they are today (Warner, 1995). This has contributed to the character and unique qualities of each of the spaces.

2.3.4 *Program philosophy*

Both Sitka and Lilliput have children enrolled full time and part time care that is available every weekday from 8:00 am to 5:00 pm. As part of the daily schedule, the children play outside twice a day for an hour and a half, with a total of approximately three hours a day spent outside. Refer to Index A for a detailed schedule of Sitka’s daily routine. The daily activities and routines are guided by an overarching philosophy of respect for the uniqueness and individual development of the child. The following excerpt from the Lilliput Parent Handbook illustrates the developmentally appropriate care delivered by the centre:

We recognize and appreciate the fact that every child is different with her/his own special needs. Each child is encouraged to explore and develop her/his own interests through creative activities, as well as group activities. In maintaining an atmosphere of respect, warmth, predictability, and encouragement, we attempt to create a safe environment where children learn to trust their abilities and extend their limits. In these ways, we foster the development of a strong and healthy sense of self in each child. (University of British Columbia Child Care Services, 2004)

Sitka also shares Lilliput’s child centred approach to care. The commitment to respectful and developmentally appropriate care contributes to the suitability of these sites as the study sites for this project.

2.3.5 *Connection to Outside Criteria Study*

Both of the spaces are intended for young children between the ages of 12-36 monthsⁱⁱⁱ, which is representative of the age groups participating in the Outside Criteria Study. Sitka and Lilliput also illustrate two types of spaces involved in the study. Lilliput is an organic type of outdoor space and Sitka is a re-use space type of space. These terms are defined in Section 3.5 of this text.

2.3.6 *Primary and secondary study sites*

Based on the assumption that Lilliput offers more opportunities for children's development, Sitka was chosen to be the primary study site. Therefore, the Sitka children are observed in playing in Lilliput as well as their own space and Sitka is the subject of the design.

3. **Methodology**

Several methods of inquiry are used to compare what developmental opportunities exist in these two spaces. The methodology is designed to answer the following research questions:

What physical conditions in the outdoor space create opportunities for children's play and development?

What could be changed in the outdoor play space to create additional opportunities for children's play and development?

Methods of inquiry include: a literature review, summary of findings from the Outside Criteria Study, field observations of two spaces, a focused interview with Sitka child care staff, and a videotaped documentation of children's play in the two spaces.

3.1 *Literature review*

A review of relevant literature informs the analysis of findings.

3.2 *Outside Criteria Study findings*

The key findings from the Outside Criteria Study form a set of criteria referred to as the Seven Cs. This criteria is based on the evaluation of sample child care centres in Vancouver and a literature review.

3.3 *Field observations*

The field observation form is an evaluative tool developed for the Outside Criteria Study in the summer of 2003. It has been used to document the physical conditions of the sixteen child care centres involved in the study. The form documents the physical conditions of Sitka and Lilliput through the use of a checklist, plan view drawings, and photographs taken at both the adult and child's height.

3.4 *Focused interview with staff*

Interviews with staff are used by the Outside Criteria Study to gain insight into children's play outside that may not be captured during the videotaping sessions.

A one hour interview with caregivers at Sitka asked questions approved by the Ethics Review Board at the University of British Columbia. During the interview the staff were asked:

What do you like about your outdoor space?

What do you dislike about your outdoor space?

What do the children like best?

What do they dislike?

What would you change about your outdoor space if you could?

Are there any seasonal differences in the way the children use the space?

The answers to their questions were recorded on large sheets of paper during the interview and were transcribed for analysis.

3.5 *Comparison of children's play in two different outdoor spaces through videotaped documentation and field notes*

The From Yard to Garden Project used video documentation and field notes to compare the children's responses to the physical changes in their outdoor spaces. Field notes were made by researchers that recorded anecdotal observations, time of day, weather conditions, teachers and students present. The children's play was recorded through use of video as it naturally occurred in spring, summer, and in the fall. Video documentation followed a child for 20 minutes as they moved throughout the yard in free play time for an hour session. These methods led to rich narratives of the children's play that provided conclusive evidence of the effectiveness of the 'landscape-based' approach creating developmental opportunities. The Infant Garden also used videotaping and observation of children's play, but instead

used a quantitative approach of coding play behaviours. This project will follow the From Yard to Garden Project model of data collection and analysis in order to fill the need for more descriptive studies of children's play in their daily environment and activities (Pellegrini & Smith, 1998).

Rather than comparing children's play in a "before and after" scenario as seen in the From Yard to Garden Project and the Infant Garden, I will be comparing one group of children in two contrasting types of outdoor play spaces. Sitka is an example of the re-use type of space. In this setting, a child care operator moves into an available space that was not originally built to house child care. The operator and staff are left with the challenge to adapt the environment to fit with their detailed programmatic needs (Herrington & Lesmeister, 2005). Sometimes the spaces are adapted with permanent equipment, but often are characterized by the lack of design and the reliance upon the staff to set up activity areas for the children using toys and other loose parts (Herrington & Lesmeister, 2005). These types of sites have been found in low density neighbourhood settings and the age of the spaces varies across the city (Herrington & Lesmeister, 2005).

In contrast, Lilliput is an example of an organic type of outdoor space most commonly built in the seventies and eighties. Organic spaces use plant material for spatial definition, include paths that weave through the space, and change with the seasons (Herrington & Lesmeister, 2005). The Outside Criteria Study has found that these types of environments "contain unique physical features and offer varied types of play experiences" (Herrington et al., 2004).

This thesis records the children from Sitka playing in their own space in cold/rainy weather and warm/sunny weather to account for the seasonal changes that may affect on the children's use of the space. The children from Sitka also recorded in Lilliput playing in cold/rainy weather and warm/sunny weather. The duration of the taping session varied from a half hour to an hour depending on the programming needs of the staff and the children. The taping sessions occurred in the following months:

January 2005:

Sitka children in their space on three separate sessions

Sitka children in Lilliput space on three separate sessions

July 2005:

Sitka children in their space on three separate sessions

Sitka children in Lilliput space on three separate sessions

Over this seven month time span, it is not only the physical environment that is influencing the children's play. The children are changing and developing rapidly, which influences how they play during the

videotaping sessions. Other changes during this period include new children enrolling in the centre as well as changes in staff. However, the general age range of the group, socio-economic status of families, and care giving philosophy remains the same.

Another possible influence is the ratio of space per child. The numbers of children vary from one play session to the next depending on attendance and programming. For instance, some days during taping the caregiver would take groups of children on walks leaving only a small number of children in the outdoor space. As a result, they may be between four and twelve children playing in Sitka or Lilliput. Taping occurred consistently between 9:30 and 11:30 am.

Researchers took field notes to record anecdotal observations, time of day, weather conditions, teachers and students present. Field notes were also taken during the video recording session for this study.

Another graduate student and myself were present during the video recording sessions and notes were taken that describe individual children's play, examples of play that may have not been captured by the camera, and descriptions of how individual children circulate through the space.

4. Findings

The following is a discussion of the key findings from the research. Analysis of these findings helped to determine the design objectives for Sitka's outdoor play space.

4.1 Literature review findings

This portion of the paper articulates some of the key theoretical orientations that contribute to shaping this project. These influential perspectives on play and child development are summarized in this section.

4.1.1 Play

When considering play theories, it is important to note that many theories describe play as a means to develop skills necessary for adulthood (Pellegrini & Smith, 1998). However, to see play as a means of developing adult skills disregards the uniqueness of the role of play in childhood. Play is not an "incomplete or imperfect version of adult behaviour", but a unique expression "beneficial to the specific niche of childhood" (Pellegrini & Smith, 1998). The following descriptions of influential theories on social and cognitive play are considered from this perspective.

Social play is often described by using Parten's categorization of social play. Social play is divided into four different categories: solitary, parallel, associative, and cooperative. When a child is playing independent of other children without any attempts to engage or communicate with others they are engaged in solitary play (Henninger 1985, Winters 1985). Parallel or proximal play involves two or more children close by, independently engaged in a similar activity, and occasionally looking at each other or mimicking each other's behaviours (Henninger 1985, Winters 1985). Associative or complementary play involves a group of children deciding upon roles together and acting them out without responding to the rest of the group's behaviour (Henninger 1985, Winters 1985). The last stage is cooperative play where a child initiates role play with other children and adjusts the play according to the changes in the other child's behaviour (Henninger, 1985).

Solitary, parallel, and associative play categories were used in the Infant Garden as part of a large list of behaviour codes used by the researchers (Herrington, 1997). This study also used aspects of Piaget's cognitive play categories and the child's conception of space to create a framework for observing children's play. According to Piaget, children in the first two years of their life are in the Sensorimotor stage of their development (Piaget, 1972). During this stage, there is "an organization of movements and displacements which, first centered on the body itself, gradually decentralize and lead to a space in which the child situates himself like an element among others"(Piaget 1972, p.54). It is after this stage that a child enters into the Subperiod of Preoperatory Representations. In this stage of development, from two to four years old, there is the appearance of symbolic function such as language, symbolic or imaginative play (Piaget, 1972). Refer to Index C for a description of Piaget's cognitive play categories.

4.1.2 Child development

According to early childhood development theory, there are several overlapping child developmental domains. These realms include social, emotional, cognitive, and physical development. There are recognizable stages to child's development that are related to their age. However, it is also understood that a child's development is unique to the individual.

It has been shown that environments must be developmentally appropriate in order to create a healthy place for children to learn. Developmentally appropriate practice is defined as an environment that "provides for active exploration and concrete experiences"(Burts et al. 1992, p.298). It is loosely based on "cognitive developmental theory espousing that children construct knowledge through interaction with peers and their environment"(Burts et al. 1992, p. 298). It has been found that there is more overall stress exhibited by children in developmentally inappropriate classrooms than by children in appropriate

classrooms (Burts et al., 1992). Hence, developmentally inappropriate practice and environments are seen as potentially harmful to young children (Burts et al., 1992).

During an informal interview, the supervisor at Sitka was asked how she would describe the age group of the children in her care. The following is Shelley's description:

The children show flares of interest and learning. There are extremes in their temperament and emotions, ranging from tentative and watchful to exuberant. At times it is hard to predict what their temperament will be from one day or moment to the next. This creates a need to be able to balance the extremes in their emotions and learning. They also need the freedom to be expressive. The environment has a huge impact on how these children play. There must be enough to challenge, sustain play, and capture their interest. Also, they need the stability, consistency and nurturing from the people around them and their environment. They need to be safe, secure, stimulated, and loved unconditionally in order to promote healthy growth (Essau, 2005).

Shelley's response highlights the important role of the environment in child care. It also provides a clear picture of the needs of these children at this stage in their development.

Between twelve to thirty six months children are changing rapidly in all areas of their development. They are becoming confident with walking, running, and jumping. They are also moving from solitary to more social types of play and using more language. Refer to Index D for a detailed list of the developmental milestones for this age group.

4.2 *Outside Criteria Project Findings^{iv}*

The Seven Cs Criteria is the result of a sample study of sixteen outdoor play spaces in Vancouver and a review of relevant literature. Sites were selected based on their geographic location within the City of Vancouver, representation of architectural type, and willingness to participate (Herrington & Lesmeister, 2005). The methods used to evaluate each of the outdoor spaces include a field observation, an hour long interview with child care staff, and videotaped observations of the children playing in their space in both rainy and sunny conditions. The criterion includes character, context, connectivity, change, chance, clarity, and challenge (Herrington & Lesmeister, 2005).

Character refers to the overall feel of the outdoor play space and the design intent (Herrington & Lesmeister, 2005). As the researchers began to note the design intent and overall feel of the spaces, certain types began to emerge. They noted that the outdoor play spaces that were observed were similar

to the four architectural types described by Mark Dudek. The Education Design Group Founder noted that it was possible to identify late modern, organic, metaphor, and modular types of architecture for young children (Dudek, 2001, Herrington & Lesmeister, 2005). To this list of types, the researchers also added re-use which is a type of child care space that was not built with the original intent to house child care (Herrington & Lesmeister 2005, p.7).

The geographic location plays a role in shaping the context of the play space, but the researchers also noted several other influences. The amount of children playing in a space relative to its size, micro climatic conditions, degree of transparency between the play space and the surrounding context, the degrees of sun and shadow, and the relationship to grade all play a role in the centre's context (Herrington & Lesmeister, 2005).

Connectivity is the "physical, visual, and cognitive connectedness of the play space itself"(Herrington & Lesmeister 2005, p.9). Pathways play a large role in the connectivity of the space and facilitate movement through the space (Herrington & Lesmeister, 2005). Connectivity encompasses the centre's connection to the community as well (Herrington & Lesmeister, 2005).

Change describes the varying range of spatial scale and also describes how these spaces change over time (Herrington & Lesmeister, 2005). An outdoor play space that incorporates varying spatial scales facilitates different types of socialization (Herrington & Lesmeister, 2005). For example, smaller spaces often become private intimate spaces whereas larger open areas are typically used by large groups of children (Herrington & Lesmeister, 2005). How spaces change over time was often seen "expressed in vegetation and opportunities for the children to manipulate or interpret their environment" (Herrington & Lesmeister 2005, p.10).

Chance "involves an occasion that allows for something to be done; an opportunity for the child to create, manipulate, and leave an impression on the play space"(Herrington & Lesmeister, 2005, p.13). Sand areas, places to dig, loose parts, malleable material are all aspects of chance (Herrington & Lesmeister, 2005). Highlighting the importance of chance is Nicholson's article "How Not to Cheat Children: Theory of Loose Parts" written to landscape architects. He states that children's imaginations are "directly proportional to the number and kind of variables" in their environment and that "children should have the opportunity to play with space forming material in order that they may invent, construct, evaluate, and modify" on their own (Nicholson 1971, p.31).

Clarity "combines physical legibility and perceptual imageability"(Herrington & Lesmeister 2005, p.15). Boundaries, sense of place, and spatial organization all contribute to the clarity of a play space

(Herrington & Lesmeister, 2005). Greenman suggests that “clear boundaries, clear and sufficient entry and exit spaces to prevent accidents and logical placement is important” (Greenman 1988, p.190).

Challenge refers to play spaces providing both physical and cognitive challenges for the children (Herrington & Lesmeister, 2005). Challenge is critical to child’s development because “without taking risks, children cannot learn to their full potential”(Moore et. al. 1992, p.XII).

4.1 Findings from field observations

The field observation tool records the physical conditions of Sitka and Lilliput (refer to Index B). To understand the seasonal change in the space, observations were conducted in both summer and winter. As part of the field observation, I took photos of the space at both an adult level and the level of a child, sketched plan views, and microclimate diagrams. Refer to figures D4 through to D4.4 for diagrams illustrating the existing physical conditions of the space.

4.3.1 Sitka field observation: The re-use play space

Ratio of child to caregiver

There are twelve children enrolled in the program and a ratio of three children to one caregiver.

Age of building

Sitka is a recently developed program within the UBC child care services complex of buildings. The building was originally designed and built in 1989 to function as the main administration building for UBC Child Care Services. To meet the growing demand for infant and toddler child care, the inside was completely adapted to the child care program. In May 2003 Sitka Child Care opened its doors to families.

Orientation

The face of the building is oriented East. The outdoor space has a South-East orientation. Refer to figure D4.3 and D4.4 for shadow diagrams.

Drainage

Because the space was originally intended for the administration building, all of the outdoor play spaces drain into Sitka. There are two large catch basins in the space, one in a central location and the other in the corner by the shed. The swampy areas tend to be along the two longest fences and the east corner. After a heavy rain the central area fills up with water.

Size

The size of the space is 222.75 meters squared with a ratio of 18.5 meters squared per child. This is greater than the standard 130-170 meters squared per child that is recommended in the City of Vancouver Childcare Design Guidelines (1993, p.4).

Scale

The photos taken from the adult height looked the same as the photos taken at a child's level. This reveals a lack of scale differentiation for the children.

Vegetation

There is one large cedar tree and two recently planted *Acer rubrum*. The cedar branches are low to the ground which could offer opportunities for the children to climb and hang from the branches.

All other vegetation is pushed to the edges of the space or is contained in planter boxes, including flower boxes hanging from the tops of the fences. The building includes a concrete and stone planter bed at the front of the building. Staff planted a range of perennials and herbs in this area. The intent of the garden is to provide visual interest and scent and does not appear to be used by the children. There is also substantial planting at the front of the building facing the street.

At the south edge of the space along the fencing and shed, staff planted edible plants for the children. Five blueberry bushes and chive plants line this narrow ground level bed.

Pathways

The only defined pathway in the space is the main entrance to the building. This sloping concrete path is approximately meter wide. There is a drainage envelope for the building behind the planter box that may

be used as a secondary pathway by the children. Children must step up 30cm to access this dual purpose covered walkway.

Storage

The staff have access to one large storage shed and also use the sheltered side of the building to store toys at the end of the day. The shed is accessible only to adults and is a standard storage unit with cedar siding and one large lockable door.

Fixed equipment

No fixed equipment is installed in this space.

Vertical plane

High cedar fencing surrounds the space and separates Sitka from the two adjacent child care centres and Hampton Place. Holes drilled into the fencing allow the children the opportunity to view into the neighbouring yards.

The cedar tree branches and the red maple tree supports create transitory vertical planes.

Overhead plane

A section of the roof extends over the main entrance to create a "heavy" overhead plane that casts a solid, cold shadow over the concrete path and main entrance. The trees on the outside of Sitka's fence and the cedar tree create a transitory overhead plane that filters dappled light, rain, and wind. Framed between the dappled light and the solid shadow there is a band of intense sunlight. Within this exposed area, the staff set up umbrellas and tents to create shade in the summer months.

Animal habitats

No intentionally created animal habitats exist.

Dens and niches

The dominant cedar tree creates a small, secluded space amongst its low branches.

The angle of the building in relation to the surrounding fencing creates interesting corners and niches within the outdoor space.

Stones

No apparent stones, but there are some smaller rocks scattered underneath the cedar in the soil.

Sand and water

There is no sand available for children, but they do use the existing soil for digging. Holes scattered throughout the space indicate the areas where children typically dig. There are holes underneath the cedar, in the flowerbed, by the east fence, along the edge of the main concrete path, and underneath the gate to the adjacent infant care centre.

Rainwater collects along the fencing in the east area of the yard and along the south fence line. There is a water tap and hose by the main door of the building.

Seating

The ledge of the planter box is wide and high enough for seating for the caregivers. There is a long bench along the south fence. The driftwood scattered throughout the space also offers opportunities for seating.

Topography and landforms

The ground plane is slightly undulating and primarily slopes to the south.

Surface materials

Grass accounts for eighty five percent of the porous surface. The remaining fifteen percent of the porous surface is exposed dirt. The hard surfacing in the yard is primarily concrete and interlocking brick pavers.

Functional and relational spaces

The concrete path functions as the entrance way from the parking lot and sidewalk to the main door of the building. The space between the two gates functions as storage and entrance into the centre.

The planter bed relates to the windows of the face of the building but does not relate to the rest of the outdoor play space.

Microclimates

There are two distinct, opposing microclimatic conditions in this space. The areas closest to the child care centre framing the building are very warm especially in the summer afternoon sun. Shade cast from the building and the surrounding trees create cool damp areas. There seems to be minimal wind or breeze blowing through the space.

