

Lotte Resort Sokcho

LOTTE CM DEVISION

2019. 03.

Lotte Resort Sokcho

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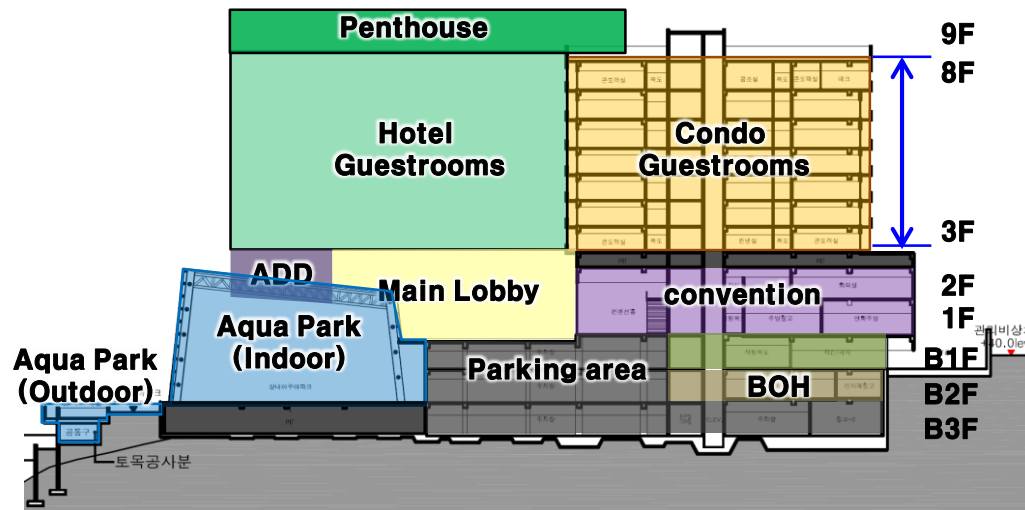
I. Project Outline

II. CM Roles

III. Best Practice



Project Outline



PROJECT	LOTTE RESORT SOKCHO
LOCATION	Taepodong, Sokcho, Gangwon-do
Duration	24 months ('15.06.26 ~ '17.06.09)
OPEN	2017. 07. 20
FLOOR	B3F / 9F (Condo 219 rooms/Hotel 173 rooms)
Building area	11,426.59 M2 (3,456 py)
Land area	69,720.00 M2 (21,090 py)
gross area	95,208.53 M2 (28,800 py)
Building Coverage Ratio	16.44% (the statutory limit under 20%)
Floor Area Ratio	66.74% (the statutory limit under 100%)
PARKING SPACE	732 cars (the statutory limit over 602 cars)
Total Cost	Approx. 160 billion KRW (5.6 M KRW/py)
OWNER	Hotel LOTTE co. (PM : LOTTE Asset Development)
Design	NOW Architects Co.

History

Date	Main schedule	remarks
1989.	Land Purchase of LOTTE E&C (From sokcho city)	
2012.	Land Purchase of LOTTE Hotel (From LOTTE E&C)	
2014.12.15.	Permit of implementation plan	
2015.04.28.	Building Permit by Sokcho city	9 Floors / condo 219 rooms / Hotel 173 rooms
2015.06.26.	Permit of Beginning	
2016.12.16.	Mock-up room Show	
2017.06.09.	(Temporary) building use permission	
2017.07.20.	Grand-Open	2018.04 Complete of building use permission

Ground-breaking ceremony 14. 12. 17

Start of entry road construction

2014.12.17



Underground excavation completed

Start of Reinforced concrete Work

2015.10.01



2015.06.26

Permit of Beginning

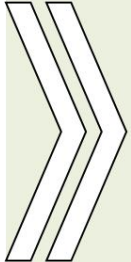
Completion of entry road construction

Start of Underground excavation

History

Completion of Underground Reinforced concrete Work
Start of Reinforced concrete Work of building frame
Start of Exterior finish work

