

Korean National Parks facilities' universal design guidelines

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I . Background and Objectives

Purposes of visiting National Park are becoming various and also various of people including foreigners, children, and adults are visiting National Park. Therefore, the applicability review and applying measures of the Universal Design to park facilities based on the characteristics of Korean National Parks are required. As a first step of applying Universal Design to park facilities, walking trails should be graded based on the walking trail classification system. As a second step, Universal Design guideline for park facilities based on the characteristics of visitors should be developed in order to seek condition improvements for the visitors.

Changes in the natural & social environment	Increase of the cultural needs according to economic growth	Legal standard maintenance	Heightened interest in the welfare of Humanity
<ul style="list-style-type: none"> Emphasizes principles of ecological welfare Nature is a key component of welfare The strengthening of healing capabilities and recreation function of the people Society evolution into the low birth rate and an aging 11.4 % of total population is over 65 years 	<ul style="list-style-type: none"> Population growth with an emphasis on leisure and health Expansion of visitors and increased utilization <ul style="list-style-type: none"> increased utilization of the aged people 5.3%(in2007) 8.5% (in 2010) urban area 15.0% Decrease of summit conquer type visitors and increase of various activity <ul style="list-style-type: none"> Summit conquer type : 66.4% in 2005 45.5% in 2010 Camping : 7.2%(2007) 12.6%(2010) Ramble : 24.6 (2010) 	<ul style="list-style-type: none"> Law enforcement to improve user convenience and to care socially disadvantaged <ul style="list-style-type: none"> Law enforcement for the disadvantaged convenience Law for promoting pedestrian safety and convenience Law for convenience of the traffic weak Applying law related to general area to National Park <ul style="list-style-type: none"> Include National park as related law applying zone such as access road, parking area and architecture Lack of standard considering National Park characters. <ul style="list-style-type: none"> Lack of detail standards of trails, camping zone and outdoor facilities 	<ul style="list-style-type: none"> The paradigm of human dignity <ul style="list-style-type: none"> UN Convention on the Rights of Persons with Disabilities UN Convention on the Rights of the Child Convention on the Elimination of Discrimination against Women Increase of the traffic weak and upsurge of the social concerns <ul style="list-style-type: none"> the increase of need of Universal Design to improve accessibility and ease of use.

Conservation first, Promoting appropriate visit

- Necessity for the new paradigm
- Designing diverse human-centered National Park
- Development of policy and system based on the characteristics of National Park

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II. Contents

1. The first step : The trail classification system based on the management direction and the characteristics of National Park

- **Methods**

This project has proceeded in two parts.

First, a walking trails classification system has been developed and adopted in order to setup the basic framework for the management of trails.

Second, the guidelines of universal design for park facilities like trails, parking lots, and campsites have been applied based on the Korean trail classification system.

- **Developing trail classification system(TCS)**

In order to develop the TCS, it was necessary to consider gradient, length, trail surface condition, and hiking time of the trail, etc. The Korean trail classification system identified 5 difficulty ratings (easy, moderate, intermediate, advanced, and expert) based on above factors. KNPS developed the guidelines for the trail classification system in 2011 and applied the guidelines to 1,700km of trail, of which is the total trail length of the Korean National Parks, from 2012 to 2013.

This system will more clearly provide basic information to better match facilities to the user, including handicapped, elderly, and moderately skilled visitors to expert visitors for hiking and mountain climbing. Detailed descriptions of the trail classes will be provided to visitors in order to manage risk and minimize exhaustion, injuries, and accidents. At the same time this will make it more convenient for visitors, as they will be provided information about trail routes that is relevant to their physical abilities and condition.

- **Standards of the trail classification system**

In order to develop a standard trail classification system for the Korean National Parks, it was necessary to identify systems that are currently

used in other countries such as Australia, New Zealand ,USA and Canada. Based on these examples, 5 classifications were developed for the Korean National Parks. An easy class and barrier free park facilities were established for the disabled and transportation vulnerable.

