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노인전문요양센터의 치유정원설계: 서울시립 동부노인전문요양센터

Therapeutic garden design proposal of a long term care facility for the elderly: Seoul Dongbu Senior Care Center

2012 년 8 월

서울대학교 환경대학원

환경조경학과

탁 영 란

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서울 시립동부노인전문요양센터

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이 논문을 조경학석사학위논문으로 제출함

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Abstract

This thesis project is undertaken to identify design elements for the people with dementia who reside in a long term care facility in order to obtain health benfits.

Environmental design research is playing an central role in creating quality living environments for the person with dementia. One successful environmental element in interventing and support the elderly with dementia is garden. Evidences have identified principles with regard to the relationship between residents and the design of their environments. These include the importance of a homelike environment, familiar environment, sensory stimulation, privacy, socialization, family visits, outdoor activities, comfort, security, and accessibility.

This project focused on designing the Seoul Dongbu Senior Center, a long-term care facility located in east region of Seoul, Korea. The center consists of assisted living facility and elderly daycare center. Therapeutic garden of this facility are two courtyard gardens and terrace garden . The main design philosophy is to create a restorative and welcoming outdoor environment where residents and visitors could get exercise and fresh air, have opportunities to grow their favorite plants, get away from the hospital routine, and have private time with visiting family and friends. Integrative concepts of design are universal and barrier free, physical, social, and cognitive/emotional support to obtaining therapeutic health benefits of residents, family, and staffs.

Key words: Therapeutic garden design, long-term care facility, dementia

Chapter 1: Introduction

1.1. Background

Due to advances in medical science, the length of age of the average is rising, resulting in the elderly population becoming one of the fastest growing age groups in Korea. The number of elderly is increasing, especially the proportion of the oldest. Since disease and impairments that hamper functional ability are most common among the oldest, it is probable that the number of elderly living in long-term care will remain high or even increase despite the emphasis placed on promoting home care.

The word *dementia* comes from the Latin words *dis*, meaning *away* from, and *mens*, meaning *mind*. The symptoms of Alzheimer's disease are both cognitive and behavioral. While symptoms are specific to individuals, most of these worsen with time. As the disease progresses, these brain cells gradually die leading to atrophy or shrinkage of the brain. Hence, what may be thought of as just forgetfulness is in reality memory loss, which means that the lost thought cannot be recovered. Alzheimer's disease is progressive and degenerative, and there is no medical treatment or cure to reverse this process.

Long-term care refers to any personal care or assistance that an individual might receive on a long-term basis because of a disability or chronic illness that limits his or her ability to function. Long-term care may be provided in a range of settings such as an individual's home and residential, assisted-living, nursing-care, or rehabilitation facilities. In some settings, individuals may spend short periods of time (90 days or

less) for rehabilitation before returning to the community. In other settings, individuals stay for much longer periods of time, often to their last days.

The term *resident* rather than *patient* is more commonly used while referring to individuals residing in long-term care settings. Most individuals receiving long-term care suffer from some chronic illness, and the focus of care is usually on supporting and maintaining health status rather than curing. While all different types of individuals (young and old) might use long term care services, the overall utilization of long-term care services and products is much higher among older adults.

Supportive environments are associated with positive health outcomes. An environment that provides aesthetic pleasure and possibilities for engaging in meaningful activities, as well as providing opportunities for socializing, may enhance coping during institutional living(Innes, et al., 2011; Safran-Norton, 2010). Many negative features characterize institutional living. These include loss of autonomy and self esteem, loneliness and hopelessness. Depression and dementia are frequent among the elderly in long-term care. The functionally efficient and sterile environment of institutions can accelerate decline in the abilities of the elderly.

In the past 25 years, an increase in research and knowledge about Alzheimer's disease and related dementia (ADRD) has occurred, and the application of nonpharmacological therapies has gained increased popularity and attention (Brawley, 2006). Though there is no cure for ADRD, researchers suggest that the utilization of nonpharmacological approaches aids in managing the behavioral and psychological problems

accompanied by the disease.

As the number of older adults with dementia increases, it is critical to recognize the importance of providing them spaces in the landscape that will effectively accommodate their specific needs. However, a major problem in designing therapeutic landscapes for persons with dementia is the gap between existing knowledge about this condition and its availability to and application by landscape architects(Tyson, 2007).

Having access to an enjoyable outdoor space can meet many needs for people with dementia, and also those that care for them. A carefully thought out garden design can be part of a treatment plan for people with Alzheimer's who are very restless or agitated and who like or need to walk around lot(Friedrich, 2009). A well planned area can provide exercise and therefore give an opportunity to relieve tension, frustration and aggression, provide personal space for reflection and privacy, give an area to accommodate a different social environment and provide additional stimulation with colors, smells and sounds of wildlife(De Bruin et al., 2009).

In particular there is a shortage of available research on wander gardens, outdoor settings that are designed to provide the person with Alzheimer's disease and related dementia (ADRD) opportunities to "wander" outdoor safety. However, there is a growing body of work on therapeutic gardens, and horticultural therapy as non pharmacological intervention, which promises to provide empirical research related to the design of outdoor settings that focus on the needs of older adults with ADRD.

A "memory garden" needs additional planning but can be regarded

as a therapeutic activity and can actually stimulate sensory sensations of persons with dementia. As we go through our lives we experience places and people which memories may be triggered by a certain sequence of images or smells. Safety issues are central to good garden design for people with Alzheimer's or dementia.

1.2. Assumptions of outdoor for the people with dementia

Florence Nightingale came closest with her observation:

> "Second only to fresh air…I should be inclined to rank light in importance to the sick. Direct sunlight, not only daylight, is necessary for a speedy recovery…I mention from experience, as quite perceptible in promoting recovery, the being able to see out of a window, instead of looking against a dead wall; the bright colors of flowers; the being able to read in bed by the light of the window close to the bed-head. It is generally said the effect is upon the mind. Perhaps so, but it is not less so upon the body that account… While we can generate warmth, we cannot generate daylight" (Nightingale, 1859, reprint 1969, 392)

Human relationships with nature are a fundamental genetically based need. According to Wilson(1984) who coined the word Biophilia to describe the need, this instinct emerges unconsciously in human cognition and emotions, and it revealed " in the predictable fantasies and responses of individuals from early childhood onwards" (p85).

In recent years, there has been a growing awareness that persons with dementia should have the necessary environmental support and freedom to access the outdoors, and a substantial crop of 'wandering parks", "healing gardens", "treatment gardens', and "restorative gardens"

has sprung up as a result.

Some of the potentially beneficial health outcomes for older persons with dementia may be similar to the potential benefits for older adults without a diagnosis of dementia: Multiple Physical and psychological benefits associated with increased physical activity; the hormonal balance associated with exposure to bright outdoor light; and psychological benefits from contact with nature elements(Cox, 2004). In addition to benefits that may be derived from actual usage of outdoor space, it is theorized that merely having access to the outdoors may in itself have substantial positive benefits, especially for person with dementia, because of the potential impact on autonomy, independence, sense of freedom, and self-esteem.

The E-B inventory for dementia environments developed by Zeisel. Hyde and Levkoff(1994) used the term "outdoor freedom" to describe the benefits to residents. Their model attempts to support individual treatment goals with measureable positive outcomes on resident behavior, mood, social interaction, and active engagement in activities. This emphasis on the freedom engendered by nature contact is echoed by Tyson. "Ultimate goal of treatment garden is to facilitate self-initiated and independent engagement in ordinary outdoor activities by proving residents access to supportive environment and the freedom to do so." (Tyson, 2002, p55)

Integrating insights from the nursing profession and landscape architecture, Randall and her colleagues(1990) proposed design solutions in the outdoor environment to specifically address symptoms of Alzheimer's disease such memory loss; apraxia; agnosia; wandering;

disorientation; plant ingestion; sun downing; and delusions and hallucinations. The authors caution that the proposed design solutions were not the only approaches to mitigate the symptoms of dementia but they tried to carefully address the issues necessary to achieve the goal of comfortable and secure outdoor environments for the patients.

1.3. Purpose of the study

Landscape designers must review empirical research and ideally, should experience outdoor therapeutic environments in institutional settings before creating landscapes for older adults with ADRD (Brawley, 2006). To create effective therapeutic environments, designers must understand the needs and the limitations of the care recipients based on evidences.

Thus this study focused on a therapeutic garden design at a long term care facility for the elderly located in urban area. By understanding the specific needs of the elderly users and other user, such as family member and care providers, better beneficial spaces can be designed to meet the needs of this particular multiple user group. The final product represents a garden design proposal of compilation of elements derived from the diverse user groups, literature review, and case studies.

The purpose of study is 1) to identify research-based knowledge that can inform the design of therapeutic garden for the long term care facility, and 2) to suggest a design solution for a long term care facility that incorporates the revised design recommendations that is sensitive to the site and user needs.

Chapter 2: Literature Review

2.1. Therapeutic Healthcare Garden

It is widely recognized that the design of the environment affects the healing process. Evidence shows that design can affect patient health outcomes, staff recruitment and retention, and even the effective provision of care.

There is growing recognition of the way our environment affects our health and well-being, with the spatial planning system now acknowledging the long-term impacts on quality of life and lifestyle factors. The design of many hospitals and health buildings now recognizes that the quality of the patient and staff environment is a main driver for efficiency in terms of health outcomes, staff performance and integrated service delivery. The collective decisions of health-service users, design teams, planning authorities and those responsible for the day-to-day provision of services will determine whether projects merely deliver on narrow goals, or whether they contribute in a more holistic way, providing wider health and well-being benefits.[1]

There are several theories as to why the natural environment is restorative. Roger Ulrich has broken these theories down into categories, the first category of theories focuses on learning as a means by which people attain restorative responses to nature. This theory speculates that people learn to associate restoration with nature

[1] Commission for Architecture and the Built Environment: CABE(2009). Sustainable places for health and well-being, London

settings, and associate stress with more urban settings. The second category includes arousal and overload theories, which theorize that the built environment is overly stimulating, leading the body to have higher levels of stress.

Nature has lower levels of complexity and stimulation, therefore making it more restorative. The third category which includes evolutionary theories, points out that many cultures have the same positive responses to nature. This may be because humans are genetically inclined to respond to certain landscapes more positively because these environments were favorable for survival (Cooper-Marcus, 1999; Gulliard & Marshall, 2012).

One major component of this process is the role nature plays in the environment of care. According to Ulrich, health outcomes research can potentially "indicate the degree to which gardens in healthcare facilities are medically beneficial and cost-effective relative to such alternatives as not having gardens" (Ulrich 1999). In fact, research has documented that the appropriate use of nature reduces stress; improves health outcomes; supports pain management; and promotes a sense of overall well-being among patients, visitors, and staff.

Clare Cooper Marcus and Marni Barnes have provided valuable research on the physical, psychological, emotional, and behavioral responses to being in contact with nature. Their numerous case studies of healthcare facilities and user groups are ongoing and are being further documented with post occupancy evaluations (POEs) as a way to check and document their findings(Cutlrer & Kane, 2009). POEs examine the effectiveness of designed environments after an

environment is designed, completed, and occupied (Cooper Marcus, Barnes, 1999).

Viewing nature may decrease pain by eliciting positive emotions, reducing stress, and distracting patients from focusing on their pain (Ulrich, 2004). According to distraction theory, pain requires considerable conscious attention. However, if patients become diverted by or engrossed in a pleasant distraction such as a nature view, they have less attention to direct to their pain, and the experienced pain therefore will diminish. The theory predicts that the more engrossing an environmental distraction, the greater the pain reduction. This implies that nature distractions may be more diverting and hence effective in reducing pain if they involve sound as well as visual stimulation, and induce a heightened sense of immersion (Ulrich, 2008).

A study of matched patients recovering from abdominal surgery found that those assigned to rooms with a bedside view of nature (trees) had better postoperative recovery than matched patients assigned to identical rooms with windows overlooking the wall of a brick building (Ulrich, 1984). Patients with the nature view suffered substantially less pain, as indicated by their need for far fewer doses of strong pain medication than their counterparts with the wall view. In addition, the patients exposed to nature had shorter post-surgery stays, better emotional well-being, and fewer minor complications such as persistent nausea or headache.

As noted, theory predicts that nature exposures may be more engrossing and hence pain relieving when they involve sound as well as visual distraction. Lee and colleagues (2004) conducted a randomized prospective clinical trial on the effects of nature distraction

on patients undergoing colonoscopy, and they found that visual distraction alone reduced pain but did not lower the intake of sedative medications. Joanne Westphal bridges medicine and design to create gardens that provide such benefits as relieving stress and improving the sense of well-being for patients, as well as for staff and family members[2].

2.2. Evidence based design for therapeutic garden

Wilson's *Biophilia* hypothesis (1984) holds that humans have a partially genetic tendency to respond positively to nature. Ulrich (2008) have developed theoretical arguments as to why a capability for rapid recovery from stress following challenging episodes was vital for the survival of early humans, and why evolution favored the selection of individuals with this partially genetic proneness for a restorative response to nature.

This restoration theory implies that modern humans, as a genetic carryover of evolution, have a capacity to derive stress-reducing responses from certain nature settings and content, but have no such disposition toward most built or artifact-dominated environments and materials (e.g., concrete, glass, and metal) (Ulrich, 2008). "These theoretical arguments have a practical design implication, which is that designing healthcare buildings with nature features may harness therapeutic influences that are carryovers from evolution, resulting in more restorative and healing patient care settings".

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[2] Source from workshop of Healthcare garden design, April, 2008, Chicago Botanic Garden

A few studies suggest that gardens can be effective restorative settings for stressed patients, families, and staff (Marcus & Barnes, 1999; Marcus, 2007; Thomas, et al., 2006; Ulrich, 2008; Windel, et al., 2010; Zeisel, 2007). Well-designed gardens not only can provide restorative nature views, but they also reduce stress and improve outcomes through other mechanisms, such as fostering access to social support, restorative escape, and control with respect to stressful clinical environments (Stigsdotter, 2005; Ulrich, 2008).

Marcus and Barnes (1995) used behavioral observation and interview methods in postoccupancy studies of four hospital gardens and concluded that recovery from stress was the most important benefit realized by nearly all garden users. Other postoccupancy research likewise has found that patients and families who use hospital gardens report reduced stress and improved emotional wellbeingSloane, et al., 2007). A quasi-experimental investigation of three gardens in a pediatric cancer center showed that participants (patients, families, staff) reported lower stress levels when in the gardens than inside the hospital(Whitehouse et al., 2001).

This approach, called, evidence-based design, is based on information available from both research and project evaluations. Such design approaches are engaged to create environments that are therapeutic, supportive of family involvement, efficient for staff performance, and restorative for workers under stress(Cutler & Kane, 2009). If implemented accordingly, these projects should result in demonstrated improvements in the organization's clinical outcomes, economic performance, productivity, customer satisfaction, and cultural measures (Calkins, 2001; Whitehouse, et al., 2001).

Zeisel focuses on the therapeutic effects of residential environmental design among patinets with the disorder[3]. Most people living with Alzheimer's Disease are still have good portion of working neurons with which they can learn, be creative, and enjoy life. Therapeutic environmental design seeks to tap into the areas of the brain that are still functioning rather than focusing on the parts of the brain that do not work[4].

2.3. Therapeutic Health care garden for the elderly with dementia: focused on Multisensory stimulation and reminiscence

The amygdala in the brain retains the person's ability to sense emotion & mood, therefore the major goal of non pharmacological treatment is to maintain positive emotion. Treatment can be a physical environment that promotes safety and reduces fear by directing cognition even without the person's awareness.

The literature is replete with environmental intervention strategies that have proven effective in improving resident behavior. The environment is like prosthesis for those who have difficulty carrying a cognitive map. By being self-evident it compensates for neurological losses (Innes, et al., 2011; Marcus, 2007; Windle, et al., 2010).

The development of psychosocial methods as a non

[3] Zeisel J. et al., 2003, Genretologist, 43(5), 697-711

[4] Zeisel, J & Tyson, M. (1999). Alzheimer's treatment gadens: design guidelines and case studies, In Healing gardens: Therapeutic benefits and design recommendations, C. Cooper Marcus and M Barnes (Eds), New York; Wiley.

pharmacological approach for the treatment of ADRD has been prevalent in the past few decades. The purpose of these treatments is to reduce psychosocial problems of persons with ADRD, resulting in improved quality of life and a reduction in maladaptive behaviors. A primary goal of psychosocial treatment is that a greater amount of attention is given to the memories, experiences, and perceptions of older adults with ADRD(Kearney & Winterbottom, 2006).

Reminiscence therapy is defined as " a part of the normal life review process brought about by the realization of death and viewed the use of the past as a mechanism that aids individuals in preparing for death by mitigating fear and anxiety" (Butler, 1963,p.66). Also it is a successful therapy because it is a vocal or silent recall of events in a person's life, either alone or with another person or group of people(Hsieh & Wang, 2003; Caniano, 2006).

In outdoor setting, plants, water, sounds, and sculpture may be incorporated in the reminiscence therapy session as memory triggers for the elderly with cognitive impairments. Activities included in the reminiscence therapy session consisted of the presentation of multi-sensory materials combined with a corresponding their experience of past(Friedrich, 2009).

Multi-sensory stimulation, also known as Snoezelen, presents a therapeutic strategy that can be conducted in outdoor environments. Snoezelen was originally developed in the Netherlands for the persons with learning disabilities in the early 1960s, and now a days to provide multisensory stimulation in a therapeutic environment for person with Alzheimer's & dementia. Snoezelen is based on the assumption that

"the world in which we live is a mixture of light, sound, smells, tastes, and tactile sensations which we access through our sensory organs. The outdoor environment has considerable potential to maximize the senses.

A garden is an important part of the care setting and can provide diverse sensory stimulation, including sound, color and fragrance(Cox, 2004). Outside spaces are often added to care homes as decorative features but without thought being given to their therapeutic benefits. Well conceived external environments can provide older people with spaces for privacy, activity and stimulation, all of which can contribute to an improved quality of life (Brawley 2006; Conhen-Mansfield, et al., 2010; DeBrun, et al., 2009; Friedrich, 1999; Gerlach-Spriggs, 1999; Kearney & Winterbottom, 2006).

The term 'multi-sensory' describes the multiple bodily senses to a stimulating environment that is designed to offer sensory stimulation using textures, colors, scents, sounds, etc. This type of environment provides an area for users to control, manipulate, intensify or reduce stimulation within a safe environment while relaxing and interacting on another.[5]

The most potent sense in evoking memory is smell. While the other senses must send messages to the lower part of the brain first to be processed and sent on to the cerebral cortex, the nose's nerves cells are directly connected to this part of the brain. And from the cerebral cortex, smell signals are sent directly to the limbic system, the part of the brain which deals with feelings and memory. Thus smell

[5] Jacky Bowring (2006), The smell of memory: sensorial mnemonics, The landscape Architect, IFLA Conference Papers, May 2006

connects to both the cortex, which is the Zone of cognition, and the limbic system of the hypothalamus which deals with memory and emotion, the non-cognitive Zone. This allows for the brain to process smell simultaneously in terms of cognitive and precognitive responses. The memory of smells becomes deeply embedded, powerful triggers of the past.

A sensory garden is a 'self-contained are that concentrates on a wide range of sensory experiences. Such an area, if designed well, will provide a valuable resource for a wide range of users, ranging from education to recreation' (Grant, 2003). Unlike traditional display gardens that are meant to be observed from a distance, sensory gardens draw the visitor into touch, smell and one can actively experience the garden with all senses (Vozzela, 2007).

Since dementia affects a person's short-term memory, a view of nature and the outdoors can provide useful orientation about the time of day and the season of the year. Therefore, any connection to nature that inspires or nurtures creative self-expression through painting, drawing or gardening is beneficial. A connection to nature has also been shown to enhance verbal expression (Chalfont 2006).

The natural world satisfies our need for contemplation, escape, restoration and distraction. Natural environments reduced agitation and aggression in people with late-stage dementia (De Bruin, et al., 2009; Parchana et al., 2003). Since nature stimulates the senses, this can provide multi-sensory therapy for people with dementia. It can also help increase attentiveness to environment, increase appropriate communication, reduce disturbed behavior and improve staff morale

(Riely-Doucet,2009).

Table< 2-1> Non-pharmacological Treatment matrix for Alzheimer's

Brain dysfunction	Functional loss	Treatment approach
Naturally mapped environment		
Parietal & Occipital Lobes	*lack of cognitive map & vision*	How environment communicates to residents by speaking for itself/cueing
Accepting Residents' Frame of Reference		
Hippocampal Complex	*being in the present, with no past or future*	How we communicate to residents by participating in their definition of the situation.
ADL Success Assistance		
Frontal Lobe	*loss of executive function -ability to sequence tasks-and motor function*	How we approach ADLs to create independence and enhance mood. The way they are done is as important as getting them accomplished."
Therapeutic Activities		
Frontal Lobe	*loss of impulse control & social norms*	How we therapeutically structure activities to increase relationships, belonging to the group & individuation.
Multiple Communication Modalities		
Anterior & Medial Temporal Lobes	*loss of language & detailed memory*	How we link into the way residents perceive, feel & process information to enhance whatever types of memory are preserved.
Self-control Behaviors		
Frontal lobe	*loss of ability to place meaning & reality -no ability to soothe themselves*	Strategies to avoid negative behaviors- agitation, confusion, hallucination- to react positively to negative behaviors & to support positive behaviors.

2.4. Therapeutic garden design guideline and recommendations: Long-term care for people with dementia

Mary Marshall of the Dementia Services Development Centre at the University of Stirling, Scotland, recommended that dementia-specific residential facilities should be designed in away that compensates for disability, maximizes independence, reinforces personal identity, enhances self esteem/confidence, demonstrates care for staff and welcomes relatives and the local community (Marshall, 2001).[6]

To achieve these results she recommended that residential facilities for people with dementia should:

- be small in size
- control stimuli, especially noise
- enhance visual access, i.e. ensure that the resident can see what they need to see from wherever they spend most of their time
- include unobtrusive safety features
- have rooms for different functions with furniture and fittings familiar to the age and generation of the residents
- have single rooms big enough for a reasonable amount of personal belongings
- be domestic and home-like

[6] Marshall, M. (2001). Environment: how it helps to see dementia as a disability. *Care Homes and Dementia: Journal of Dementia Care*, 6, 15– 17.

- have scope for ordinary activities (unit kitchens, washing lines, garden sheds)
- provide a safe outside space
- provide good signage and multiple cues where possible, e.g. sight, smell, sound
- use objects rather than color for orientation

Like other healthcare facilities, long term care Facilities with a medical model orientation can be even more foreign. Yet even contemporary and innovative facilities normally oversimplify and underuse cultural resources. Caregivers and designers may not appreciate the value of accommodating clients' religious, ethnic, or lifestyle characteristics in facility programming and design; neither do they understand how to do so(Safran-Norton, 2010).

Culturally based design interventions will have greater therapeutic value when they are based in activities or interactions (a) that are cognitively simple or comprehensible to people with dementia and (b) that have a possible manifestation in the physical and social environment. Such activity-oriented design interventions are likely to be equally meaningful to older adults without dementia.

Thus, the criteria for inclusion of cultural resources (and the focus of this article) are based on the needs and capabilities of people with dementia, but the potential applicability is much broader. Although they may not revert to the more traditional end of the cultural continuum in the same way, many cognitively intact older adults may also benefit from incorporation of activity-based cultural resources in their living environments.

