



Tel Aviv Metro Project CONFERENCE





MRS. YODFAT AFEK ARAZI
NTA – CHAIRWOMAN



MR. ITAMAR BEN MEIR
NTA – CEO



MRS. DANA DOVER
MOF – BUDGET DEPARTMENT



The Tel Aviv Metro Project

Economic Importance and Funding Framework

Dana Dover

Head of Infrastructure Team
Budget Department, Ministry of Finance

BERLIN

2026

Tel Aviv Metro Area Is Israel's Economic Center



Tel Aviv METROPOLITAN AREA

62%

of Israel's business GDP

is generated in the Gush Dan metropolitan area

#1 globally in unicorns per capita

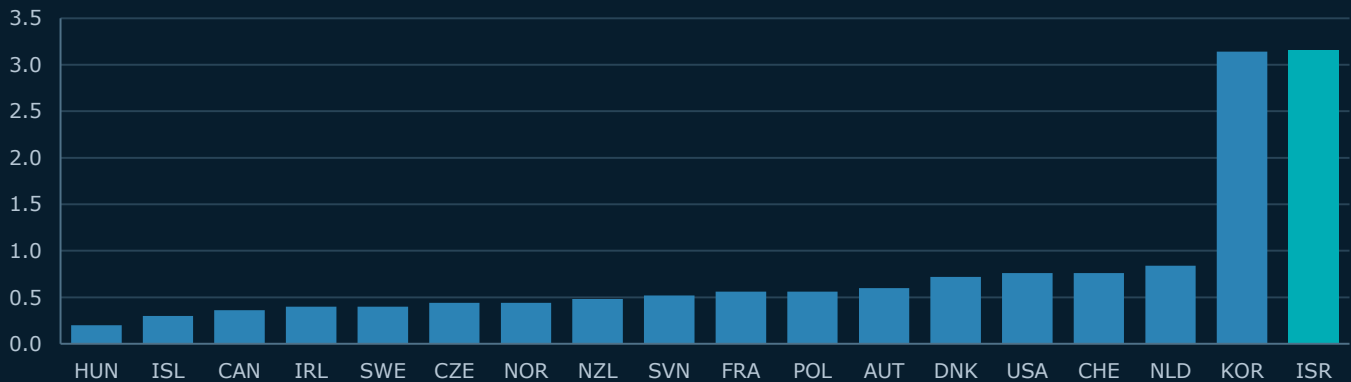
A major center for technology companies and R&D activity

Severe Congestion in Tel Aviv



Road traffic intensity, 2022

Million vehicle-km per road-km



16th / 500

Greater Tel Aviv's congestion rank among cities worldwide

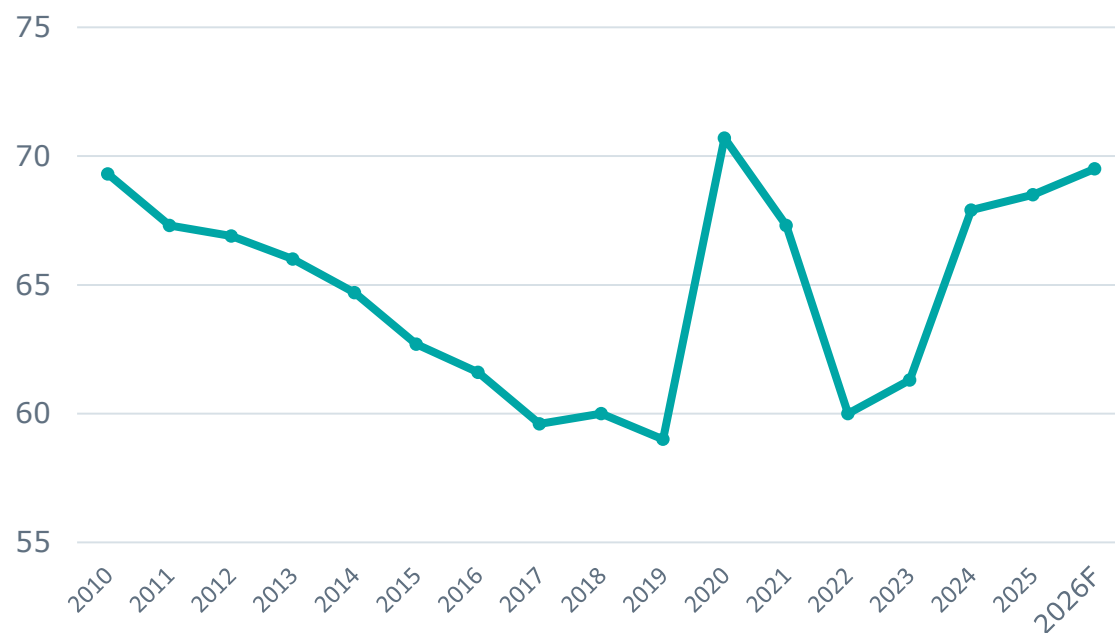
NIS 25bn

annual congestion cost in 2040 without the Metro

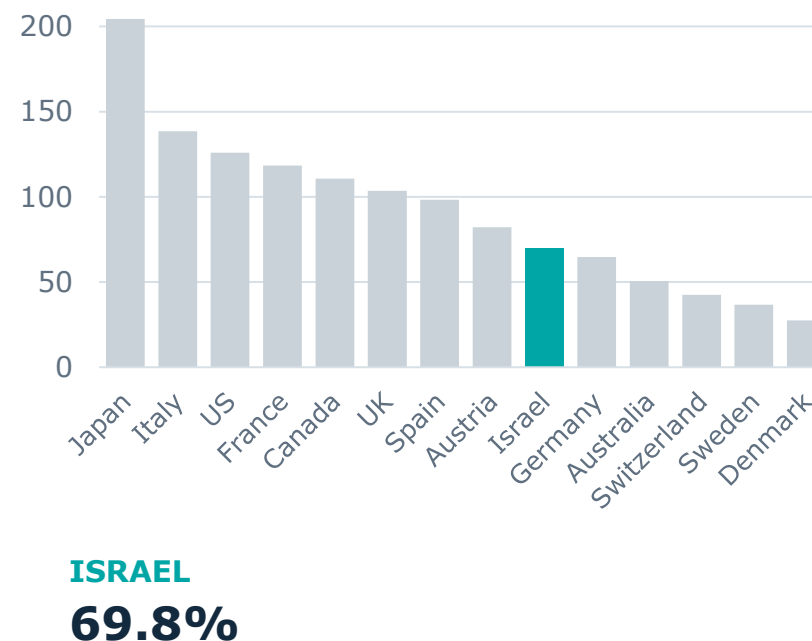
Sources: OECD, 2023; TomTom, 2021; Tel Aviv Metro Economic, Social and Urban Impacts Report, 2021

A Strong Economy with Debt Below Many Advanced Economies

Debt-to-GDP ratio (%), 2010–2026F



International comparison, 2026



A Diversified Funding Package Supports Stable Delivery

TEL AVIV METRO
NIS 180bn
≈ USD 60bn

50% STATE BUDGET
NIS 90bn

50% PROJECT-SPECIFIC
FUNDING SOURCES
NIS 90bn



Metro Funding Levy



Increased Betterment Levy



Israel Land Authority
Revenues



Congestion Charge
Revenues



Local Authority
Contributions



The Tel Aviv Metro Is Underway

We invite you to take part in delivering Israel's largest infrastructure project

Dana Dover

Budget Department, Ministry of Finance



MRS. OSHRAT DAVID DAKAR
MOF – ACCOUNTANT GENERAL

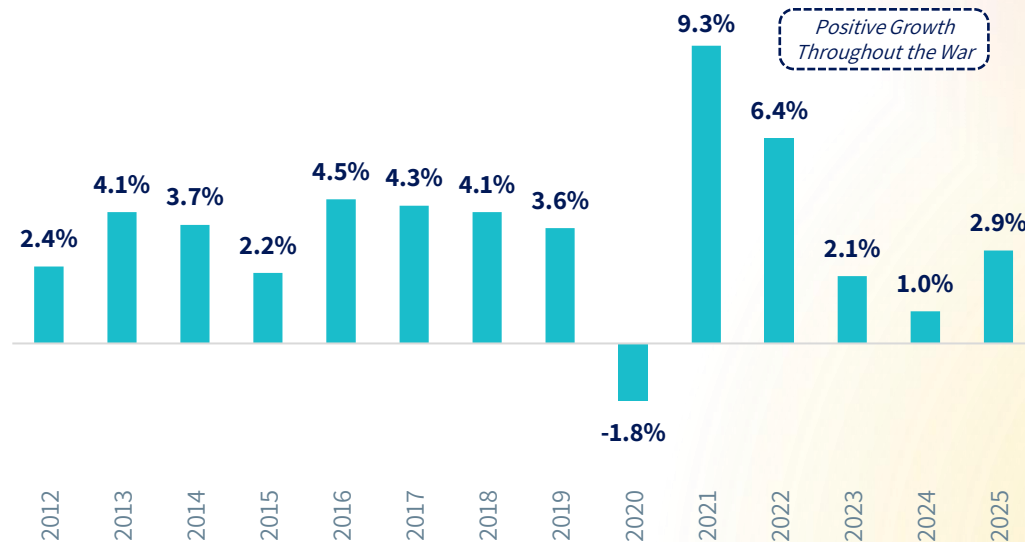


Israeli Infrastructure Opportunities ►

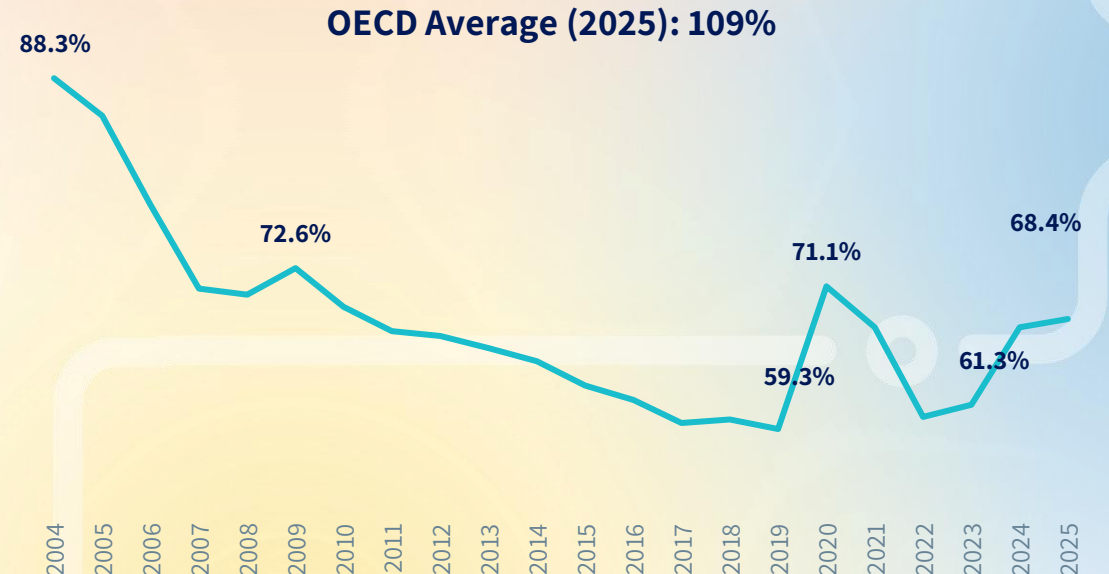
September 2026

Israel proves resilience through times of crisis

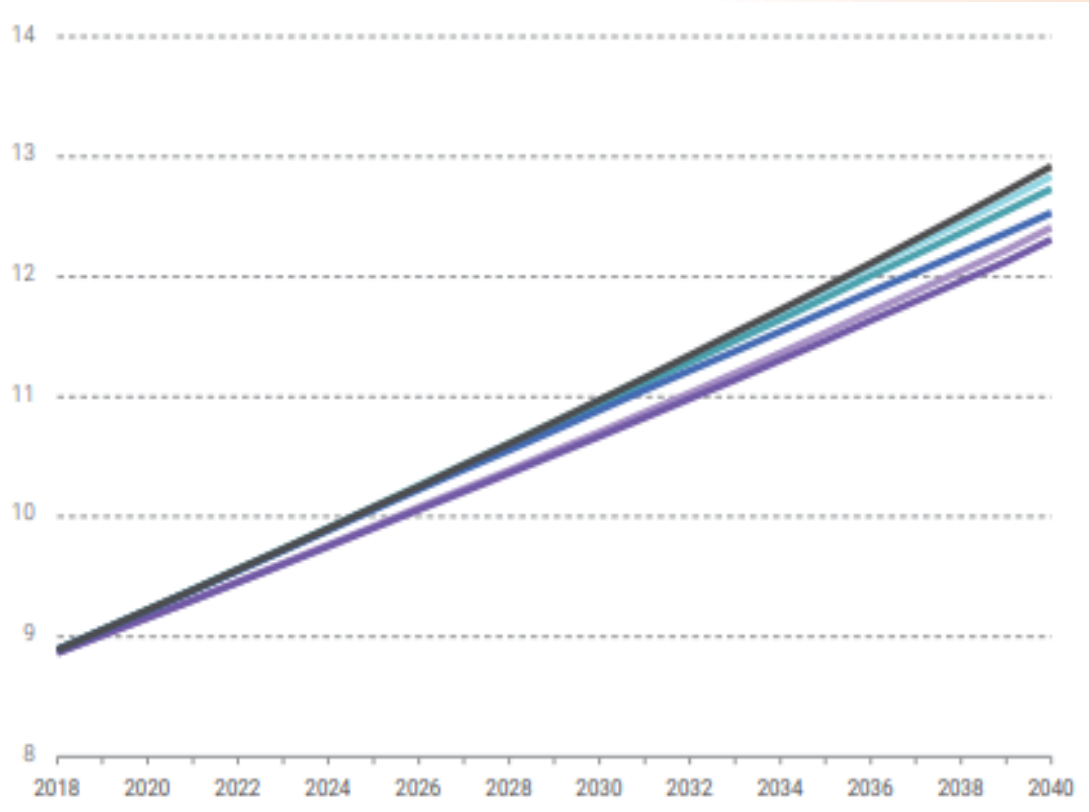
Real Quarterly GDP Growth Rate %, annualized



Debt-to-GDP (General Government) % of GDP



Population Growth

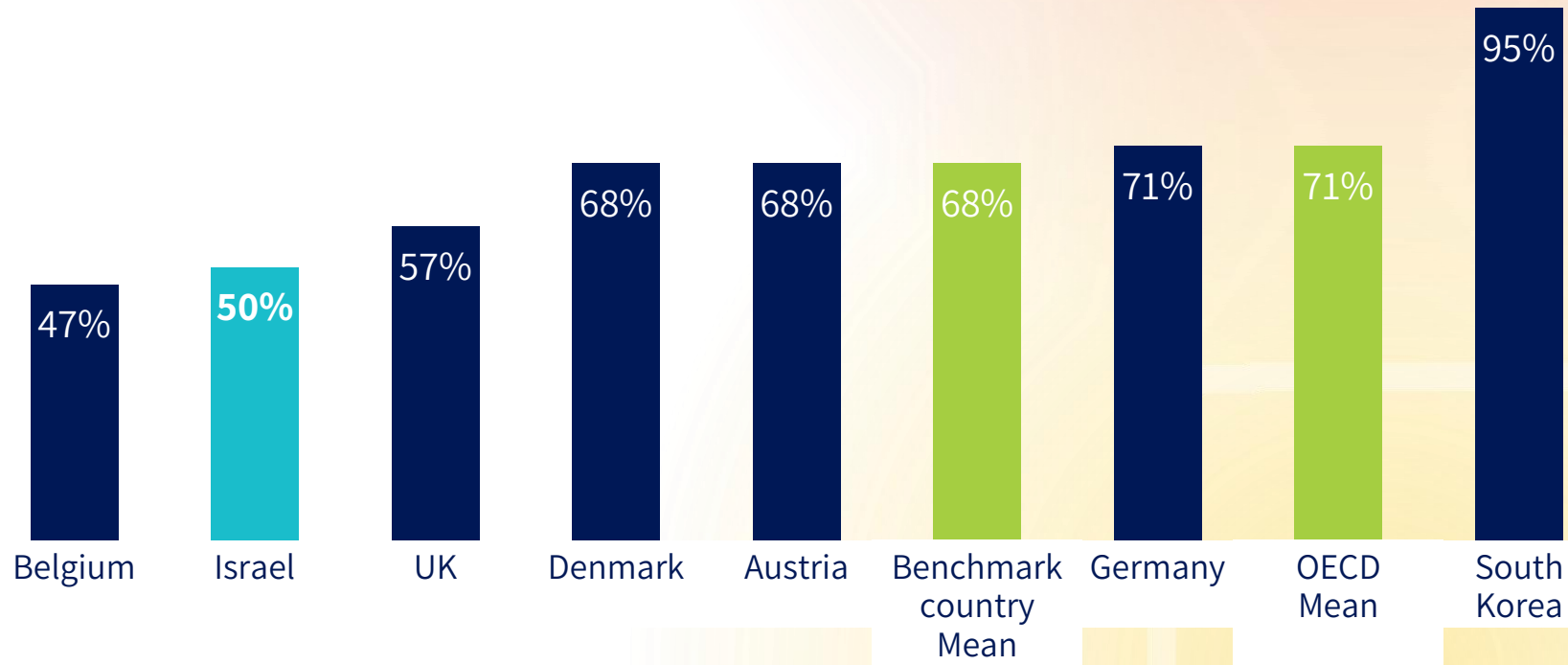


Israel's Population is set to increase to a number between 12.3 Million and 12.9 Million Citizens by the year 2040

**That is between
21%-27%
in 15 Years**

Israel faces infrastructure deficit

Infrastructure Stock (% of GDP)



Israel Views Infrastructure as a Growth Generator

Expected investments in the coming decades:

**NIS
500
Billion**



Metro
NIS **180** billion



Roads
NIS **25** billion



Water Infrastructure
NIS **28** billion



Israel Railways
NIS **65** billion



Aviation
NIS **12** billion



Construction
(Health, defense,
Public Construction)
NIS **31** billion



LRT
NIS **65** billion



Power
(Generation,
Distribution, and
Transmission)
NIS **122** billion



Waste
NIS **16** billion



Main Opportunities



Complementary Airport to Ben Gurion Airport

- 20,000,000 Passengers
- The tender is structured as a Public-Private Partnership (PPP) tender
- The airport will be operated by a private concessionaire
- We are seeking bidders with proven experience in airport operation





NIS 65 Billion
in Heavy rail investment

- Electrification
- New Railroads
- Rolling Stock
- 2050 Expansion path

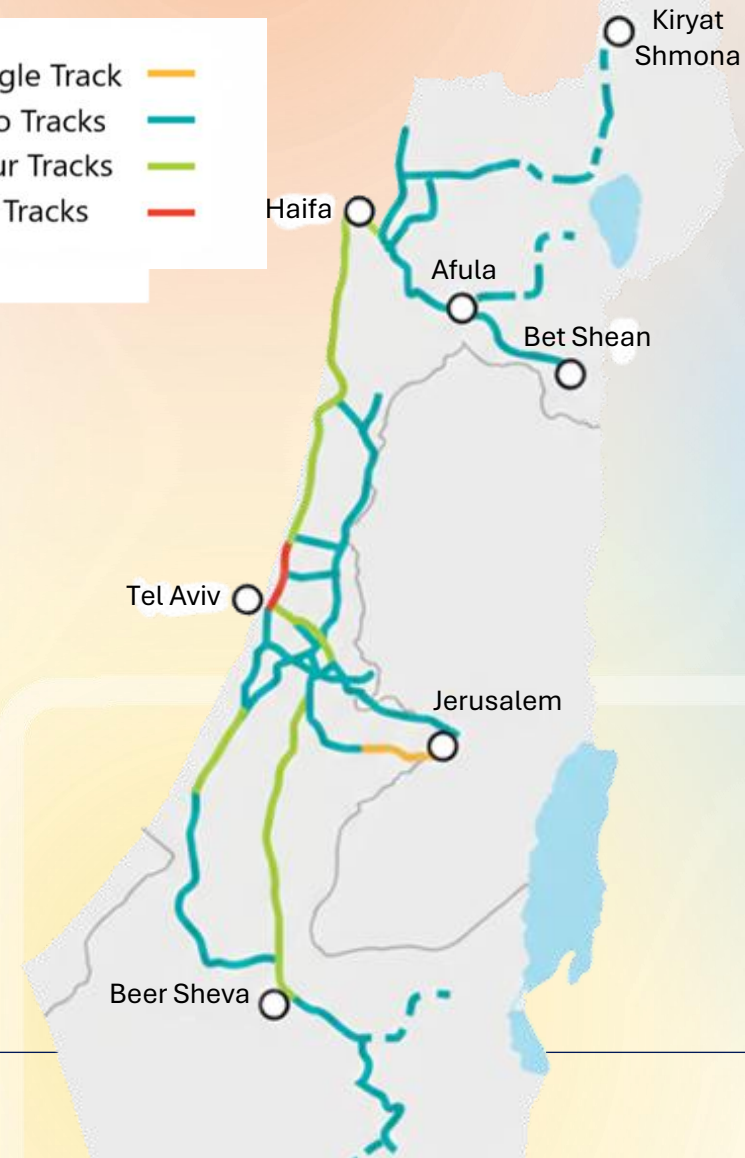
NIS 65 Billion



An addition of 400 km of tracks

The railway development plan for 2040

Single Track —
Two Tracks —
Four Tracks —
Six Tracks —





Light Rail Transit



NIS 65 Billion
in Light Rail investment

- Jerusalem LRT Network
- Dan Metropolitan Network
- Haifa-Nazareth LRT Line

NIS 65 Billion





The Water Sector

Desalination Plants

- Emek Hefer 400 MCM
- Ashkelon 220 MCM
- Shafdan 165 MCM

NIS **14** Billion

Water Authority Projects

- Expansion of the national Transmission and distribution networks
- Expansion of wastewater treatment facilities

NIS **14** Billion

By the end of 2026, With the addition of Ashkelon and Emek Hefer Plants,

90% of Israel's potable water will be from Desalination!



Overall NIS 28 Billion in Water investments



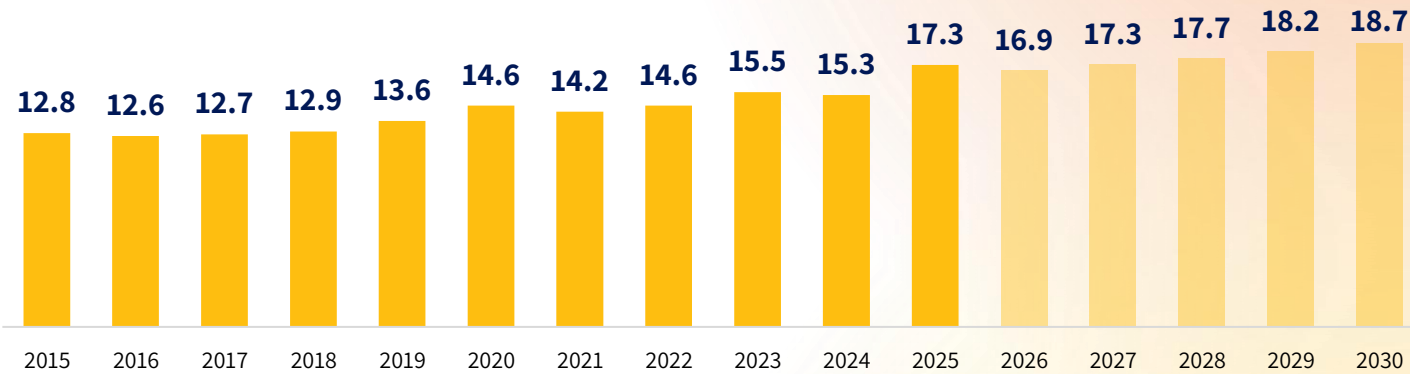
What we're looking for:

- Civil Engineering experts
- Desalination Experts
- Long-term operation experts
- Energy generation experts

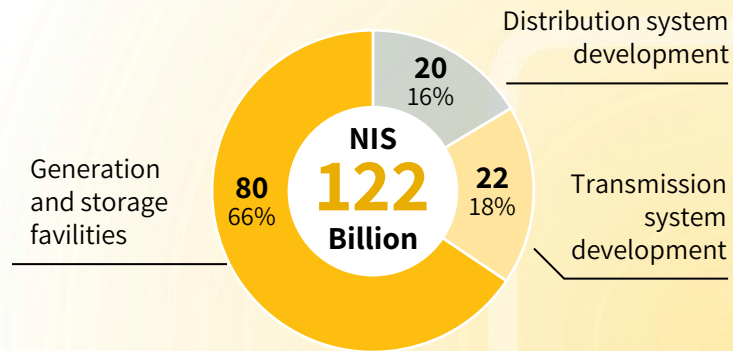


The Energy Sector

An Ever-growing demand for electricity



19 combined cycle power plants (CCGT) with a capacity of 670–900 MW each by 2045



What we're looking for:

- Power station EPCs and Operators
- Solar Energy Experts
- Energy Storage Experts
- LNG Import and Storage Experts
- Hydrogen Experts
- Data Center experts



The Waste Sector

2026:
 **80%**
goes to landfilling

 **20%**
goes to treatment
↓

Israel Plans to reverse
the trend by 2033:

 **80%**
treatment

 **20%**
landfilling



Hence, by 2033 we expect to
launch:

At least

11

Waste to Energy Plants



What we're looking for:

- Civil Engineering experts
- sorting Experts
- Long-term operation experts
- Waste to Energy experts

Pre-Tender and Tender Phase

 **Jerusalem Region Waste to Energy**
Status **Pre-Tender**
Capacity 650,000 ton (per year)

WASTE

 **Emek Hefer Desalination**
Status **Pre-Tender**
Capacity 400 MCM (per year)

WATER

 **International Airport**
Status **Pre-Tender**
Capacity 20,000,000 Passengers

TRANSPORT

 **Tamar Region Waste to Energy**
Status **Pre-Tender**
Capacity 650,000 ton (per year)

WASTE

 **Ashkelon Desalination Upgrade**
Status **Tender**
Capacity Increasing the current capacity to 220 MCM

WATER

 **Yavor LPG Storage Facility**
Status **Tender (PQ)**
Capacity 20,000 ton

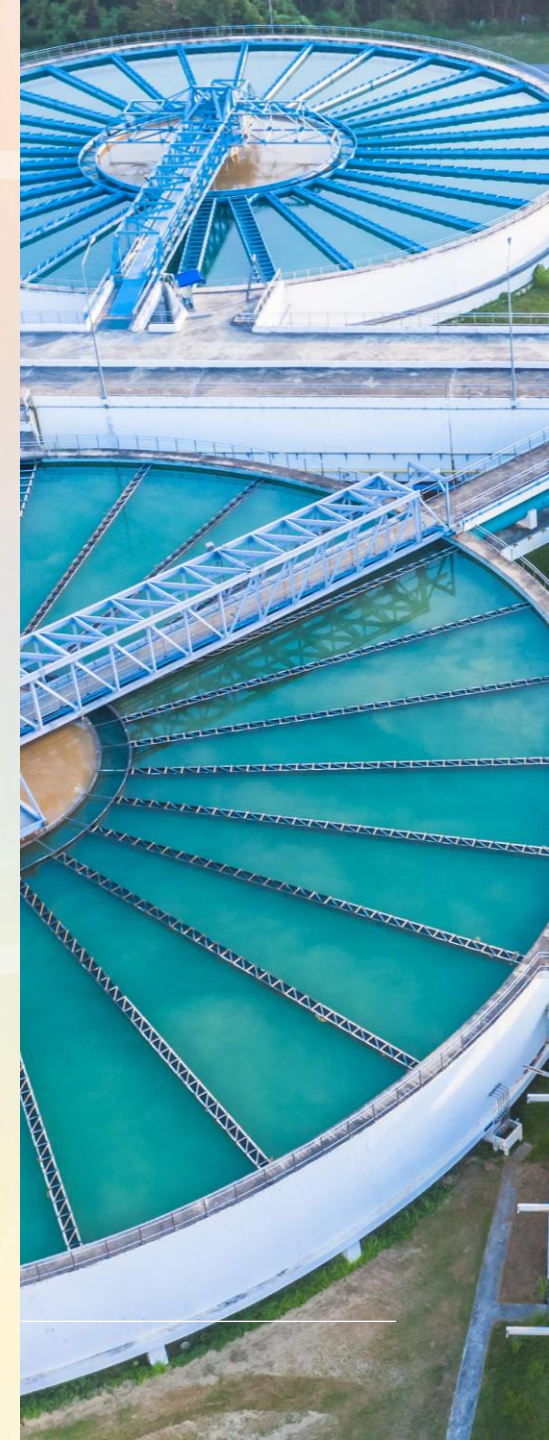
ENERGY

 **Anaerobic Digestion Ashdod**
Status **Pre-Tender**
Capacity 250,000 ton Sorting, 200,000 ton anaerobic Digestion (per year)

WASTE

 **Shafdan Effluent Enhanced Treatment Facility**
Status **Tender (PQ)**
Capacity 119 MCM (per year)

WATER



THANK YOU!

