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Restoring Cheonggyecheon Stream in the Downtown Seoul

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I. INTRODUCTION

Historic Cheonggyecheon restoration works started July 1st 2003. As its demolition works have made rapid progress, the original picture of the Cheonggyecheon can be seen as soon as September 2005. Until now, no concerned traffic crisis has broken out, and the conflict with merchants has been settled for the most part because Seoul government decided to arrange an alternative site at Songpa-district for their new businesses. Main reason why all the eyes home and abroad fixate on this project is that Seoul city has shifted its policy paradigm from development to environment, and made harmony with city paradigm whose focus moved from vehicles to human and from efficiency to equity, leading social changes rapidly. In fact, this project is beyond simple restoration works, rather can be a litmus test to see if Seoul and other cities can come to life again as a globally competitive one.

This paper is to introduce basic directions and key contents of Cheonggyecheon restoration works. The contents of this paper is organized as follow: Chapter 2 presents environment and problems around downtown and Cheonggyecheon area. Chapter 3 introduces the main contents of its master plan. Chapter 4 discusses basic directions of downtown renewal, and Chapter 5 deals with the proposal for downtown redevelopment followed by the Cheonggyecheon restoration. Chapter 6 gives a conclusion.

II. IN AND AROUND CHEONGGYECHEON(SDI, 2003C)

Before the restoration works, Cheonggyecheon was covered by 6km long and 50-80m long road structure, with 5.86km long and 16m wide of Cheonggye elevated highway over the road, and 11km of the intercept sewage system under the road. More than 168 thousand cars a day were running Cheonggye street and Cheonggye elevated highway, and 62.5% of them were through- traffic. According to a study conducted by the Korean Society of Civil Engineering in 2000, serious repair works should be done for three years with a budget of 100 billion won to address deficiencies of the road and elevated highway structures. It was for this reason that the Cheonggyecheon restoration project was formulated.

Neighboring area around Cheonggyecheon is 6km long and about 688.5 acres(85 thousand pyeong) including 22blocks between Jongno street to the north and Uljiro street to the south. The area can be classified according to characteristics of spatial structure into three parts: CBD area with predominant office buildings, Dongdaemun area with full of whole and retail stores selling electric devices and garments, and Outer(Northeastern) area with retail shops selling shoes, aquariums and over 500 street vendors concentrated in Hwanghak-dong. Urban structure of the neighboring area consists of three categorized areas: a traditional district featuring small lots and narrow streets, grid-type districts arranged through subdivision projects, and a large lot district adjusted through redevelopment. In case of number of stories in building, 75% of total buildings in the urban center have less than four stories, while it is 65% for the outer area. As 53% of structures over the whole area are made of wood or brick

and also decrepit, they are very vulnerable to a fire.

Total five subway lines, No. 1, 2, 5 lines in the east-west direction and No 3, 4 lines in the north-south direction, are operating in 27.8 km, and six stations among them have over 100 thousand boarding/alighting passengers a day. This area has more than 20 subway stations, but due to relatively unpleasant environment caused by the Cheonggye elevated highway its floor area ratio is merely 270%, especially 150% in northern/southern blocks along the Cheonggyecheon. As of 1997, roads in the central area were 357km long and small ones less than 12m wide accounted for 72%. In 15 out of total 41 roads, the level of service(Los), a measure of the flow of traffic on roads, is F, indicating severe traffic conditions in the area.

Many bus service routes are available in the downtown, however, these days the number of passengers is on the sharp decrease. Although 18 bus routes were operating in the Cheonggyecheon area, the average boarding/alighting passengers per bus per bus-stop was only one person. On the other hand, there were 800 parking stalls for loading/unloading, but illegal on-street parking was a common practice. So the travel speed of the almost occupied lane by illegal parking was only 6km/h in the afternoon. Also illegal parking under the Cheonggye elevated highway was prevailing. Pedestrian volume in the downtown is more than 2,000 persons. However, in spite of the large population of pedestrians there is lack of pedestrian crossings, resulting in hampering the continuity of walking on streets. Also various obstacles and many motor cycle traffics on sidewalks cause inconvenience to pedestrians.

To make things worse, air pollution along Cheonggye street is very serious. In particular, the emissions of criteria pollutants except fine particle (PM10) are above the average of Seoul, and the level of nitrogen oxide exceeds the environmental air quality standard of Seoul. Noise level also tops roadside noise standards for commercial areas, which becomes a stumbling block to pleasant living and business environment. And the level of benzene, one of carcinogenic Volatile Organic Compound (VOC), is high. Like a reflection of these facts, health awareness survey for those who live or work near Cheonggyecheon suggested that the residents were more than twice as likely to suffer from respiratory diseases compared to people in other areas(SDI, 2003A).