Building fenestration

The horizontal wood siding is painted light yellow. The large front windows have yellow painted metal x's attached to the outside frames.

Indoor outdoor relationship

Large windows span the height and length of the building that face into the outdoor space. This creates high visibility between the indoors and outdoors. There is a main entrance door into the centre and a secondary door on the same building face that opens to the outside. The only transitional space between the indoors and outdoors is the heavy roof line over the main entrance area.

Unifying elements

The surrounding cedar fencing and scattered driftwood bring some unity to the space.

Spatial organization

By setting up activity areas using toys and other props, the staff organize this large undefined space. However, during the children's play session, the props and loose parts move throughout the space and the organization is lost.

Seasonal expression

The vegetation along the edges and the trees that hang over the surrounding cedar fencing provide seasonal change. The drainage problems also mark the change of the Vancouver seasons.

Primary materials

Grass, wood, and plastic are the primary materials.

Relationship to the street

The building is set back several meters from the street and the outdoor play space is hidden from the street behind the building. However, some noises from the street can be heard in the outdoor space.

Community context

UBC Child Care Services are located on the south east corner of the campus on the edge of the University Endowment Lands and Pacific Spirit Regional Park, next door to Hampton Place private residences. Acadia Family Housing and University Hill Secondary School are also located in this area of the campus. This creates a high population of families and youth in the area. Acadia Family Housing was built around the same time as the child care centres and are primarily two storeys. Currently, there are new, private housing developments, pointing to an increase in the area's population.

Hampton Place dominates the views in this area of the campus. Hampton Place was built in the early nineties and covers 28 acres. Most of the child care centres are in the shadow of the buildings which stand up to 18 storeys. After Hampton Place was built, there was a significant impact on the microclimatic conditions of the outdoor spaces, drainage, and solar access. In some areas, Hampton Place is a mere 15 feet away from the child care fence which creates a feeling of the building looming over the play spaces. Often the building is partially screened from the centres by a border of trees or bamboo.

Access to the paths leading through the University Endowment Lands is located across the street from the main administration office for the child care services (2881 Acadia Road).

Neighbourhood character

Traffic calming speed bumps along Osoyoos Crescent help to create quiet streets, where families often walk with strollers or young children on bikes. Large, mature tree canopies are scattered between the housing developments and line the crescent.

Building description

The centres are designed by Larry McFarland Architects Ltd. and are built on the original site of the army huts that housed the daycare society. The buildings which line Osoyoos Crescent are low, single storey, and are reminiscent of school houses with steeply pitched roofs and painted wood siding. Each unit is painted in a light purple, yellow, or peach. The ten units are joined in two's with their own separate entrances.

Sensory impressions

Distinct differences between warm and cold are felt as one moves through the outdoor space. There is the sound of birds and construction in the background. Frequently, planes can be heard flying overhead.

External views

Through peep holes in the fencing, the children can see into the outdoor play spaces of the adjacent child care centres. They can also see into the infant centre interior rooms through a large window.

*4.3.2 Lilliput field observation: **The organic play space***

Refer to Sitka's description of the community context, relationship to the street, and description of the building.

Ratio of child to caregiver

There are twelve children enrolled in the program and a ratio of three children to one caregiver.

Age of building

The building was finished construction and open to families in 1989.

Orientation

North South building orientation with the outdoor space facing south.

Drainage

No apparent drainage concerns. A strip drain and catch basin function as the primary collectors for run off.

Size

The size of the yard is 296.28 meters squared with a ratio of 24 meters squared per child. This is greater than the standard 130-170 meters squared per child that is recommended in the City of Vancouver Childcare Design Guidelines (1993, p.4).

Scale

Photos taken from both an adult and a child perspective show a remarkable difference in the way an adult and a child experience the space. Vegetation, structures, and seating all have a distinct quality that is only visible at the child's view. By comparing the two photos, it is evident that the space is designed for a child.

Vegetation

When first entering the space, the amount and diversity of plant material leaves a great impression. Plants are used to define smaller spaces, to create shade, and to provide food for the child care centre. There are a total of eleven trees in the space ranging in type and scale. Most of the fruit trees are located on the central mound.

Shrubs and vines are used throughout the space as well. A mature Kiwi vine frames the main entry way into the centre. A honeysuckle vine twists over the trestle along the main pathway.

Also, perennials are in abundance with lilies and mint being the predominant plants.

Between the two entry gates there are planter boxes with peas, flowers and strawberries. This area has been created and maintained by the staff.

Pathways

A clearly defined pathway connects the different areas within the space. A ground plane treatment of asphalt and wood edged with logs defines the path from the surrounding grass and sand. The wood trellis frames a section of the pathway creating vertical spatial definition.

Storage

There are two custom built wooden painted storage sheds for bikes and push toys. Smaller boxes in the sand play area hold shovels and buckets. The wooden boxes built with 2x4s are low enough so that they may be accessible to children if staff remove the lids.

Fixed equipment

Custom built wooden structures provide opportunities for climbing, balancing, and sliding. Bars are also incorporated in the space for swinging. Tire stairs built into the central mound and a rope net leading to the top of the climber are the main climbing areas. There is also a small wooden custom built playhouse that is intended for dramatic play.

Vertical plane

A high cedar fence, similar to Sitka's fence, surrounds the entire yard. Children are able to peek into adjacent outdoor play spaces through the holes cut into the fence.

The fence that surrounds a portion of the grassy area is transitory and children are able to move under the upper railing of the fence.

Overhead plane

Several permanent and transitory overhead planes exist in this space. An overhead canvas canopy attached to the face of the building creates a protected area. Also, the playhouse and an area over the climber have permanent, non-permeable overhead planes. The wooden trellis over the bike path creates a permeable overhead structure. Trees and deciduous vines create transitory overhead planes.

Animal habitats

Birdhouses have been placed throughout the space.

Dens and niches

The spaces underneath the play structures create small, dark subspaces. There are also some areas that are created and screened by bamboo.

Stones

Several boulders are placed at the base of trees.

Sand and water

There is a large sand area at the south end of the play space. Sand is also used as a fall surface underneath the play structure. Outdoor water taps are located close to the building entrance and in the large sand area.

Seating

Logs, tires, and steps can be used for seating. Staff arrange child-sized chairs and tables under the canvas canopy.

Topography and landforms

There is a central mound with a slide built into the slope with a grade of approximately five percent.

Surface materials

Approximately sixty percent of the surface is porous with the dominant material being sand. Grass makes up the rest of the porous surface. The non-porous surface is primarily asphalt, with some wood.

Functional and relational spaces

The main organizing element in the space is the 'figure 8' pathway. The two circles formed by this 'figure 8' contain different areas of activity. In one circle there is a group play area, while in the other there is a grassy mound with a slide. Sand areas, storage, and small group activity areas frame the space outside the 'figure 8' pathway. The transitions between the path and the areas of activity are marked by changes in ground plane material and driftwood log borders.

Microclimates

Mature trees and shrubs create dappled light throughout eighty percent of the space. The canvas canopy that covers the main entrance creates solid shade. The central lawn receives most of the sun. Hampton Place and the mature trees shelter the space from the wind.

Building fenestration

Sanded log posts support the wood trellis. The horizontal wood siding on the building is painted light lilac.

Indoor outdoor relationship

The child care building defines two edges of the space. Windows facing into the space dominate the face of the building creating a transparent relationship between the indoor and outdoor space. Also, along this building face are double glass doors and the main entrance door. As one moves from the indoors to the outdoors, there is a transition from the overhead canopy to a vine covered arbour, and then into the sunny main gathering area. This creates a gradual transition from the indoors to the sunlight.

Spatial organization

Patches of play areas are interconnected by a continuous 'figure 8' path.

Seasonal expression

The space contains annuals, deciduous vegetation, fruiting, and flowering vegetation.

Primary materials

Wood and vegetation are the primary materials. Grass and sand are the secondary materials.

Sensory impressions

Birds can be heard in this quiet and cool space, as can distant airplane and construction sounds. The central grass area is warm and sunny with faint smells of the ripening kiwis on the vine.

External views

There are numerous peepholes for the children to look through into adjacent play spaces. From the climber and the viewing platform, children can look over the fence into the adjacent play spaces. Hampton Court dominates the views at the south end of the space.

4.4 Interview with Sitka staff

Because the caregivers have been in the space nearly everyday for the last two years, they have valuable insights that could be missed by an observer. During the interview, they commented on how the space changes with the seasons and described how certain physical conditions influence how they use the outdoors in their program.

When asked what they liked about their outdoor space, the first thing the caregivers noted was the irregular shape. They stated that the irregular shaped allowed children to feel as though they could hide away without being seen. While the staff liked these hide away spots, they also appreciated the openness of the yard. The open space allows them to supervise the children easily without plant material or structures blocking their views. They also like Sitka's open grassy space because the children are able to run freely from one end to the other. They appreciate the dense vegetation that separates them from the adjacent centres and Hampton Place. These trees and shrubs hang over their fence and provide droppings for the children to play with. The vegetation also attracts birds, butterflies, and provides the staff with some privacy.

Drainage and circulation problems were two issues that the staff discussed when they were asked what they disliked about their space. There have been several attempts to re-grade their outdoor space to help improve drainage, but there are several areas that still turn into a "mud pit". As a result, the grass is difficult to maintain. In terms of circulation, there is only one hard surface area for bikes and toy cars.

The main entrance path was not designed to be a bike path and it is difficult for the children to turn around at either end of the path. Given the number of children that enjoy riding bikes and using push toys, it often becomes congested. The bike path is also the only covered area in the space. Ideally the staff would like to use the covered area for quieter activities since it is protected and children that need to be comforted tend to gather in this area close to the building. Often the children on bikes unintentionally disrupt the children that are seeking a quiet comforting moment.

When asked what the children like best about their space, they described the typical activities that take place outdoors. Children enjoy digging, picking plants, chasing, eating blueberries and chives, riding the bikes, and climbing the tree. When asked what the children dislike about the space, they stated that children didn't like being underneath the cedar, being exposed to rain, or waiting for their turn to look through the peepholes in the fence.

The staff and children play outside throughout the seasons, but they spend more time outside in the summer. The seasonal differences in the way the children use the space have to do with the element of water. In the summer, the children water the plants using buckets and hoses. During the rainy season, they love playing in puddles, and mixing dirt and water. The seasons also influence the way children circulate through the space. In the summer, the children move around to all areas of the space and in the colder months they tend to stay closer to the building.

4.5 Videotaped observations of the children at play

The observations from the videotapes are organized according to play patterns that emerged from the child's engagement with their physical environment. Some of the play patterns that were observed are consistent with findings from the Outside Criteria Study, and are noted.

The descriptions of these patterns create a rich narrative of children's play in their outdoor space and illustrate how the environment creates opportunities for the child's development in these two different play spaces. Refer to Figures D5, D6, and D7 for the circulation and play diagrams that summarize the observations of children's play.

All three of the rainy, cold sessions in Sitka are described in the first section. Following that is a comparison to their play at Lilliput. Then, all three of the warm, sunny tapings in Sitka are discussed, followed again by a comparison to their play in Lilliput in warm, sunny conditions.

4.5.1 *Children's play in cold rainy weather in Sitka*

Mining for water (Outside Criteria Study)

The only water that was available during the tapings was water that had collected in puddles from rainfall. Children were highly engaged with digging in the puddles and moving water from one area to the next. They would take the water from the area it was pooling by the fence and carry it in shovels or buckets to the cedar tree.

Puddles were also a place for sensory exploration. Children would carefully watch the water squish out from under their boots and listen to the sounds they made as they jumped up and down in the water.

Transferring materials (Outside Criteria Study)

As mentioned in the previous *Mining for water* section, children would move materials from the source to other areas. Push toys, buckets, and shovels were often used to carry small stones or water. During one session, the children gathered water from a puddle and carried it several meters to the cedar tree. As they walked, their steps were slow and careful so that they would not spill the water from their shovel or bucket.

Following the signs

Although there are no paths to lead children through the space, children followed what few landmarks do exist. The key landmarks that guided children are the two catch basins, the two new maple trees, and the stumps from the cedars that were cut down. Most often, children would begin walking, turn sharply to walk towards the catch basin, jump on the catch basin, and head in a different direction. The landmarks appeared to influence the child's direction and become destination points as the children walked through the space.

Walking

Experimenting with their developing gross motor skills, the children would frequently go on walks. However, they were seldom experiencing only the action of walking. Their walks were a complex combination of sensory exploration and physical actions. As they walked they also hopped, threw one leg out in front of them, ran for short bursts, stopped suddenly to observe their environment, and changed directions. Their walks were a highly sensory experience, as everything they passed they touched. When

walking past a seemingly uninteresting fence or a window, children would often reach out, move their hand lightly over the surface or stick out their index finger and gently touch the material. Sometimes they would stop to explore the surface or object, but most often they would continue to walk.

Fun with topography (Outside Criteria Project)

The videotaped observations illustrated the value of topography in introducing challenge to children. To an adult eye, the changes in grade are hardly noticeable. However, after filming the children in the space, it is apparent how challenging it was for some children to walk up the slight slope.

In addition to creating challenge, changes in grade provided a great deal of enjoyment for some children. One girl laughed and smiled as she repeatedly ran up and down a slope with a push toy. She would begin running from the stumps and up the slope to the fence, turn around and run back towards the stumps. Using the stumps as a beginning and an end point of departure also demonstrates the *following the signs* pattern. Often children positioned themselves in their toy cars at the top of the concrete path, pushed quickly to gain momentum, and sped down the walk.

Busytown (Outside Criteria Study)

The toddlers were observed to be attentive to the surrounding auditory environment. One girl was digging in a puddle and paused to listen to a plane fly over head. She looked up to the sky, remained still, listened until the plane was no longer audible, and then looked up to say "plane". Children would pause and listen to the birds and construction noises off in the distance. They would ask questions and look in the direction that the sounds were coming from. One day a child heard the sound of a dump truck outside the centre in the parking lot, and several children moved over to the gate to try to catch a glimpse.

Mimicking

The older toddlers tended to engage in parallel play with their friends through mimicking each other's actions. This would typically occur in the small playhouse, walking around the space with toys, in the plastic play pool, and on the slide. Duplicate props seemed to be an important part of the mimicking behaviour, as was the small scale of the space.

Many of the older children would attempt to invite younger children into their play by handing them the same props to play with, but the younger toddlers would not take the offering and would instead watch

the child carefully. The younger toddlers tended to use the transparent main door as a place to copy each other's actions and sounds while standing on either side of the glass.

Observing

Children would often stand or sit to the side of the action and observe the other children playing. During one session a boy tucked himself into a corner by the main window to watch the other children playing. Through the peek holes in the fence and the infant room window, they were able to observe the children in the adjacent child care centres.

Crashes

In areas where there were conflicting activities in close proximity, or a large number of children playing in a small space, children's play would inevitably be disrupted. During one taping episode, there was a large group of children in the playhouse, whose play was interrupted by children crashing toy cars into the house. Because crowding and conflict typically happened in or around the playhouse, staff were often close by to redirect or help support children's play.

Congestion along the main cement path was also common. Many children would ride their bikes or cars back and forth along this concrete path, and because of the difficulty turning around at the end of the path, children would get stuck in the corner by the garden bed, their play interrupted.

Hiding and seeking

Hiding objects and finding them again is another developmental milestone that was often demonstrated by the children. A stump with a deep hole through the centre created a perfect hiding spot for two boys during one play session. For approximately ten minutes, they would push their plastic farm animals into the hole, pretend it was lost, and then stick their hands down the hole to find it again.

Looking for worms was also a common activity. Many children would seek out worms under rocks, driftwood, or the cedar tree. When a child would find a worm they would demonstrate a great deal of interest and call over a caregiver to observe and discuss the worm.

Sticking close by

The children did not often use the far corners of the space. The staff set up activities throughout the space, but there were still some areas that did not seem to capture the children's interest, such as the far south corner of the space. High activity areas tended to be focused close to the main entrance.

The children often stayed close to the caregivers. They would group around the caregivers, creating pockets of activity, and would focus on the words or actions of the caregiver. In these small groups, children are focused on the caregiver rather than interacting with the other children in the group. Children grouping around the caregivers occurred on the days that there weren't any puddles in the space.

Climbing trees

The cedar tree is an interesting, challenging place for the children to climb. During one session, two of the older toddlers climbed into the tree and began to pretend that they were monkeys. They would pass pretend bananas back and forth to the caregiver and change their voices to sound like monkeys. It was one of the few examples of dramatic play during any of the taping sessions.

Edge play

Children were aware of the edges that defined spaces and would incorporate edges into their play. For example, the circular area of exposed earth around the base of the newly planted maple trees became a contained area of play for one boy and his toy truck. This boundary became part of the play and he moved the truck around repeatedly within this circle defined by the change in ground plane material.

4.5.2 Comparing children's play in Lilliput in cold rainy weather

The play patterns described in Lilliput are described as a comparison to what was observed in Sitka.

Sequence of events

As the children entered into the outdoor play space from the main gate, there was a noticeable sequence of events. Most of the children would first go directly to the boat. They would spend a short amount of time either sitting inside or scooping up water that was left at the bottom of the boat. They next walked to the large fire truck. Here, they stepped up to sit and view the space. After observing the space, they

would then make a decision where they were going to play next, and either run or bike to the sand play area. A sequence of events such as this was not apparent during the sessions at Sitka.

Malleable materials

Children spent most of their time digging in the sand areas. They would fill up buckets; pour sand onto railings in the sand area, and also onto the tree stump in the centre of the sand area. Parallel play most often occurred here, as children played with similar objects in close proximity, but did not interact directly with one other. Children would occasionally glimpse at each other playing but did not share toys or speak to each other.

Dispersed play

Children's play was dispersed into different areas of the space. Although most of the play occurred in the sand and slide area, children moved throughout all areas of the space. There was less crowding and less conflicting play as observed at Sitka. For example, children did not push or drive bikes into the sand area where other children were quietly digging. This could be due to the well defined play areas, and the range of various play areas throughout the space.

Different ways to move through space

Children found many different ways to move throughout the space. One girl found a wooden ramp that was placed by staff to link the upper platform of the house to the sand. She used the slight grade of the ramp to move up and down between the two spaces. First she walked down the ramp, then she walked down a bit faster, and then she hopped down. She didn't walk back up the ramp but rather looped around to use the stairs to get to the top. When she hopped down the ramp, she described her actions by saying "hop, hop, hop". Jumping from different heights was another way children experienced moving through space. Children jumped off of the low stumps that divide the path from the sand.

Circulation

In Lilliput, children were able to move around the space without interruption. They moved at their own speed and in their own manner, without being stopped or slowed by other children or objects. As children followed the looped path around the mound they would speed up and run fast or slow down to a walk. The speed that they would move was sometimes influenced by the physical design of the path. During one play session a boy standing on the mound declared he was going to go through the "tunnel". He then

ran fast along the pathway to the trellis, and upon reaching the threshold of the "tunnel", he slowed right down and walked slowly under the trellis. He repeated moving through the "tunnel" several times, finding different speeds and routes to move under and around the structure. This freedom of movement was not as prevalent in Sitka however, as children would often have to slow down because of something or someone in the way.