2016.06.26



2016.12.12

Start of interior finish work
Completion of the Indoor Pool Dome

Completion of Construction

(Temp.) Building use permission

2017.06.09



History

2017.07.20 Grand OPEN



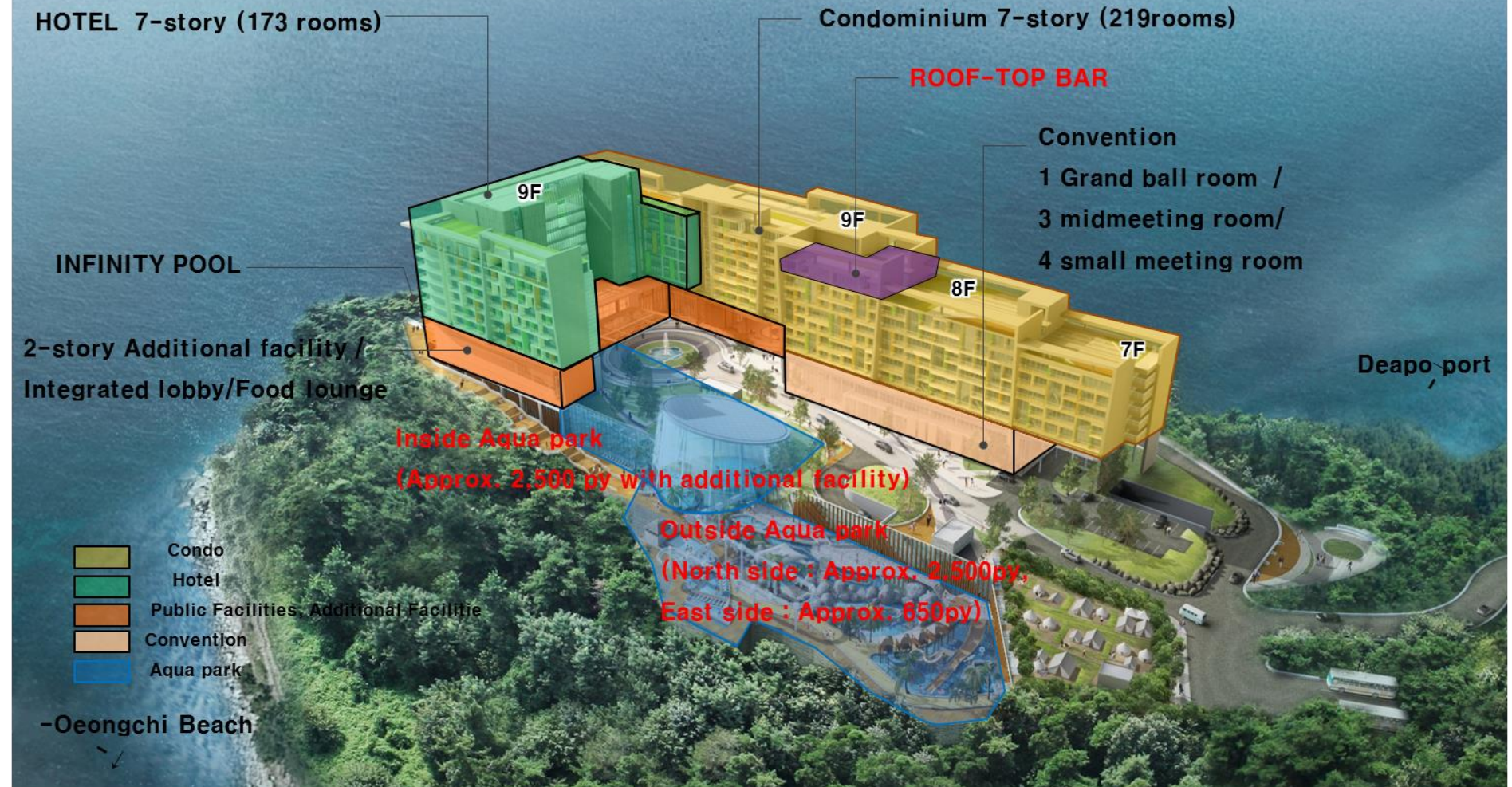
Design Concept

- Emphasize differentiated formability with design system that shaped Ulsan rock



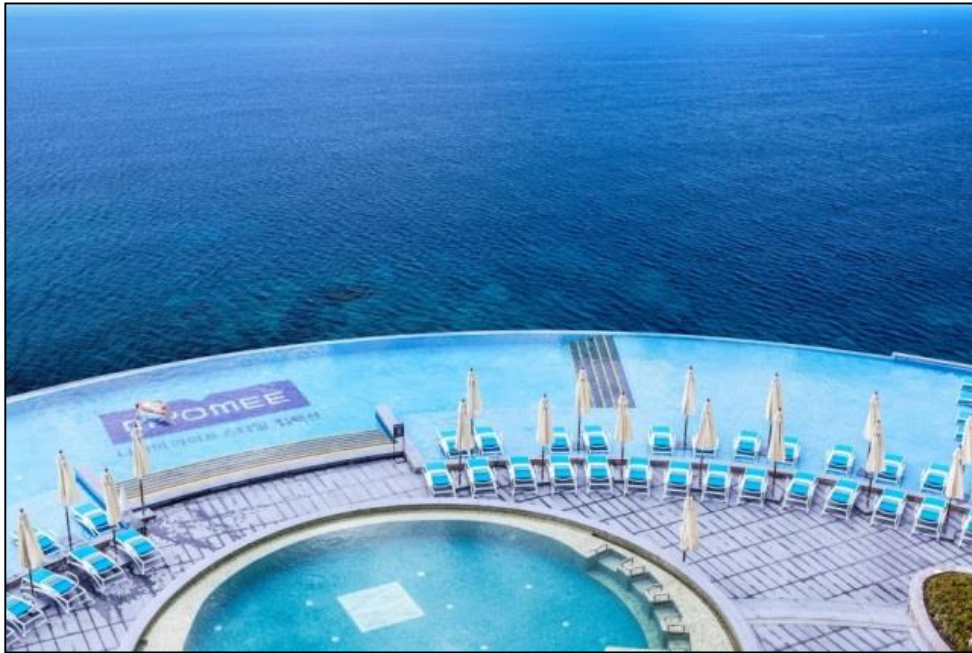
Placement and Zoning plan

- Facility placement and zoning plan considering natural topography.
- Layout plan considering features of sea view of 3 sides