Key areas of cultural heritage to consider as a foundation for

design based on a review of existing literature on culture and aging. Key domains of culture identified in existing literature include cultural groups'(a) history and life experiences, (b) assets, (c) beliefs and values, (d) care giving practices, and (e) activities and preferences

2.5.1. Environmental design for the people with Dementia[7]:

- Where it is necessary to provide for the safety and security of the residents by confining them within a secure perimeter, this should be achieved by means of unobtrusive security measures that maximize the feeling of control over the environment.
- Those parts of the facility which are accessible to the residents should contain a variety of spaces that provide the residents with differing ambience, size and function.
- Each resident should have the opportunity to have a single room and be allowed to personalize that room.
- Residents should be able to see the features that are most important to them from the location(s) where they spend most of their time.
- The levels of stimulation should be adjusted to minimize unhelpful stimulation and optimize helpful stimuli with the periodic availability of high levels of illumination.
- be small
- have a homelike appearance
- provide opportunities for engagement with the ordinary activities

[7] *Fleming, R. & Purandare, N. (2010). Long-term care for people with dementia: environmental design guidelines.. International Psychogeriatrics, 22 (7), 1084-1096.*

of daily living,

- have an outside space that is accessible to the resident when accompanied by a member of staff.

2.5.2. Dementia-Friendly environments: A guide for residential care-Gardens and outdoor spaces checklist by Victoria government health information, Australia [89]

- Unimpeded access for people with dementia to outdoor areas
- Safe and secure outdoor spaces
- Outside areas visible from inside
- Dining areas with garden views
- Outside access from bedrooms overlooking gardens
- Clearly marked entries and exits
- Porches, patios and pergolas located near entrances to help orientation and wayfinding
- Clearly designated areas for meals and socialising
- Enclosed areas for privacy
- Places to sit with family and friends
- Private space for staff
- Shaded areas
- Barbeque for outdoor eating
- Level, well-lit, non-slip, no-glare paths
- Paths of uniform color or safe transition between colors
- Paths with color contrasted edges and borders
- Paths suitable for ambulant and semi-ambulant people and

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[8] Fleming, R., Crookes, & Sum, S. (2010). A review of the empirical literature on the design of physical environments for people with dementia, Australian government Initiative.

[9] Source: www.health.vic.gov.au/dementia/changes/gardens.htm

wheelchairs

- Hard to climb fencing
- Fences concealed with plantings along boundaries
- Trees close to fences that cannot be climbed
- Gates and fences merged to conceal gate handles and latches
- Familiar looking, long-lasting and stable outdoor furniture
- Seating providing rest along paths
- Outdoor furniture arranged to support either private time alone or social interaction
- Handrails where needed
- Low maintenance, non-toxic trees, shrubs and plants
- Fruit trees, herbs and vegetables, providing seasonal cues and outdoor activities for people
- Plantings with different colors, shapes, foliage and scents
- Trees planted for shade
- Colorful and scented plants for orientation and wayfinding
- Pot plants and vegetable and herb gardens close to where people sit
- Raised garden beds
- Walking circuit

Other features:

- movable potting bench /greenhouse/potting shed
- recreational shed with cupboards for rummaging
- tool shed with secure storage for items requiring supervised use
- safe water feature without a pond or stones
- bird bath and feeder/children's play equipment

- mail box/ bus stop /car for washing and tinkering
- gate for latching and unlatching
- adjacent recreational areas, such as a bowling green

2.5. Synthesis of literature review

Design Program for Design Imperative– behavior–setting interactions which support therapeutic goals–provide the framework for the identification of activities and associated facilities that will achieve the stated therapeutic goals and objectives. The design imperatives for the elderly with dementia are:

Table< 2–2> Design guidelines for the elderly with dementia

Design Imperatives[10]	Program considerations	Design Application
Diversity: The opportunity provided by the setting for multiple choices to be made with respect to preferred behaviors or experiences. The provision of diversity allows the individual to choose the place which best supports her or his preferred experience.	Provide range of activities, spatial qualities and landscape character.	Large open multiuse space Smaller enclosed spaces Manicured garden planting & natural areas Enhance seasonal/diurnal change
Discovery: A quality of setting which encourages the individual to explore. Akin to mystery, discovery is a quality suggesting more can be known about the setting by actively seeking new elements, relationships and experiences.	Provide hierarchy of space and visibility. Provide interest in detail & elements at close range. Hands–on activities, materials	Water features Manipulate materials–sand earth, water, wind Plant, harvest & process

[10] Lise Burcher (1999). The special care unit garden at the veteran's care program. Parkwood Hospital, London. Unpublished thesis, University of Guelph

Complexity: The cumulative affect of setting stimuli on the individual. Settings which are too complex are over stimulating and confusing; settings which exhibit too little complexity lead to boredom and listlessness.	Provide range of complexity & hierarchy of garden layout. High legibility near entrance, more complex in smaller perimeter spaces	Main garden layout visible to all. Smaller spaces, edges more complex Add complexity over time with plants material etc. Materials, elements that are moveable, changeable.
Engagement: The ability of the setting to maintain active interest over a period of time. The individual can easily derive a variety of experiences with qualities of the setting and can be intrigued by elements and their relationships.	Provide range of spatial experiences & program activities Incorporate change & movement in environment	Range of garden areas & materials to explore–color, form, texture Sensorial experiences
Connection: A personal relationship a person forms between himself or herself and qualities of the setting. Unique individual connections can be fostered through active personalization or nostalgic elements the individual relates to	Activities to personalize appropriate space–add, change, maintain elements	Authentic materials, elements based on personal, cultural, experience, preference
Ritual: The opportunity provided by the setting for repeated behaviors occurring on a daily or seasonal basis. Individuals can engage in behaviors individually or within a group which have temporal and symbolic consistency.	Involvement in temporal & spiritual activities, daily & seasonal chores, events	Authentic temporal activities–clothesline, flagpole, water plants, birdfeeder, sweeping, raking–access to tools
Control: The ability of the individual to manage his or her local environment. Factors such as noise, temperature, interaction with others, view, route etc. should when possible, be under the patients control. A sense of control will influence the individuals'	Opportunity to modify climate, select & move seating, walking route options etc. Legibility, accessibility to master environment	Moveable seating, tables, awnings, umbrellas, shade, cut flowers, harvest, plant.

perceptions of privacy, territoriality, security and comfort.		
Manipulation: The individual' s ability to change aspects of her or his environment to meet perceived needs and comfort. More importantly, manipulation of setting attributes offers the individual a chance to personalize his or her relationship with a setting.	Encourage personalization & Appropriation of spaces & elements. Incorporate in therapeutic programs	Planting & furnishings moveable, changeable "Wall of Fame" by residents, embellish garden, interior.
Accomplishment: The ability of the individual to achieve the fulfillment or completion of a task or to demonstrate an acquired skill. Walking for a known distance, maintaining a garden, adding another species of bird to a list are examples of activities that can included in program goals to create a sense of accomplishment for patients.	Opportunity to attempt challenge with security, to use skills for 'real' work	Patients care for self, manage & maintain setting Real activities –measurable
Temporal awareness: The opportunity provided by the setting for marking the passage of time on a diurnal and seasonal basis. Additional opportunities for engagement with the environment can be achieved by exploring opportunities to enhance patient awareness of the passage of time.	Provide opportunities to mark, measure time in active way with designated responsibilities	Mark seasonal & diurnal change elements, activities Measure wind, sun, rain Plants–seasonal characteristics, productive Flagpole, dinner bell etc.
Containment: The ability of the setting to create designed enclosure– the creation of visual boundaries which are opaque from within the designed setting but which are also obscured with landscape elements to minimize the experience of the edges thereby directing The focus inward to the	Design of edges to create strong enclosure and direct focus inwards to reduce anxiety. Edge to vary to articulate spaces. Edge treatment to have meaning, experiential component	Alterative edge options– plants, wall structure, garden feature as edge ie, water feature. Authentic edge treatment

experience of the designed setting.		

2.6. Case studies

1) The Alnarp Rehabilitation Garden

The term *rehabilitation garden* is no well-recognized concept but rather a term chosen to describe work done within the scope of the garden. To be clear, concept-wise a rehabilitation garden can be said to be a health garden, where experiences of parts of the garden are more dependent on the presence of therapists and activities, in which cases it can be said to be a therapeutic garden- while other parts of the garden are intended to give the patient opportunities for restoration by offering a restorative environment. (Figure 2-1)

But as there has been no established terminology to rely on in this field, the terminology is not consistent throughout this thesis. This is because knowledge has developed during the work on the thesis, and the papers have been written in collaboration with different colleagues and have also been written slightly differently as they are published in different contexts. In some papers, for example, it has been important to discuss the differences between the restorative and therapeutic parts of the garden while in other papers it has not.

Thus, there is no consistency in the English texts about the Alnarp Rehabilitation Garden; sometimes the American term healing garden is used, sometimes therapeutic garden is used and sometimes it is simply called a rehabilitation garden.

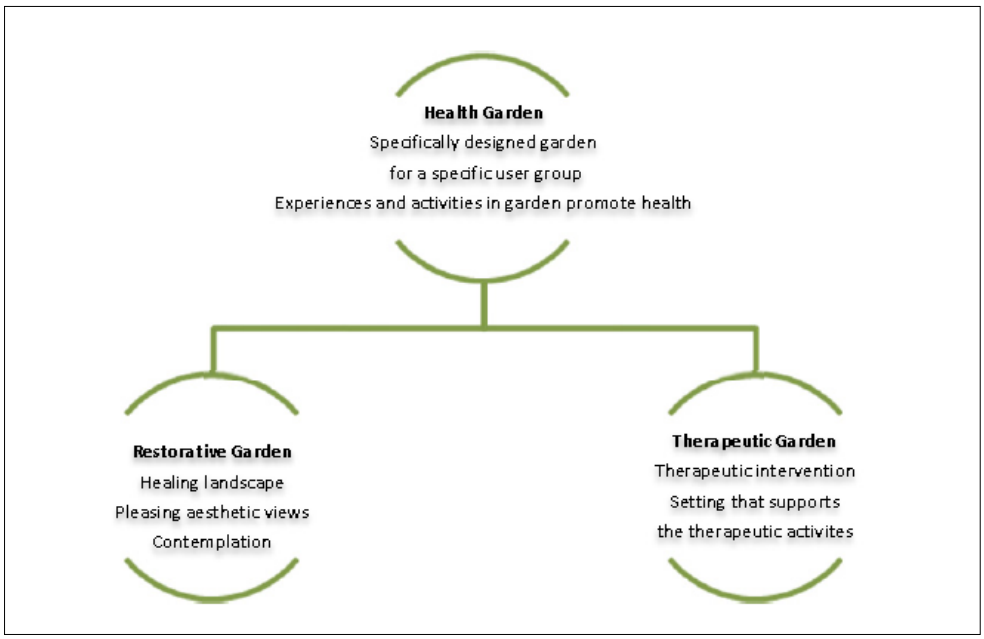

Figure <2-1> The Alnarp Rehabilitation Garden is a health garden that includes a combination of botha therapeutic garden and parts that are intended to be a restorative garden.(Developed from Abramsson & Tenngart, 2003.)

Since patients have different life situations, and different strength levels, the intent has been to design the Alnarp Rehabilitation Garden to suit participants at all levels. The first objective was to create environments that are less demanding and that focus on a more nature-oriented and restorative function. Secondly, there should also be environments that are more demanding and focus on cultivation and horticultural therapy.

There are also transition stages between very demanding areas and undemanding ones . The intent is to be able to illustrate the more orthodox manifestations of horticultural therapy and healing gardens, and simultaneously point to interesting transitions and intersections (Stigsdotter & Grahn, 2002, 2003). Put together, the intention has been to create a health garden that is a supportive environment for

people suffering from stress-related diseases.

Figure <2-2> Place for both rest and cultivation, inside the glass house
(Source Photo by Ulrika A. Stigsdotter)

The eight main dimensions of parks and gardens (Stigsdotter & Grahn, 2003).

- Serene - A peaceful, silent, and caring room
- Wild - A room facilitating fascination with wild nature
- Rich in Species - A room offering a variety of species of animals and plants.
- Space - A room facilitating a restful feeling of entering another world; a coherent whole
- The Common - A green, open place allowing vistas and visits
- The Pleasure Garden - An enclosed, safe and secluded place
- Festive - A meeting place for festivity and pleasure
- Culture - A historical place facilitating fascination with the course of time

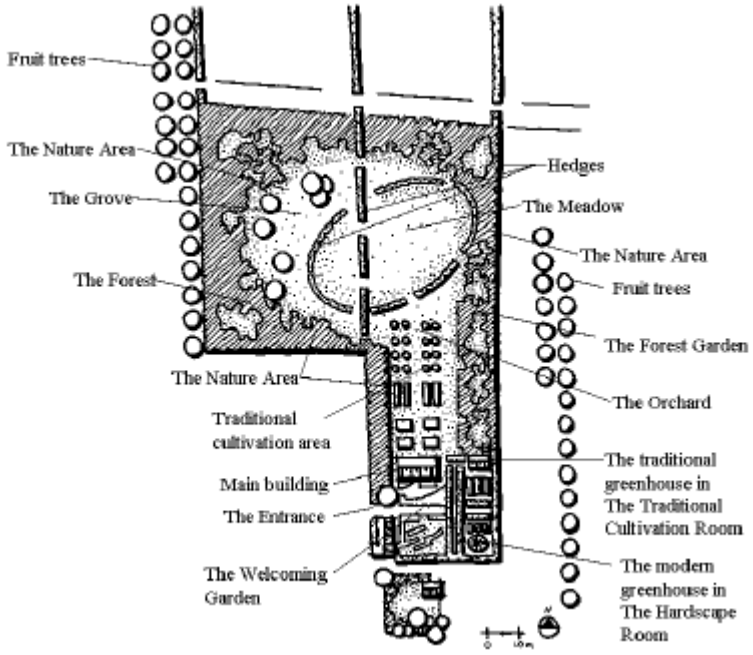

Figure <2-3> Plan of the Healing Garden at Alnarp
(Source & Illustration by Ulrika A. Stigsdotter)

2) The Sophia Louise Durbridge-Wege Living Garden of the Family Life Center, Michigan, USA.

The Sophia Louise Durbridge-Wege Living Garden of the Family Life Center in Grand Rapids, Michigan (Landscape Architect: Martha Tyson) is an exemplary facility serving the needs of patients with Alzheimer's and other forms of dementia who live with their families but spend each weekday at this day centre.

The garden was designed by Martha Tyson of Douglas Hills Associates for individuals with Alzheimer's and other forms of dementia and it was the first of its type in Michigan. There are two main components to the half-acre Living Gardens; the main strolling

and viewing garden, and the working garden.

One entry door to the garden and a simple looped pathway encourage walking while avoiding the confusion or aggression that can occur when patients have to make a decision to turn left or right, or remember which of several doors to return to. A large gazebo, wired for sound (music is especially soothing) and for fans on hot summer days, is a popular setting for staff-led programs. A waterfall feature provides the soothing sight and sound of water without the possibility of people getting into it (a problem with some Alzheimer's patients). A wide variety of perennial flowers popular during the youth of many of the patients provide opportunities for experiences of memory-recall led by the staff.

The working garden is a rectangular area east of the building with raised beds and trellises for horticultural therapy; a potting area with shade and a sink; a garden shed; a small orchard; a butterfly garden; and an area for seating with umbrellas for shade near the artrium entry door. The larger component of the garden entered via an arbor from the working garden consists of lawns, paths, perennial beds, gazebos, a waterfall and pond, and various places to sit.[11]

The principles used in designing garden are as follows:

- Creating an outdoor space that is domestic in scale and appropriate to local culture
- Maximize planting of a wide variety of perennials
- Involve management and staff in the design of the garden.

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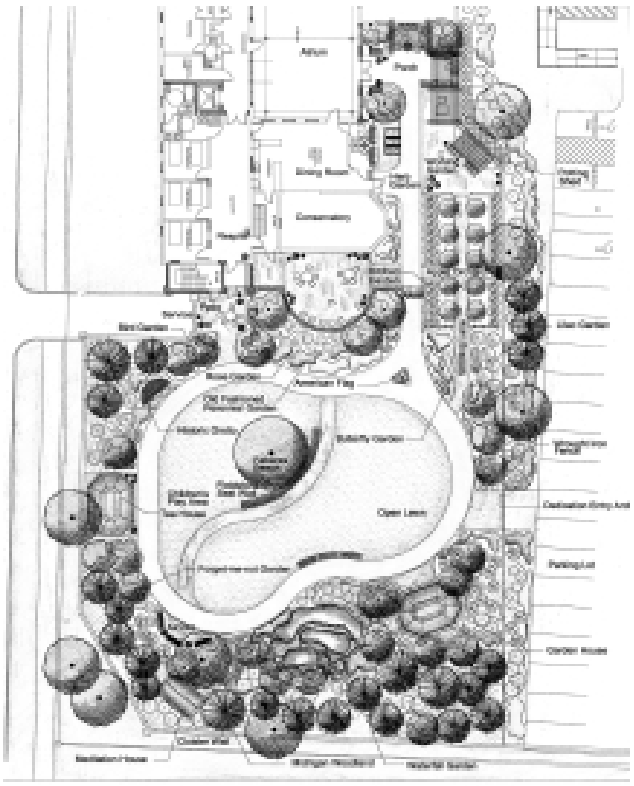
[11] Cooper Marcus (2007)

Figure <2-4> Sophia Louise Durbridge-Wege Living Garden of the Family Life Center



cited from Marcus (2007) Designed by Martha Tyson

3) Dementia Wander garden Psychiatric Service, Veterans Affairs Medical Center, Salem, Virginia, USA.

The dementia wander garden stage of the post-stroke rehabilitation helped the patient through a period of treatment resistance. The garden provided both an introduction to the patient's goal of outdoor rehabilitation and a less threatening environment than the long-term care facility hallways.

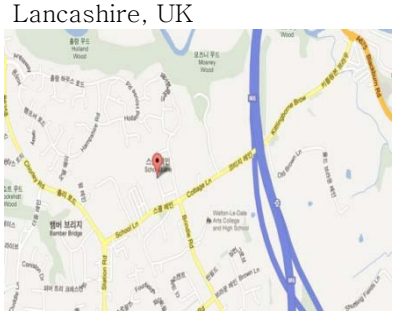
The outdoor area that we wish to develop will be more than just a garden; it will be a safe haven for our long term care residents and community visitors. It will truly offer therapeutic benefits to its visitors, providing a safe outdoor environment and reducing many of the negative behavioral aspects associated with wandering, especially for residents living with varying forms and degrees of dementia.

The wander garden will be a fully fenced area connected from the residents' lounge, within our long term care unit, to an open courtyard with direct access to and from the lounge. The eight foot fence will be camouflaged by shrubs and trees to divert the residents' eyes from focusing on what lies outside the Wander Garden and to minimize the residents' feelings of confinement. The garden surfaces will be level to minimize fall risk, with walkways that promote strolling. Walkways will also have a safe and easy surface for residents in wheelchairs or using walkers. Appropriate nontoxic plants will provide a therapeutic, tactile environment. Benches and appropriate seating will be interspersed throughout.

Making the outdoors a continued part of an individual's life through their very senior years can bring a measure of peace and contentment, evoking memories of childhood days and happy times.

4) Day Care Center– Charnley Fold Enhanced Day Care (EDC)

Location Bamber Bridge,
Lancashire, UK



Figure< 2–5> Charnley Fold Enhanced Day Care garden,
Source from report by Garuth Chalfont, May,2009

Charnley Fold is a newly remodeled facility in Bamber Bridge, Lancashire which supports older people with complex mental health needs. A wide range of services include a health and well-being centre; a carer's café and support service; a community based assessment, diagnostic and treatment service; a Memory Clinic and a specialist staff of psychiatrists, psychologists and social workers. Partners include Lancashire County Council, Central Lancashire Primary Care Trust NHS, Alzheimer's Society, Age Concern and Lancashire Care NHS Foundation Trust. Charnley Fold also provides an enhanced day care (EDC) facility for older men and women with complex mental health needs including dementia.

The EDC offers 125 day places weekly to service users who attend for over a 12 week session. Neurological conditions range from early onset dementia to those with severely impaired memory and attention, language and problem-solving skills, as well as challenging behaviour and depression. Staffing ratio is generally 1 to 3 with a maximum of 25 clients attending daily.

Up to six *sessions* occur each day. Two are specifically related to the gardens, but all have some involvement with the outdoors. Tasks such as weeding, watering, planting, cleaning bird tables, cleaning and refilling the bird bath and caring for the vegetable patch and the chickens are worked into the plans of the Gardening Group.
Spatial Archetypes: Seven Meaningful Spaces are based on familiar spatial archetypes that older people may recognize.

Enabling Space: Circulation loops connect six doors with secure garden areas. Doors are always open. They have the freedom to come out, they’ re not stuck inside. Many walking routes. A person can walk off a temper…sit down, look around…temper’ s gone. Paths and activity areas (beds, greenhouse, tables) are tightly integrated.
Outcomes: The Charnley experience benefitted clients with dementia emotionally, mentally, psychologically and socially, Communication, Mood, Memory. Interest, Motivation & interest, Skills .

Figure <2-6> Photos of Charnley Fold Enhanced Day Care garden, cited from report by Garuth Chalfont, May,2009

Table< 2-3> Alois Alzheimer Center

Alois Alzheimer Center, Cincinnati, Ohio Courtyard Garden Margarette E. Becjwit, Land. Arch. Number of beds: 102 Garden established: 1994 Size: 5,951 sq.ft.-0.14 acre	
Accessibility	The garden is accessible by two entrances and exits, both on the northern side and coming off of common areas. From the inside, the garden is visually accessible by windows surrounding every side, allowing views from surrounding every side, allowing views from several patient rooms, hallways, and a few offices.
Circulation	One large looping pathway that rakes the patients throughout the entirely of the garden, with one slight variation around a small fountain and plantings. Along the pathway are several landmarks- a birdfeeder, hill, birdbath, and gazebo, with two benches placed equidistantly-that help to keep the patient moving.
Covered and open space	Permanent covered space is provided by an arbor covered with trumpet vine located by the two entrances to the space. There are two main open spaces in the garden, one large green space, located in the middle, and a patio, on the northern end of the garden.
Design elements	Include all of the landmarks and small fountain. The two bird items allow users to return to a somewhat daily activity, replenishing the birdfeeder and cleaning out the birdbath. The hill allows the user to "climb" up a small incline, allowing them to get a farther view of the naturalistic setting. The gazebo offers a small place for refuge , should the patient choose so. The benches, which include room for a wheelchair to pull up next to, act as a resting point for those who may not be able to walk far distances. The fountain in the middle acts not only asa visual landmark, but creates a sound that permeates throughout the entire garden, letting the users mind wander away from what they may be thinking.
Plantings	The plantings are varied, using fragrant and characteristically unique plants. Large trees are spread around the garden offering small spots of shade.
Restraining system	The garden is almost entirely enclosed by the building, with exception of one corner which is made up of a 6-foot fence. The small gap allows for the view of the nearby wooded landscape just beyond the boundaries of the garden.
Seating	Seating is provided not only along the pathway, but several movable chairs are made available on the patio letting different sized groups gather together.
Sun & Shade	There is an ample amount of both sun and shade, provided by semi-mature and several small tress. The arbor next to the building offers a place for shade as well.

