



TORONTO TRANSIT COMMISSION  
ENGINEERING DEPARTMENT

## Waterfront Transit Streetcar Connection: Exhibition Loop – Dufferin Gates Loop

April 10, 2019

# PDR Presentation for Exhibition Place Board of Governors

# Project Areas

## Dufferin Gate Loop

- Replacement of Existing Tracks
- Signalization
- New facilities for Streetcar and Bus
- Regrade Streetcar and Bus area to match Dufferin Street

## Liberty Village

- Area redevelopment

## Exhibition Place

- New connection to GO platforms
- New access building & tunnel

## Dufferin Bridge

- Replacement of Bridge
- Grade raise
- Protect for future streetcar extension, signalization

## Track Extension

- Connection of service between Dufferin Loop and Exhibition Place

## Exhibition Place

- New westbound platform and amenities
- Grade separated pedestrian crossings

## Exhibition Place

- BMO Expansion
- Existing and New events

## West Track Extension

- Protect for future extension

## Centennial Park

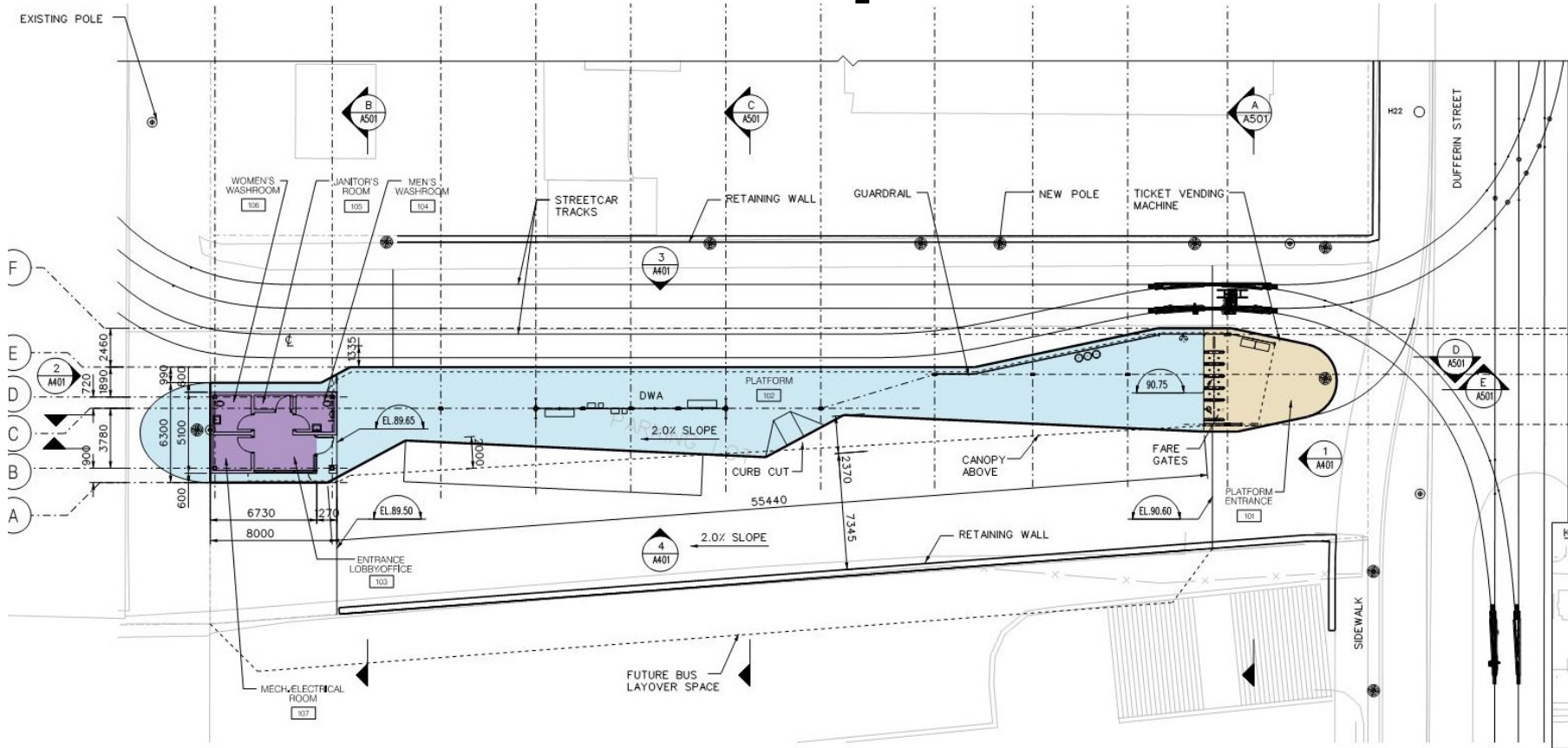
- New Stop
- Pedestrian connections to Park
- Pedestrian connections to Dufferin Street
- Protect for future westerly extension