Another important aspect to developing the trail classification system was the necessity to identify variables for judging the classes of the trails. After selecting the possible variables, the delphi method and analytic hierarchy process was applied to identify the validity, importance and weight of each variable. Through this process, 5 major variables were identified to develop the trail classes, which were gradient, trail length, trail surface condition, rocky features, and hiking time.

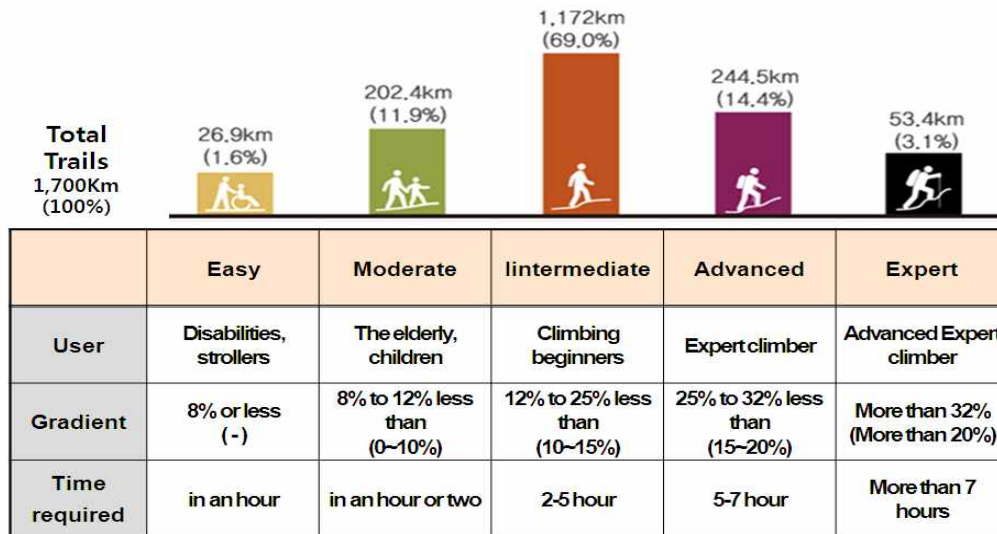
Classes	Easy	Moderate	Intermediate	Advanced	Expert
Gradient	8% or less (-)	8% to 12% less than (0~10%)	12% to 25% less than (10~15%)	25% to 32% less than (15~20%)	More than 32% (More than 20%)
Distance	500m or less (2km or less)	1km or less (2~4km)	3km or less (4~6km)	5km or less (6~8km)	More than 5km (More than 8km)
Surface Conditions	Well Formed trail (Wood decks, concrete, etc)	Formed trail (Dirt road 80% ~ 100%)	Relatively unformed trail (Dirt road 50~80%)	Unformed trail (Stone road 50~80%)	Very unformed trail (Stone road 80%~100%)
Natural obstacles	None	Some rock	wooden stairs are installed	Ropes, ladders, etc. installed	Required hand up and down
Time required	in an hour	in an hour or two	2-5 hour	5-7 hour	More than 7 hours

