

视域策划 ——朝鲜半岛金刚山风景区 景观规划设计

CURATED VIEWSHEDS — LANDSCAPE PLANNING AND DESIGN OF THE MOUNT KUMGANG INTERNATIONAL TOURIST ZONE ON THE KOREAN PENINSULA

1 金刚山丰富的地理及人文资源

金刚山位于朝鲜半岛中东部临海区域，横跨朝韩边境，从古朝鲜时期起就是该地区的文化象征。整个山脉三分之二的面积以及大部分自然风光和文化遗迹都位于朝鲜境内。

1910年，在日本殖民期间，朝鲜境内的金刚山区域首次作为景区被开发。1953年停战协定签订后，金刚山一直拒绝接待韩国访客。直到

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摘要

金刚山位于朝鲜半岛中东部临海区域，横跨朝韩边境，从古朝鲜时期起就是该地区的文化象征。由于朝鲜坐拥金刚山总面积的三分之二以及大部分自然风光和文化遗迹，因此整个金刚山风景区都位于朝鲜境内。为了调动金刚山丰富的地理及人文资源，回应朝韩人民渴望彼此了解的情感，笔者尝试利用视觉网络构建景区规划系统，为当地政府合理进行土地开发建设提供参考，为双边居民塑造欣赏金刚山风景的绝佳视野。面对文献不足、资料缺失、难以涉足场地进行实地调研等问题，笔者通过解读该片区文化内涵，借鉴古代山水画《金刚全图》和“金刚山全景地图”（1939）中青绿山水和白描的描绘手法，结合电脑制图进行图面表现。同时引入了两种实体模型，以增强场地的可读性。最终，通过针对性的设计策略和深思熟虑的表现方式，为金刚山地区后续的开发建设提供建议。

关键词

视域分析；景观规划；风景区；图像表达；文化景观

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ABSTRACT

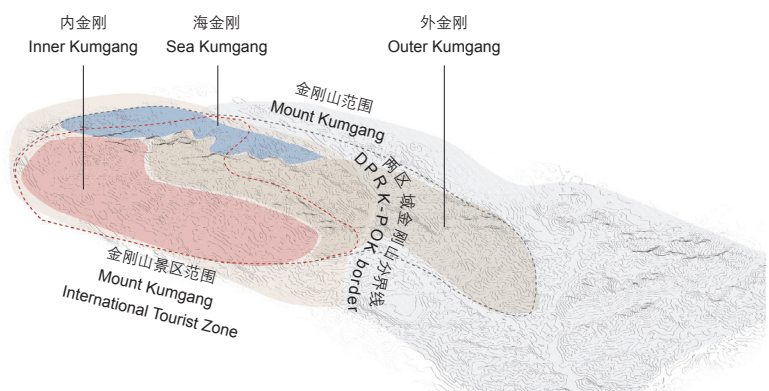
Mount Kumgang, located in the middle of the eastern coastal area of the Korean Peninsula, has been a cultural symbol of this region historically. It stretches across two countries, the Democratic People's Republic of Korea (DPRK) and the Republic of Korea (ROK). The former enjoys two thirds of the total area and rich natural landscape and cultural relics, which is now known as the Mount Kumgang International Tourist Zone. The design responds to the bond of both DPRK and ROK people through design approaches while celebrating the rich natural and cultural resources of Mount Kumgang. By building a tourist zone planning system based on a visual network, the design would improve the sight-seeing system for the both sides of Mount Kumgang and provide references for the local government on the future development of the area. However, when faced with challenges such as the inadequacy of literature, missing data, and difficulties in field survey, the author explored into the Korean culture and studied the blue-and-green-color landscape painting and line drawing techniques from the famous Korean painting *Geumgang Jeondo* and the "Panorama Map of Diamond Mountain" (1939), combining with computer-generated graphics in the design drawing. Meanwhile, to help audience better read the site and design concepts and strategies, two types of material models were also introduced. Finally, the suitable design strategies and deliberated representation together provide thoughts for the development and construction to Mount Kumgang in the future.

KEYWORDS

Viewshed Analysis; Landscape Planning; Tourist Zone; Graphic Representation; Cultural Landscape

编辑 汪默英 翻译 李慧彦

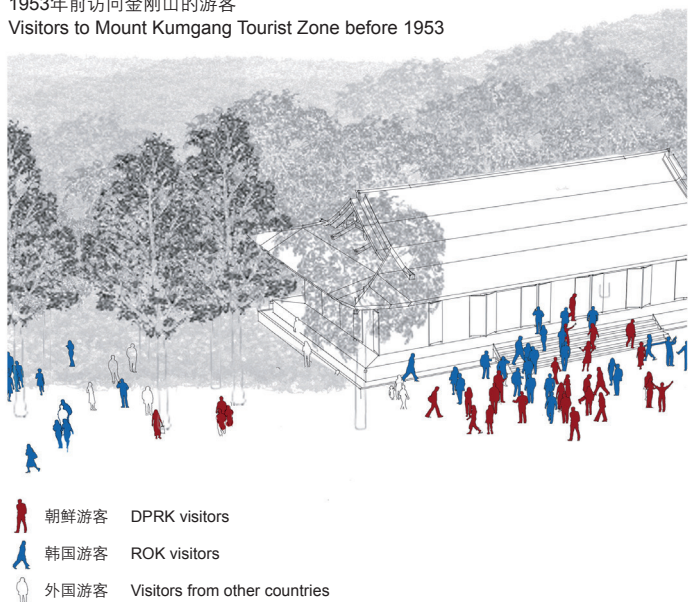
EDITED BY WANG Moying TRANSLATED BY LI Huiyan



1. 金刚山景区区位
 2. 山地非军事区战前及战后游客类型
1. Location of the Mount Kumgang International Tourist Zone
 2. The nationalities of visitors to the demilitarized zone in mountainous areas before and after wars