# Dufferin Gate Loop

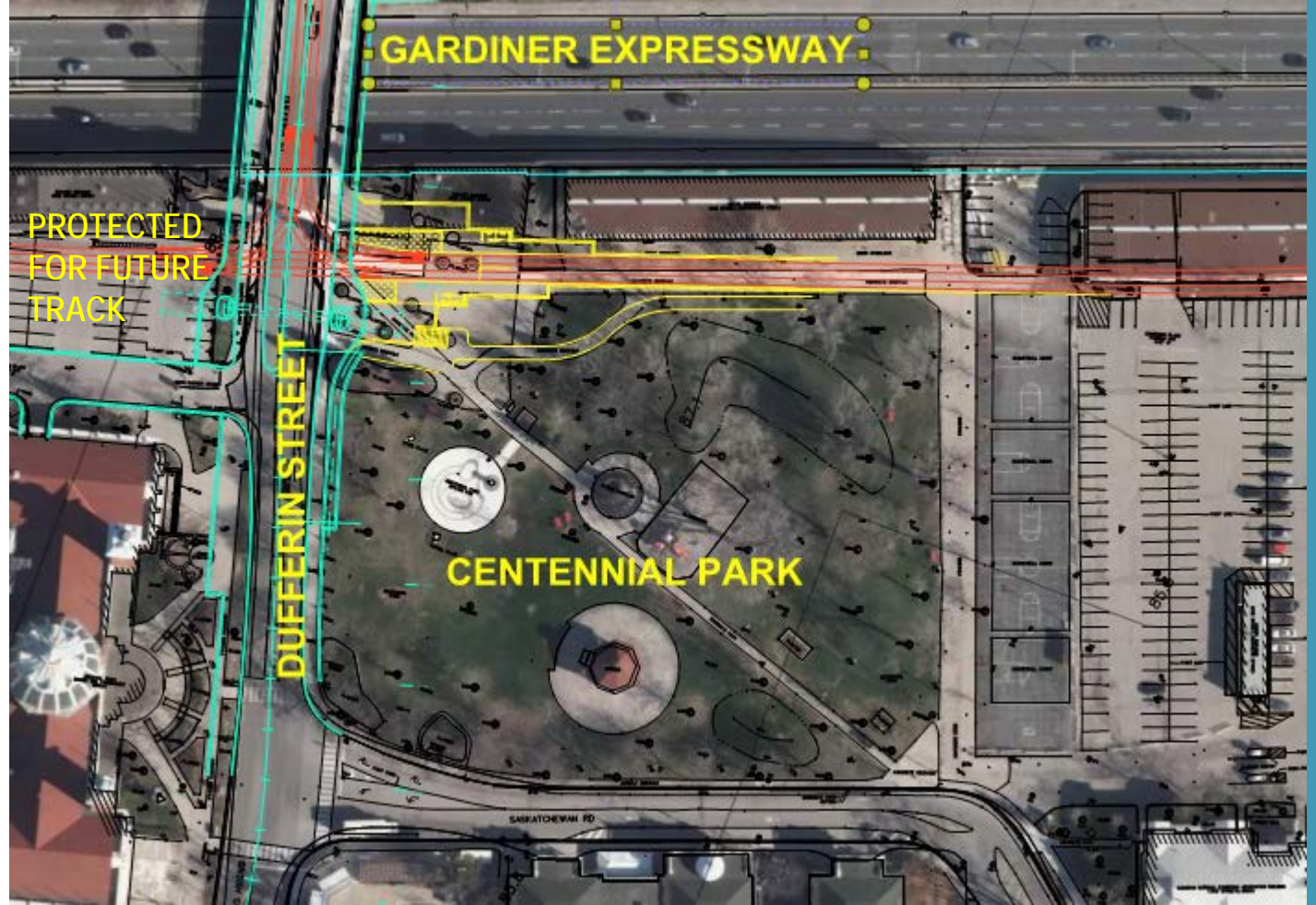


# Dufferin Gate Loop



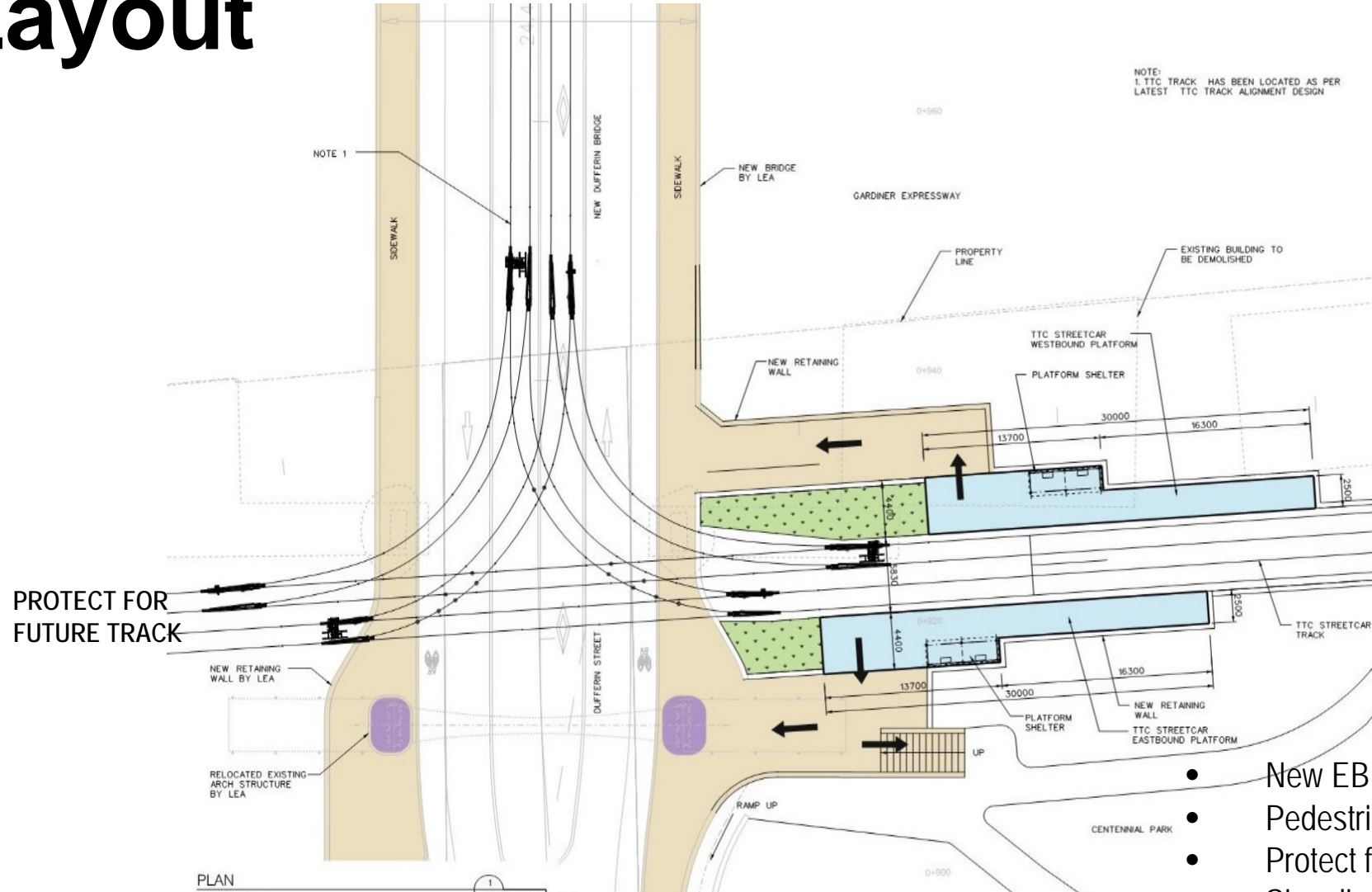
- New platform serving 2 streetcars, 2 articulated buses
- New surfacing in the loop area
- Accommodate day-to-day and special events
- Updated customer areas/shelters
- Constructed as part of the Dufferin Bridge replacement





# Centennial Park Stop

# Centennial Park Stop – Draft Functional Layout



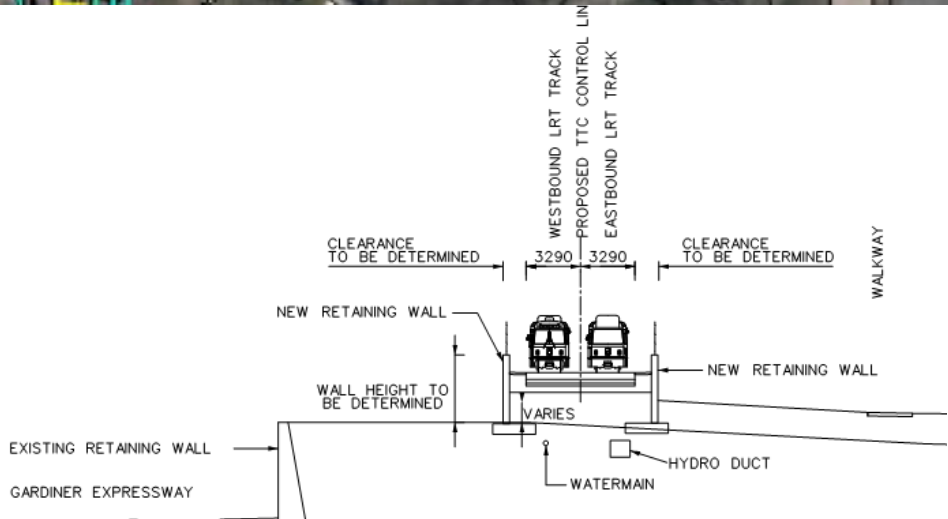
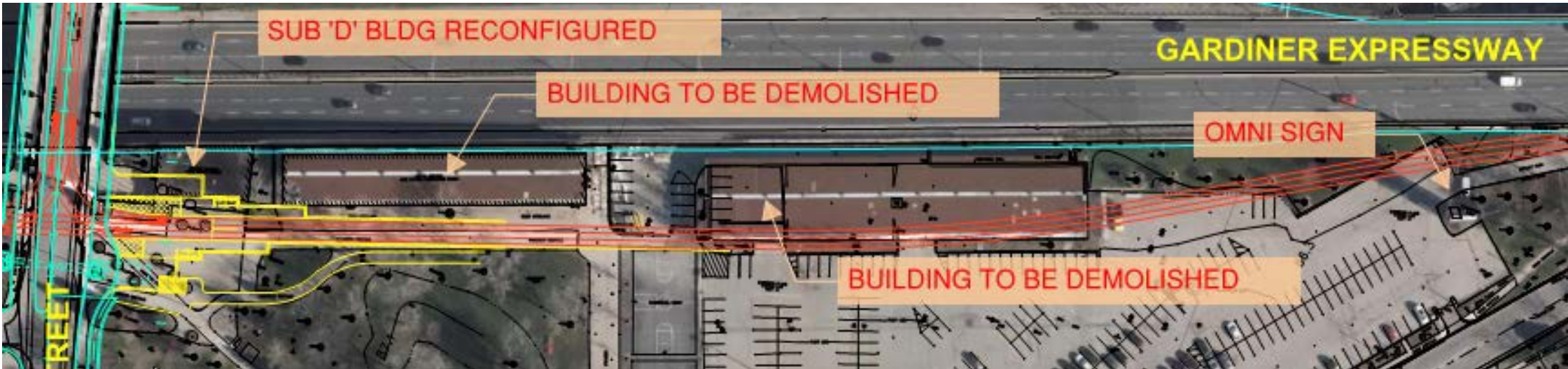
- New EB & WB platforms east of Dufferin Street
- Pedestrian connections into Centennial park
- Protect for westerly extension
- Signalized intersection to control pedestrians, cars, and inbound/outbound streetcars
- Under review by TTC