Cheonggyecheon area has various problems including traffic congestion, air pollution, deterioration of houses/buildings and so on, which dull competitive edge of the northern part of Seoul. As of 2000, 49,510 people lived in the downtown, while 129,287 people lived along the Cheonggyecheon riversides, and the population has decreased by 66% and 14.9% respectively for the last 20 years.

As of 2000, the number of businesses in the central area decreased to 77,000 by 24.1% compared to that of 1991, and also accounted for 10.8% of that of Seoul, down 6.9% from 17.7%. The number of businesses along the Cheonggyecheon is 38,145 and is in charge of only 2.8% of that of Seoul. Urban redevelopment failed to draw private capital and fizzled out, and its feeble urban industrial competitiveness serves as an essential factor in deteriorating the competitiveness of Seoul as a central city of northeast Asia. Only 8% of urban industrial activities are related to financial and business industries, and the Cheonggyecheon area is excessively abundant on small-scale traditional manufacturing industries and short on knowledge-based industries.

III. MASTERPLAN OF CHEONGGYECHEON RESTORATION (SDI, 2003D)

Sections of Cheonggyecheon to be Restored

The restoration project covers the area from the Donga building in the CBD to the ending point of

the covered road. Some deep ecologists argued that the restoration work should be extended to the upper reaches of the Cheonggyecheon. However, due to traffic problems and costs, it has been decided to consider the inclusion of the water source in a long term basis. Instead, pipes are to be installed between Cheonggyecheon and its origins, Inwangsan(Mt.) and Bugaksan(Mt.) to provide clean water to the stream all the time.

Dimolition of Structures

The demolition work started July 1, 2003, and the Cheonggye elevated highway was completely dismantled on October 5, 2003. The demolition of structures covering the stream began on August 18 2003 and will be completely dismantled by December 30, 2004. In order to reduce noise and dust during the work, the city used diamond wire saws and wheel saws. A total 680,000 tons of waste will be generated during the demolition work. Of this, 100% of the scrap iron and steel will be recycled and 95% of the waste concrete and asphalt will be reused.

Stream Design

The Cheonggyecheon will be restored as an urban stream in nature, a human and environment friendly space with a waterfront and walks along the banks. The proper flood management is very essential in designing the stream. In consideration of the increasing incidence of floods and the extraordinarily heavy volume of torrential shower during summer, the city built embankments that can withstand the worst possible flood that is expected to occur every 200 years. Also, the minimum number of bridges are planned in order to allow maximum water flow in heavy rainfalls, and some remained covering structures will be used in order to prevent dirty water from flowing into Cheonggyecheon during the heavy rain season. Terraces and lower-lever sidewalks will be built along the upper and lower reaches of the stream. The mid-stream section will be made water-friendly space, and in the upper reach of Cheonggyecheon intercept sewage lines will be installed.

Water Supply and Management

Cheonggyecheon is an intermittent stream, being normally dry. It requires additional flow to maintain a maximum 40cm depth of water throughout the year. The water amount to be flown on Cheonggyestream will be maintained at the level of more than 120,000 tons a day. The stream water will be from the three origins, Han river, underground water and water clarified at the Jungnang Sewage Treatment Plant. Water from the Han River will be used until the expansion of the Jungnang sewage treatment system. The water will be supplied at four location. Targeted level of water quality is the 2nd class, BOD 3mg/l. The sewer system is designed to treat a total of 1.95 million tons a day, three times the maximum sewage to generated from the Cheonggyecheon.

Transportation Plan and Bridges

Both sides of the stream will be wide as much as at least 13.5m to accomodate one-way two-lane roads, sidewalks and loading/unloading space for smooth traffic flow after the restoration. The restored stream will be accessible at 17 locations. Concerning the traffic plan, left turn is limited as much as possible and U-turn is allowed only at three designated locations in an effort to protect the environment from car emission. Five pedestrian bridges and 17 bridges for motorists will be built across Cheonggyecheon.