图 1

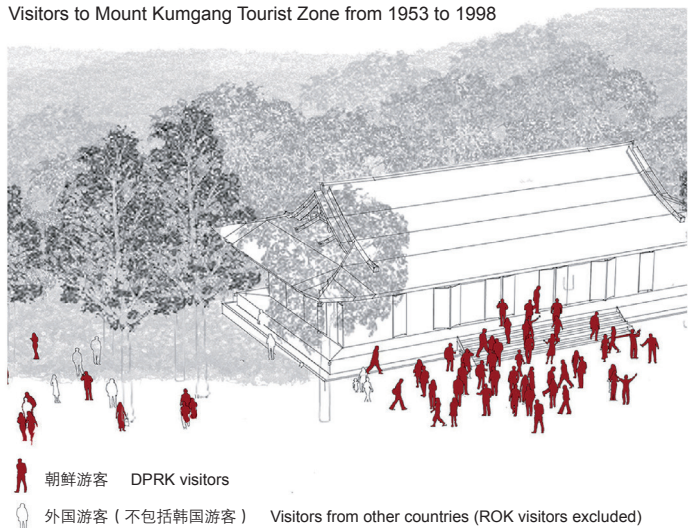
1953年前访问金刚山的游客
Visitors to Mount Kumgang Tourist Zone before 1953



- 朝鲜游客 DPRK visitors
- 韩国游客 ROK visitors
- 外国游客 Visitors from other countries

图 2-1

1953~1998年访问金刚山的游客
Visitors to Mount Kumgang Tourist Zone from 1953 to 1998



- 朝鲜游客 DPRK visitors
- 外国游客 (不包括韩国游客) Visitors from other countries (ROK visitors excluded)

图 2-2

1998年,韩国现代峨山公司与朝鲜亚太和平委员会达成协议,启动金刚山旅游合作项目。该项目是在之前景区的区划范围内进行的再开发,即整个景区仍位于朝鲜境内,但是打破了对韩国访客的禁令。据资料记载,很多韩国人(尤其是老人)在踏上金刚山时,都喜极而泣。然而,由于2008年的一次韩朝冲突,金刚山再次对韩国访客关上了大门。^[1]

即使韩朝边界冲突不断,但分治两国的局面毕竟是第二次世界大战后才形成,细数起来不过70余年,很多老一辈人民仍深陷在隔界相望的乡愁之中。在经历过历史变迁的朝韩人民眼中,横跨边界的金刚山也成为了两国和平关系的寄托。

整个金刚山被分为海金刚、外金刚和内金刚三个部分:海金刚东侧与日本海相邻,西侧为延锦江,南部靠近边境线,其最早因优美的山地与海洋风光而闻名,而现在主要充斥着军事景观。剩余区域被分为东西两部分,东部为外金刚,西部为内金刚。外金刚地势相对平坦,曾经有大量基础设施集中兴建于此,如今却只留下废弃的金刚山电气铁路大桥、车站及民居^[2]。由于大部分边境区域都与外金刚相切,因此该区域现阶段还设立有部分边境机构及军事设施。内金刚的环境相对闭塞,仅南端略与边境线相连,是寺庙等古建筑的聚集地,眼下正有越来越多的森林被转变为农田,以获取更多经济效益。而一般意义上的金刚山景区则包括全部内金刚及部分海金刚和外金刚。^[3]

2 以视线连接两侧

笔者希望通过设计,在充分调动金刚山丰富的地理及人文资源的同时,回应朝韩人民渴望彼此了解的情感。考虑到政治因素的限制,视域连接是相对有效、且可行性较高的方式。因此,笔者尝试利用视觉网络构建公园规划系统,为当地政府合理进行土地开发建设提供参考,为双边居民塑造赏金刚山风景的绝佳视野。需要说明的是,规划设计范围主要集中在金刚山风景区,但考虑到韩国人民对于眺望金刚山景区的需求,因此也将边境线东南侧韩国境内的山脊线纳入了考量。

笔者首先利用地理信息数据对地形、用地类型、文化标志物等信息^[4]进行分析,沿边境线朝鲜一侧和韩国一侧的山脊线分别选定了8处制高点,计算出可视区域。分析结果显示,俯瞰海金刚区域的视野相对开阔,而俯瞰外金刚和内金刚的可见区域则相对较少。作者随后根据地块基底条件叠加出不同地块的潜在用地类型,进行针对性开发,让人们可以在不同制高点上俯瞰到各种不同的景观。^[5]

经过分析,方案叠加得到了16个制高点的可视范围,并以此为基础结合植被种植设计来引导人们的视线。笔者将重要的历史遗迹、自然风光等落位于可视范围内,并在视线廊道内重新种植低矮的植被;而对于军事设施、政府基建等需要隐藏的目标来说,一方面可设置在不可视区域之中,另一方面也可以在其前方种植高大植物——如当地常见的红松(*Pinus koraiensis*)、油松(*Pinus tabuliformis*)等——进行



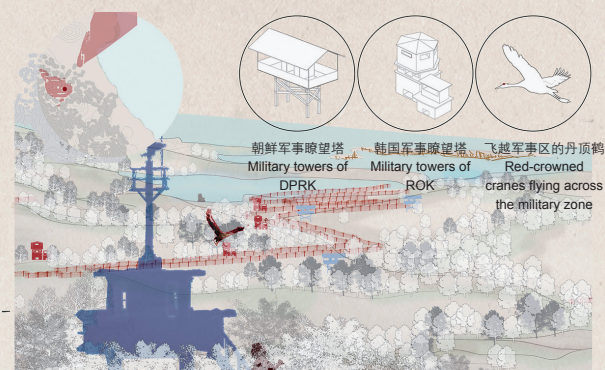
海金刚
Sea Kungang

资料中的海金刚景象描述
Historical images and narratives about the Sea Kungang

在早期的邮票和照片中可以看到因优美的自然风光而闻名的海金刚。
Old stamps and pictures showing the beautiful scenery in Sea Kungang.



海金刚景象现状意向图
Drawing about the existing landscape of Sea Kungang



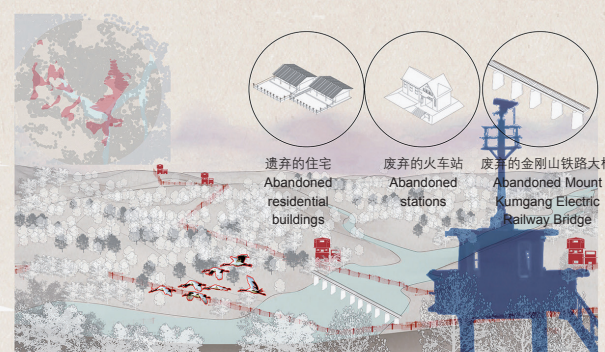
外金刚
Outer Kungang

资料中的外金刚景象描述
Historical images and narratives about the Outer Kungang

因为相对平坦的地势，外金刚在日本殖民时期修建了金刚山电气铁路大桥及接驳车站，用以运输煤矿和游客。
Many infrastructures such as Mount Kungang Electric Railway Bridge and major stations for transporting coals and visitors were built by the Japanese in the Outer Kungang due to its relatively flat landform.