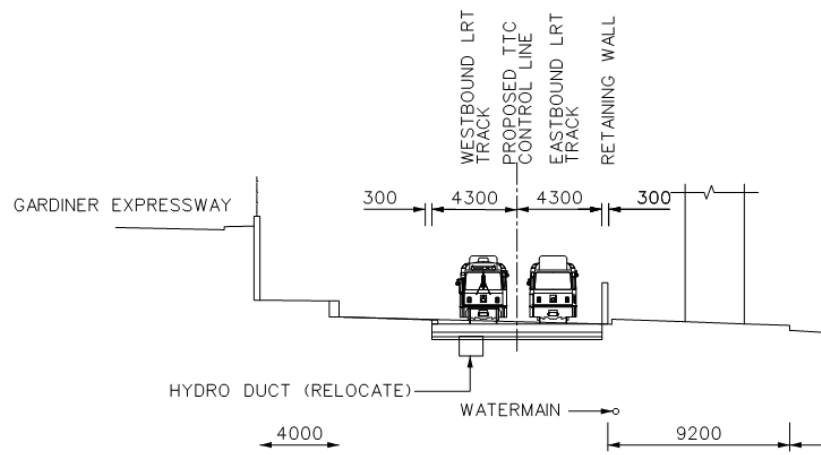


# Track Extension – Dufferin Loop to Exhibition Place Loop

# Track Extension

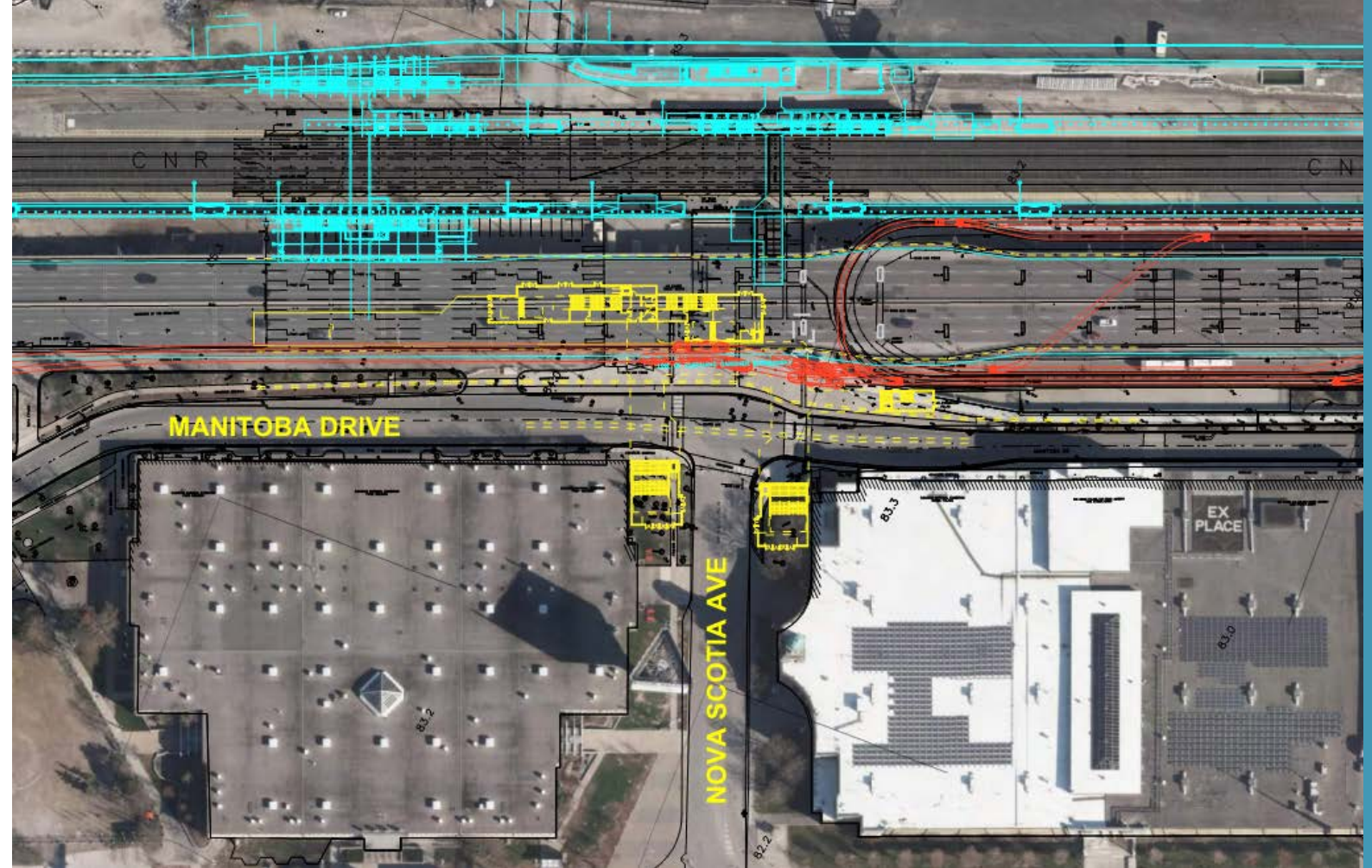


Near Dufferin Street



Near Exhibition Place