Graduated challenges (Outside Criteria Study)

There are a range of challenging opportunities for children in this space. 'Tire stairs' leading to the slide platform offered a great deal of challenge, especially for the younger children. During one filming session, a younger toddler attempted to climb up the tire steps twice and a caregiver had to help her to reach the slide platform. On the third try she was able to reach the top of the platform on her own.

The rope ladder leading to the top of the climber platform provided challenge for the older toddlers. While the children climbed, the caregiver would be close by to place an encouraging hand on their back so they knew that she was there behind them. Many of the children expressed a feeling of accomplishment upon reaching the top on their own, and would often exclaim "I did it!" and jump up and down. For the younger toddlers, just walking up the stairs by the playhouse presented a challenge. They would hold onto the railing and carefully make their way down the stairs, some times sitting down and moving from stair to stair. Many of the children would often reach out to grab a post or railing for support when walking up the stairs or on top of the platforms.

With the increase in challenge, there was also an increase in socialization. For instance, the children would often ask for help from other children if they were unable to master the activity. One girl was having a hard time riding her bike over a section of the bike path and asked for help from a boy who was nearby. He helped her move past the section of the path by pulling on her bike.

4.5.3 Children's play in Sitka in warm sunny weather

Crowding and waiting

In order to set up the space, the staff have many toys to bring out of storage. Often, children follow the caregiver to the storage shed during this preliminary set up time. The children wait for the toys, and sometimes become frustrated by the delay.

The observation sessions indicate that the children used even less of the space than they did in the winter. The play was concentrated around the front of the building, which is a small area given the number of children using that space. Despite the caregivers setting up activities in other areas, the children still focused most of their activity here. The wear on the grass in this area also indicates heavy use.

Wandering

Many of the children did not engage in play for long periods of time, but instead wandered around the space from one activity to the next.

Seasonal Activities

Some activities changed according to the change in seasons. Although there is little plant material in this space, children were often picking, observing, and collecting dandelions or clover. One girl used the clover flower heads as props for her imaginary play. The blueberries were frequently picked and eaten by the older toddlers.

During one session, the supervisor spent time with two children pulling weeds from the blueberry bed. The children were focused on this physical, cognitive, emotional, and social dimension of the activity. Using their whole bodies, they were determined to tug and rip the weeds from the ground. The children's use of language increased during this activity, by asking questions and repeating words that the caregiver used such as 'thistle', 'weed', and 'wheelbarrow'. There was also evidence of problem solving, such as when one child decided to find the wheelbarrow in order to bring the weeds to the garbage can. The children expressed feelings of accomplishment when they were able to pull the weeds.

Puddles in summer

During one play session, the staff set out large, empty soap containers filled with water. A group of children decided to make puddles with the water and pumped out water from the soap containers into an existing shallow hole in the ground. When the puddle was large enough, the children would repeatedly push their cars through the puddle.

Unfortunately, there was only this one puddle for the whole group. One boy wanted to put his bare feet in the puddle, while other boys wanted to push their cars through the water. The caregivers had to mediate the situation and encourage the creation of second puddle. This example of conflict illuminates the need to extend activities into all areas of the space.

Lack of challenge

Many of the children seemed developmentally beyond many of the toys that were available to them, especially climbing pieces. For example, the slide was physically too small for many of the children and did not offer much in the way of challenge. In order to create challenge for themselves, children would try to use the slide in ways that the staff viewed as unsafe, and were re-directed from the toy.

Auditory sensory exploration

One boy played with the noises that a pie tin made when hit against different surfaces. The pie tin was used to hold pieces of Lego at a small table. After he put two pieces of Lego together, he dumped the pieces out and banged the pie tin on the table. He repeated this action on the table, then walked over to a tree and banged it. He hit it against the wooden posts supporting the tree, and then hit it on a plastic push toy to compare the sound.

4.5.4 Comparing children's play in Lilliput in warm sunny weather

Landmarks

During the three videotaping sessions when the children first entered the space, they consistently walked over to the large fire truck by the entrance. All of the children during the taping session would sit in the truck and pretend to be driving somewhere. Being able to enter into the space and start playing immediately is different from the wait for toys that children experience in Sitka.

Small Group Play

During the first day of taping in Lilliput, a group of boys played in a smaller space for an extended period of time, approximately twenty minutes. The smaller subspace is close to the main entrance of the child care centre, under the canopy, and bordered by a low edge used for sitting and storage for toys. The three boys played with cars and a toy garage in this space, and were removed from the rest of the outdoor space. It was unusual to observe the children engaged in parallel play for this length of time in Sitka.

Sensory exploration

During two of the three days of filming, children removed their shoes and socks at the beginning of the play period. They would remove their shoes in the sand area, and left them off for the duration of their time in the space.

Circulation

As in the winter, the children frequently used the path for cars and push toys. They would circulate around until they found an interest in something else. The main path is a sufficient width to allow children to pass by each other easily without crashing into each other.

5. Discussion of the findings

One of the most surprising differences between the children's play was the length of time that children were engaged in an activity in Lilliput as compared to Sitka. The running record observation that describes one boy's movement and activities shows a remarkable difference in the length of engagement in the two spaces. In Sitka, he moved from activity to activity without sustaining any play beyond a few minutes. The number of activities significantly decreased when he played in Lilliput and the length of time significantly increased to approximately fifteen to twenty minutes. Over the course of one play session, he played on the fire truck with a group of children, pushed the lawnmower around the path, and dug in the sand area with other boys. During these three activities, he expanded the play and explored the range of possibilities within each activity. For example, when he pushed the lawnmower along the path, he varied the speed and direction. The pathway itself offered him a range of experiences. Along the path, the ground plane textures change several times, the slope is variable, and there is an area to move through a "tunnel". The width of the well defined looping path also contributed to the long duration of his play. He navigated around children and toys on the path easily without having to stop.

The number of small group activities also seemed to increase in Lilliput. This appeared to be facilitated by the smaller social spaces that are defined within the larger space. The subspaces are quiet with clear boundaries. When in these subspaces, the children played for a sustained period of time without interruption from other children or conflicting activities. The interruption of play seemed to occur frequently in Sitka. As mentioned in the interview with the staff, although they have a sufficient amount of space, conflicting activities often occur in the same area. The area directly in front of the main entrance becomes congested with children riding bikes, digging holes, and children seeking an area for

rest close to the building. This congestion interrupts the children and staff are needed to help the children negotiate the frustrations that arise. A small group activity without the support of staff was rarely seen during the observations in Sitka.

Although children frequently sought out challenges at Sitka, the toys and the physical conditions did little to challenge the toddlers, especially the older toddlers in the group. Often, a child would explore a toy repeatedly, finding a new way to use the object until being redirected by staff because their activities were considered unsafe. For example, one of the older children at Sitka used a small toy slide several times in many different ways until he had to be redirected. First, he climbed up the stairs of the slide, slid down, then climbed up again, straddled the top seat of the slide with his legs, then he lay with his whole body draping over the slide. When he attempted to walk up the down side of the slide, the staff intervened.

In Lilliput, the physical space and materials provided challenge and complexity. This is most apparent in the sand area. In the large area, children were observed forming sand, digging, dumping, shaping, carrying, mixing, patting, and squeezing the sand. Sand offers children endless possibilities, which creates experiences that are complex and enrich all areas of the child's development.

Lilliput also seemed to offer physical conditions that facilitated children's language development. During all six of the play sessions observed in Lilliput, the children consistently used words to describe the physical conditions of the play space and how their actions related to a physical form or feature. For example, one child found a ramp placed in the sand box. She walked down the ramp a few times, then hopped down the ramp. As she moved up and down the ramp, she would describe what she was doing. She said "I am going down the ramp, hop, hop, hop". This description of a child's own actions relating to the physical form was observed in Sitka as well. When children climbed the tree, they exclaimed, "I am climbing the tree". However, the frequency of their descriptions was higher when playing in Lilliput. This finding is supported by other studies that found that the physical environment has significant effects on development particularly in the area of language development (Wach & Chan 1986, Herrington & Studtmann, 1998)

In conclusion, these observations taught me a great deal about the development and play of toddlers. The knowledge I have gained from observing the children in their play space and the findings from other studies helped to determine the design objectives for this project.

6. Design objectives

Character

The design intent is to translate the “fundamental theories of early social, emotional and sensorimotor development into landscape forms, textures, and images”(Herrington 1997, p.53).

Context

Relate the yard to the community context by reflecting the historical and present geometrical form of the child care buildings.

Give form to the processes happening on the site.

Connectivity

Create defined areas that relate to each other in order to create a narrative of experiences for the children moving through the space. This includes creating a hierarchy of pathways and areas with distinct character and form.

Use pathways and other devices to encourage the children to circulate throughout the entire yard.

Enhance the visual connection between the indoors and outdoors and create areas of transition between the two spaces.

Change

Scale the space according to the growth and physical development of children 12 months to 36 months. Physical heights at this age range from 81.3 cm at 12 months and 96.5 cm at 36 months. However, consideration must also be given to creating an environment that is comfortable for adults, and accessible to caregivers.

Vary the spatial scale in order to create places for a range of social interactions. This includes creating areas for large groups to small niche spaces, and opportunities for solitary, parallel, or cooperative play. Relate these smaller spaces to the geometry of the larger outdoor play space.

Provide opportunities for children to experience, at a manageable scale, elements such as shrubs, groundcover, vines, stones, and earth (Herrington 1993, 1997)

Vary the microclimatic conditions in the yard through the use of plant material and built structure.

Highlight the sensory experiences of the children through materials and construction details. Ensure that elements commonly considered “backdrops,” such as the ground plane or walls, become sensorial areas of exploration and engagement.

Chance

Enliven children’s engagement with the physical environment by using materials and forms that respond to the children’s manipulations and changes in seasons and the weather. Create opportunities for the child to create, manipulate, and leave an impression of the play space (Herrington & Lesmeister, 2005).

Clarity

Create defined areas that relate to each other in order to create a narrative of experiences for the children moving through the space. This includes creating a hierarchy of pathways, sequences of events, and a unified material palette.

Challenge

Use landscape to create opportunities for developmental milestones for children aged 12-36 months in all of the developmental domains (social, cognitive, physical, emotional). Create opportunities for graduated challenge for children practising new skills and to accommodate individual variations in skill levels.

7. The design

The following describes the main areas in the design for Sitka and the developmental opportunities within space. Refer to figure D8 for the master plan.

The Path

The pathway extends through the central area of the space. It acts as a main circulation spine for the space and connects all the other nodes of activity. Traffic squares at opposing ends of the path mark the

beginning and end of the path and help the children to turn around with ease. *Miscanthus sinensis* is planted within each traffic square. This plant material is responsive to movement, so the blades of grass move with the children to provide a sensory experience as they loop around the path. Children encounter additional sensory experiences as they move from one end of the space to the other. The joints between the square concrete pavers that define the path create a unique sensation and sound for the children riding bikes over the surface. An occasional paver is replaced with a mosaic of stone pebbles adding further texture to the path. The slope of the path allows children to feel changes in speed and movement. The tunnel provides children with the experience of moving “under” and it creates different patterns of light and dark for the children to move through.

In terms of supporting child development, the path creates opportunities for running, stepping, walking, pushing a toy, riding a bike, and transferring objects to other areas. By decreasing the amount of frustration that children experience on the existing concrete path, their social and emotional development is also supported.

Blue room

This small niche space intensifies the toddlers sensory experience of place. Blue saturates this subspace and the colour is expressed through different textures and plant material. Blue stepping stones encourage the children to jump or hop through beds of *Vaccinium angustifolium*, *Festuca ovina glauca*, and *Nepeta racemosa*. The qualities of the plants make them suitable for picking, eating, smelling, touching and collecting.

Behind the rows of planted beds is the window with views into the infant centre. The window is partially hidden by the beds, creating a sense of mystery. Hidden amongst the dense plantings are sound installations for the children to discover through auditory discrimination. The installations are responsive to the children’s touch. This encourages the children to play with cause and effect which is an important developmental milestone for toddlers approximately two years old.

The size of the space allows for solitary, parallel, and associative play. To support the child’s emotional development, the area provides children with the opportunity to find a place away from the large group for quiet moments alone, with a caregiver, or with another child.

Grassy Jungle

Stepping stones winding through a dense planting of *Millium effusum* 'Aureum' and *Miscanthus sinensis* 'Kleine Siberspinne' lead children from the main path to the cedar tree. Both grasses act as markers of seasonal change. *Millium effusum* 'Aureum' changes colour dramatically through the seasons from green to yellow to pink. *Miscanthus sinensis* grows rapidly in the spring into a soft responsive plant, and in the winter it turns brittle and stiff. It can be cut back to the ground which would open up this area in the winter months.

The grasses also provide material or "props" for the children to hold, tug, carry, pull, or grasp. When the grasses are cut back in the winter, the grassy mounds offer opportunities for balance, stepping, jumping, and hopping. The plants rapid growth offers opportunities for the children to notice their height relative to the grasses.

Front porch

The porch replaces the existing planter bed at the front of the child care centre to create a transitional space between the building and outdoors. The aluminium overhead plane highlights the sound of the rain and creates a dry area to play on rainy days. The open porch is slightly raised from the ground plane and provides clear views into the rest of the space.

Having the porch slightly raised and against the building creates a sheltered, quiet area for the children and caregivers when watching the other children playing. Since these children need to be held as part of their social and emotional development, the porch also offers a space for those quiet comforting moments.

The step up to the decking surrounds the entire porch structure. The step is also a place for sitting, jumping, stepping up and down, crawling, and balancing. By keeping the porch open without any fencing surrounding the deck, children can enter the porch from any angle.

Mosaic basin

The basin highlights change and site infrastructure. Rain water from porch roof is carried along an overhead rain pipe. The rain pipe stretches over the main concrete path and so creates an entry for families walking to the main door. The water flows through the pipe and falls into the pebble mosaic that surrounds the existing central catch basin. The gently sloping sides of the mosaic direct the water

towards the drain. The mosaic is made from Mexican river pebbles set into concrete. The pebbles change colour when wet and create an interesting ground plane surface.

The slight slope and bumpy surface provide opportunities for the children to walk, squat, touch, balance, and hop. It will also encourage the children to feel the stones and the small pockets of water that will collect between the pebbles. They might rub or pat the smooth stones with their hands or take off their shoes to experience the surface on the bottoms of their feet. The spaces between the pebbles will also catch plant material so the children use their fine motor skills to pick and collect the fallen leaves or twigs.

Sand areas: Terraced, dump and fill

Sand areas provide a wide range of developmental opportunities. Sand promotes digging, dumping and filling, and sensory experiences, all of which are important aspects of children's cognitive development.

There are two distinctly different sand play areas in this design. They are located at opposing ends of the outdoor space to promote children transporting sand back and forth between the two areas. This would encourage biking, walking with push toys, and carrying,

The first sand area is a smaller space that is located close to the child care building. It is a terraced sand area so there are opportunities for the children to jump and to move the sand up and down between the levels. The retaining wall that separates the sand areas is also a pathway that cuts through the sand and provides opportunities for jumping, balance, and pulling to stand up.

An important part of this sand play area are the plantings, which frame the entrance at both ends of the retaining wall. Mexican feather grass is used because of their soft fine texture that is responsive to wind and children's movement. Leaves from the nearby bamboo den provide children with an additional malleable material that can be mixed with the sand.

The second sand play area is inspired by the dumping and filling stage of the toddlers development and their beginning interest in functional relationships and making mechanical objects work. Attached to the surrounding fencing are simple machines like levers, weights, and pulleys. Children can experiment with the machines and understand through their "manipulations that an action can have a physical effect on the environment" (Herrington, 1997, p.154). The mechanisms would also help to encourage eye hand movement and coordination, which is a stage in their perceptual-cognitive development. This sand play

space is larger than the other sand area, so it would provide different opportunities for parallel, associative, and collaborative play.

Bamboo den

The bamboo den will provide dappled light and shade for one of the currently exposed corners of the space. It will be a cool, quiet place to move through and links the basin to the terraced sand area. This hardy plant material can be picked, collected, grasped, and ripped by the children. They can also reach and pull on the stalks. The thickness of the plantings will promote exploration, and its close proximity to the centre will give the children emotional reassurance that a caregiver is nearby.

Open space

This space allows for a gradual transition for the children as they move outside to play. Rather than stepping directly into an activity area, children can clearly see the pathways that lead throughout the space. The size of this grassy area allows for large group activities.

Topo fun

In this area of the space, the topography is exaggerated to create varying challenges for children to walk, crawl, run, or hop up and down the grassy slopes. The two semi-circular mounds face each other so the children can move between the two spaces. There is a feeling of enclosure created by the two mounds, which also creates a small subspace for gathering or mimicking. One mound has a slide embedded within the earth and a sandy fall surface at the base of the mound. Sliding promotes the development of a child's core muscles and provides a unique sensory experience of moving through space. The two different heights of the mound provide graduated challenge for the varying abilities of children in the group.

8. Implications and conclusion

The observations of children in Lilliput and Sitka illuminate how children's play experiences are enriched in a space designed to support all areas of their development. While there were opportunities for development in Sitka, the experiences of the children playing in Lilliput were far richer. The children in Lilliput frequently used language to describe their actions and the environment, they were engaged in solitary and parallel play for longer durations of time, and there were graduated challenges to meet the range of children's abilities. Considering the benefits of opportunities available in spaces such as Lilliput, the number of hours a child spends in child care, and the increasing demand for centre based care, it is critical that outdoor play spaces are designed to support a child socially, emotionally, cognitively, and creatively.

This project demonstrates how observing children to understand their developmental milestones can help provide the basis for design. The observations of children at play made a significant contribution to my understanding of how they relate to and interact within their outdoor play space. I witnessed how highly aware children are of their surrounding physical environment, and how they touch, eat, and watch everything around them as they move through the outdoor play space. The observations also revealed how seemingly insignificant details such as ground plane material, a slight grade, and rain collected in a puddle, can influence and guide their play. The unique ways in which toddlers and infants experience the outdoors makes observation an invaluable tool in the research and design process.

This project focuses attention on the challenges that child care operators face when adapting a re-use space. With the trend of child care moving into re-use spaces, it is important to find design solutions that address the developmental needs of a child. The Seven Cs Criteria used for Sitka's design can fulfil these needs in most any site or budget. For instance, to address the lack of spatial definition commonly found in re-use spaces, plants can be moved from the edges to the centre of the space, creating a change in spatial scale. Also, by carefully choosing plant material, seasonal change can be highlighted, and the plants become props for children's play. As the play space at Sitka demonstrates, there is potential for re-use spaces to provide more varied types of development.

In the fall of 2005, construction of Sitka's outdoor play space will begin. The implementation of my design presents an opportunity for a before and after study, where the children's play in the new space will be compared to the findings described in this paper. I will evaluate the design based on how the children's play changes with the addition of spatial definition and richer textural materials. It is my aim that the continuation of this project will strengthen the argument that it is vital to create rich child care landscapes that foster a child's learning, growth, and play.