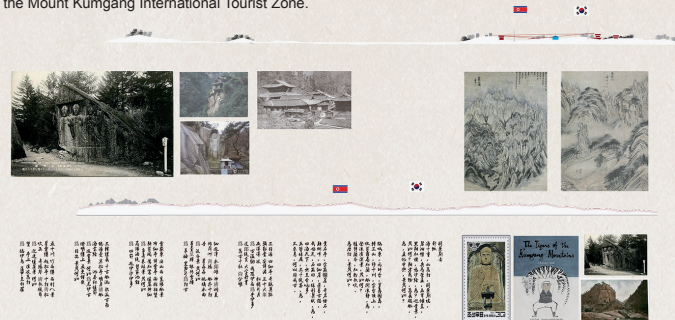
外金刚景象现状意向图
Drawing about the existing landscape of Outer Kungang



内金刚
Inner Kungang

资料中的内金刚景象描述
Historical images and narratives about the Inner Kungang

内金刚环境相对闭塞，拥有诸如佛寺、石刻等历史文化遗迹，是金刚山景区文化的代表。
The relatively remote Inner Kungang with many ancient temples and carved stones is the cultural hub of the Mount Kungang International Tourist Zone.



内金刚景象现状意向图
Drawing about the existing landscape of Inner Kungang



3. 古代（左）及战后（右）金刚山景象
4. 朝韩双边视点可视范围及高程

3. The ancient Mount Kungang (on the left) and that after the war (on the right)
4. Viewsheds and elevations of the 16 overlooking points

遮挡。由于大部分边境区域都与外金刚相切，因此上述策略主要应用于外金刚景区。其中，金刚山电气铁路大桥作为金刚山区域最重要的地标之一，需尽可能保证在最多视点可见。^[5]

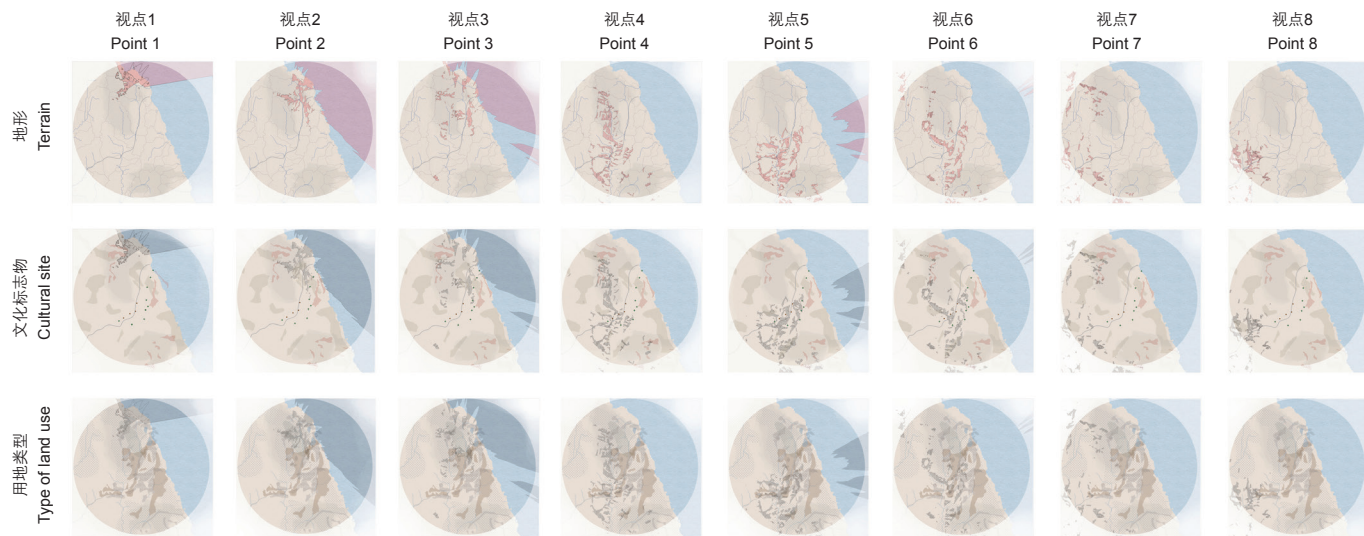
除上述主要措施外，笔者还针对海金刚和内金刚的使用现状进一步制定了生态系统保护策略。在海金刚中分布着很多丹顶鹤栖息地，由于丹顶鹤对栖息地环境的要求很高，因此种植在这里的水稻也被认为是无污染的，可以以较高的价格售卖^[6]。但是丹顶鹤也会以水稻为食，会影响水稻产量。为了保证粮食的经济收益，笔者利用地理信息数据识别出了丹顶鹤栖息地，在部分栖息地周围建立沙洲屏障，在满

足丹顶鹤粮食需求的基础上，防止它们过度侵袭稻田。内金刚区域已有部分土地被开垦为不同种类的粮食作物（诸如土豆、玉米等）及人参种植区，但这些种植区的分布随意且分散。因此，笔者试图通过分析地块坡度、土壤条件等信息，找出适宜这些物种生长的区域，以避免在不适宜种植区进行不必要的森林开垦，从而在保障农业经济效益的同时保护该地区的生态系统。

在对制高点视域范围进行分析的过程中，发现部分视域包含部分韩国范围内尚未开发的山区，虽然这些地块不在金刚山风景区范围内，但笔者亦希望通过此次规划设计为这些区域的未来开发提供参考。