Table <2-4> Chemainus Health Care Center

Chemainus Health Care Center, Chemainus, British Columbia, Canada Adult Day Care Garden	
Edward A Stillinger, Land. Arch. Building established: 1898 Number of beds: 74 Garden established: n/a Size: 4,219 sq. ft - 0,10 acre	
Accessibility	Located on the far side of the Chemainus Care Center, it is not that accessible There are two entrances into the garden form the building that offer a way in. Visually, a large common area looks out onto the garden
Circulation	Circling around a large green space and two smaller planters, the users of the garden have a few options of how they would like to walk around the space. In total, seven different complete loos can be walked within the garden
Covered and open space	Covering one of the entrances into the garden, with seats underneath, a large canopy allows the users of the garden to sit outside even in inclement weather. The rest of the garden is rather open, split evenly with green space and with hard space.
Design elements	The prominent features are the raised planters where residents are encouraged to plant edible plants. The other feature for the garden are the two small planters in the northern end, where the patients are encouraged to plant what they want..
Plantings	The planting for the garden include several large trees, offering shade near seating, and areas where the plantings are resident's 'choice. A unique feature for the garden includes several different types of fruit plants where the uses can pick and eat while still in the garden.
Restraining system	With only a small plant barrier of the ocean is just beyond. On the other sides of the garden, but still beyond plants, is a fence system.
Seating	Several benches are scattered around the garden, providing a place to stop, rest, and socialize with other patients. Seating underneath the canopy provide a place for the users when rain, or other bad weather, is an issue. Additionally, portable seating is also available, so groups may form in the large open spaces.
Sun & Shade	The garden has tons of sun provided in the garden. Located on the east side, this garden catches the early morning sun into the mid-afternoon and then radiant evening sun Shade is provided by several large trees, however, all of the shade is located on the perimeter of the garden, where only some of the seating is located. The canopy next to the building also provides a little shade as well.

Chemainus Health Care Centre, Chemainus, British Columbia, Canada The Stroll Garden	
Edward A Stillinger, Land. Arch Building established: 1898 Number of beds: 74 Garden Established: n/a Size: 2,145. Sq. ft. – 0.05 acre	
Accessibility	Accessibility into the Stroll garden is from two doorway along a parallel hallway. This hallway surrounds a common area where visual access into the garden is attained through several windows looking out from the building.
Circulation	(Due to the garden being rather small) Only one wide walkway is present. Although appearing as a lone, seemingly one-way path, it connects to a parallel corridor on the inside, completing a loop. This loop encourages the residents to keep walking and improve their mobility.
Covered and open space	A trellis, covered with vines, acts as both a stopping point and a source of shade in the garden. The pther source of shade in the garden are a few trees next to the fence, that covers the basketball "court" and one of the seating areas. The rest of the garden remains fairly open with hard space dominating the area.
Design elements	Several design elements are included in the space. A basketball hoop is in one corner, offering asn activity to increase mobility. A clothesline is right next to the hoop, where residents can hang up anything they would like. A trellis is located near center of the garden, creating a stopping point in the garden. Lastly, a water spigot is right next to the trellis, a source where residents can collect water for use in the garden.
Plantings	There is a great variety of plants in the garden ranging from vines to large tress. Offered at a personal level, there are many options for the residents to see and touch. Plantings on the interior and exterior help to hide the fence on both sides.
Restraining system	The building creates the barrier on one side of the garden and a fence creates the other side. Because of the size of the garden, there is not a lot of room for plants to cover the fence, however, an attempt is made with small shrubs and a few trees.
Seating	There is plenty of seating available for the users of the garden. Located next to one of the entrances are two benches, creating a space for conversation and pleasantries. Another bench is underneath the trellis, a mid-point between both doorways. A final bench is adjacent to the water tap, a space for social interaction.
Sun & Shade	While there is a lot of sun available in the garden, the trellis and three large trees provide a substantial amount of shade, covering areas where residents will stop and socialize. When combined, the trees and trellis add the perfect amount of shade to balance out the amount of sun already available in the garden.

2.7. Summary & Conclusion

It is clear from the body of evidence that healthcare garden provides a benefit not only of restoration from stress for the clients , families, visitors, and staffs but also positive outcomes for the residents with ADRD as a nonpharmacological support. While it is still little evidences to know for sure what exact benefit is offered to elderly with ADRD, families, and staff in the garden it is safe to say that benefit from contact with nature include its ability to:

1) Offer some control for patients, who can wander about independently and safely with private yet visible seating, so that they experience a sense of freedom;

2) Socialization may improve when the garden feels safe and familiar to them. Family might visit more often in comfortable surroundings. Aggression and agitation may diminish and patients may talk among themselves;

3) Exercise can be encouraged when patients walk about the paths or stop and bend to perform gardening tasks ;

4) Connected nature can provide exposure to sun, winds, fresh air, smells of flowers, positive distraction can help reduce anxiety and mental fatigue, and promote positive mood. Patients become oriented to seasonal cues from nature.

Necessary characteristics of the design of space for use by ARDR patients include thru literatures , evidences from research and theory, and case studies;

- Space at same level with door open to the unit—important for residents' physical and psychological health and for reducing the stress level of caregivers

– Provide a number of looped pathways outdoors that from a continuous route with indoor corridors designed as “wandering paths”. Wandering and pacing are characteristic behaviors of many ARDR patients. Environments that support therapeutic walking, and thus lower the degree of restlessness and agitation, include corridors and outdoor paths that are easy to use, are provided understandable visual cues and interesting “events” en route, and form a continuous route that permits patients to walk safely without supervision, indoors and out.

– Provide an exit to the outdoor space that is easy to use and is kept unlocked. With ARDR patients, seeing space that is off limits can arouse high degrees of agitation and even violent behavior.

– Ensure that the outdoor space is securely enclosed. A garden or outdoor space must be enclosed by the building it serves, or with high, opaque fencing preferably screened with planting so that the image of enclosure is not too obvious. A fence or even a gate that allows residents to see “out” without actually permitting access can precipitate agitated behavior.

– Avoid using poisonous plants as ARDR patients may randomly pick leaves or flowers to eat.

– Employ memory triggers. Items evoking personal or cultural memories such as furnishing and plant materials may be usefully employed in the design of special care units.

– Provide a space for contact with plants during inclement weather or extremes of temperature. It is desirable to include a solarium, sunroom, greenhouse or even just a plant alcove.

As an evidence , case studies were performed to look at the effects of the “therapeutic garden” concept within the scope of the environmental design field. The studies analyzed the outdoor garden

spaces for the people with dementia. The gardens are located within assisted living facilities identified[12]

The majority of residents living in a long term care facilities require assistance with various activities of daily living which primarily happens on the ‘inside’ of the building. The findings in this study suggest that some activities could be taken outdoors (such as physical therapy, meals and music therapy) to complement some of the more medically-related therapies residents receive. Such a complementary and integrative approach in incorporating the garden space as an important aspect of living in the facility would benefit not only the residents, but the staff and family members as well. The garden additionally becomes a ‘coping mechanism’ for family members to seek respite and staff members to seek diversion

In general, smaller spaces make it easier for an older person to meet and talk with others, because smaller spaces reduce the number of distractions that may contribute to the loss of a train of thought or confusion over who was speaking, even what was being said. In addition, smaller spaces are more easily approached and claimed as “our meeting place”.

Arrange and design outdoor spaces to help older people orient themselves and find their way outdoors. Older people may depend on more limited sensory information when interacting with others, finding their way around the outdoors, or just enjoying being outside. Major issues for design are orientation, sensory stimulation, and environmental comprehension.

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[12] Hernandez, Rebecca Ory (2007) 'Effects of Therapeutic Gardens in Special Care Units for People with Dementia', Journal of Housing For the Elderly, 21: 1, 117 ~152

Table <2-5> Summary of Design Guidelines for site planning and design for the elderly with ADRD

Key principles: Clustering together activities and services can increase the opportunities for drop-in use and the level of activity and use of amenities.
Microclimate: - Elderly people are particularly susceptible to changes in temperature, excessive heat, cold, windiness and glare. - Situate seating areas where they will catch summer breezes. - Provide outdoor seating or strolling areas that allow a choice of sunny or shady locations at different times of day. - Use darker, non reflective paving to reduce glare
Universal & Barrier free - Provide a "prosthetic environment" that offers appropriate levels of challenge and support when needed. A prosthetic environment is one that permits the older person to function, in spite of disabilities, by offering support when needed but allowing for independence, challenge and learning. It requires recognizing the disabilities of the elderly and searching for environmental supports that facilitate a higher level of functioning.. - Providing incremental "doses" of challenge and support for one approach, permitting the practice of skills and independence and reducing the likelihood of frustration, anxiety, and even withdrawal from too challenging and activity. Physical/Social/Cognitive & Emotional - Provide a variety of outdoor areas and activities. If given a choice, older people tend to select that activity best suited to their ability level. - Encourage autonomy, independence, and a sense of usefulness by letting residents perform routine tasks for themselves. Some autonomy is sacrificed in housing that offers group services and facilities. A design and management policy that allow residents of all ability levels to perform some or most tasks for themselves reinforces a sense of autonomy and self-esteem use the design of outdoor spaces to reinforce both actual and perceived safety and security. Feeling safe and secure encourages outdoor use and is a strong determinant of older people's general life satisfaction. - Provide a transition or halfway zone between indoor and outdoor areas. A halfway zone for a moment's hesitation to adjust to changes in light, temperature, and sound, or for sitting and watching and activity, can provide needed time for sizing up the situation and preparing oneself before joining in, or at least a comfortable spot for watching. - Create subspaces for meeting others, for intimacy with a few friends, or for solitude. A popular misconception about older people is that they prefer a "peaceful and quiet environment". Even sitting and watching the activities of others may be an active form of participation, particularly for the most frail.

Table <2-6> Synthesis outcomes and principles of the therapeutic garden of the Long term care facilities for elderly with dementia

Principles	Outcomes
Services that afford independence, autonomy & control by being adaptable to the users	Universal Barrier free
Spaces that afford meaningful & culturally appropriate activity	Cognitive Emotional
Interior and exterior detailing that is familiar & non-threatening	Cognitive Emotional
Spaces, access points, pathways & services that use appropriate modes (light, color, pictorial, verbal, tactile) for presentation of essential information to assist appropriate task completion (i.e. cueing stimuli)	Physical Cognitive
Spaces, access points, pathways & services that eliminate unnecessary complexity & reduce extraneous sensory stimuli	Physical Cognitive
Spaces, access points & pathways services that reduce agitation & opportunities for meaningless wandering	Physical Emotional
Spaces, access points, pathways & services that afford approach, reach, manipulation, and use regardless of user's limitations (i.e. highly negotiable)	Universal Barrier free
Spaces, access points, pathways & services that are tolerant of user related error (i.e. safe & secure)	Physical Cognitive
Spaces, access points, pathways and services that meet the needs of staff	Social Emotional

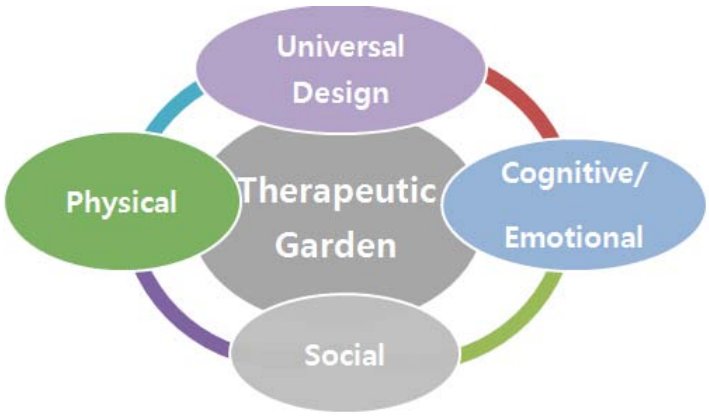


Figure <2-7> Integrative concepts of Garden Design for Person with Dementia

Table <2-7> Integrative concepts and design imperatives

Therapeutic Goals	Quality of life - Residents. Family, Staffs
Universal & Barrier free	Design Characteristics of Ability profile
Physical	Safe & comfort Wandering Natural light & shade
Social	Social interaction and Privacy
Cognitive& Emotional	Meaningful activities Multisensory stimulation and reminiscence Familiar and home-likeness

Summing up these evidences and case studies with integrative concepts, it could be implemented with following design goals and objectives of therapeutic garden in a long-term care facility for the elderly:

Design goals and objectives#1: Universal/barrier free

Creatively offer patients some control of their environment allowing for some independence

-Provide signage in the resident common room showing the way to the garden

-Provide more seating allowing for various groups to form

-Provide moveable and stationary seating in a variety of locations

-Provide handrails to assist independent movement

-Ensure that ground plane is level and of a suitable material for safe footing and reduced glare.

-At least on path wide enough for two wheelchairs to pass.

-Create a raised planting bed with varying access height to

accommodate patients who can stand and garden as well as those in wheelchairs.

−Define space with paving changes

−Use different plant material as each entry/exit door to aid in way−finding and patient’ s visual location in the garden

Design goals and objectives#2: Physical domain

Facilitate movement, light exercise, and performance of remembered skill in gardening and outdoor activities

−Improve walking path ground plane

−Provide more than one looping, returning path

−Provide one large, raised bed of varying access height

−Incorporate handrails into the garden to assist the residents

−Plant on poisonous plants safe for residents to pick or plant

−Wide paths for wheelchair accessibility.

Design goals and objectives#3: Social domain

Promote social support for patients/family/staff

−Provide more seating for family, friends and staff to passively enjoy the garden

−Provide seating that allows private or group seating.

−Provide more shade in the sunniest corner (north) to encourage passive use of the garden

−Provide signage in the garden to help family and friends locate and use the garden with residents.

−Enlarge shaded patio area to accommodate more users.

Design goals and objectives#4: Cognitive/Emotional Domain

Positive distractions

−Provide a water feature for sound and visual distraction and stress

relief

−Plant heirloom plants for memory cues, aesthetic appeal and sense of place

−Add a focal point for interest

−Plant material shall offer four season interest

−Plant material shall offer bloom, color, texture, fragrance interest to the garden and provide memory triggers, visual, tactile, olfactory stimulation.

−Utilize shade plant material with white or yellow foliage or blooms to attract attention and reduce feeling of discomfort in the deep shade area.

The next chapter will analyze the current therapeutic garden space of Seoul Dongbu Senior Center, which is providing long− term caring for the elderly with dementia in stage of mild to severe and frail and propose the design solution using integrative design concepts and design imperatives .

Chapter 3. Methodology

3.1. Site Inventory & Analysis

The Dongbu Senior Center was constructed and opend in 2005. It was intended specifically for the treatment and care of a geriatric population in Seoul district. The center encompasses a spectrum of care for older adults including a long-term nursing care facility and day care center. The center is located on the east side of Seoul sorrounded high rising residential area within 7 km of the center of City and 2 km of Chonggyecheon stream.

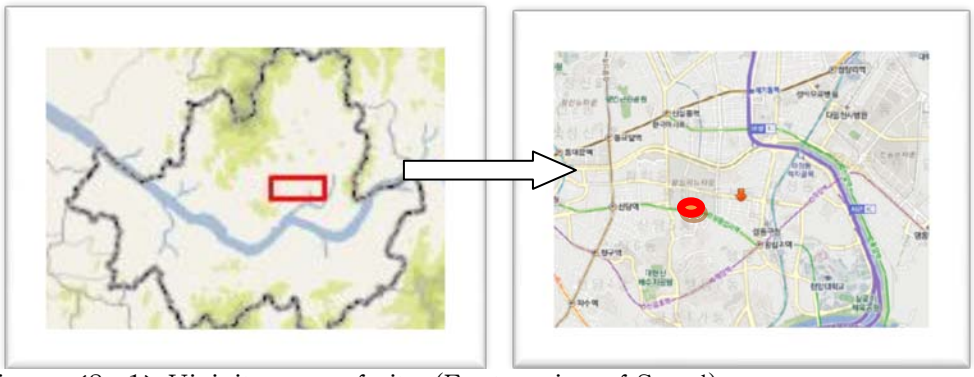


Figure <3-1> Vicinity map of site (East region of Seoul)

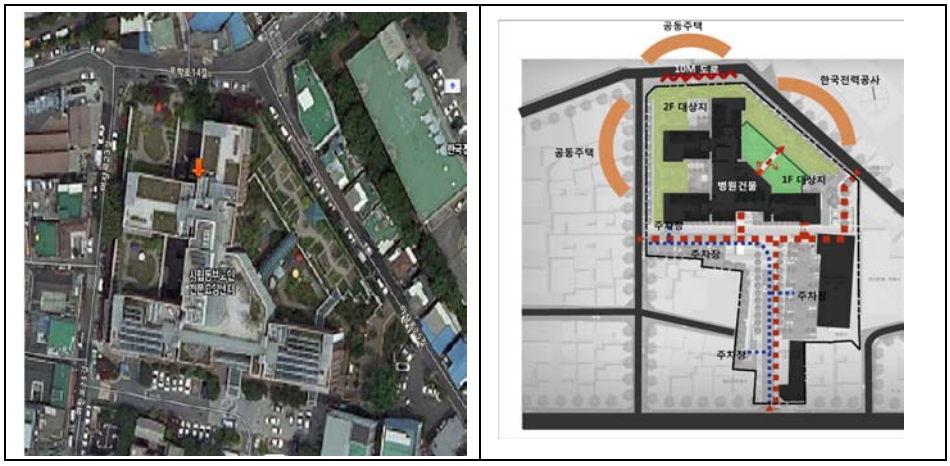


Figure <3-2> Location Site and Neighborhood

Figure< 3-3> Photo of Seoul Donbu Senior Center (source from Yang, N)

Table <3-1> Site Inventory

Established	Seoul Municipal in 2005
Administrator	The On-Nuri Social Welfare Foundation
Address	16-1 Hongikdong Songdonggu Seoul
Building	Land 9,379.5 m^2 Building space 10,400,94 m^2 Five story building
Residents	Residents: 296- Elderly with fragile & dementia(mid to severe) Service-medical/ daily activities and support /rehabilitation/functional support, family support Day Care Center: 37- Eldely with Mild living in neighborhood (residents in Songdonggu) Service-daily acitivity/Rehabilitation/recreation/ functional support Monday thry Friday 9am- 10pm Saturday 9am - 6pm
No. of Staffs	195
1^{st} Floor	Daycare Center/Thermal Therapy room/Excersice Occpational Therapy room/Snoozeling Room/ Reminisence Therapy Room/Alterative Therapy room//auditorim/ dinning room/ Lobby/Therapeutic garden/Administration Office/Information desk/Counseling room/Volunteer' s room/Corridor Parking area
2^{nd} ~5^{th} Floor	Special Care unit, Residen/Nursing station/Living room/Assisted bathroom/therapuetic garden (2^{nd} & 5^{th} fl)

Table <3-2> Service program of Dongbu Senior Center

Services for Function restoration & Recreation - Rehabilitation/Recreational service - Cognitive, communication, physical activities, activities of daily living - Physcial, social, psychological need driven care & services	
Recreational support	Folk song/Chinease letter class/sing a song class/Art club/laughing therapy/ religious program/exercise/reminiscence therapy
Therapeutic program	Music,, art, horticulture, ceramic art, paper craft, quilt therapy
Service for Bedridden	Reading books/play/Clay therapy
Daily living	Personal hygine/meal & nutrition service/grooming
Cultural service	holiday/birthday celebration/movie/family & community events/
Family support	Family self help/family education/family event/family counseling
Medica/Nursing care	Health assessment/medication/ Wound management/tube care/emergency care/
Rehabilitation service	Physcial therapy/occupational therapy/Reminiscence and multisensory stimulation therapy/thermal therapy
Day care center	AM 8~10: Arrival 10~12: Physcial exercise/music tx/Art tx/horticulture PM 12~1:30: Lunch & Rest 1:30~2:30: Folk song Class congitive tx/ religiousactivities/movie/small drum class 2:30~3:30: Snack & Rest 3:30~ 5:00: Programs/Therapy/outdoor activities 5:00: ready to pick up
Long-term care residents	AM 6-7: Personal hygine support/ Breakfast 7:30 : Health Service/Nursing care 9- 10 ; Programs for functional support 10: Snack & Counseling/Exercise PM 12: Lunch & Resst/Free time 2:30: Snack 3~5: Cognitive & occupational tx, Physical tx 5: dinning & rest 8: ready to sleep

Lobby
- Social interaction
- Viewing courtyard
On stage Space
- Therapy Room
- Audotorium
- Day care Center
Off stage space
- Dinning room for staffs
Courtyard

Corridor between north and south courtyard
Source Yang, N.