- **Use of trail classification system for Trails of the Korean National Parks**

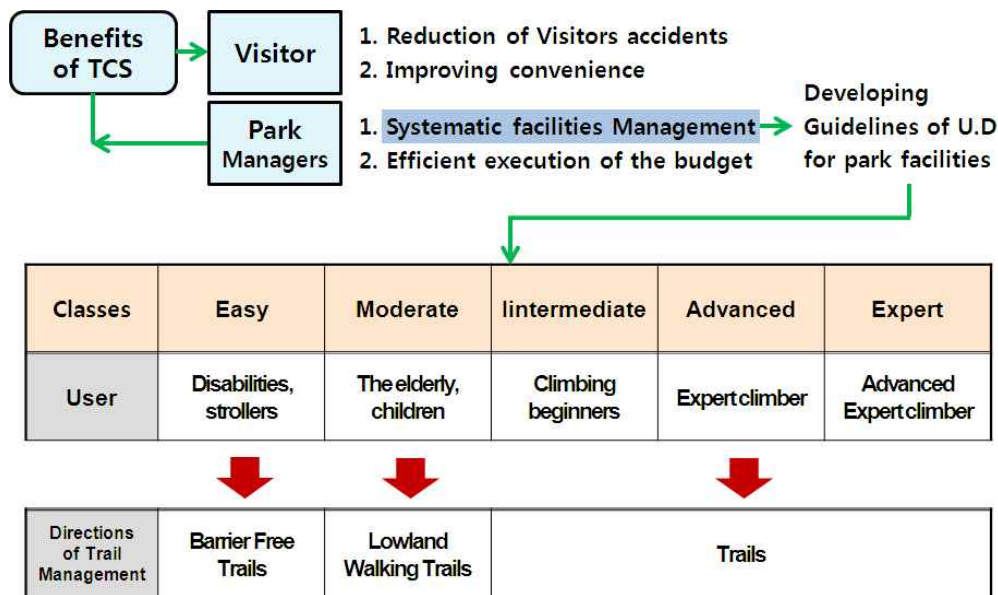
Inspections for Trail classification were carried out for 1,700km of the 20 national parks from 2012 to 2013. Using the GPS measurement units by the Trimble, gradient and length of trails were measured.

Staff of the Korean National Parks surveyed the trails for surface conditions and any natural obstacles on the trails, like rocky features. Information from the national park maps were utilized to measure the hiking time of each trail route. All the data were then entered into Microsoft Excel and were analyzed.

Trail classes analysis were as follows.



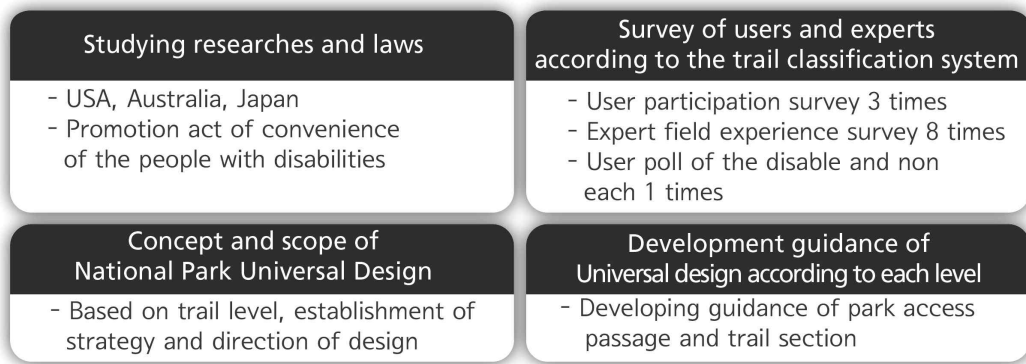
● Trail classes and incorporate universal design



2. The second step : Establishment of design guidelines according to the visitors trait based on trail level

2-1 The process and main contents

Conducted researches and site investigations based on the walking trail classification system to develop Universal Design Guideline considering each facility's features.



● The results of literature and related laws



2-2 User and expert survey

● Three types of survey of user, expert and poll about amenities and National Park trails.

	User participation survey	Expert status survey	Poll	
The purpose of survey	In the view of user, grasp of problems and use possibility of National Park.	In the view of expert, based on journey process, verification of National Park	Verification of feasibility to apply Universal Design to National Park according to visiting patterns and proficiency of users on each trail level.	
Contents of survey	Availability and issues of facilities, information and climbing routes on journey schedules.	Availability and issues of facilities, information and climbing routes on journey schedules.	Studying the trails use patterns and requirements based on visiting purposes.	
Surveyed National Parks and participants	Area	Participants	Area	Area
	Bukhan mountain trail	Wheel chair user 1 person	Gaeryong Mountain trail Chiak Mountain campsite	17 National Parks
	Taeon trail	Wheel chair user	Odae Mountain campsite	National Parks
	Bukhan mountain trail	wheel chair user 2, 2 families using strollers 2 kids, 1 the old	Bukhan mountain trail	
Dukyu Mountain trail, campsite				
Jili Mountain trail				
		Naejang Mountain trail		
Surve method	Where : Non handicapped trails How : Walking through the target trails, observing the facility users and interview	Where : Trails, campsites and other facilities in National Park How : Verifying the journey and conditions of sites based on 7 Universal Design 7 principles.	Target : National Park visitors and the handicapped How : Survey and polling about user info(sex, age, activity, skills) and favorability about facilities. To handicapped, the type of disability and using patterns.	

