MANHATTAN FUTURE GATEWAY

NEW PORT AUTHORITY BUS TERMINAL

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Complex Projects Graduation Studio | New York Midtown
INTRODUCTION
Location

TRANSITIONAL YARDS

NEW YORK MIDTOWN

9th Ave  8th Ave  40th St  42nd St
Opened in 1950

Source: The New York Times

Source: The Port of New York Authority
8,000 BUS TRIPS
225,000 PASSENGERS PER DAY

“It’s a mid-20th century bus terminal trying to meet mid-21st century needs.”

Source: Frank G. Runyeon, Will the Port Authority Bus Terminal ever get replaced? November 29, 2018
New Mobility Trends Cannot be Facilitated
New Mobility Trends Cannot be Facilitated
Technological Development Cannot be Implemented

Online Tickets

Real-time Information

Turnstile

Smart Parking
THE BUS TERMINAL CHALLENGES

1. Operating beyond capacity

2. New mobility trends cannot be facilitated

3. Technological development cannot be implemented
RESEARCH QUESTION

How can bus terminal meet the existing need in the dense NY Midtown urban context and adapt to changes of new mobilities that may arise in the future?
FUTURE AMBITION

Improve the transport efficiency by reorganizing the terminal and parking spaces and cater for future development of new mobilities.
RESEARCH
History of Mobility in NYC


19th Century: Horse-drawn carriages
end of 19th Century: Streetcars
1900-1930: Automobiles
1930-1980: Automobiles (decline)
1980-now: Bicycles
NYC's Mobility in History

Horse-drawn carriages, 1892
Trolley, 1909
Old NYC buses

Bicycle, 1896
Private automobiles boom, 1930
NYC subway, 1963
Different Terminals in History

Streets of Manhattan in 19th Century

Williamsburg Bridge Terminal, c. 1919

Pennsylvania Greyhound Terminal, 1929

Port Authority Bus Terminal, 1950
New Mobility Trend in NYC

Taxis & FHV (for-hire vehicles) change from 2010-2019

CitiBike (NYC) Daily Ridership Record, 2019

In Manhattan, FHVs now make up nearly 30% of all traffic.
Port Authority Bus Terminal

Port Authority Bus Terminal, 1950

Port Authority Bus Terminal, 2019

?
Port Authority Bus Terminal

Parking - 5F/6F/7F

Bus Terminal

4F
3F
2F
1F (Groundfloor)
-1F
-2F

Port Authority Bus Terminal

1250 Parking Spaces!

Bus Terminal

4F  good

3F  newest, good

2F  worst, individual elevator, narrow and crowded

1F (Groundfloor)

-1F

-2F  gates on two sides, dark

148 Gates!

Functional Distribution

1. Bus Terminal: 74,650 m²
2. Parking: 52,000 m²
3. Support Functions: 12,650 m²
BUS TERMINAL CHALLENGES

- Different type of gates on different layers of north/south wings
- Congestion
- Inappropriate functional distribution
- Interior space gathers criminals and homeless people
Different Types of Gates
Congestion / Technological Development Cannot be Implemented
Corridor of Crime and Homeless

Source: The Port of New York Authority

Source: Bob Glass/The New York Times
DESIGN OF NPABT

- Simple, clear and unified boarding way
- Larger area of circulation and public space
- New functional distribution
PARKING CHALLENGES

- High demand even with expensive parking fee
- Long ramp system
- No parking area for buses
- Private vehicle drivers have no separate flow
Huge Parking Demand
Parking
High demand, Scattered, Waste of public space
Long Ramp System
No parking area for buses
DESIGN OF NPABT

- Keep enough parking lots
- Add bus storage area
- Reorganize the ramp system
- Divide the flow of passengers and car drivers
SUPPORT FUNCTIONS CHALLENGES

- Public spaces are not in good use
- Did not make use of the good view
- Without consideration of white-collar workers
Public Spaces in PABT
Views on the Rooftop of PABT
DESIGN OF NPABT

- Improve public space
- Add viewing platform
- Add entertainment place for workers
Lot Area: 23,690 m²
Max FAR: 10 - residential
15 - commercial
15 - facilities

Lot Area: 10,000 m²
Max FAR:
6.02 - residential
2 - commercial
6.5 - facilities

Lot Area: 30,000 m²
Max FAR: 10 - residential
10 - facilities
Massing Study

cube

scattered bulk

building(s) with base

centrally concentrated
Urban Restrictions

1. react to the public spaces in the surroundings
2. make the city road in the middle passable
3. consider Lincoln Tunnel exit and traffic condition
4. centrally concentrated with courtyards
Program of New PABT

- BUS TERMINAL: 50,000m²
  - BUS STORAGE: 10,000m²
  - BUS BAY: 15,000m²
  - GATES: 7,500m²
  - OFFICE: 3,000m²
  - TICKETING: 1,000m²
  - FOYER: 500m²
  - RAMP SYSTEM: 10,000m²
  - BUS STORAGE: 10,000m²
  - SHARING CAR: 2,500m²
  - E-BIKE: 500m²
  - PRIVATE VEHICLE: 30,000m²
  - RETAIL: 7,500m²
  - ENTERTAINMENT: 2,500m²
  - WC: 1,000m²
  - ROOF GARDEN: 2,000m²