Figure <3-4> Lobby and corrider with garden view

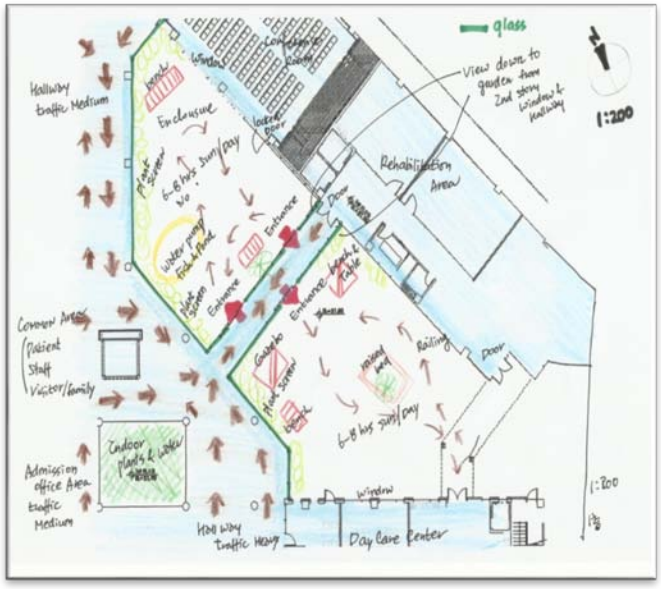
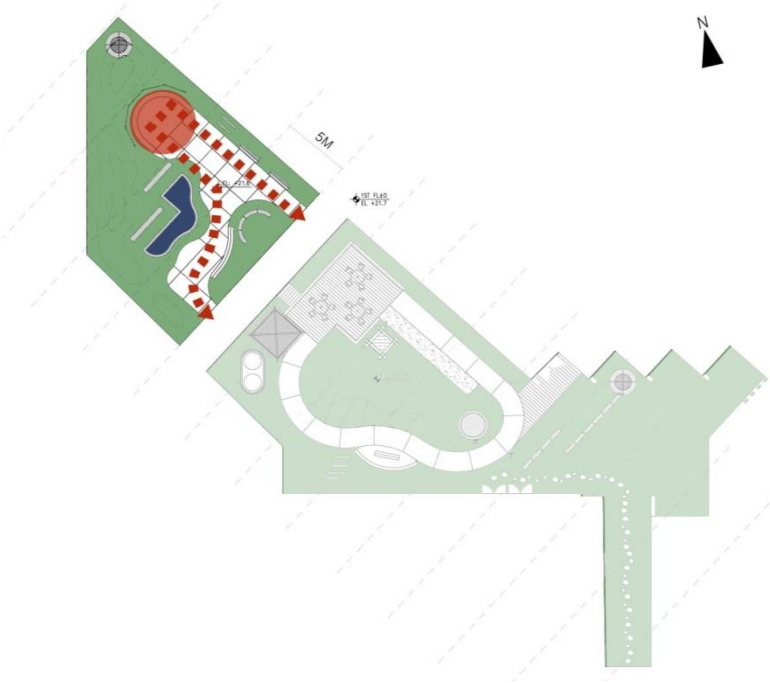
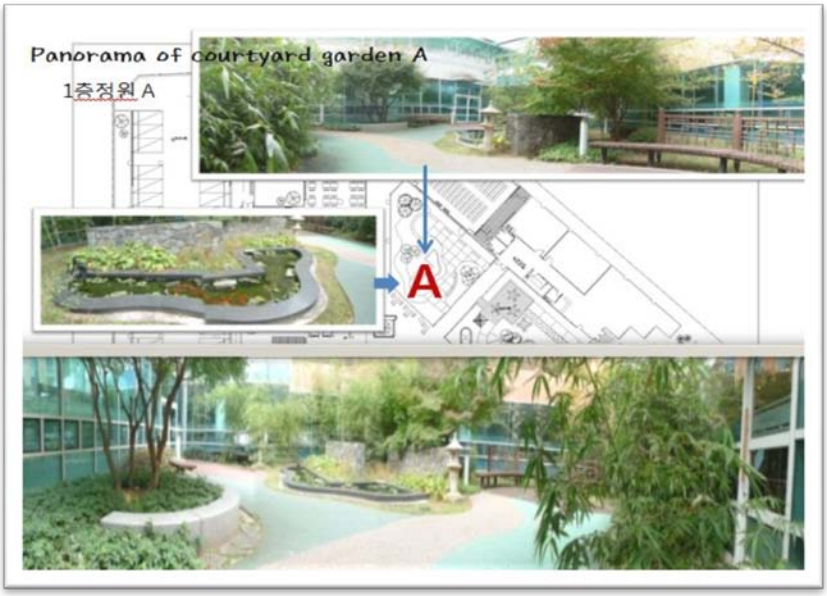
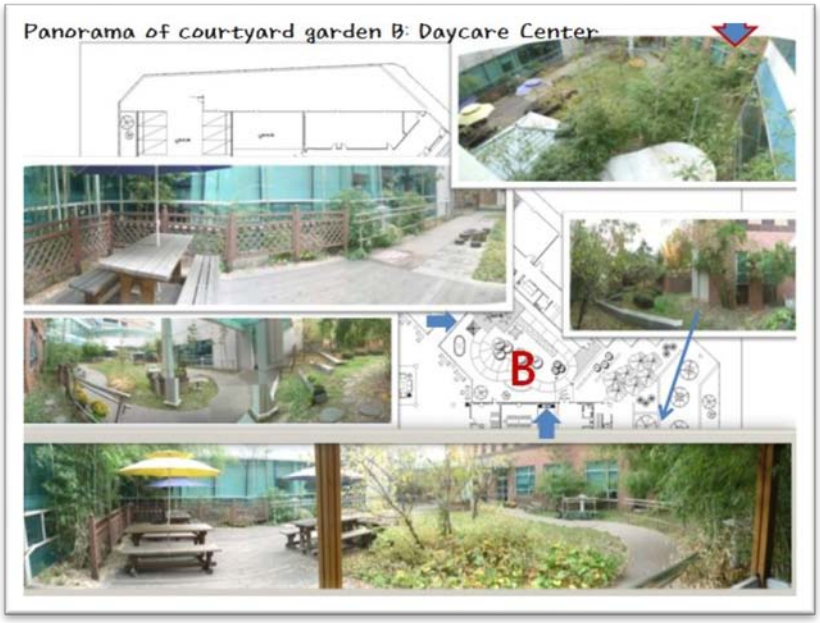
	Summary of View points Open view from lobby, corridor, dinning room, administrating office. Residents' room located in 2nd floor~5th floor. Courtyard garden and terrace could be viewed thru room windows and lobby of each floor.
	Behavior Mapping Location: Corridor and Lobby lounge of 1st Fl. Observation : 11:00 am~ 1:00 pm Oct. 20, 2011. North courtyard: residents/staff/visitors High tarffic indoor hallway Sourth courtyard: Daycare center High traffic Indoor entrance area

Figure <3-5> Summary of analysis & Issues in 1st Floor and courtyard garden

The behavioral mapping was noted to entail a walk-through of the garden and overlooks garden from inside following a predetermined route, at 10minutes intervals. This observation no only illustrated which features were used most frequently, but whether residents, staff, and visitors appeared to use particular elements more often.

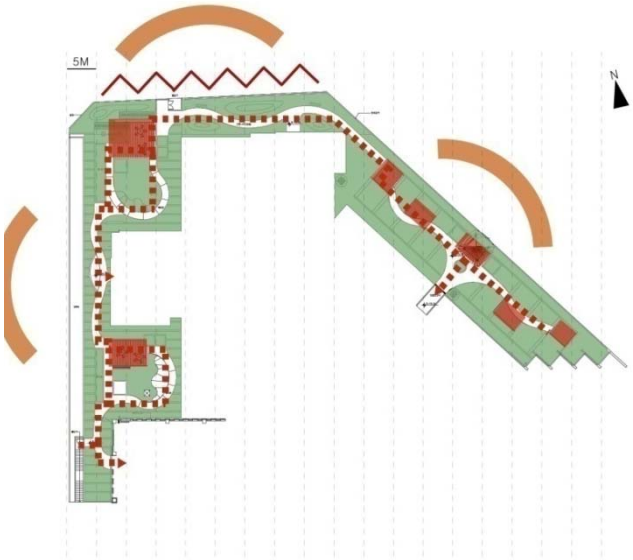
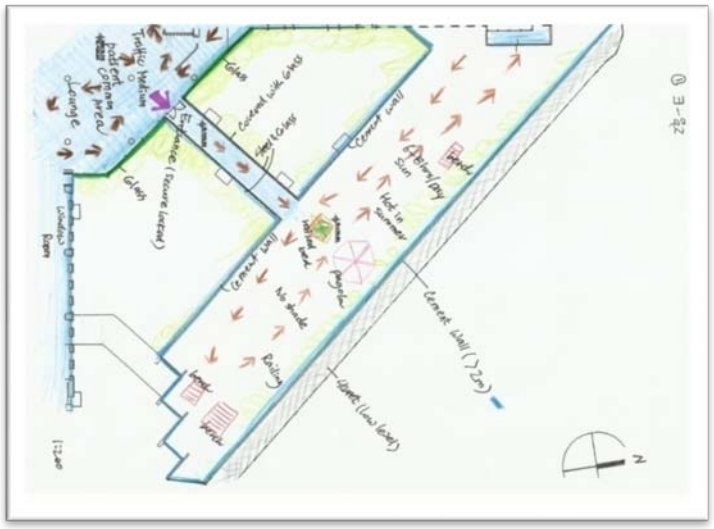
Table <3-3> Summary of evaluation: courtyard gardens

1st Fl. North Courtyard pathway	
	

1st Fl. South Couryard	
	
Space	Lack of focal point & multiple use space. No seat area, minimum shade
Path	Simple loop of pathway, no landmarks and alternative path Circulation of the garden is poor due in part to the size of each garden, but also for the design of the walkways within them. Accessibility into the gardens are fairly adequate.
Planting	Lack of diversity of planting and maintenance. Lack of seasonal, temperal supportive stimulaion.
paving	Lack of naturally mapped and safe materials

feature	Low level of water feature Lack of seating area with shade No space for family and staff Lack of seating space for barrier free.
views	Lack of Indoor outdoor unity
maintenance	Lack of maintenance and water supply facilities.

	2^{nd} ~5^{th} floor: resident room, nursing station, lounge Resident room for 4 person has open view from window
	Viewpoints from corridor and residents' room/ Lounge and pathway Nurses view residents in garden View down to courtyard garden from hallway of entrance to garden

	Views from inside building. East: 2m cement wall & Resident neighborhood aside with road West: 2m cement block wall and Resident area aside with road North: Road and apartment
	Behavioral mapping 2010. 20. 2~4 PM High traffic indoor lobby lounge Low garden use

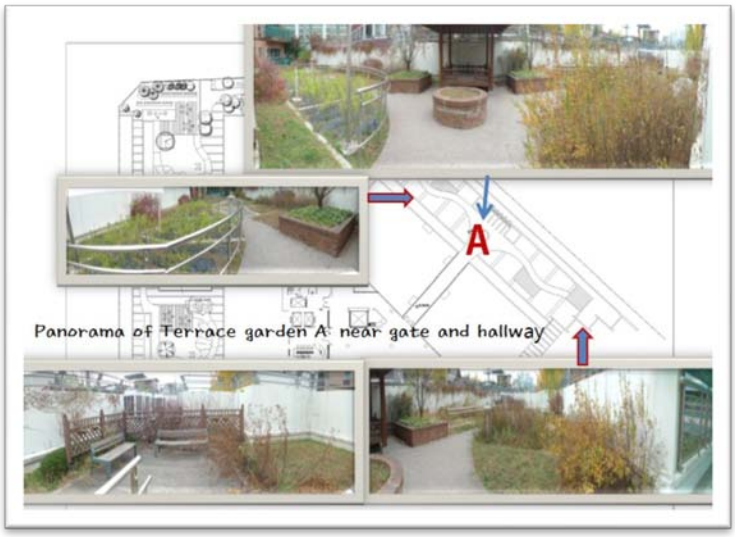
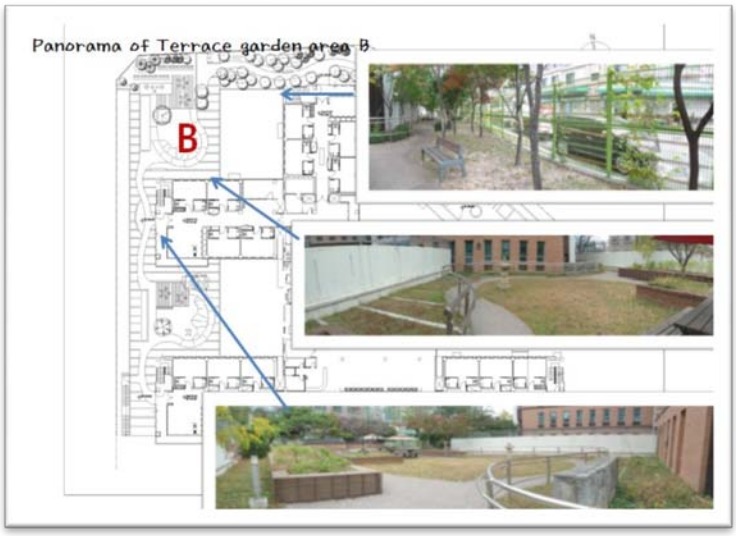
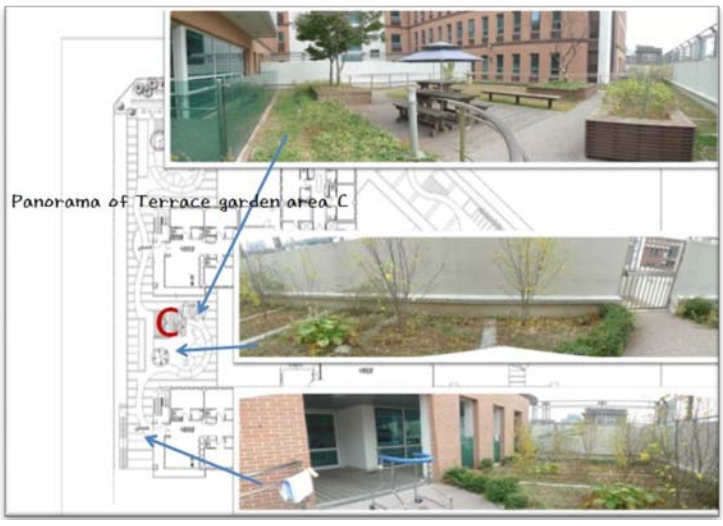
	Confusion problem at Front Entrance due to bidirection of pathway. Problem of management & planting Lack of rest feature and access to plants No attractive feature No memory & seasonal cues in planting
	Noise problems due to traffic road and neighborhood of markets Lack of shielding Lack of privacy Lack of diversity of planting Limiter plant palette Small shade structure with seating
	Lack of maintenance Limited seasonal and memory cues Small shade structure

Figure <3-6> Summary of site analysis and issues in Terrace Garden

Figure <3-7> Summary of Problems and issues

3.2. Therapeutic Garden Audit[13]

For the post occupancy evaluation of garden, Alzheimer's garden audit was used . The checklist is divided into seven domains and each item is scored on a four-point scale. This checklist was coded by four raters who have background of long term care facilities or landscape architecture after attending checklist workshop for

[13] Clare Cooper Marcus (2007) Alzheimer's garden audit tool, Outdoor environments for people with dementia, 179-191.

acceptable interrator reliability.

Table <3-4> Scoring checklist using Garden audit tool

score	A. LOCATION AND ENTRY TO GARDEN
3	Visibly accessible from inside building so that residents can see the garden when going about their daily activities inside.
2	Door to garden is easy to find.
2	Door into garden is easy to operate.
1	Door is usually unlocked.
3	Threshold of entry door is flat and smooth.
0	Provision of shaded entry patio with seating just outside the door for those who want to come outdoors but cannot venture further.
1	Attractive garden view from entry patio since this space may get used more than garden itself.
2	Entry patio is large enough to accommodate several people in wheelchairs, together with tables and chairs for programmed group activities.
1	In regions with significant bug problems in summer, entry patio is screened and lit at night.
2	Location of entry patio/screened porch to receive late afternoon sun, thus avoiding long shadows that accompany increased agitation at that time of day ("sundowning").
0	Provision of a conservatory or solarium with plants, birds in cages, etc., looking over garden where residents can enjoy a semi-outdoor experience year-round. Bright, natural light beneficial to health.
1	A single entry door to garden, designed as a "landmark " so that those using garden can easily see where they have to return to get back indoors.
1	The whole garden can be viewed from inside the building by staff going about their daily activities or from a nurse's station (if there is one).
B . LAYOUT AND PATHWAYS	
1	The layout of the garden is easy to see and understand to minimize confusion for those who are not functioning well.
2	Provision of a simple looped, circular or figure-of-eight pathway system with no dead ends or confusing choices whether to turn left or right to return home.
1	A simple, clear garden layout with one or two destination points, since Alzheimer's residents experience disorientation, or short-term memory loss as it relates specifically to a sense of physical location, and can become easily disoriented and agitated in unfamiliar settings.
1	Appropriate destination points, such as a gazebo, seating arbor, or large shade tree that can be used for programmed activities.
2	provision of a level pathway system including exit from building and patio,

	since residents may exhibit lack of coordination and balance (apraxia) but are still impelled to move without apparent goal or purpose (wandering behavior).
3	Handrail along all or part of pathway system for those with balance problems.
2	Non-reflective path surface since aging eyes have a hard time dealing with glare. Tinted concrete is good solution.
2	Appropriateness of pathway surfaces for wheelchairs, walkers, reclining geri chairs, shuffling feet of the frail elder, etc. Brushed concrete or asphalt provide appropriate traction.
2	Consistent pathway color, since an Alzheimer's resident reacts to contrasting ground plane colors as if there were a change in depth ("visual cliffing," an example of agnosia, or the inability to understand and use sensory information).
1	Raised edges to pathways to prevent wheelchair user from rolling into planted area.
1	Pathways wide enough for two wheelchairs to pass (at least six feet).
0	Provision of "markers" or landmarks along the pathway to assist in spatial orientation and allow staff or family members to measure how far a patient can walk.

C. PLANTING	
1	High ratio of green to hard surface in garden – ideally around 70:30.
1	Provision of a flat lawn area large enough for an informal grouping of movable chairs, a game of croquet, etc., or for young residents to sit or lie on.
1	Provides a great diversity of plants selected for seasonal interest, sensory variety, shade qualities, screening, wildlife habitats, etc.
1	Vegetation introduced in a variety of ways: raised beds, vine-covered arbors and trellises, perennial borders, tubs of annuals, trees, hedges, etc.
1	Provision of a rich multisensory experience (vision, touch, hearing, smell) to activate the senses.
1	An area specifically designed for supervised gardening activity program (raised beds, potting shed, tool shed, various large containers, gathering area, access to drinking fountain, close to building entry, etc.).
2	Garden receives at least half a day of sun in order for paintings to flourish.
2	Avoidance of toxic plants in gardens for late-stage Alzheimer's patients, since people tend to revert to infancy and put everything in their mouth at this stage in the disease.
2	Avoidance of trees whose fruit or leaves could cause slipping/trip hazards on pathways.
1	Plants are maintained so that walkways are clear of hazards such as branches too low, shrubs "spilling" onto hardscape, etc.
3	Provision of plants popular during youth of residents for potential to promote reminiscing (e.g., roses and lilac in New England).

D. SEATING	
1	Avoidance of plant shapes, structure, shadows, statures, etc. that might trigger delusions since Alzheimer's patients may perceive things that don't exist, and become agitated.
2	Seating options available for person alone or couple.
1	Seating available for groups larger than two to sit and easily converse.
1	Appropriate seating design (e.g., with back and arms for ease of pushing up from a seated position).
2	Comfort of seating material (wood, fabric or hard plastic preferable, steel, aluminum or concrete, least preferable).
1	A bench or chairs for two in a niche that gives the illusion of privacy, since this may encourage social interaction.
1	Choice of seating in sun/shade throughout most of day/year.
1	Seating at relatively frequent intervals along main paths; every 15 feet is necessary for those who are quite frail, and to encourage those who pace or wander excessively to take a rest.
1	Near view from most seats is alterative/interesting (varied plants materials by color, leaf shape, height, etc.; variety of objects that might be interesting to look at – bird feeder, bird bath, sculpture, etc.).
1	Some moveable seating available; easily moved, but still sturdy enough to prevent tipping.

E. OVERALL DESIGN AND DETAILS	
2	Provision of features that might evoke memories for residents. Depending on location, cultural background, etc., these might included a garden shed, mail box, vegetable garden, barbecue, bicycle or small piece of farm equipment (fixed to ground).
1	Small scale design changes so that a person moving slowly would have a variety of visual experiences (enclosed/open, sunny/shaded, varied plant materials, etc.).
1	Avoidance of any garden structure (arbor, trellis, pergola) which might cast slatted shadows which can be misinterpreted as "troughs" or changes in depth.
1	Potential to observe wildlife (e.g., plants that attract birds, butterflies; bird feeder, bird bath, etc.)
1	Incorporates a bubbling fountain where moving water can be watched and listened to; or a simple water–wall where water can be touched.
1	The extent to which this outdoor space might allow a resident, visitor or staff member to experience an environment in complete contrast to the building interior.

1	The extent to which this outdoor space offers users the opportunity to make choices (other than waling routes, which can cause confusion), thus allowing residents a sense of control (e.g., choice of seating arrangements, variety of sub-spaces, etc.).
1	The extent to which this outdoor space is nurturing, calming, familiar, and homelike, not an "artistic statement' or "envelope-pushing" design that might be unfamiliar or jarring to residents.
0	Education/interpretive material that might be of interest to visitors or residents (e.g., plant labels, plan of garden, etc.).
1	Garden is very attractive, well maintained, and rich with amenities (gazebo, glider, bird bath, flower beds) so that family members might be encouraged to visit more often, and take their relative outdoors.
1	Lighting so that space can be used for walking, sitting, etc. on warm evenings; or viewed from inside when dark.
1	Opportunity for staff to find a place to take a break or eat a brown-bag lunch where they might feel truly "away" from their work, and out of sight of residents.
1	Appropriateness of space to local climate.
2	Appropriateness of space to local culture e.g., using local plants, construction materials, decorative images).
2	Degree of privacy from resident rooms/windows looking out onto space.
1	Degree of privacy for those inside rooms adjacent to garden.
1	Building edge encloses garden as much as possible, so that the degree to which garden has to be fenced is minimized.
1	Boundaries of space provide complete enclosure with trees and tall shrubs screening view of fences or walls and forming a permanent attractive framework to the garden.
2	Gate into garden for maintenance staff, and/or serving as an emergency exit is subtly disguised with planting.
0	Outdoor space is free from intrusions of unpleasant/incongruent sounds (e.g., traffic, loading dock, loud air conditioners, etc.).