Differentiation factor

1. The only infinity pool in the East Sea that can be used for all seasons.



2. Aqua park with different theme that can swim with the sea



Differentiation factor

**3. Roof-Top Bar with a Mt. Seolark/
Sokcho City/beach view**



**4. Top-Floor specialized suite room (Hotel)
with a private terrace and pool**



Differentiation factor

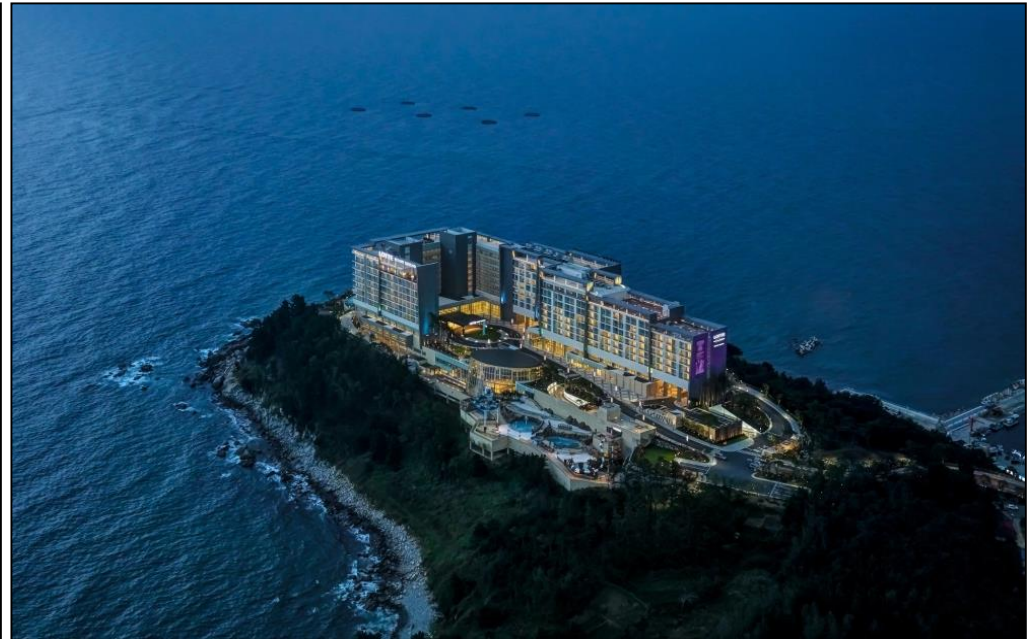
**5. A variety of photo zones and trails
utilizing features of the sea on three sides**