Analysis

- In order to provide safe and comfortable conditions for visitors, development of Universal Design standards is necessary.
- Various guidelines based on the classification are required because of difference of visitors.
- National Parks not only require development of facilities but they also require development of amenities.

● Case studies of domestic (Bukhansan National Park)



Tour map - Verification of non handicapped trails

Jung Ji Young 27 female Seoul DPI manager

Handicapped type : wheel chair using

Transportation : Owner driving

Destination : 2 section trails (300m)

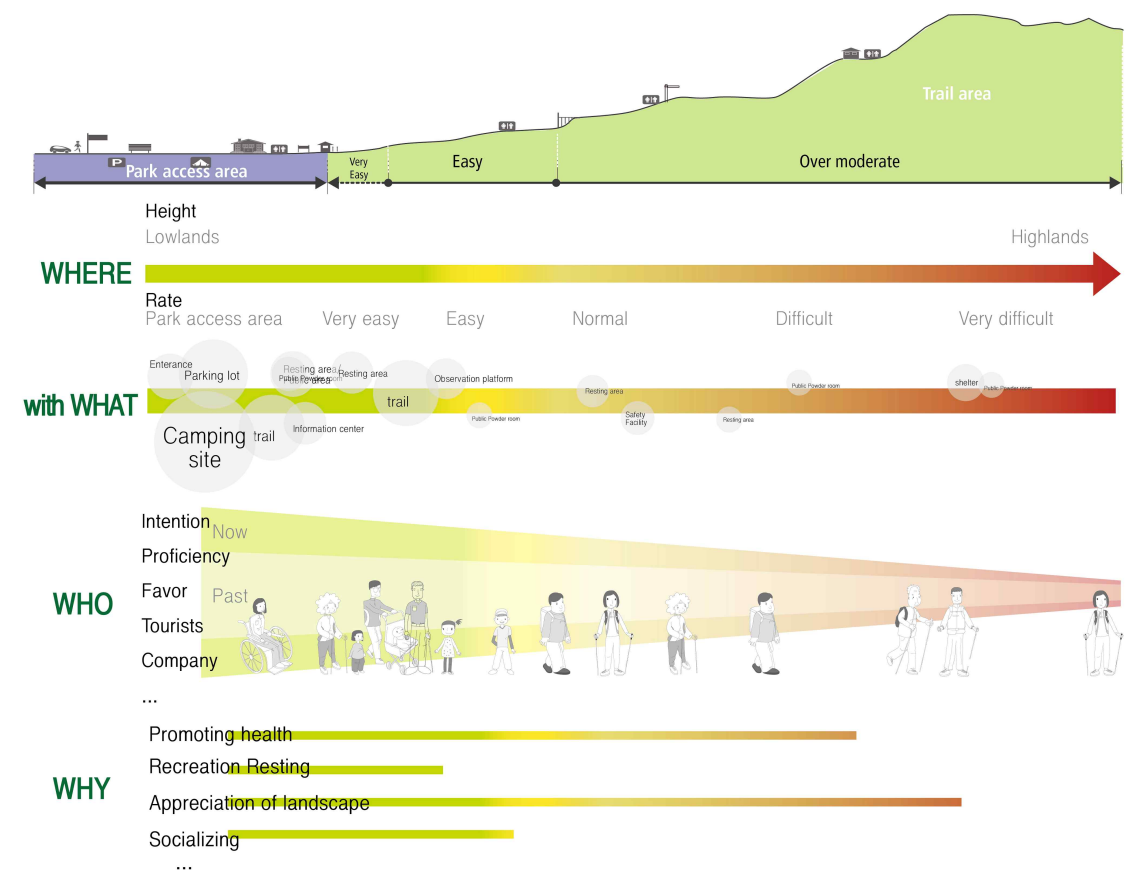


- Lack of signs
- Lack of secure facility
- Lack of convenience facility








III. Universal Design Guideline

1. Design Strategy

Based on survey results, establishment of design strategy



● Plan for the walking trail classification system

Grading Name	Easy	Moderate	Intermediate	Advanced	Expert
Hikers	- people with disabilities, pregnant - Wheelchairs, stroller	- children, seniors	- Bigining hikers	- Experienced hikers	- Experienced hikers
Pictogram	 	 			
Gradient	Flat	Gentle hills	Short steep hills	Very steep	Very steep and difficult
Trail surface	Well formed trail	Formed trail	Relatively unformed trail	Unformed trail	Very unformed trail
Suggested gear	None	Sneakers	Hiking boots, backpack, water, pole, etc.	Hiking boots, backpack, water, pole, etc.	Hiking boots, backpack, water, pole, etc.



● Guideline for National Park facility Universal Design

