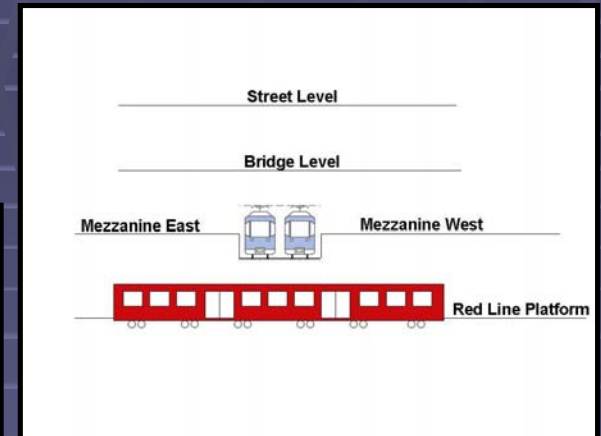
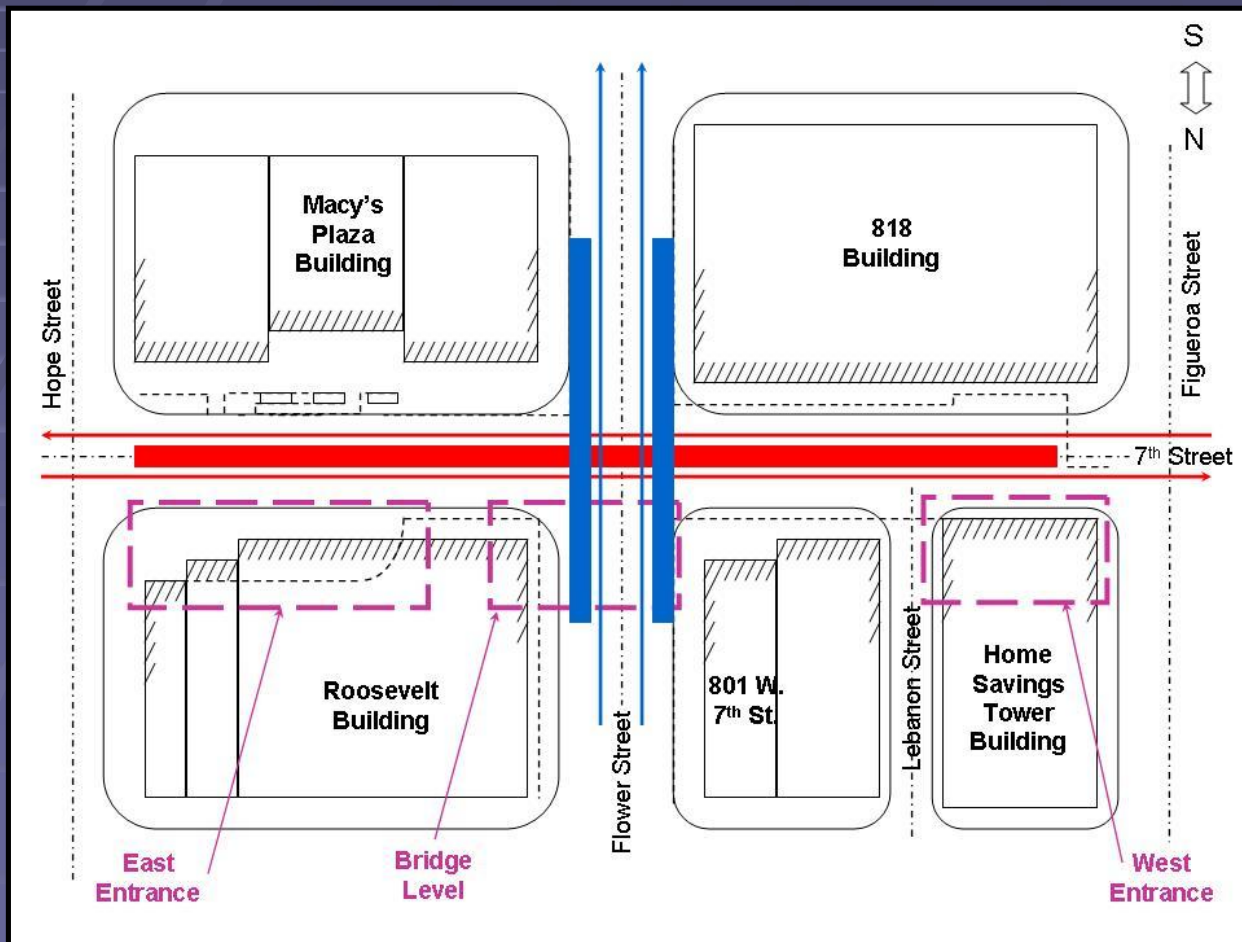