**6. Night scenery considering geographical
features that can be perceived anywhere**



Completion Picture



Completion Picture

Main Looby



Looby lounge



Grand Ballroom

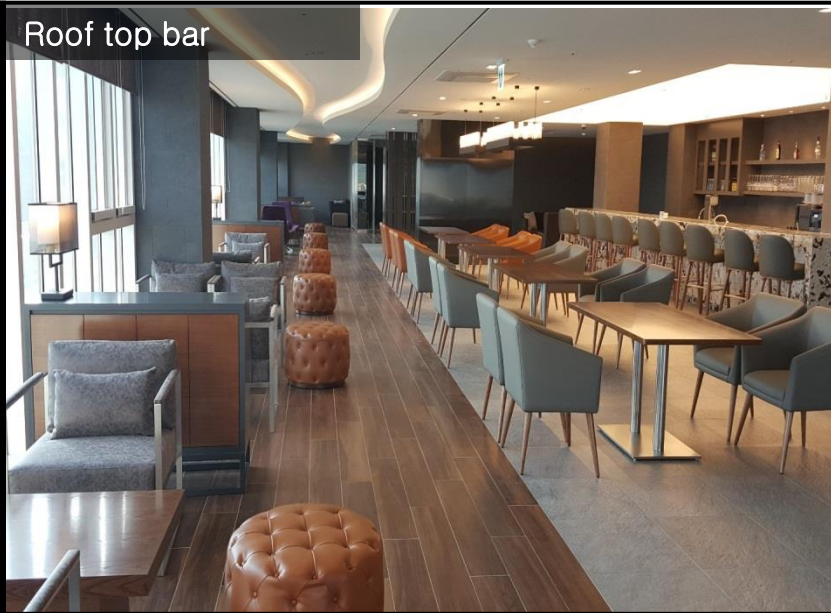


Pre Function Spaces

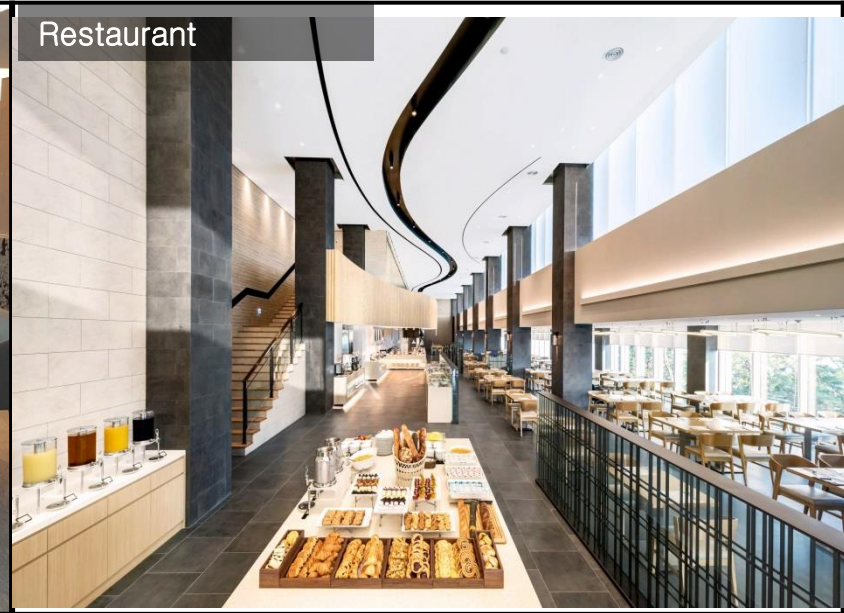


Completion Picture

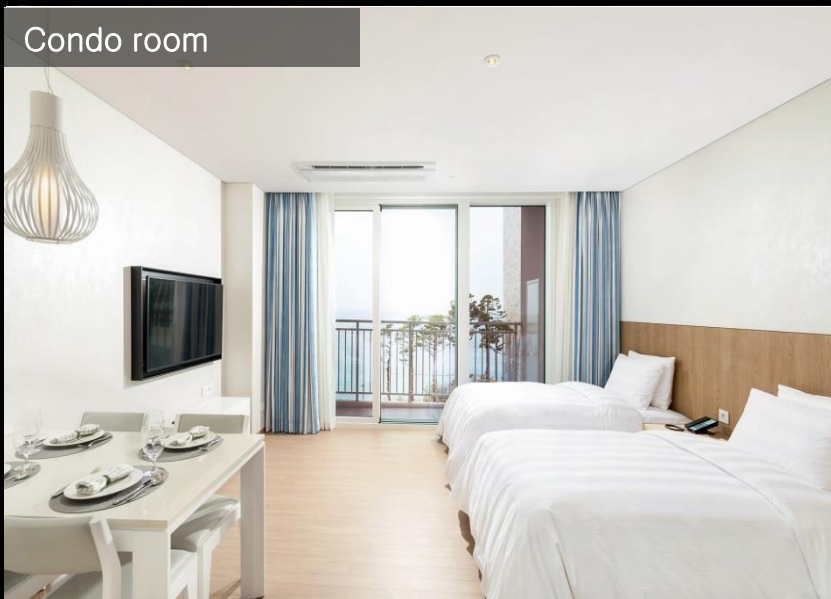
Roof top bar



Restaurant



Condo room

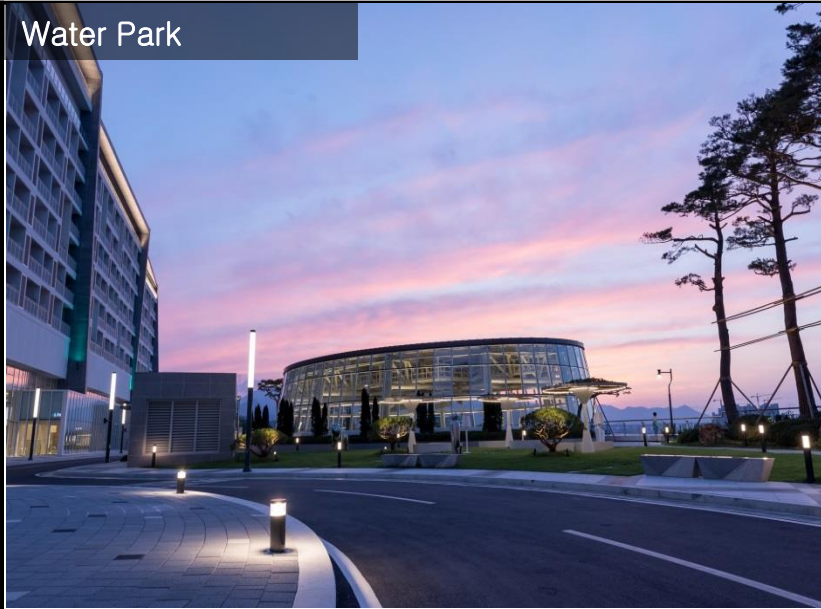


Hotel room

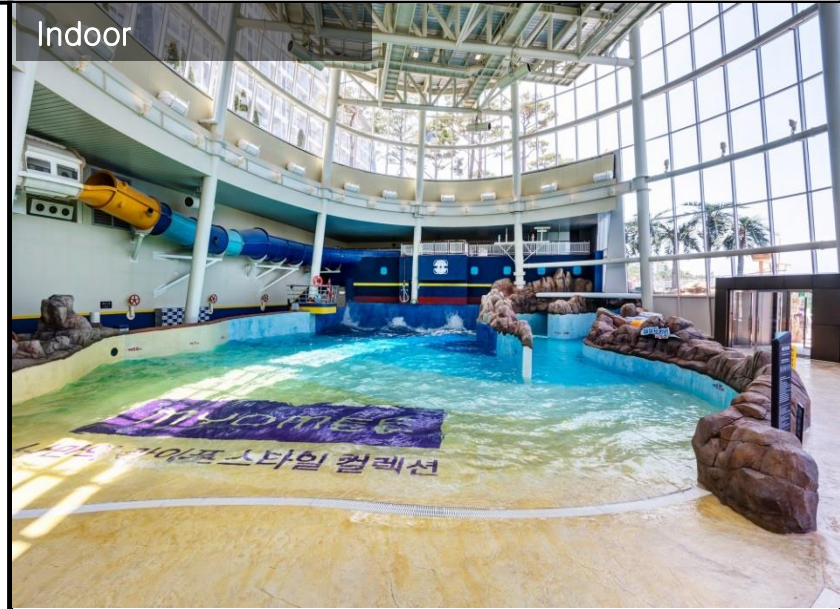


Completion Picture

Water Park



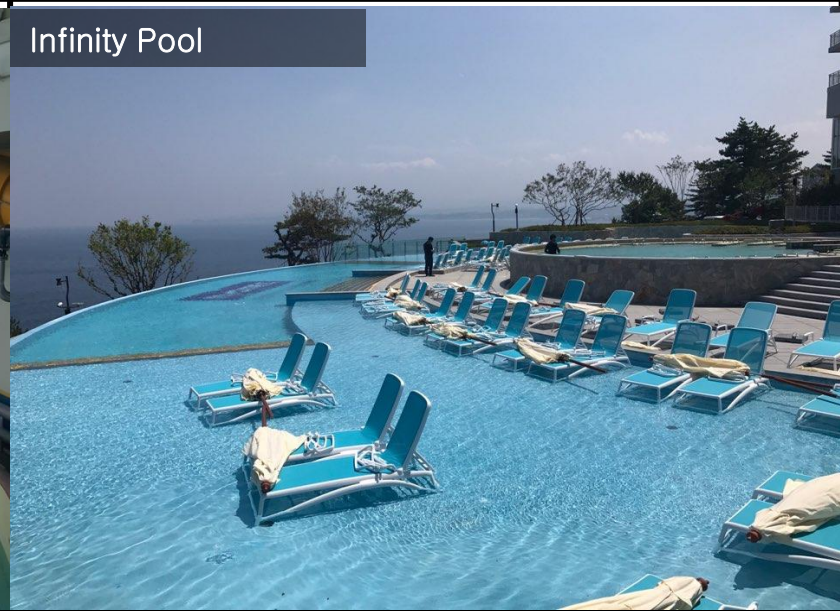
Indoor



Indoor



Infinity Pool



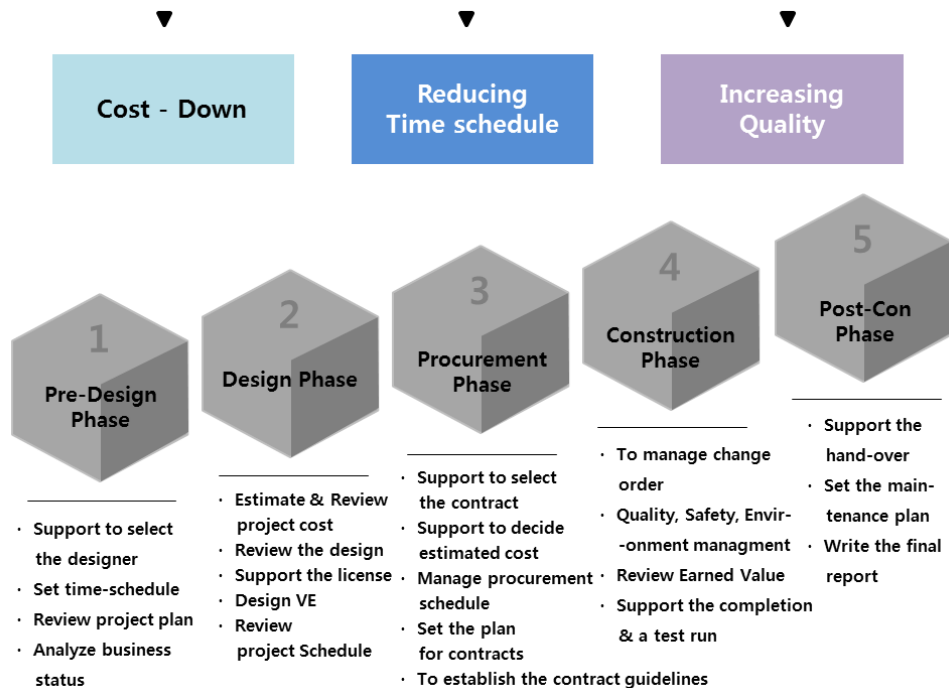
Project Participation Company

Client	• LOTTE HOTEL(Funding and facility operations) / PM : LOTTE ASSET DEVELOPMENT(Developer)
C M	• LOTTE CM DIVISION (Construction Management)
Construction	• LOTTE CONSTRUCTION&ENGINEERING(Completion of responsibility)
Supervision	• Architecture : SUH-HAN ARCHITECTS & ENGINEERS INC. • Civil : G.S. Engineering & Construction Co., Ltd. • Machanic : Wuyi Architectural Supervision • Fire : Chun Loss Prevention & Engineering Co., Ltd • Electricity/Communication : Yongwang E&I
Design	• NOW Architects