- PARKING: 30,000m²

- SUPPORT FUNCTIONS: 13,000m²

New added functions comparing to current PABT: 7,500m²
modern light green passable
spacious, visible, organized
open
lively
good view
pedestrian accessible
URBAN STRATEGY
MAIN CHALLENGES

1. Lincoln Tunnel connection & vehicles' routes
2. Relationship with the surrounded buildings and parks
3. Commuters & tourists' circulation
Axon of Transitional Yards
Group Site Plan - New Lincoln

- Hyper-Vertical Subway Station
- Mixed Use with Homeless Shelter
- Mixed Use with Sports Facility
- Mixed Use with Community Facility

Relationship with the surroundings
- Keep the exit of LT open

New PABT
Ramps
Passenger's way
Connect parks / public space
Urban Strategy
Urban Strategy

Vehicle’s way
Buses out from the tunnel
Urban Strategy

Vehicle’s way
Buses out from the tunnel
Cars out from the tunnel
SPACE & FUNCTION
MAIN CHALLENGES

1. Space efficiency: use less area but same amount of gates

2. Buses’ & Communiters’ circulation

3. Convenience and comfort of space

4. New mobility services should be implemented
Development
Development
P2.5 Model 1:500
P2.5 Model 1:500
Concept

1. Round volume for ramps with atrium
2. Two wings with atriums
3. Viewing Platforms
4. Interlace layers
Ramp for Buses

2 spirals, one-way ramp

1 spiral, two-way ramp
Ramp for Buses

2 spirals, one-way ramp

1 spiral, two-way ramp
Route for Buses

Inner side

+: Better view for pedestrians
   More bus gates

-: Longer pedestrian circulation
   Shorter bus circulation
   Connect the atrium and platforms

Outer side

+: Shorter Pedestrian circulation
   Longer bus circulation

-: No outside view for waiting area
   Less bus gates
   Connect the atriums and platforms

Public Functions  Bus Boarding Bay

--- Pedestrian Circulation  -- Bus Circulation
Route for Buses

Inner side

+: Better view for pedestrians
   More bus gates

-: Longer pedestrian circulation
   Shorter bus circulation
   Connect the atrium and platforms

Outer side

+: Shorter Pedestrian circulation
   Longer bus circulation

-: No outside view for waiting area
   Less bus gates
   Connect the atriums and platforms
Program Scheme

- Pedestrian Area
- Bus Boarding Bay
- Pedestrian Circulation
- Bus Circulation
Outer Boarding Area
Inner Boarding Area
Program Scheme

Connection?
Commercial Layer
A-A Section
B-B Section

- Support Functions Layers
- Bus Boarding Layers
- Ramp
- Greenery
Typical Plan
Typical Plan

3rd Floor Plan

- Parking Lot
- Ramp

Support Functions Layers

Bus Boarding Layers
Commercial Layer and the Balcony
Commercial Layer and the Balcony
Program Scheme

Departure Building

Bus Verticle Circulation
Bus Parking Bay & Waiting Area
Public Functions
Platforms
Parking
Pedestrian Circulation (Arrive)
Car Circulation (Arrive)
Car Circulation (Departure)
Pedestrian Entrance
Vehicle's Way
Private Car Parking / Car Sharing
Private Car Parking / Car Sharing
FHV Drop-off Point
FHV Pick-up Point
FHV Waiting Area
Parks
Exterior from the South Park
Exterior from the West Plaza
STRUCTURE
MAIN CHALLENGES

1. Long span structure

2. Round volume
Material

Concrete
Long Span Structure

Beam

20m

6m

4m

3m

7m

3m

4m

10m
Boarding Area
Atrium
Fragment Section

- Atrium
- Commercial Area
- Boarding Area
Two Floors as a Unit
FACADE
MAIN CHALLENGES

1. Huge volume and long elevation
2. Different demand of different functions
Facade

Light color
Translucence
Penetration
Elevation
Elevation
Exterior from the South
Exterior from the West
CLIMATE
MAIN CHALLENGES

1. Natural systems of lighting and ventilation (atrium)

2. Shading system

3. Acoustic
Climate Border
Climate Border
Climate Border
Ventilation

natural ventilation

mechanical ventilation
Lighting (day)
Shading system (south)
Lighting (day)

natural light
artificial light
Rain Water system
Noise Absorbing
Noise Absorbing
Strato Breathing Ceiling

Source: https://www.texaa.com/products/strato-breathing-ceiling/
Strato Breathing Ceiling
Boarding Area
REFLECTION
MAIN CHALLENGE

Urban Strategy  ?  Internal Function & Space

contradiction
Main Challenges

External Ramps

PABT

NewPABT

- Horizontal Bus Flows
- Vertical Bus Flows
Main Challenges

"L" shape volume

Horizontal Bus Flows

Vertical Bus Flows
NEW PORT AUTHORITY BUS TERMINAL

MANHATTAN FUTURE GATEWAY