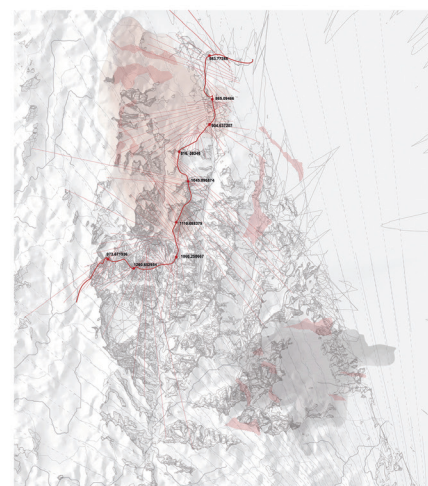
朝鲜境内不同视点的可视范围

Viewsheds of the 8 overlooking points in DPRK



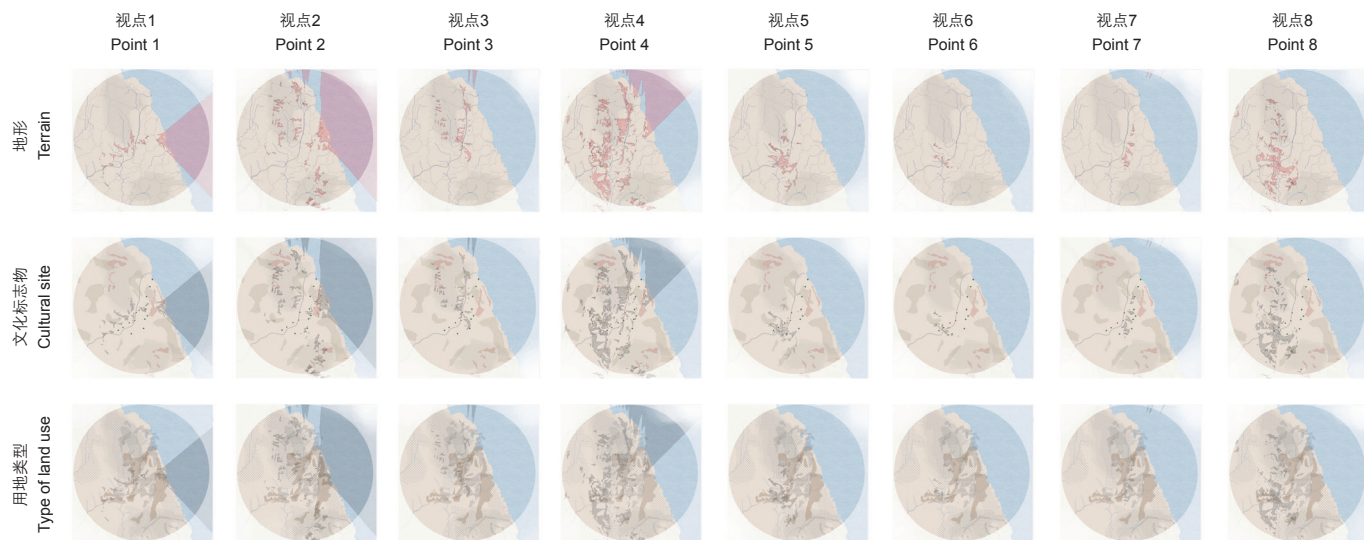
朝鲜境内不同视点的高程

The elevation of different overlooking points in DPRK



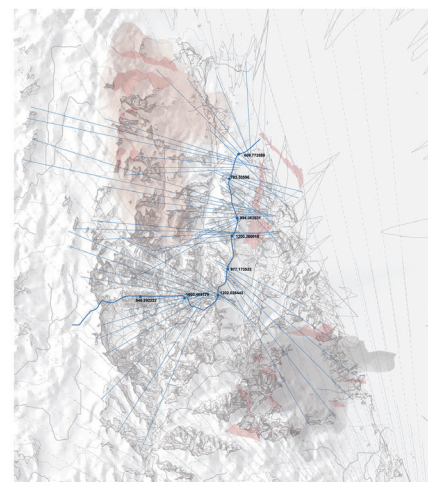
韩国境内不同视点的可视范围

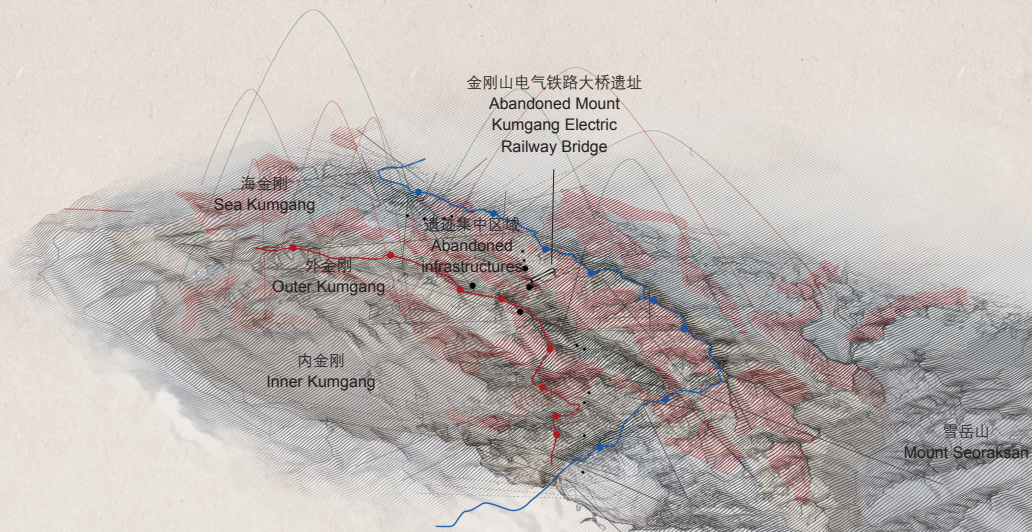
Viewsheds of the 8 overlooking points in ROK



韩国境内不同视点的高程

The elevation of different overlooking points in ROK





本地植物选择 Selected native species



紫穗槐 *Amorpha fruticosa*

高度: 1~4m
土壤要求: 无特殊要求
Height: 1 ~ 4 m
No strict requirement with the pH of soil



水稻 *Oryza*

高度: 0.3~1m
土壤要求: 无特殊要求
Height: 0.3 ~ 1 m
No strict requirement with the pH of soil



人参 *Panax ginseng*

高度: 0.3~1m
生长坡度: 15~35°
土壤要求: pH 4.5~5.5
根系深度: 45~55mm
Height: 0.3 ~ 1 m
Slope: 15 ~ 35°
pH of the soil: 4.5 ~ 5.5
Depth of roots: 45 ~ 55 mm



鸡爪槭 *Acer palmatum*

土壤要求: pH 4.5~5.5
钙质含量: 2.7kg/m²
pH of the soil: 4.5 ~ 5.5
Calcium: 2.7 kg / m²



腊梅 *Chimonanthus praecox*

生长成熟时间: 6年
高度: 1.5m左右
土壤要求: 无特殊要求
钙质含量: 2.7kg/m²
根系深度: 50mm
Maturity: 6 years
Height: about 1.5 m
No strict requirement with the pH of soil
Calcium: 2.7 kg / m²
Depth of roots: 50 mm