Would you like to stay updated?

Please send us email to
PPP.Projects.Israel@inbal.co.il
and join our mailing list!



Ministry of Finance

 **Accountant
General**



MR. ZOHAR ZOLLER
NTA – DEPUTY CEO, METRO

Tel Aviv Metro Project

General Overview

Zohar Zoller
Deputy CEO – NTA



Disclaimer

The purpose of this presentation is to provide certain high-level information, as general reference only, regarding the Tel Aviv Metro Network Programme. NTA intends, in due course, to publish tenders for the execution of the works for the Programme. Nothing herein is intended or should be construed as: (i) imposing any obligation on NTA to publish any such tender or any similar tender; and/or (ii) imposing any obligation on NTA to include any specific terms, conditions or provisions in any tender documents (if any); and/or (iii) derogating from any tender process (if any) or from any tender documents (if any); and/or (iv) negating, replacing, amending or limiting any tender documents (if any). Without derogating from the generality of the foregoing, only formally published tender documents (if any) shall be binding on NTA and any reliance on any of the contents of this presentation shall be at the sole risk of the person/entity relying thereon

Facts and Figures

The largest and most complex project ever delivered in Israel!

€50bn

Estimated Cost

€7.3bn

Annual Economic
Benefits

+30%

Increase Use of
Public transport

2 mil

Daily Passengers

2037

Stage 1 –
Operation

Required Resources

1.1M units

TBM Tunnel Segments

10M m³

Concrete for Slurry Walls

10M m³

Soil Excavated from the
Tunnels

45 units

Slurry Wall Machines
at Peak

24 units

TBM Machines at Peak
(for Stage 1)

25 km

Conveyance Pipelines

Temporary pipeline
conveying water between
the wells, the treatment
plant and the reinjection
points

24 units

Equipment Units per Site

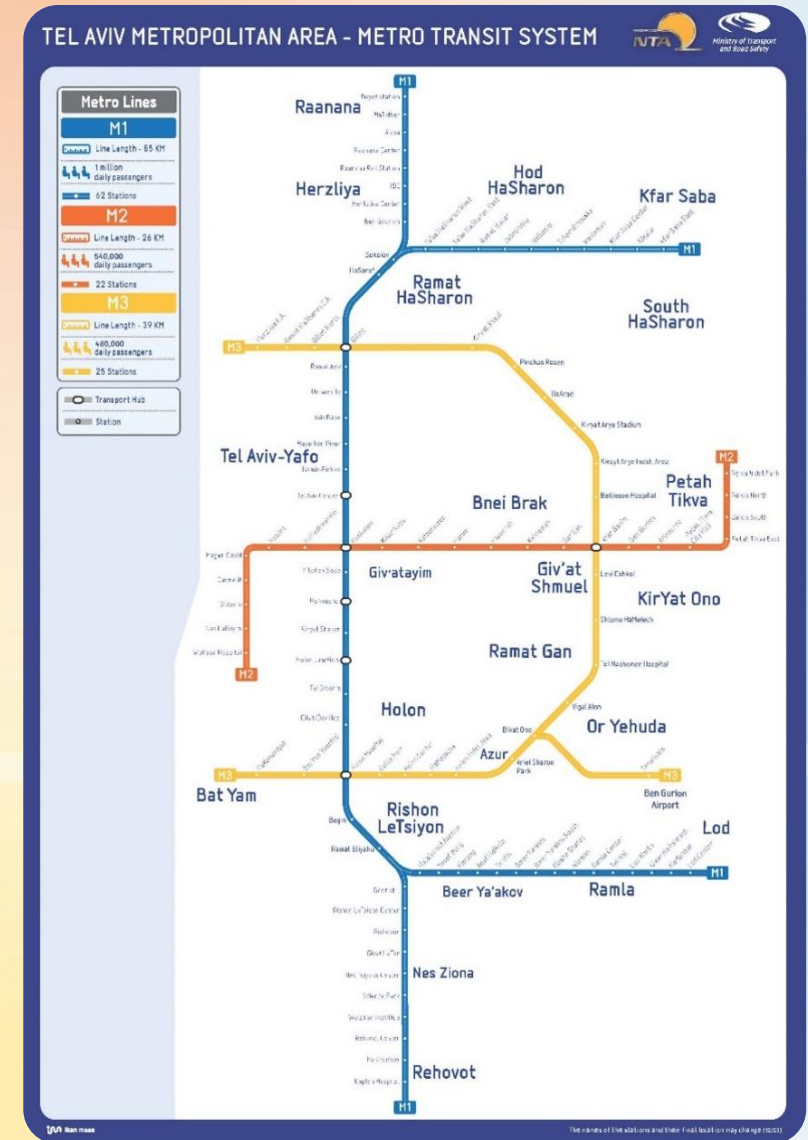
Pumps, wells, and
pumping equipment —
required at
approximately 120 sites

Required Resources

System	M1	M2	M3	Total
Escalators	648	287	196	1,131
Elevators	186	140	161	487
TVS Fans	248	76	112	436
PSD (meters)	15,430	3,800	4,860	24,090
Fare Gates	684	294	248	1,226

General Overview

- 3 Lines (M1/M2/M3)
- 150 km Underground Network (double tunneling)
- 109 Stations
- 24 Municipalities
- 4 Depots
- 7 Transportation Hubs



Project Staging

The Metro Project is divided into two main execution stages:

Stage
Execution
1

Track Length
stations
Depots

M1

28 km

20

Rishonim

M2

26 km

22

Sgula

M3

24 km

17

Mesubim

Total network

78 km

59 Stations

3 Depots

Stage
Execution
2

Track Length
stations
Depots

58 km

-

11 km
+ 5 km to
airport

42

-

7
+ 1 to
airport

Ra'anana

-

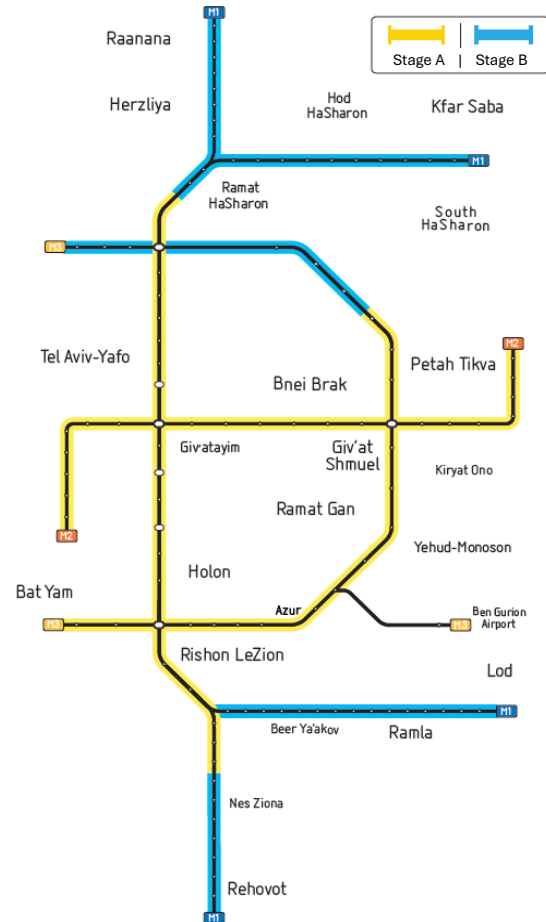
-

85 km

26 km

39 km

Total: 150 km, 109 Stations



Transportation Hubs and LVC



GLILOT

- M1
- M3
- IR
- IR 5-6
- Bus Station

KFAR GANIM

- M2
- M3
- LRT-P
- Bus Station

YOSEFTAL

- M1
- M3
- IR

SAVIDOR

- LRT-R
- LRT-P
- M1
- IR
- Bus Station

HAHAGANA

- LRT-P
- M1
- IR
- Bus Station

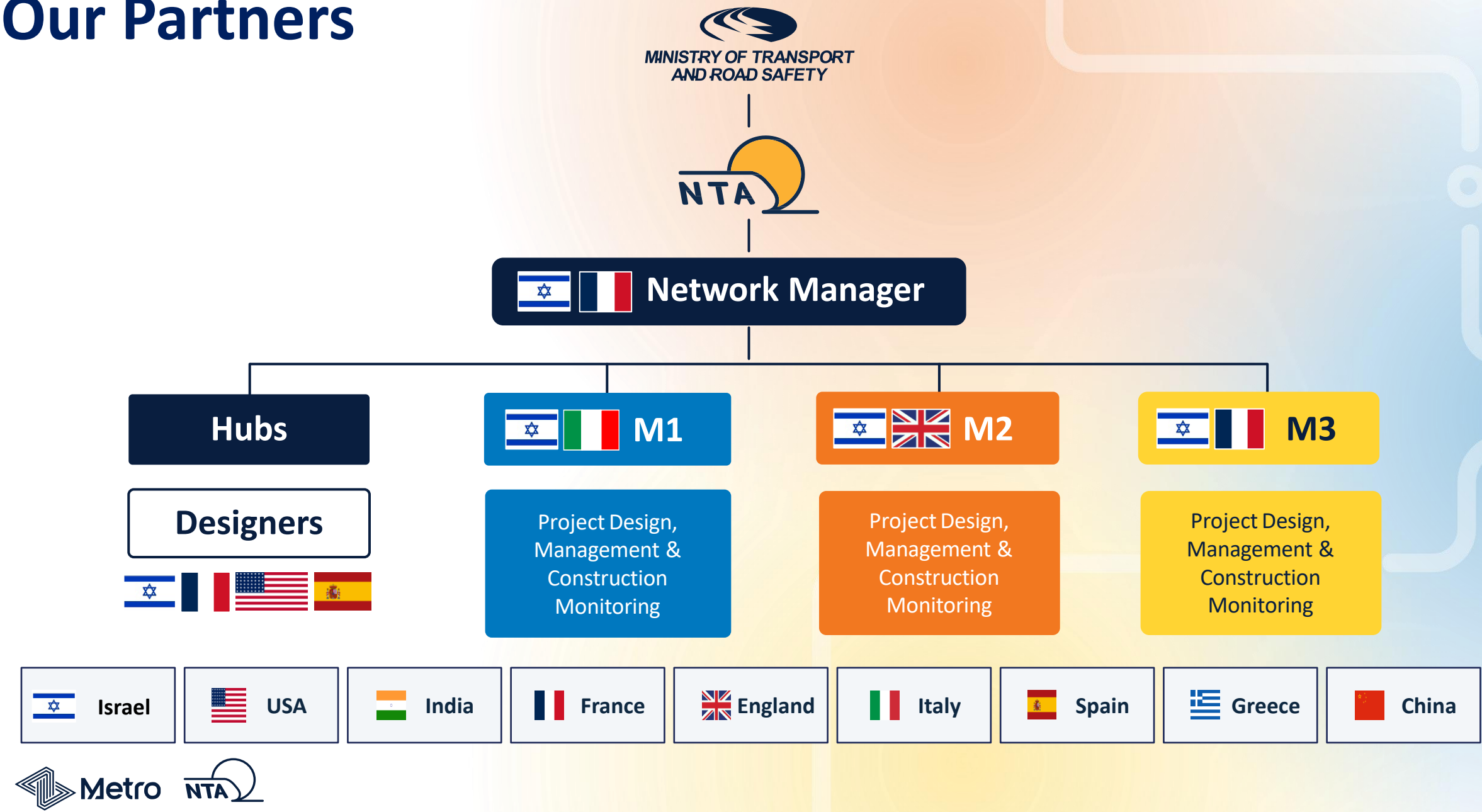
HASHALOM

- LRT-R
- M1
- M2
- IR
- IR 5-6
- Bus Station

MAAR BEN TZVI

- LRT-G
- M1
- IR
- Bus Station

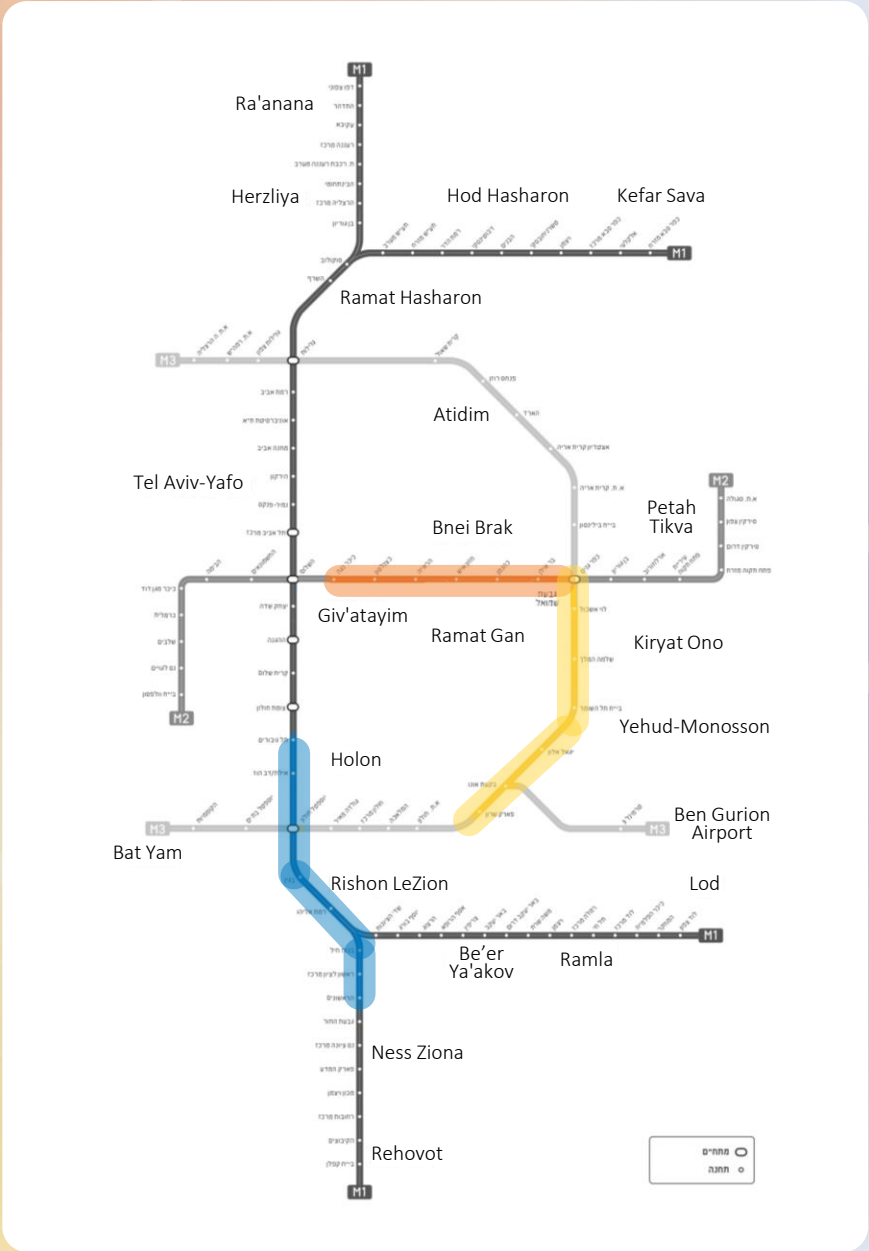
Our Partners



Execution Stage 1.1

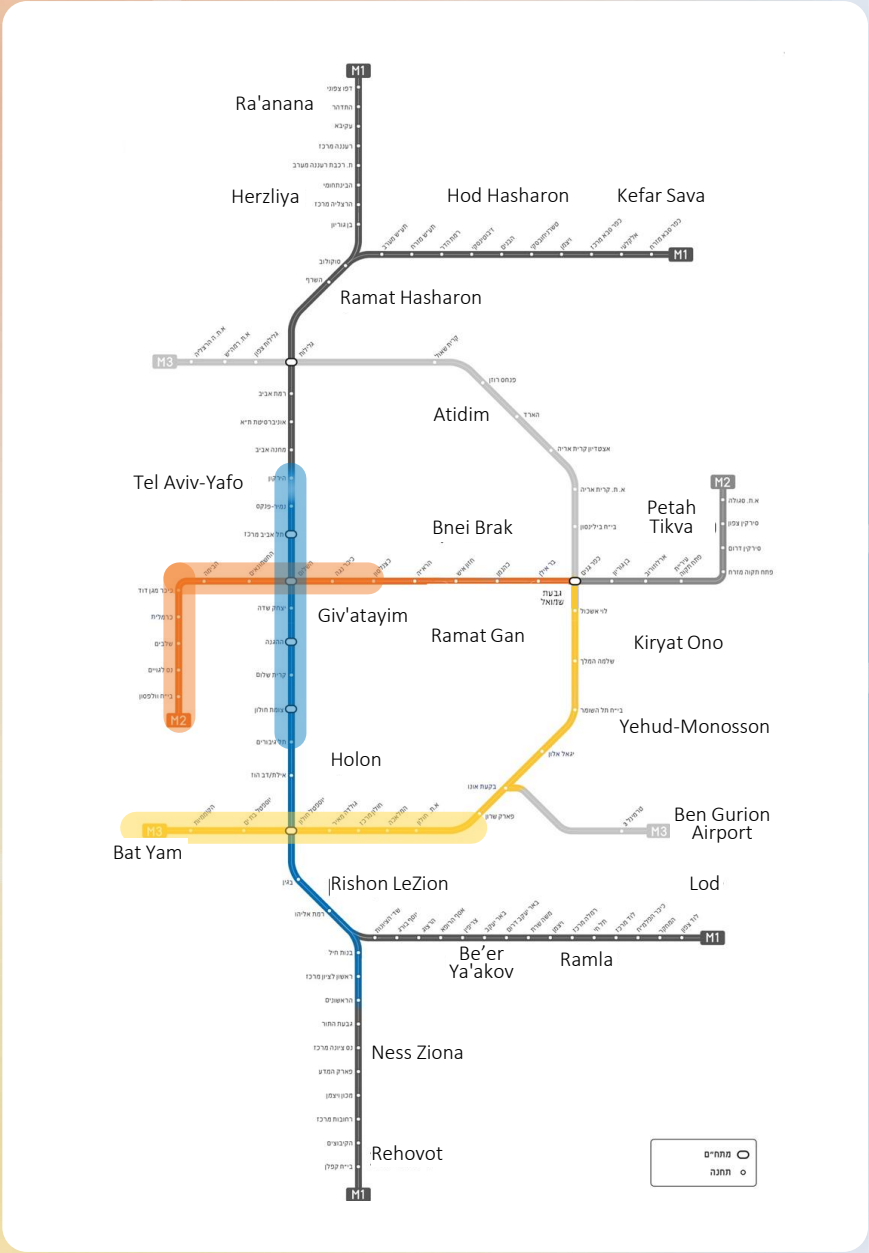
M3 Substage 1.1	Km	Boxes
Ha Melacha – Yigal Alon	0	8

M1 Substage 1.1	Km	Stations
Rishonim-Ramat Eliahu-Holon Junction	14.2	9
M2 Substage 1.1	Km	Stations
Kfar Ganim-Kikar Noga	5.1	6
M3 Substage 1.1	Km	Stations
Ariel Sharon Park-Shlomo Ha Melech + Depot Interchange	7.4	5



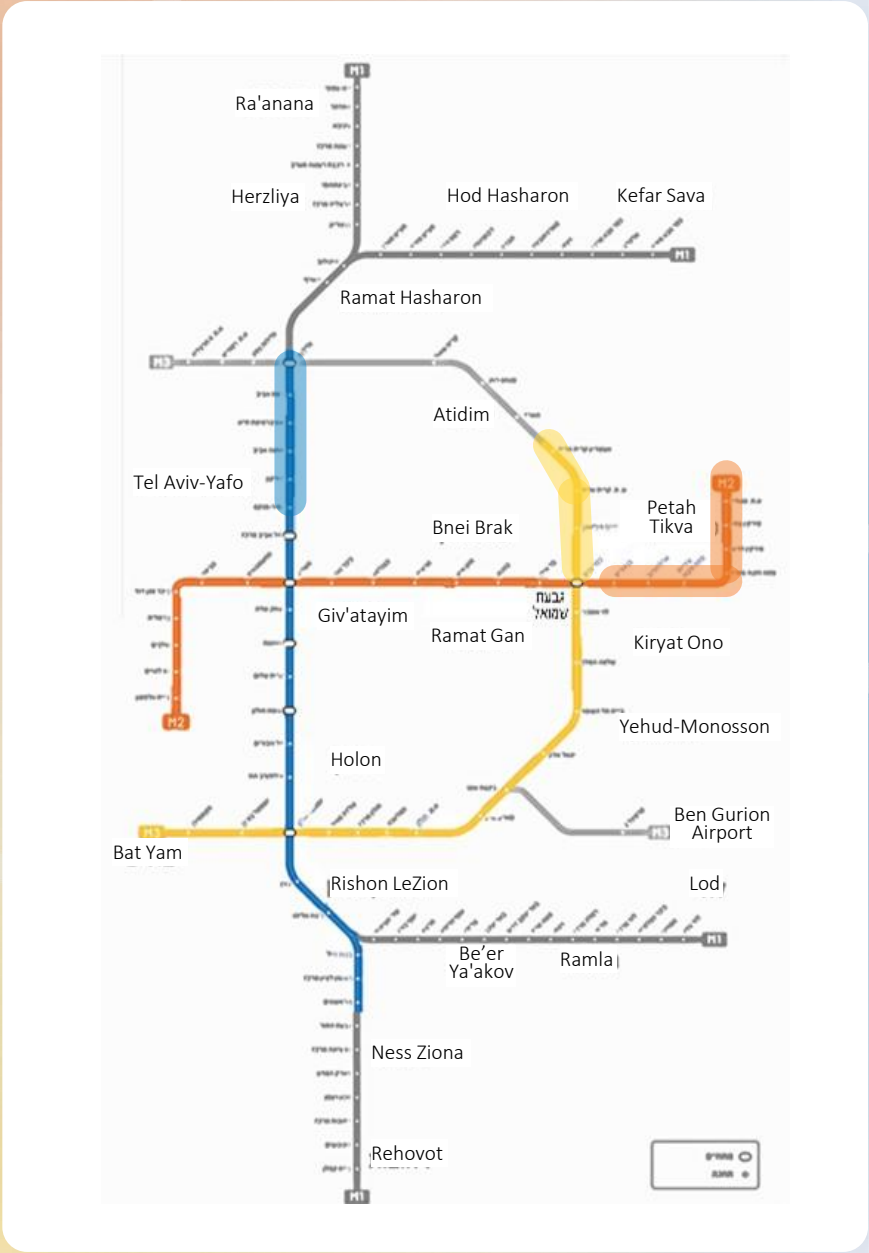
Execution Stage 1.2

M1 Substage 1.2	Km	Stations
Holon Junction-Hayarkon	7.9	7
M2 Substage 1.2	Km	Stations
Wolfson-Kikar Noga	9.3	8
M3 Substage 1.2	Km	Stations
Bat Yam Terminus-Ariel Sharon Park	8.7	6