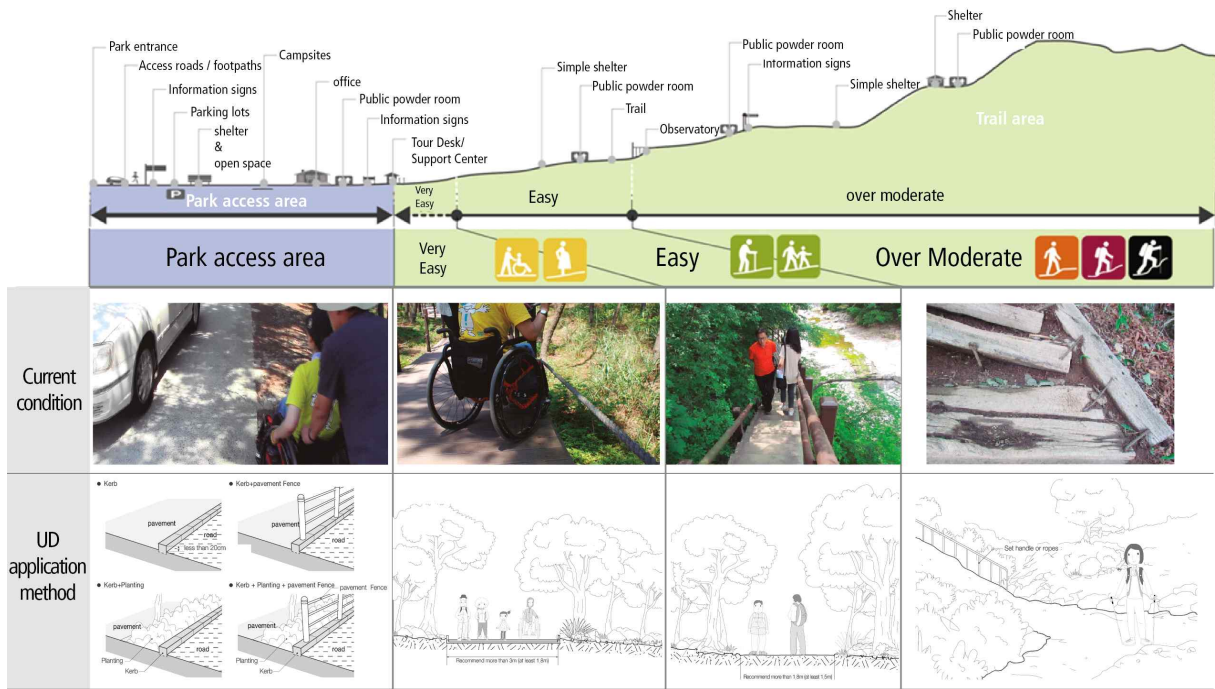
Objectives	Helping various National Park visitors to achieve their visiting purposes safely and conveniently
Basic Direction	<h2 style="margin: 0;">Man & Nature & Areas</h2> <p style="margin: 0; color: #008000;">Considering Design Respecting Design Harmonious Design</p>
Basic Principles	<p>Accessibility The physical components of the environment that assists users' behavior functionally. Regardless of User's body size, position, movement, the appropriate size and accessible space are provided to operate easily and to be reached easily by hands. Without psychological sense of discrimination, some of the options can be selected equally.</p> <p>Safety Self-knowledge, improvement and prevention of physical risks such as accidents Coping and reverting errors and accidents have already happened Using with confidence wherever and whenever through a unified promise and system.</p> <p>Comfort With not only functional satisfaction but also aesthetic beauty, harmonious dignity arises. Through environmental stimuli such as light, heat, air and sound, bringing physical and psychological pleasure.</p> <p>Individuality With maximizing and expressing the unique characteristics, differentiating is possible. Based on regional history and cultural context, meaningful story and new value creation.</p> <p>Sustainability Easy maintenance and low cost of operation for a long time No waste of energy and resources. Deep considering of the earth environment.</p>