红松 *Pinus koraiensis*

生长在海拔350~2 800m的山地上
高度: 30m左右
Grow in mountainous areas from 350 to 2,800 m
Height: about 30 m

柏树 *Platycladus orientalis*

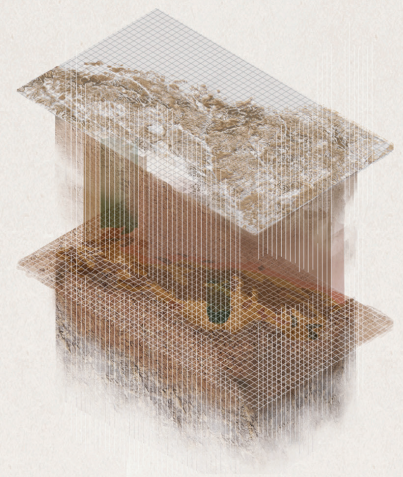
生长在海拔150~1 800m的山地上
土壤要求: pH 4.7~6.2
Grow in mountainous areas from 150 to 1,800 m
pH of the soil: 4.7 ~ 6.2



玫瑰 *Rosa rugosa*

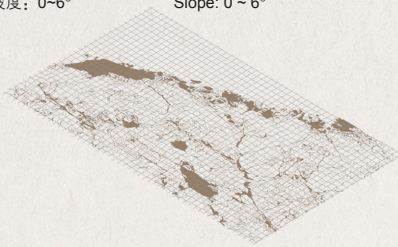
高度: 1.5m以下
土壤要求: 无特殊要求
钙质含量: 2.7kg/m²
根系深度: 50mm
Height: shorter than 1.5 m
No strict requirement with the pH of soil
Calcium: 2.7 kg / m²
Depth of roots: 50 mm

土壤类型 Layers of soil



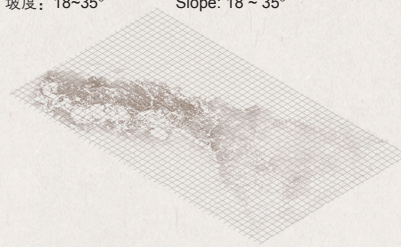
适宜建造构筑物的区域
位于可视范围外
坡度: 0~6°

Area suitable for construction
Out of viewsheds
Slope: 0 ~ 6°



适宜人参生长的区域
位于可视范围内
坡度: 18~35°

Area suitable for ginseng planting
In viewsheds
Slope: 18 ~ 35°



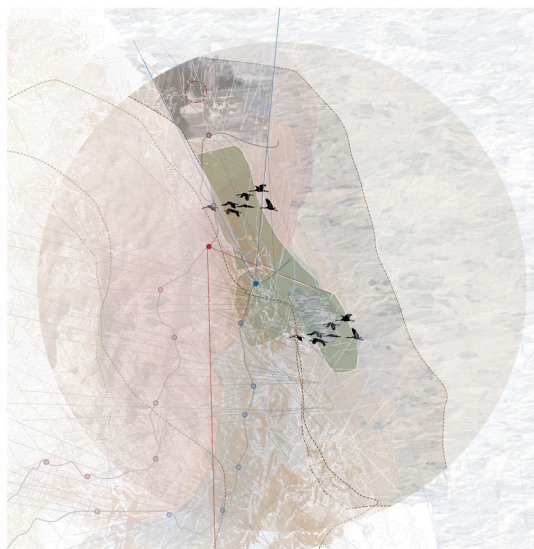
适宜粮食作物生长的区域
位于可视范围内
坡度: 15~30°

Area suitable for crops planting
In viewsheds
Slope: 15 ~ 30°

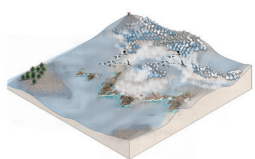


海金刚可视范围
Viewsheds in Sea Kumgang

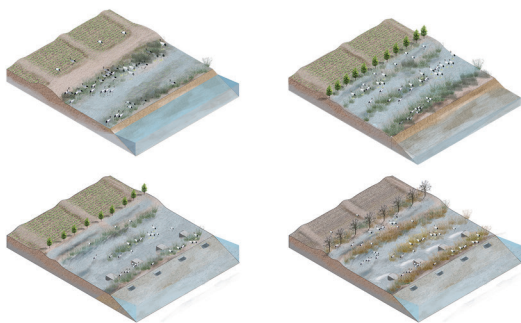
打开更多的视野，满足观赏风景的需求
Increase viewsheds to open the scenery horizon
种植低矮的水稻，回应场地现有对于水稻种植的需求
Plant more rice which will not block the sight-lines while ensure agricultural needs



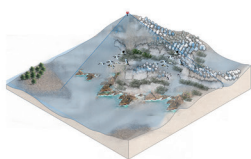
视线范围打开前 Before
由于遮挡，美丽海景无法被欣赏
Beautiful scenery of the sea was blocked



营造浅滩水岸，创造更多丹顶鹤的栖息环境
Restore shoals to create more habitats for red-crowned cranes

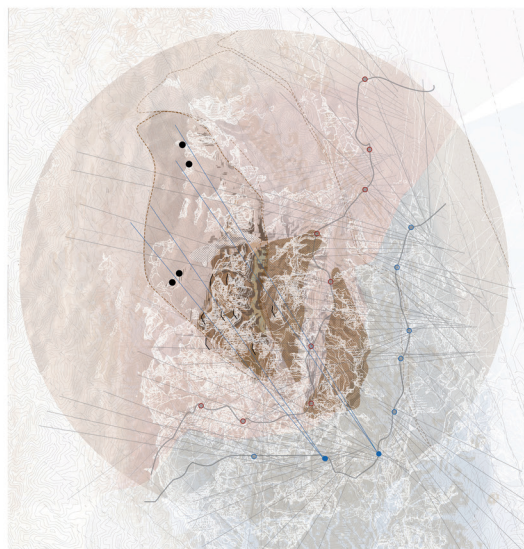


视线范围打开后 After
在得以欣赏海景的同时，满足水稻种植需求
Meet both the needs of sight view and rice cultivation