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INDEX

Index A

Daily schedule for Sitka

8:00	Open freeplay inside, books, table toys, art, water
9:30	Toileting
10:00	Songs and fingerplays at snack time
10:30	Outdoor play (only in extremely bad weather will the children stay inside)
11:15	Gradual transition inside, bathroom routine, and wash up
LUNCH	
12:30	Nap/rest
2:00-3:00	Quiet play
3:00-4:00	Snack
4:00	Outside play
5:00	Centre closes

Index B

Sample page from field observation tool

Physical conditions of the outdoor space

Animal Habitats	Dens or Niches	Stones	Terrace
Water	Sand	Seating	Steps
Topography or landforms	Table		An X indicates that the physical condition is not present

Porous surfaces	Non-porous surfaces
Gravel	Asphalt
Grass	Concrete
Moss	Pavers
Sand	Wood
Dirt	Rubber tiles
Wood chips	Poured rubber
Fibar	Brick
	Tile
	Stone

Index C

Piaget's cognitive play categories

Repetition

The child performs motor actions at least twice in succession. The child's repetitive actions may be an effort to sustain an activity which provides vestibular stimulation

Combination

The child performs two or more motor movements in an identifiable pattern. This category also refers to vestibular stimulation in which the child is actively engaged (eg. Pumping legs to swing). The child may also place two or more objects into spatial relationships. The child may choose to place himself into a spatial relationship with other objects.

Constructive

This form represents goal oriented play in which the child tests a hypotheses or creates end products.

Conversion

The child uses a concrete object to symbolize another absent object. The child may use gestures to indicate that an object is being symbolized rather than a concrete object.

Animation

The child pretends that an inanimate object is alive (e.g. child growls for a toy lion) or operational (e.g. a child moves a toy truck)

Role play

The child portrays the role of a real or imaginary character.

Spontaneous Games

The child engages in playful interactions with another peer. These interactions are governed by mutually understood rules which arise spontaneously and are temporary in a nature. The children alternate turns in performing actions and may reverse roles during the game.

Adapted from "Toddler Play Behaviors and Equipment Choices in an Outdoor Playground" by Suzanne M. Winter 1985

Index D

Stages of development for children aged 12 to 36 months

Twelve to 24 months

Growth and Physical Characteristics

Rate of growth is considerably slower during this period compared to infancy

Height increases approximately 5 to 7.6 cm per year toddlers reach an average height of 81.3 to 88.9 cm

Weights approximately 21 to 27 pounds (9.6 to 12.3 kg) gains $\frac{1}{4}$ to $\frac{1}{2}$ pound (.13-.25 kg) per month; weight is now approximately 3 times the child's birth weight

Head size increases slowly; grows approximately $\frac{1}{2}$ inch (1.3 cm) every six months; anterior fontanel is nearly closed at eighteen months as bones of the skull thicken.

Chest circumference is larger than head circumference

Rapid eruption of teeth six to ten new teeth will appear.

Body shape changes, takes on more adult like appearance; still appears top-heavy; abdomen protrudes, back is swayed.

Visual acuity is approximately 20/60.

Motor Development

Crawls skillfully and quickly.

Stands alone with feet spread apart, legs stiffened, and arms extended for support. Gets to feet unaided.

Most children walk unassisted near the end of this period; falls often; not always able to maneuver around obstacles such as furniture or toys.

Uses furniture to lower self to floor; collapses backwards into a sitting position or falls forward on hands and then sits.

Voluntarily releases an object.

Enjoys pushing or pulling toys while walking

Repeatedly picks up objects and throws them; direction becomes more deliberate.

Attempts to run, has difficulty stopping usually just drops to the floor.

Crawls up stairs on all fours; goes down stairs in same position.

Sits in a small chair.

Carries toys from place to place.

Enjoys crayons and markers for scribbling; uses whole-arm movement.

Stacks two or four objects.

Perceptual-Cognitive Development

- Enjoys object hiding activities, early in this period the child always searches in the same location for a hidden object (if the child has watched the hiding of an object). Later, the child will search in several locations.
- Passes toy to other hand when offered a second object (referred to as "crossing the midline"-an important neurological development).
- Manages three to four objects by setting an object aside (on lap or floor) when presented with a new toy.
- Puts toys in mouth less often.
- Enjoys looking at picture books.
- Demonstrates understanding of functional relationships (objects that belong together, puts spoon in bowl and then uses spoon as if eating).
- Shows or offers toy to another person to look at.
- Names many everyday objects.
- Shows increasing understanding of spatial and form discrimination: puts pegs in a pegboard, places three geometric shapes in foam board or puzzle.
- Places several small items (blocks, clothespins, cereal pieces) in a container or bottle and then dumps them out.
- Tries to make mechanical objects work after watching someone else do so.
- Responds with some facial movement, but cannot truly imitate facial expression.

Speech and Language Development

- Produces considerable "jargon": puts words and sounds together into speech-like (inflected) patterns.
- Holographic speech: uses one word to convey an entire thought; meaning depends on the inflection.
- Later, produces two-word phrases to express a complete thought (telegraphic speech).
- Follows simple directions.
- When asked, will point to familiar persons, animals, and toys.
- Indicates a few desired objects and activities by name; verbal request is often accompanied by an insistent gesture.
- Responds to simple questions with "yes" or "no" and appropriate head movement.
- Speech is 25 to 50 percent intelligible during this period.
- Locates familiar objects on request (if child knows the location of objects).
- Acquires and uses five to fifty words; typically these are words that refer to animals, food, and toys.
- Uses gestures, such as pointing or pulling, to direct adult attention.

Enjoys rhymes and songs, tries to join in.

Seems aware of reciprocal (back and forth) aspects of conversational exchanges; some turn-taking in other kinds of vocal exchanges, such as making and imitating sounds.

Personal-Social Development

Usually friendly towards others, less wary of strangers.

Helps pick up and put away toys

Plays alone for short periods

Enjoys being held and read to.

Often imitates adult action in play.

Enjoys adult attention, likes to know that an adult is near.

Recognizes self in mirror.

Enjoys companionship of other children, but does not play cooperatively.

May have a tantrum when things go wrong or if overly tired or frustrated.

Exceedingly curious about people and the surroundings; need to be watched carefully.

Play and Social Activity

Develops a strong sense of property rights; "mine" is heard frequently. Sharing is difficult, hoards toys and other items.

Enjoys walks, stops frequently to look at things; squats to examine and pick up objects; much dawdling. Still plays alone (solitary play) most of the time, though showing some interest in other children; lots of watching. Some occasional parallel play (play alongside, but not with another child), but no cooperative play as of yet.

Wakes up slowly from a nap; cannot be hurried or rushed into any activity.

The two year old

Growth and Physical Development

Weight gain averages 2 to 2.5 pounds (0.9-1.1 kg) per year; weighs approximately 26 to 32 pounds (11.8-14.5 kg) or about 4 times the weight at birth.

Grows approximately 3 to 5 inches (7.6 to 12.7 cm) per year; average height is 34 to 38 inches (86.3-96.5 cm)

Posture is more erect; abdominal muscles are not yet fully developed.

Body temperature continues to fluctuate with activity, emotional state, and environment.

Brain reaches about 80 percent of its adult size.

Eruption of teeth is nearly complete; second molars appear, for a total of twenty deciduous or baby teeth.

Motor Development

Wide stance walk giving way to more erect, heel to toe pattern; able to manoeuvre around obstacles in pathway.

Runs with greater confidence; has fewer falls.

Squats for long periods while playing.

Climbs stairs unassisted (but not with alternating feet).

Balances on one foot (for a few moments), jumps up and down, but may fall.

Throws large ball underhand without losing balance.

Holds cup or glass in one hand.

Opens doors by turning knobs.

Grasps large crayon with fist.

Climbs up on chair, turns around and sits down.

Enjoys pouring and filling activities.

Stacks four to six objects on top of one another.

Uses feet to propel wheeled riding toys.

Perceptual-Cognitive Development

Eye-hand movements better coordinated; can put objects together, take them apart; fit large pegs into pegboard.

Begins to use objects for purposes other than intended.

Does simple classification tasks based on one dimension.

Stares for long moments; seems fascinated by, or engrossed in, figuring out a situation: where the tennis ball has rolled, what caused a particular noise.

Discovering cause and effect.

Knows where familiar persons should be; notes their absence; finds a hidden object by looking in the last hiding place.

Speech and Language Development

Uses fifty to three hundred different words, vocabulary continuously increasing.

Has broken linguistic code; in other words, much of a two-year-olds understand significantly more than they can talk about.

Utters three- and four- word statements; uses conventional word statements; uses conventional word order to form more complete sentences.

Repeatedly asks, "What's that?"

Speech is as much as 65 to 70 percent intelligible.

Uses some plurals; tells about objects and events not immediately present (this is both a cognitive and linguistic advance).

Personal-Social Development

Shows signs of empathy and caring; comforts another child who is hurt or frightened; sometimes is overly affectionate in offering hugs and kisses to other children.

Continues to use physical aggression if frustrated or angry; physical aggression usually lessens as verbal skills improve.

Temper tantrums likely to peak during this year; cannot be reasoned with while tantrum is in progress.

Impatient; finds it difficult to wait or take turns.

Enjoys "helping" with household chores; imitates everyday activities.

Watches and imitates the play of other children, but seldom joins in; content to play alone (parallel play).

Offers toys to other children, but still possessive.

Ritualistic; routines carried out as before, belongings placed "where they belong".

Explores everything in their environment.

Source:

Allen, Eileen Allen and Lynn R. Marotz. By the Ages Behavior and Development of Children Pre-Birth through Eight.

Index E

Description of plant material for design

Blue garden

Plant	Character	Growing conditions
<i>Festuca glauca</i> 'Elijah Blue'	Blue silvery colour, hardy, thread like foliage clumping fine texture	Full sun or part shade Drought tolerant
<i>Festuca ovina glauca</i>	Foliage has a rubbery feel, still soft, nice blue tone	Full sun or part shade Drought tolerant
<i>Vaccinium angustifolium</i> Lowbush Blueberry	Low open growing up to 70 cm high and a 70 cm spread, sweet fruit	Does well in poor dry soils
<i>Nepeta x faassenii</i> 'Dropmore blue'	Aromatic leaves, looks like mint, low rounded shape, haze of blue flowers	Dry sandy soil, full sun

Wet border plants

Plant	Character	Growing conditions
<i>Carex elata</i> 'Aurea' Bowles' Golden Sedge	Bright yellow, grows upright in compact bundles, 70cm high, 50cm spread	Wet, partial shade

Jungle area by conifer

Plant	Character	Growing conditions
<i>Milium effusum</i> 'Aureum' Golden Wood Millet	Changes colour from yellow to pink to green, 50cm tall	Full or partial shade, moist soils
<i>Liriope muscari</i> 'Silver Ribbon' Lilyturf	30cm high, 45cm spread, blue flowers like small upturned bunches of grapes, evergreen	Moist, well-drained/light, full sun, partial shade, shade, hardy
<i>Luzula sylvatica</i> Woodrush	60cm high, 45cm spread, dark green foliage, evergreen, clumping	Full sun, partial shade, shade hardy acidic, moist, well-drained/light, boggy
<i>Miscanthus sinensis</i> 'Kleine Silberspinne'	Narrow, arching leaves with a silver mid-rib, 180cm high, 45cm spread, dark red-brown panicles, turn silver in the autumn, cut down to ground level in the spring	Moist, well drained soil, partial sun

Planted boxes for seating/storage boxes and bike path edges

Plant	Character	Growing conditions
<i>Stachys byzantina</i> Lamb's Ears	Soft fluffy foliage, purple flowers, 45cm high, 60 cm spread	Full sun, dry sandy soil,
<i>Nasella (Stipa) tenuissima</i> Mexican Feather Grass	Grows in clumps, very soft fine texture, picks up the breeze, hanging form, yellow green, up to 90 cm high	Well drained soil, tolerates drought, sun or partial sun

Ground cover for under the cedar and between pavers

Plant	Character	Growing conditions
<i>Mentha requienii</i> Corsican mint	Nice scent, creeping perennial, small bright green leaves, tiny light purple flowers	Moist, well drained, sun or partial sun
<i>Soleirolia soleirolia</i> Baby's Tears	Dense deep pile green pile with a slight pinkish tinge	Shade or sun, moist or sandy conditions

Bamboo den

Plant	Character	Growing conditions
<i>Phyllostachys aurea</i>	Bright yellow canes, 240m high, 300m wide	Partial shade, damp but free draining soil

Traffic squares

Plant	Character	Growing conditions
<i>Miscanthus sinensis</i> 'Kleine Silberspinne'	Narrow, arching leaves with a silver mid-rib, 180cm high, 45cm spread, dark red-brown panicles, turn silver in the autumn, cut down to ground level in the spring	Moist, well drained soil, partial sun

ⁱ The first two introductory paragraphs are cited from "The Design of Landscapes at Child Care Centres: Seven Cs" (2005) by Susan Herrington and Chandra Lesmeister. Awaiting publication in Landscape Research.

ⁱⁱ The Outside Criteria Study is part of a five-year, interdisciplinary university-community partnership called CHILD (Consortium for Health, Intervention, Learning and Development).

ⁱⁱⁱ At Sitka, children attending the centre are between the ages of 12 to 36 months. Lilliput cares for children between the ages of 18 to 36 months. According to the City of Vancouver Child Care Design Guidelines and Licensing of the Province of BC, Infants are considered to be under 18 months and toddlers are between 18 and 36 months (City of Vancouver 1993, p.3).

^{iv} For further information on the findings from the Outside Criteria Study, refer to the article "The Design of Landscapes at Child Care Centres: Seven Cs" (2005) by Susan Herrington and Chandra Lesmeister. Awaiting publication in Landscape Research.

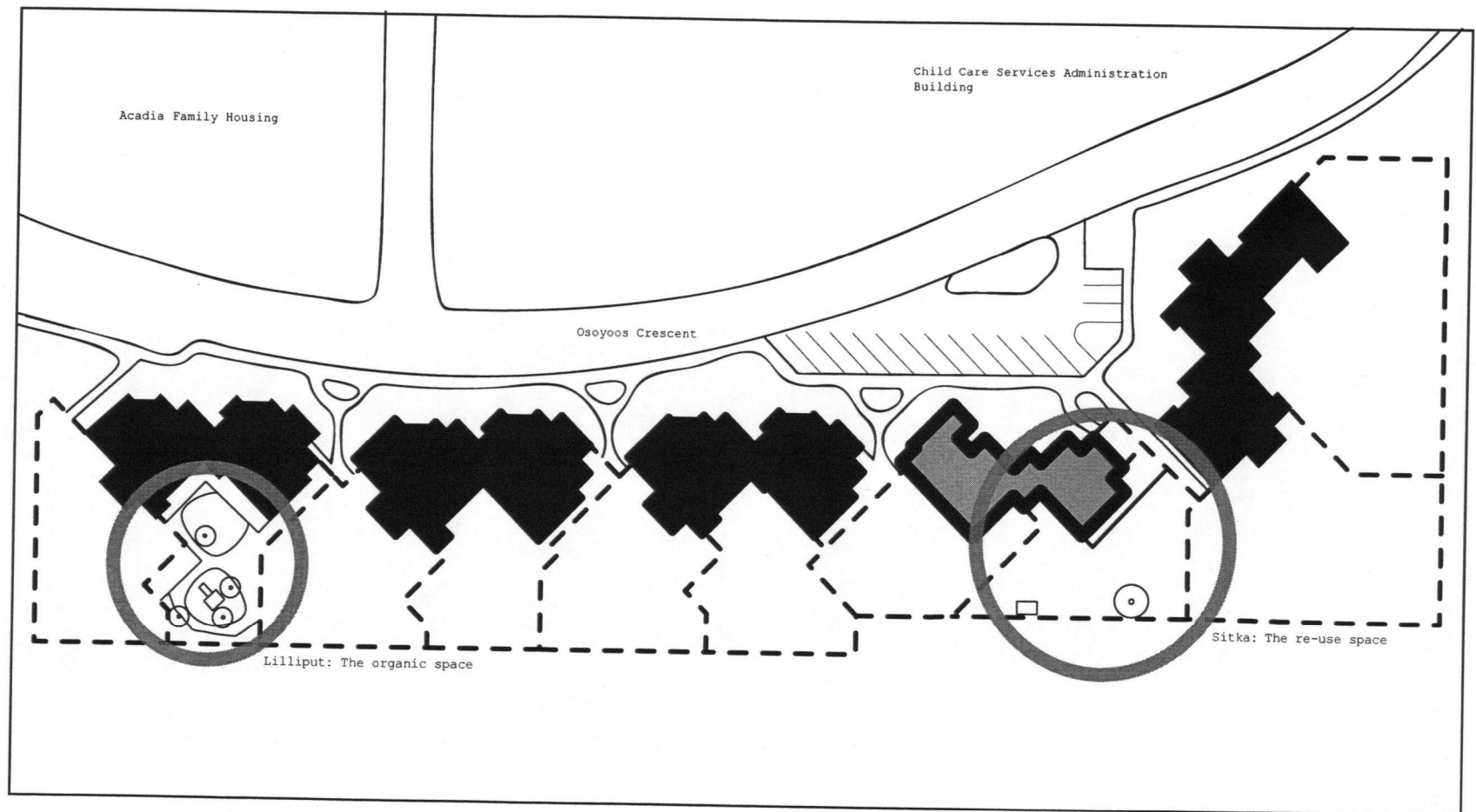
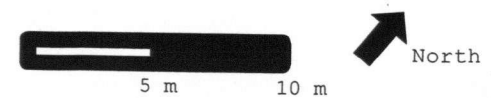
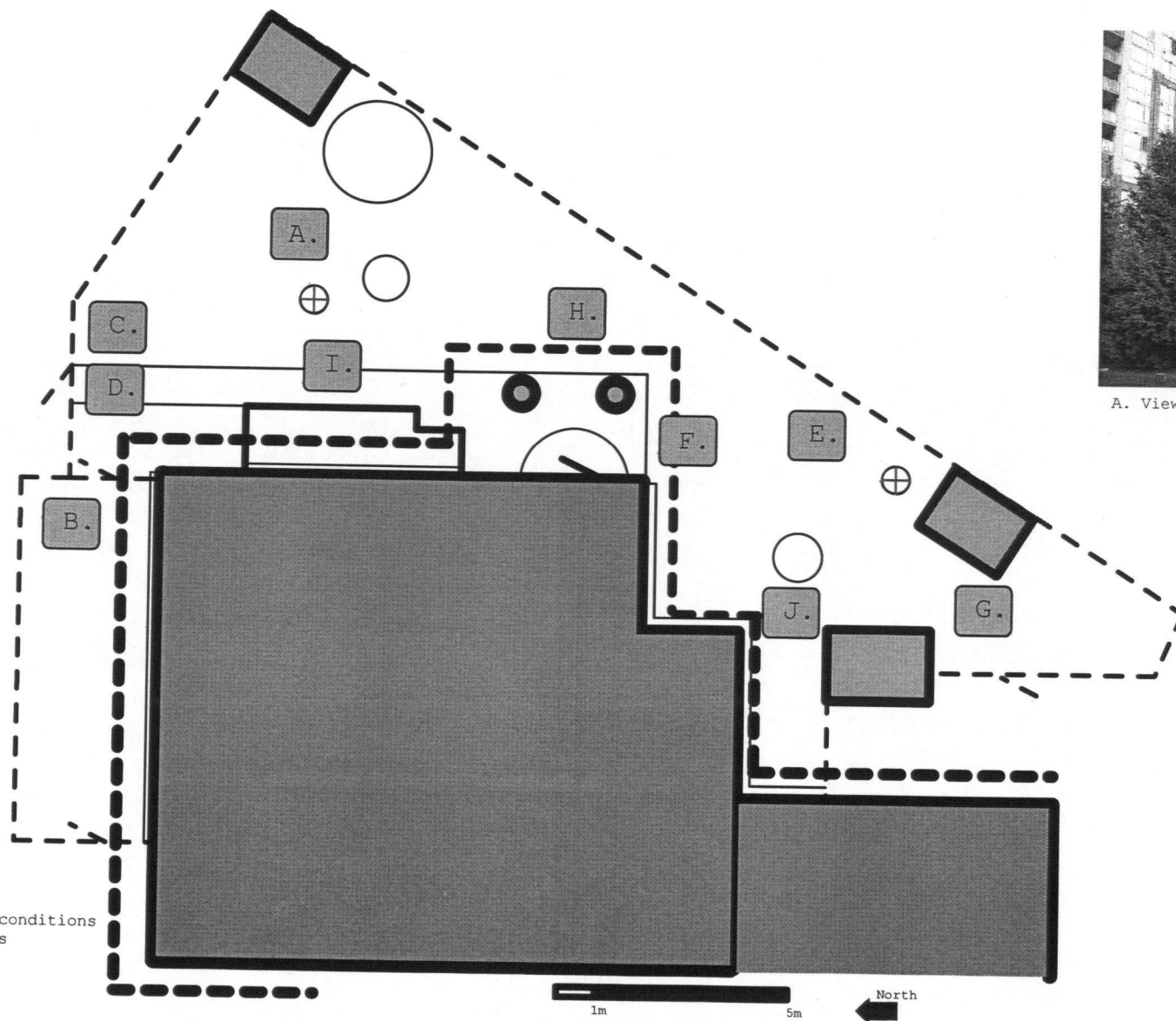