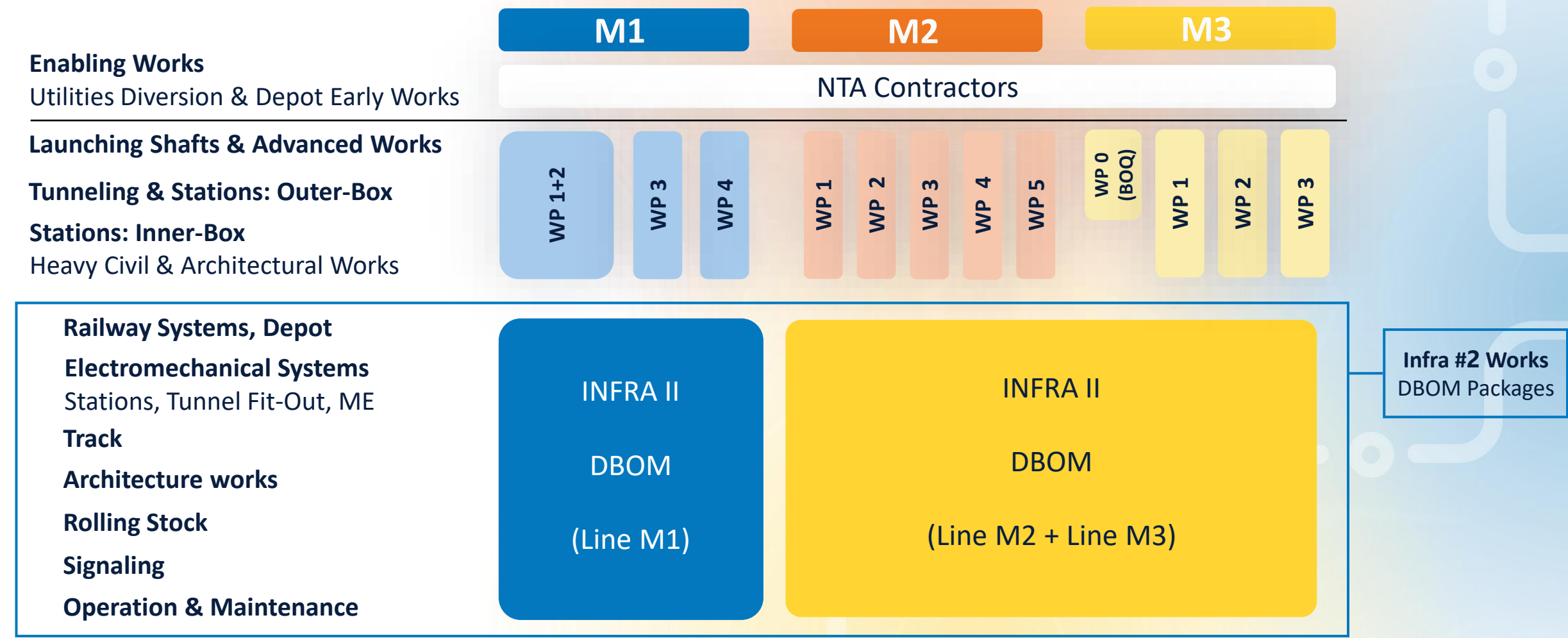


Execution Stage 1.3

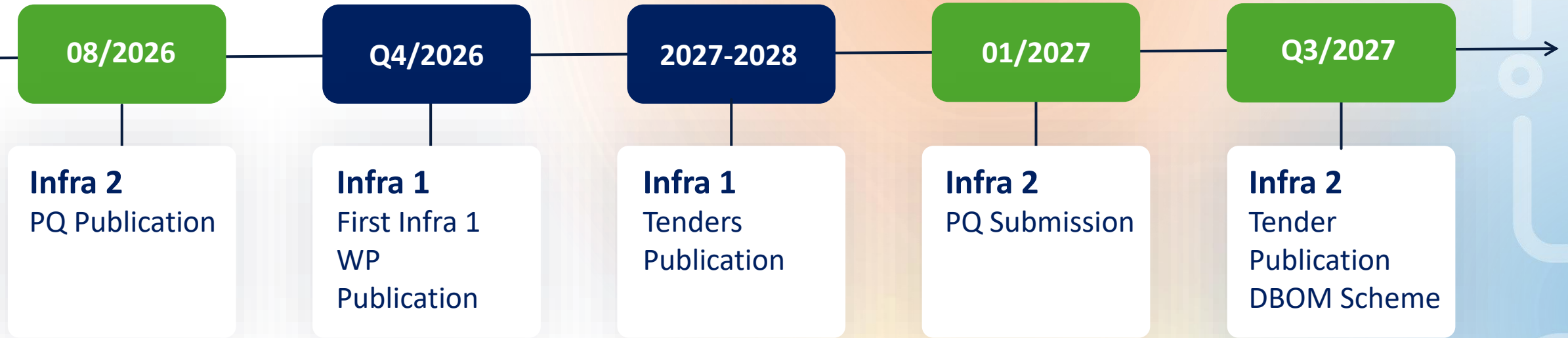
M1 Substage 1.3	Km	Stations
Hayarkon-Glilot	5.5	4
M2 Substage 1.3	Km	Stations
Kfar Ganim-Segula Depot	7.6	7
M3 Substage 1.3	Km	Stations
Hayarkon-Kfar Ganim-Shlomo HaMelecha	7.9	5



Procurement Strategy Scheme



Project Major Milestones



Ongoing Works:

Depot Early
Works

HV- Sub Stations

Acoustic
Protection

Utility Diversion

Launching Shafts

Site Preparation





Thank You & Shalom





MR. UDI KAPLANSKY
NTA – VP Passenger Service,
Operation & Maintenance

Tel Aviv Metro Operation Concept

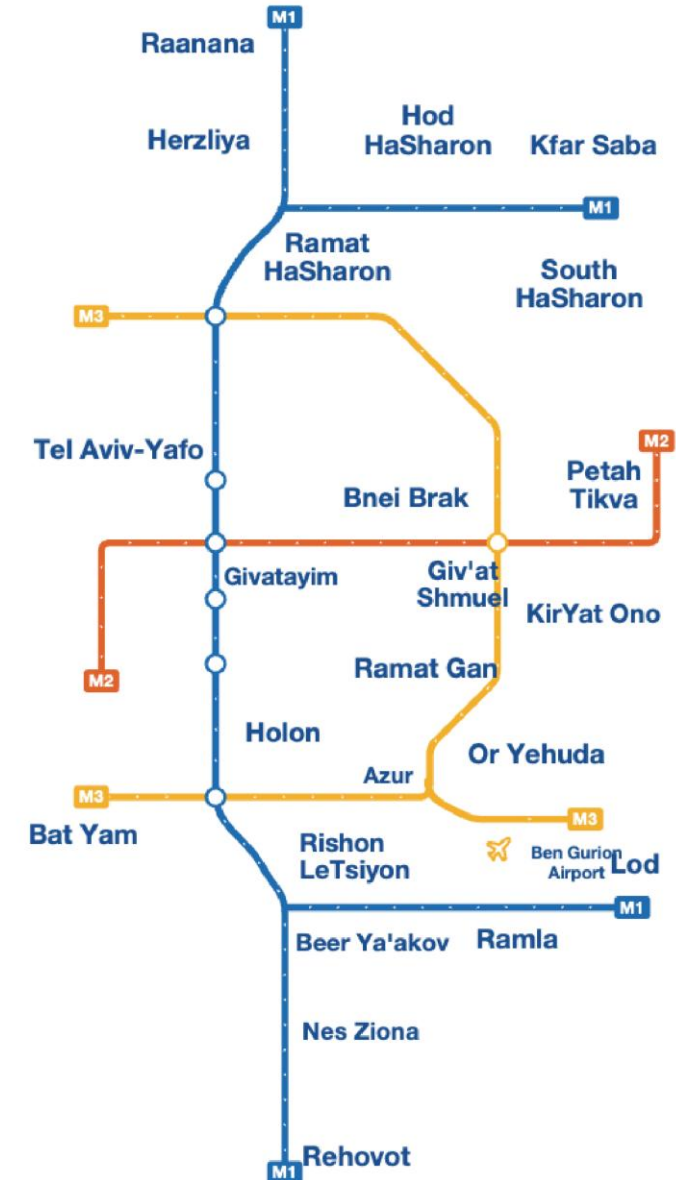
Udi Kaplansky

VP Passenger Service,
Operation &
Maintenance - NTA

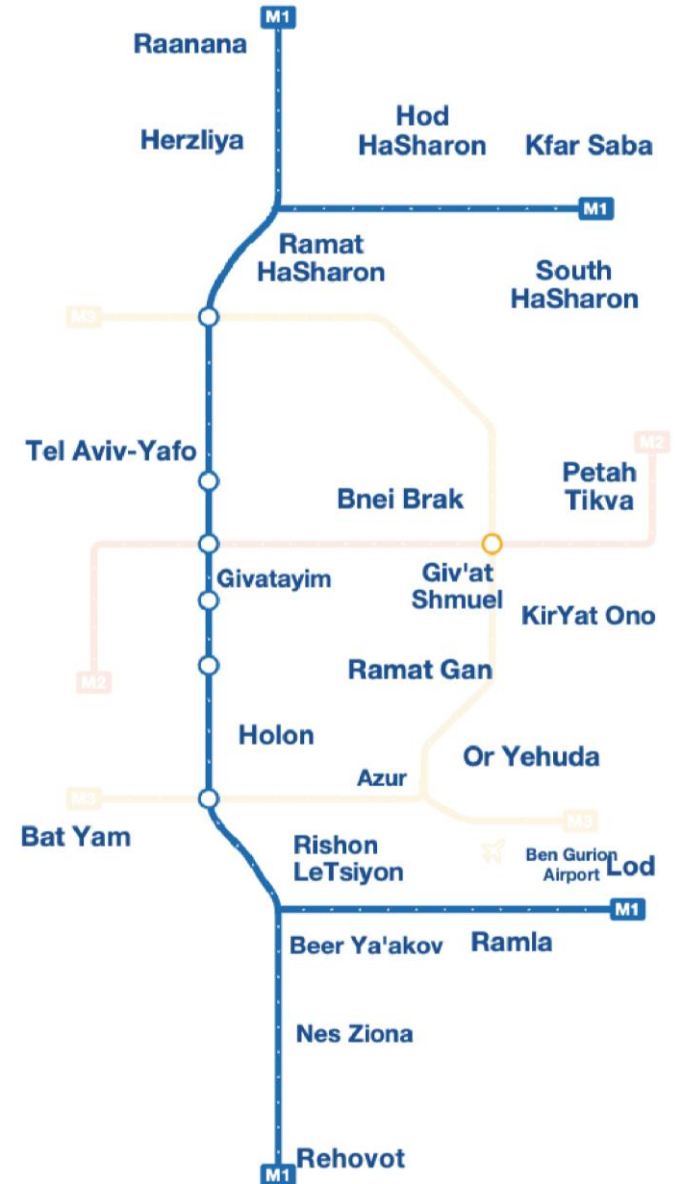


Network General Overview

- 3 Lines (M1 / M2 / M3)
- 150 km Underground Network (double tunneling)
- 109 Stations
- 24 Municipalities
- 4 Depots
- 7 Transportation Hubs



Metro Line M1



M1 Main Features

North–south radial line
connecting northern and southern cities
to central Tel Aviv


85 Km
Line Length


14
Municipalities


62
Stations


1M
Pass/Day
PPHPD 2040: 23,000
PPHPD 2050: 27,000

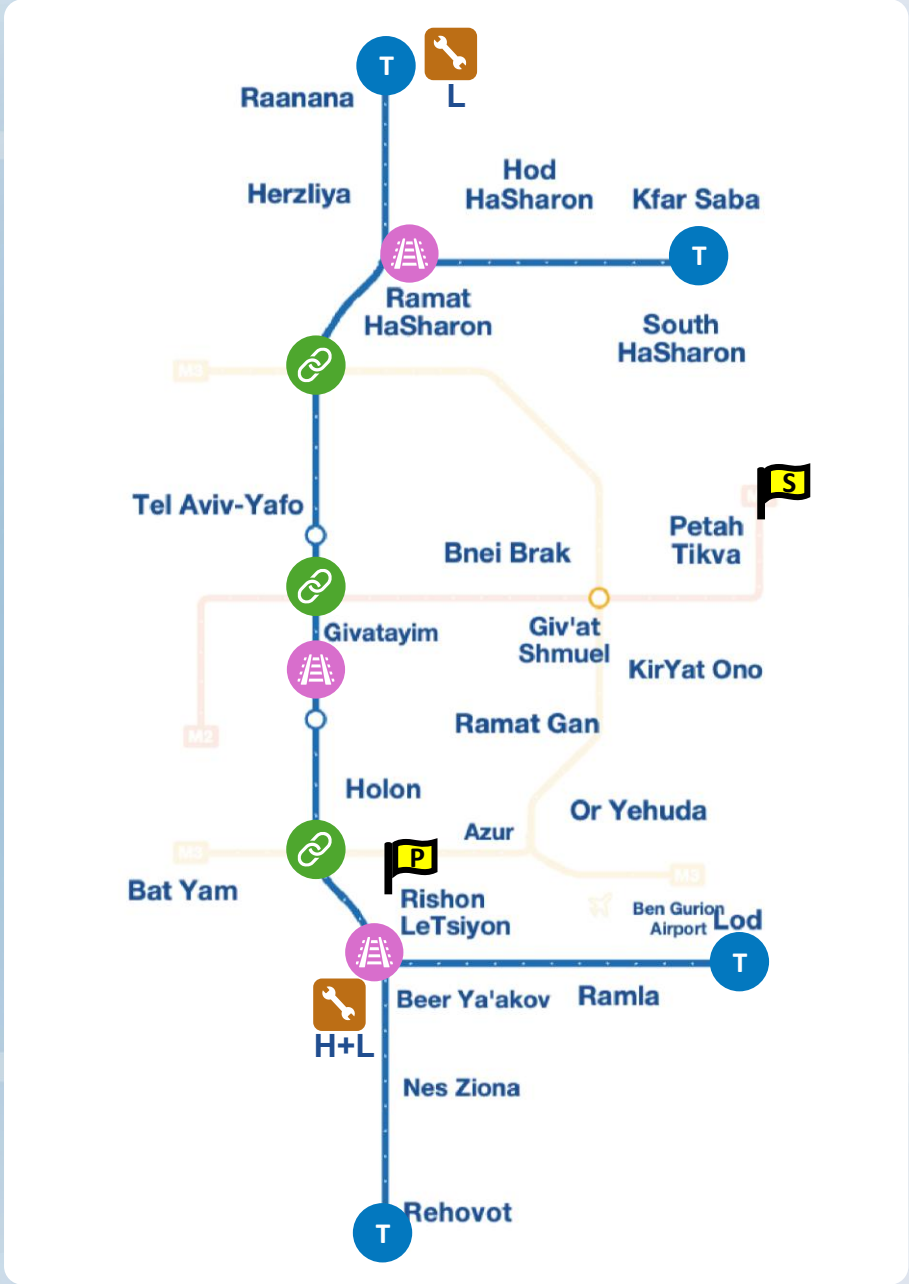

2
Depot Sites


2
Service Lines



M1 Line Description

Symbol	Feature	Details & Locations
	Depot & Train Stabling	136 Stabling Berth Total: Rishonim Depot: 58 Ra'anana Depot: 66 Termini: 12
	Terminal Stations	North: Ra'anana / Kfar Saba South: Lod / Rehovot–Kaplan
	Pocket Tracks (PT)	Ramat Eliyahu Yitzhak Sade Glilot Ta'as
	Line Connectivity	M2 Line: HaShalom M3 Line: Glilot & Yoseftal (Holon)
	OCC	Primary: Harishonim (South) Secondary: Sgula



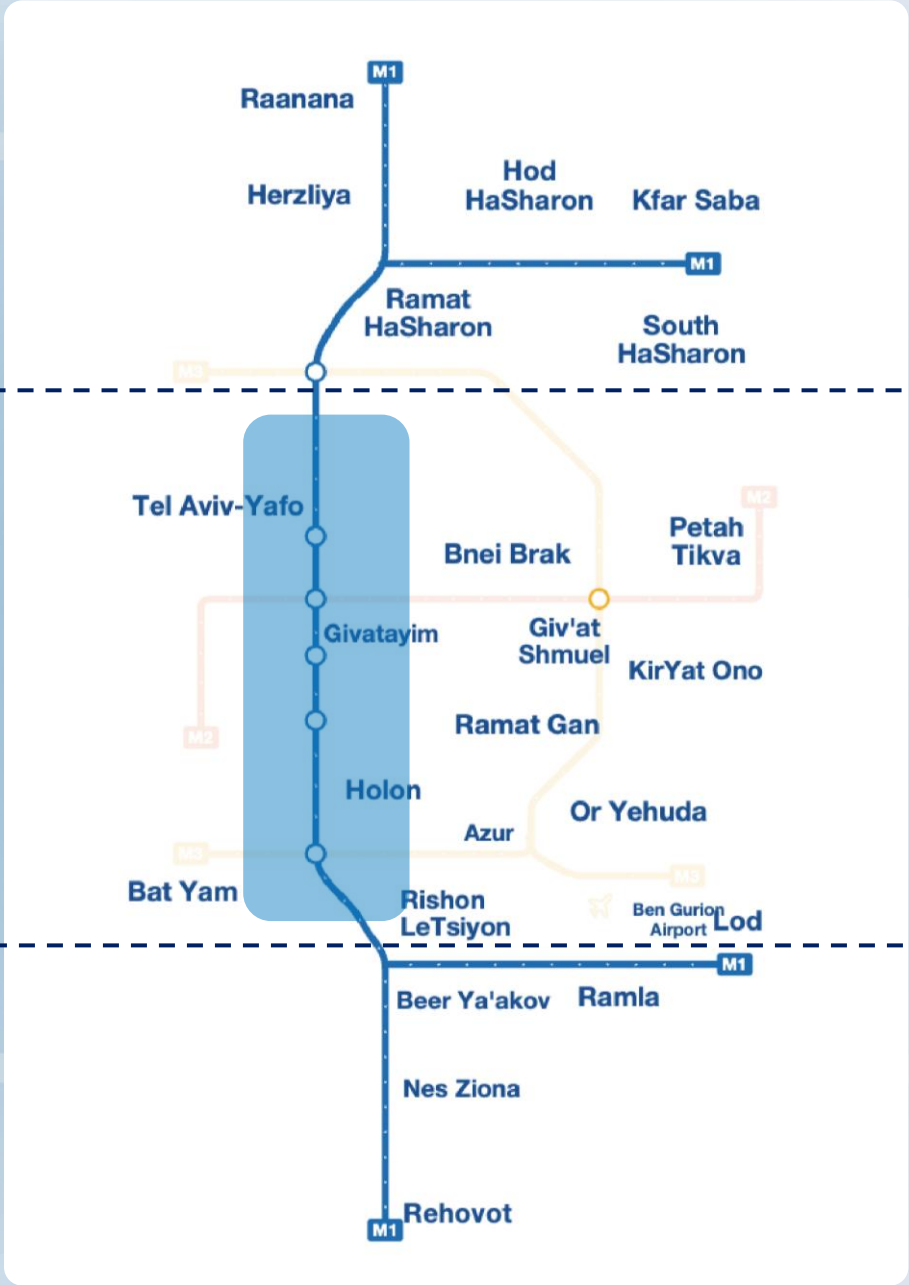
Operational Stages - Central Trunk - Sub-Stages

- STAGE 1 CENTRAL TRUNK
- STAGE 2 NORTHERN BRANCH
- STAGE 2 SOUTHERN BRANCH

STAGE
2

STAGE
1

STAGE
2



Operational Stages - Central Trunk - Sub-Stages

STAGE 1 CENTRAL TRUNK

Stage 1 is divided into 3 sub-stages:

Sub-stage 1.1 HaRishonim → Holon Junction 13.5 km
depot + 9 stations

Sub-stage 1.2 HaRishonim → Namir/Pinkas 7 km
+ 6 stations

Sub-stage 1.3 HaRishonim → Glilot 7 km
+ 5 stations

STAGE 2 NORTHERN BRANCH

STAGE 2 SOUTHERN BRANCH



Metro Line M2

M2



M2 Main Features

East-west radial line
connecting eastern metropolitan cities
to central Tel Aviv


25 Km
Line Length

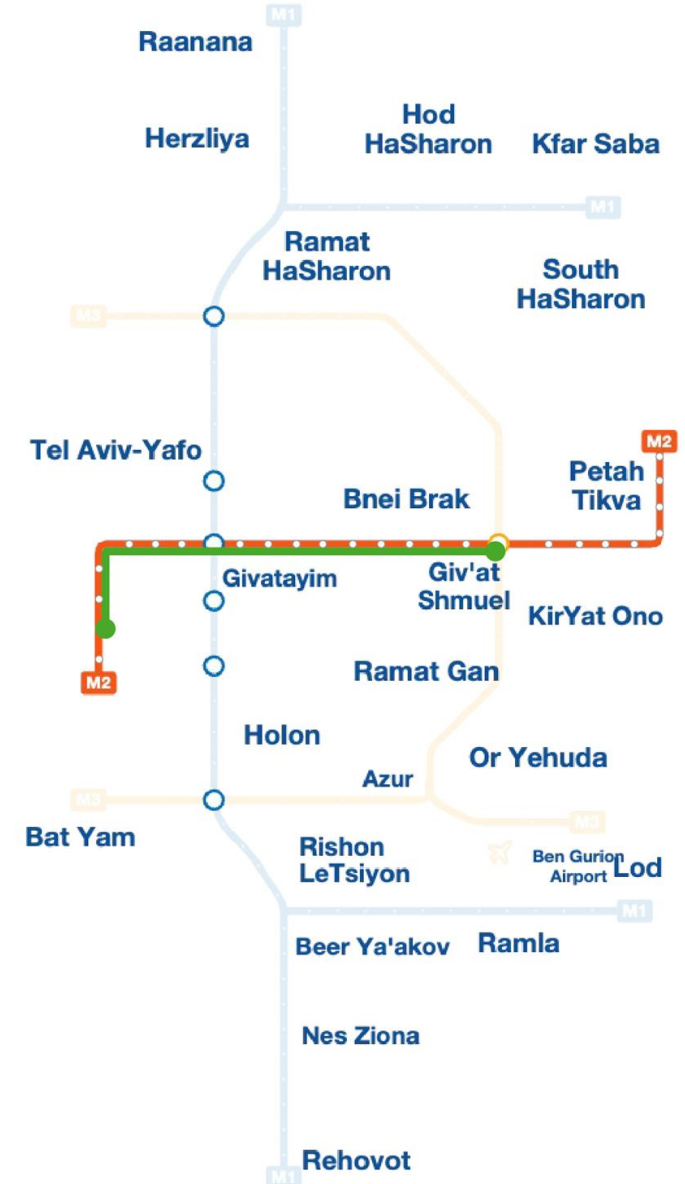

9
Municipalities


22
Stations


540K
Pass/Day
PPHPD 2040: 18,000
PPHPD 2050: 21,000


1
Depot Sites


2
Service Lines



M2

Line Description

Symbol	Feature	Details & Locations
	Depot & Train Stabling	73 Stabling Berth Total: Segula Depot: 63 Terminals: 8 Pocket Tracks: 2
	Terminal Stations	Petah Tikva Wolfson, Holon Kfar Ganim Carmelit
	Pocket Tracks (PT)	Kfar Ganim
	Line Connectivity	M1 Line: HaShalom M3 Line: Kfar Ganim Station
	OCC	Primary: Messubim Secondary : Sgula



Operational Stages

STAGE 1 3 sub-stages:

Sub-stage 1.1 Kfar Ganim → Noga Square*

Sub-stage 1.2 Kfar Ganim → HaShalom*

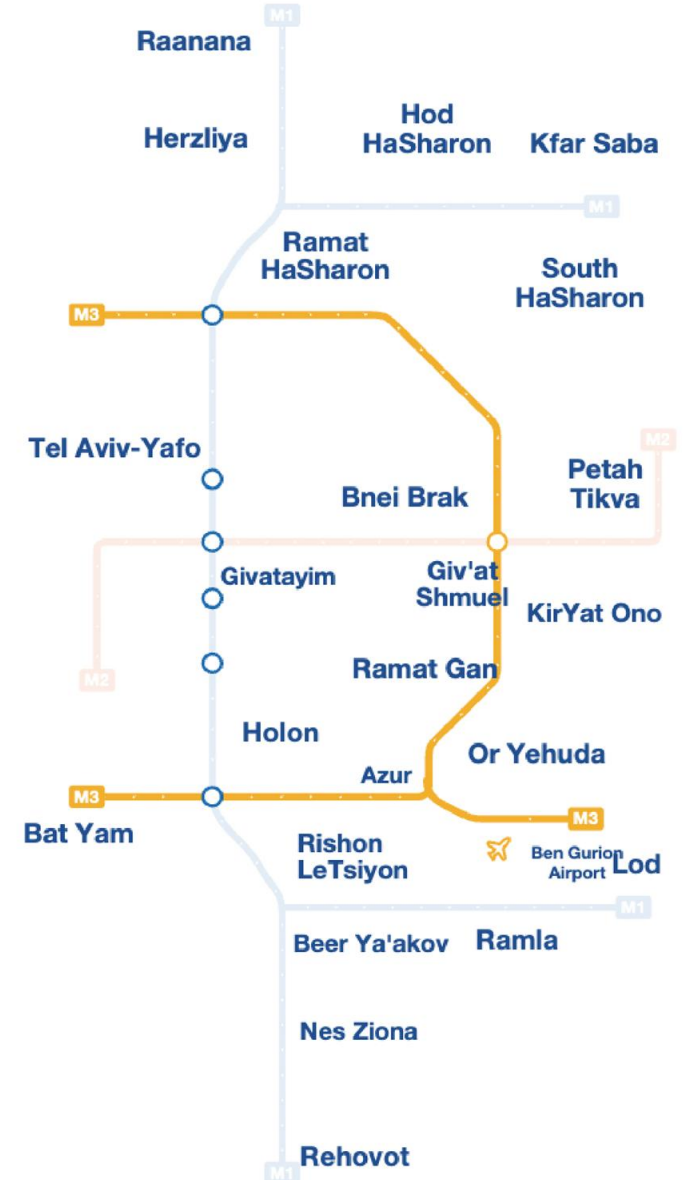
Sub-stage 1.3 Full line: Segula Industrial Zone, Petah Tikva–Wolfson Medical Center, Holon