Restoration of Historical Cultural Sites

The restoration of Gwanggyo, one of the main relics, gives challenges, because its original form has been severely damaged. Also as the current position is away northeast from the crossroad, its relocation to the initial place may cause considerable traffic disruption. Therefore, experts on cultural properties should converge their opinions regarding whether the bridge should be moved to a new location or placed over the stream. Relocating Supyo bridge to where it was originally placed needs to redesign the stream due to the discrepancy between the length of the bridge and the width of the stream. As for Ogansu bridge, it is considered to have a slim chance to restore its original form, although its existence has been confirmed. Restoration of all the bridges will be determined based on the results of the detailed index survey on relics restoration.

Construction Management

In order to reduce public inconveniences during the construction, various measures have been suggested: to set up screen to guarantee commercial activities during the construction period, to keep operating loading/unloading spaces, to utilize the Dongdaemun Stadium as parking lots, to secure additional parking facilities, to maintain at least two lanes open for traffic, to reflect merchants' opinions on moving to alternative places, to actively provide administrative and financial supports for the relocation, if it virtually happens.

IV. DOWNTOWN REVITALIZATION PLAN (SDI, 2003C)

Downtown Management Framework

For the past several decades, Seoul city has taken measures against the downtown in the Gangbuk area (the northern part of Seoul), instead exerted its effort to develop Gangnam area (the southern part of Seoul). As a result, the Gangnam area has emerged as a new downtown. Some environmentally unfriendly structures like the Cheonggye elevated highway served as obstacles to the development of the downtown in Gangbuk. Now that the obstacles have been removed through the restoration of Cheonggyecheon, the Gangbuk area should be transformed into an eco-friendly downtown center integrating all the urban functions.

Along with the Cheonggyecheon restoration project, the downtown should be developed as a historical and cultural center, a business and commercial center, and a center of tourism and shopping. In other words, the plan should aim at two goals, one is the preservation of history and environment, and the other is pursuing development in consideration of regional characteristics and circumstances. Also the development should not be exploited to destroy history and waterside eco-friendly environment. To achieve these goals, the downtown revitalization plan should designate two types of target areas, one for development, the other for rehabilitation, then adjust height, development density, the floor space ratio, and so on for each area. Also, redevelopment methods should be reviewed.

To facilitate the development process, the downtown is managed being divided into four districts to maintain harmony with conservation and development: "Strategic Redevelopment District", "Preservation District", "Self-Rehabilitation District" and "Comprehensive revitalization District." To have a better landscape, it is necessary to place a building height cap. For some areas, the current limitation of 60 meters needs to be strengthened. While the buildings along the Cheonggyecheon should have no more than five stories, the cap should be established at the level of 50 to 70 meters for Sejongno from which people have a good view of Bugaksan(Mt.). However, the height limitation policy will have certain conditions for the flexible application in the redevelopment region.

Floor space ratio in downtown is an important barometer to measure the balance between

development and conservation of downtown. According to the Compact City theory, intensive downtown development with good accessibility to public transport is the most environmentally. Considering the current downtown capacity and the expected increase in demand for offices and housing, it is considered possible to maintain the present level of floor space ratio at 600 percent. Controls and incentives regarding the ratio are very significant, since it serves as a means to secure the profitability of development projects.

Restoring History and Culture

In an effort to restore history of the downtown, the following restoration works will be conducted: to restore Seoul castle walls, to beautify historic streets like Namdaemunno, Sejongno and Jongno, to create longitudinal and circular green axis inside the four historical gates, to restore the original form of Sajikdan, to create a "culture-tourism belt", to preserve modern cultural assets such as Jungmyeongjeon and Jeongdong Church, to restore Gwangyo and Supyogyo.

To restore culture, it is needed to implement measures to utilize the cultural assets abundant in the urban center as tourism resources. One of the measures is designating "cultural belts": Cheonggye, Bukchon, Jeongdong, Daehangno, Donhwamun-gil, Jangchung and Namchon. Along with the introduction of the cultural belts, special routes have been drawn up for walking, sightseeing and shopping. Four courses are available for tourists to walk along: from Gyeonghuigung(Palace), Museum of History, Chongdong Theater, Seoul Museum of Art to Deoksugung(Palace), from Gyeongbokgung(Palace), Bukchon, Changdeokgung(Palace), Biwon to Insadong, from Changgyeonggung(Palace), Daehangno, Marronnier Park to Naksan(Mt.), from Sungnyemun, City Hall to Gwanghwamun Plaza. Those who want to visit modern historical sites may walk from Jeongdong to Jongno via Namsan(Mt.). Visiting the allies in the Cheonggye area is also an available option by taking one of the two courses: from Yejidong, Gwangjang Market to Dongdaemun Market, and from Daehakcheon, Dongdaemun to Hwanghakdong.