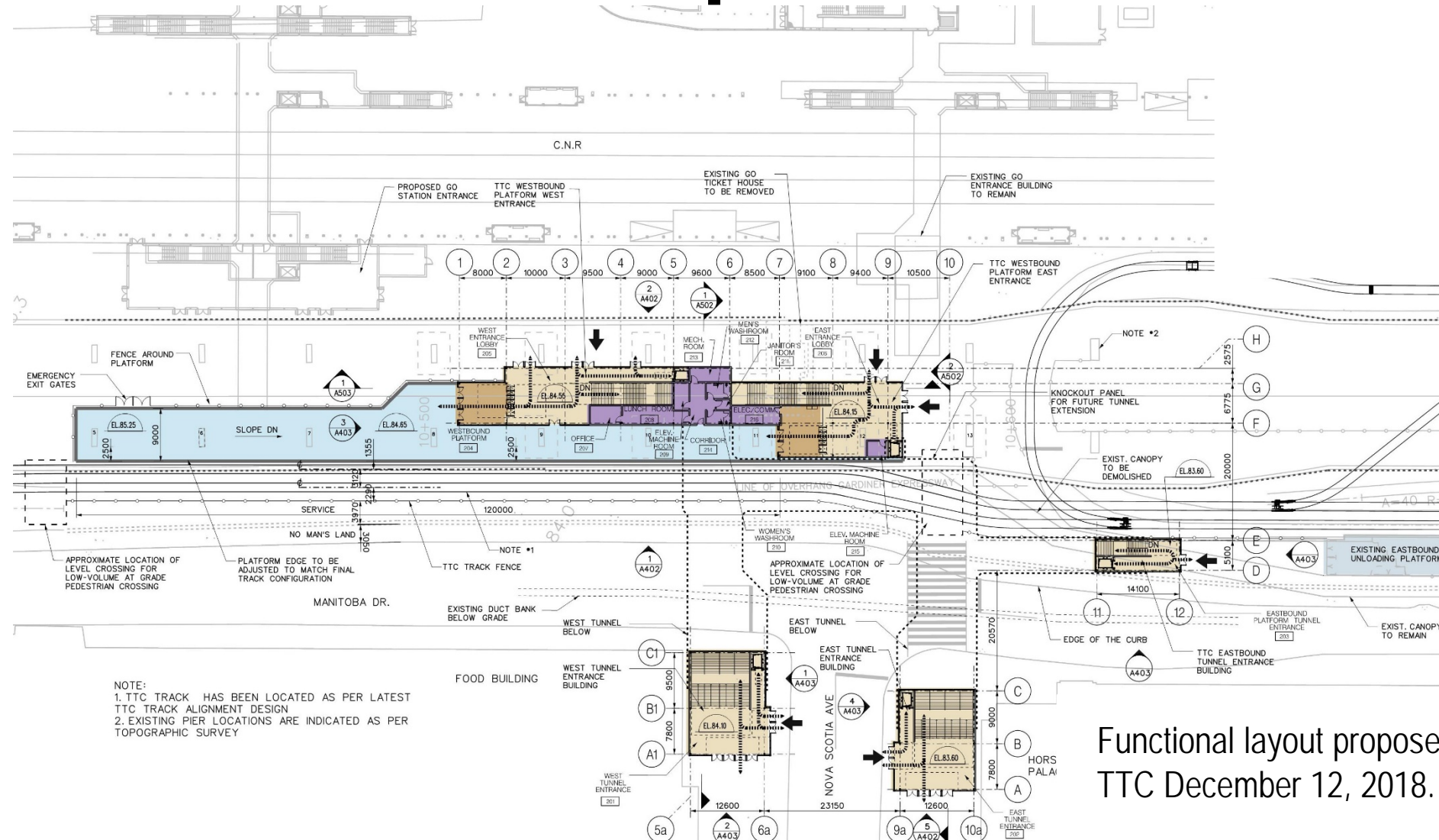




# Exhibition Place Loop



# Exhibition Place Loop - Ultimate

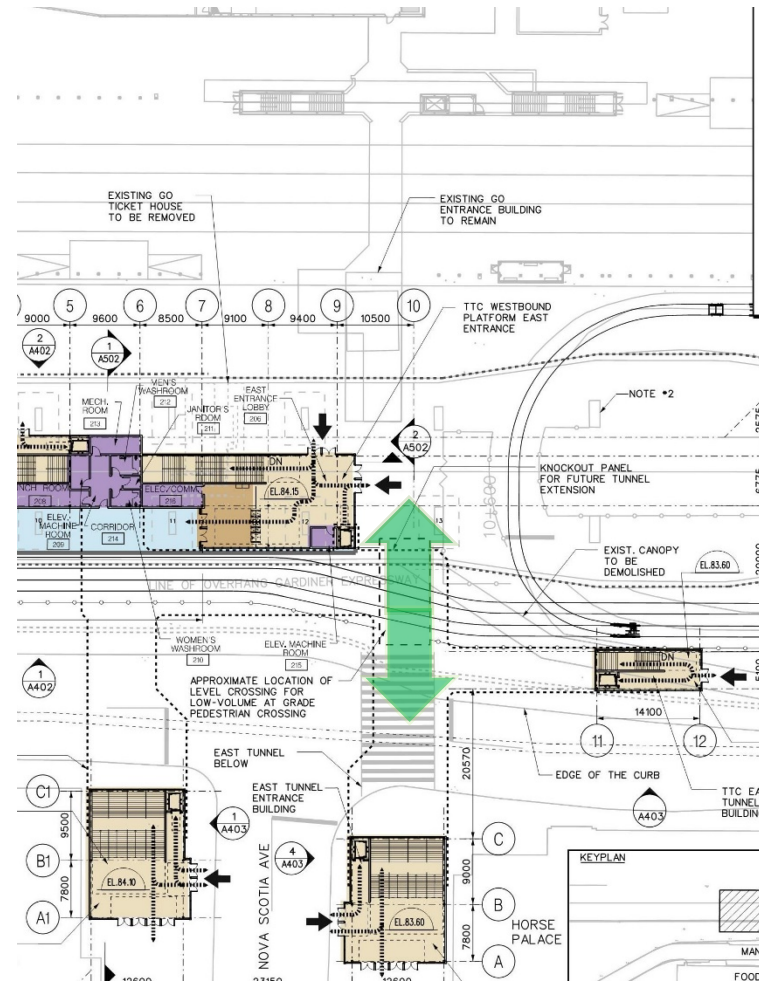
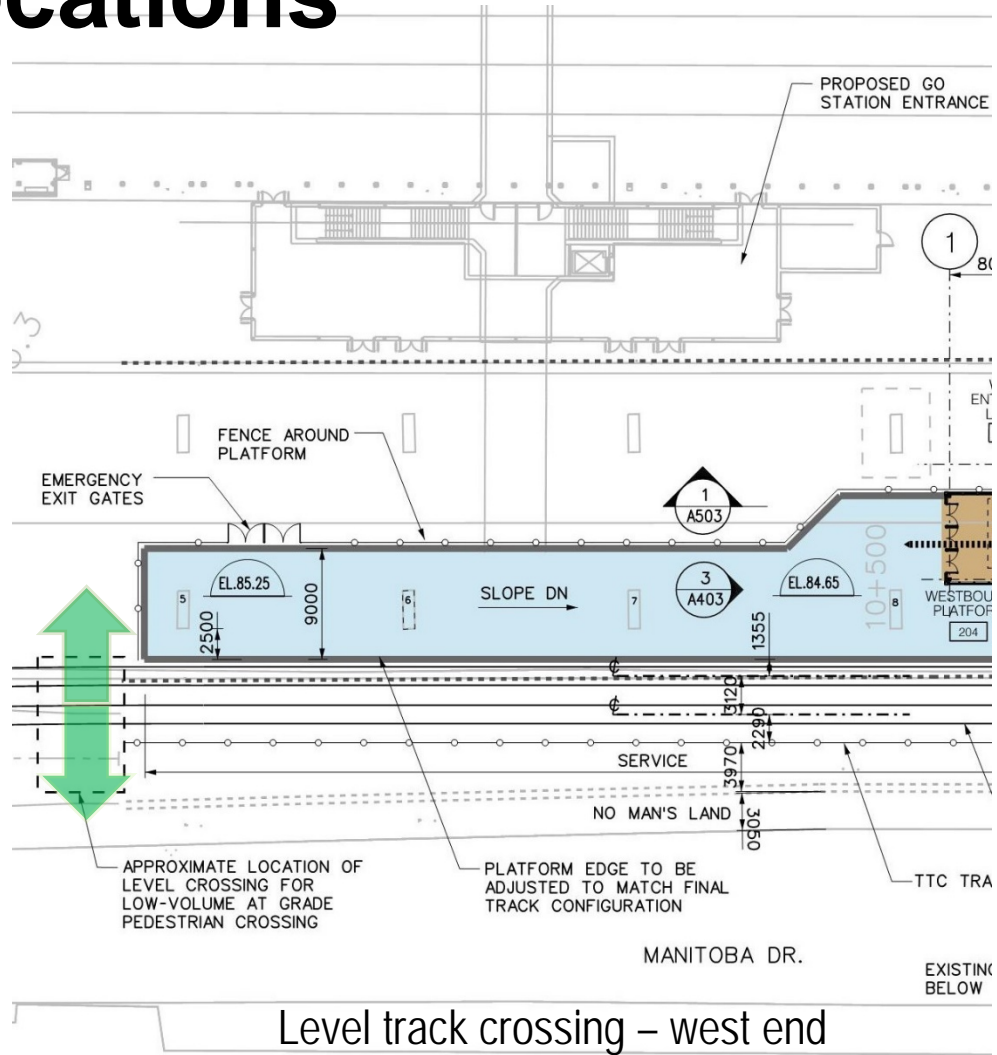


Functional layout proposed by  
TTC December 12, 2018.