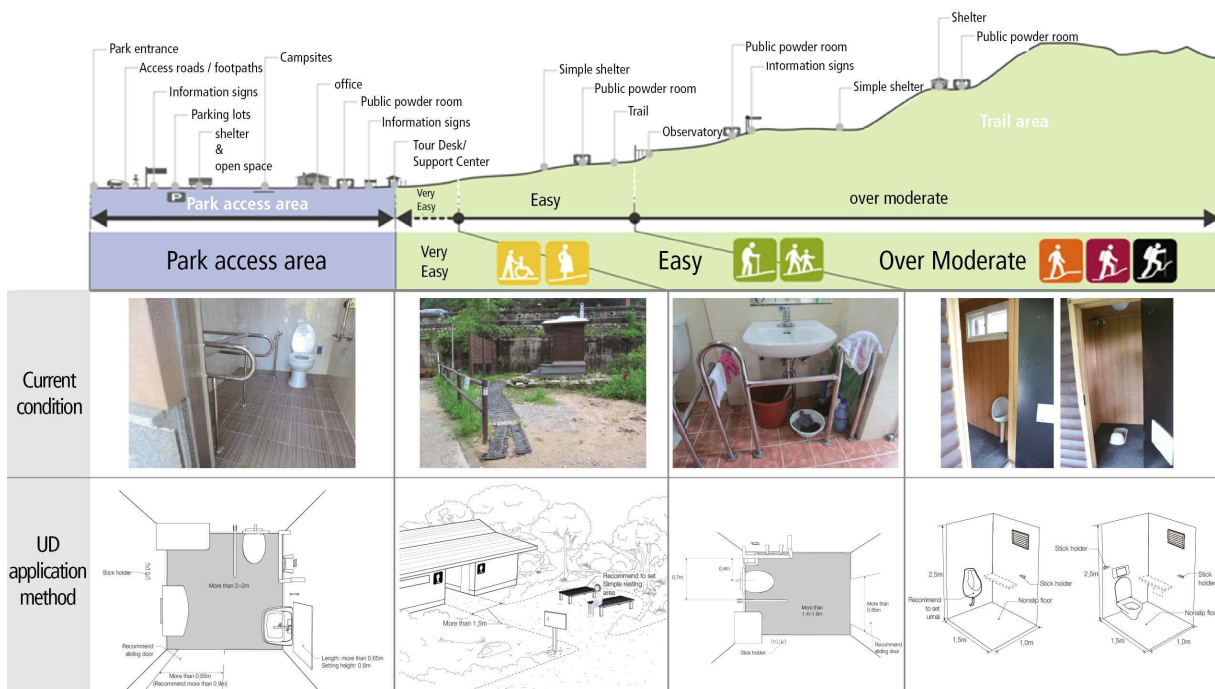
Characters	<ul style="list-style-type: none"> - Pursuant to city space - Including all facilities - Vehicle accessible - Most visitors usage - Various activity such as meeting and rest 	<ul style="list-style-type: none"> - Very flat trails 15% of National Park - Wheel chair and stroller easy access - Low countries trail 	<ul style="list-style-type: none"> - Flat trails 13% of National Park - Various trail activity such as walk, rest - Various visitors such as the young and old 	<ul style="list-style-type: none"> - Most of National park - Relatively steep and rough trail - Summit conquer climbing activity - Climber
UD application method	<ul style="list-style-type: none"> - Fault-tolerant facility maintenance for reasonable access - Expansion of public function for various users 	<ul style="list-style-type: none"> - Fault-tolerant facility maintenance for reasonable access - Consideration of recreation and healing function for the most people with disabilities 	<ul style="list-style-type: none"> - Facility maintenance for comfortable access - Consideration of recreation and healing function for various visitors 	<ul style="list-style-type: none"> - Facility maintenance for safe climbing - Promotion of nature conservation and efficient climbing
Applicable standards	<ul style="list-style-type: none"> - Applying any accessibility act - Proposal considering the characteristics of National Park 	<ul style="list-style-type: none"> - Applying some accessibility act - Proposal considering the characteristics of National Park 	<ul style="list-style-type: none"> - Proposal considering the characteristics of National Park 	