Design Vendor	• Structure : SEN Engineering Group • Civil : Towoo engineering / Ohju Engineering • Machanic : SAM-SHIN ENGINEERS. INC. • Fire : Korea fire protection UBIS Co.,LTD • Electricity/Communication : Electrical Consultant hyeobin co.,ltd • Landscape : jteng • Water : SHINWHA AQUA CO.,LTD • Water park : indesign • Interior : DOOYANG ARCHITECTURE CO.,LTD(Hotel) / INDESIGN(Condo)

□ Business Features of LOTTE CM DIVISION

- From the project Before Service to the After Service , Use the fast track in all steps to perform the work
- Performs the overall CM business of commercial/business facilities through the keytenant(Deapartment,Mart,Cinema and etc.),Constructor, Highest perfomance in Commercial facilities, Developer belonging to our group.

TOTAL SOLUTION SYSTEM



► Reduce Construction Cost

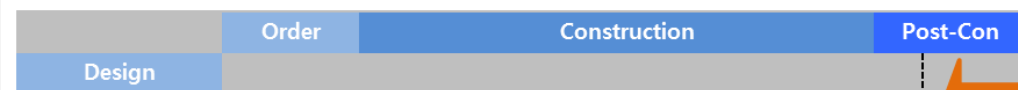
- Design Phase ; reduce cost through VE
- Construction Phase ; cost down through construction in-put cost analysis & management



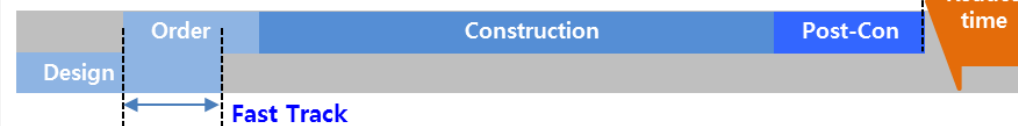
► Reduce the project schedule(Time management)

- Design Phase ; Reduce the design schedule through optimized design review and Fast – track through just-in-time design and the order.
- Construction Phase ; Reduce construction schedule through time management.