*Use of M3 Depot at Mesubim



Metro Line M3

M3



M3 Main Features

Semi-circular line
connecting the mass-transit network
and forming a radial–orbital structure


39 Km
Line Length

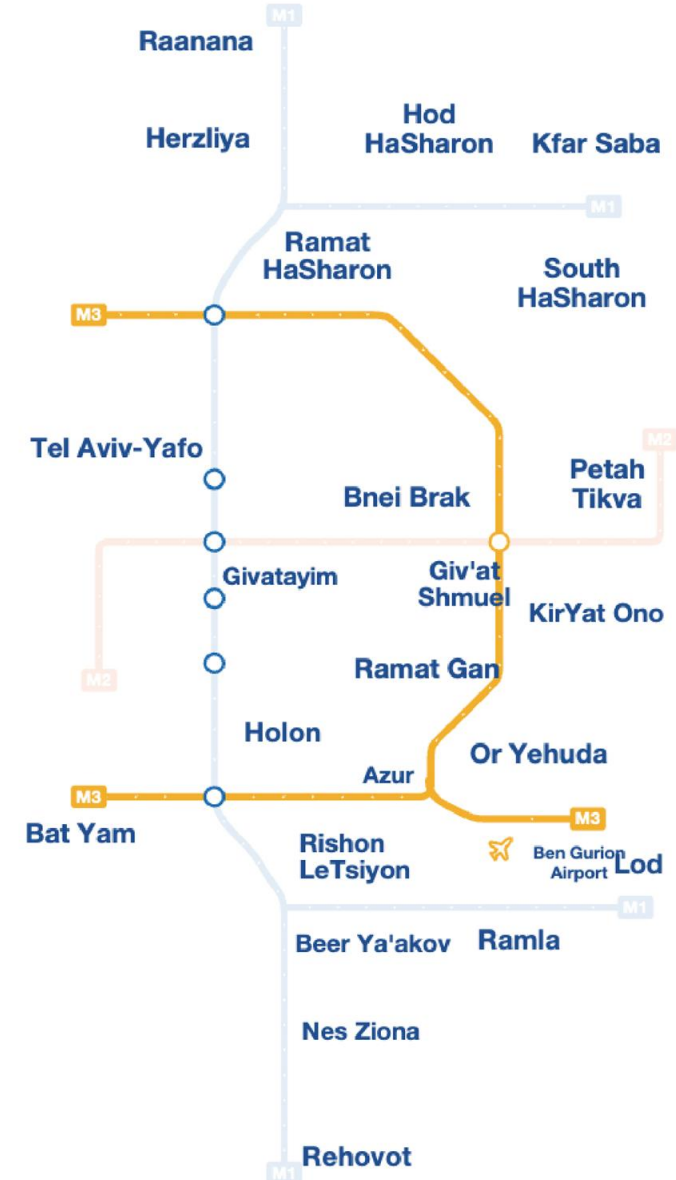

13
Municipalities


25
Stations


480K
Pass/Day
PPHPD 2040: 9,500
PPHPD 2050: 11,000


1
Depot Sites


2
Service Lines



M3 Line Description

Symbol	Feature	Details & Locations
	Depot & Train Stabling	70 Stabling Berth Total: Mesubim Depot: 62 Terminals: 8
	Terminal Stations	Bat Yam Yoseftal Herzliya Marina
	Pocket Tracks (PT)	Yarkon
	Line Connectivity	M1 Line: Glilot and Yoseftal, Holon M2 Line: Kfar Ganim Station
	OCC	Primary: Messubim Secondary: Sgula
	Ben Gurion Airport	service will be provided by a shuttle between the Bik'at Ono stations and the airport



Operational Stages

STAGE 1 CENTRAL TRUNK

STAGE 2 NORTHERN PART

STAGE
1



Operational Stages

STAGE 1 CENTRAL TRUNK

Stage 1 - 3 sub-stages:

Sub-stage 1.1 Kfer Ganim → Ariel Sharon Park

Sub-stage 1.2 Ariel Sharon Park → Bat Yam HaKomemiyut

Sub-stage 1.3 Kfer Ganim → Kiryat Aryeh Station

STAGE 2 NORTHERN PART

STAGE
2

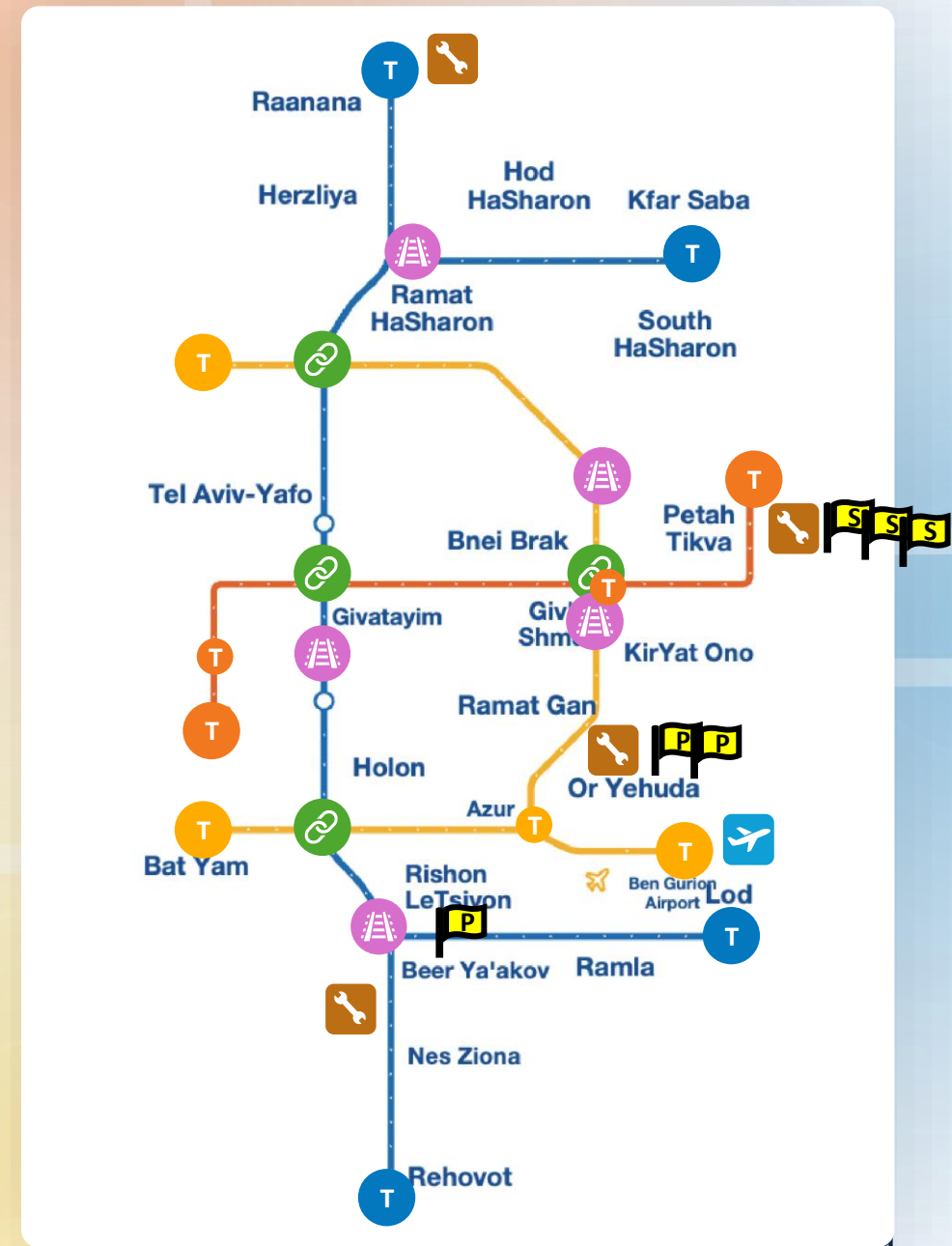
STAGE
1

STAGE
2



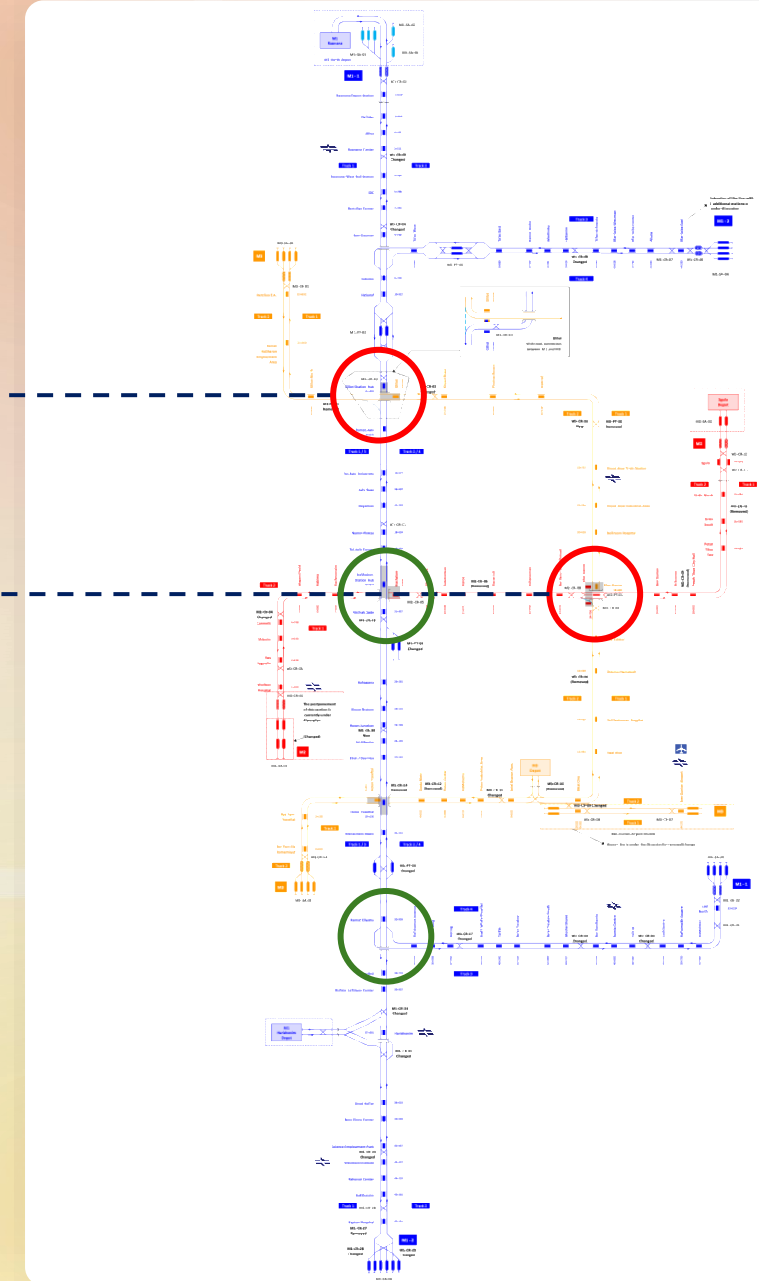
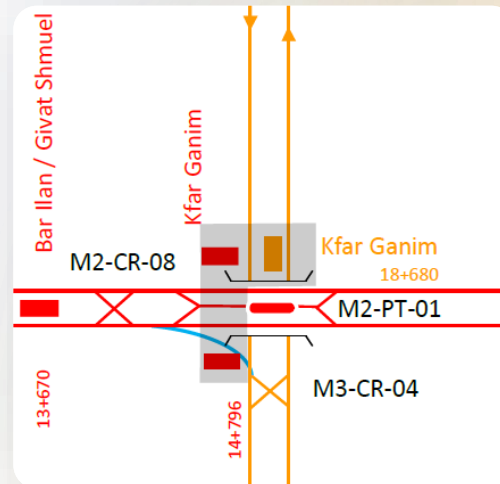
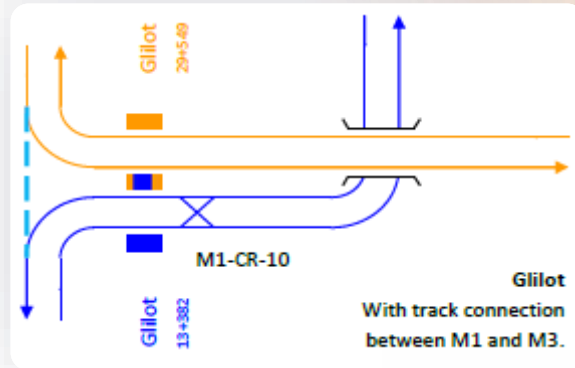
M Network General Overview

Symbol	Feature
	Depot & Train Stabling
	Terminal Stations
	Pocket Tracks (PT)
	Line Connectivity
	OCC
	Ben Gurion Airport

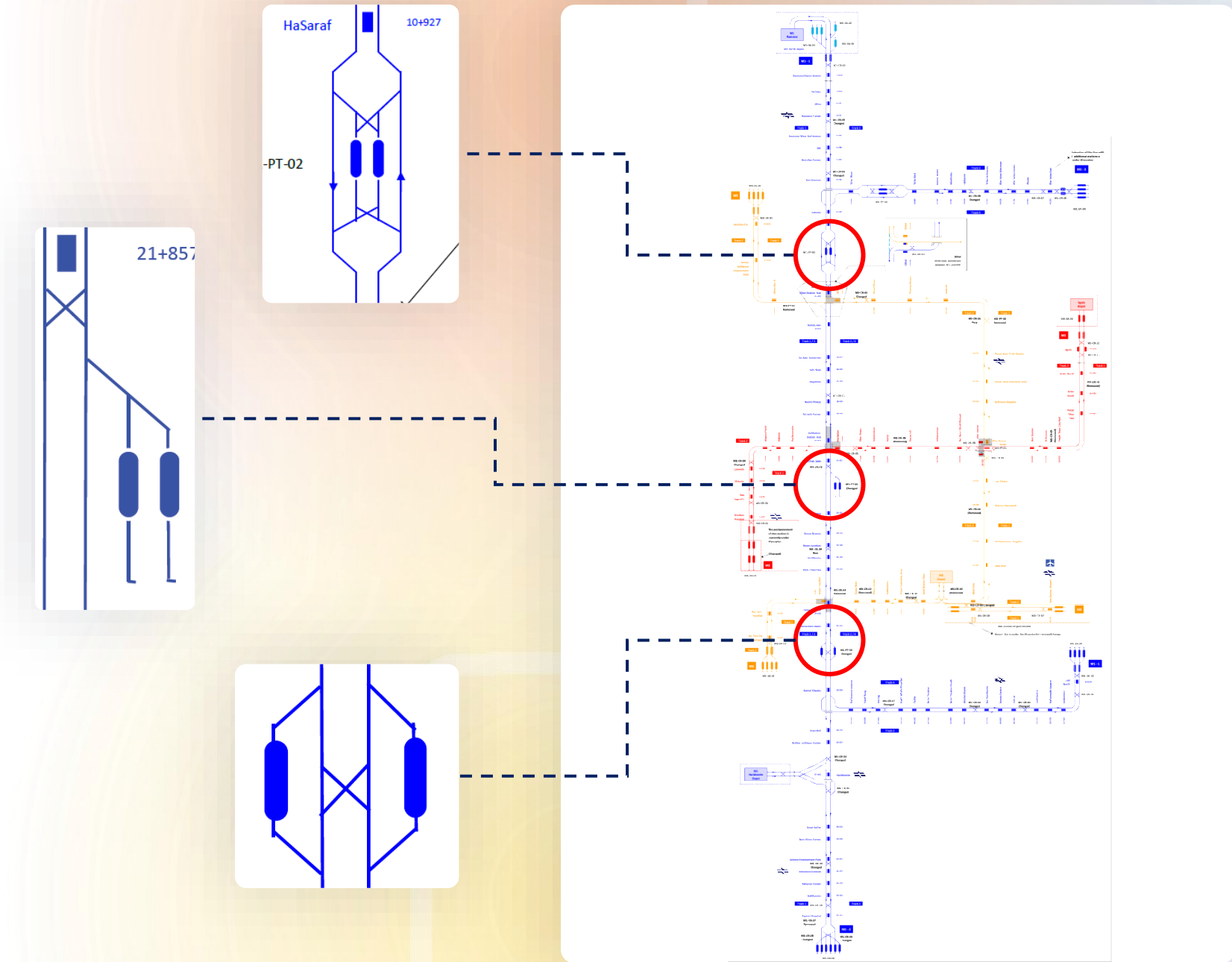


Line Connectivity

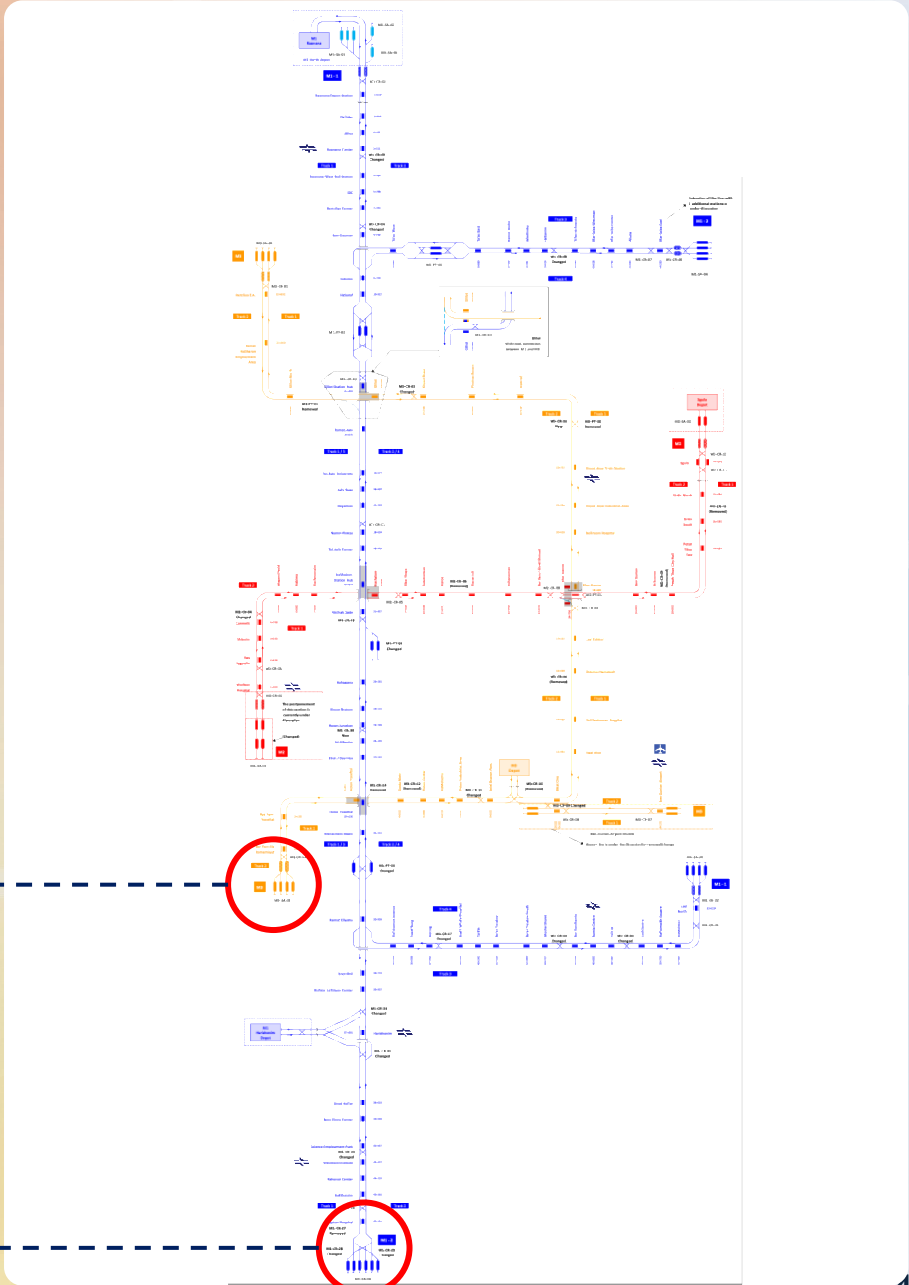
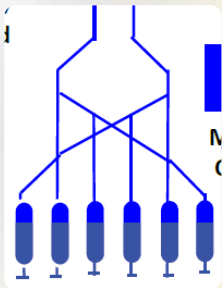
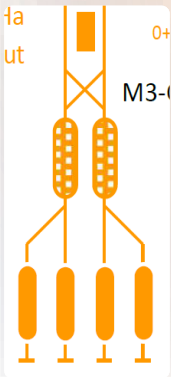
- Noncommercial
- For maintenance purpose only
- 1 connecting track only



Pocket Tracks

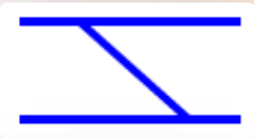


Termini

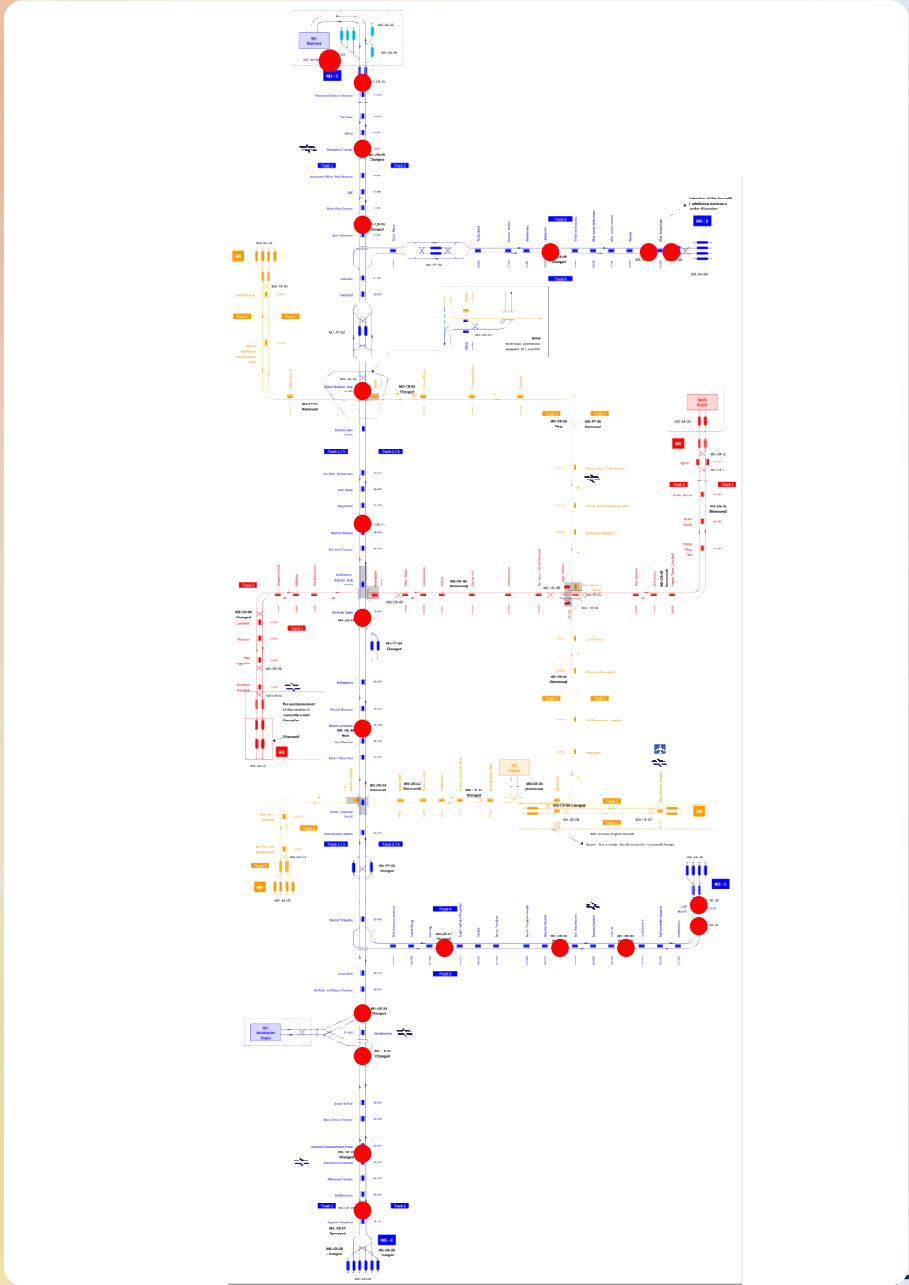
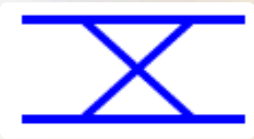