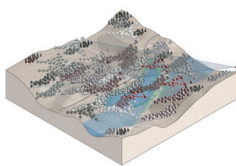


外金刚可视范围
Viewsheds in Outer Kumgang

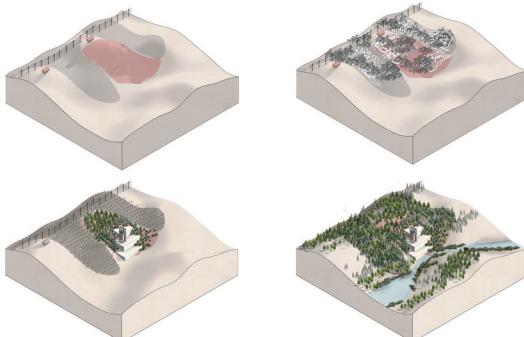
通过视线叠加分析，甄别可以看到电气铁路大桥遗迹的视点
Identify the overlooking points which cover the abandoned Mount Kumgang Electric Railway Bridge based on viewshed analysis



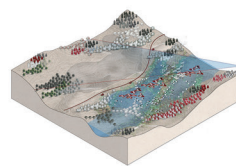
视线范围打开前 Before
由于遮挡，无法看到标志性的铁路大桥
The Railway Bridge was blocked



种植植被，保障韩国境内的山地开发利用状况被遮挡
Plant vegetation to conceal the land occupancies in ROK

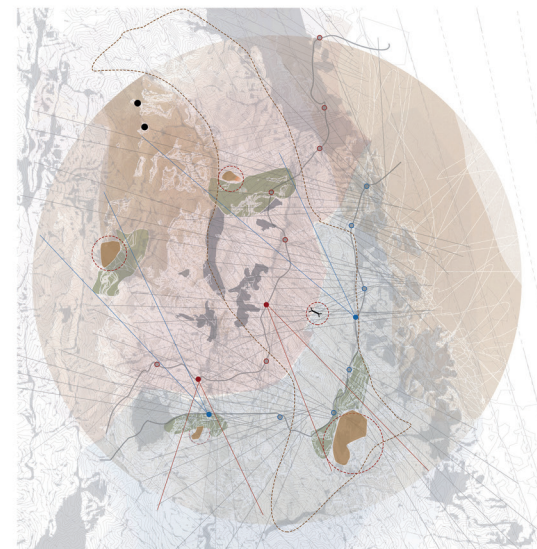


视线范围打开后 After
标志性的铁路大桥可以在尽可能多的视点被看到
The Railway Bridge can be seen at the most overlooking points

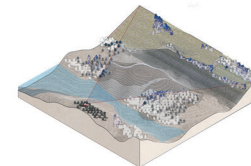


内金刚可视范围
Viewsheds in Inner Kumgang

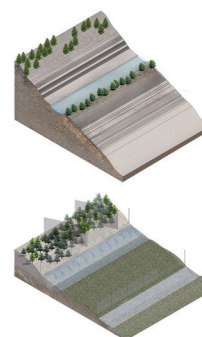
通过视线范围的叠加分析，甄别可以被用于农业种植的土地，指导朝鲜进行合理的土地利用
Identify the land for agricultural cultivation based on viewshed analysis to provide a reference to the DPRK government for future development programs



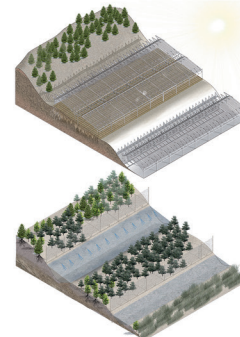
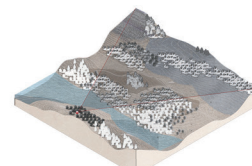
视线范围无遮挡 No block
朝鲜土地开发利用情况可以被看到
Land occupancies in DPRK expose to visitors



对适宜开发地块进行进一步处理，以满足人参等作物的生长需求
Meet the needs for planting ginseng and other crops



视线范围有遮挡 Blocked
种植高大乔灌木，达到对视线范围的遮挡
Block the sight lines with tall trees and shrubs



5. 视线连接及叠加策略分析
6. 针对不同区域的设计策略

5. Analysis of the connection of the sight-lines by overlaying different elements
6. Design strategies for different zones

3 表现手法的选择

由于场地位置的特殊性，在资料收集的过程中出现了文献不足、资料缺失、难以涉足场地进行实地调研等问题。在此情况下，后期的景观设计表现手法就显得至关重要。为了更好地呈现设计方案，笔者通过解读该片区的文化内涵，借鉴朝鲜名画家谦斋郑敦的山水画作品《金刚全图》和“金刚山全景地图”（1939）中青绿山水和白描的描绘手法，结合电脑制图进行图面表现。笔者还以代表朝鲜的红色与代表韩国的蓝色贯穿整个制图过程的始终，来表现两方的隔离与联系。最终奠定了整个项目的图面的色彩基调——以棕黄、灰白、青绿色系为底，红蓝两色为点缀。

其中大部分图纸都是基于地理信息数据模拟场地条件进行计算机建模，再通过后期技术增加多种元素，来展现场地的景观特征。在具体设计策略部分，笔者通过多组轴测图来直观表现改造前后的效果。效果图则采用了照片、图面资料、手绘相拼贴的方式进行表现。

与此同时，为了引导观者更好地阅读场地、理解项目设计理念及策略，笔者还引入了实体模型这一重要表现方式。此次设计中主要包括了两种实体模型。其一为高程断面模型，笔者将部分地区的高程起伏直观地体现在模型之中，之后将打印好可视区域的透明纸板叠加于其上，通过探讨地形与可视区域之间的关系，综合选择目标策略。其二，通过在建模软件中研究金刚山区域的山脊线和相对高度来提炼其方向和走势，笔者以折纸的方式抽象出山脊与山谷。随后通过地理数据分析，在实体模型中将某一观测点在朝鲜境内和韩国境内的可视范围分别涂成红色和蓝色，加以区分。在场地信息缺失的情况下，对于整个片区的全局性分析往往难以进行，上述两种实体模型则起到了很好的辅助说明作用。