Before CM application

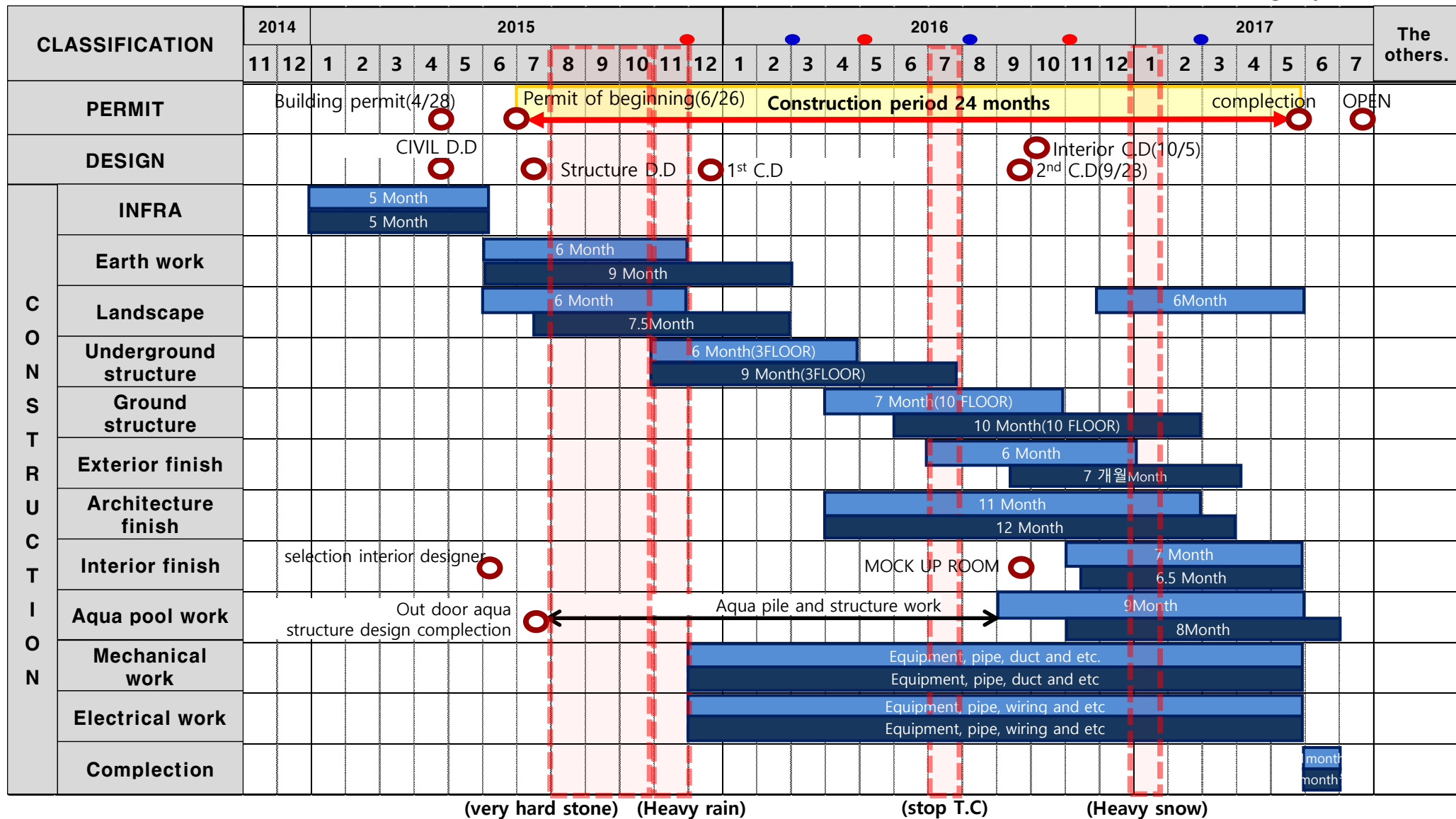


After CM application



Schedule

Original plan
Changed plan



(very hard stone) (Heavy rain)

(stop T.C)

(Heavy snow)

Construction Delay Factors_ External factors

(Groundbreaking permit delay)

CLASS	2015						2016						2017							
	2	3	4	5	6	3 quarter	4 quarter	1 quarter	2 quarter	3 quarter	4 quarter	1 quarter	4	5	6	7	8			
Before		○ Start	CONSTRUCTION 26Month, Dry run 2Month														○ OPEN			
After					○ Start	CONSTRUCTION 23Month, Dry run 1.5Month														○ OPEN



SUN	MON	TUE	WED	THU	FRI	SAT
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

2016.07 : Tower crane was shut down 27days

SUN	MON	TUE	WED	THU	FRI	SAT
1 1 °C 14 °C	2 8 °C 17 °C	3 6 °C 18 °C	4 5 °C 18 °C	5 9 °C 22 °C	6 9 °C 14 °C	7 9 °C 12 °C
8 10 °C 11 °C	9 9 °C 11 °C	10 8 °C 12 °C	11 8 °C 11 °C	12 9 °C 12 °C	13 9 °C 12 °C	14 10 °C 13 °C
15 8 °C 19 °C	16 8 °C 14 °C	17 9 °C 12 °C	18 6 °C 11 °C	19 6 °C 9 °C	20 5 °C 14 °C	21 5 °C 12 °C
22 6 °C 10 °C	23 5 °C 8 °C	24 2 °C 6 °C	25 0 °C 5 °C	26 -2 °C 4 °C	27 -3 °C 3 °C	28 -1 °C 6 °C
29 1 °C 11 °C	30 3 °C 11 °C					

2015.11 : Due to the bad weather, the removal of the soil was delayed.