Strengthening Residential Development

Currently the urban center is hollowing out seriously, so it is necessary to strengthen the residential function of downtown for its revitalization. To this end, several suggestions should be considered such as downtown village improvement, traditional house district conservation, and high-quality modern residences. For example, high-quality residential area can be arranged around Iksundong in Jongno-gu, and Jongmyo areas through the redevelopment for midrise/lowrise housing in the downtown. Downtown village improvement should be done in the area within 500m of 25 elementary. For saving traditional housings, the city should offer various supports to residents who are willing to renovate their houses voluntarily.

The housing supply in downtown is a very critical factor in reviving it as a space capable of maximizing its competitiveness. However, the parking supply problem in new residential buildings needs thoughtful consideration. Some argue that parking ceiling regulation should be relieved in order to attract more wealthy people into these areas. On the other hand, some argue that parking ceiling regulation for residential buildings in downtown should be reinforced, otherwise, the increased car uses by residents will be a stumbling block in achieving better transportation system, which puts more emphasis on pedestrians and mass transit.

Revitalizing Downtown Industries

Urban functions and the industrial structure are required to be sophisticated to enhance the status of the downtown in Seoul. In particular, it is urgent to revitalize industries in the Cheonggyecheon area. In addition, industrial competitiveness should be strengthened through the restructuring of various sectors. The pollution emitting industries and the out-fashioned manufacturing industries need to be reshuffled and clustered to make best use of the linkage among them. Also, Seoul city needs to find an alternative place for these industries.

The industrial structure of the urban center needs to be enhanced to sharpen its competitive edge. International business complex consisting of multinational regional headquarters and international financial institutions will be developed around Mugyodong, Dadong and Samgakdong which are very close to the downtown and have lots of domestic and foreign financial institutions. Convention facilities and hotels will be added to support these industries. The redevelopment of Sewunsangga shopping district will be a turning point for industry revitalization in the downtown. Under the trust redevelopment plan, land owners of Sewunsangga district will be paid certain amounts from a trust company, and after the trust period being over, they will be given a share in the profits from the redevelopment project.

Cheonggye 6 ga around Dongdaemun market will be a "Total Fashion Industry District" where clothing and accessories are made and sold. And the government will support logistics and distribution facilities. Cheonggye 7 ga and 8 ga will be improved into the downtown industrial complex, where shoes and stationery are produced. On the other hand, Munjeong and Jangji districts in Songpa-gu are appointed as an alternative site for merchants' moving, securing about 15 thousand pyeong.

Establishing Environmentally Friendly Transport System

It is essential to upgrade the transportation system in order to invigorate urban functions. The vehicle-centered transportation environment should be changed into the human-oriented and eco-friendly one to enhance the competitiveness of the downtown. For that purpose, the city should introduce a new form of mass transit system, and improve pedestrian environment. Moreover, the transportation demand management(TDM) needs to be strengthened to alleviate traffic congestion and air pollution due to excessive auto uses.

Active investment on public transportation is required to **improve the accessibility to the urban center**. First of all, in a short-term the bus service will be dramatically reformed into a system of trunk and feeder. Also, the city is considering to introduce central bus lane system along Jongno street to better manage bus flows passing through the urban center. In addition, subway intervals should be reduced at the maximum degree through the improvement of the Automatic Train Control(ATC) system to increase the service capacity. New urban rail system serving Incheon International airport, and Metropolitan A line(Sinansan line) and B line(Sinbundang line), as well as Gyeongbu KTX(Korean bullet train) will pass through Seoul station in the downtown. Also, LRT system and a city airport terminal will be introduced to the Cheonggyecheon area, which will serve as a transfer complex. At the same time, it is proposed to build new subway station in Cheonggyecheon 3ga and connect it with Jongno 3ga station and Ulji 3ga station, making a large scale of underground connection.

So far, road transportation system has been operated mainly focused on vehicle flow. That is why the walking continuity is lost, then more and more cars are running on streets in the urban center. The

most important thing to improve the current road system into pedestrian-friendly one is to expand pedestrian crossings and to promote sidewalk environment. The main road from Gwangwhamun to Seoul station through City hall has the great centrality and symbolism of Seoul. It is proposed to make a pedestrian-centered street (provisionally named "Seoulite street") featuring pedestrian-friendly environment, symbolism and public spirits. So, if necessary, road width will be reduced. Along with that, there are also some other things to be concerned for better pedestrian environments such as a signal system considering walking flow, the additional installation of crossings, the expansion of crossing width, and crossroads structure improvement for more crossings.

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