Crossover

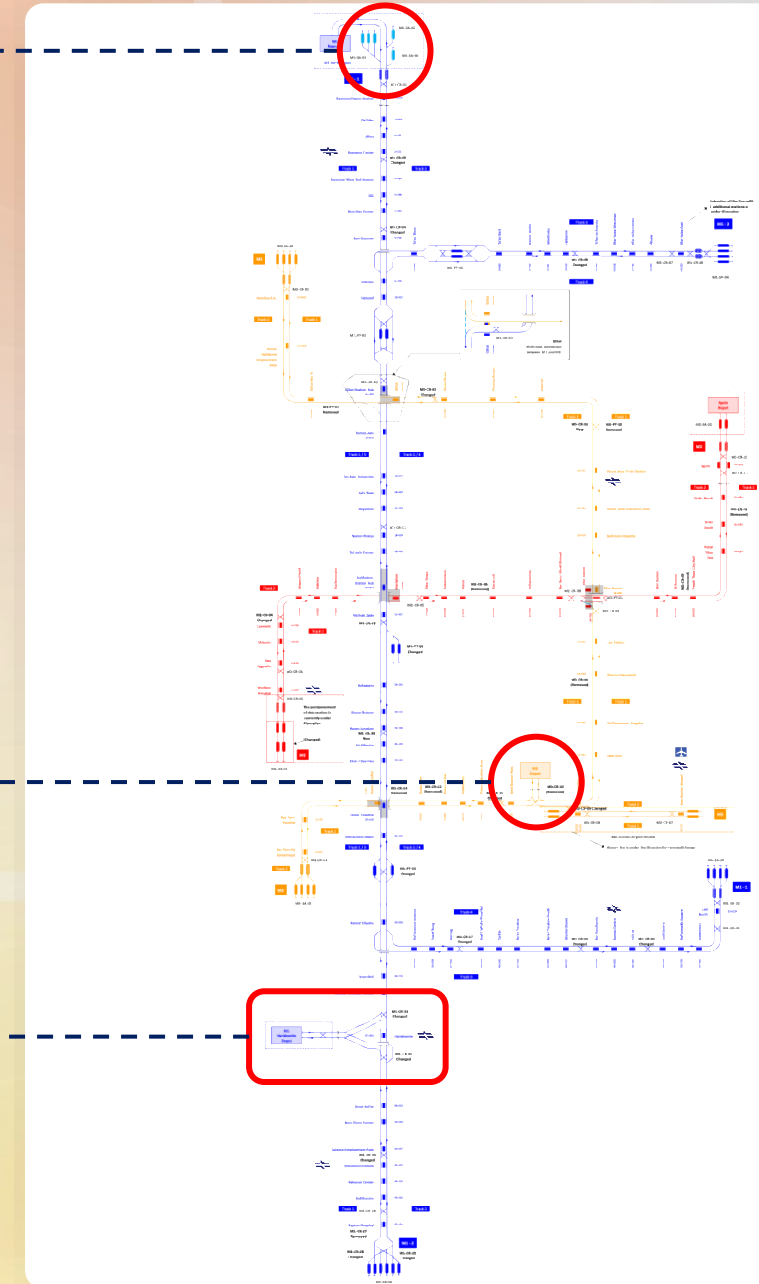
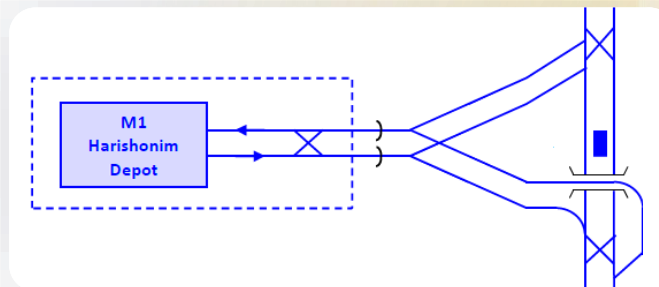
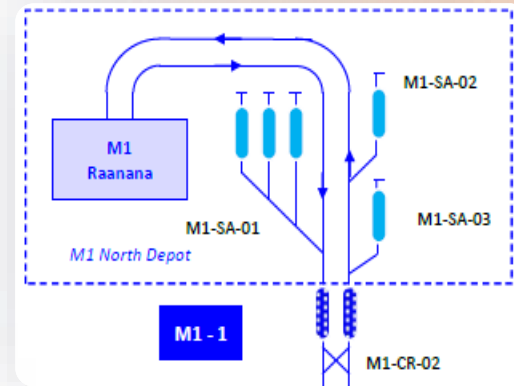
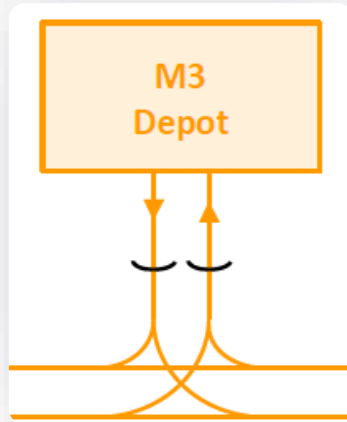
Single Crossover



Scissor/Double Crossover



Depot Entrance Layout



Thank You, &... Shalom



Metro





MR. GILAD FUX
NTA - VP SYSTEMS AND TECHNOLOGIES

Infra 2

Work Package General Overview

Gilad Fux

VP Systems &
Technologies- NTA



Infra II Major Milestones



Project Staging

The Metro Project is divided into two main execution stages:

Infra 2 SOW covers Stage 1 of the project with an option to extend the services also to Stage 2

Stage
Execution
1

Track Length
stations
Depots

M1

28 km

20

Rishonim

M2

26 km

22

Sgula

M3

24 km

17

Mesubim

Total network

78 km

59 Stations

3 Depots

Stage
Execution
2

Track Length
stations
Depots

58 km

-

11 km
+ 5 km to
airport

42

-

8

Ra'anana

-

-

85 km

26 km

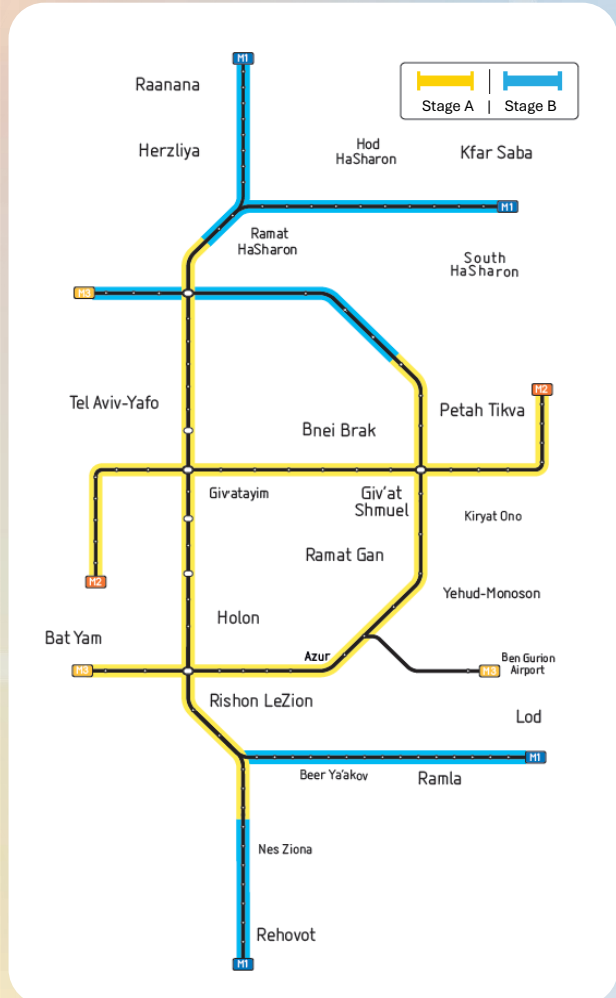
39 km

Total: 150 km, 109 Stations

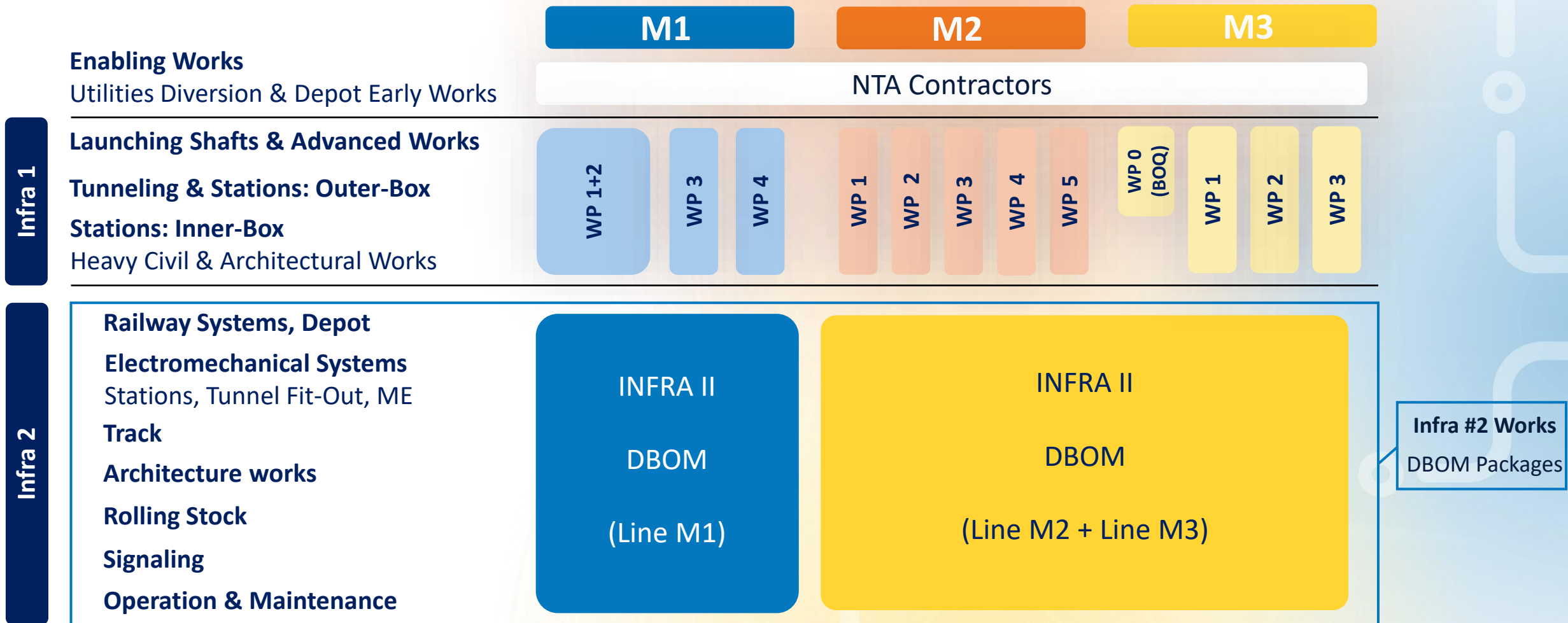
74 km

50 Stations

1 Depot

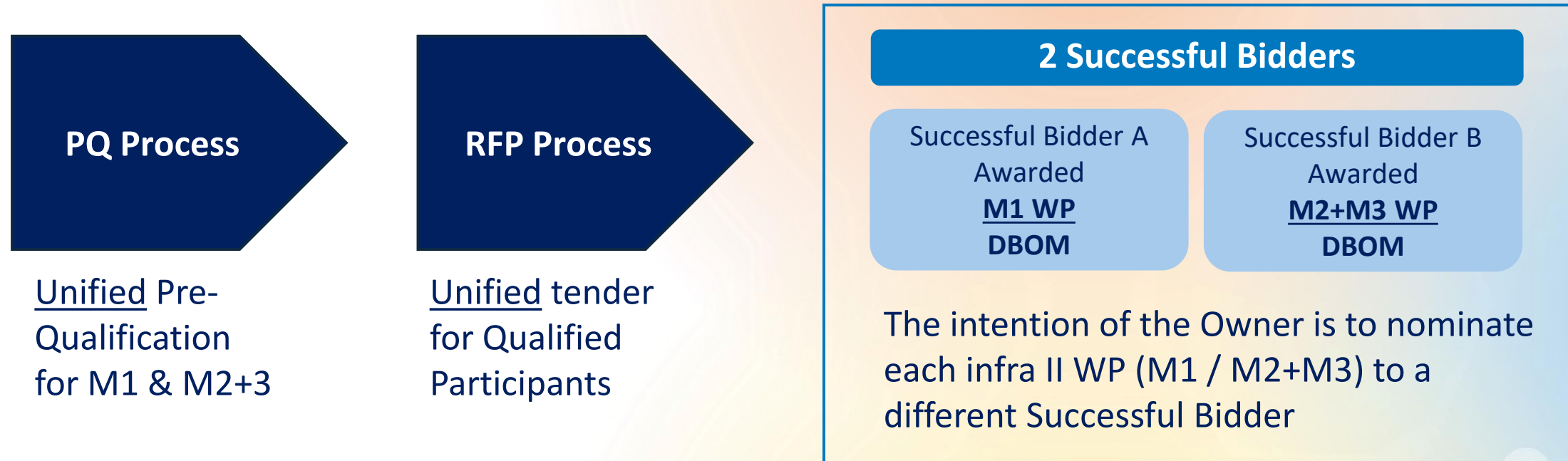


Procurement Strategy Scheme



Infra II PQ: Key Features

Unified PQ process and RFP process for both M1 and M2-M3 infra II WPs



- Infra II SOW covers Stage 1 of the project with an option to extend the services also to Stage 2
- DBOM : Design-Build-Operate-Maintain

Unified and Super Systems Approach

Unified Systems



Centralized Single Platform Across All Network Lines



DEFINITION

A common system used across all three Metro lines (M1, M2 and M3)



SYSTEM ARCHITECTURE

One common system and architecture shared across M1, M2 and M3



EXAMPLES FOR UNIFIED SYSTEMS

AFC

CSMOA

EARS

DMRS



Super System



Top-Tier Integration & Oversight Management Layer



DEFINITION

A centralized solution enabling the operator or an authorized emergency authority to monitor a specific system across all Metro lines (M1, M2 and M3) from a single location



SYSTEM ARCHITECTURE

Independent line systems connected to an additional centralized supervision layer



EXAMPLES FOR SUPER SYSTEMS

TMM

CSOC

MMIS

PSIMS

Critical Systems



Communication:

Wired, Wireless, Operational Radio, Emergency Networks, Cellular, WIFI



Security Layers:

Information Security System (ISS), Physical Security Systems



Computing Infrastructure:

Data Centers ,Cloud ,Workstations ,Laptops



Industrial Control:

SCADA, PLCs, HMIs



Control & Integrations:

Command & Control (C2), Integration Systems, Operational Management



Transit Core:

Signaling and OCC

The Owner may impose participation restrictions on competition, criminal or national security grounds, in accordance with applicable law, including with respect to specific parts or aspects of the process or project.

Thank You & Shalom





MR. DAVIDE CURION
METPRO - DESIGN AND TECHNICAL DIRECTOR

Railway Systems and Rolling Stock General Requirements

Davide Curioni
Design and Technical
Director-Metpro

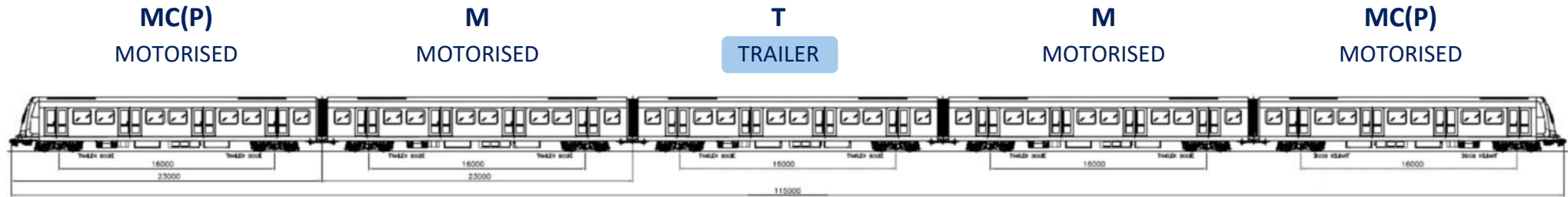


Rolling Stock - Design Overview

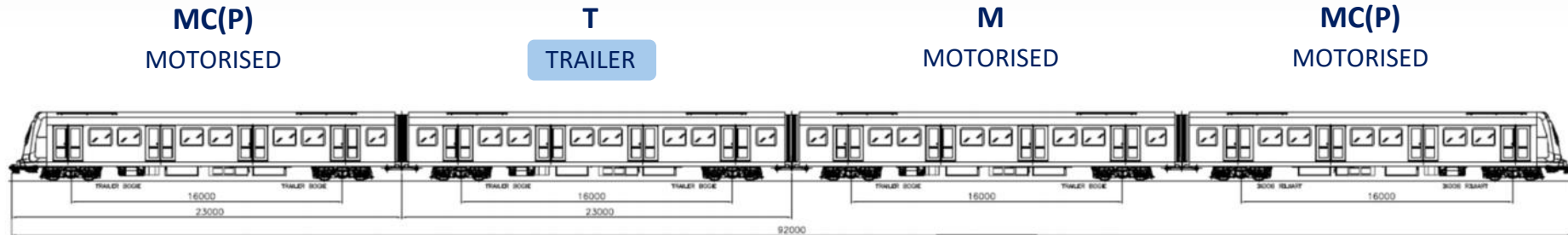
Approx. Passenger Capacity derived based on load according to IS 5350, EN 15663, EN 13452-1 standards

	M1 Trains		M2/M3 Trains	
Number of Cars	5		4	
Approx. Length	115 m		95 m	
	Total Train Capacity		Total Train Capacity	
	Seats (longitudinal)		Seats (longitudinal)	
Nominal Capacity (approximate) (4p/sqm standing)	~1,070		~860	
	~20%		~20%	

Rolling Stock - Design Overview



M1 TRAIN: 5 cars • MC(P) – M – T – M – MC(P)



M2/M3 TRAIN: 4 cars • MC(P) – T – M – MC(P)

Rolling Stock - Overall Parameters 1/2

Sl.no.	Parameter	Value
1	Train power supply voltage system	1500v DC
2	Nominal track gauge	1435mm
3	Axle Load	~17 tons
4	Gauge of the Rolling Stock	range 3.05 to 3.20 m
5	Train design speed	90kmph
6	Operational speed	80kmph
7	Minimal track radius	100 m in Depot 250 m on the line
8	Train length	115m (5 car configuration) M1 95m (4 car configuration) M2/M3

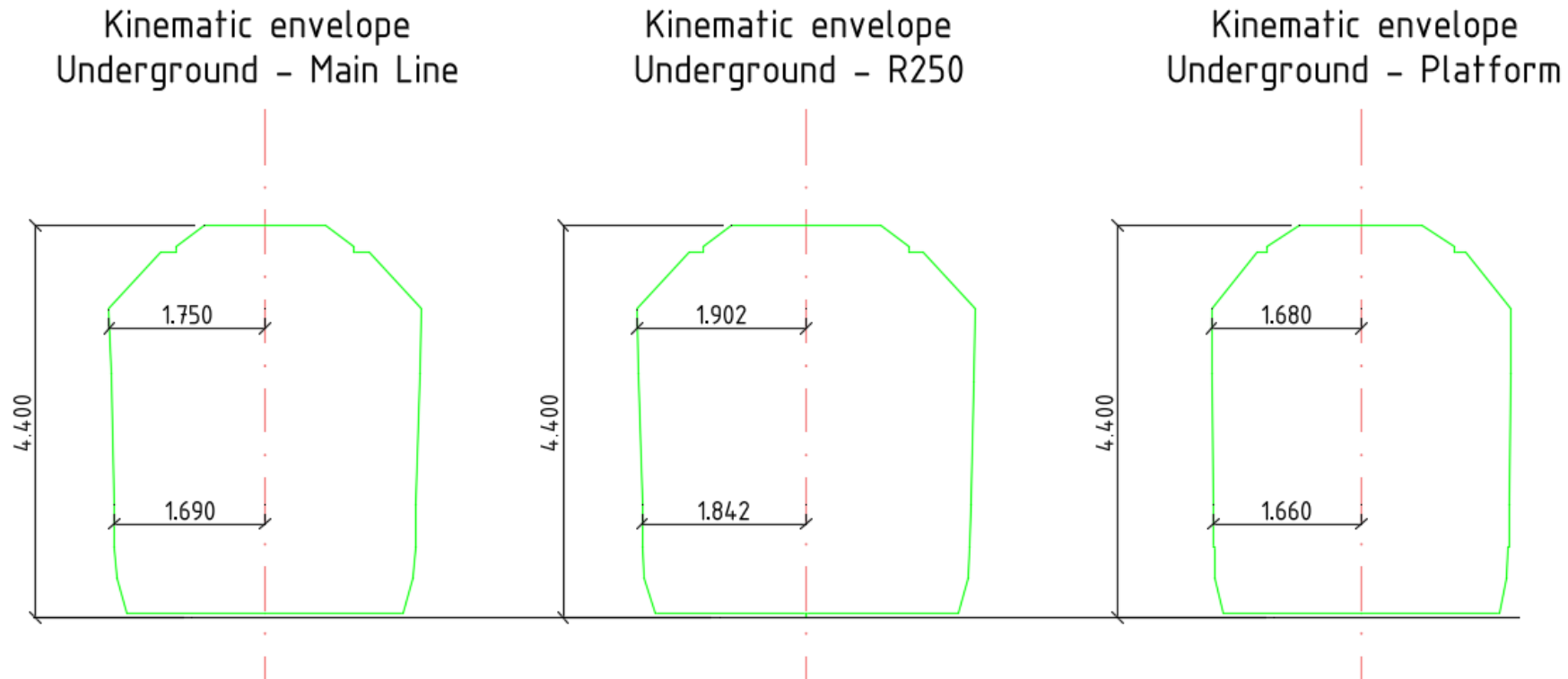
Rolling Stock - Overall Parameters 2/2

Sl.no.	Parameter	Value
9	No. of Doors per car per side	4 Doors per side
10	Nominal floor height of the car body	Between 1000 to 1140mm from TOR
11	Grade of Automation	GoA4 (UTO mode)
12	Maximum acceleration	1.3 m/s ²
13	Maximum service brake deceleration	1.2 m/s ²
14	Maximum emergency brake deceleration	1.3 m/s ²
15	Car body material	Aluminum or Stainless Steel - Wrapped

Rolling Stock - DKE

Train Universal Kinematic Envelope:

defined according to market survey / capability and mandatory for Infra#2 bidders



Rolling Stock - On Board Communication systems

The Rolling Stock shall include **On-board Communication systems** such as:



Passenger
Announcement



Passenger
Announcement



CCTV
connected to OCC



Help
points

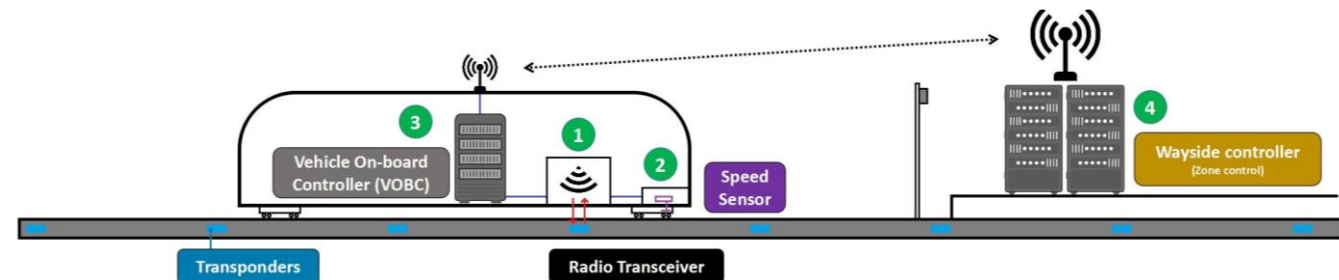


Radio
Systems



Wi-fi
public/staff

Additionally, trains shall accommodate and fully integrate **On board Signalling System** for GoA4 driving.