The Strategy of Time management

Change of roof structure (RC → STEEL, overhang length adjustment(6M → 3M))

[BEFORE]



[AFTER]



- Designed RC cantilever beam with the shape of original Ulsan rock
 - ➔ Changed to steel frame construction considering construction difficulty

The Strategy of Time management

Exterior work change(scaffolding → gangform work)

[BEFORE]



[AFTER]



- External scaffolding plan considering various changes in face(Ulsan rock design and etc)
 - ➔ change to gang form considering period and risk of temporary(gust of wind and strong wind)
 - minimal scaffolding installation
 - ➔ external tile panel finish work, use of equipment – Thoroughly managing the schedule between the processes, such as landscaping.

The Strategy of Time management

Minimizing Wet work (Brick or Block wall) & Applying Light Weight Concrete Panel



[1py = 3.3m2]

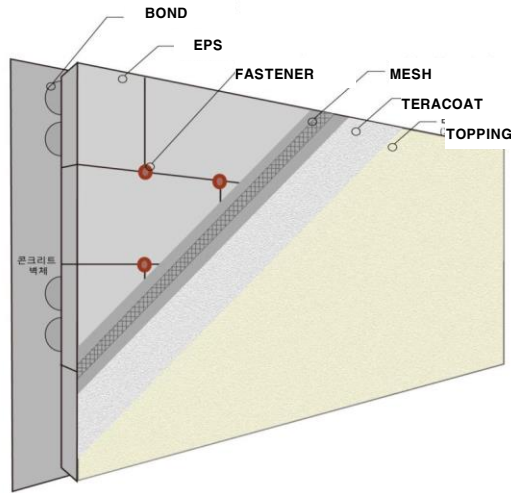
class	Buyeo Resort (wall structure)		YeongJeongdo Resort (Beam & Girder)	
	Quantity	Per PY	Quantity	Per PY
Conc' (M3)	41,701	2.4	36,339	3.64
Form (M2)	197,731	11.37	125,853	12.62
Re-bar (TON)	4,725	0.27	4,737	0.48
class	Jangam island castle (Beam & Girder)		Sokcho Resort (Beam & Girder)	
	Quantity	Per PY	Quantity	Per PY
Conc' (M3)	107,491	2.9	75,922	2.64
Form (M2)	462,501	12.48	300,966	10.49
Re-bar (TON)	13,448	0.36	8,447	0.29

- Applying Light Weight Concrete Panel because of aged engineer and avoiding block type wall.
- Minimizing non-bearing RC Wall because of the raising of RC cost and the needs for the reduction of construction period.

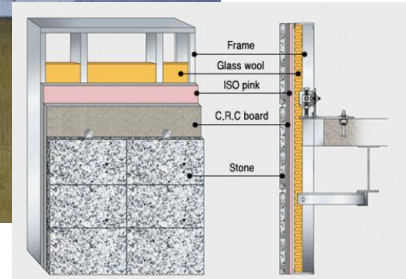
The Strategy of Time management

Applying for external panel system

[before]



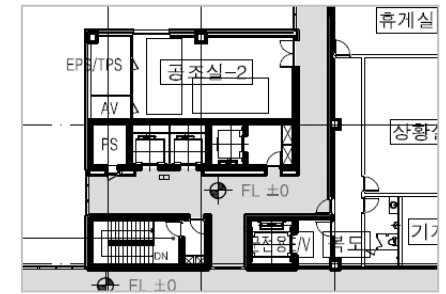
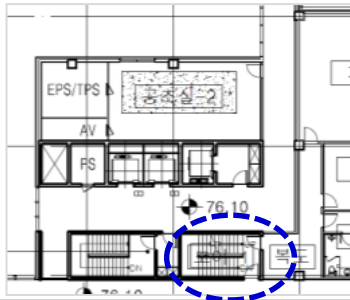
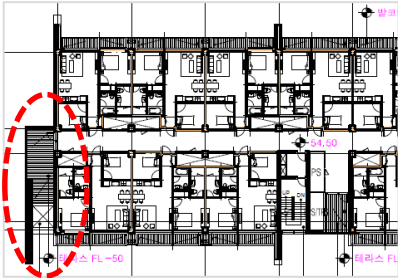
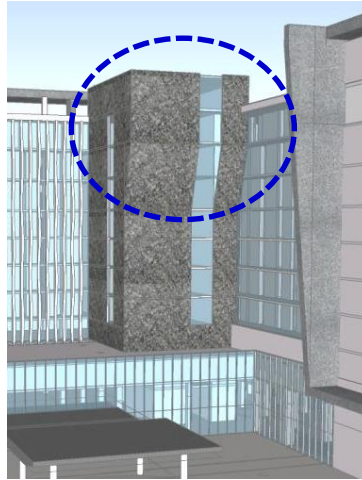
[after]



- Before : Dryvit – N/A (not applicable) : Extremely High wind pressure can blow away the wall
- After : TEC pannel system – Do not need scaffold and Shop fabrication is possible.
(conduct mock up test for wind pressure simulation and durability)

The Strategy of Time management

Modifying the elevation to improve constructability



- Remove the balcony for easy application of gang form.
- Change stair to elevator to simplify the elevation line of CORE#1,#2 → simplify form work

The Strategy of Time management

Provision of temporary steel column and construction of upper condominium



- By applying temporary post column at banquet area, using road until main structure construction was completed.