# 7<sup>th</sup>/Metro Egress Analysis

Prepared by

DMJM Harris  
Rolf Jensen & Associates

# Station Layout

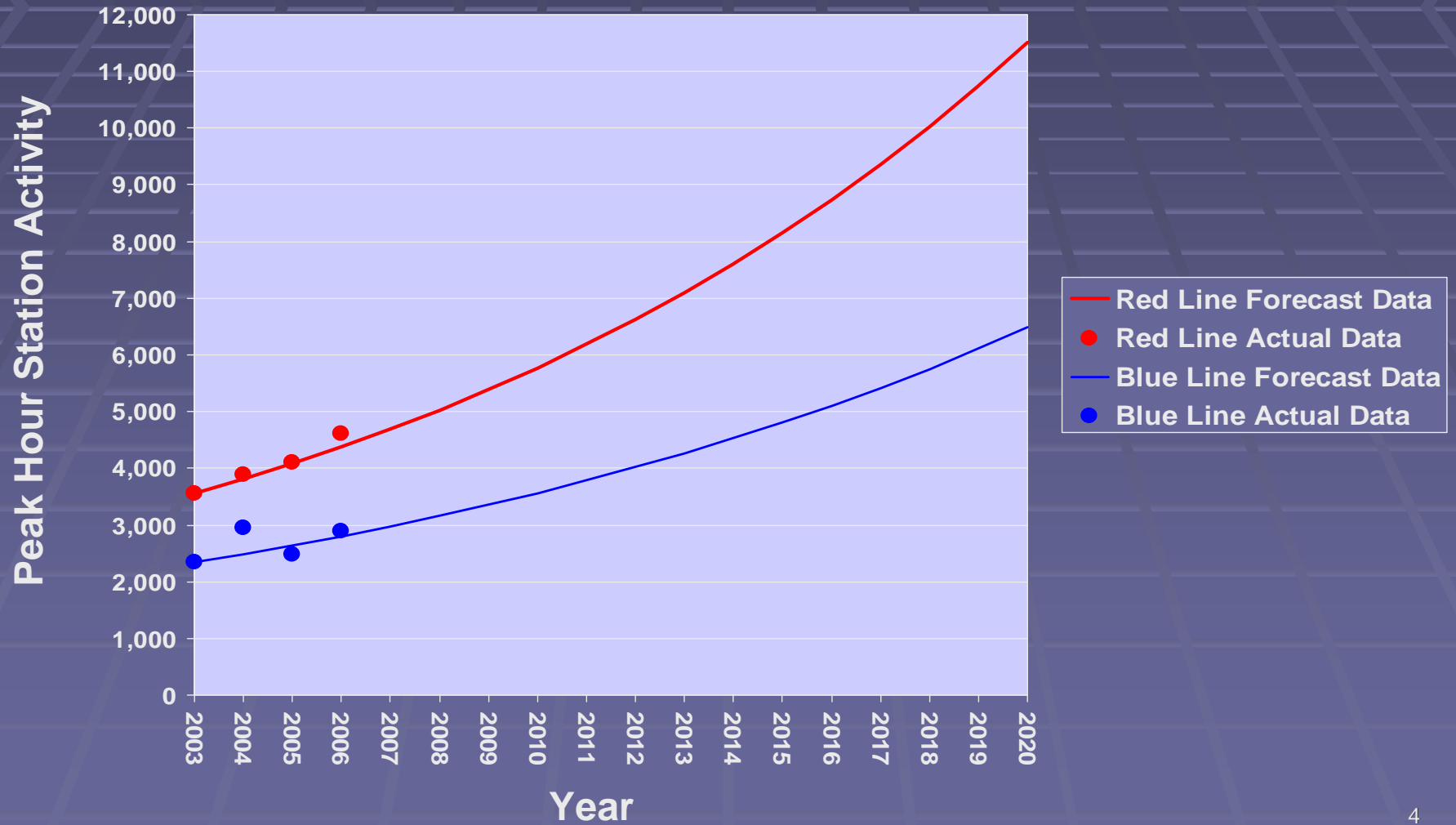


# Analysis Assumptions

- § National Fire Protection Association Guidelines (NFPA 130)
- § 2020 Peak Hour Ridership Projections
- § Peak Headways / No. of Cars:

Line	Headway	No. of Cars
Blue Line – Pacific	10 min.	3-car
Blue Line – Willow	10 min.	3-car
Red Line – Wilshire/Western	4 min.	6-car
Red Line – N. Hollywood	4 min.	6-car
Expo Line	5 min.	2-car

# Peak Hour Station Activity Actual vs. Forecast



# Two Egress Tests

§ Must be able to evacuate each platform in 4 minutes or less

§ Must be able to evacuate all station occupants to a point of safety in 6 minutes or less

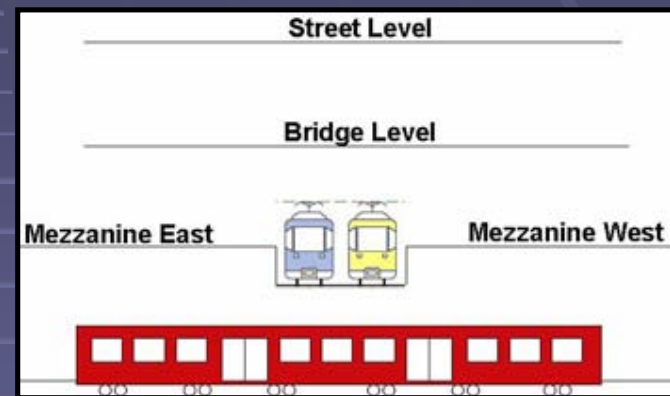
# 4-Minute Test

Line/Platform	2020 Occupant Load	Evacuation Time (minutes)
Red Line Platform	1,838	2.09
Blue Line East Platform	1,854	3.12
Blue Line West Platform	1,854	2.91
Expo Line East Platform	798	1.34
Expo Line West Platform	798	1.25

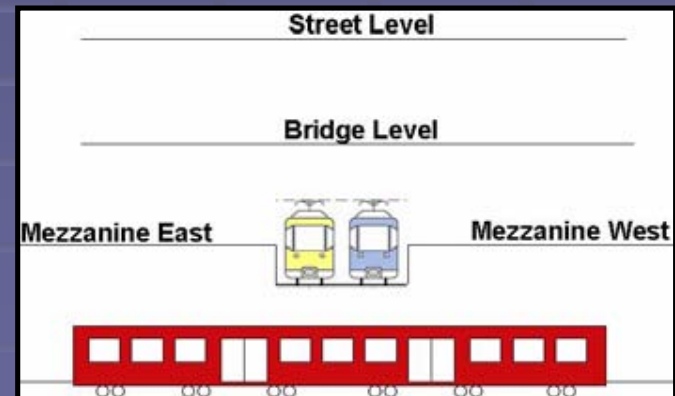
# 6-Minute Test

Two Operating Scenarios:

§ Blue Line East Platform /  
Expo Line West Platform



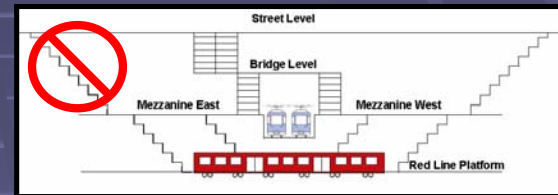
§ Blue Line West Platform /  
Expo Line East Platform



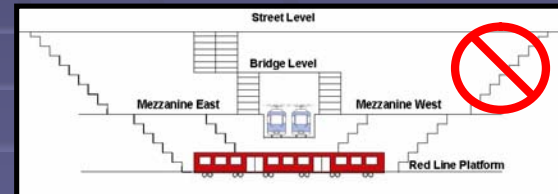
# 6-Minute Test

## Four Escalator Out-of-Service Scenarios:

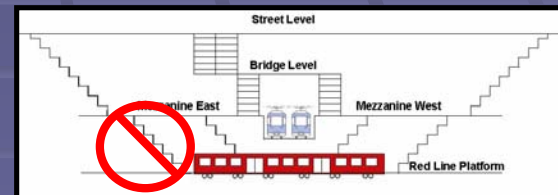
§ **Scenario 1: Mezzanine East Escalator Out-of-Service**



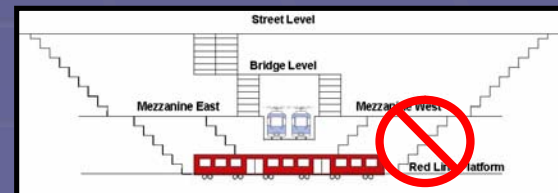
§ **Scenario 2: Mezzanine West Escalator Out-of-Service**