Rolling Stock - Fleet

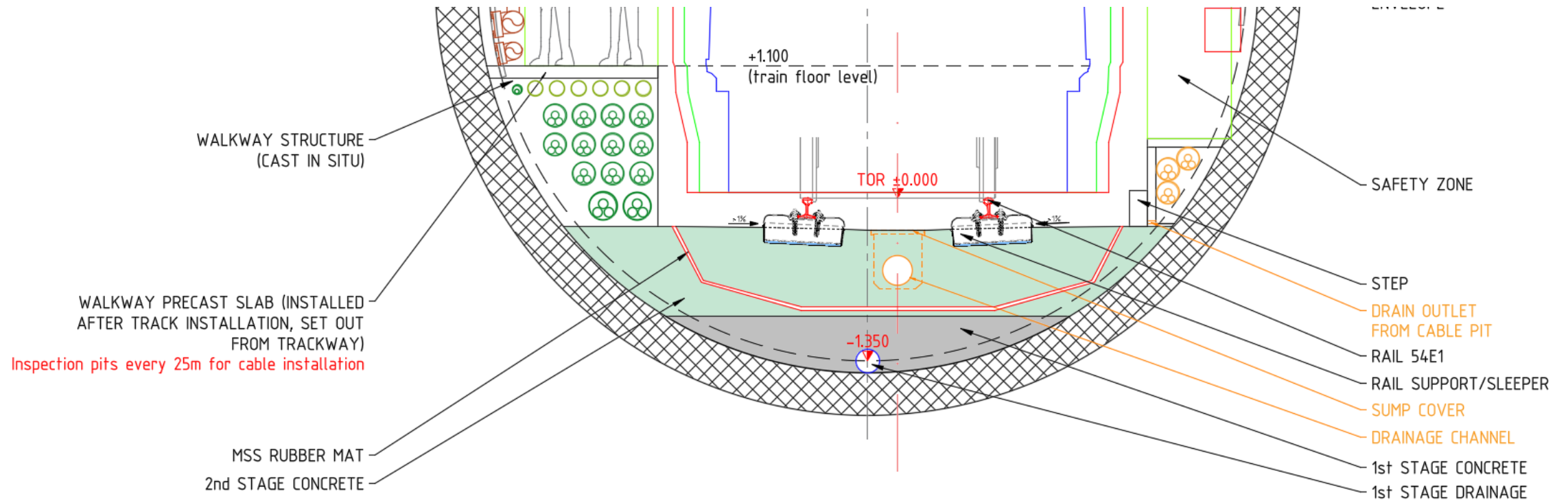
	Max Future Capacity (including reserve)	
	Headway	No. Trains
M1	90 / 180 s	128
M2	90 s	62
M3	120 s	61(*)

(*) including Airport Shuttle branch

Tunnel Cross Section - Tracks

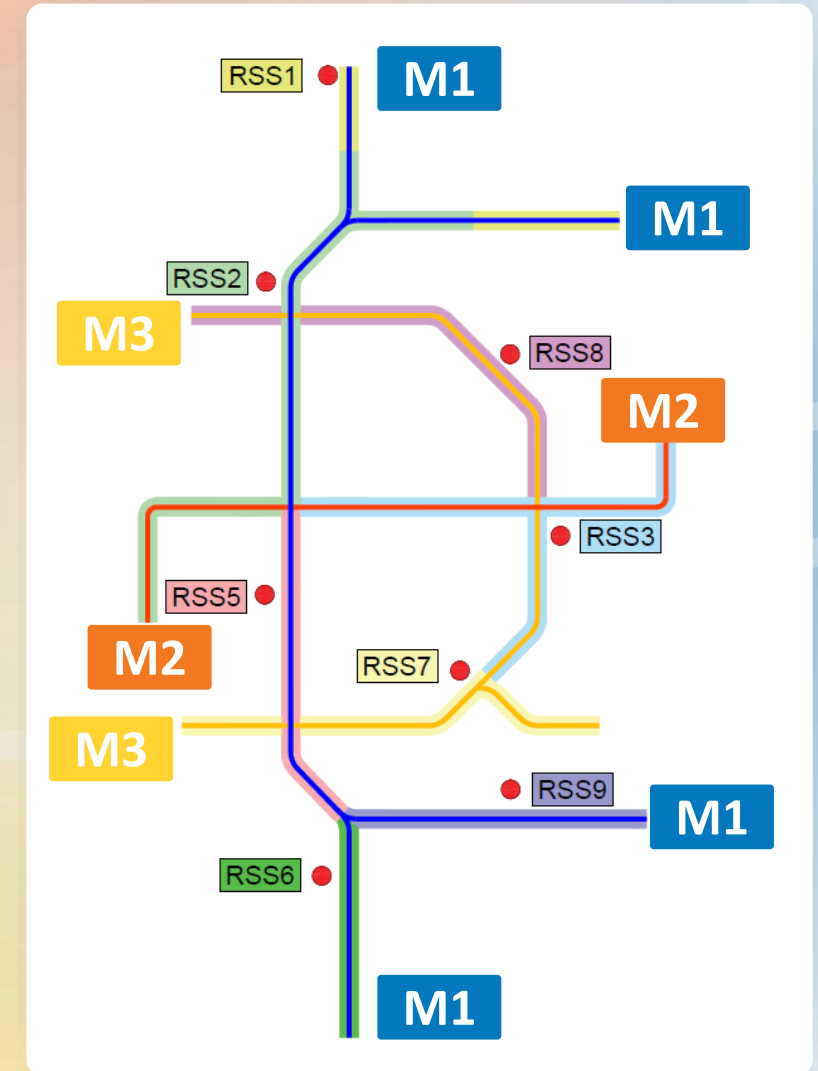
Mainline Tracks are Ballastless tracks on independent booted blocks.

Cross section space proofing for wide Mass Spring System where required

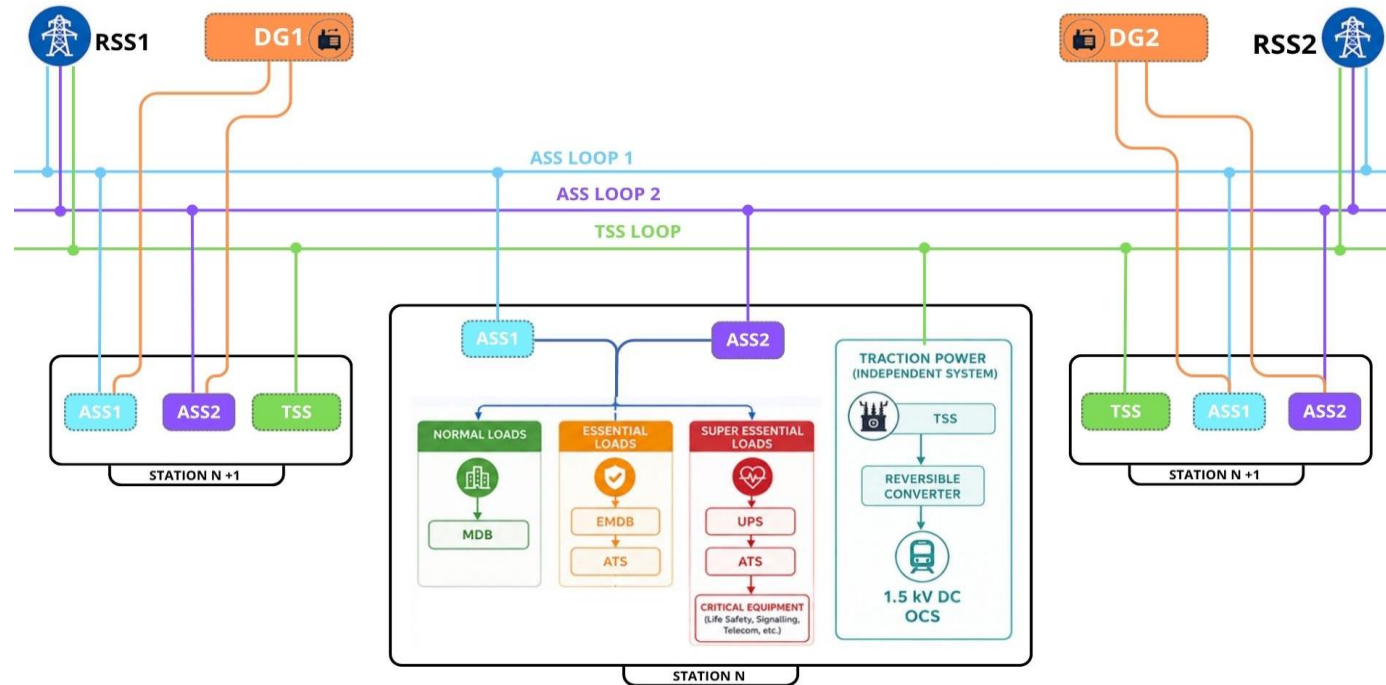


Power and Traction - Receiving Substations

- The full Metro Network (M1 – M2 – M3) is fed by **8 HV** (161 kV) Receiving Substations (**RSS**)
- RSS 2-5-6-7-8 are part of Execution Stage 1
- Construction and Electrification of Receiving SubStations is handled by NTA.
- Infra 2 Contractor shall operate and maintain the relevant RSS.



Power and Traction - Power Feeding Scheme



REDUNDANT SUPPLY

Dual MV rings (IEC Loops) and dual EASS ensure high availability.



RELIABLE BACKUP

DGs provide backup to essential loads through ATS.



CONTINUOUS POWER

UPS ensures uninterrupted power for critical and safety systems.



DEDICATED TRACTION

1.5 kV DC traction power supplied independently for optimal reliability.

Note: DG – Diesel Generator | EASS – Earthing and Switchboard (MV) | MDB – Main Distribution Board
EMDB – Essential Main Distribution Board | ATS – Automatic Transfer Switch | UPS – Uninterruptible Power Supply

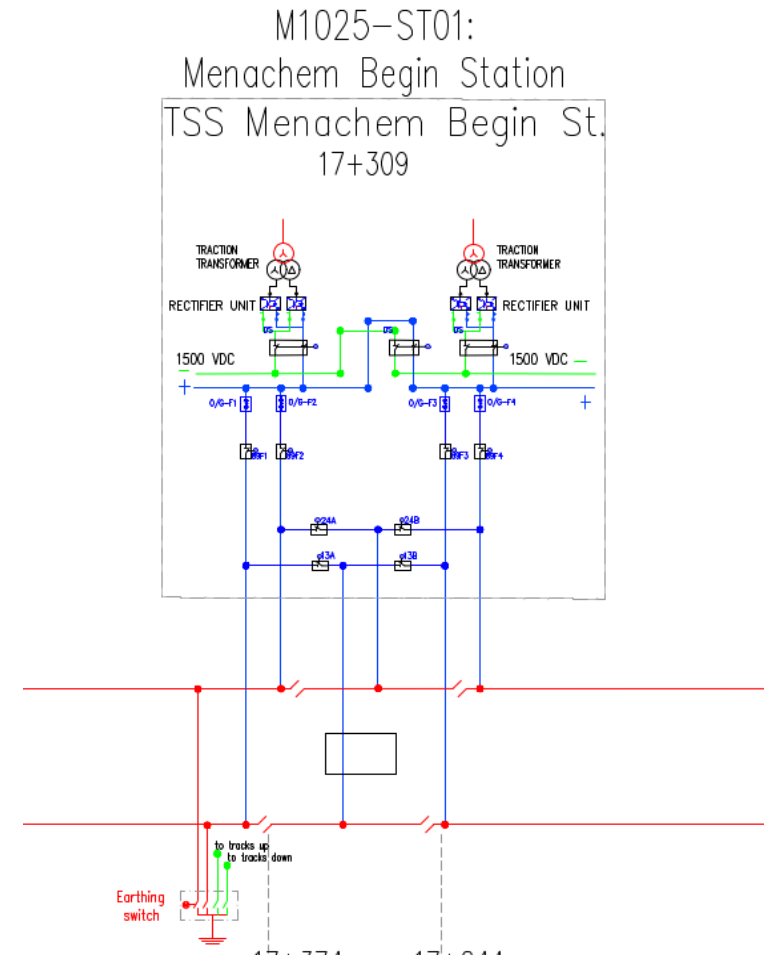
Power and Traction - Quantities

	Auxiliary Substations (ASS)		Traction Substations (TSS)		DG Set locations	
	No.	Size (Tentative)	No.	Size (Tentative)	No.	Size (Tentative)
M1 – Stage 1	54	3 MW	16	5.5 MW	4	3 to 4 DGs 2.5 MVA each
M1 – Stage 2	100		31		6	
M1 – TOT	154		47		10	
M2	66		14		1+1	
M3	80		18			

Power and Traction - Catenary System

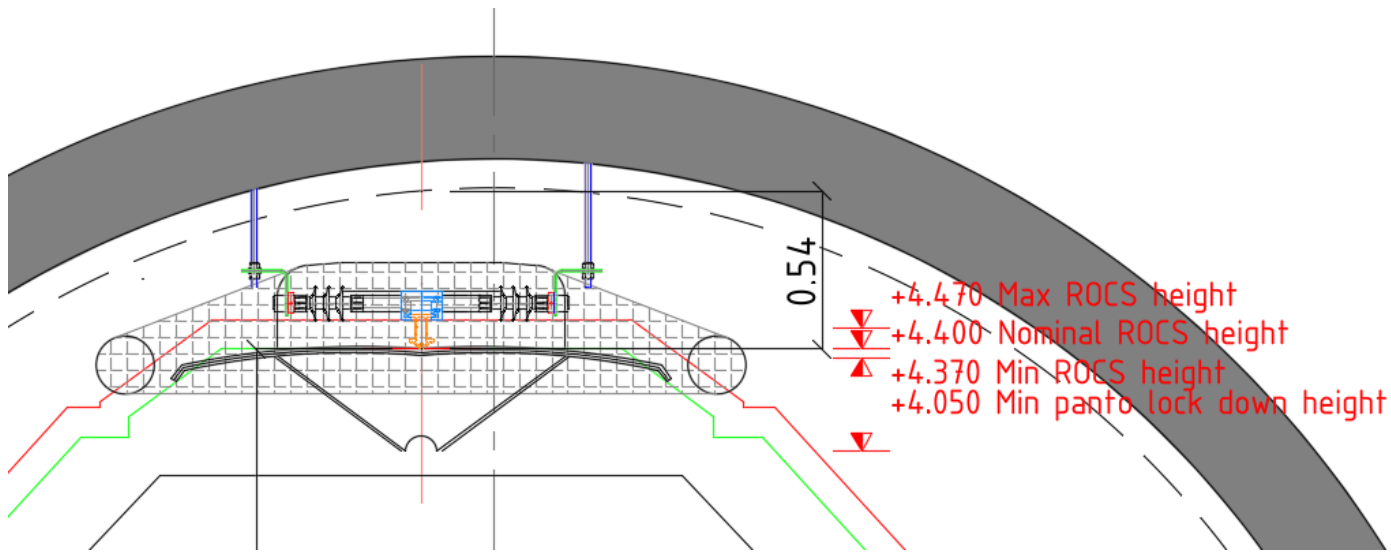
MAINLINE TSS FEEDING SCHEME TO OCS

- Traction supply to ROCS is fed as shown in the diagram below, i.e. traction power to each side of gap is fed by one HSCB.
- There is one power section at the station area called “neutral section” with a physical gap with left and right side of section, this section is separately fed through disconnector switch as shown in diagram, TSS look like “TTT” as a feeding arrangement.



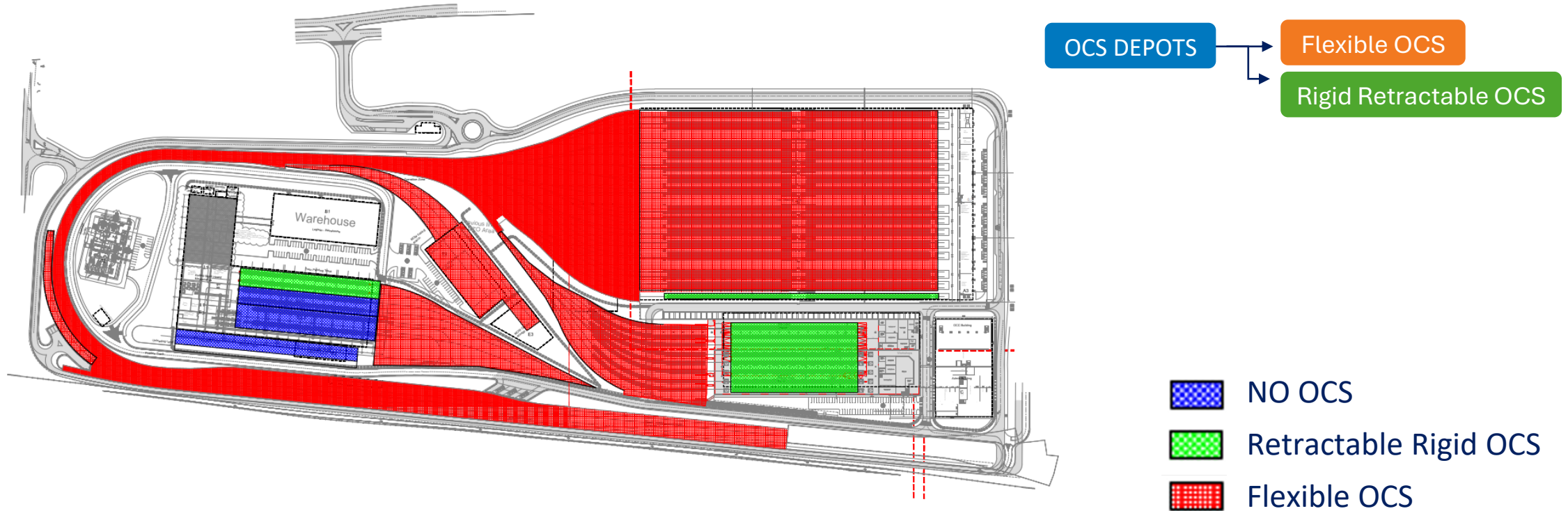
Power and Traction - Catenary System

Typical OCS Tunnel Cross-section



Power and Traction - Catenary System

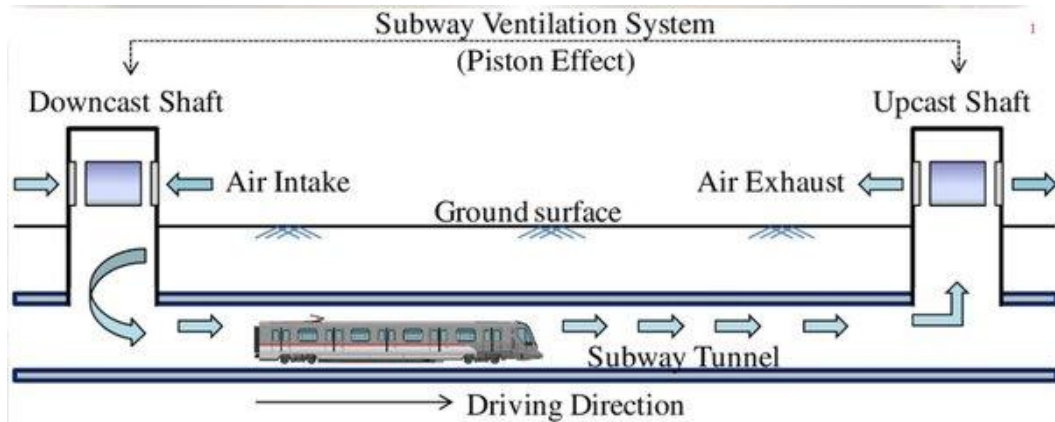
Example M1 Depot Ha Rishonim



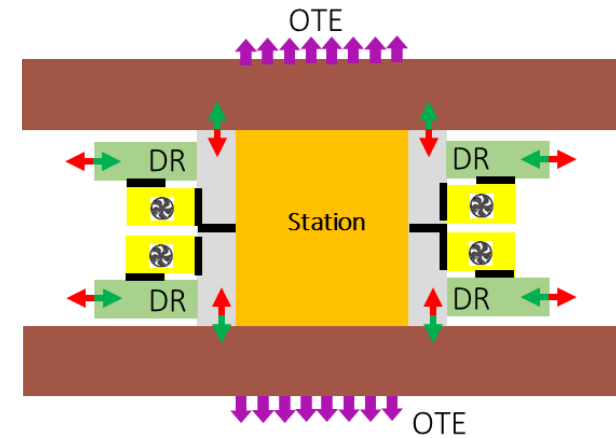
Tunnel Ventilation - Concept & Operating Modes

Normal Mode

Piston effect in normal mode



TVS operation in normal mode



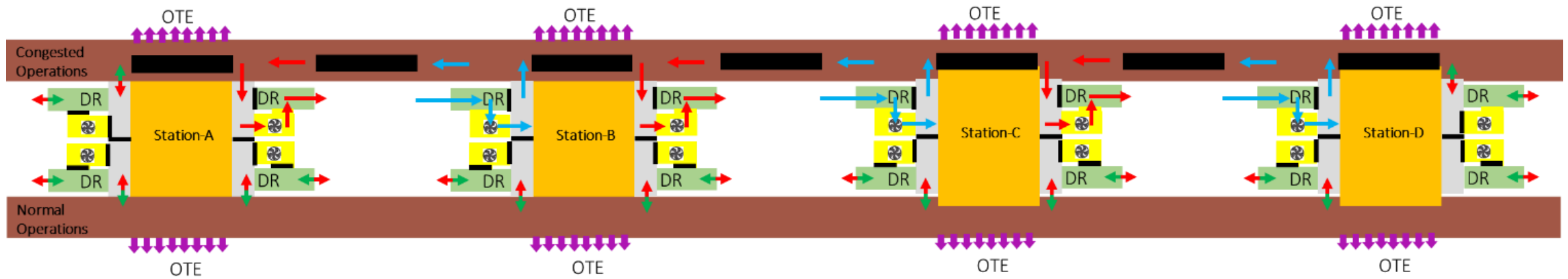
Functions:

- Maintain pressure transients caused in the station areas within acceptable range
- Maintain tunnel and trackway within 40°C

Tunnel Ventilation - Concept & Operating Modes

Congestion Mode

TVS operation in congestion mode

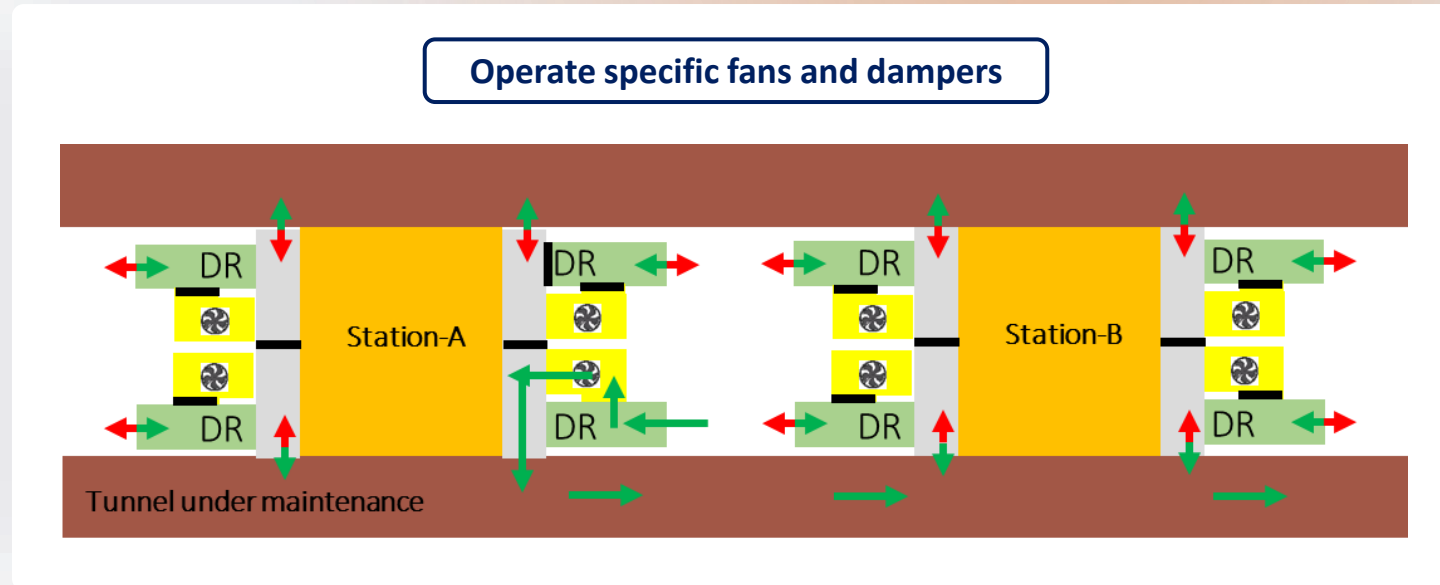


Functions:

- Maintain tunnel and trackway within 45°C

Tunnel Ventilation - Concept & Operating Modes

Maintenance Mode



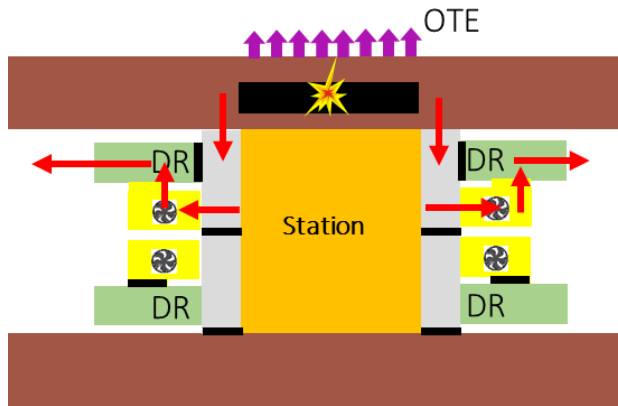
Functions:

- Provide air changes to create thermal comfort during engineering hours
- Induce outside air in non-revenue hours to cool tunnel air temperature, if required
- Enable testing for individual components

Tunnel Ventilation - Concept & Operating Modes

Train Fire in Station

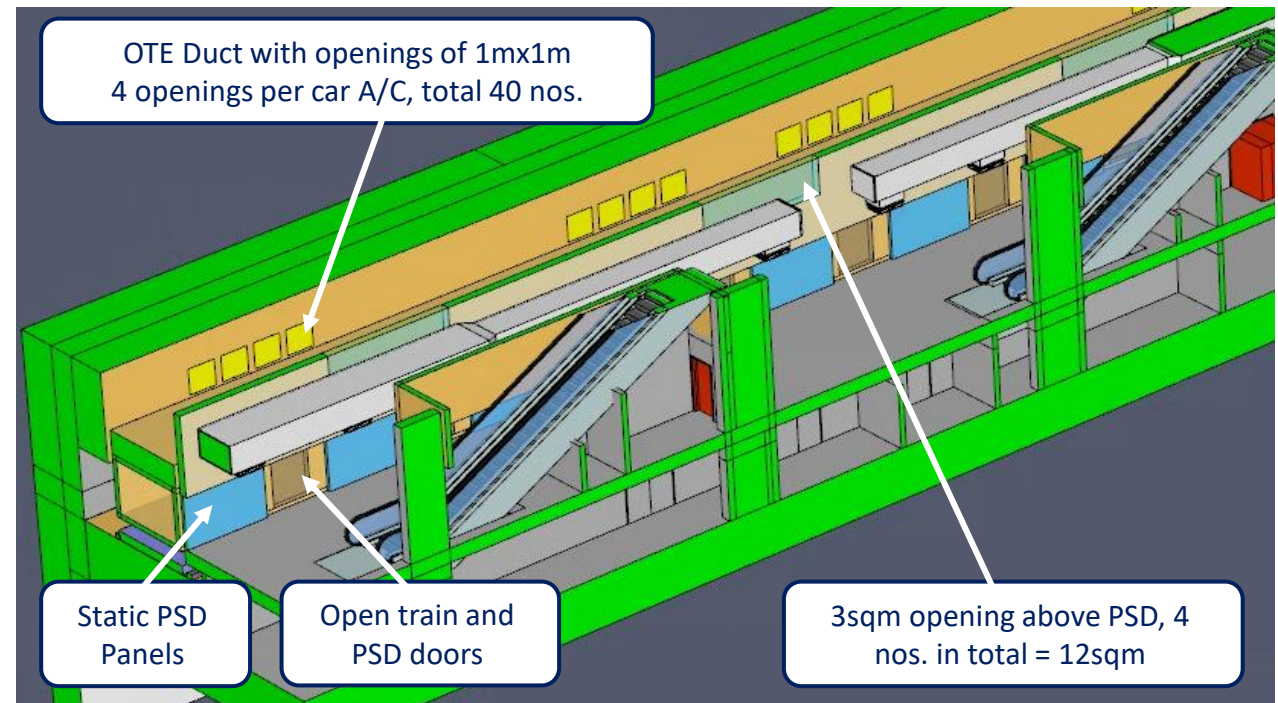
TVS operation in train fire at station mode