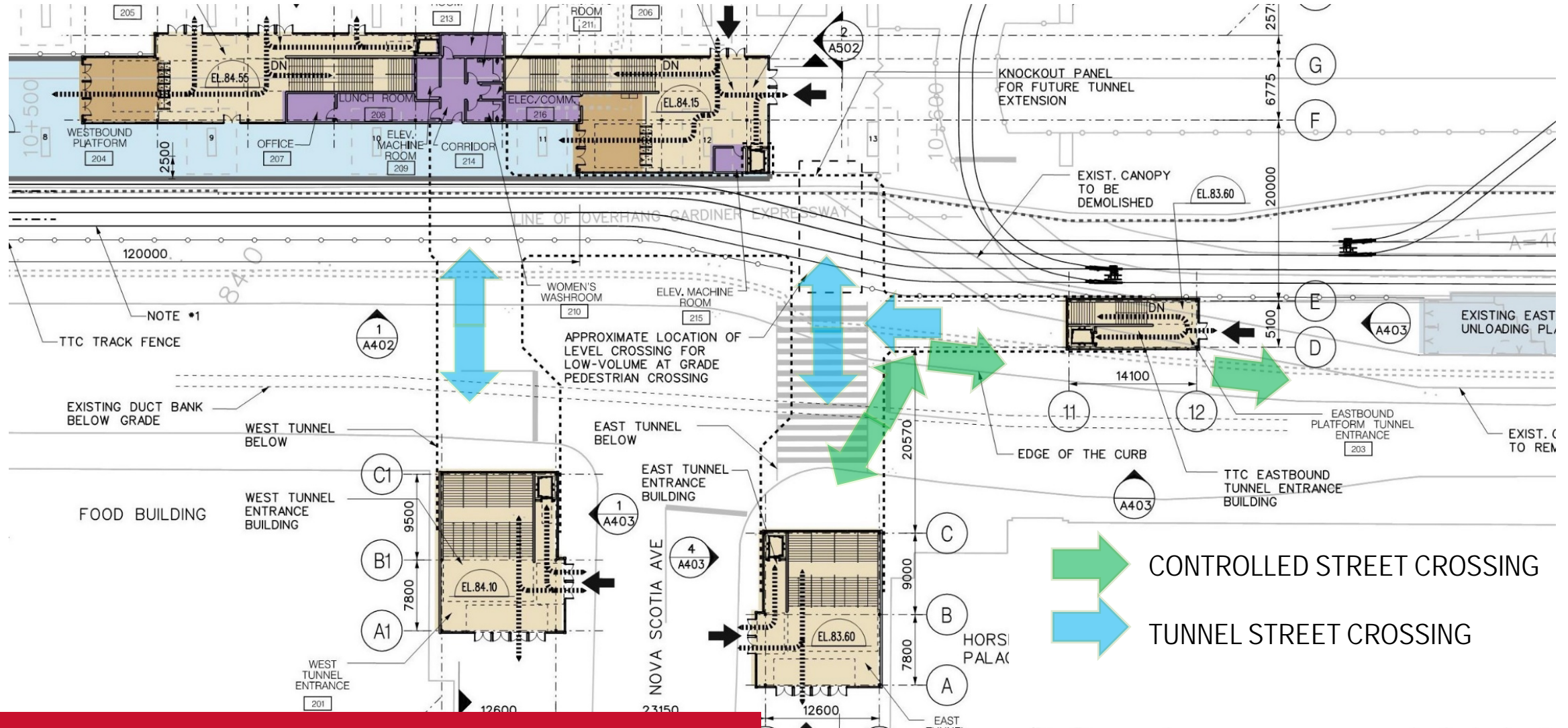






# Exhibition Place Loop – Daily service crossing locations



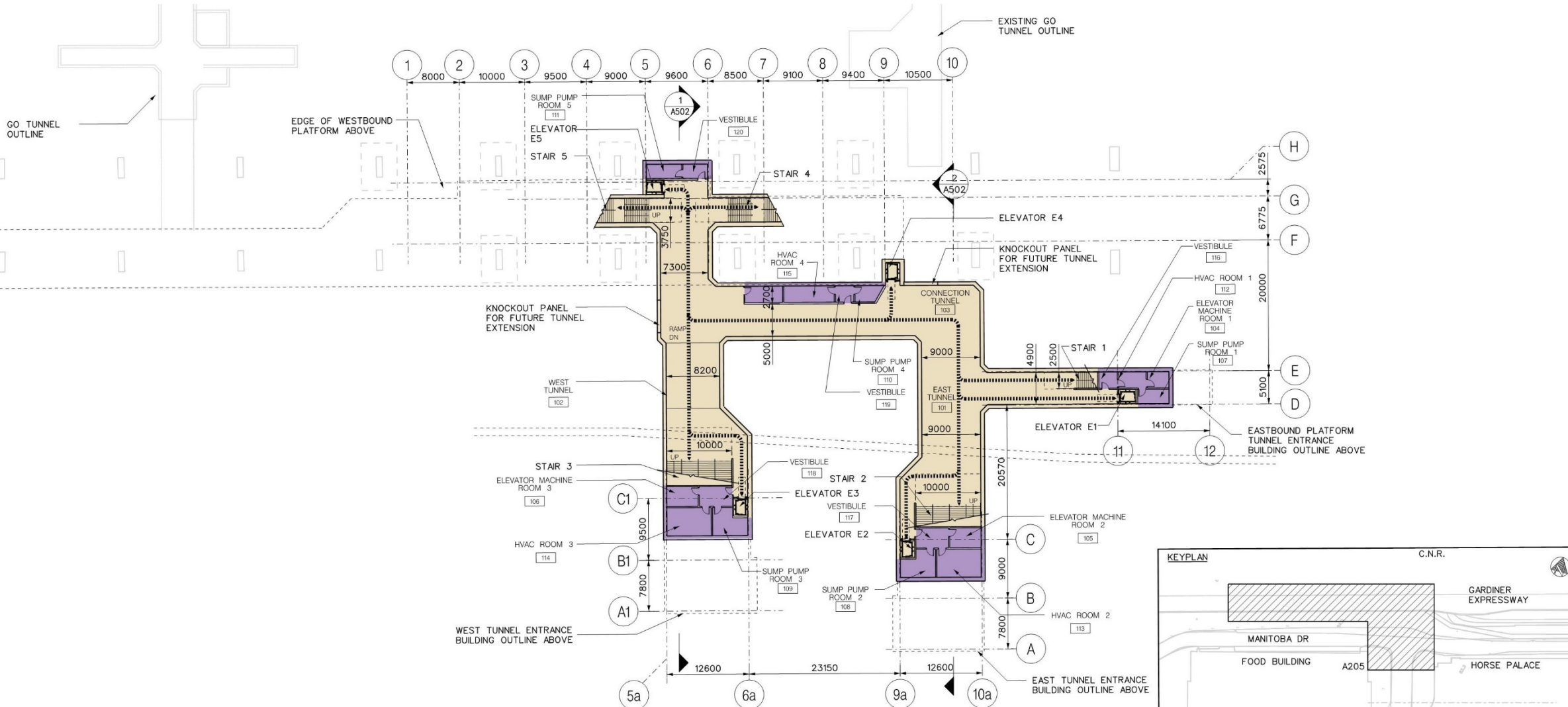
# Exhibition Place Loop – Busy and Special Event crossing locations



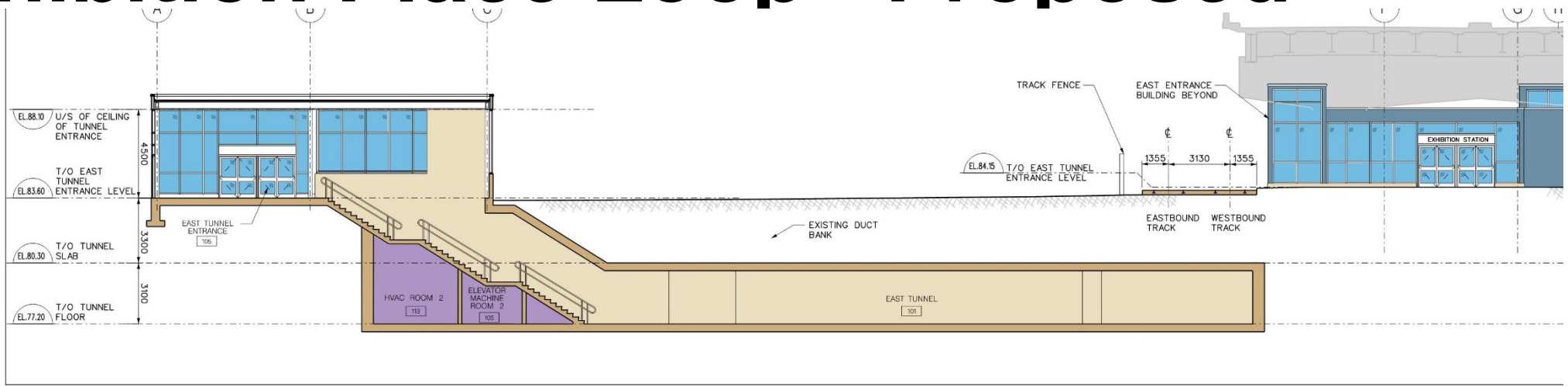
 CONTROLLED STREET CROSSING  
 TUNNEL STREET CROSSING



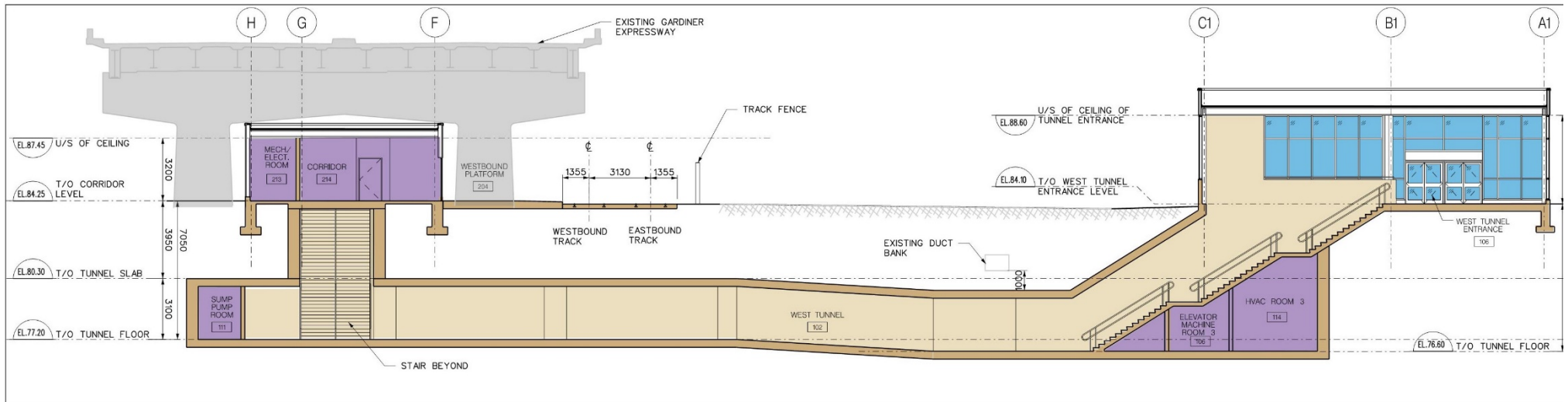
# Exhibition Place Loop - Proposed



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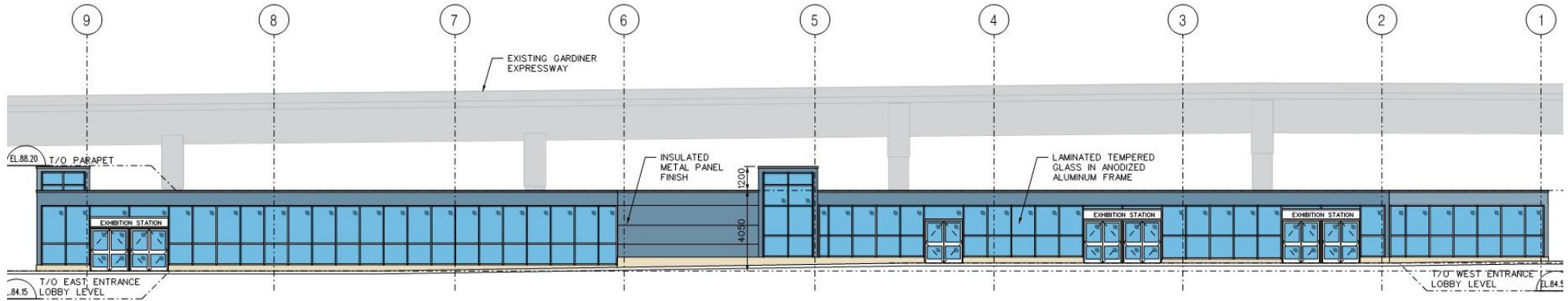
SECTION 2  
SECTION THROUGH EAST TUNNEL  
P6-16-A203