G. MAINTENANCE AND AMENITIES	
1	Maintenance quality of built features, furnishings and landscape.
1	Maintenance quality of plant materials (plant health).
1	Availability of litter receptacles and (where appropriate) ash trays.
1	Maintenance quality of litter pick-up.
0	Availability of phone or communication device (in weather proof box) for emergencies.
NA	Availability of nearby toilets with signage to same in garden.
NA	provision of a specific outdoor smoking area in this garden or elsewhere,

0	Storage facility for maintenance staff.
Scoring notes	
0	Feature not present (e.g., no entry patio)Quality missing (e.g., not familiar, homelike)
1	Poor to fair
2	Moderately good, could be improved
3	Very successful
NA	Not applicable

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Table <3-5> Problems and issues from the Results of checklist using Therapeutic Garden Audit for Alzheimer's

domain	Issues
Planting	Ground planted areas have a limited flowering plants, limited color palette, limited fragrance or texture available to patients for cognitive stimulation.
Entry to garden	Floor to ceiling windows that look out into public hall space encourage patients to try and elope from the ward.
Layout & Pathways	No handrails around planted areas for independent enjoyment of space
Seating	Limited seating.
Overall & details	Limited usable shade
Overall & details	Extreme heat and sun in one corner of the space.
Overall & details	Lack of staff assistance
Overall & Details	No water feature
Overall & Details	Outdoor space is free from intrusions of unpleasant sounds
Overall & Details	Boundaries of space provide complete enclosure with trees and tall shrubs screening view of fences or walls and forming a permanent attractive framework to the garden
Overall & Detail	Appropriateness of space to local culture and climate
Maintenance & Amenity	Maintenance quality of plants materials

3.3. User and Program descriptions

Focus Group informal Interview was conducted to determine

who would use garden, what activities they would prefer engaging in, and some elements they would like to encounter if they want to enjoy the garden. Informal interview contributed by two family members, four nurses, and a programmer provide a richer insight into the user preferences. Interviews were conducted among care providers(family and staff) to determine who would use the garden and at what time during day and season, and what is the most interesting or meaningful outdoor activities to them. Interview findings are summarized as following tables. (See Table 3-7 & 3-8)

Table <3-6> Questions for focus interview

Questionnaire- Care Provider (family & Staff/Programmer)
Q1. Describe the 'typical' resident within your care -their backgrounds, family involvement, activities and interests, movements, physical and cognitive abilities and impairments
Q2. Describe in detail your job and your daily activities as a direct care provider
Q3. How could the design of an outdoor garden and/or indoor garden room help you in caring for the residents. What specific features or components could assist you in your work?
Q4. How could the design of an outdoor garden and/or indoor garden room help you in the care of, and programming for, the residents? Please describe your visits with your family member-how often do you visit and what time of day and week are most typical? What activities do you typically engage in with your family member and where do these take place?
Q5. As one of the goals in the re-design of the therapeutic garden is to support resident abilities and compensate for losses, identify any particular features or aspects of the garden that should respond to physical or cognitive needs. This may include the following needs; physical safety, way finding/orientation, stimulation. Could you provide some general information as to the 'typical' family visitor, the frequency of visits and the types of activities they might engage in with their family members

Table <3-7> Summary of Focus Group Interview

User	Program	Outdoor activity	Season/Time
Patient	Walk Reminiscence Horticulture Therapy Gardening	Gardening Take a walk/Wander Celebration Party/Family meeting Reminiscence Program	Spring (all day) Autumn (all day) In appropriate weather condition Summer(before noon & Evening) Winter (afternoon)
Family	Family party Family education & support gardening	Meeting with family Family picnic Barbeque Rest	Spring Autumn Summer(evening)
Staff	Events & celebration Conversation with family gardening	Walk Conversation Gardening Rest & have break Meditation/Relaxation	Spring Summer Autumn winter
Visitors	Social support Aids for patients Gardening	Walk Conversation Gardening	
Community	Garden club/ Support group	Gardening/Maintenance	Spring thru Autumn
Key Concept	Familiarity Home likeness	Reminiscence	Multisensory stimulation

Table <3-8> User information with activities and program thru season/day

User	Act	Prog	Path	GP	EN	GV	PL	Fur	Ms	IN	SG	MG	LG	SP	SM	AU	WI
PT	walk	DA	●		●	●	●	●		●	●			●	●	●	●
	Rest	DA	●	●	●	●	●	●	●	●	●			●	●	●	
	Soc	DA	●	●	●	●	●	●			●	●		●	●	●	
	Rem	RTx		●	●		●	●	●			●	●	●	●	●	●
	HT	HTx					●	●			●	●		●	●	●	
	Gar	DA					●	●	●		●			●	●	●	
	EvN	SE		●				●			●	●	●	●	●	●	●
FA	Walk	WA	●	●	●	●	●	●		●				●	●	●	●
	Pty	SE		●	●		●	●			●	●		●	●	●	●
	Gar	WA		●			●	●			●				●	●	●
	Rest	WA	●				●	●		●				●	●	●	●
	FaEd	SE		●	●			●			●	●		●	●	●	
	EvN	SE		●				●				●	●	●	●	●	
ST	Rest	DA	●			●	●	●		●	●			●	●	●	●
	Soc	DA	●	●	●		●	●			●			●	●	●	
	EvN	SE		●				●			●	●	●	●	●	●	
	Gar	WA					●	●		●	●	●		●	●	●	
VS	Rest	WA	●	●		●	●	●		●	●			●	●	●	●
	Aid	WA	●	●	●	●	●	●			●			●	●	●	
	Gar	WA					●	●			●			●	●	●	
CM	Gar	WA					●	●		●	●			●	●	●	
	EvN	SE		●				●				●	●	●	●	●	
User	**Act**	**Prog**	**Path**	**GP**	**EN**	**GV**	**PL**	**Fur**	**Ms**	**IN**	**SG**	**MG**	**LG**	**SP**	**SM**	**AU**	**WI**

Act: Activity	SP: Spring	PT: Patients	Soc: Social interaction
Prog: Program	SU: Summer	FA: Family	REM: Reminiscence
Path: Pathway	AU: Autumn	ST: Staff	HT: Horticulture Therapy
GP:Garden Place	WI: WInter	VS: Visitors	Gar: Gardening
EN: Enclosure	Day: daytime	CM: Community	EvN: Events
GV: Garden view	Eve:Evening		Pty: Party & Picinic
PL: Planting	L1A: Level 1A		FaEd: Family Eduction Session
Fur: Furnishings	L1B: Level 1B		Aid: Aiding patients to going out
Ms:Misc	L2A: Level 2A		DA: Daily Activity
IN: Independent	L2B: Level 2B		WA: Weekly base Activity
SG: Small Group	L2c: Level 2C		SE: Special Events
MG: Medium GR	Fre: Frequencies		
LG: Large Group			

Day	Eve	L1A	L1B	L2A	L2B	L2C	Fre	User	Act
●	●	●	●	●	●	●	●	PT	walk
●	●	●	●	●	●	●	●		Rest
●	●	●	●	●	●	●	●		Soc
●		●	●	●			●		Rem
●			●	●		●	●		HT
●			●	●		●			Gar
●	●			●			●		EvN
●				●	●	●		FA	Walk
●			●	●		●	●		Pty
●				●		●	●		Gar
●				●		●	●		Rest
●			●	●		●	●		FaEd
●	●		●	●		●			EvN
●	●	●	●	●	●	●	●	ST	Rest
●	●		●	●		●	●		Soc
●	●		●	●		●	●		EvN
●			●	●		●			Gar
●			●	●		●		VS	Rest
●			●	●	●	●	●		Aid
●			●	●		●			Gar
●		●	●	●	●	●	●	CM	Gar
●	●		●	●					EvN
								User	Act

Act: Activity Prog: Program Path: Pathway GP:Garden Place EN: Enclosure GV: Garden view PL: Planting Fur: Furnishings Ms:Misc IN: Independent SG: Small Group MG: Medium GR LG: Large Group	SP: Spring SU: Summer AU: Autumn WI: WInter Day: daytime Eve:Evening L1A: Level 1A L1B: Level 1B L2A: Level 2A L2B: Level 2B L2c: Level 2C Fre: Frequencies	PT: Patients FA: Family ST: Staff VS: Visitors CM: Community	Soc: Social interaction REM: Reminiscence HT: Horticulture Therapy Gar: Gardening EvN: Events Pty: Party & Picinic FaEd: Family Eduction Session Aid: Aiding patients to going out DA: Daily Activity WA: Weekly base Activity SE: Special Events

	PROGRAM	Therapeutic garden elements
Lobby (1fl) Courtyard	Reminiscence Sensory Stimulation	"Open space for reminiscence program" "Sunshine" "enclosure" "Seasonal interests" "Rest" "Conversation" "overlook from indoors"
Terrace (2fl)	Restorative place Wandering Special Events Family activity Community activities Horticulture Greenhouse Vegetable gardening	"Old village gate and village forest" "Stone & plants" "Unexpected place" "Open space" "Social space & Multiuse open space" "water figure and base" "Stream, fish, water plants" "Rose garden"

Chapter 4. Design Proposal and Site Plan

The literature review, case studies, and site analysis were helpful in giving a richer insight to activities and elements that the users would like be interested in as well as providing elaboration on several criteria of guidelines.

Table <4-1> Summary Guidelines for the People with Dementia

Domain	Characteristics changes associated with Dementia	Desired Goals of Outdoor Spaces	Design Criteria
Physical	Decrease in fine and motor skills Independence of ADLs decline Sensory capacity remains intact	Safe and secure Leaning support Landmarking Exposure to a variety of stimulation Wheelchair accessible Universal design	Seating with backrest and armrests, along pathway Provide interest along minimum 6' wide pathway Choose a plants that attract birds and butterflies, have various textures, forms, and scents, and have seasonal qualities
Social	Decrease in initiative Decrease in autonomy Decrease in self-esteem Decrease in social interaction and participation	Indoor/outdoor unity Natural mapping Temporal support Leaning support Sub-spaces for varying group sizes and activities Exposure to a variety of interactions	Transition from indoor to outdoors Signs should be accompanied by symbols Horticulture and music therapy Position seating for observation
Cognitive/ Emotional	Memory gradually fails Ability to recognize familiar people & express and understand language declines Repetitive statements movements increase	Indoor/outdoor unity Natural mapping Temporal support Leaning support Landmarking Ease in orientation Familiar environment Memory stimulation	Looped pathways that do not dead end Provide landmarks and elements that may stimulate memory

Behavioral /Universal design	Increase in wandering behavior Increase in physical aggression	Safe environment Natural mapping Landmarking	Looped , non-slip, non-glare pathways High branching trees to avoid climbing Minimum 6' screened fence Views from all spaces

Key concepts of design

- Integrate familiar elements
- Utilize all senses: views, memories, smells, touch
- Integrate things into routine schedule-walks, daily stretches on the patio or sun porch
- Always design inside and outside together
- A park in the garden
- Continually visible re-entry
- Plan the entrance and exit to an from the garden
- Absolute safety and security

In order to accomplish this, following goals and objectives were developed by integrating the user needs and therapeutic benefits from outdoor activities;

1) the psychosocial and behavioral problems of dementia elderly and nature's effect on health and well being of elderly, family, and staffs who care the elderly;

2) the qualities that contribute to a healthcare therapeutic garden;

3) design guideline that emerged from the review of the literature and case studies; and,

4) the design process that included design input from clients, the families and visitors, and healthcare staffs. Based on these findings,

the final outcome will be a garden design that can be used as a therapeutic space, ultimately improving overall sense of well-being and quality of life for all.

4.1. Design goals and objectives

Table <4-2> Design goals and objectives

Physical	Goal	Facilitate movement, light exercise, and performance of remembered skill in gardening and outdoor activities
		-Improve walking path ground plane -Provide more than one looping, returning path -Provide one large, raised bed of varying access height -Incorporate handrails into the garden to assist the patients -Plant on poisonous plants safe for patients to pick or plant -Wide paths for wheelchair accessibility
Social	Goal	Promote social support for patients/family/staff
		-Provide more seating for family, friends and staff to passively enjoy the garden -Provide seating that allows private or group seating. -Provide more shade in the sunniest corner (north) to encourage passive use of the garden -Provide signage in the garden to help family and friends locate and use th garden with patents. -Enlarge shaded patio area to accommodate more users.
Cognitive/ Emotional	Goal	Positive distractions
		-Provide a water feature for sound and visual distraction and stress relief -Plant heirloom plants for memory cues, aesthetic appeal and sense of place

		−Add a focal point for interest −Plant material shall offer four season interest −Plant material shall offer bloom, color, texture, fragrance interest to the garden and provide memory triggers, visual, tactile, olfactory stimulation. −Utilize shade plant material with white or yellow foliage or blooms to attract attention and reduce feeling of discomfort in the deep shade area.
Behavioral /Universal design	Goal	Creatively offer patients some control of their environment allowing for some independence
		−Provide signage in the patient common room showing the way to the garden −Provide more seating allowing for various groups to form −Provide moveable and stationary seating in a variety of locations −Provide handrails to assist independent movement −Ensure that ground plane is level and of a suitable material for safe footing and reduced glare. −At least on path wide enough for two wheelchairs to pass. −Create a raised planting bed with varying access height to accommodate patients who can stand and garden as well as those in wheelchairs. −Define space with paving changes −Use different plant material as each entry/exit door to aid in way−finding and patient’s visual location in the garden

4.2. Implementation and plan

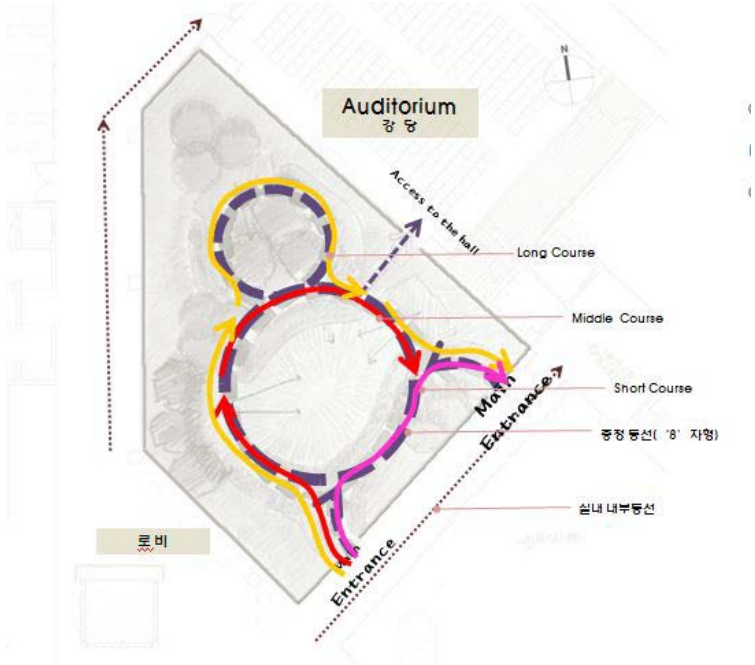
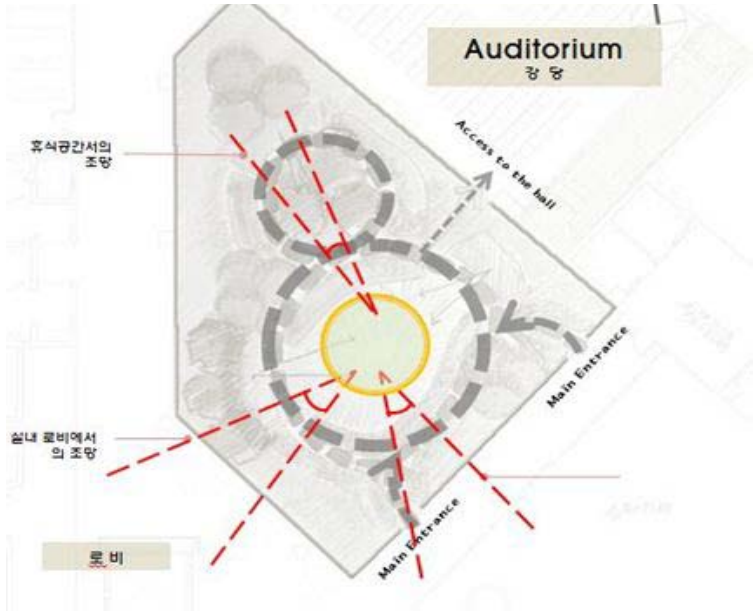
Table <4-3> Design Element and Activities

Design Elements		Program	Activity/Meaning	Space
Pathway	The walking path The strolling garden path	Daily activity Walking	Walk	Terrace Courtyard
	Just around the corner (to invite movement)	wandering	Wandering	Terrace
	Familiar destinations (for landmarks /way finding cues)		Reminiscence	Courtyard Terrace
Garden places	Open places Gathering places	Play Group gatherings picnics	Hanging towels over the porch railing to dry Feeding the bird	Terrace
	Working garden Gardener's workbench	Harvest celebrations	Events and group activities of ordinary life Place for doing work Potting flowers Watering plants	Courtyard
	Sun room	Distant views and sense of freedom the confinement of being indoors Visiting & caring for plants	Sitting in the sun	Courtyard Terrace
	Porches and terraces	Watching	Sweeping the patio	Terrace
Enclosure	Gates, fences, and screens (trellised screens)		Covered places for walking Filtering, overlook	Courtyard

	Awnings and arcades (porch roof, canopy, arbor)			
Garden views	Distant views Inside views Filtered views Forced perspective Sight−line views Vignettes		Visual connection Encouraging movement Sense of enclosure	Terrace
Plantings	Framework plantings Sunny places, arbors, and shade	Sit in the sun Under a canopy or arbor with vines for filtered sunlight Plants and screens for filtering breezes and cooling in summer	Living structure of garden Connected to nature Create own planting area	Courtyard Terrace
	Evolving gardens	Bring plants from home Grow vegetable and flowers Create own garden		Terrace Courtyard
	Flower borders and window boxes Container gardens (Raising the level of plantings)	Brightly colored flowers in borders along pathways, window boxes Containers of all styles, sizes, and materials		Terrace Courtyard
Furnishings	Nomadic chairs Structured seating along the pathways Visiting small alcoves	Control own placement to take advantage of sun, shade, and shelter as desired	Conversation Visiting rest	Terrace Courtyard

	Council ring	Create places for small groups of 6~10 peoples to gather		Courtyard
	Quite places (single benches along pathway or sit alone) Sculpture and water features			Terrace
Misc	Spring and Summer garden Autumn and winter garden Songbirds and butterflies Kitchen garden	Springtime blooming trees, shrubs, wild flowers, and bulbs Tress that offer summer shade and filtered sunshine and flowering shrubs Vibrant autumn colors Harvest plants Falling leaves, fruits, evergreens, berries Watch from the indoors Grow vegetables in domestic realm of the home harvest	Connected to nature Reminiscence Planting Multisensory stimulation	Terrace

Figure <4-1> Plan for Northern Courtyard

	Indoor/outdoor unity Natural mapping Landmarking 8 or o type of simple loop No confusion
	Open views Indoor/outdoor unity

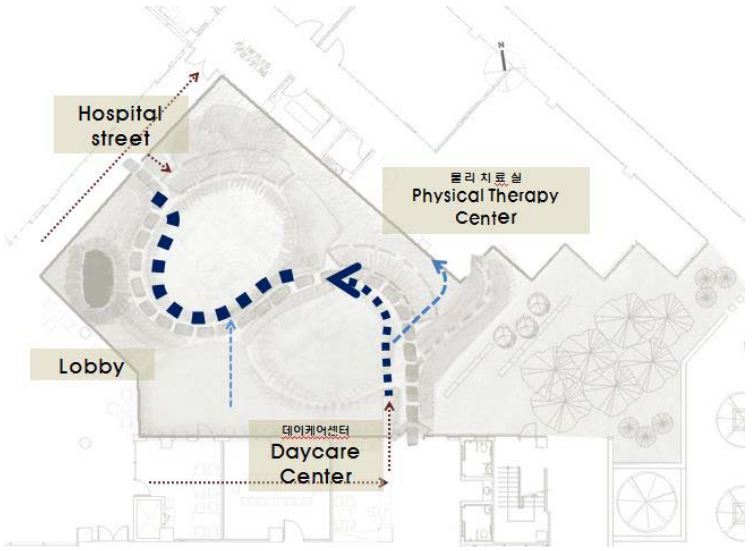
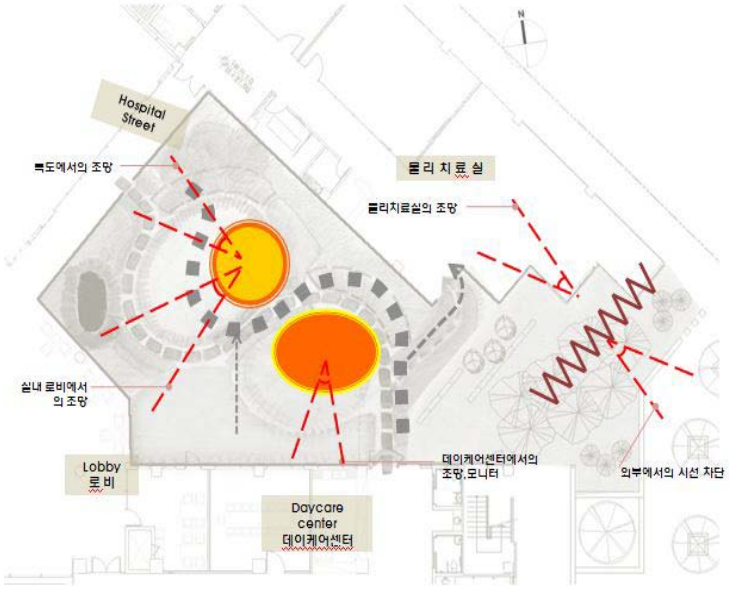
	Physical activities/treatment program/social events of day care center Natural mapping Social space
	View from indoor Diverse space and organization of small space for multiuse

Figure <4-2> Path Plan of southern Courtyard-Daycare Center

Figure <4-3> Path Plan of Terrace garden (2nd FL)

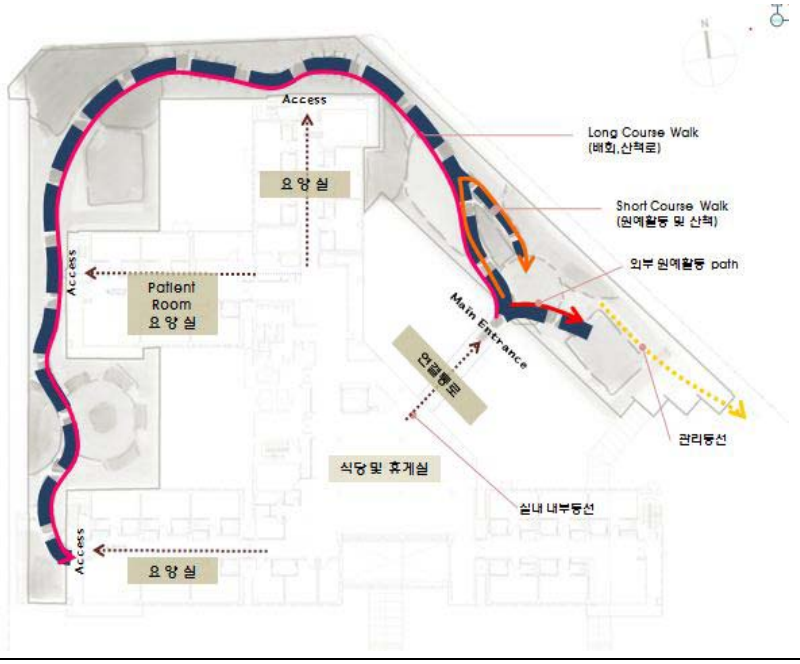
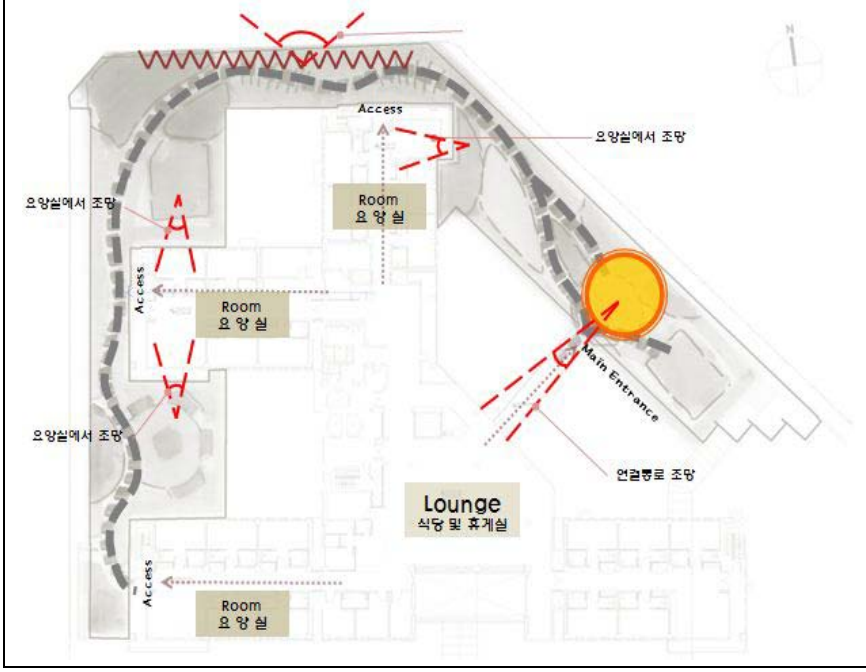
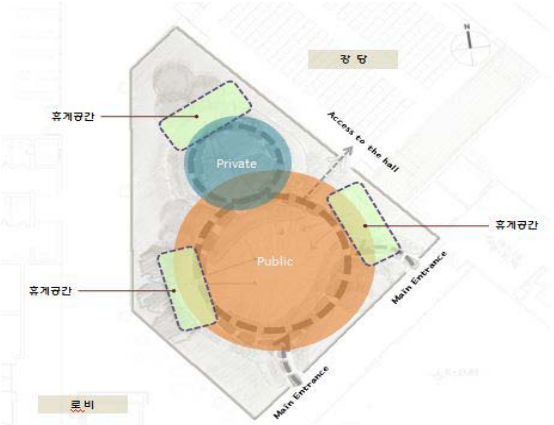
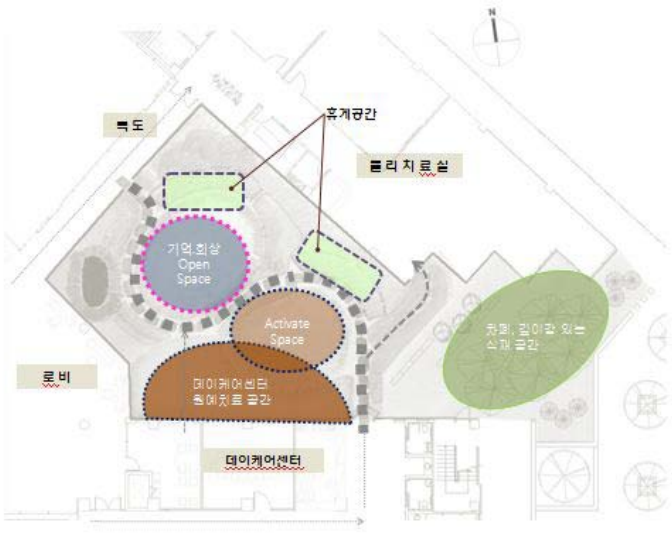
	Land-marking main entrance Diverse path-short/mid/long range
	Traffic noise from north side road Blocking views-2M walls around terrace