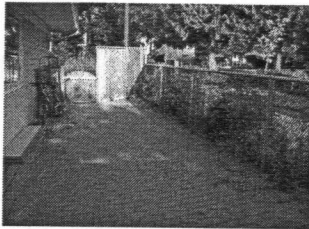
Figure D1.
University of British Columbia Child Care Services
Study sites highlighted in circles





A. View of Hampton Place

Figure D2
Existing conditions
Site photos



B. Main entrance to the child care centre



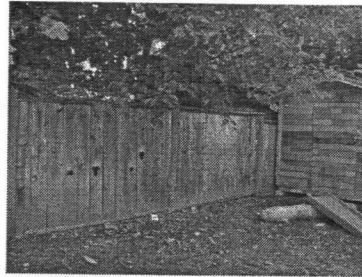
C. High point of the slope



D. Garden bed in front of windows

Figure D3
Exisiting conditions
Site photos

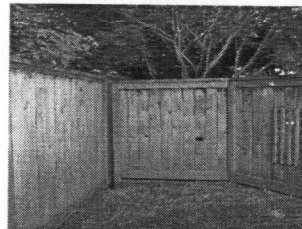
p.59



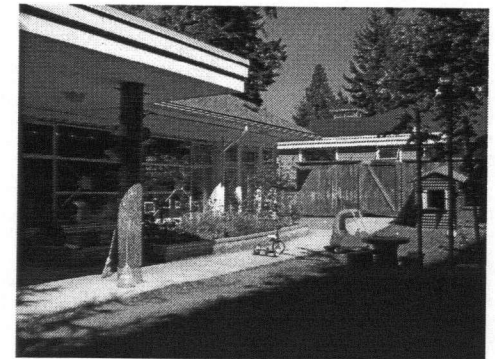
E. Run off collects along this fence edge



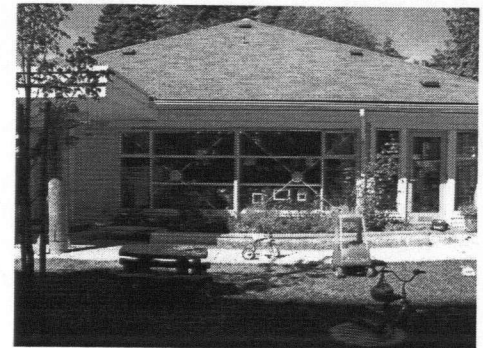
F. Main door to child care centre



G. Corner unused by children



H. Central catch basin



I. Window providing views



J. Views into adjacent infant centre

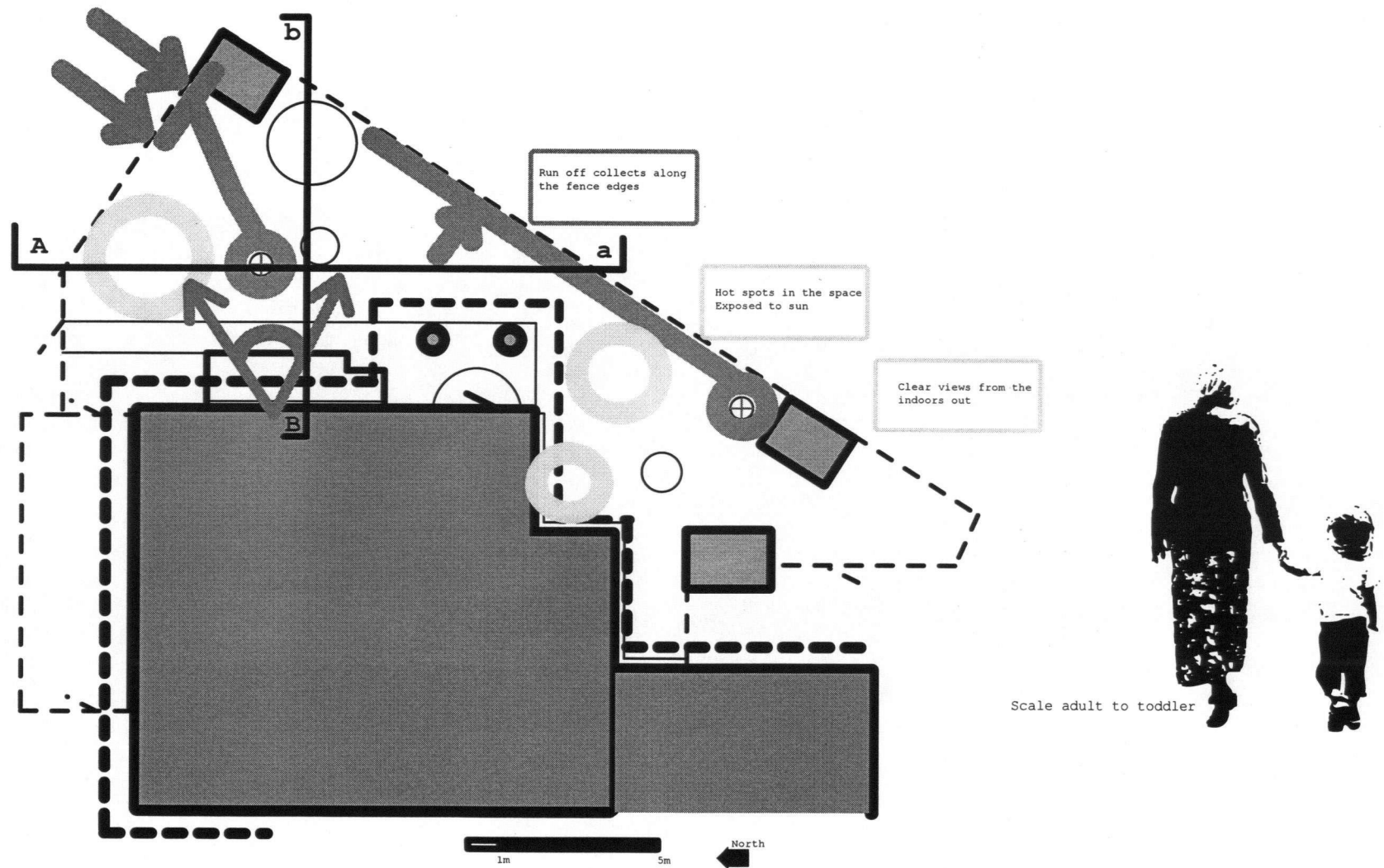


Figure D4
Summary of significant existing physical conditions
Scale example

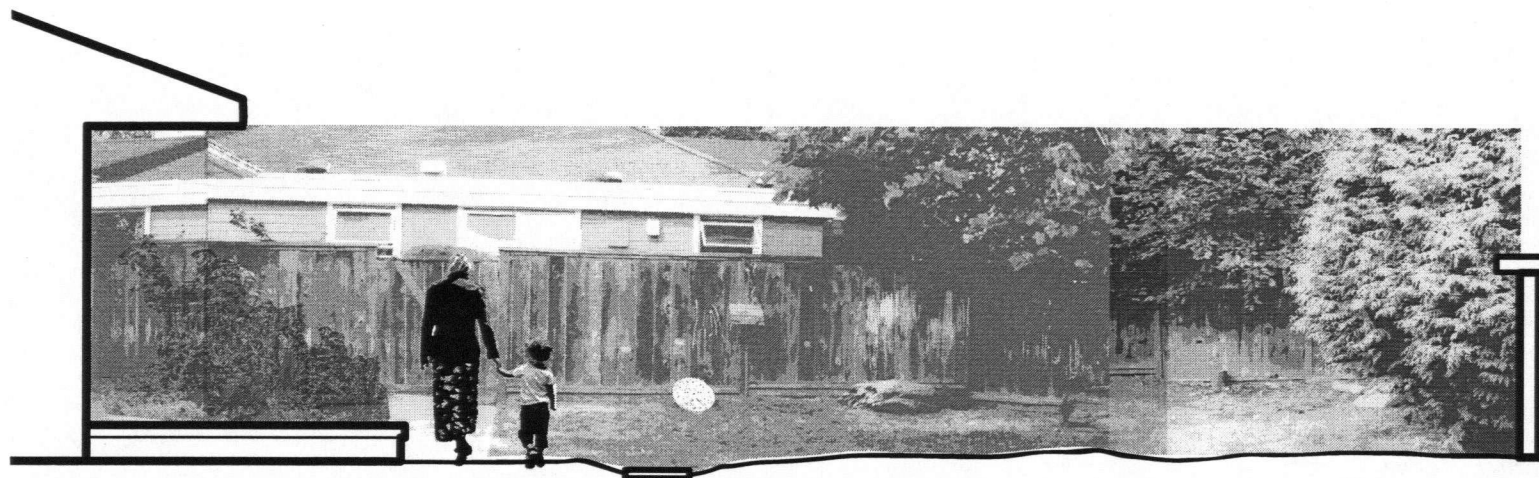
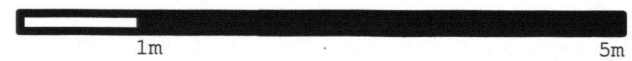