The Strategy of Time management

Change rebar joint system (coupler → gas pressure welding)

[before]



[after]



- Coupler type need more than 10 days for fabrication
: Job site → rebar factory → shop → coupler factory → Job site
- Applying gas pressure welding, to minimize the duration – Intensive Quality management required

Cost management

(UNIT : KRW)

구 분	Pre-estimating ('15.04)	contract ('15.08)	1 st change ('16.12)	completion ('17.07)	Increase and decrease (complete-1 st change)
Cost (billion)	132.0	125.0	153.5	159.2	5.7
Remark	Estimating cost	Applying VE workshop	Owner' s Requirement (Interior Design Change)	Change external material conditions of authorization Site condition	
Cost down	Pre Con Phase : 7.6 billion (5%) save (by Design review and VE Engineering) Construction phase : 3.3billion (2%) save (by Value Engineering)				1.Structural VE (rebar, conc' strength, foundation system review) 2. Review for application of plain conc' at Parking area. 3. Review for Decoration item

Cost management

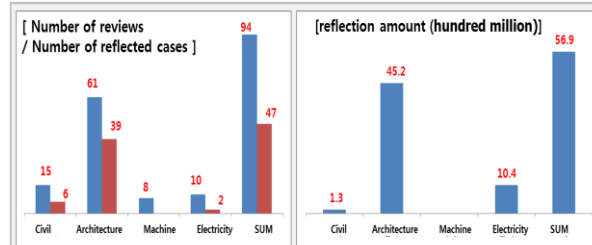
1. Proper cost control through similar case studies

	BUYEO RESORT		YEONGJONGDE RESORT		YANGAM ISLAND CASTLE		JEONSEON RESORT		SOKCHO RESORT	
CLASS										
FLOOR	B1F, 10F(322 ROOMS) 3.5 STAR		B6F, 9F(201 ROOMS) 3 STRA		B3F,15F(632 ROOMS) 3 STAR		B3F, 10F(339 ROOMS) 3 STAR		B3F, 9F(392 ROOMS) 4 STAR	
LAND AREA	11,407 PY		4,411 PY		11,811 PY		3,938 PY		21,234 PY	
BUILDING AREA	3,755 PY		782 PY		2,308 PY		949 PY		3,393 PY	
GROSS AREA	17,393 PY		9,982 PY		37,064 PY		12,448 PY		28,685 PY	
PERIOD	'09.01 ~ '10.07 (19month)		'06.10 ~ '08.09 (24month)		'06.08 ~ '09.06 (35month)		'07.05 ~ '09.09 (29month)		15.05 ~ '17.05 (25month)	
TOTAL COST (BILLION KRW)	79	455	61	615	172	464	61	494	159	567
THE OTHERS	• INDOOR AQUA 1,135 PY • INCLOUD ATTRACTION • INCLOUD KOREA TRADITIONAL CORROIDR • INDIRECT COST 14.42%		• FLOOR : B6F, 9F • COST UP : TOURIS AREA, FOREST CUT SOIL AND ROCK GROUND • AQUA 2,090PY • EXCEPT BANQUET FINISH • INCLOUD ATTRACTION		• INDOOR AQUA 4,750PY • OUTDOOR AQUA 3,270PU • FINISH SPEC LEVEL LOW • INCLOUD ATTRACTION		• INCLCUD SAUNA FACILITY		• INDOOR AQUA 3,220PY • OUTDOOR AQUA 1,450PY • INCLOUD INFRA ROAD • INCLOUD ATTRACTION • INDIRECT COST 17.74%	

3. To reduce investment costs Work Shop – considering business feasibility

CLASS	Number of reviews	Number of reflected cases	reflection amount (hundredmillion)	Hold count
Civil	15	6	▼ 1.3	9
Architecture	61	39	▼ 45.2	22
Machine	8			8
Electricity	10	2	▼ 10.4	8
SUM	94	47	▼ 56.9	47

- Hold count(parking area finish change and etc 46cases) : Application step by step after checking construction cost trends

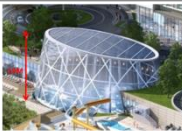
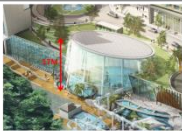


2. Design Pre View – design adjustment, reflects standard manual

REVIEW CONTENTS
1. Slab Construction Review : PLWOOD → DECK PLATE
2. Review of North-Side Retaining Wall Structures : CIVIL → ARCHITECTURE
3. Review of FOUNDATION Structures
4. Structural Material Review
5. External Insulation Material Review
6. Design Load Review
7. A Study on the Application of Non-Steel Concrete to Parking Lot
8. Non-resisting RC wall review
9. Insulation review
10. Review VE Repetitions

4. Design / Construction Value engineering

REVIEW CONTENTS
1. Landscape Wood Deck Change
2. Bicycle storage, changing fences
3. Change foundation slab steel arrangement
4. concrete strength adjustment
5. Changing the partition on the third basement level
6. Review of the Waterproofing of the Bottom
7. Delete Terrace#2
8. Hotel Core Elevation Change

REVIEW	Change and height adjustment of the exterior finish of the indoor aqua	Reviewer	CM Kim Hana
CONTENTS	ORIGINAL  CHANGE 		
COST	ETFE(double air membrane structure), maximum height 19M Reduction 9 hundred million	roof panel + C/W, maximum height 17M Constructability	1 Quality
THE OTHERS	1. Deleting design-specific elements- No Domestic Construction Cases, Construction costs rise due to monopoly, difficult to maintain in the form of membrane structure 2. Change to the most common form(CW+ROOF PANEL). Reduce construction costs and ensure a certain level of quality		
REVIEW	Hotel Front Curtain Wall Decorative BAR Change	Reviewer	CM Kim Hana
CONTENTS	ORIGINAL  CHANGE 		
COST	Reflected by decorative BAR curves Reduction 0.15 hundred million	Reflects with decorative bar straight lines	1 Quality
THE OTHERS	1. Some design changes are made to the extent that they do not affect the overall exterior elevation design		

LOTTE GROUP

MISSION

We enrich people's lives by providing
superior products and services that
our customers love and trust

LOTTE