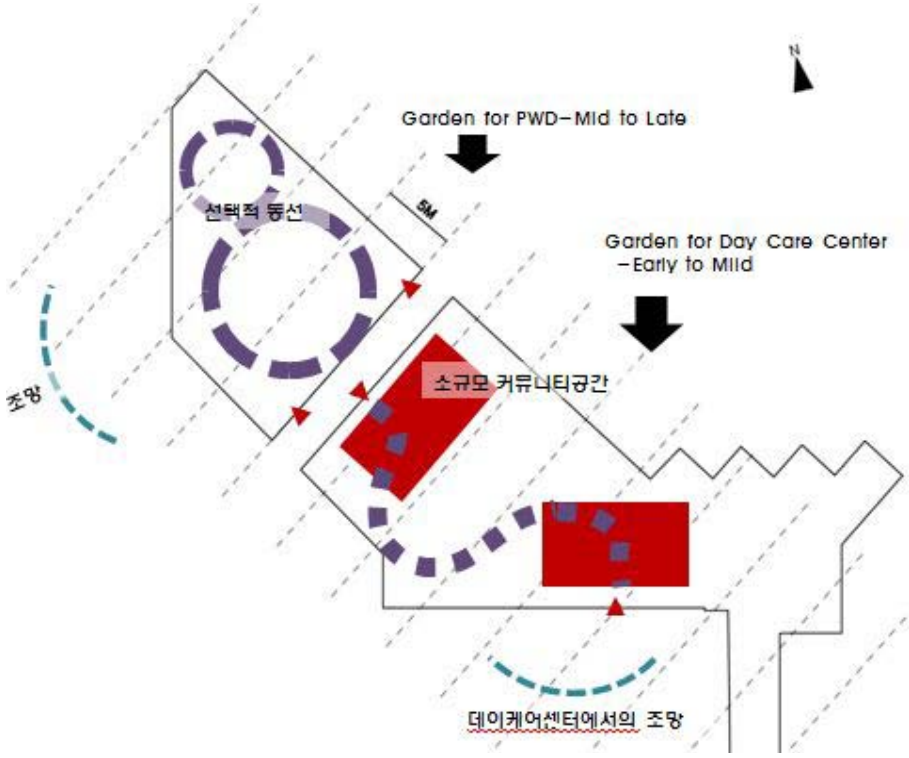
Figure <4-4> Schematic plan for courtyard

	Shared places Walking pathways Private/public territory Prosthetic support
	Sensory experiences Familiar & homelike space

	Temporal support Prosthetic supports Shared space Point of interest Space of Enabling & Rehabilitative activities Flexible space Preserve views

Providing options that allow for being present for activities, exposes people with dementia to social and sensory stimulation and facilitates the maintenance of a sense of autonomy. It has been observed that a centre which provides a variety of environmental options is more likely to be meaningful to more clients.

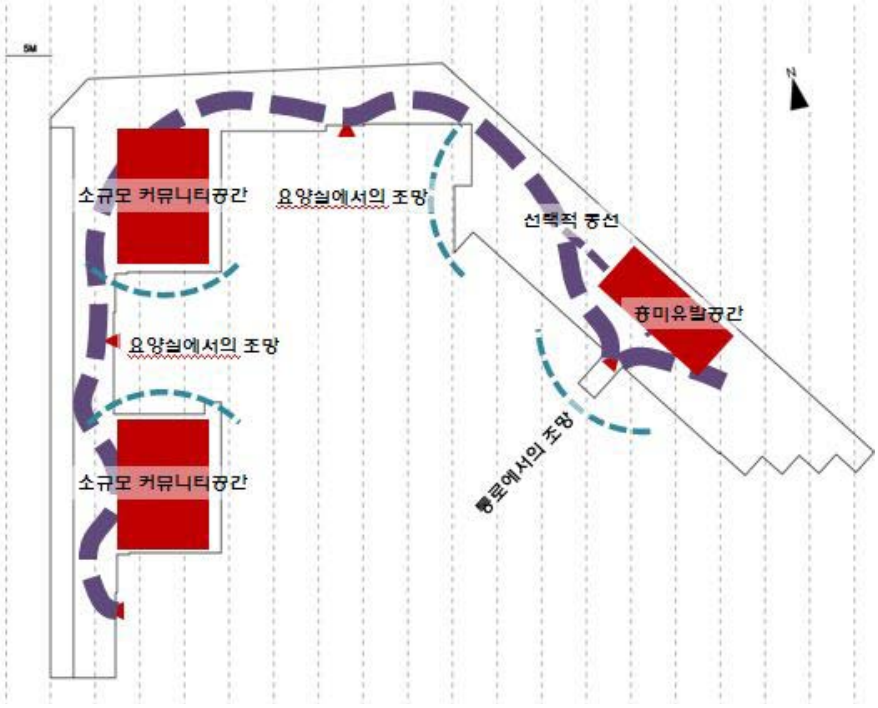
These healthy and familiar environments assist in the creation of a soothing, pleasant and non-threatening environment, qualities necessary in an adult day care center.



-Integration of courtyard – Northern and South courtyard could be integrated for the purpose of garden use and multi zones for user characteristics
-Spaces that afford meaningful & culturally appropriate activity
-Simplicity in design is required to avoid adding to confusion
-Interior and exterior detailing that is familiar & non-threatening
- Varied path lengths

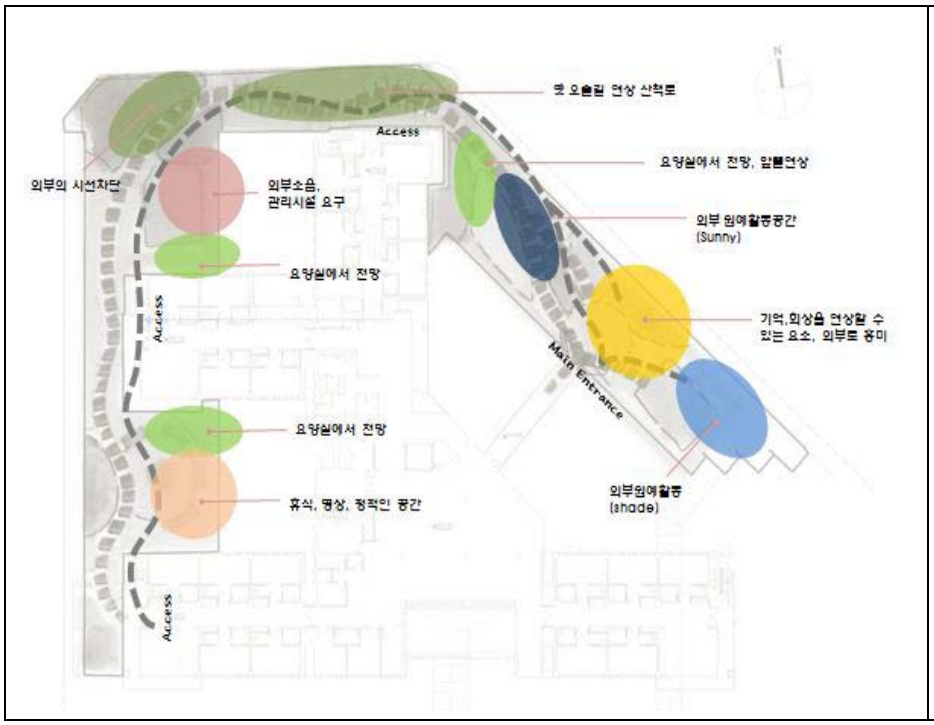
Figure <4-5> Schematic plan of courtyards

Courtyards provide residents with easy access to outdoor space because of its central location of building. Glassed in hallway or solarium located on around of the space, so residents can sit inside whild enjoying a view to the outside.They bring light into the center of the building and, because they are generally smaller than other outdoor spaces, provide home like environment, a more intimate and human scaled experience. This glassed-in corridor provides a view to a couryard for residents who preferred to remain in the building.



- Spaces that afford meaningful & culturally appropriate activity
- Simplicity in design is required to avoid adding to confusion
- Spaces, access points, pathways & services that eliminate unnecessary complexity & reduce extraneous sensory stimuli
- Wandering path should go through many secure rooms including the secure outdoor area and should showcase activities alternate to wandering to participate in or observe.
- Interior and exterior detailing that is familiar & non-threatening
-Varied path lengths
-increase amount of shaded areas
-point of interest at varied distances from building
-raised planting beds
-shade structures
-seating along paths

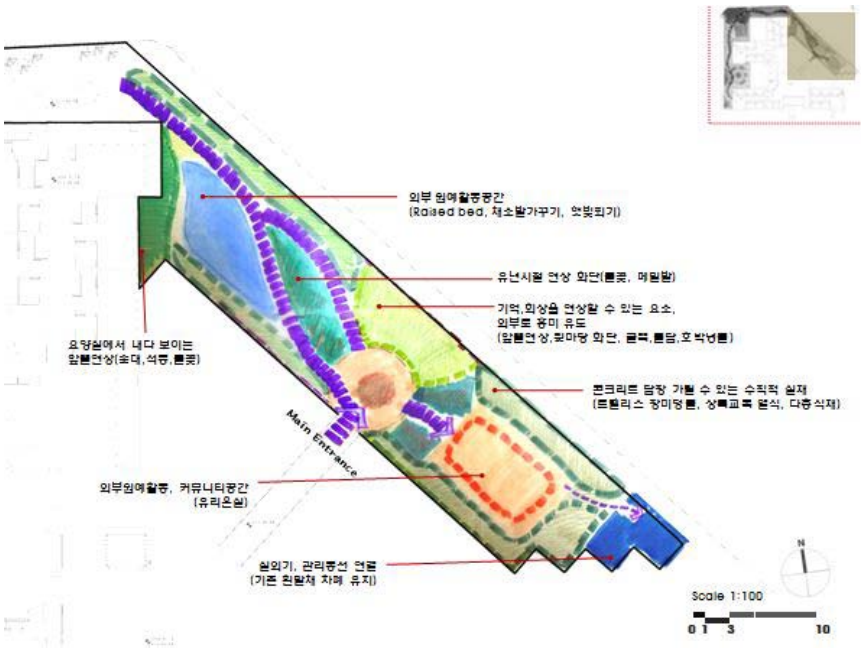
Figure <4-6> Schematic plan for Terrace garden



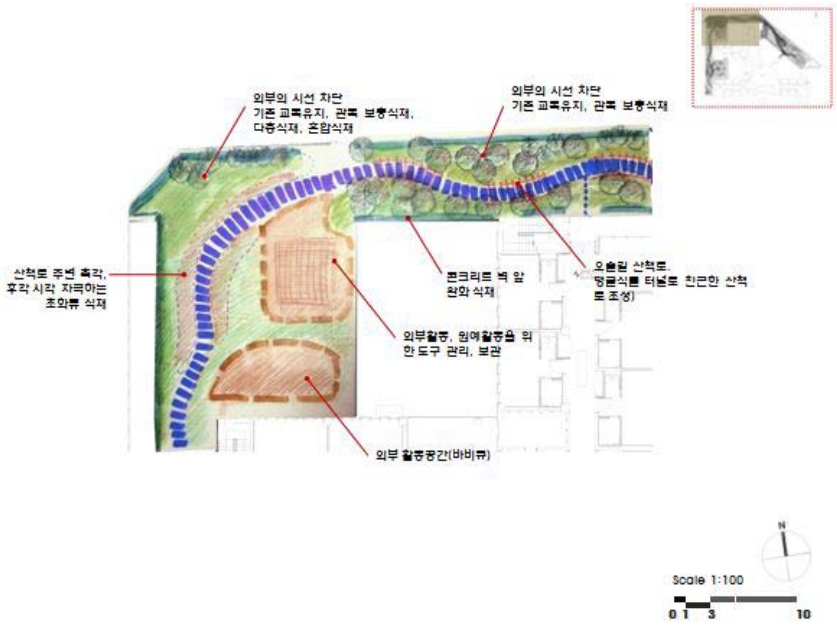
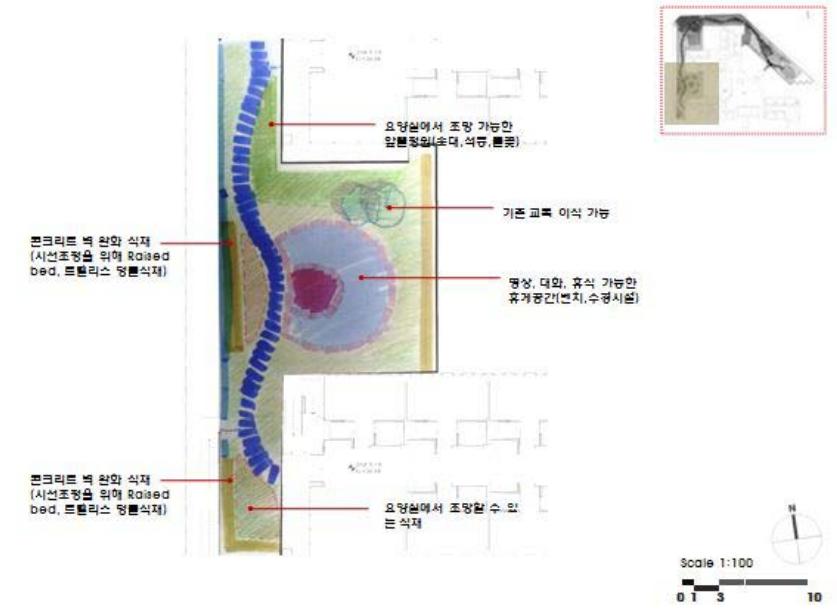
Zoning of Terrace garden

Figure <4-7> Diversity in Zoning of Terrace garden

Figure <4-8> Schematic plan of terrace garden



Front yard
Main entrance
Events
Multi-sensory stimulation
Reminiscence horticulture

	Shied noise Strolling Family events Life review
	Meditation Religious activities Rest area for staff and family

Providing options that allow for being present for activities, exposes people with dementia to social and sensory stimulation and facilitates the maintenance of a sense of autonomy. It has been observed that a center which provides a variety of environmental options is more likely to be meaningful to more residents.

Spaces, access points, pathways & services that use appropriate modes (light, colour, pictorial, verbal, tactile) for presentation of essential information to assist appropriate task completion.

- Wandering related to disorientation can best be dealt with by providing a more highly negotiable environment with good visual access and simple layout and highlighting helpful stimuli.
- Wandering related to boredom or habitual activity can be accommodated with pathways that not only provide exercise, but also provide opportunities for residents to encounter landmarks familiar to their younger adult life and to be passively involved in activities without requiring direct participation, thereby exposing them to social/sensory stimulation.
- The key concern related to those who wander is that they might wander away, therefore, a secure area in which to safely wander is required.

Figure <4-9> Programs and activities in therapeutic garden

Figure <4-10> Path plan for courtyard

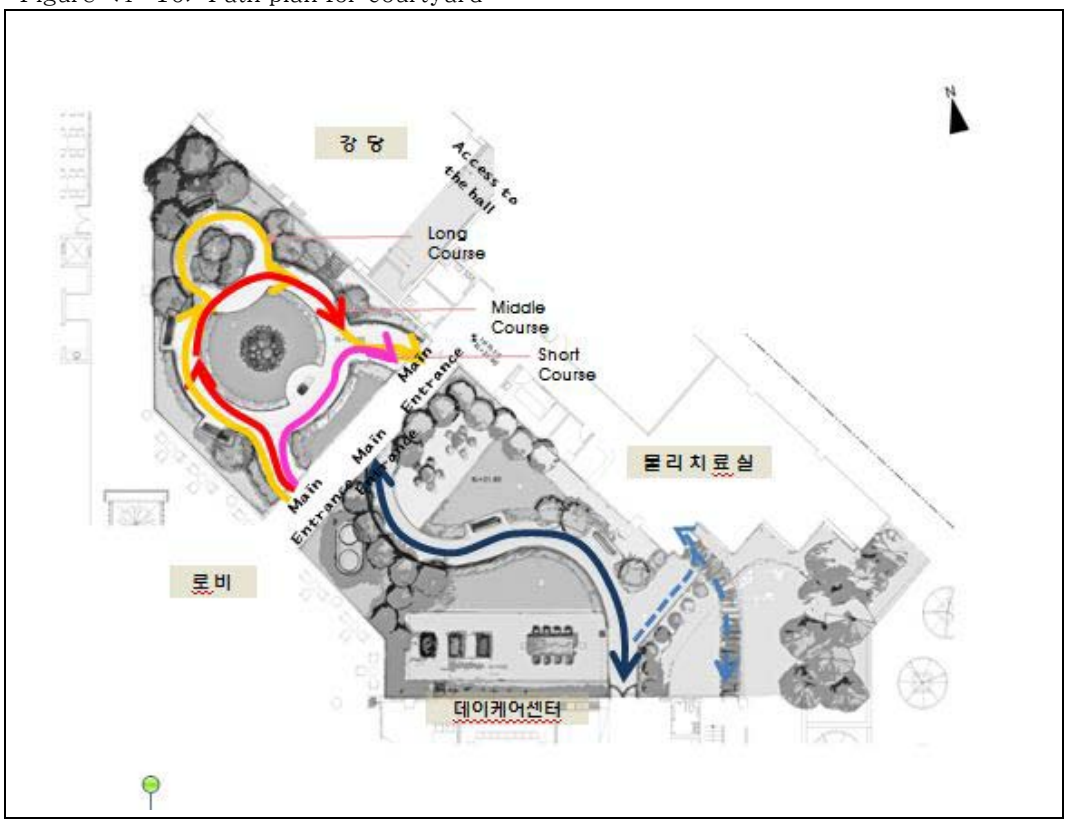
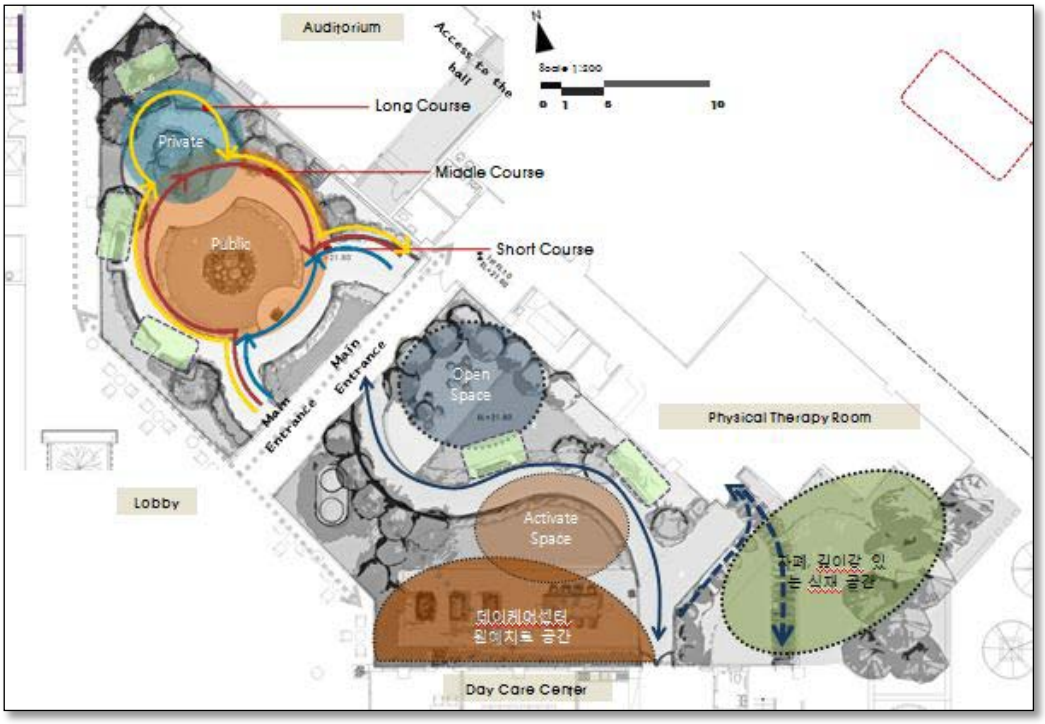


Figure <4-11> Plan for Planting in courtyard (including existing trees)



Figure<4-12> Zoning of Courtyards (Pathway/Private and Public area/space for program)