§ **Scenario 3: East Red Line Platform Escalator Out-of-Service**

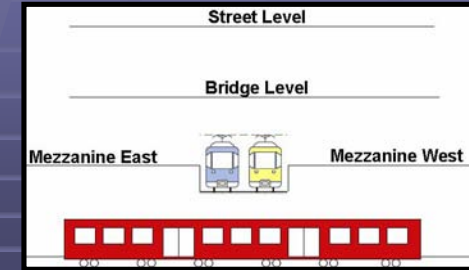


§ **Scenario 4: West Red Line Platform Escalator Out-of-Service**



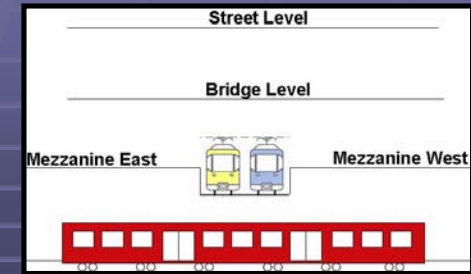


# Blue Line East Platform / Expo Line West Platform



Exit Location	Timed Egress Results (minutes)			
	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Mezzanine East Entrance	6.43	5.93	5.81	6.00
Blue Line East Platform Bridge Exterior Exit	3.88	3.88	4.02	4.02
Mezzanine West Entrance	3.91	4.15	4.21	3.56
Expo Line West Platform Bridge Exterior Exit	3.93	3.93	4.07	4.07
Cumulative Load at Bridge Exterior Exit	4.68	4.68	4.82	4.82

# Expo Line East Platform / Blue Line West Platform



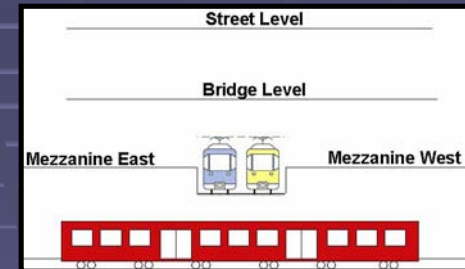
Exit Location	Timed Egress Results (minutes)			
	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Mezzanine East Entrance	4.36	4.08	3.96	4.16
Expo Line East Platform Bridge Exterior Exit	3.88	3.88	4.02	4.02
Mezzanine West Entrance	5.62	6.05	5.69	5.51
Blue Line West Platform Bridge Exterior Exit	3.93	3.93	4.07	4.07
Cumulative Load at Bridge Exterior Exit	4.68	4.68	4.82	4.82

# Egress Analysis Conclusions

- § All platforms satisfy 4-minute test
- § Station fails 6-minute test under two scenarios
  - § Mezzanine East Entrance fails when East Platform serves Blue Line trains
  - § Mezzanine West Entrance fails when West Platform serves Blue Line trains
- § If Blue Line restricted to one platform, only one entrance would fail
- § Station fails with or without Expo Project

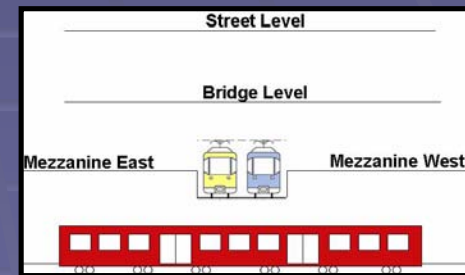
# Sensitivity Analysis

§ Blue Line served by East Platform:



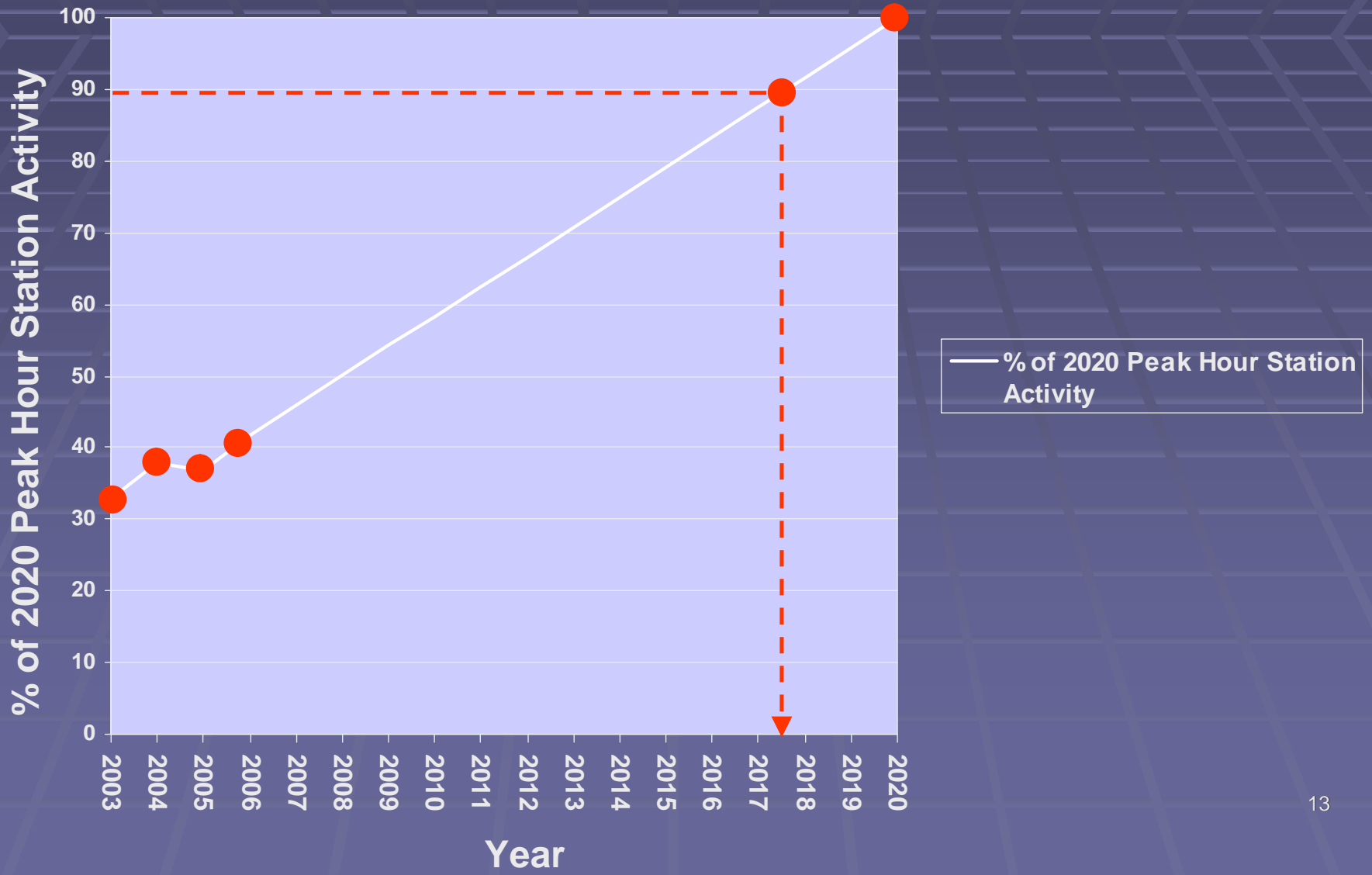
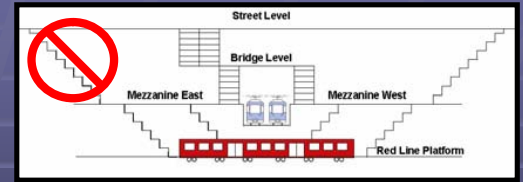
§ East Entrance fails when occupant loads reach 90% of 2020 ridership projections ~ Year 2017