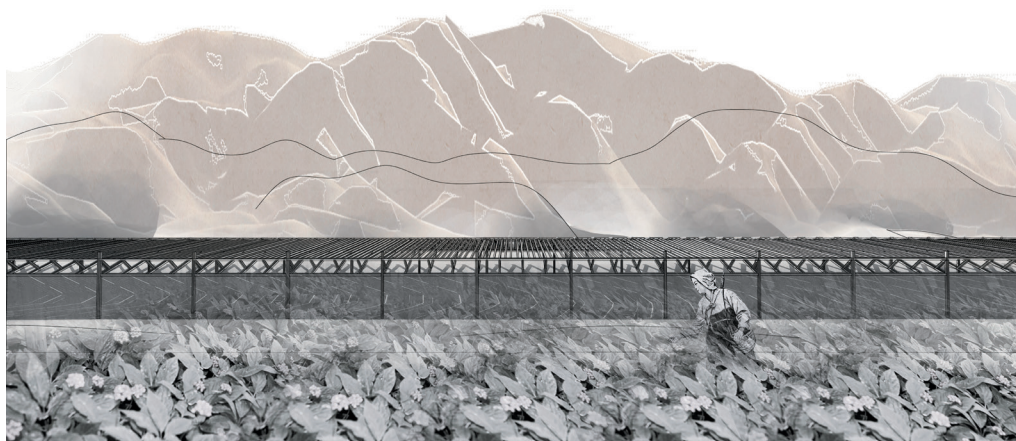
4 讨论与评述

通过确定视域范围，针对不同场地提出合理的规划方案，笔者试图重申金刚山对于朝鲜半岛人民的特殊意义——边境不是一条线，或是一个军事区域，而是承载着文化象征意义的连接空间，也是两国人民的情感寄托。

虽然目前大多数设计作品都习惯于应用电脑后期制图来展现场地的设计愿景，但笔者更希望每个设计都可以有其自身独特的阐述方式，做到“图能达意”。因此，笔者尝试在电脑制图的基础上借鉴青绿山水和白描的描绘手法，以更好地传达地域景观特征。此外，图片表现还突破了鸟瞰图、效果图等多种惯常的透视展现方式，让人们可以对项目设计地点进行无限畅想，体会场地背后的人文感情。景观图像的表达不仅要思考如何绘制精美的图像，给人以赏心悦目之感，更重要的是通过图像的绘制表达一种有序的设计过程，并引导观者阅读和思考，以产生共鸣。最终，通过针对性的设计策略和深思熟虑的表现方式，为金刚山地区后续的开发建设提供建议。LAF



崔玉琳 © 7



崔玉琳 © 8

7. 作物种植效果图
8. 人参种植效果图

7. Rendering of crop cultivation
8. Rendering of ginseng cultivation

1 Geographical and Cultural Resources of Mount Kumgang

Mount Kumgang, located in the middle of the eastern coastal area of the Korean Peninsula, has been a cultural symbol of this region historically. It stretches across the Democratic People's Republic of Korea (DPRK) and the Republic of Korea (ROK). The former enjoys two thirds of the total area and rich natural landscape and cultural relics, which is now known as the Mount Kumgang International Tourist Zone.

Mount Kumgang was first planned and developed as a tourist zone in 1910 under the Japanese colonization. For a long period of time since 1953 when the Korean War Armistice Agreement was announced, ROK visitors were not allowed to enter the tourist zone. The isolation did not change until 1998 when Hyundai Asan Cooperation of ROK and the Korea Asia-Pacific Peace Committee launched the Mount Kumgang Tourism Cooperation Project that was a redevelopment of the former tourist zone in DPRK and open to tourists from ROK. It was said that many ROK visitors (especially senior ones) wept for joy when they reached the mount. However, due to a conflict between the two countries, Mount Kumgang shut its door to ROK visitors again in 2008.^[1]

It has been about 70 years since the Korean Peninsula split into two countries at the end of the Second World War. Many senior Koreans, who had witnessed such changes in history, have been dreaming about seeing their families and friends in the other side. Therefore, Mount Kumgang is a place full of good wishes of a peaceful relationship between the two countries.

Mount Kumgang consists of three parts, namely Sea Kumgang, Outer Kumgang, and Inner Kumgang. Sea Kumgang, to the west of the Sea of Japan, east of the Yeongeum River, and north of the border area, was renowned for its beautiful scenery of mountains and sea but now is filled with military construction. For the rest of the mountain, Outer Kumgang sits in the east and Inner Kumgang in the west. Infrastructures were concentrated in Outer Kumgang due to its relatively flat landform, while only the abandoned Mount Kumgang Electric Railway Bridge, stations, and residential buildings left now^[2]. The adjacency to the border area also made it accommodate some governmental agencies and military facilities. The relatively remote Inner Kumgang only slightly connected with the border on its southern tip, with many ancient temples and other buildings dotted in the flourishing forests. However, today more and more forestlands are being converted into farmland for greater economic benefits. Basically, the Mount Kumgang International Tourist Zone now includes the entire area of Inner Kumgang and some parts of the other two.^[3]

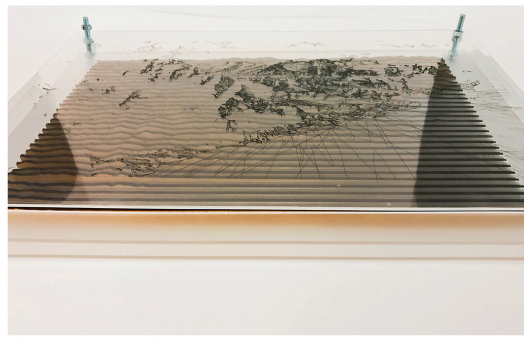
2 Establishing Sight-Line Connection of the Two Sides

The design is expected to respond to the bond of both DPRK and ROK people through design approaches while celebrating the rich natural and cultural resources of Mount Kumgang. Considering the political restrictions, the author finds out that establishing sight-line connection between the two sides seems to be a relatively effective and feasible way. By building a park planning system based on a visual network, the design would improve the sight-seeing system for the both sides of Mount Kumgang and provide references for the local government on the future development of the area. Considering the needs of ROK visitors to see Mount Kumgang International Tourist Zone in the distance, the design also takes the ridges on the southeast of the border area in ROK into consideration.