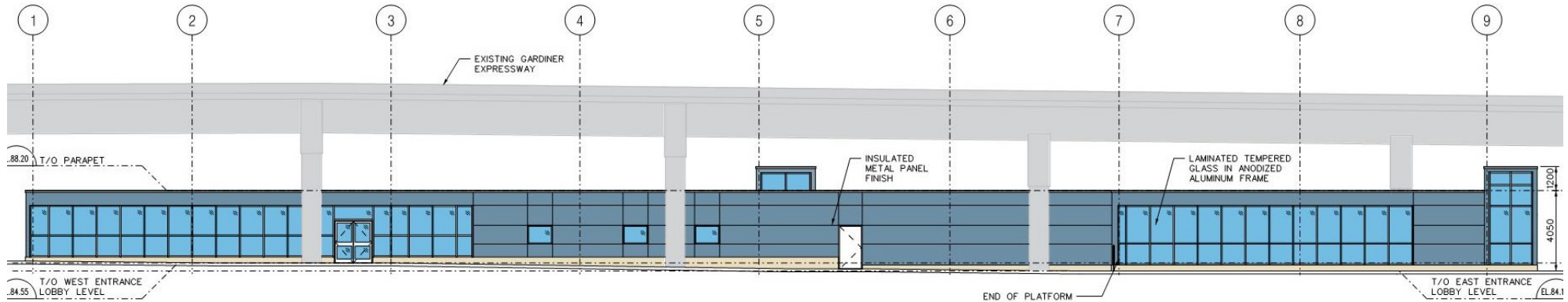
SECTION 1  
SECTION THROUGH WEST TUNNEL  
P6-16-A203



# Exhibition Place Loop - Proposed



EVIATION  
TBOUND PLATFORM ENTRANCE BUILDING - NORTH  
2  
P6-16-A203



EVIATION  
TBOUND PLATFORM ENTRANCE BUILDING - SOUTH  
1  
P6-16-A203



# Exhibition Place Loop – Concerns heard from stakeholders

- Size of circulation area between GO accesses and TTC platform
- High volume of users during special events
- Level track crossing for daily operations
- Possible heritage issues for tunnel entrances adjacent to Horse Palace and Food Building
- Providing Indy Car clearances to allow for streetcar operations during the race
- Robust pedestrian modeling to define location, number, width and access locations for grade separated crossings (tunnels) to serve high volumes at special events

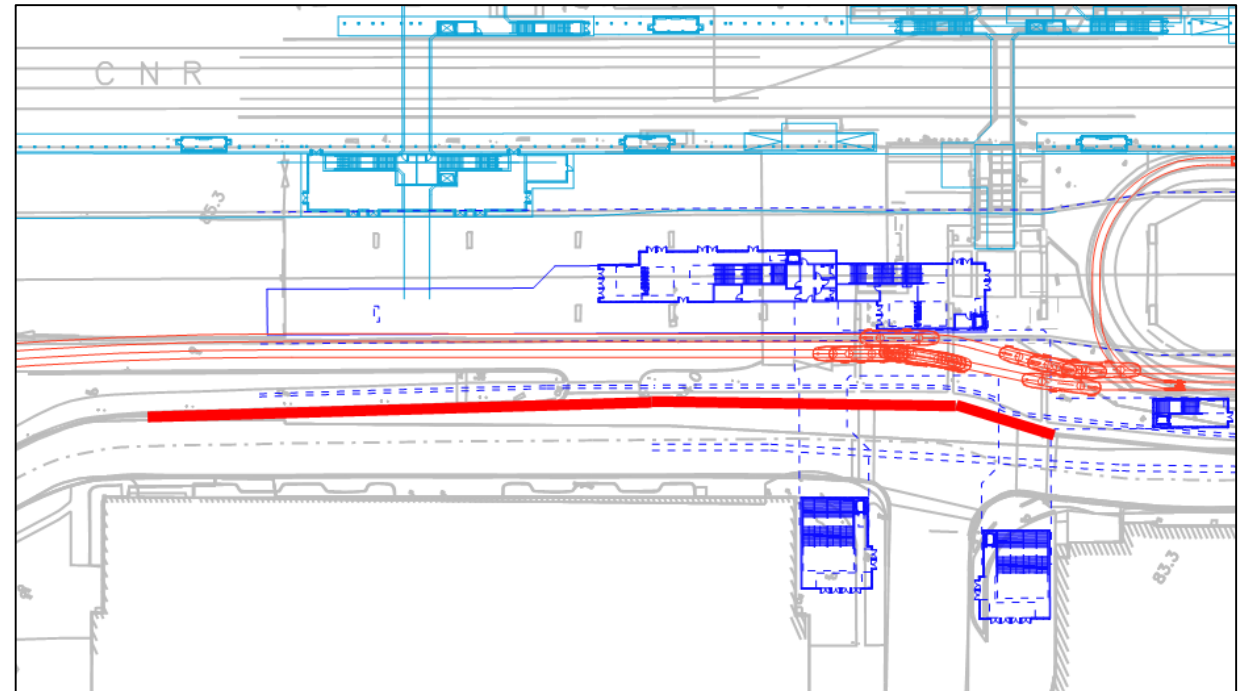
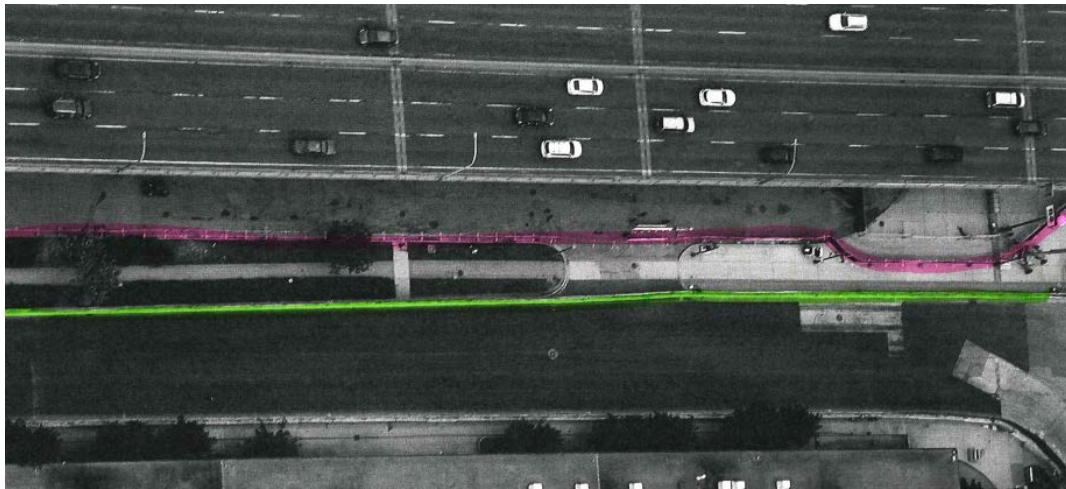




# Exhibition Place Loop – Indy Car

## Indy car safety requirements

- No-Man's Land - 10 ft from roadway curb
- Service/Emergency Access Road – 15 ft beyond the No-Man's land
  - Must be unobstructed for emergency vehicle use (fire code)
- Perimeter Fence



# Exhibition Place Loop – Pedestrian Modelling

Initial work: Reviewed the passenger flow capacity of the proposed station and tunnel design to identify potential deficiencies

3 Scenarios were examined:

- 15,000 Transit Passengers
- 25,000 Transit Passengers
- 75,000 Transit Passengers



# Pedestrian Modelling – Context

Data from: *Revised Transportation Strategy, Proposed BMO Expansion*, City of Toronto April 2015, MMM Group Limited (22,500 to 30,000)