Figure D4.1 Section B-b
Existing conditions
Indoor outdoor relationship



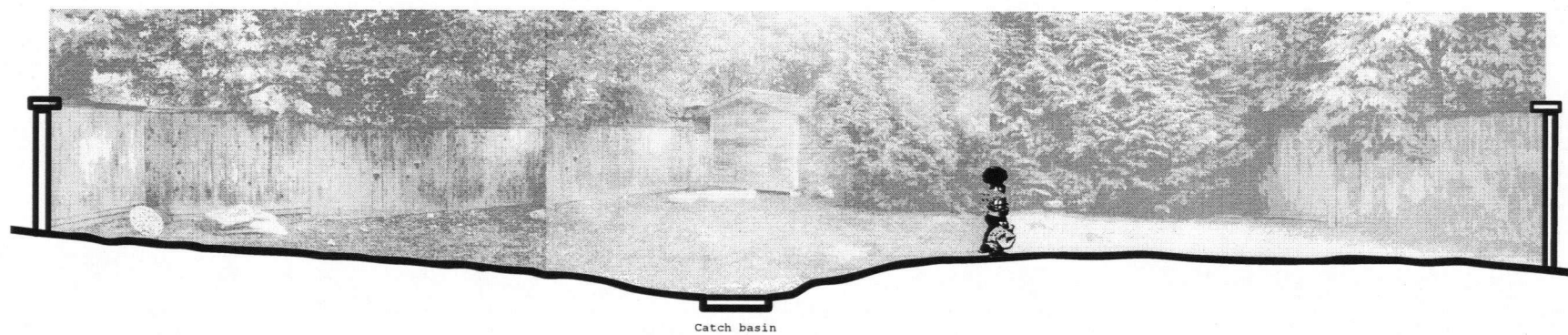


Figure D4.2 Section A-a
Existing topography



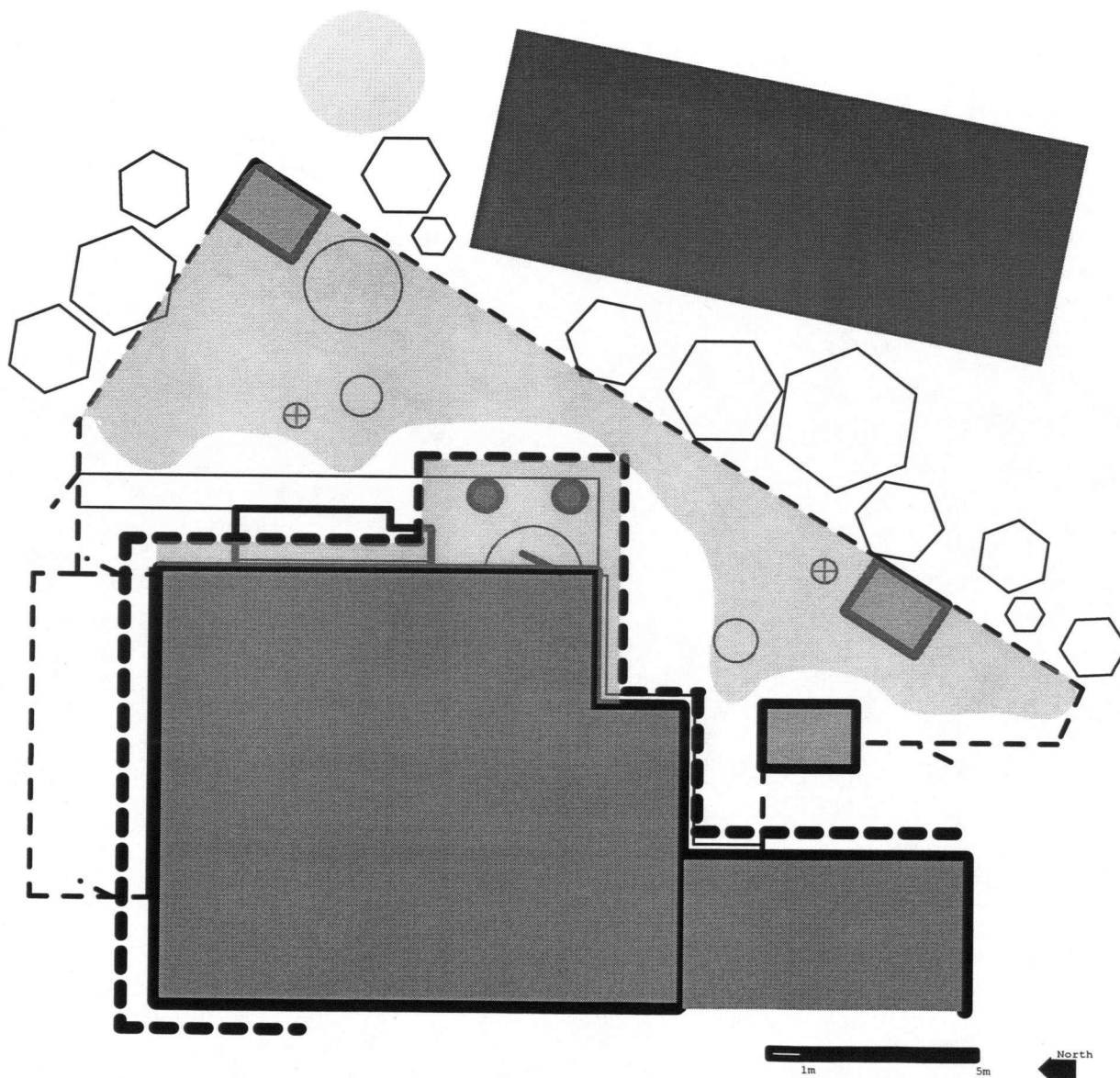


Figure D4.3
Existing shade diagram
10:00 am summer

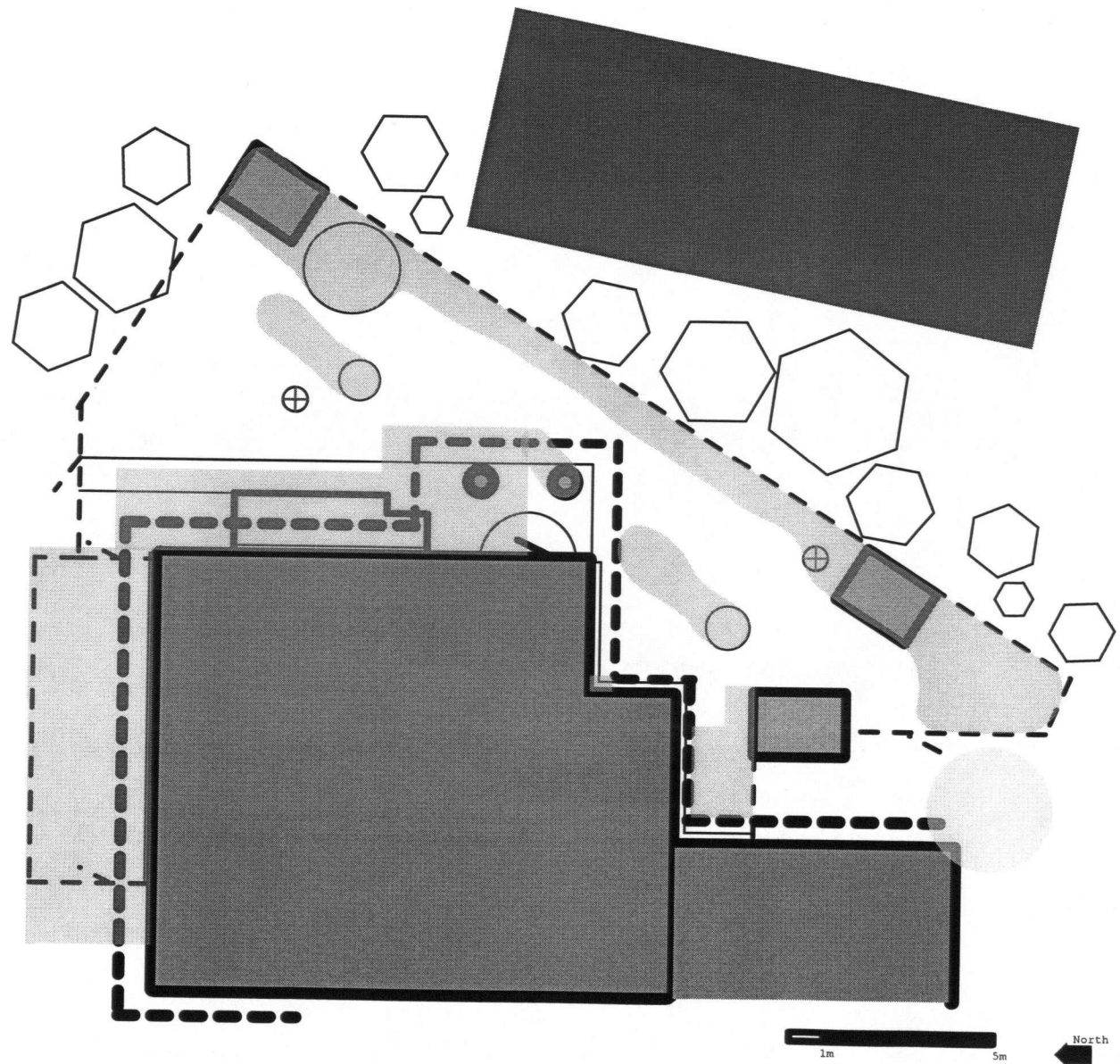


Figure D4.4
Existing shade diagram
3:00 pm summer

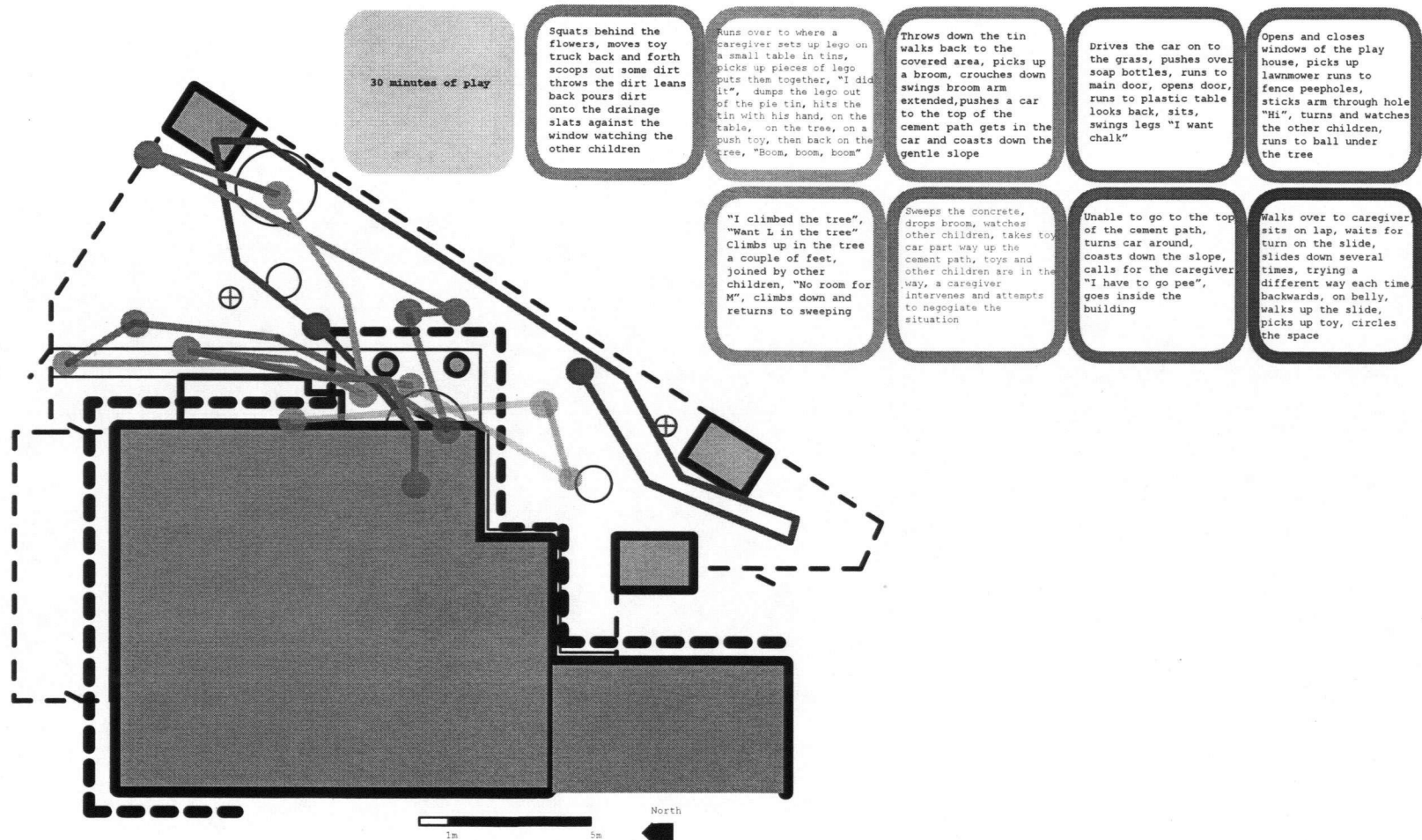


Figure D5
Circulation diagram illustrating the movement of an older toddler through the space during thirty minutes of freeplay

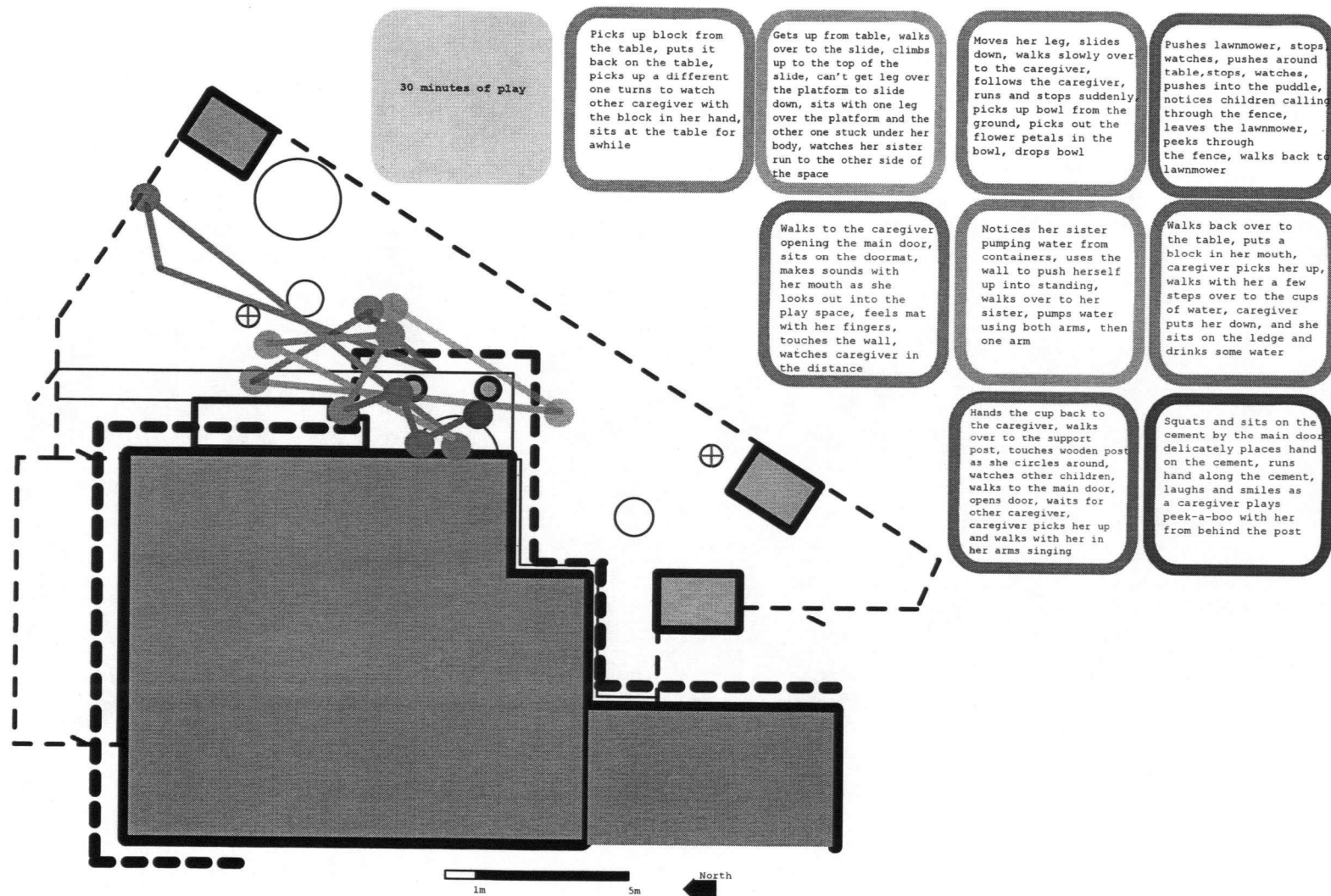


Figure D6
Circulation diagram illustrating the movement of a young toddler through the space during thirty minutes of freeplay

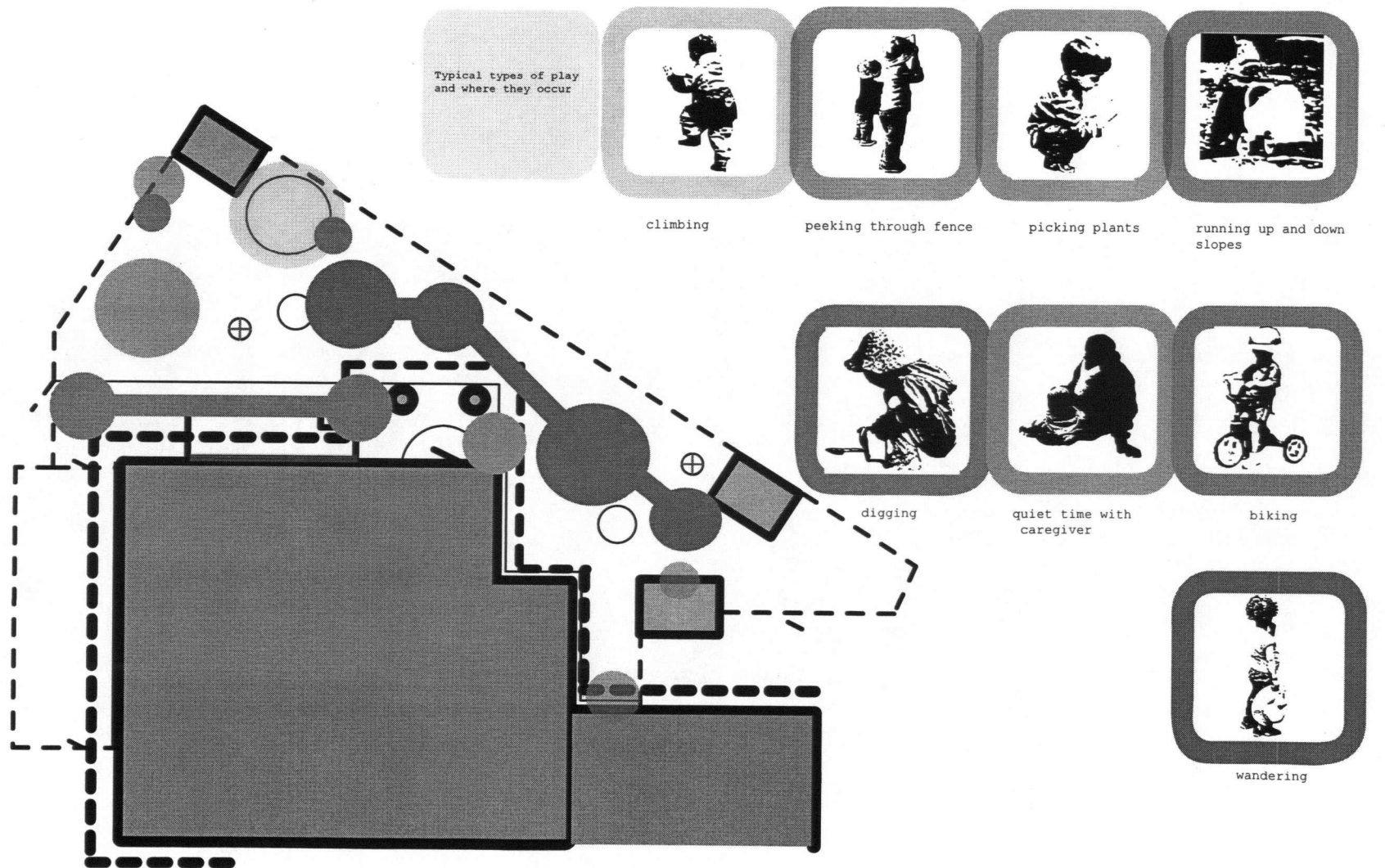
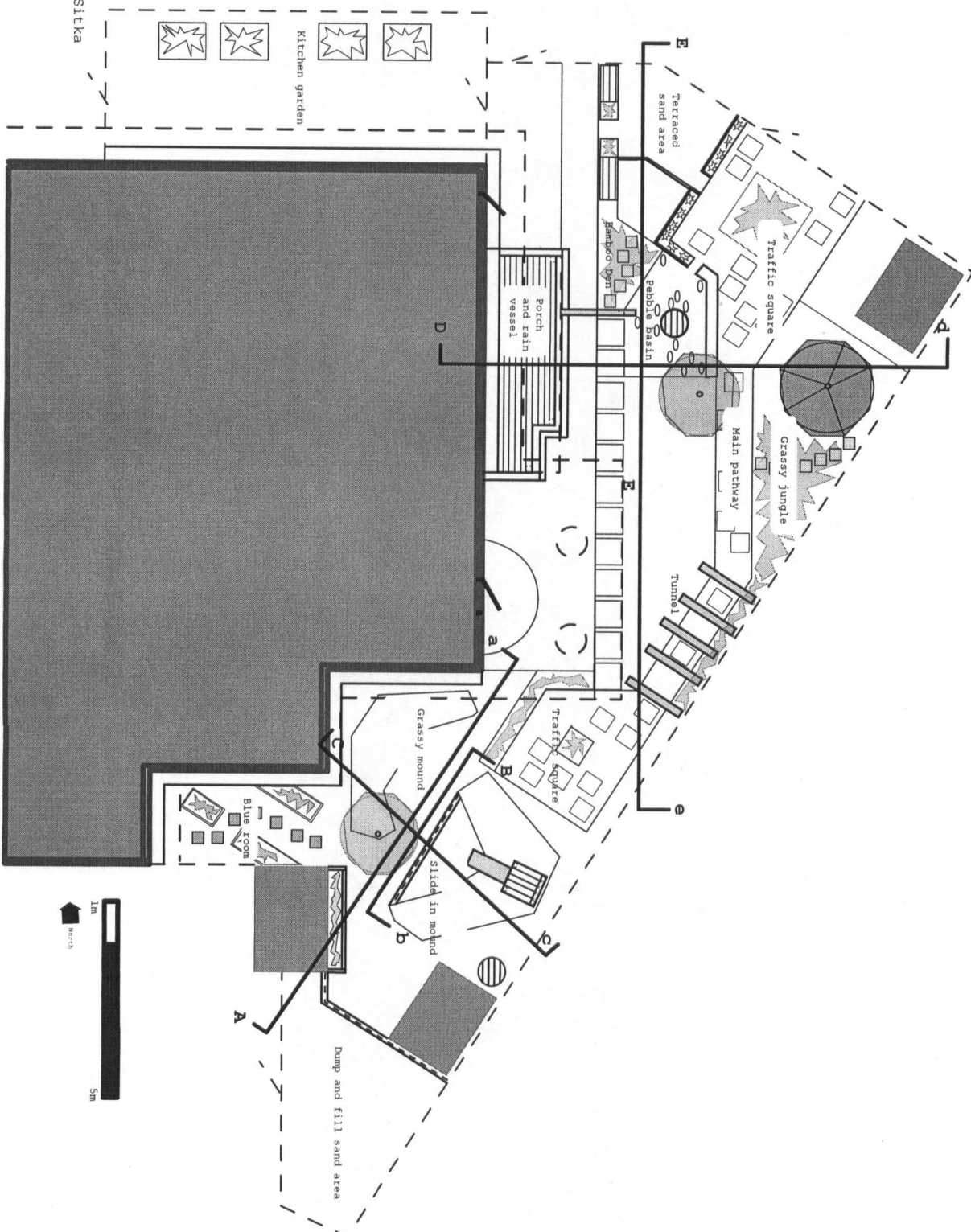


Figure D7
Diagram showing existing opportunities for development and typical types of play