§ Blue Line served by West Platform:

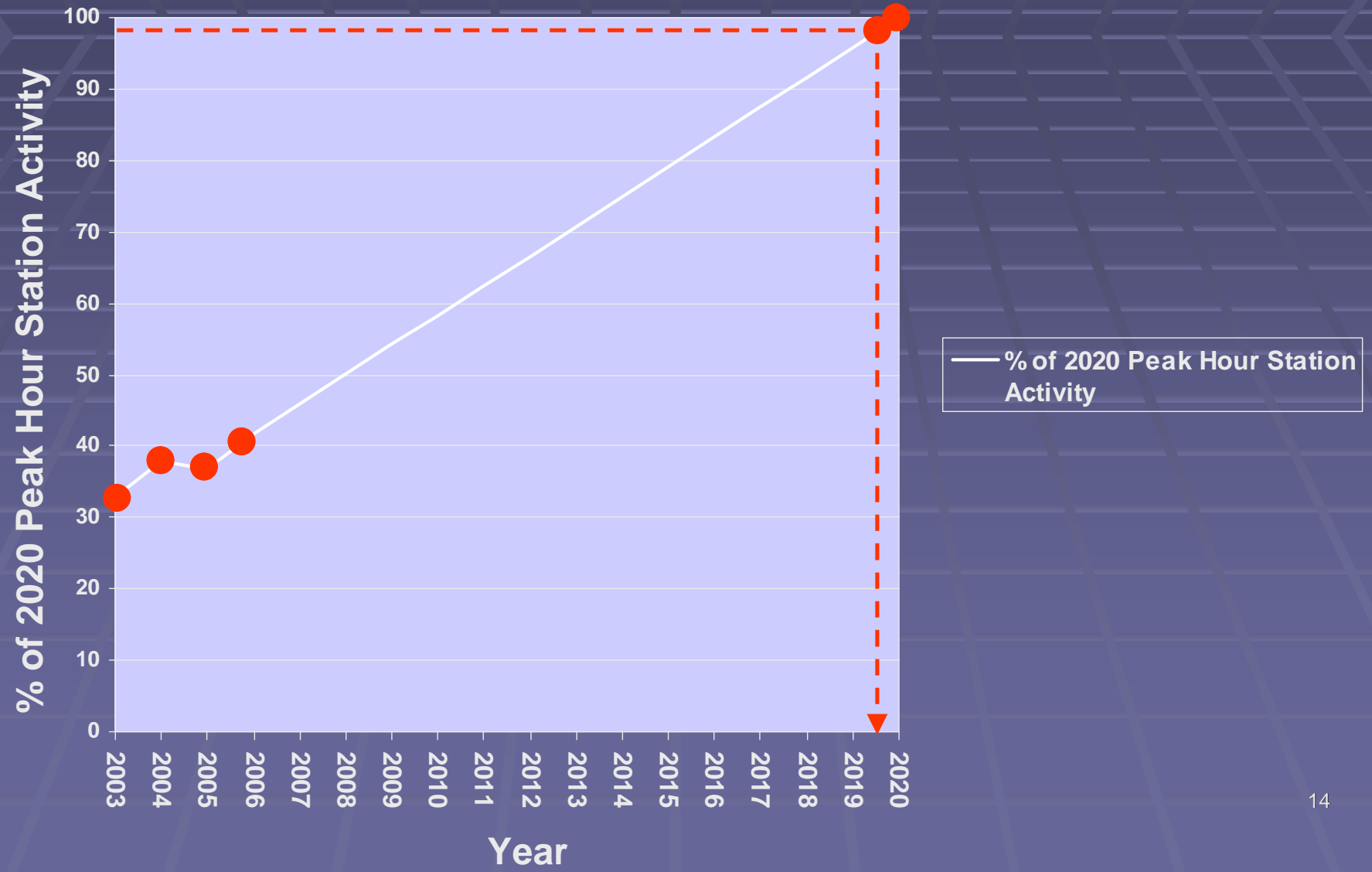
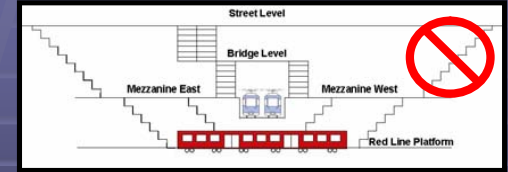


§ West Entrance fails when occupant loads reach 98.5% of 2020 ridership projections ~ Year 2019

# East Entrance – Estimated Year of Failure

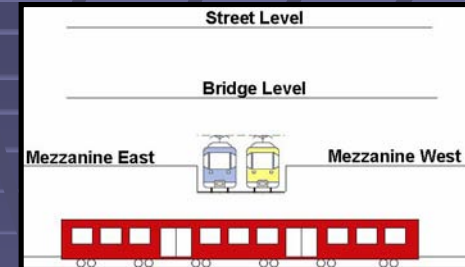


# West Entrance – Estimated Year of Failure



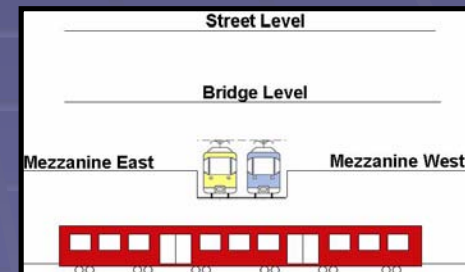
# Sensitivity Analysis

§ Blue Line served by East Platform:



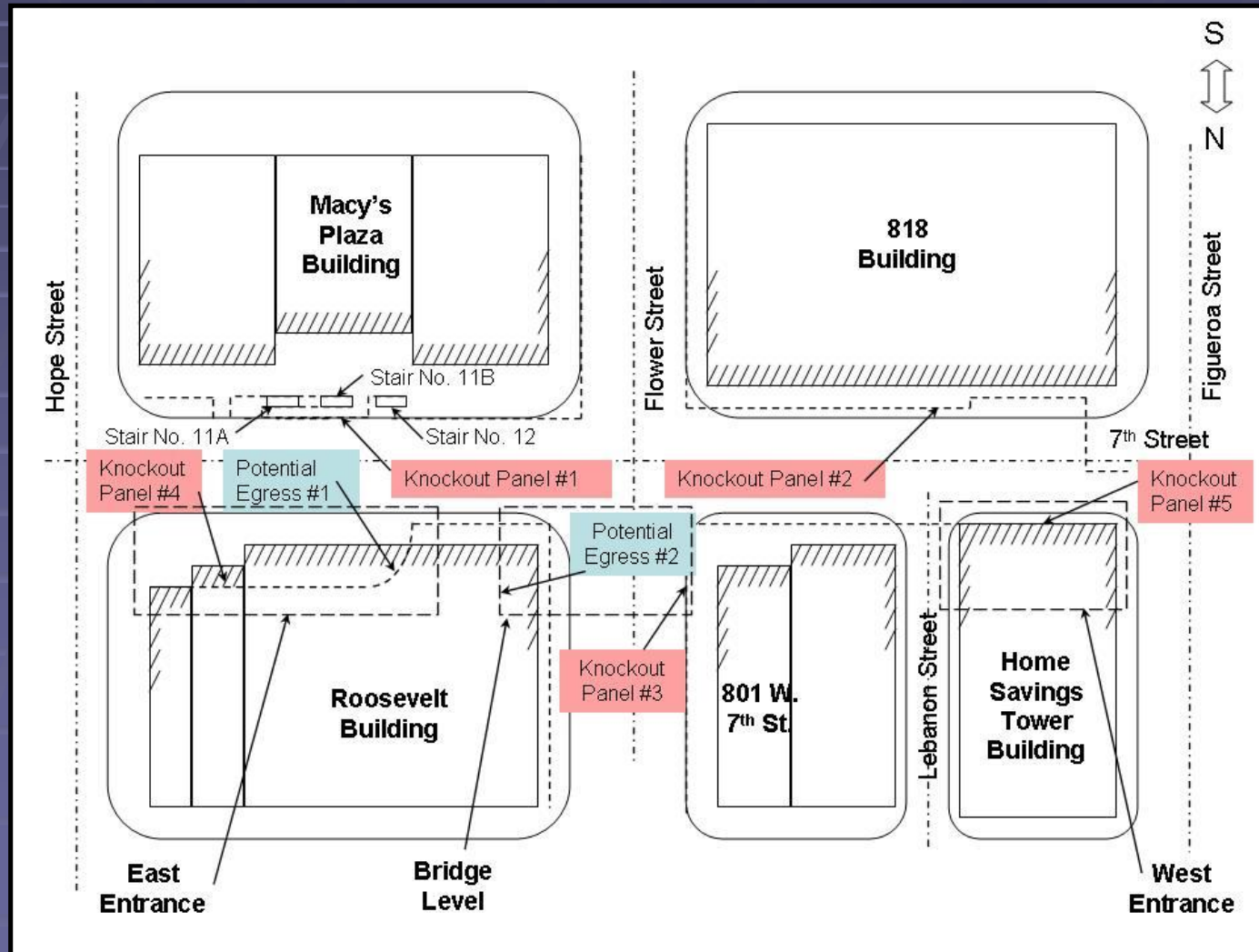
§ Need additional 32 inches egress capacity on the Mezzanine (Blue Line) East level

§ Blue Line served by West Platform:



§ Need additional 4 inches egress capacity on the Mezzanine (Blue Line) West level

# Knockout Panels & Other Potential Egress Locations

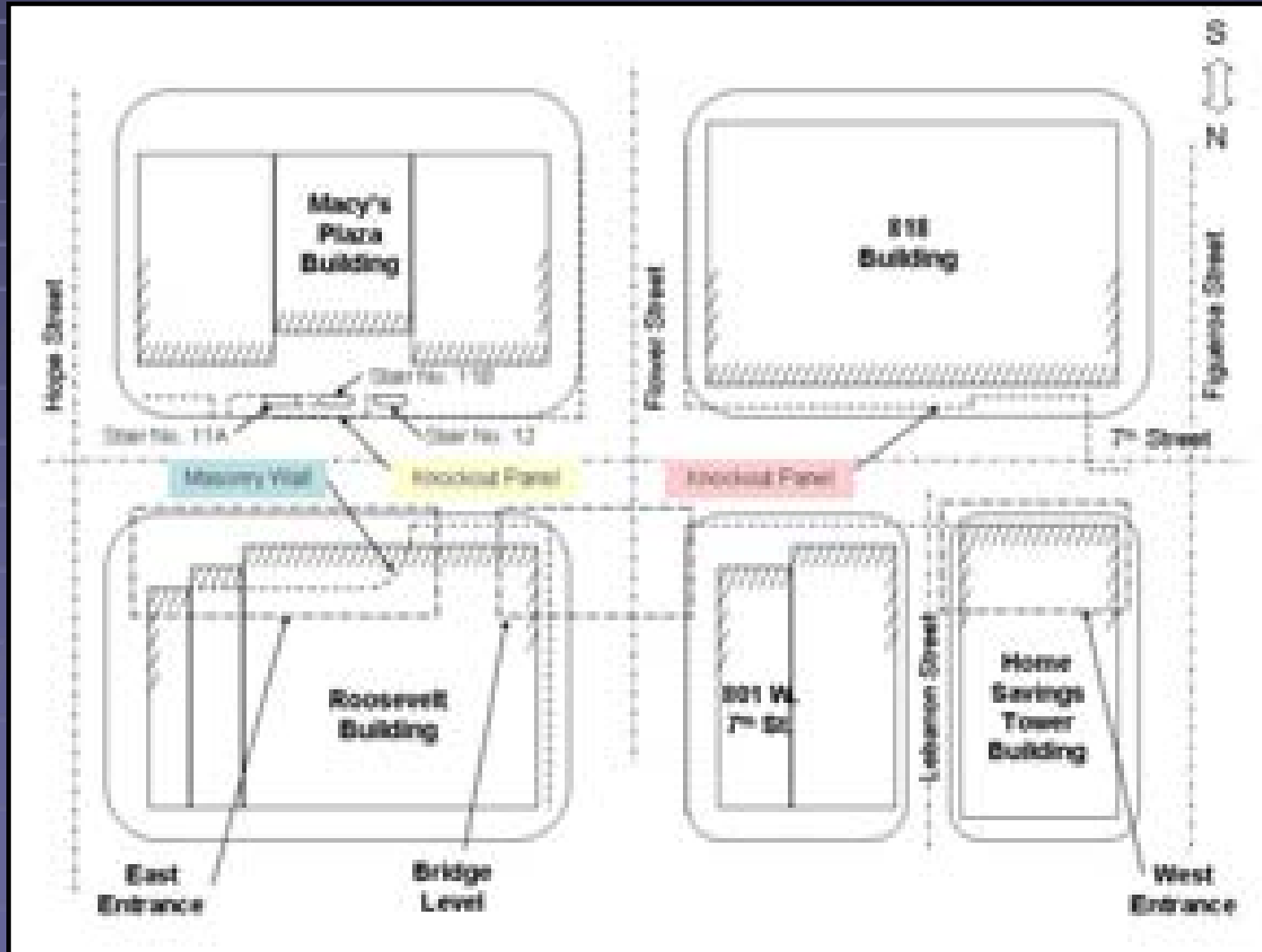




# Viabale Egress Locations

- § Identified three viable egress locations:
  - § Knockout Panel opposite East Entrance
  - § Knockout Panel opposite West Entrance
  - § Masonry Wall at foot of East Entrance

# Viability Egress Locations



# Viable Egress Locations

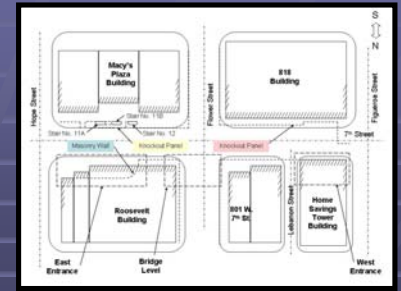
§ For each location, analyzed:

§ Structural Implications

§ Electrical/Mechanical & Systems Implications

§ Cost Implications

# Cost Analysis



#	Potential Egress	Access	Permanent Exit (ROM)	Emergency Exit (ROM)
1	Knockout Panel Opposite East Entrance	Sidewalk on south side of 7 <sup>th</sup> Street or basement of Macy's Plaza Building	\$7 million	\$2 million
2	Knockout Panel Opposite West Entrance	Sidewalk on south side of 7 <sup>th</sup> Street or basement of 818 Building	\$7 million	\$1 million
3	Masonry Wall at foot of East Entrance	Sub-basement level of Roosevelt Building on east side of 7 <sup>th</sup> Street	\$5 million	\$1 million
4	Knockout Panel Opposite West Entrance	Lower level of 7 <sup>th</sup> /Figueroa Marketplace on southwest corner of 7 <sup>th</sup> and Figueroa Streets	\$6 million	Not Applicable

# Viabile Options – Mezzanine East

§ Macy's Plaza to install permanent exit from knockout panel at their cost (\$7M ROM)

If unsuccessful:

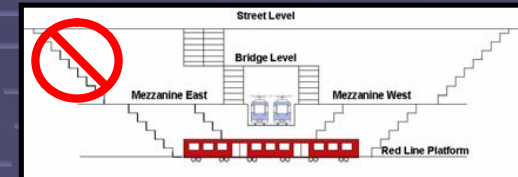
§ Install emergency exit from masonry wall (\$1M ROM)

Or:

§ Install emergency exit from knockout panel (\$2M ROM)

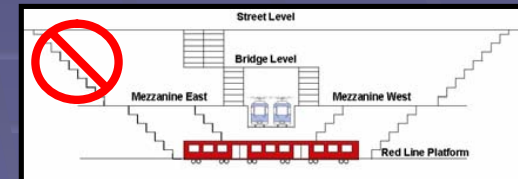
# Sensitivity Analysis

§ With Addition of Permanent Exit:



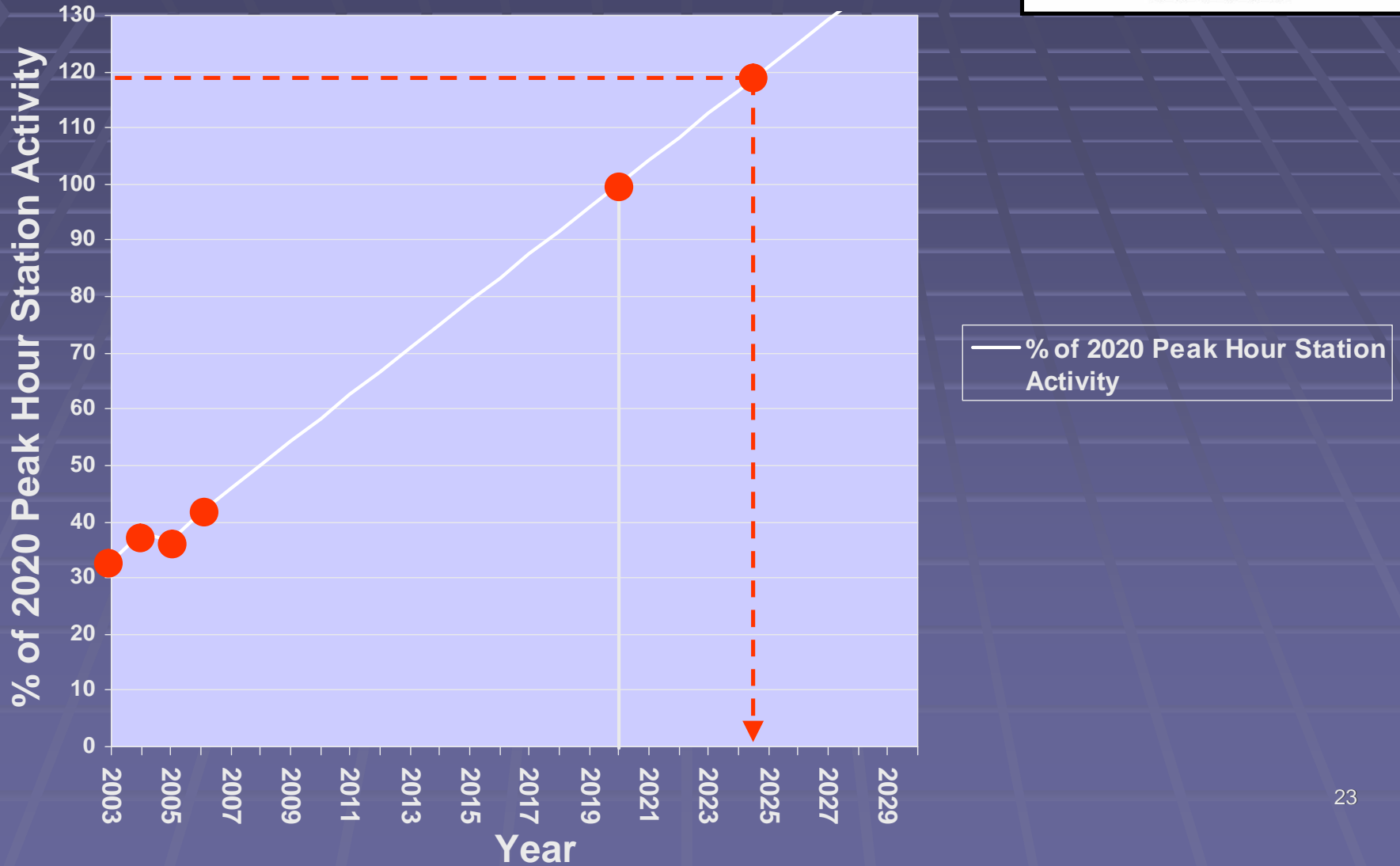
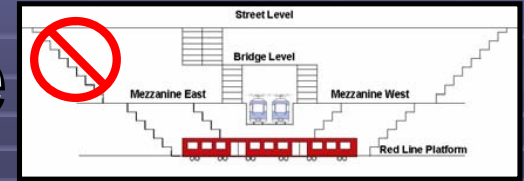
§ East Entrance would fail when occupant loads reach 119% of 2020 ridership projections ~ Year 2024

§ With Addition of Emergency Exit:

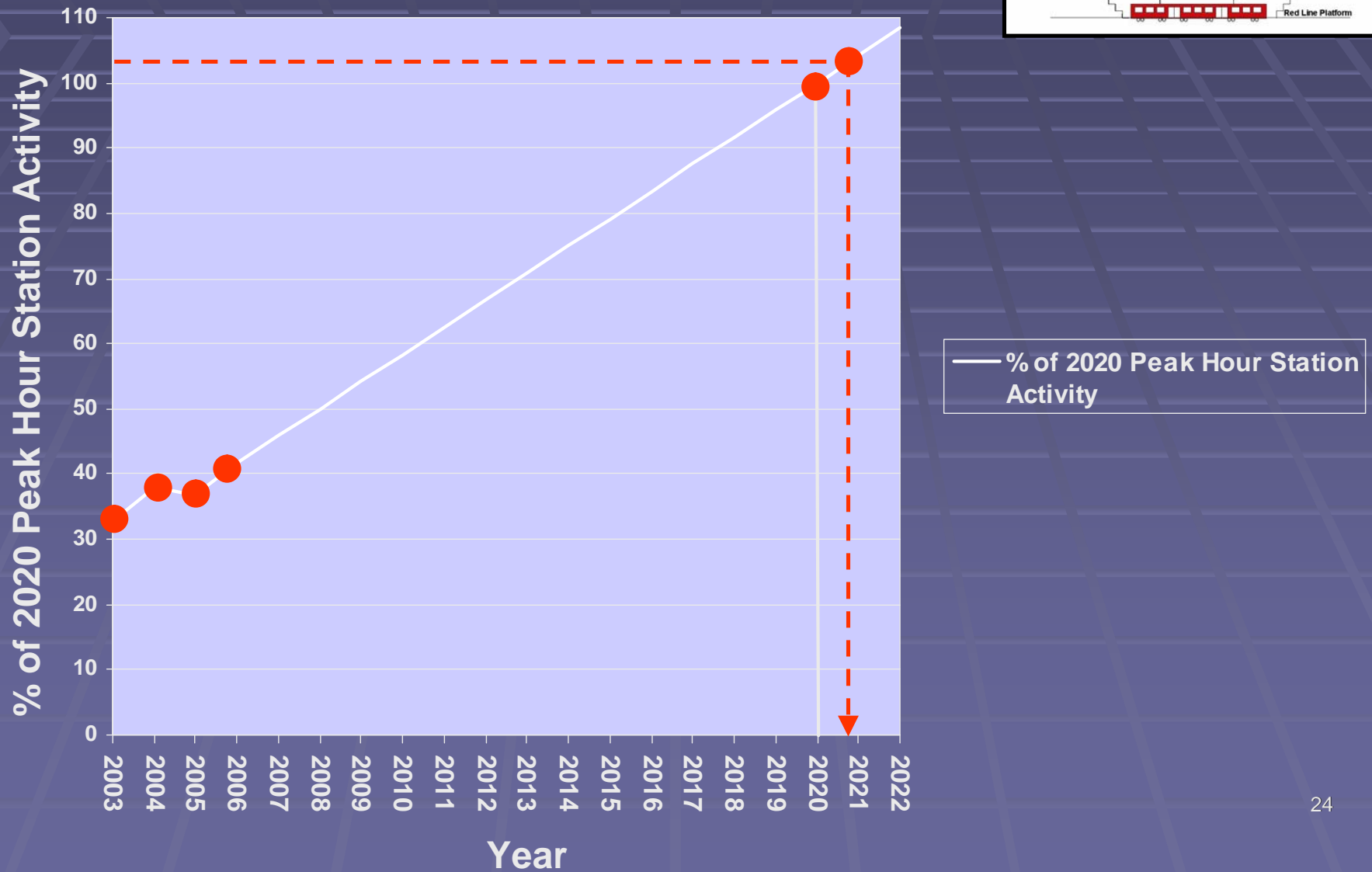
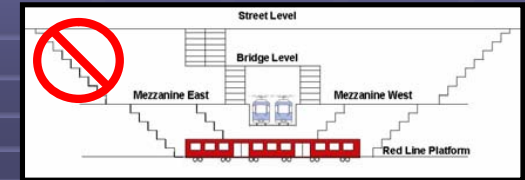


§ East Entrance would fail when occupant loads reach 104% of 2020 ridership projections ~ Year 2021

# Addition of Permanent Exit – Estimated Year of Failure



# Addition of Emergency Exit – Estimated Year of Failure





# Viabile Options – Mezzanine West

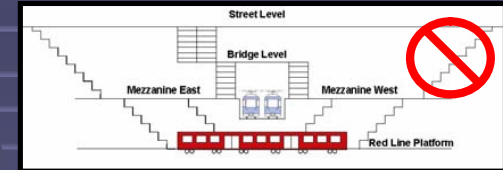
§ 7th/Figueroa Marketplace to install permanent exit from knockout panel at their cost (\$6M ROM)

If unsuccessful:

§ Install emergency exit from knockout panel (\$1M ROM)

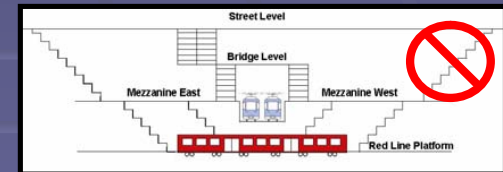
# Sensitivity Analysis

§ With Addition of Permanent Exit:



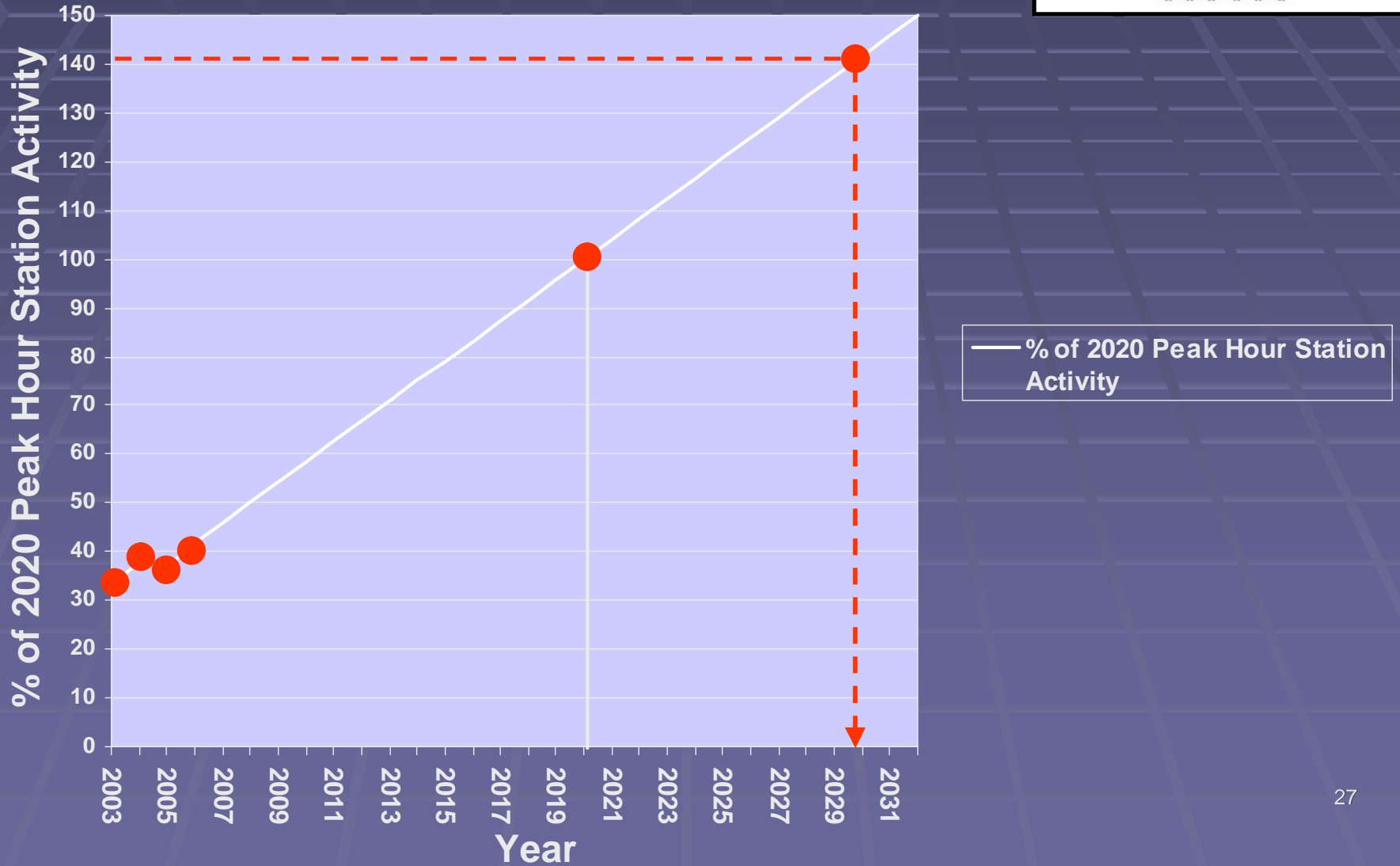
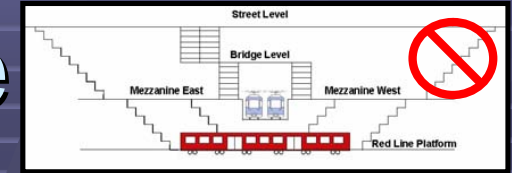
§ West Entrance would fail when occupant loads reach 142% of 2020 ridership projections ~ Year 2030

§ With Addition of Emergency Exit:

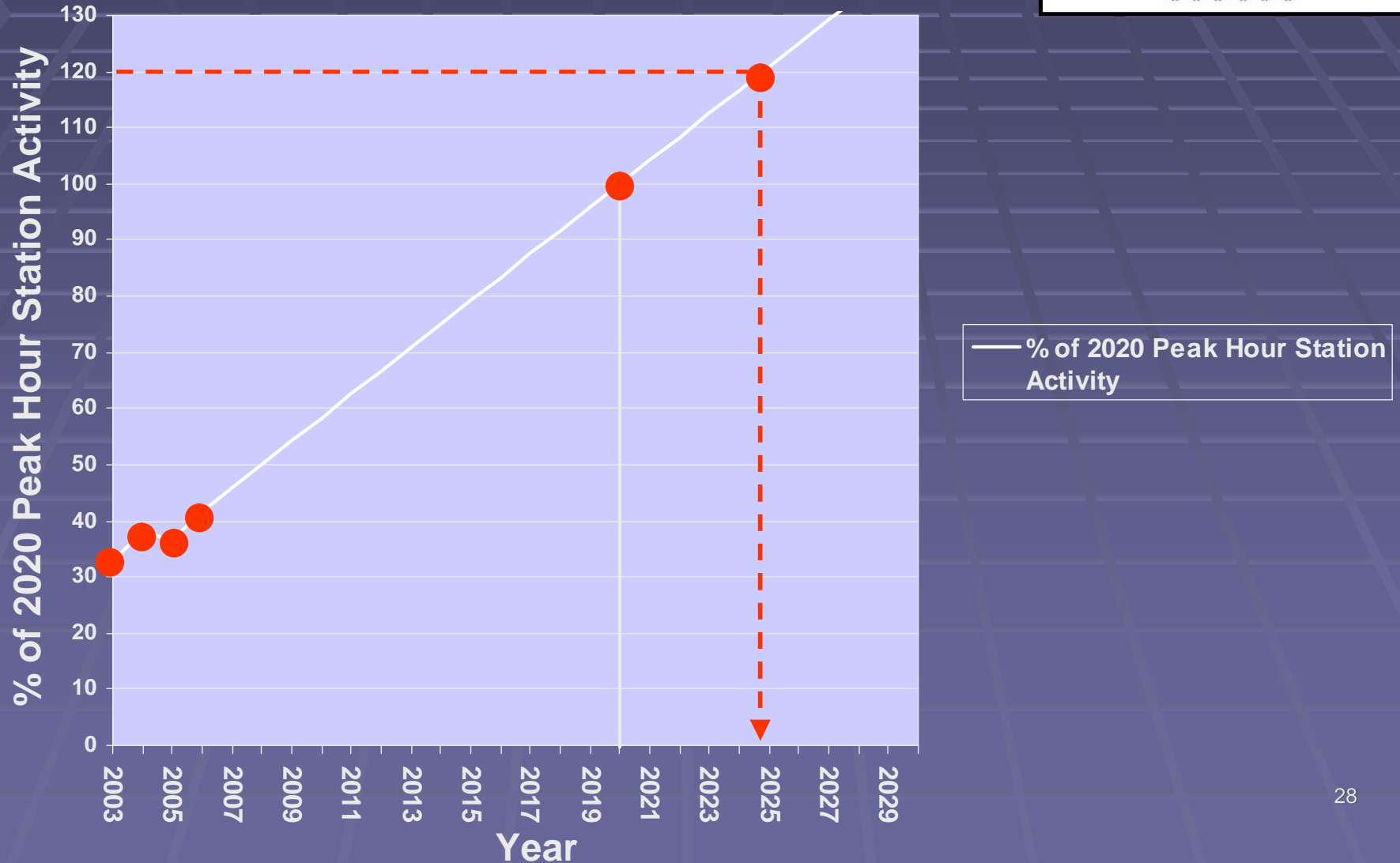
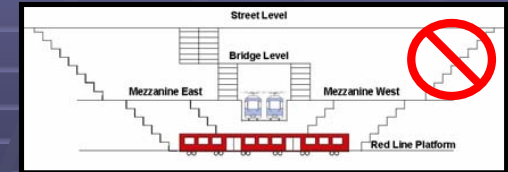


§ West Entrance would fail when occupant loads reach 120% of 2020 ridership projections ~ Year 2024

# Addition of Permanent Exit – Estimated Year of Failure



# Addition of Emergency Exit – Estimated Year of Failure



# Egress Analysis Conclusions

- § All platforms satisfy 4-minute test
- § Station fails 6-minute test under two scenarios
  - § Mezzanine East Entrance fails when East Platform serves Blue Line trains
  - § Mezzanine West Entrance fails when West Platform serves Blue Line trains
- § If Blue Line restricted to one platform, only one entrance would fail
- § Station fails with or without Expo Project