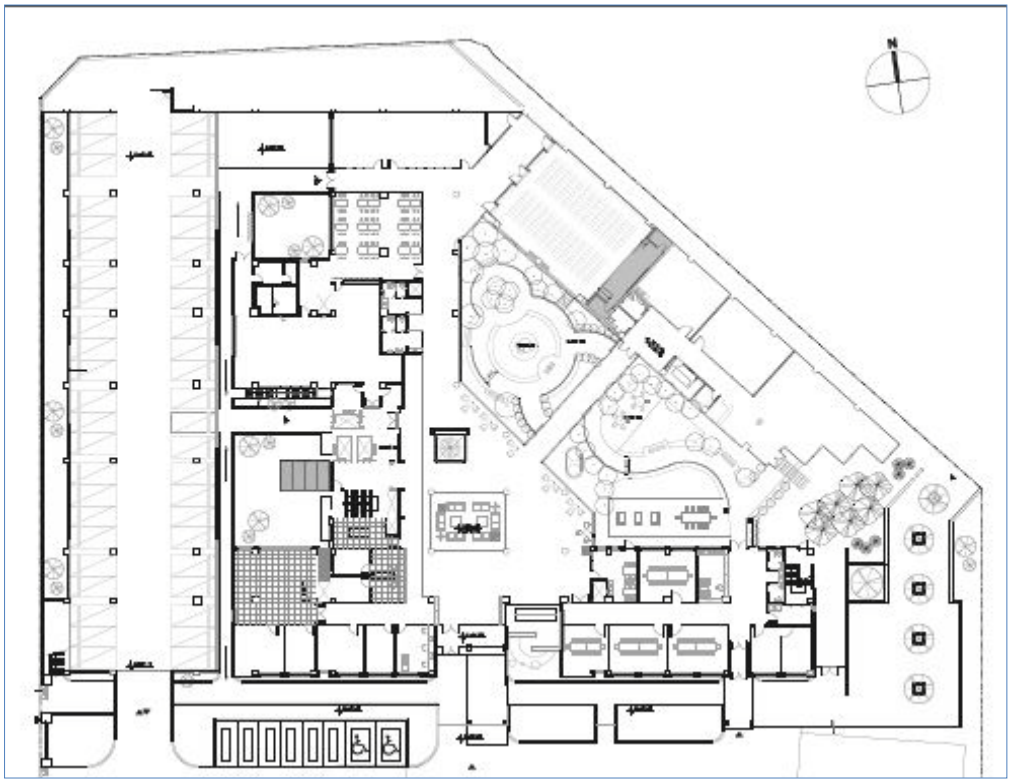


Figure <4-13> Plan of courtyards-Ground floor plan

Figure <4-14> Design of courtyards

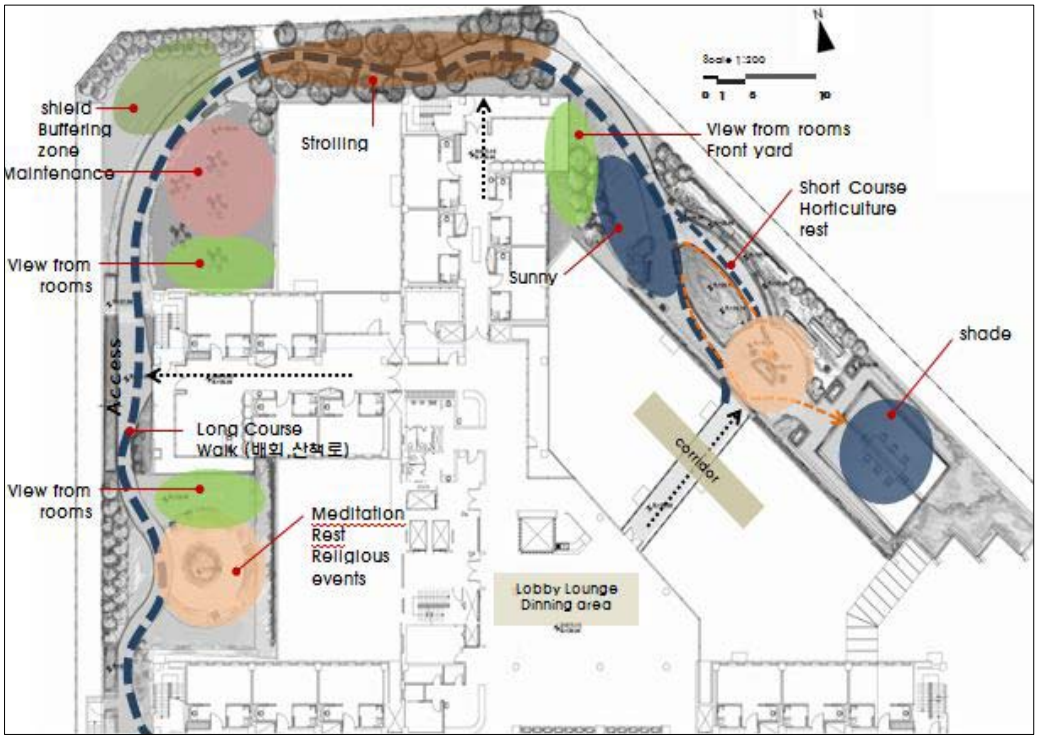


Figure <4-15> Schematic plan of Terrace garden

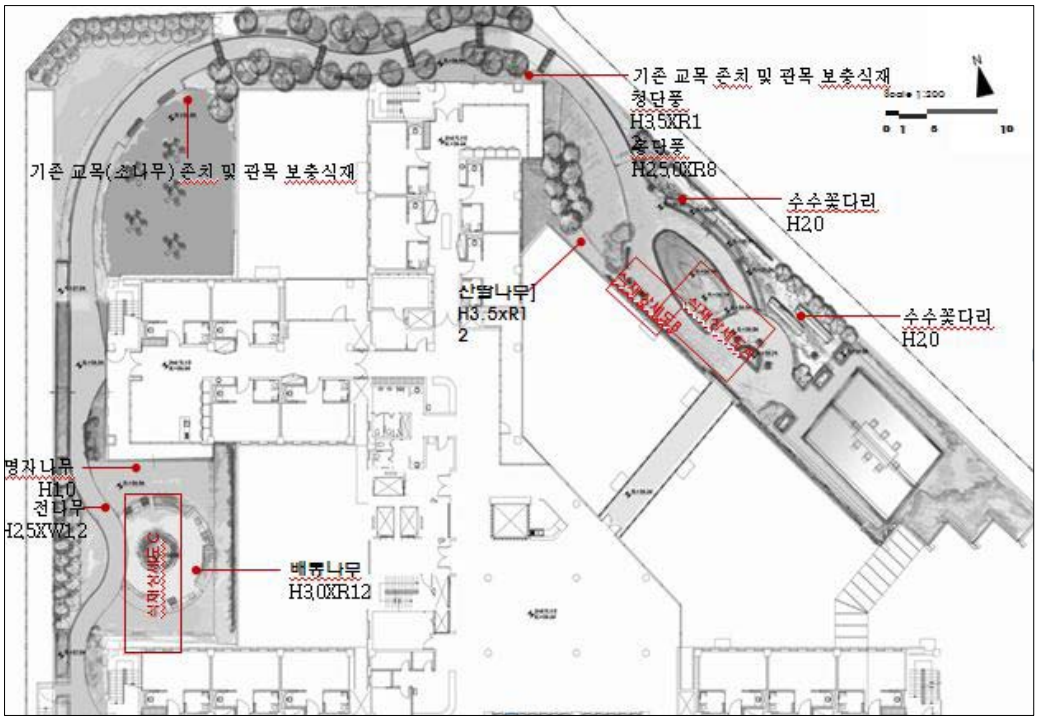
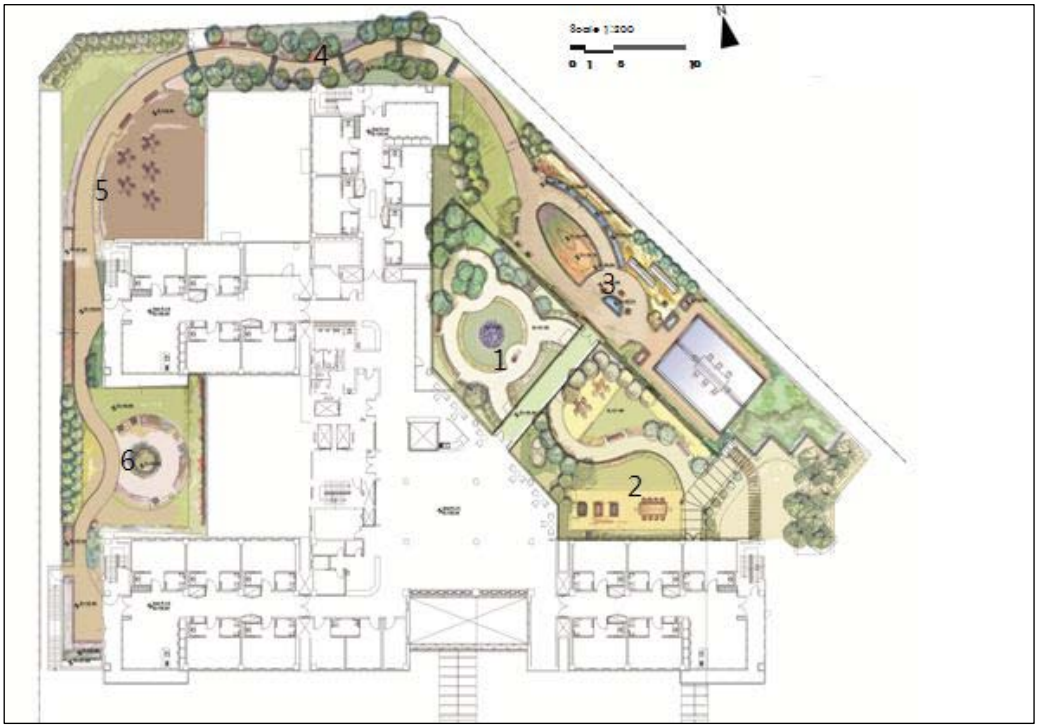


Figure <4-16> existing trees in terrace garden

4.3. Master Plan & Details

Figure <4-17> Master plan of therapeutic garden



Legend

1st level

1- Therapeutic garden
Courtyard for PW-mid to severe dementia
Amenities for Family/visitors/staffs

2- Daycare center garden for PW-mild dementia
Activities for Horticulture Therapy

2nd level

3- Terrace garden-Front yard
Daily activity and home likeness

4- Terrace garden-side yard
Wandering path

5- Terrace garden for family
Space for reunion & meeting

6- Terrace garden -back yard
Space for rest & meditation

Figure <4-18> Detail plan of courtyards

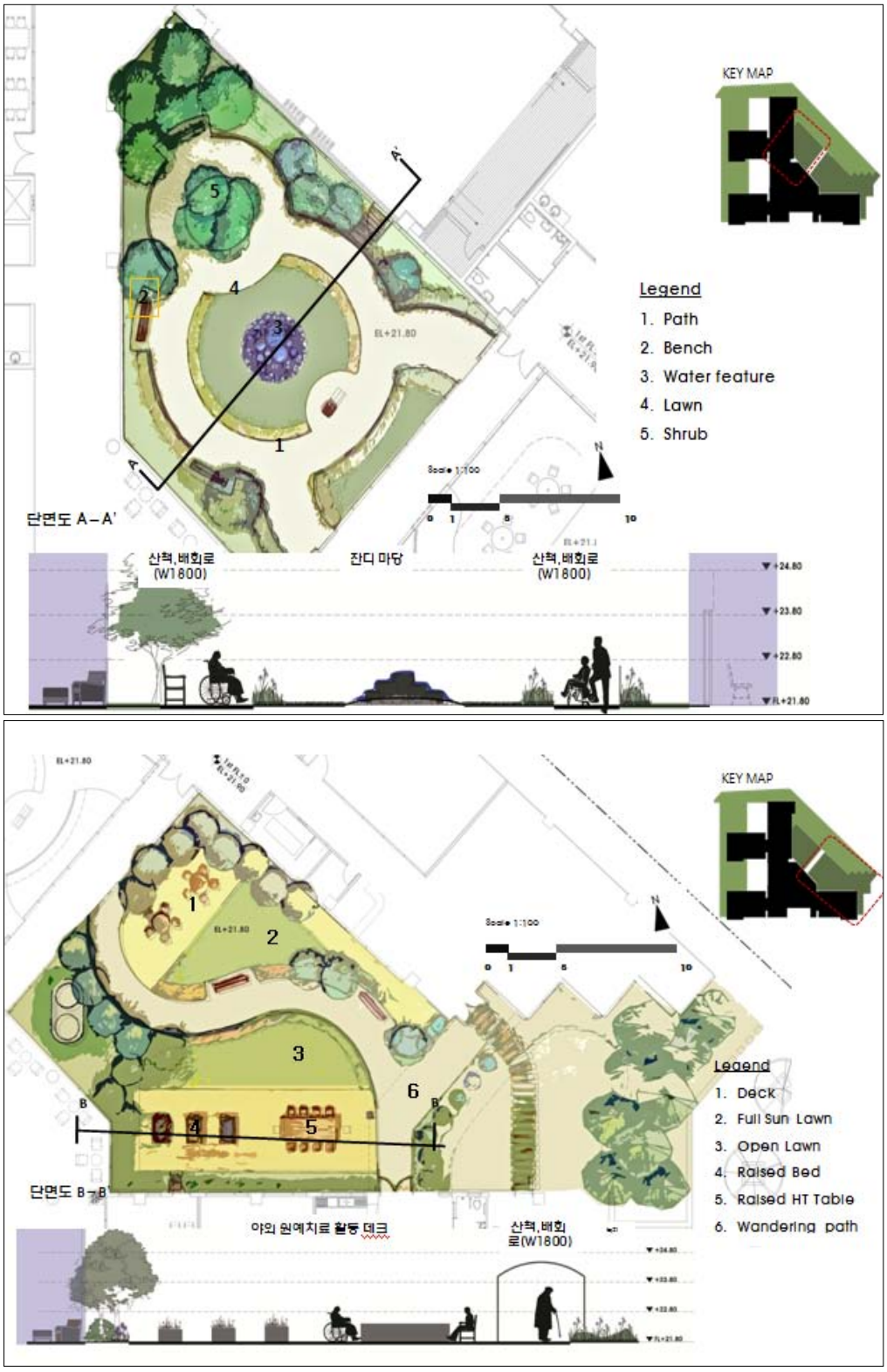


Figure <4-19> Plan of Terrace Garden

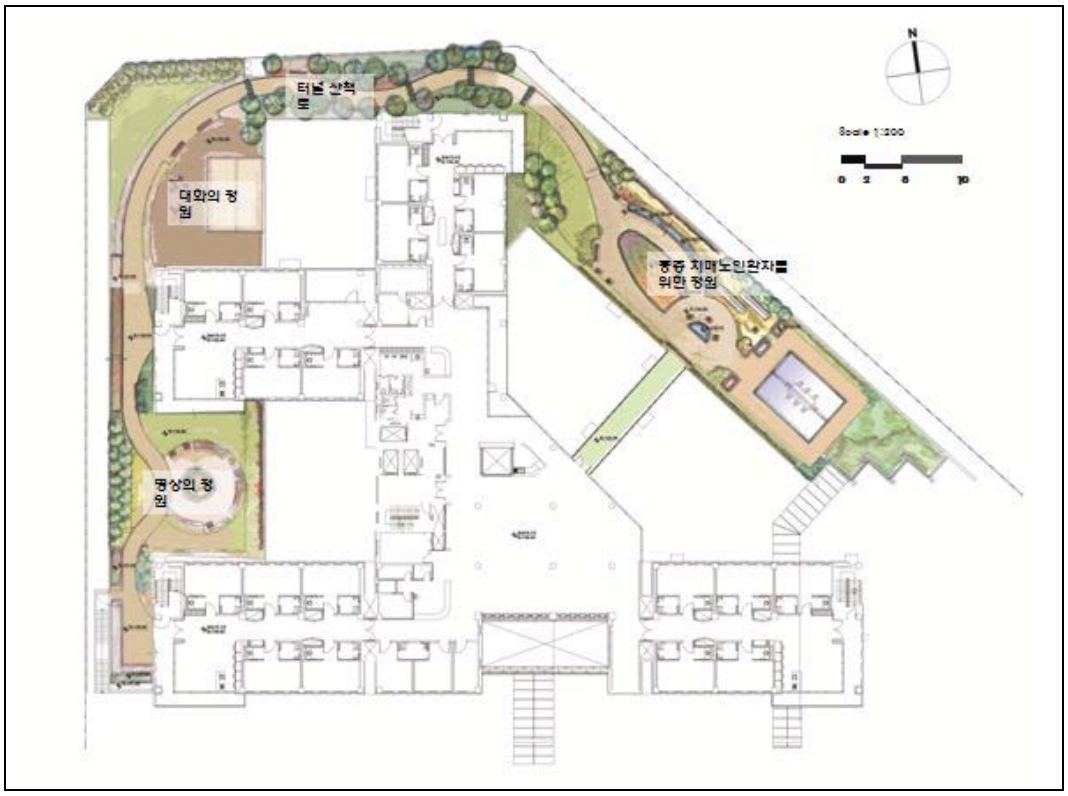


Figure <4-20> Detail plan of Terrace garden-Front yard

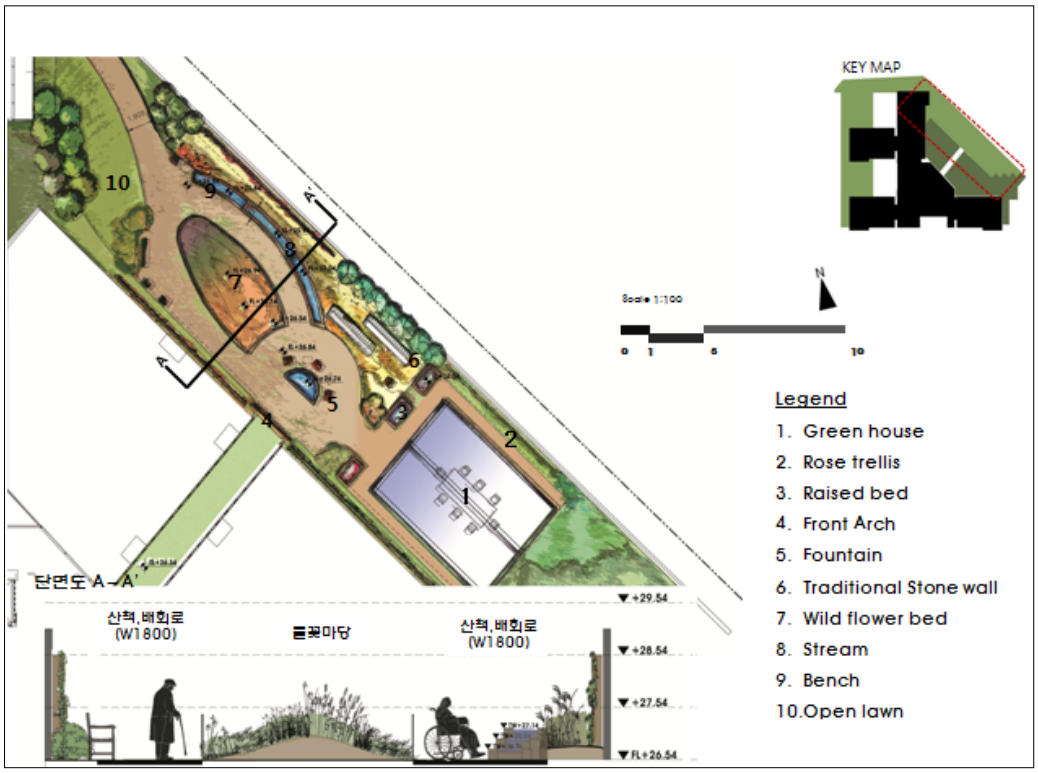


Figure <4-21> Detail plan of Terrace garden-Stroll

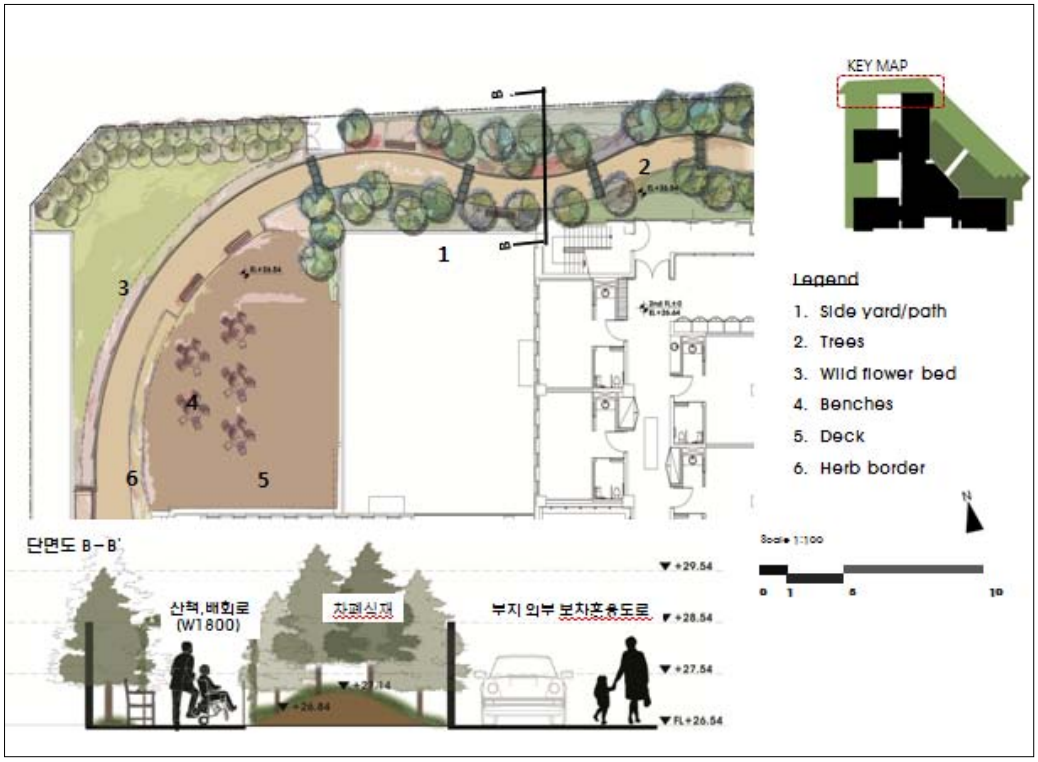
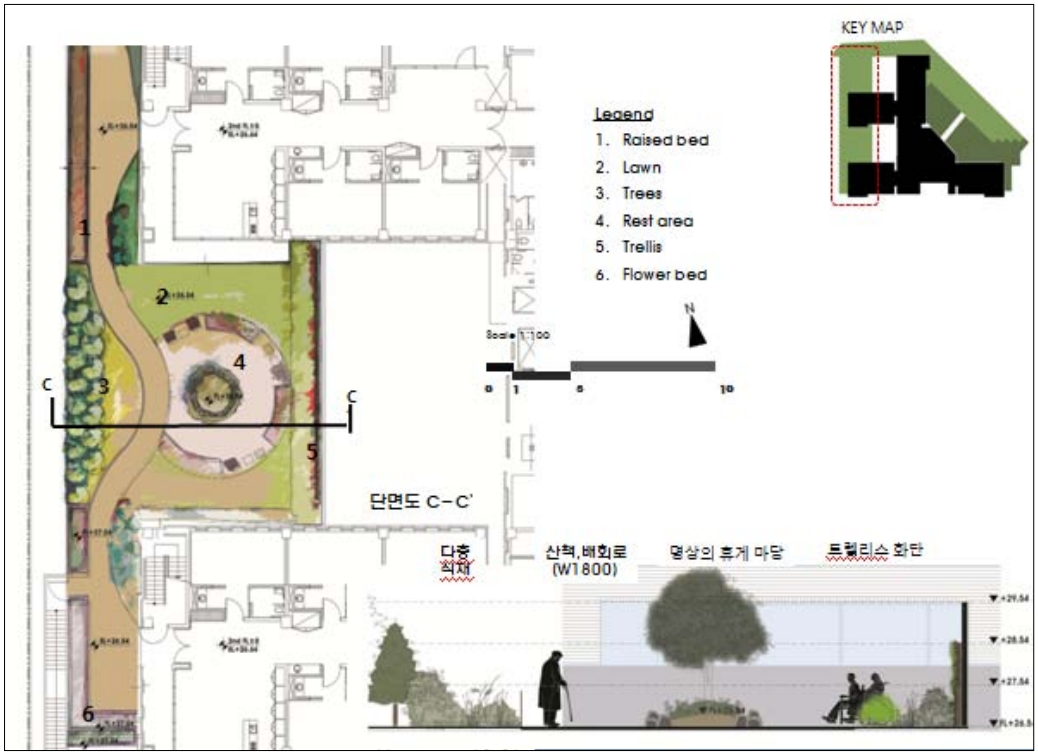


Figure <4-22> Detail Plan of Terrace garden-Backyard



Planting Plan I: Pathway

Seasonal orientation
Familiar plants for reminiscence
Multisensory stimulation－smell, texture, color, etc