Figure D8
Plan view of Sitka



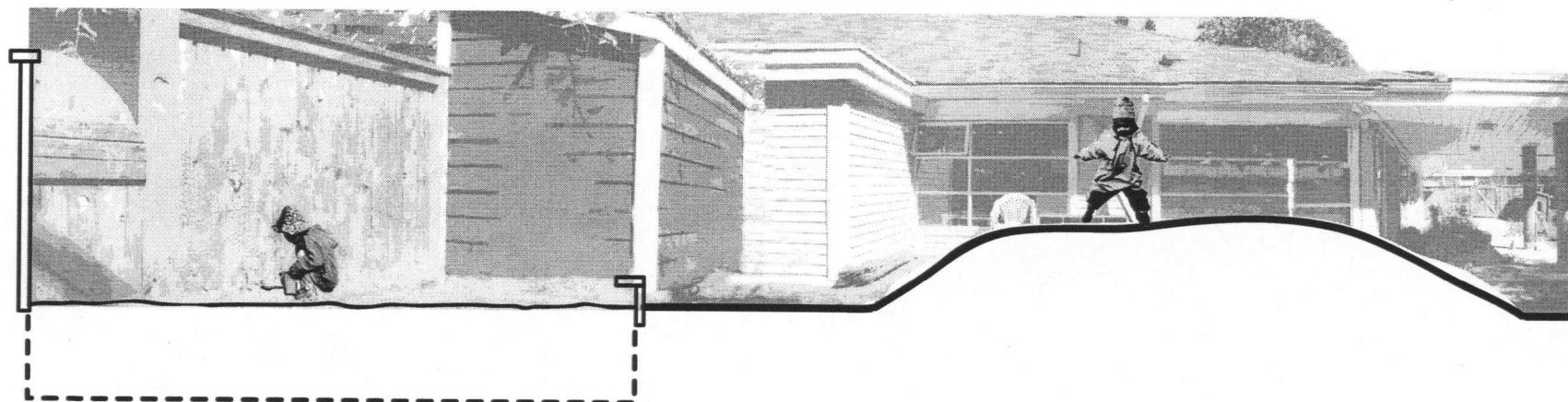
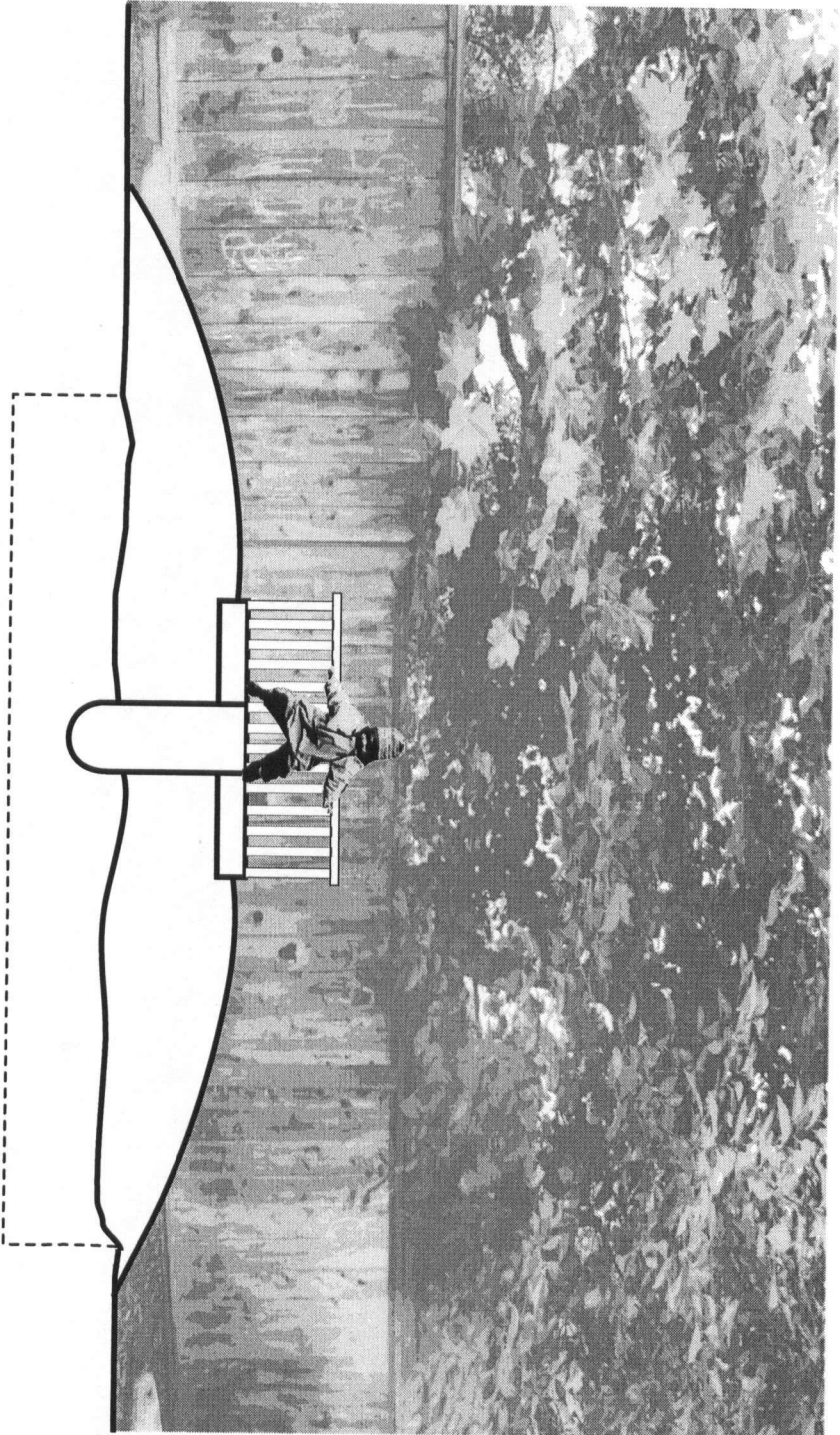


Figure D9 Section A-a
Dump and fill sand area and mound





1m

5m

Figure 9.1 Elevation B-b
Slide and mound

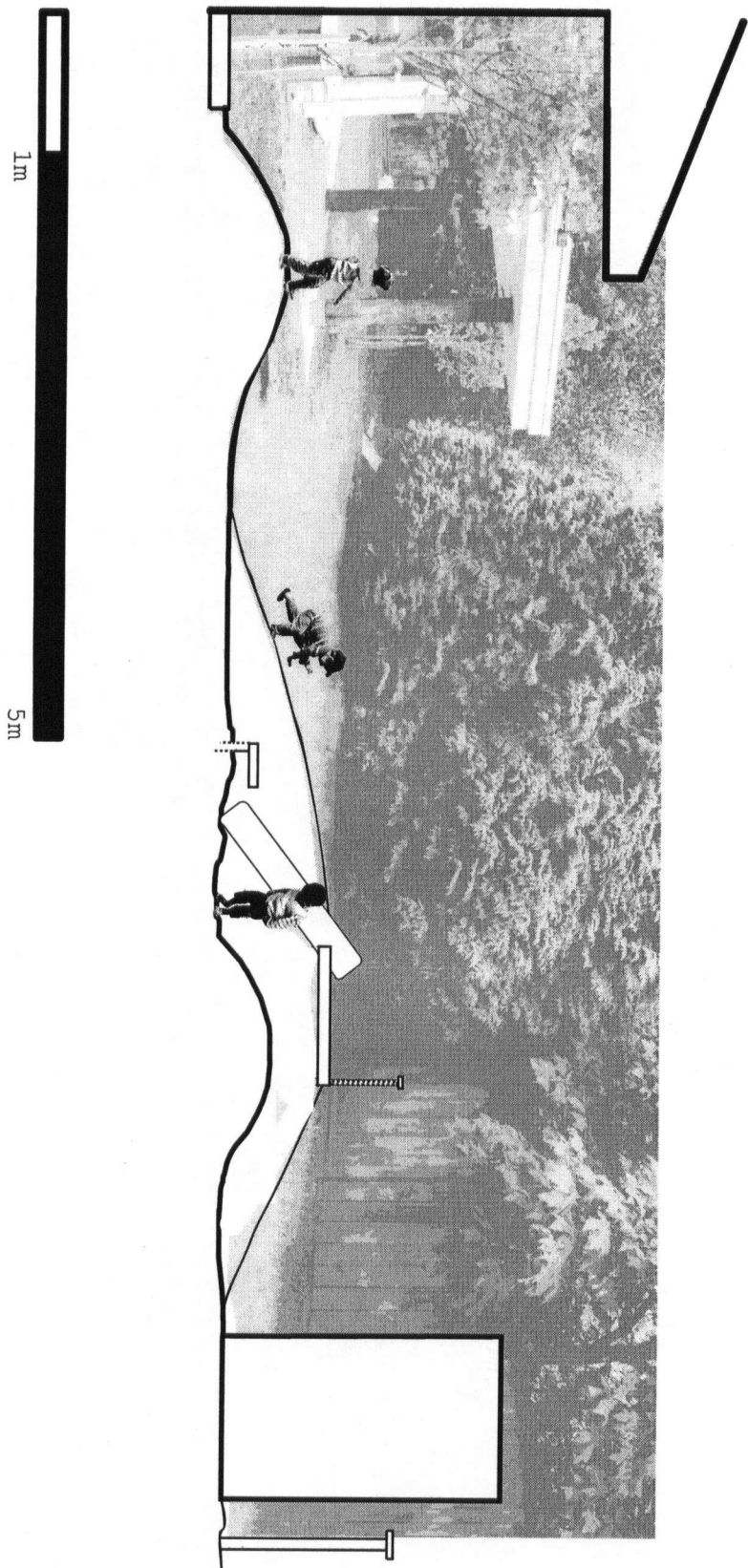


Figure D9.2 Section C-C.
Section of grassy mound and slide

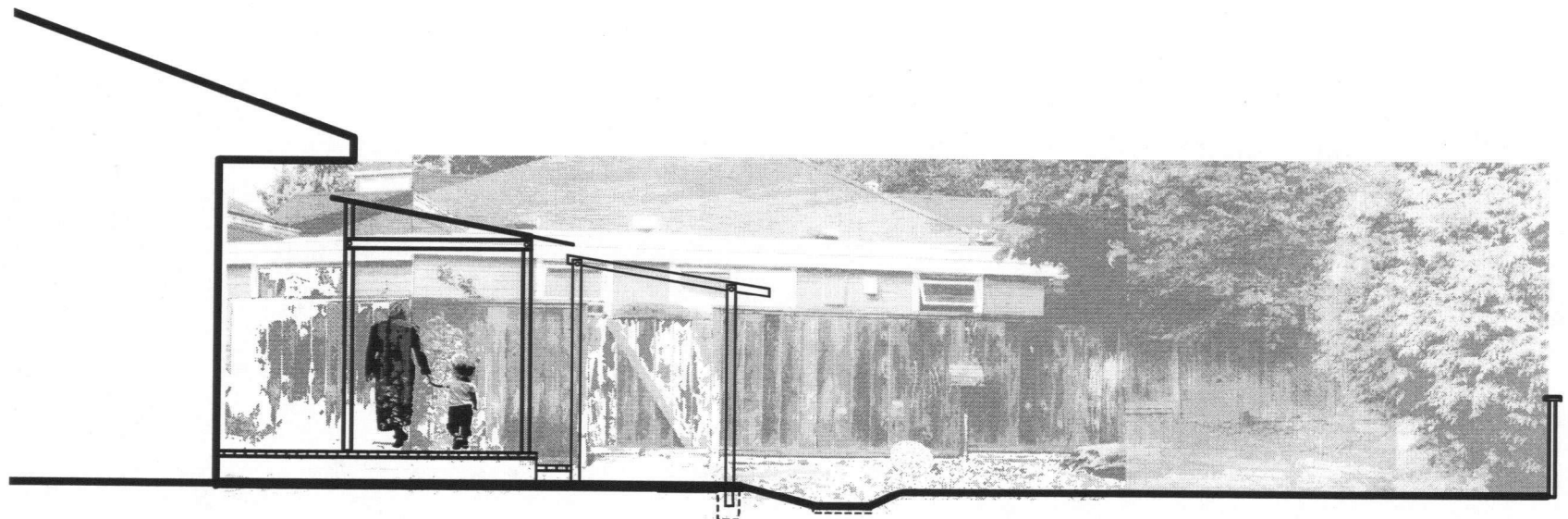


Figure 9.3 Section D-d
Porch section through mosaic basin



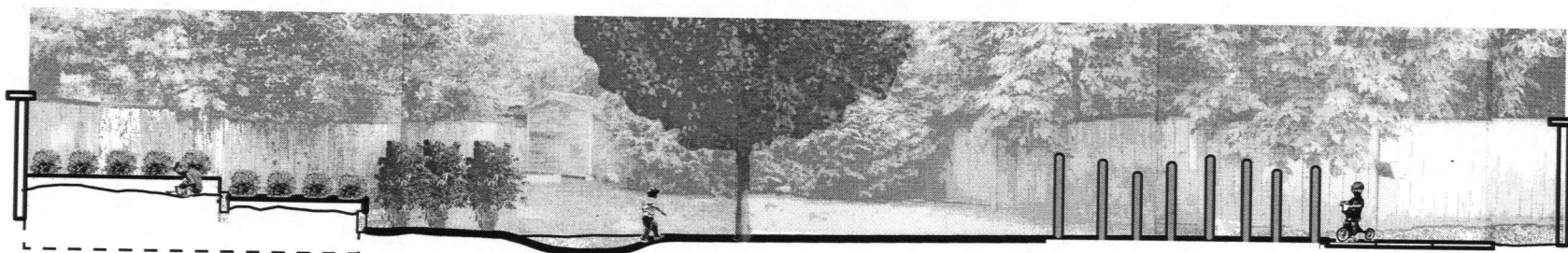


Figure 9.4 Section C-c
 Architectural topography: terraced sand box, bamboo den, mosaic basin, tunnel, main pathway