Functions:

- Removal of smoke to create tenable escape route in platform

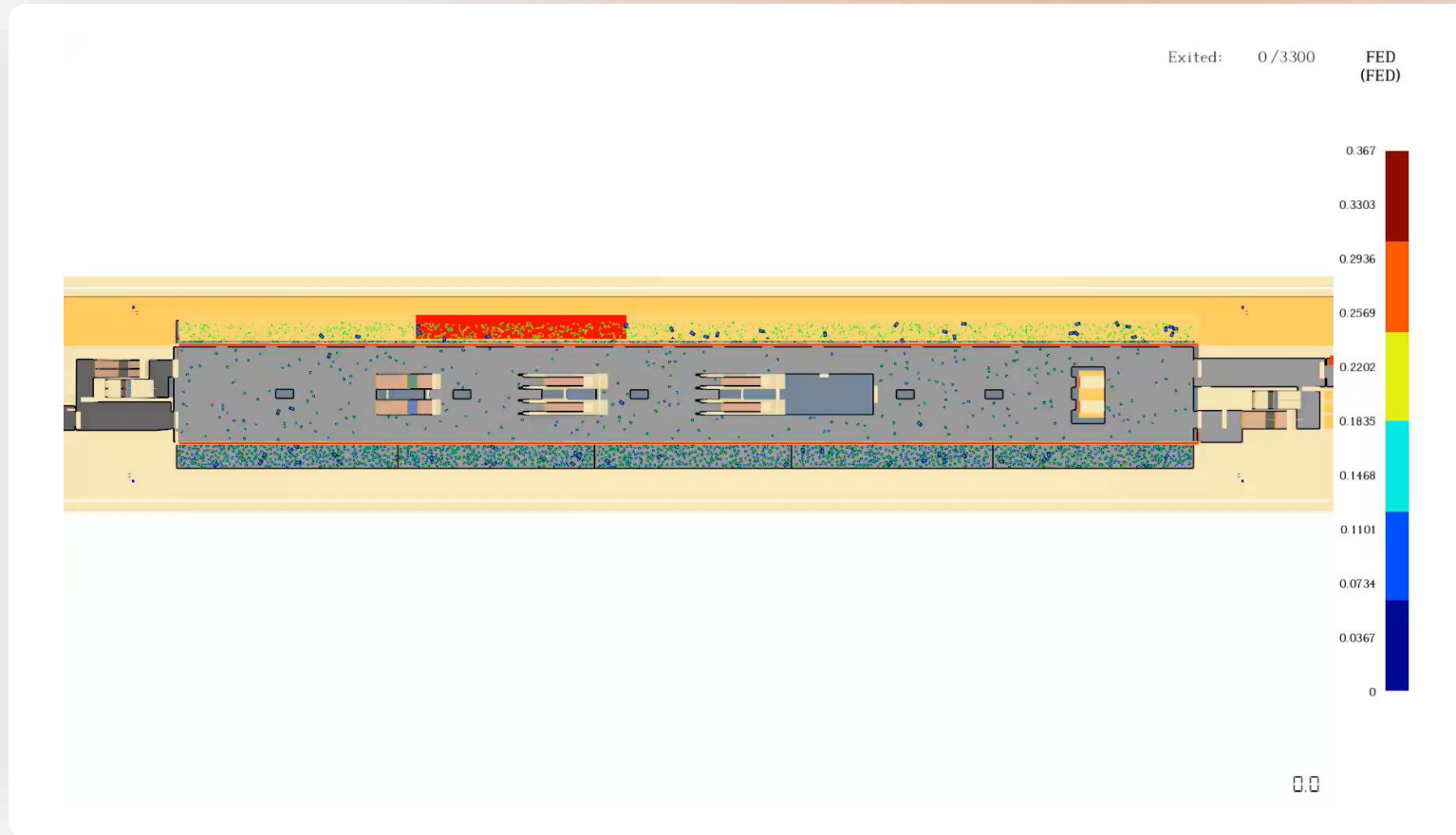
CFD Model



3D detail view of Platform

Tunnel Ventilation - Concept & Operating Modes

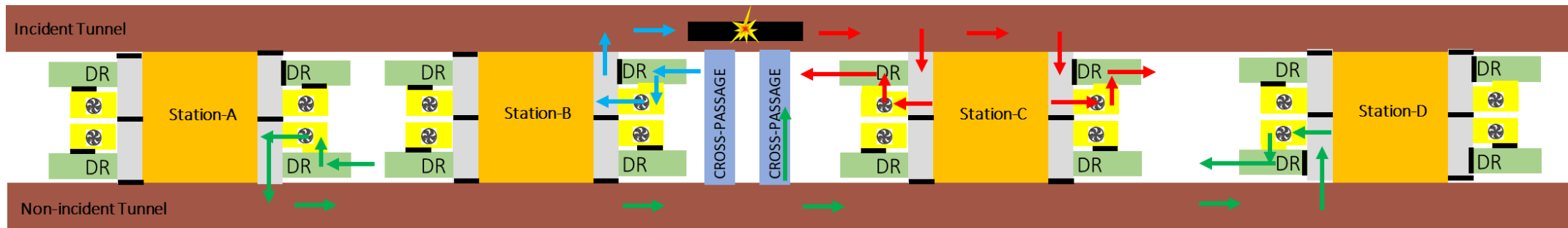
Train Fire in Station – Integrated CFD & Evacuation Simulation Result



Tunnel Ventilation - Concept & Operating Modes

Train Fire in Tunnel

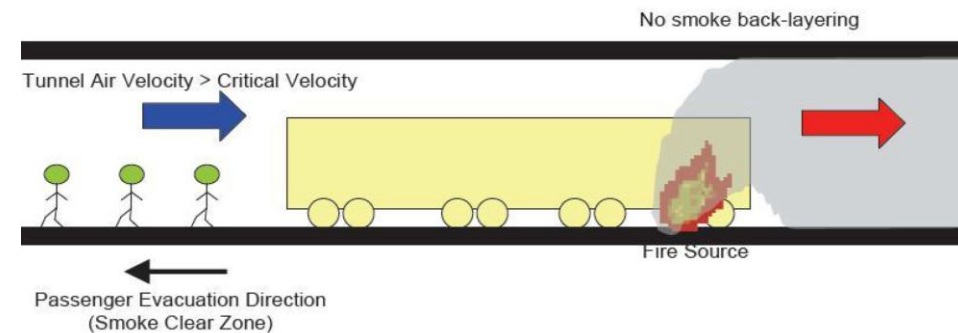
TVS operation in tunnel fire mode



Functions:

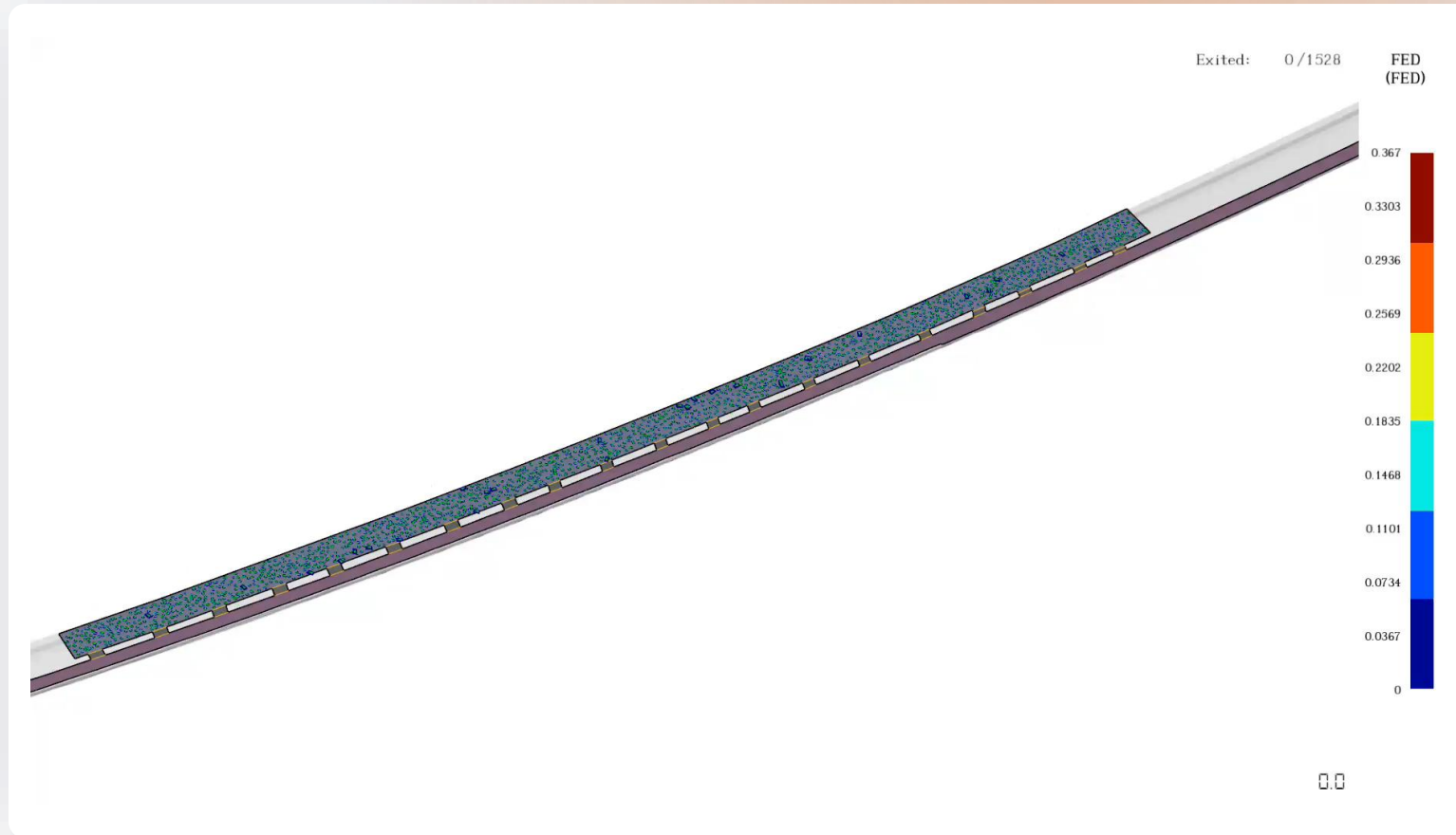
- Removal of smoke and supply of adequate fresh air calculated in line with required **critical velocity**, during tunnel emergency conditions

Environment to be ensured by TVS operation in tunnel fire



Tunnel Ventilation - Concept & Operating Modes

Train Fire in Tunnel – Integrated CFD & Evacuation Simulation Result



Tunnel Ventilation - Quantities

Line	Stage 1	Stage 2
M1 - TV Fans	117	236
M1 - OTE Fans	40	90
M2 – TV Fans	95	N.A
M3 – TV Fans	89	47

Thank You & Shalom





MR. JOAO MAGANO
DAN RAIL - O&M DIRECTOR

Depots and Stations General Requirements

João Magano

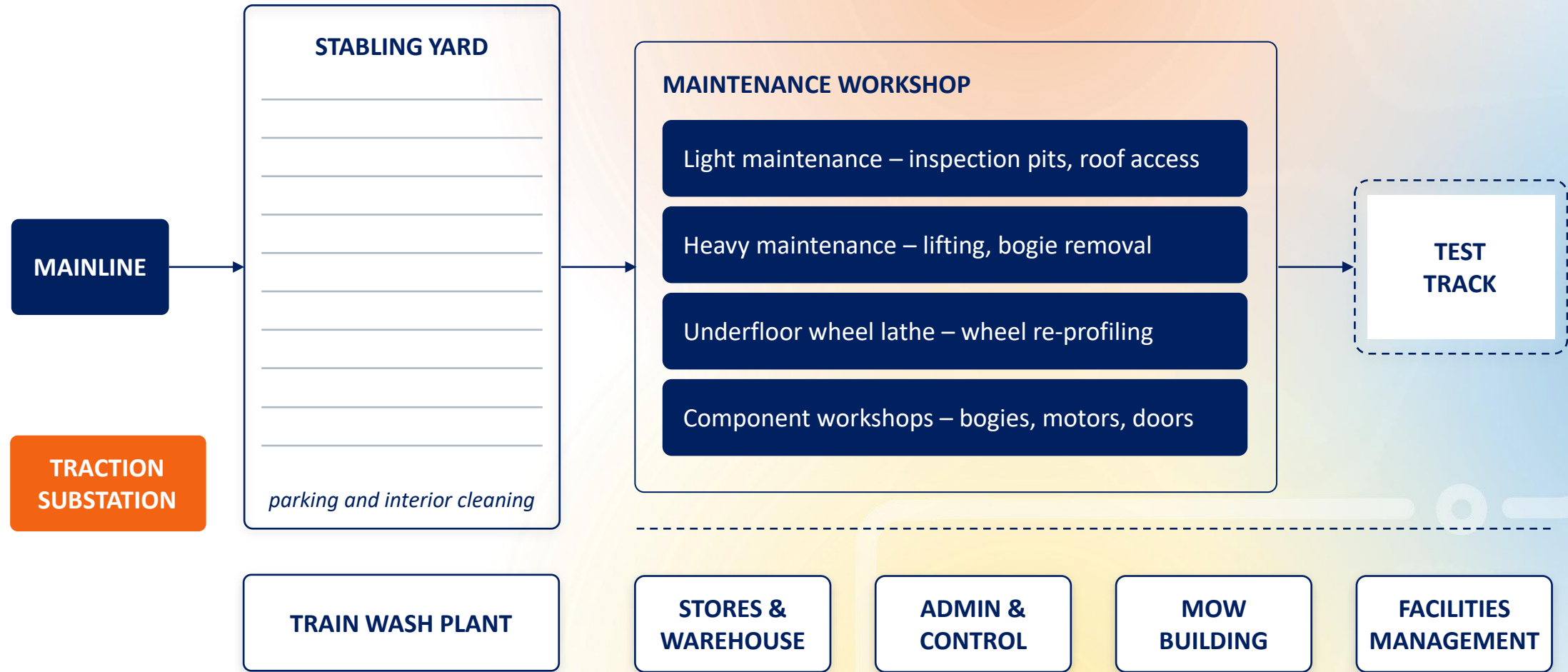
O&M Director – Dan Rail



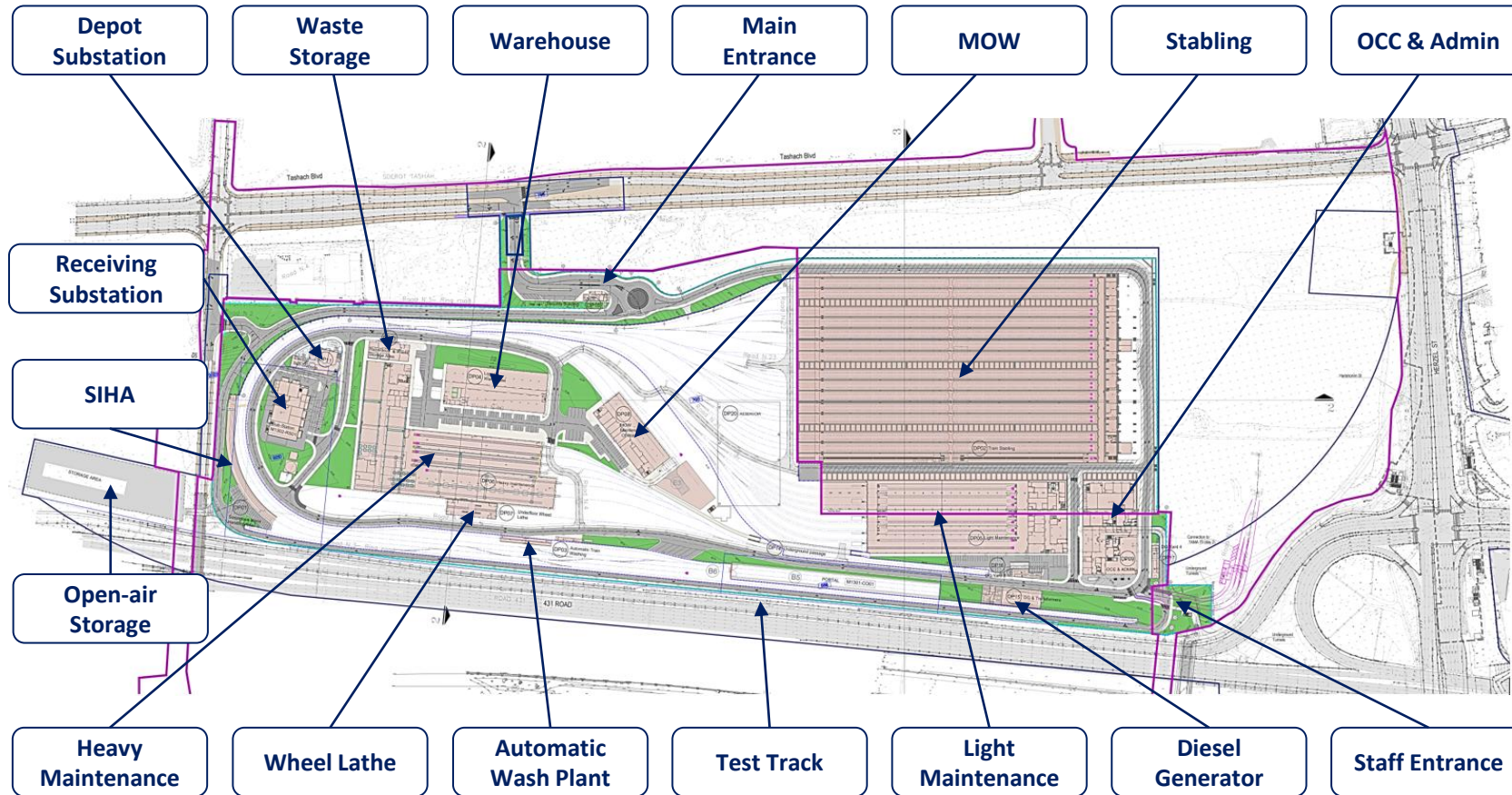
Depots

Four depots across the three lines –
layouts, buildings and equipment

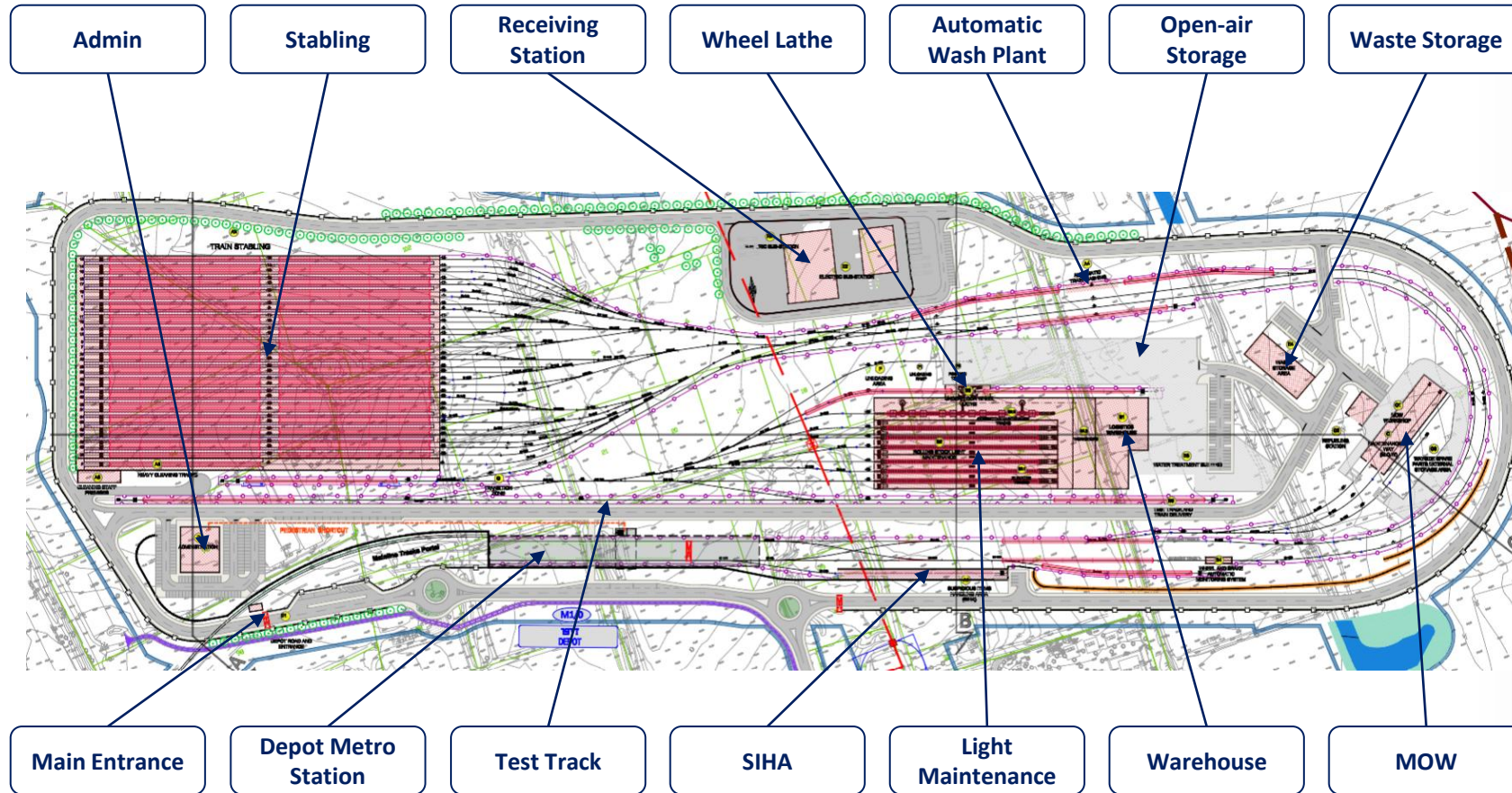
Inside a Metro Depot



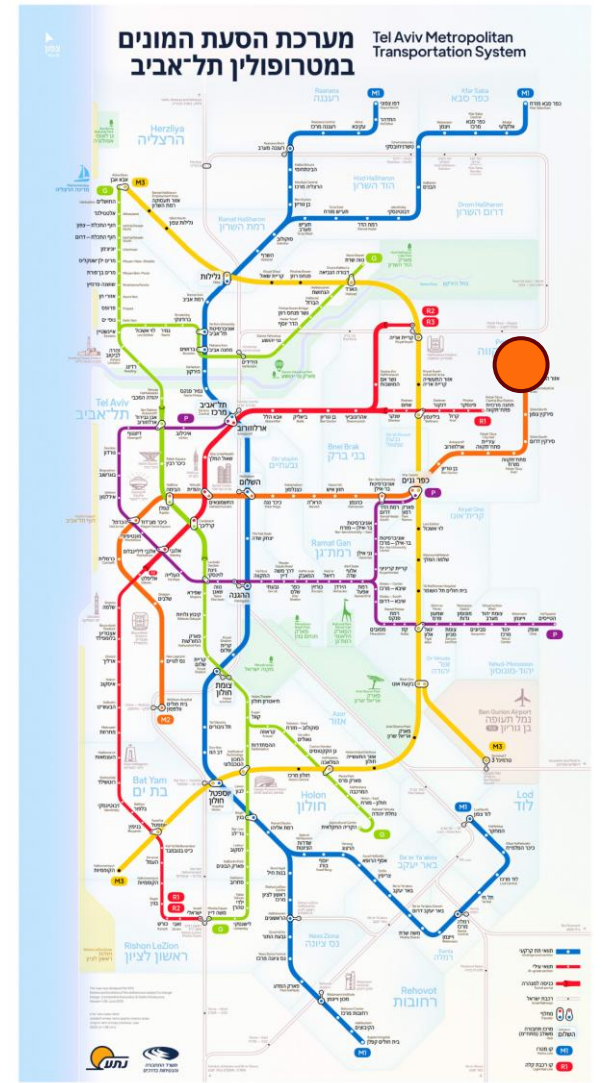
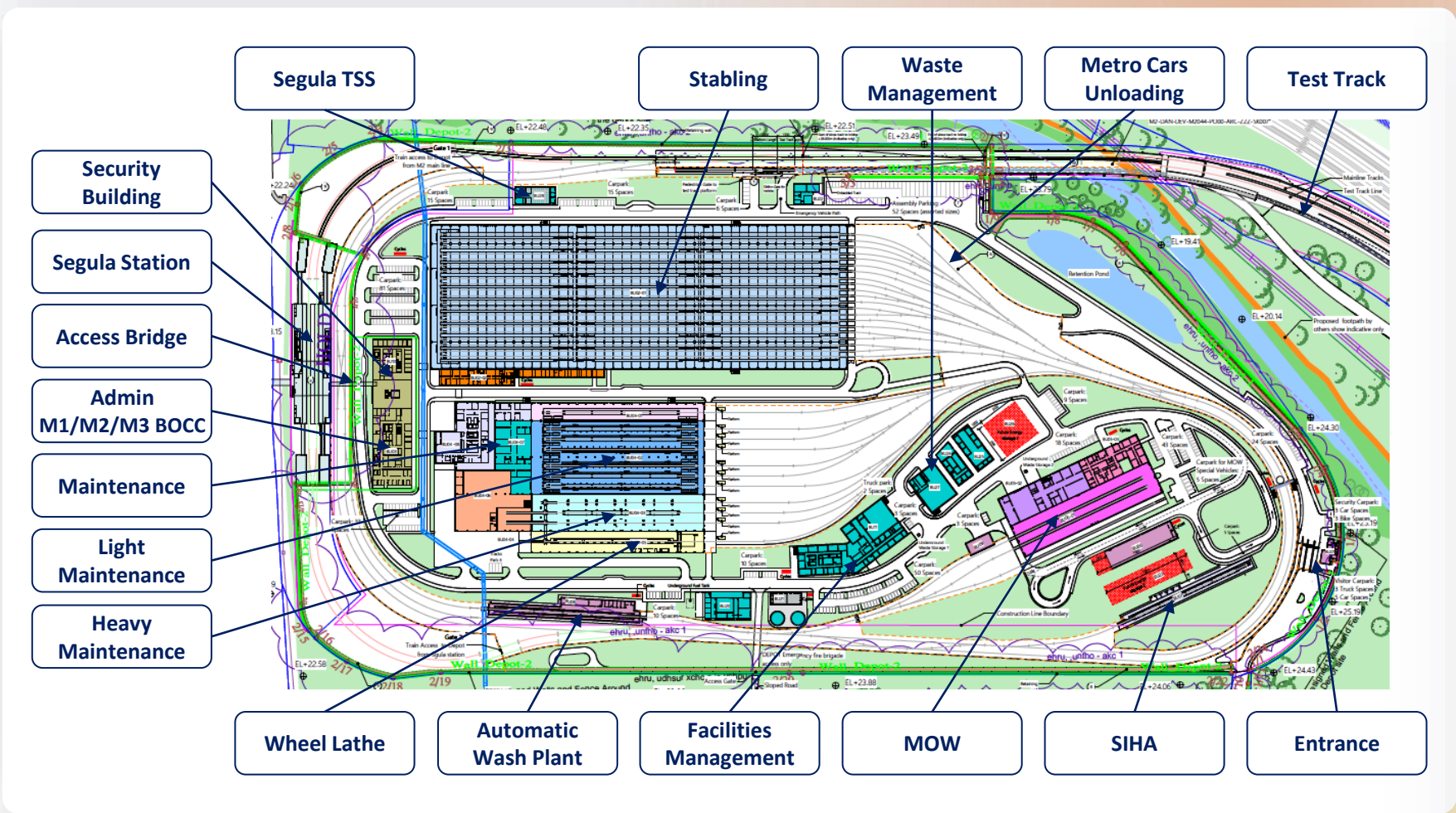
Depot Harishonim (M1-South) Layout