Table 4.1 Surveyed Modal Split

Travel Mode	Modal Split	
	Surveyed by MLSE (July, 2013)	Surveyed by MMM (May 3, 2014)
Auto (Driver and Passenger)	49.2%	48.5%
Taxi	1.0%	5.8%
Drop-off/Pick-up	1.3%	3.3%
TTC Streetcar and Bus	22.5%	12.8%
GO Train	18.4%	21.2%
Walk	5.6%	7.8%
Bike	2.0%	0.5%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>

- MLS: modal split survey with TFC fans in July 2013. (40.9% transit)
- MMM: modal split survey during TFC match May 3, 2014 (34% transit)

BMO Seating Capacity – 30,000 (up to 40,000 with temporary seating)

Attendees using transit:

$$30,000 \times 41\% = 12,300 \quad 40,000 \times 41\% = 16,400$$

$$30,000 \times 34\% = 10,200 \quad 40,000 \times 34\% = 13,600$$

Table 11.1 Estimated Transit Capacity during Special Events

Route	Peak Hour Crowding Standard/Capacity (No. of Passengers)	Transit Headway (Frequency of Service)	Capacity per hour (No. of Passengers)
29 Dufferin Articulated Bus	77	3 min (20 buses/hr)	1,540
511E Bathurst Express Bus	51	5 min (12 buses/hr)	612
193 Dundas West Station Express Bus	51	5 min (12 buses/hr)	612
509 Harbourfront (streetcar)	130	3 min (20 streetcars/hr)	2,600
511 Bathurst (streetcar)	130	3 min (20 streetcars/hr)	2,600
Lake Shore GO Train - Westbound	1,944 <sup>(1)</sup>	30 min (2 trains/hr)	3,888
Lake Shore GO Train - Eastbound	1,944 <sup>(1)</sup>	30 min (2 trains/hr)	3,888
<b>Total</b>			<b>15,740</b>

(1) Capacity of GO Train varies depending on the number of bi-level coaches on each train. 1,944 represents the maximum seated capacity per train.

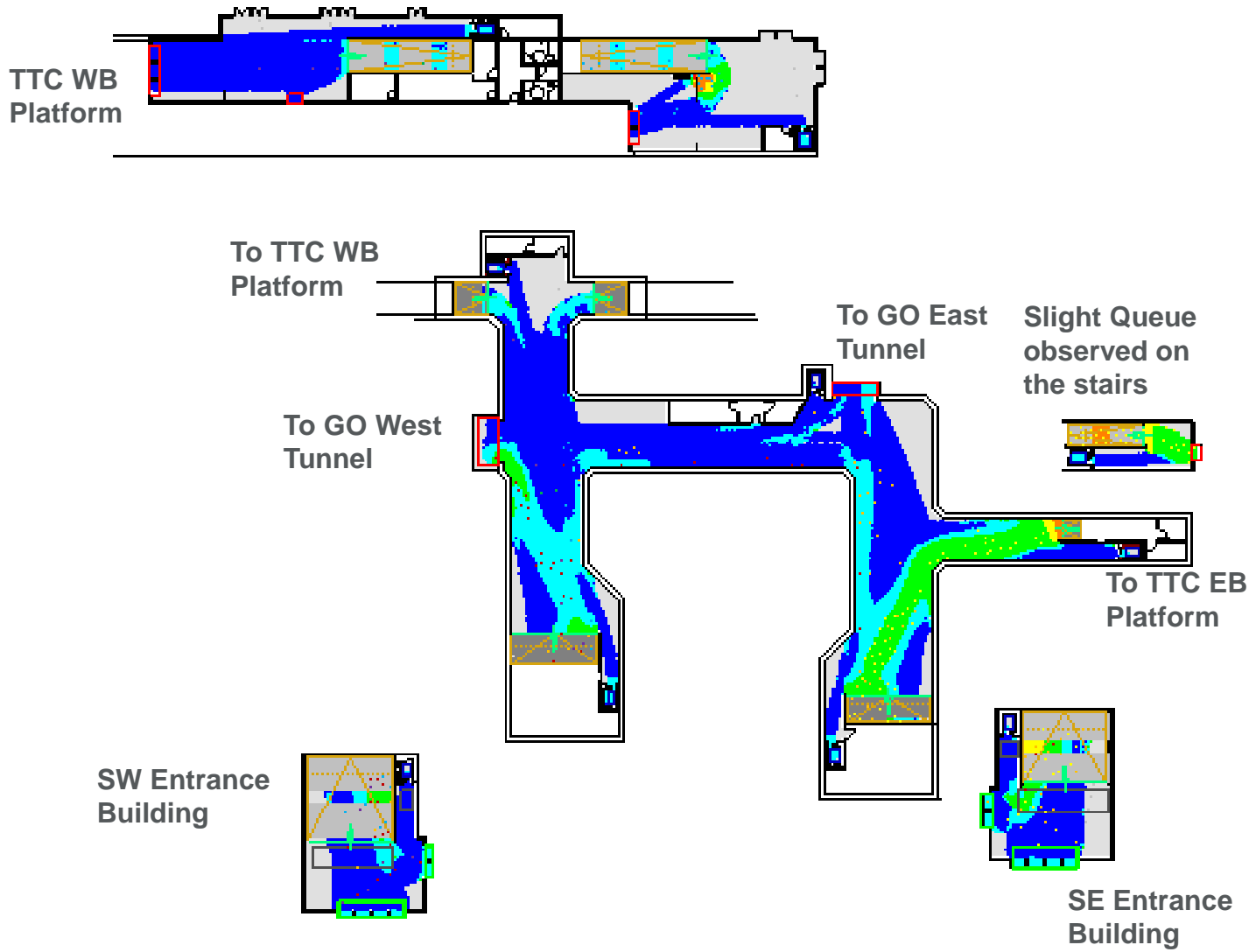
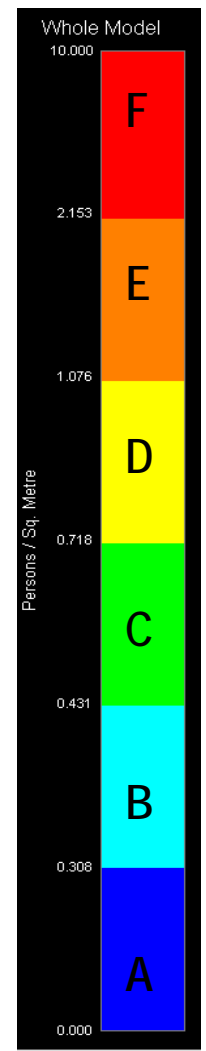
Table 11.2 Projected Future Transit Ridership vs. Estimated Transit Capacity

Design Attendance Level: 22,500			
Transit Service	Modal Split (Surveyed by MLSE)	Projected Transit Ridership (No. of Passengers/hr)	Available Transit Capacity per Hour (No. of Passengers)
TTC Bus/Streetcar	22.5%	5,063	7,964
GO Train	18.4%	4,140	7,776
<b>Total</b>	<b>40.9%</b>	<b>9,203</b>	<b>15,740</b>