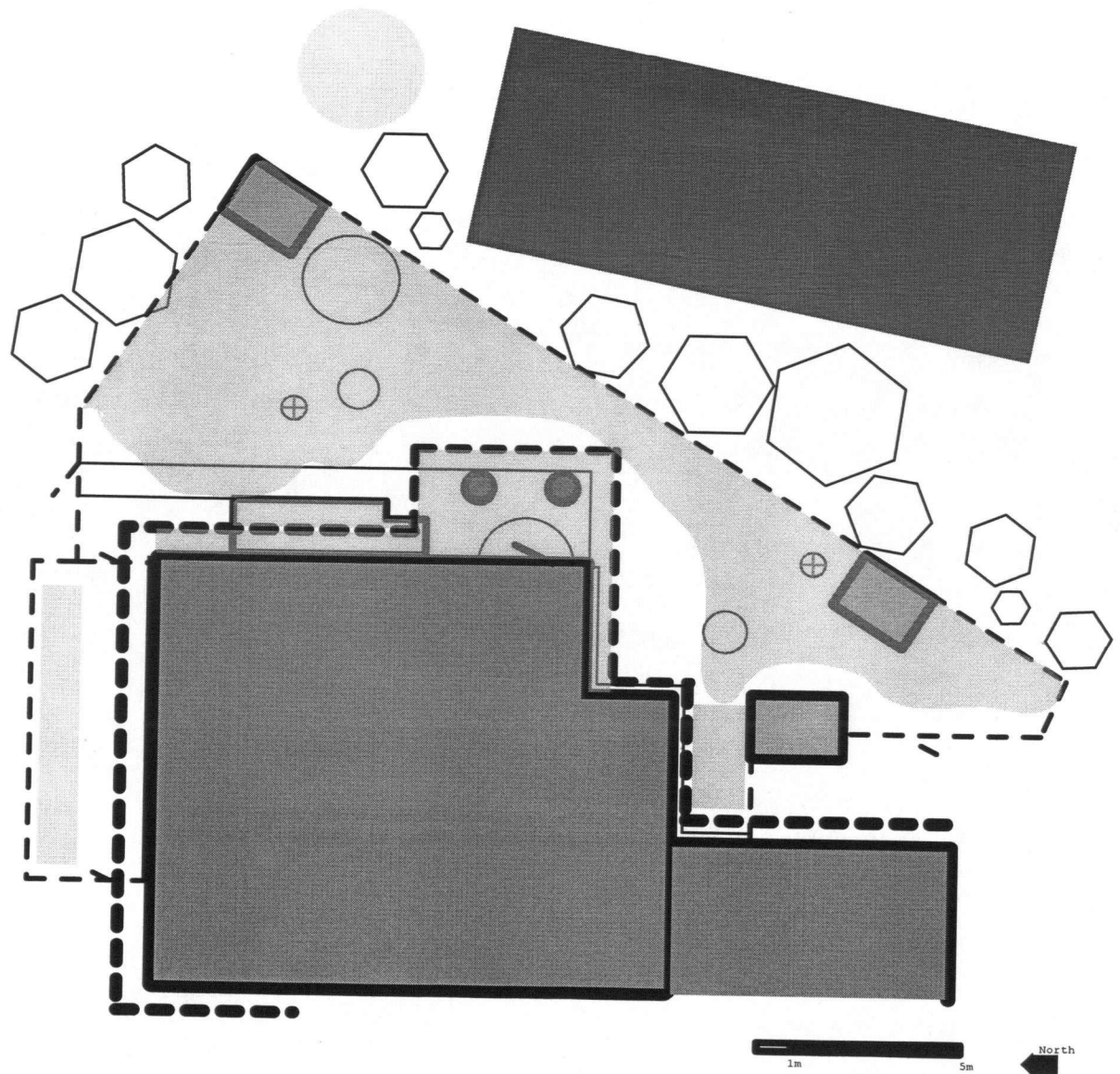


Figure D10
Shade diagram after design implementation
10:00 am summer

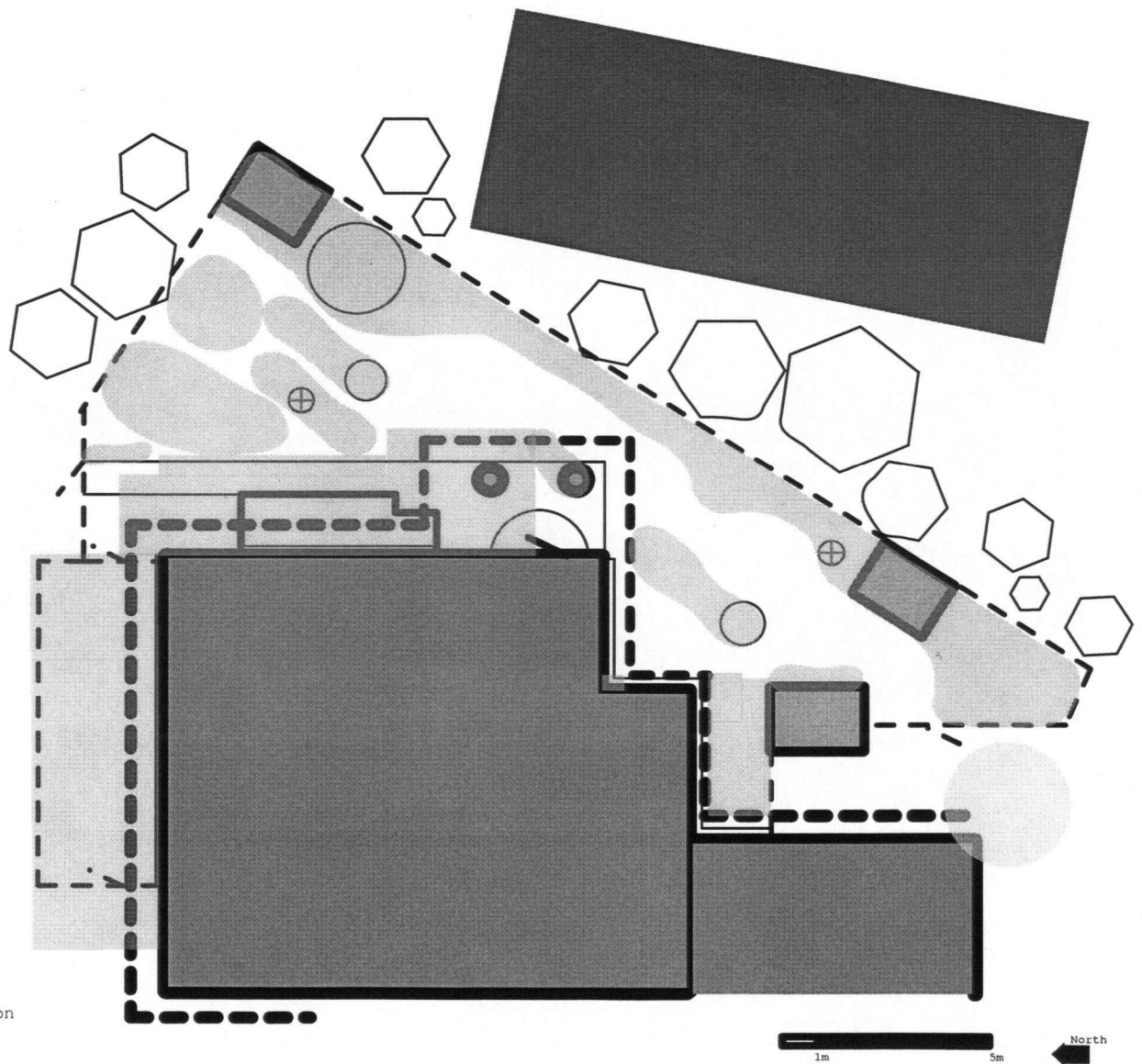


Figure D11
Shade diagram after design implementation
3:00 pm summer

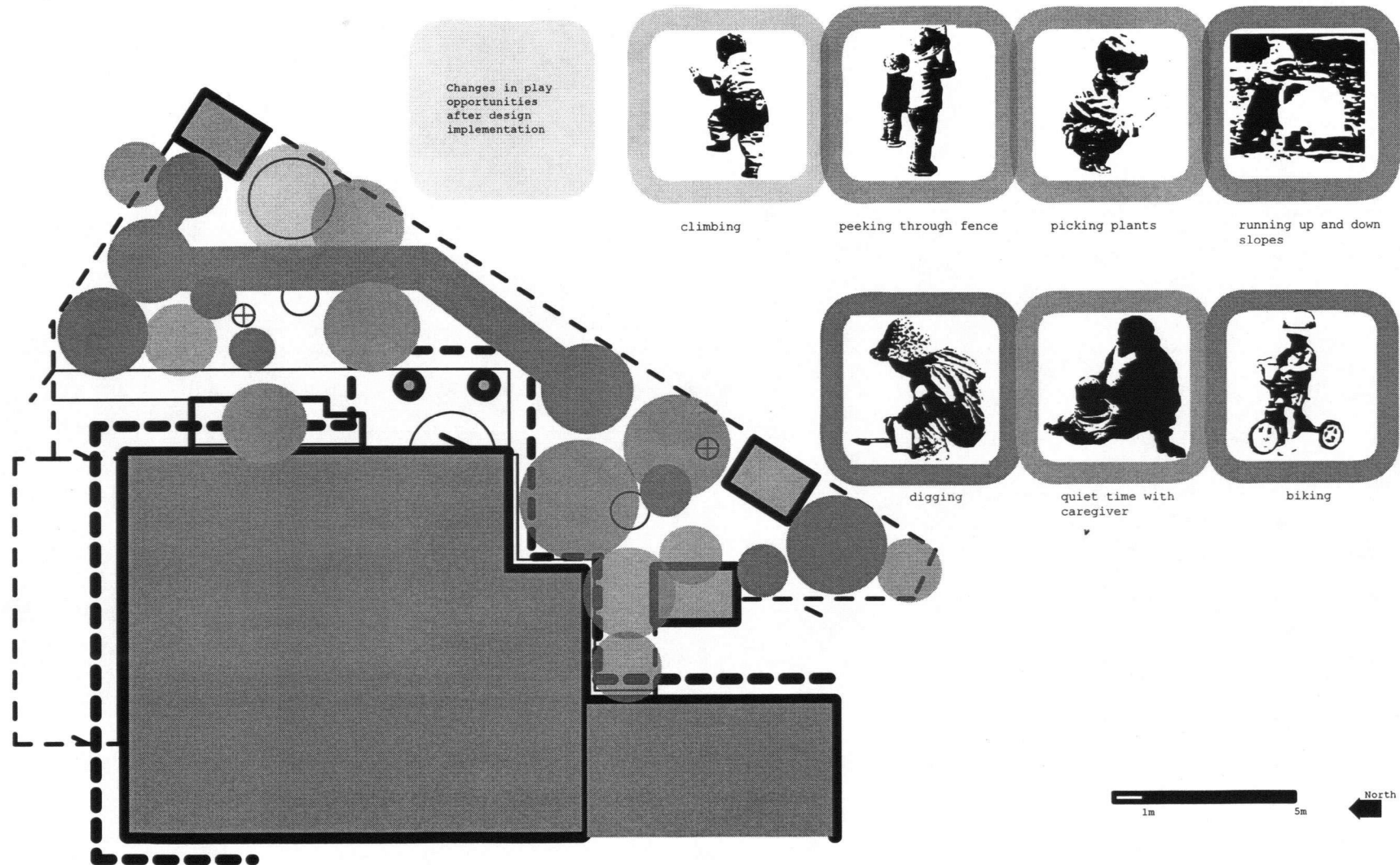


Figure D12
Diagram showing the increase in opportunities for development and increase in varied types of play after design implementation



Figure D12.1
Varied types of play after design implementation cont'd

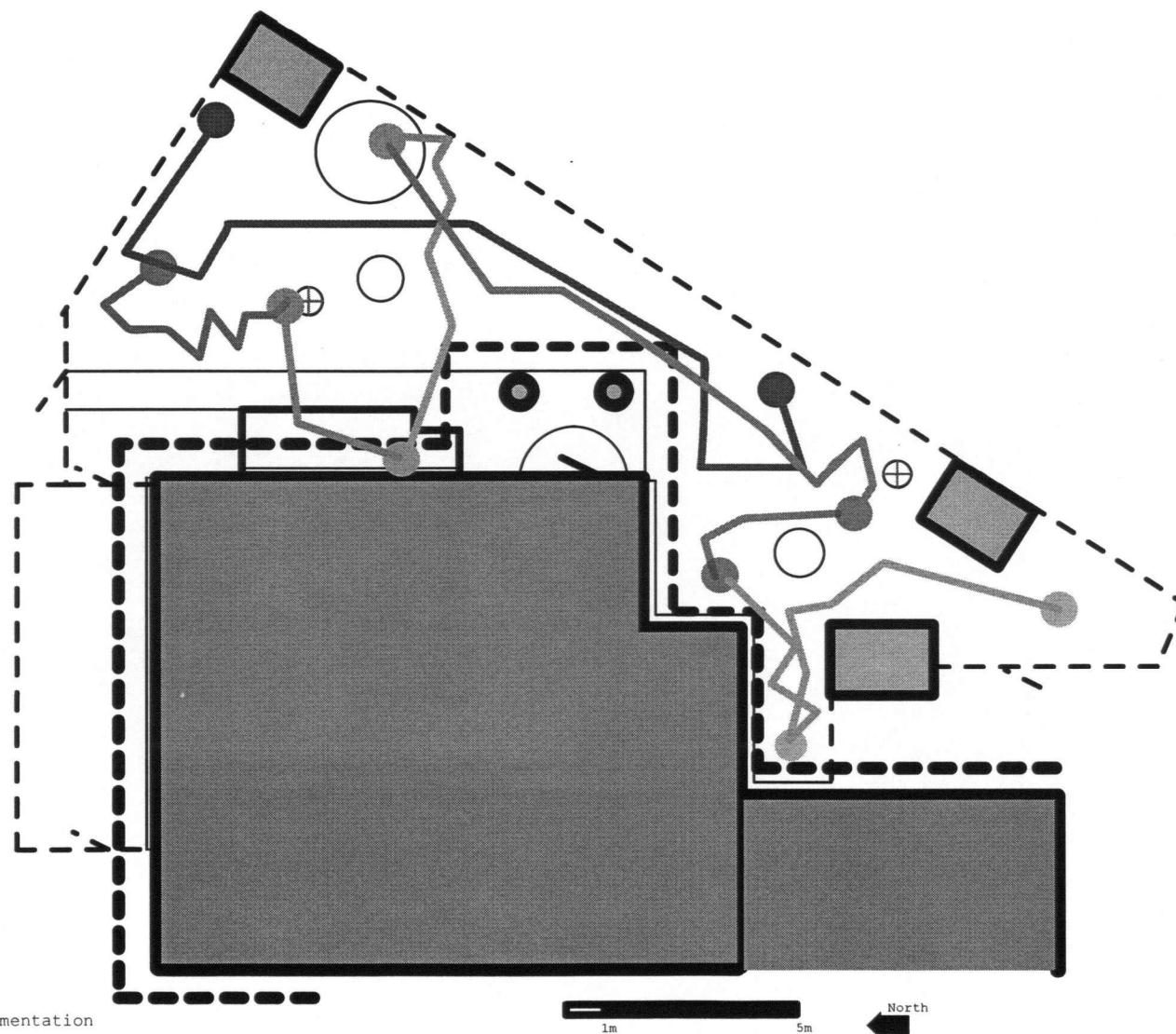


Figure D13
Possible toddler circulation
through the space after design implementation

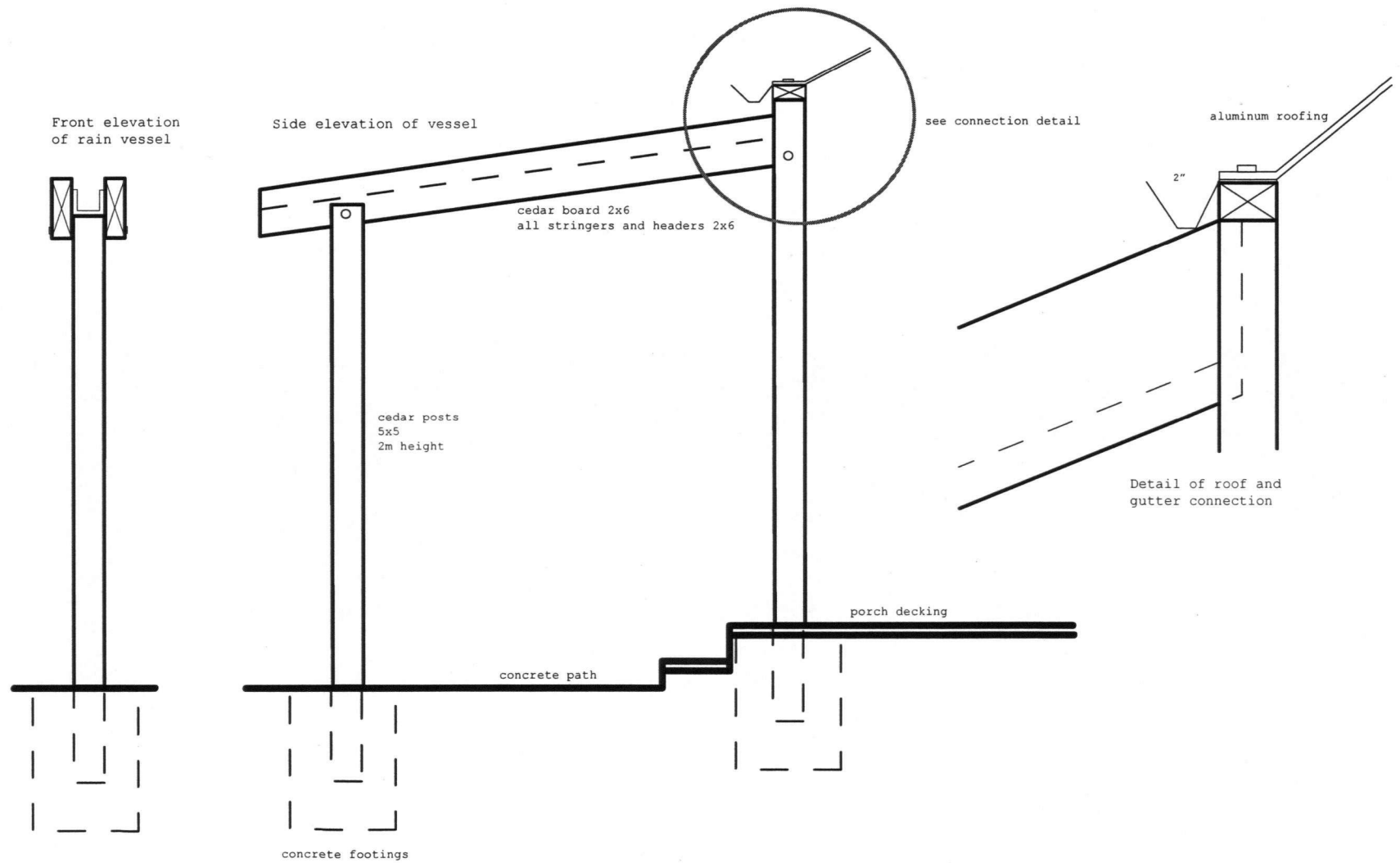


Figure D14 Detail of rain vessel
Front and side elevations

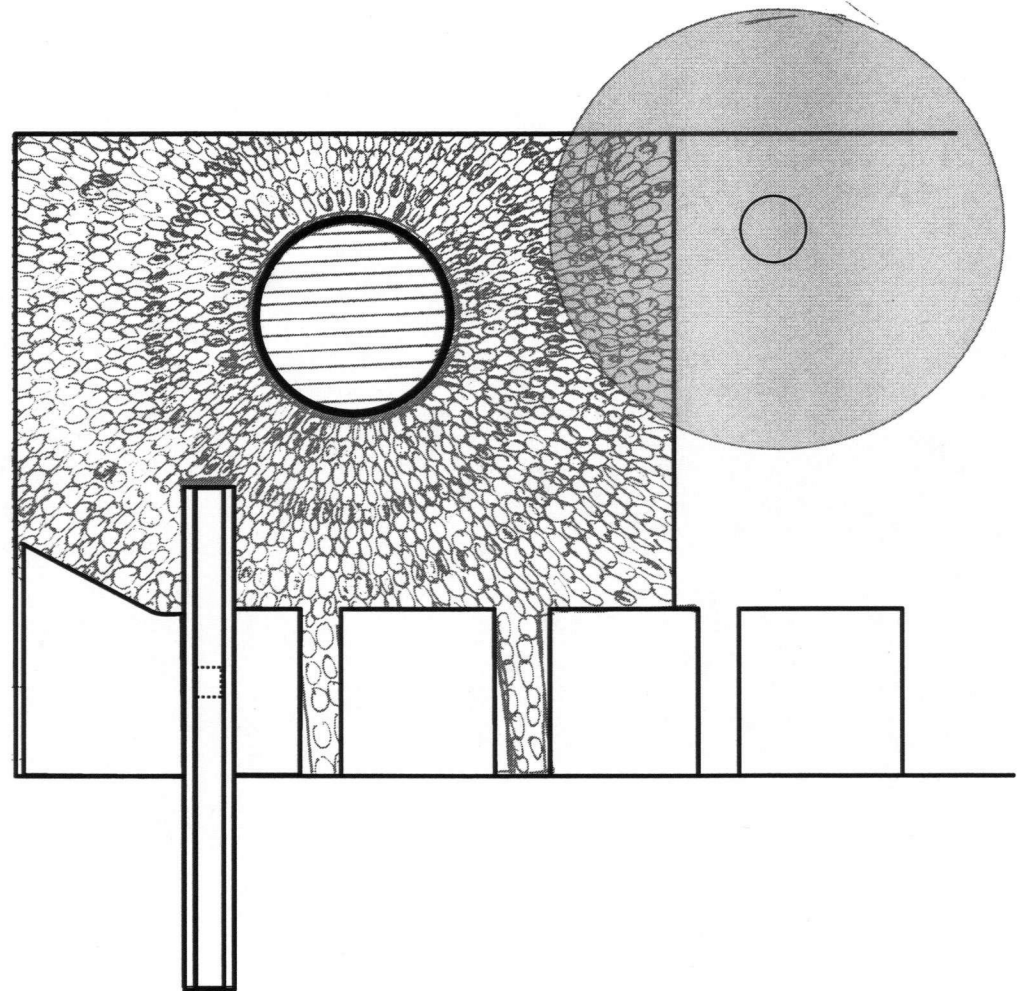
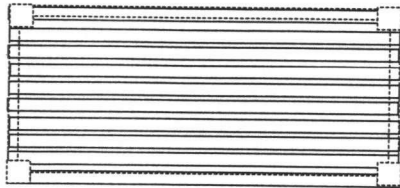
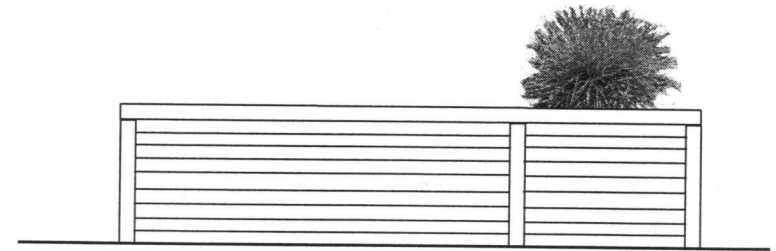


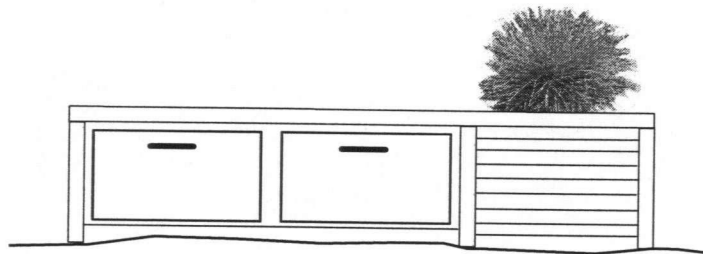
Figure D14.1
Detail plan view of mosaic pebble basin and rain vessel
1" Blue and green Mexican river stones set in concrete



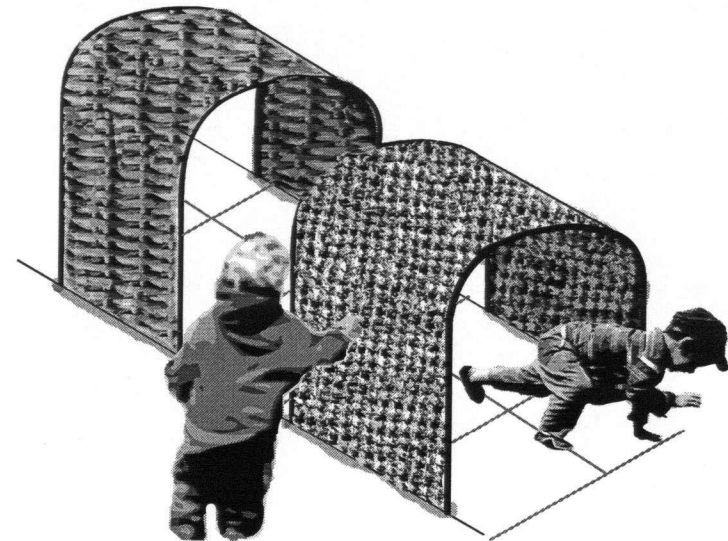
Plan view storage/bench
4x4 cedar posts
2x3 cedar frame for attaching cedar siding



Elevation storage and planter
Cedar siding

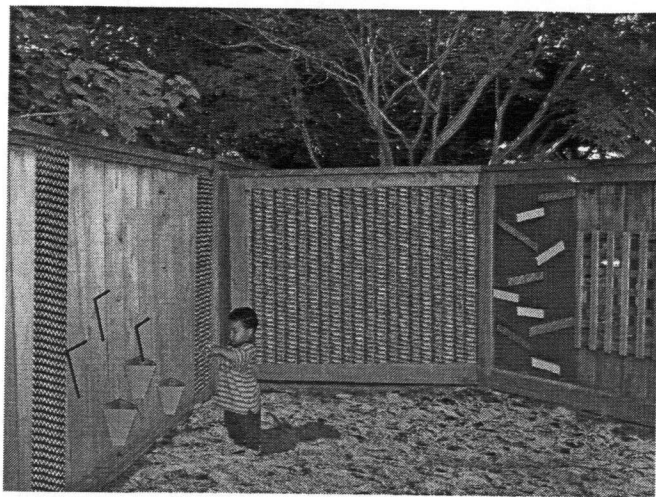


Removable storage boxes that lock into place



Textured tunnel along the main pathway
A range of materials are used to form archway

Figure D14.2
Detail loose parts storage for terraced sand area
Detail textured tunnel for main path



Dump and fill sand area with texture fence panels



Grassy jungle

Figure D15
Illustrative images



Blue room with blueberry bushes, mint, and grasses