2. Main contents of guidelines

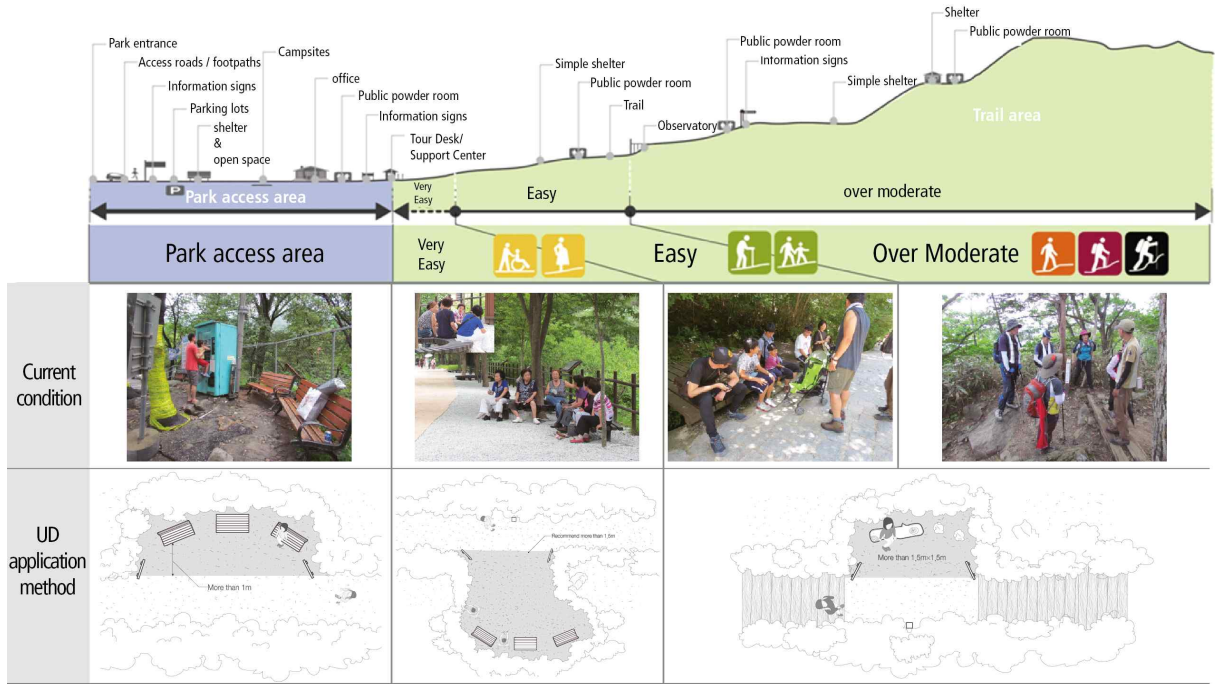
● Securing pedestrian safety and space



● Considering various type of visitors



● Efficient & comfortable shelter



● Universal Design guideline

Trail Rating System



Universal design guideline