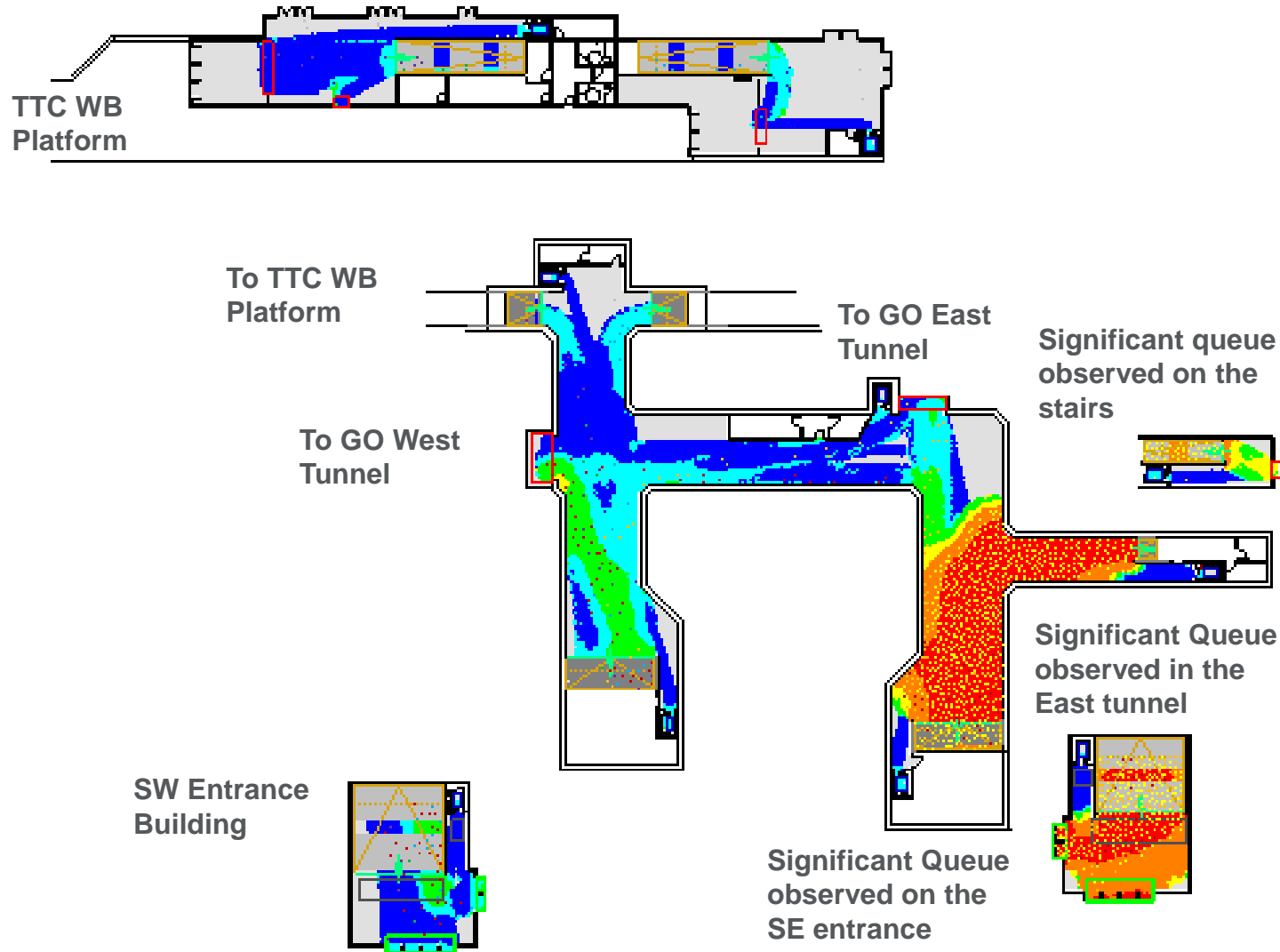
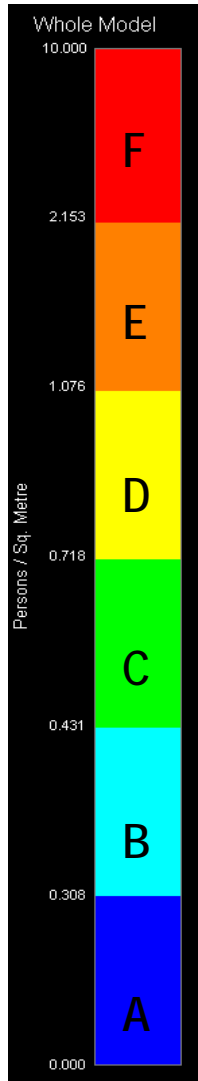


# Scenario 1 - PM Event Peak 15-min Cumulative Mean Density (Fruin Walkways)



- ❖ Scenario 1
  - The proposed station/tunnel design can accommodate 15,000 passengers during the peak hour
  - Platform Level: Minor queues are observed in front of the stairs to the north-east exit (to TTC WB platform). All other entrances and exits are operating at good conditions;
  - Tunnel Level: Minor queues are observed on the stairs leading to the TTC EB platform. Overall both sides of the tunnel operate at good LOS.

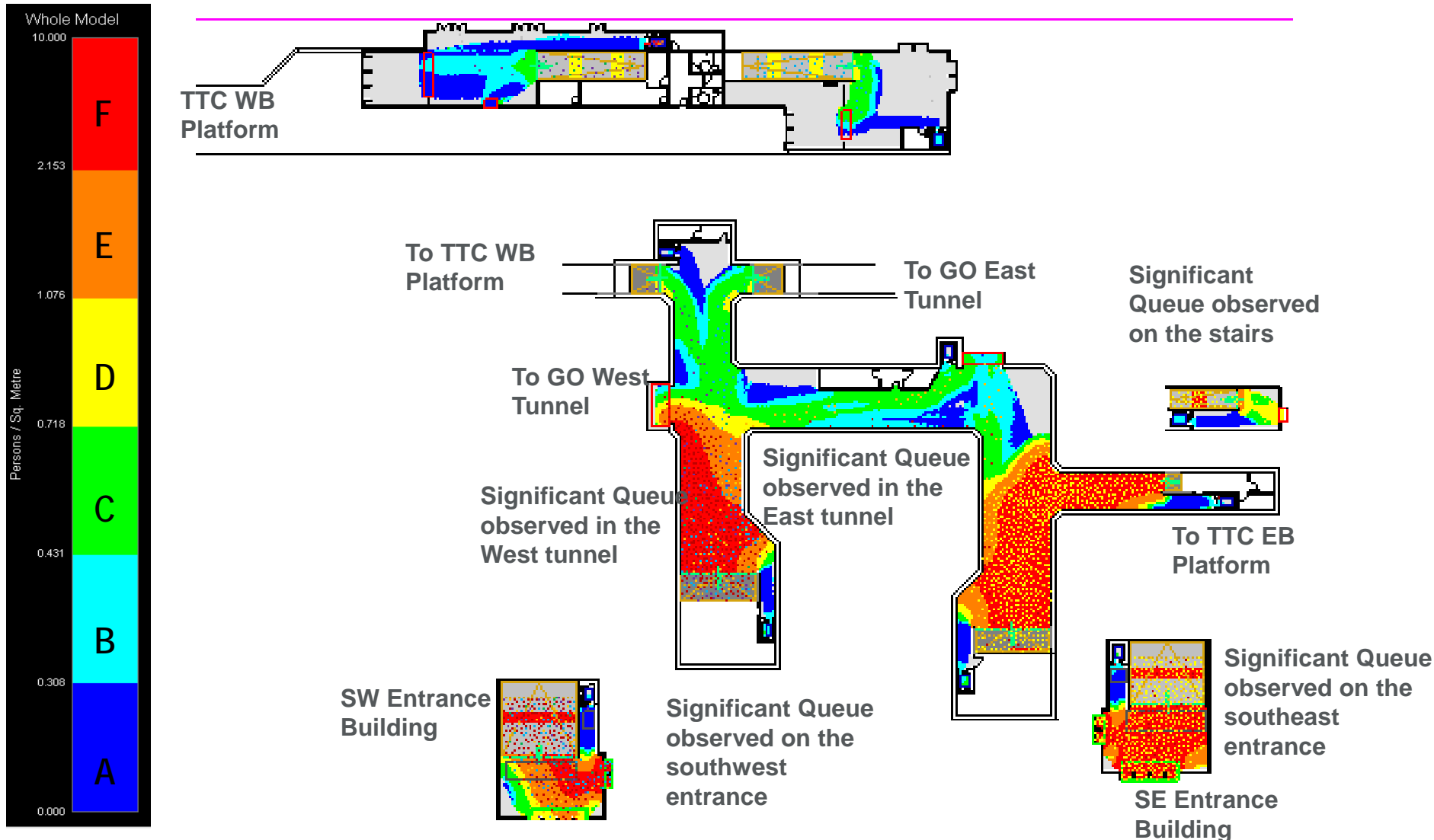
# Scenario 2 - PM Event Peak 15-min Cumulative Mean Density (Fruin Walkways)



- ❖ Scenario 2
  - The east tunnel would reach its capacity when passenger volumes approach 25,000;
  - **Platform Level:** Significant queues are observed on the east exit and the southeast entrance;
  - **Tunnel Level:** Significant queues are observed at the east tunnel and the stair leading to the TTC EB Platform. The main reason for this is because the stair has reached its capacity. It is recommended to either widen the stair to accommodate more flow/capacity or to add another stair further east to distribute the passengers.

# Scenario 3 - PM Event Peak 15-min Cumulative Mean Density (Fruin Walkways)

- ❖ Scenario 3
  - Sensitivity analyses indicate that both tunnels could reach its capacity with 75,000 passengers;
  - **Platform Level:** Significant queues are observed on the east exit and the southeast entrance;
  - Significant queues also observed on the southwest entrance;
  - **Tunnel Level:** Significant queues are observed at the west tunnel and the stair which connects to the east exit. Significant queues are observed at the east tunnel due to the capacity issue;
  - The southwest entrance is predicted to reach its capacity first before the west tunnel reaches its capacity. The maximum capacity for the southwest entrance should be between 30,000-35,000.





# Next Steps

- **Complete enhanced pedestrian modeling**
- **Continue with Stakeholder outreach/coordination**
- **Optimize design elements at Exhibition Place for:**
  - Access opportunities,
  - Crossing location(s) & configuration
  - Capacity
- **Complete design at Centennial Park**
- **Complete 30% designs**
- **Update the Preliminary Design Report (fall 2019)**