Through an analysis of the geographic data in terrain, land use, and cultural sites^[4], eight overlooking points on each ridge lines in DPRK and ROK were identified, which further informed the calculation of the viewsheds. It is found that the visibility to destinations in Sea Kumgang is relatively clear while that in Outer Kumgang and Inner Kumgang is somewhat blocked. Then, a suitable development planning was conducted by overlapping multiple layers of land use requirements to determine the potential land use types of the sites while creating varied overlooking landscapes at different points.^[5]

Based on the identified viewsheds of the 16 overlooking points, the author attempts to strengthen these sight-lines through planting design. To the viewsheds that cover important historical sites and sound natural landscapes, short vegetation is (re)introduced; to the viewsheds that cover military facilities, civil infrastructures, and other sight objects which need to be concealed are not included in any viewsheds as much as possible, or covered with tall native vegetation, such as *Pinus koraiensis* and *Pinus tabuliformis*. These strategies are mainly applied in the Outer Kumgang because of its adjacency to the border area. Besides, the Mount Kumgang Electric Railway Bridge as one of the most remarkable landmarks in the area should be ensured visually connected with as many overlooking points as possible.^[5]

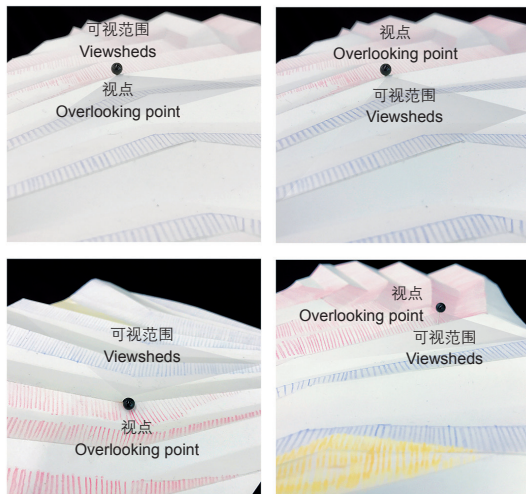
The design further offers strategies to Sea Kumgang and Inner Kumgang in ecosystem protection. Sea Kumgang sees a number of red-crowned cranes habitats. This bird species has a very high environmental requirement of habitats, therefore the local rice production enjoys a good quality and a great economic return^[6]. However, red-crowned cranes are rice-eating birds which impacts the yield of rice. As a response, the design examined the local geographic possibilities and identified some of the bird habitats that can be surrounded with sandbanks to keep the birds away



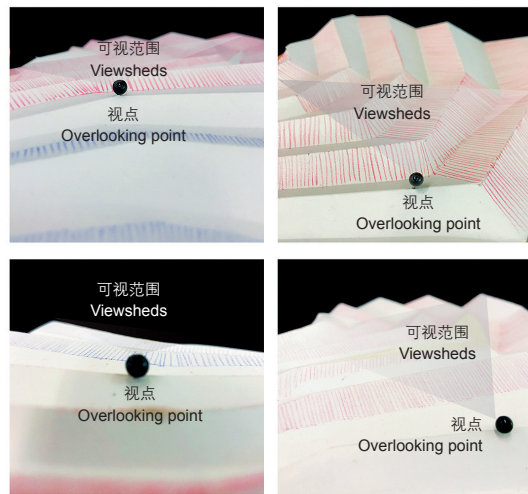
9. 地形-视域叠加分析概念模型
10. 可视范围实体模型
11. 设计愿景

9. Conceptual models of the relationship between the viewsheds and topologies
10. Material models of viewsheds
11. Design scenarios

朝鲜境内视点可看到韩国的区域意向
Viewsheds in the ROK from the overlooking points in DPRK



韩国境内视点可看到朝鲜的区域意向
Viewsheds in DPRK from the overlooking points in the ROK



from most rice fields while reserve a few paddies as the food source for the cranes. In Inner Kumgang, lands have been partly transformed from forestlands to farmlands and planted with crops such as potato, corn, and ginseng. However, the existing farming is fragmented and in poor management. To avoid unnecessary reclamation in forests, the design studied the existing slope and soil conditions to identify the plots suitable for growing such species, protecting the forest ecosystem and ensuring economic benefits of local agriculture.

The viewshed analyses also reveal that part of the undeveloped area of Mount Kumgang in the ROK side can be reached. Though it is not a part of the tourist zone, the design proposes several ideas for its future development.

3 The Ways of Representation

Due to the uniqueness of the site, the design encountered problems such as the inadequacy of literature, missing data, and difficulties in field survey, making it tricky for the representation of design ideas. The author explored into the Korean culture and

studied the blue-and-green-color landscape painting and line drawing techniques from the famous painting *Geumgang Jeondo* by Jeong Seon, an ancient Korean artist and the “Panorama Map of Diamond Mountain” (1939). Computer-generated graphics were then used in the design drawing. Especially, color red and blue, representing DPRK and ROK respectively, is emphasized in all the drawings to narrate the separation and connection between the two countries, while the hue of the whole set of drawings are defined by brown-yellow, gray-white, and blue-green.

Most of the drawings were generated by computer modeling that simulates the site conditions based on geographic data, to which multiple elements were then overlapped to render the landscape characteristics of design proposals. In the representation of specific design strategies, several groups of axonometric drawings are adopted for a clear and strong comparison before and after the design. The renderings are represented through an assemblage of photos, drawing materials, and hand paintings.

Meanwhile, to help audience better read the site and design concepts and strategies, material model, an important tool of representation, was also introduced. In the design, two kinds of

material models were made. One is to simulate the elevation changes of the terrain, in a form of a series of cross-sections, onto which transparent paperboards with printed viewsheds are overlaid, to disclose the relationship between terrain and viewshed to inform the selection of targeted strategies. The second is paper folding model. The topography of the ridges and valleys of Mount Kumgang are extracted with modeling software and further abstracted by means of paper folding. Then, through geographic analyses, the viewsheds in DPRK and ROK at a certain overlooking point are painted in red and blue, respectively. The data missing about the site made it hard to conduct a comprehensive analysis of the whole area, and these two kinds of models help audience understand the design concepts in a direct way.

4 Discussions and Review

Through viewshed planning of the site, the design highlights the cultural significance of Mount Kumgang to people in the Korean Peninsula — the border here does not mean a separation line or a military zone, but a sanctuary of unison to both countries.

Although a majority of designers are accustomed to visualize their design ideas with computer-generated graphics, the author hopes that each design can show its uniqueness of graphic representation that narrates design concepts. When faced with the challenge of the absence of image data, the author tried to combine the traditional blue-and-green-color landscape painting and line drawing techniques with computer-generated graphics to better show the characteristics of the site. Moreover, in addition to conventional aerial views and renderings, the drawings of the design offer audience with a new perspective to imagine the site and reflect the national culture and bond behind the representation. In landscape design, representation is not only about generating delicate pictures to offer aesthetic pleasure, but also to reveal the logic of thinking and lead viewers to read the design and understand the reasons. Finally, the suitable design strategies and deliberated representation together provide thoughts for the development and construction to Mount Kumgang in the future. **LAF**

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