Figure<4－23> Planting plan of pathway

Planting II : Seating Area

Shading
Multi layered
Seasonal composition

Figure <4－24> Planting plan of seating area

Planting III : Wild flower garden

- Natural mix & breeze
- Seasonal & Random planting

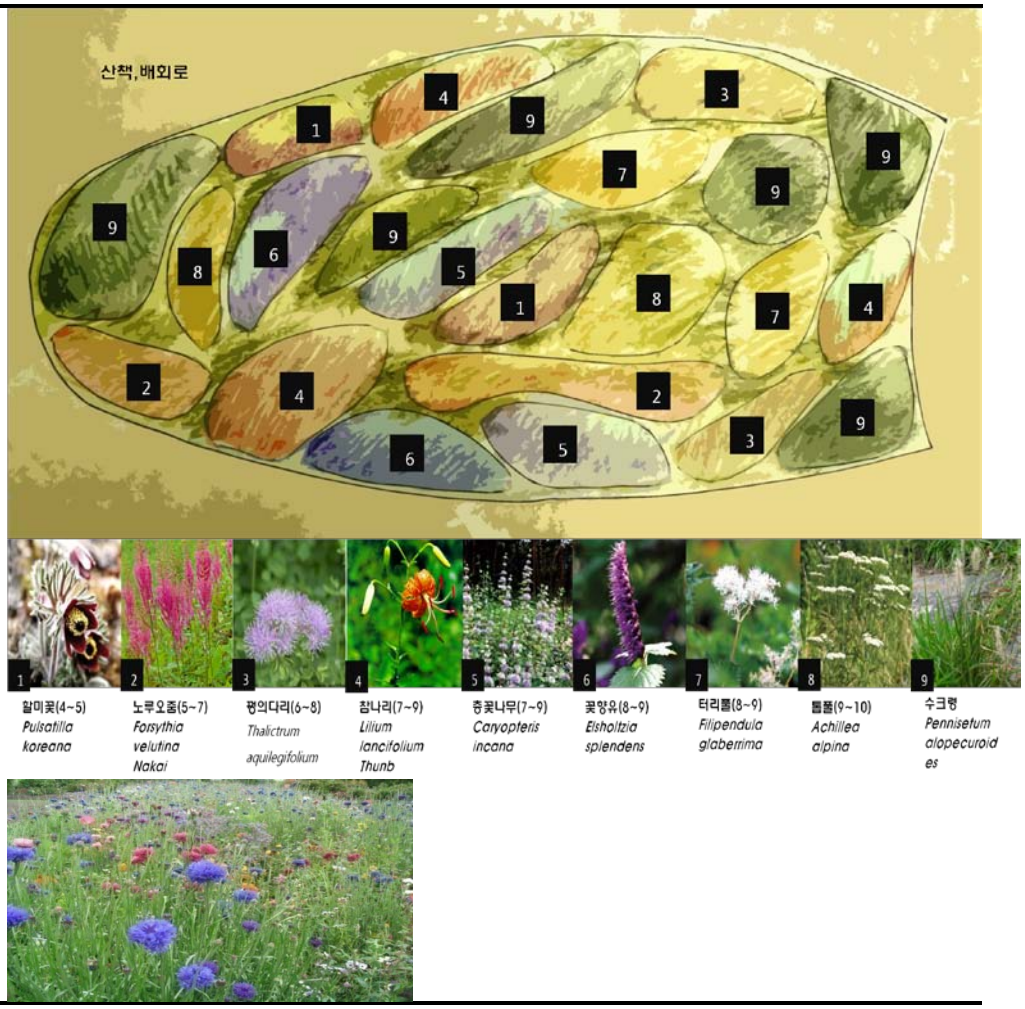


Figure <4-25> Planting plan of Wildflower garden

Figure <4-26> Detail plan of Courtyard-Northern part

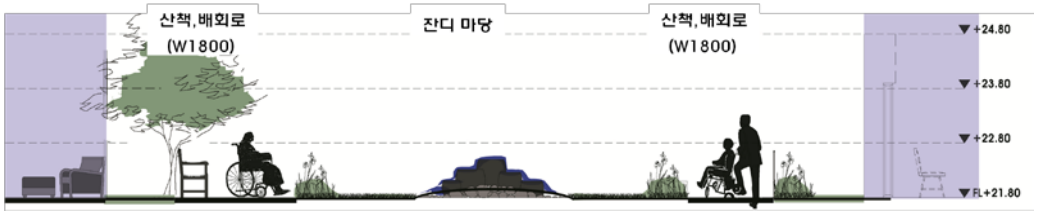


Figure <4-27> Section of Courtyard-Northern part

Figure <4-28> Illustrative perspective of courtyard

Figure <4-29> Detail plan of courtyard-Daycare Center

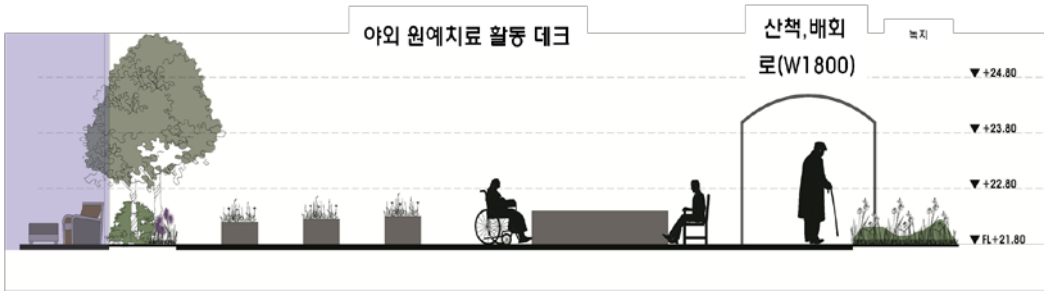


Figure <4-30> Section of Courtyard-Southern part: Daycare center

Figure <4-31> Illustrative perspective of Southern Courtyard-Daycare Center

Figure <4-32> Detail plan of Terrace garden-Front yard

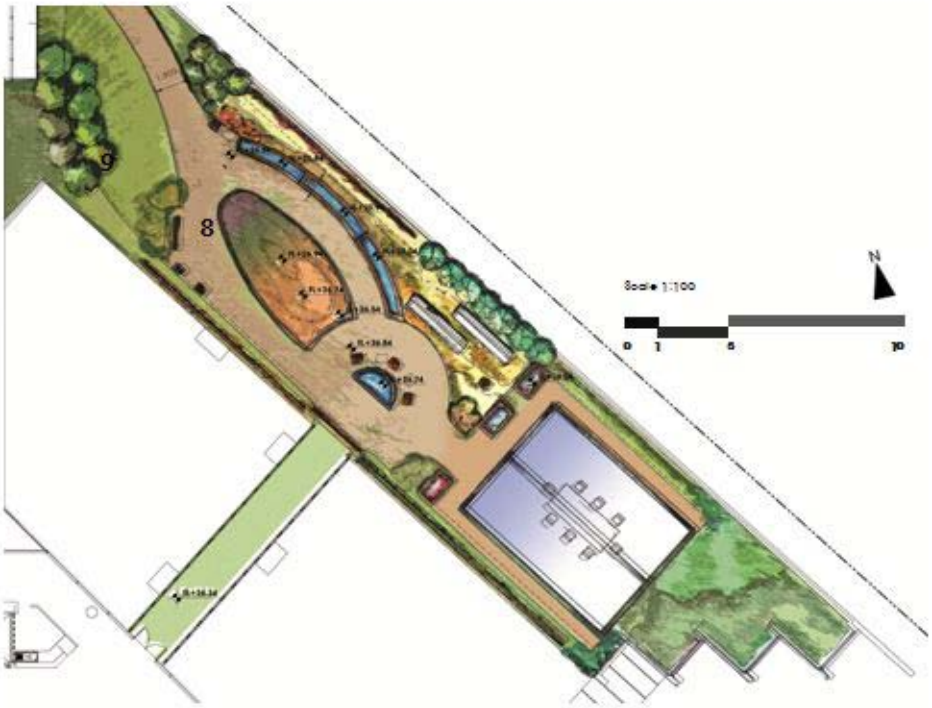


Figure <4-33> Section of Terrace garden-Frontyard

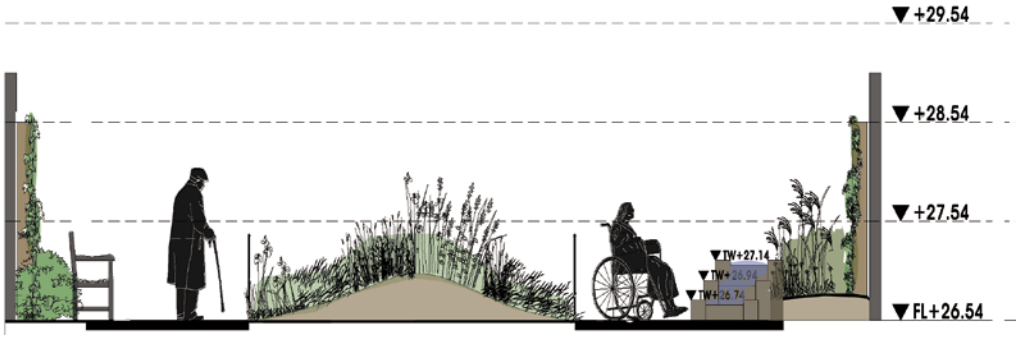


Figure <4-34> Illustrative perspective of Terrace garden-Frontyard

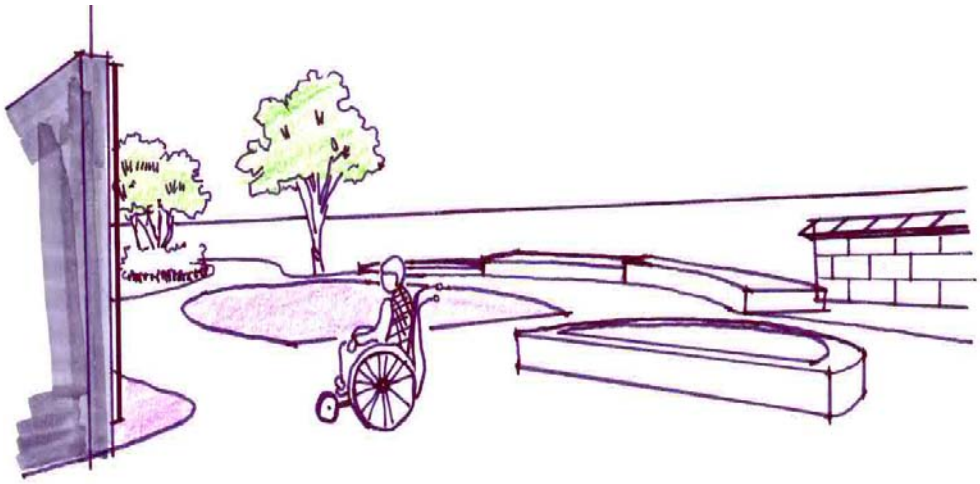


Figure <4-35> Illustrative perspective of Terrace garden-Main entrance

Figure <4-36> Detail plan of North side of Terrace garden-Stroll & Wandering

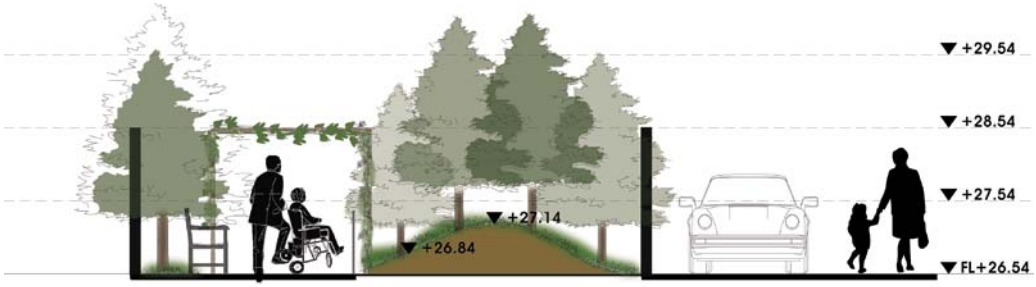


Figure <4-37> Section of Terrace garden- Trellis and stroll

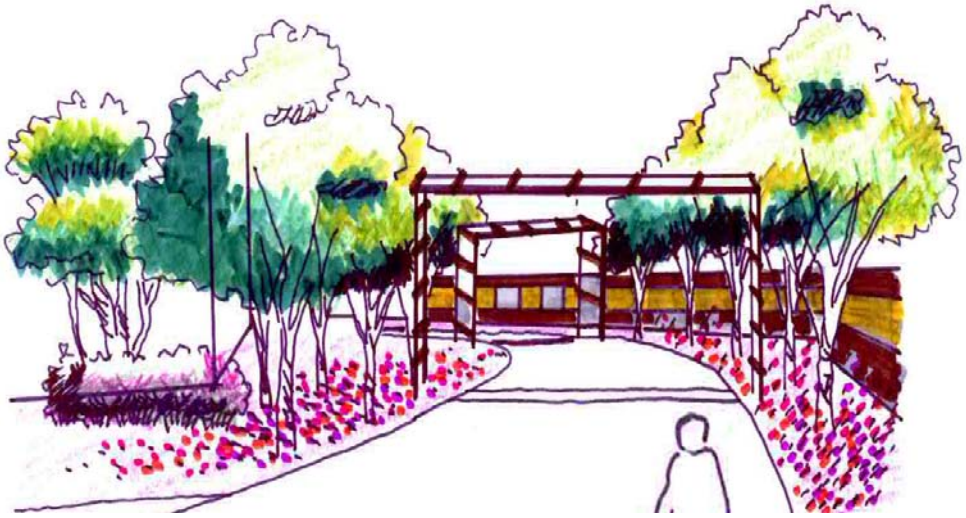


Figure <4-38>Illustrative perspective of stroll garden (North side of Terrace garden)

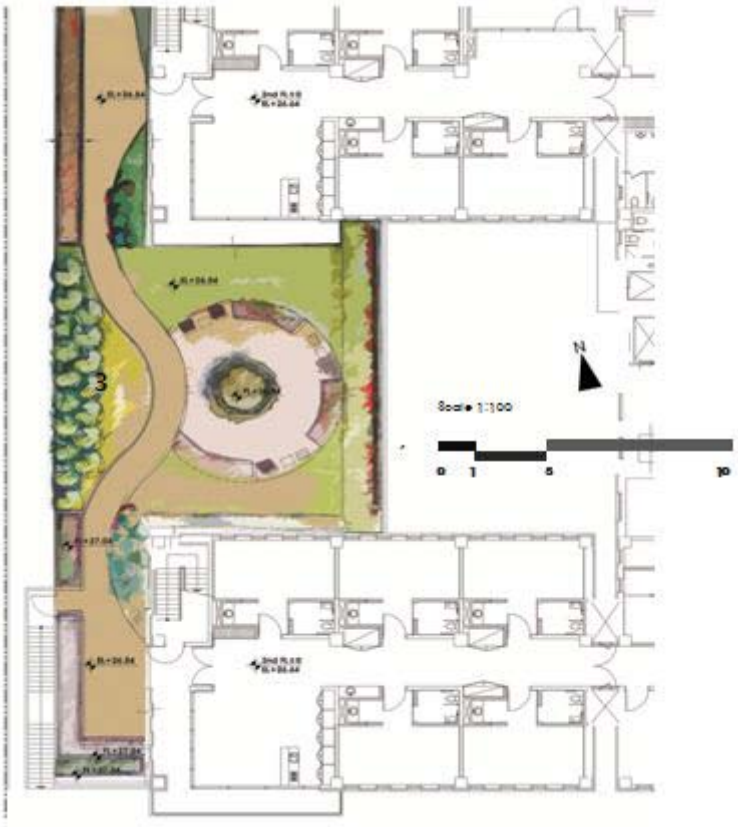


Figure <4-39> Detail plan of Terrace garden-Meditation garden

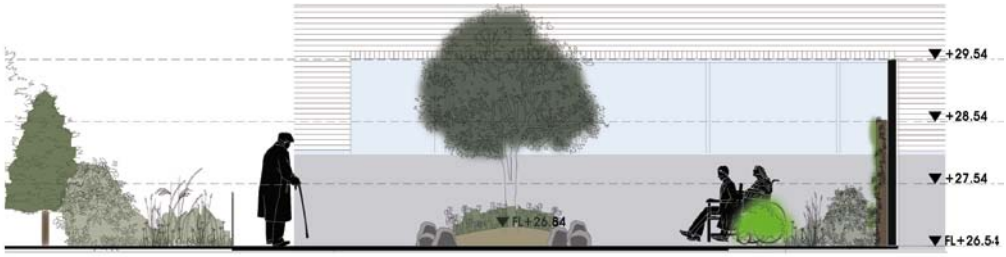
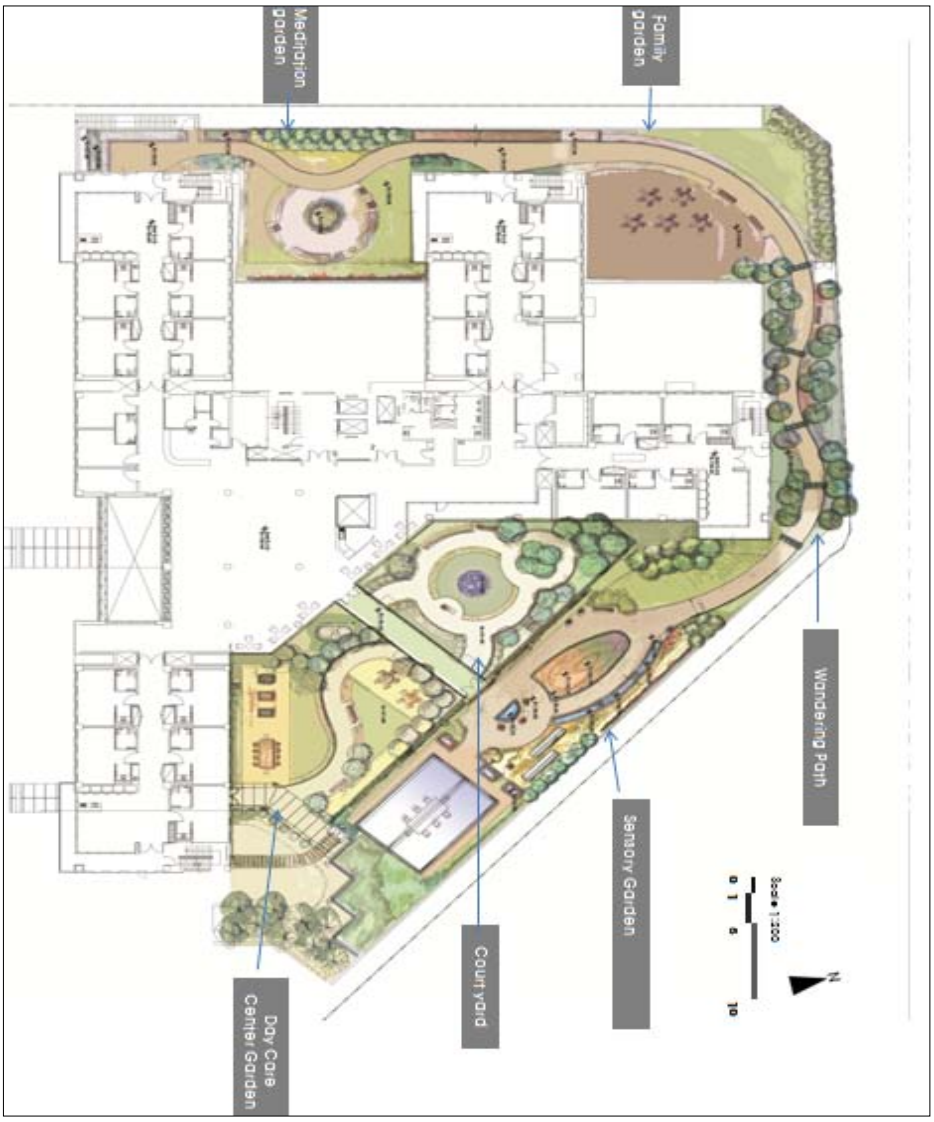


Figure <4-40> Section of terrace garden-Meditation garden


Meditation Garden
Family Garden
Wandering Path
Sensory Garden
Courtyard
Day Care Center Garden
N

Epilogue

In recent years, there has been a grwoing awareness that person with dementia should have the necessay environmental support and freedom to access the outdoors, and a substantial crop of wandersing parks, healing gardens, therapeutic gardens, and restorative gardens has sprung up as a result.

Central to designing a therapeutic garden for people with Dementia is to understand what dementia is and how it affects human health and behavior. Dementia is a syndrome, a group of related symptoms that is associated with an ongoing decline of the brain and its abilities, including thinking, language, memory, understanding, and judgement. People with demenia may also have problems controlling their emotions or behaving appropriately in psychosocial and environmental situations.

A gaden for people with dementia should be one that is easy to use and understand, free from ambiguity and one that provide opportunities for meaningful activity within it. To compensate for the various perceptual changes experienced by a person with dementia, garden design should strive to provide structure and reduce anxiety and confusion. Garden offer healthy exposure to fresh air and sunlight for residents and staff.

Recent research has begun to document the evolution of the healthcare environment and the role that innovative physical design may ultimately play in health and health outcomes. Gardens are more than just another amenity or form of therapy. They are ultimately about quality of life.

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국문초록

이 논문은 장기요양센터에 입원중인 치매노인에게 건강유익을 가져오는 치유적 정원요소를 확인하고 이를 정원 설계에 적용하기 위해 시도되었다.

환경설계 연구는 치매노인들의 삶의질을 향상하는데 중심적인 역할을 해오고 있으며, 장기요양센터에 거주와 요양을 하고 있는 치매노인에게 치유와 지지역할을 하는 가장 중요한 환경요소는 정원이다. 치매노인과 환경설계 요소간의 치유적 관계를 확인하는 원리에 관한 근거들이 제시되고 있는데, 주로 집과 같은, 익숙한 환경, 감각 자극, 사적 보호, 사회화, 가족 방문, 옥외 활동, 편안함, 안전, 접근용이성 등이다.

서울시가 설립하고 온누리사회복지재단이 위탁 운영하는 서울 동부시립노인전문센터를 대상으로 장기요양시설의 치유정원 설계를 적용하였다. 노인전문센터는 허약 및 치매로 장기적 돌봄과 요양을 필요로 하는 노인요양시설과 지역사회의 돌봄이 필요한 치매노인을 대상으로 운영하는 주간보호센터로 구성되어 있으며, 치유정원은 현재 1층의 중정과 2층 테라스정원으로 구성되어 있다.

대상지의 치유정원 설계를 위한 주요 전제는 회복적이고 친숙한 옥외 환경을 조성하는 것으로서, 요양 노인과 가족을 위시한 방문자들이 신선한 공기를 마시며 가벼운 산책과 활동을 할 수 있고, 좋아하는 식물을 키울 수 있는 기회를 제공하고, 병원의 일상적 환경에서 벗어나 있는, 그리고 가족과 친구들과 사적인 시간을 가질 수 있는 공간을 마련하는 것을 목적으로 한다. 장애가 없이 누구나 이용할 수 있는, 신체적, 사회적, 인지정서적 지지를 위한 통합적 설계 요소를 적용, 거주 노인과 가족, 직원들의 치유적 건강유익을 목표로 설계안을 제시하였다.

주요어: 치유정원 설계, 노인장기요양센터, 치매

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