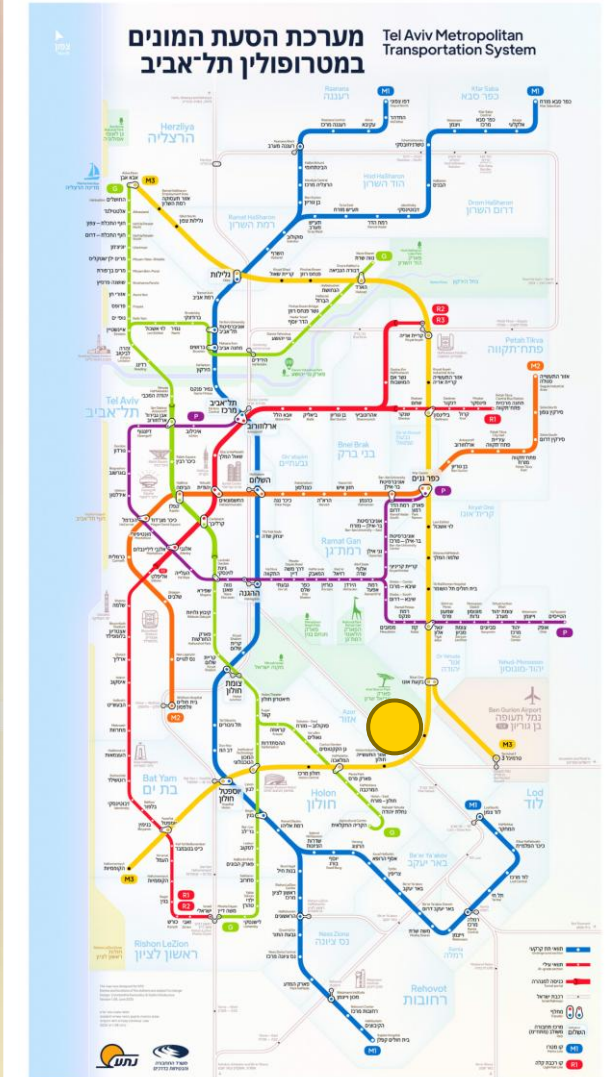
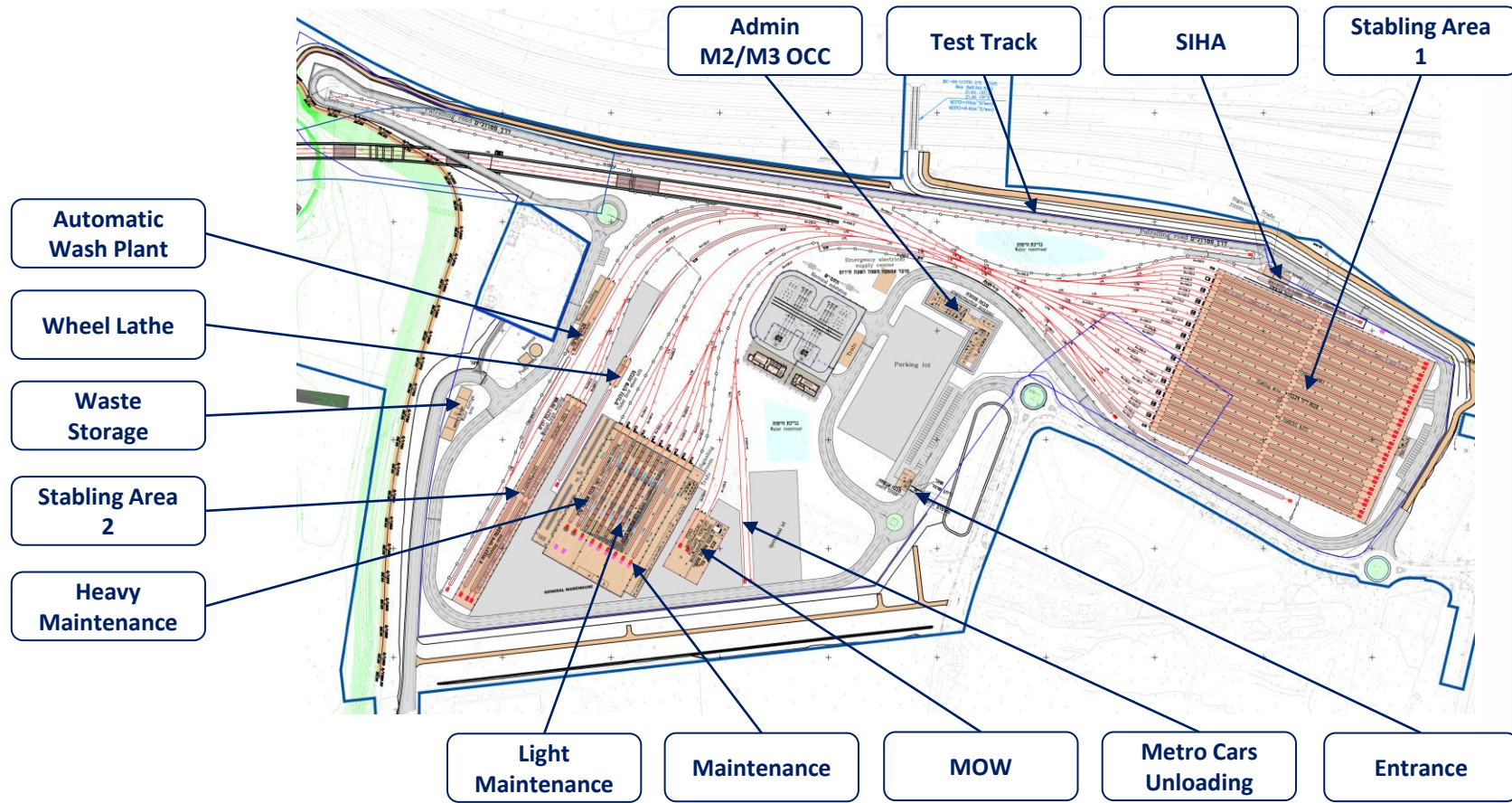
Depot Ra'anana (M1-North) Layout



Segula Depot (M2) Layout



Mesubim Depot (M3) Layout



Depots in Numbers

Buildings	M1 Harishonim	M1 Ra'anana	M2 Segula	M3 Mesubim
Train stabling	58 (28 tracks x 2)	66 (33 tracks x 2)	63 (21 tracks x 3)	62 (28 tracks x 2 + 6 tracks)
Train Light maintenance	8 tracks	6 tracks	6 tracks	5 tracks
Train Heavy maintenance	6 tracks	1 track	3 tracks	4 tracks
Underfloor wheel lathe	1	1	1	1
Automatic train wash	1	1	1	1
Automatic Inspection	1	1	1	1
SIHA (Suspicious Item Handling Inspection)	1	1	1	1
Maintenance of Way	2 int + 2 ext tracks	2 int + 1 ext tracks	2 int + 1 ext tracks	2 int + 1 ext tracks
Admin & OCC	M1 OCC	-	M1/M2/M3 BOCC	M2/M3 OCC
Test Track	1 (80km/h)	1 (80km/h)	1 (55km/h)	1 (80km/h)
Maintenance	Level 1 to 5	Level 1 to 5	Level 1 to 3	Level 1 to 5

Yellow Fleet in Numbers

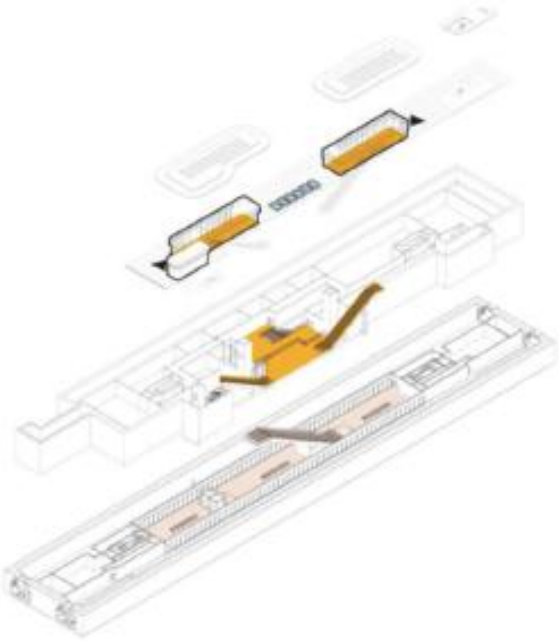
Vehicles	M1 Harishonim	M1 Ra'anana	M2 Segula	M3 Mesubim
Rail Milling / Grinding	1	TBD (Stage 2)	1 (shared between M2 and M3)	
Overhead Line	1		1	1
Rescue Vehicle	1		1	1
Wagons	3 (2 freight + 1 track wagon)		2 (flatbed wagons)	4 (flatbed wagons)
Track Inspection	1		1 (shared between M2 and M3)	
Shunters	5 (1 R/R with cab + 2 R/R without cab + 2 diesel loco tractors)		1	1
Cleaning	1		1 (shared between M2 and M3)	

Station Equipment

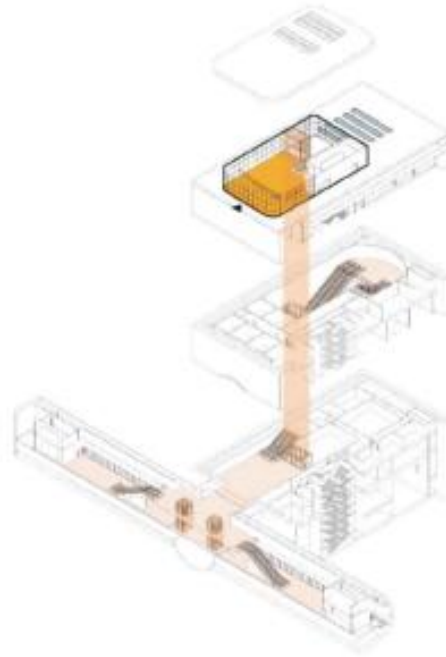
109 stations, three construction methods –
Cut and cover, mined (NATM), and at-grade

109 Stations

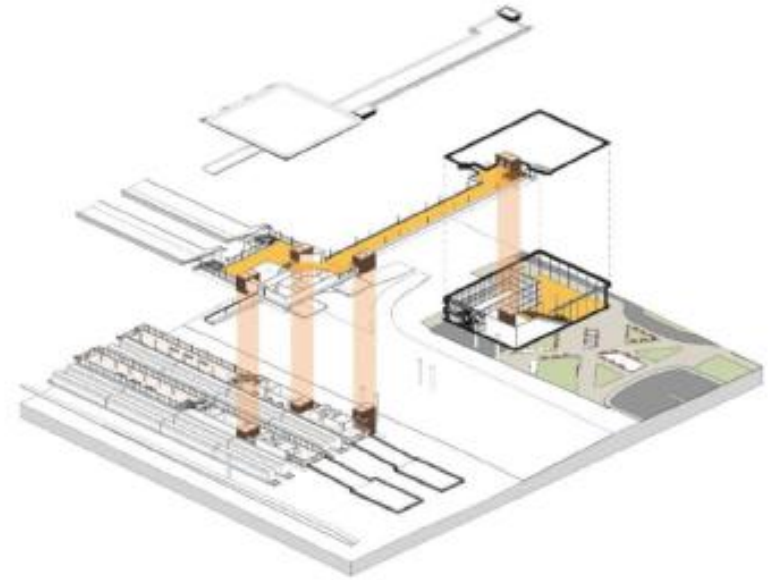
CUT AND COVER x99



MINED x8



AT GRADE x2



Cut and Cover Stations - Levels

M1

M2

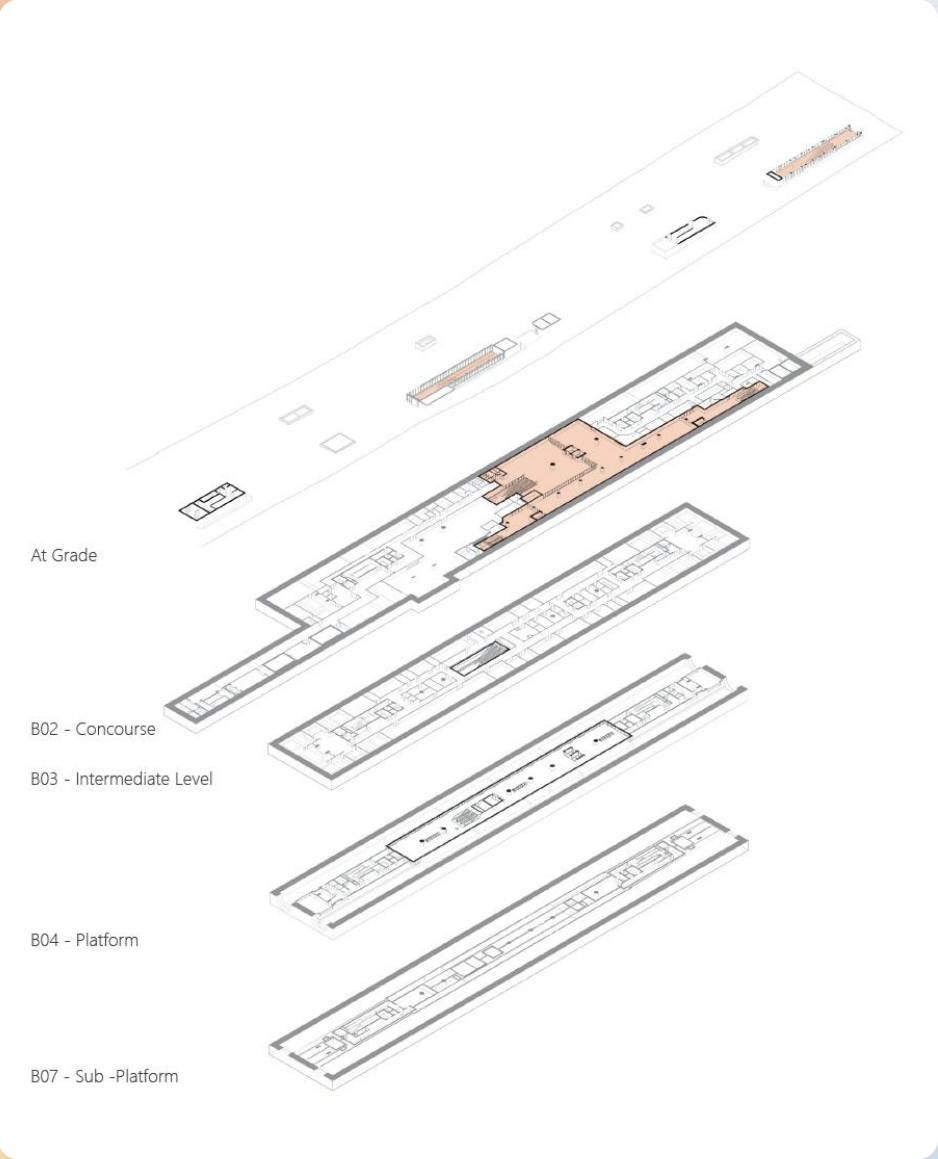
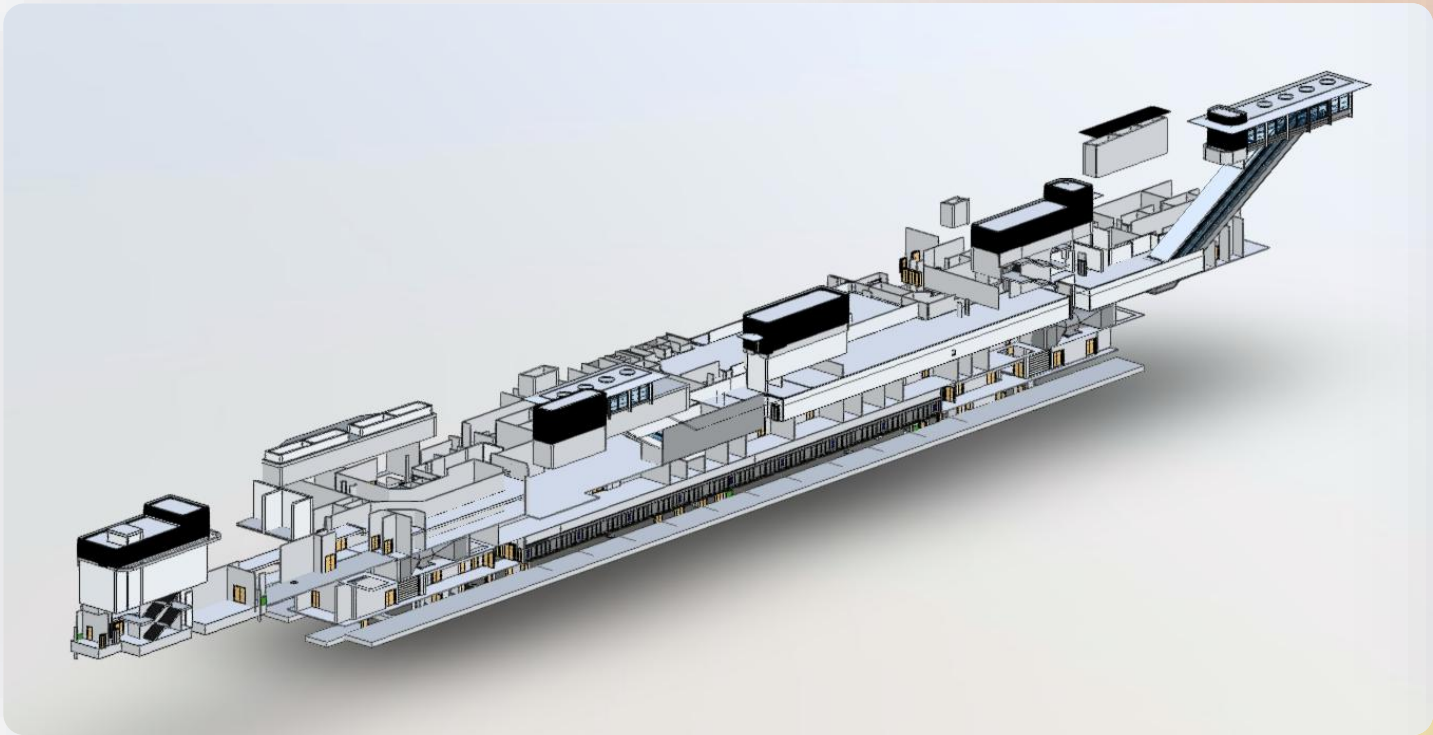
M3

Line M2 - Bar Ilan University Station

61

13

25



Mined Station - Levels

M1

0

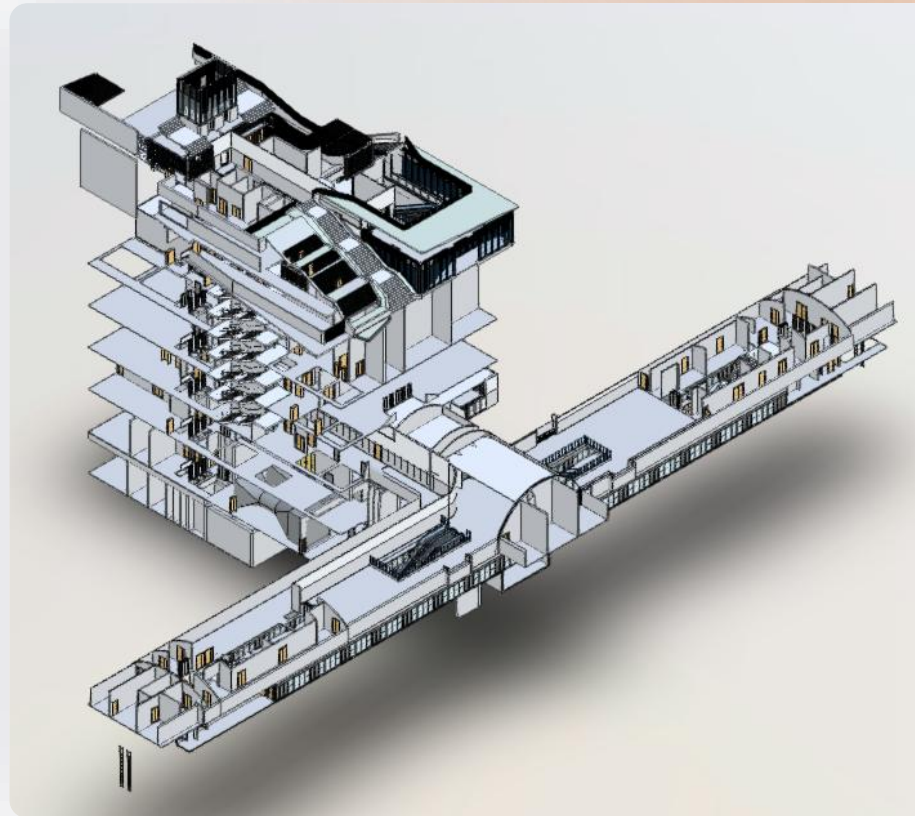
M2

8

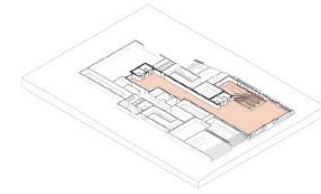
M3

0

Line M2 – Hazon Ish Station



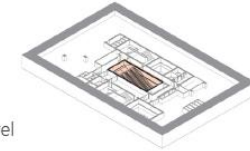
At Grade



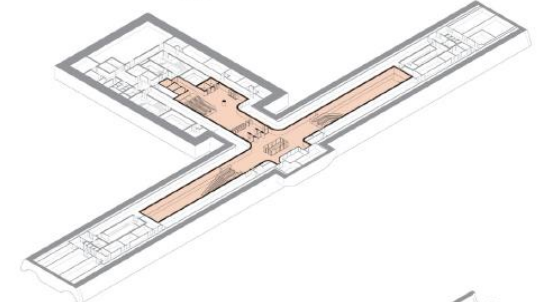
B02 - Intermediate Level



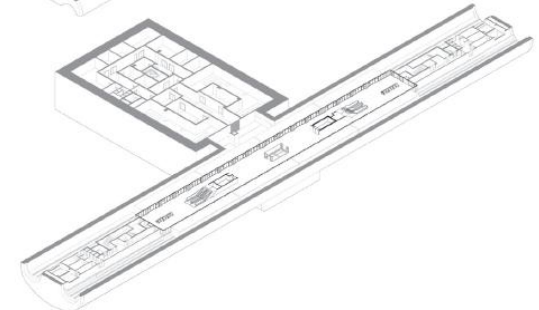
B03 - Intermediate Level



B04 - Concourse



B05 - Platform



At Grade Stations - Levels

M1

M2

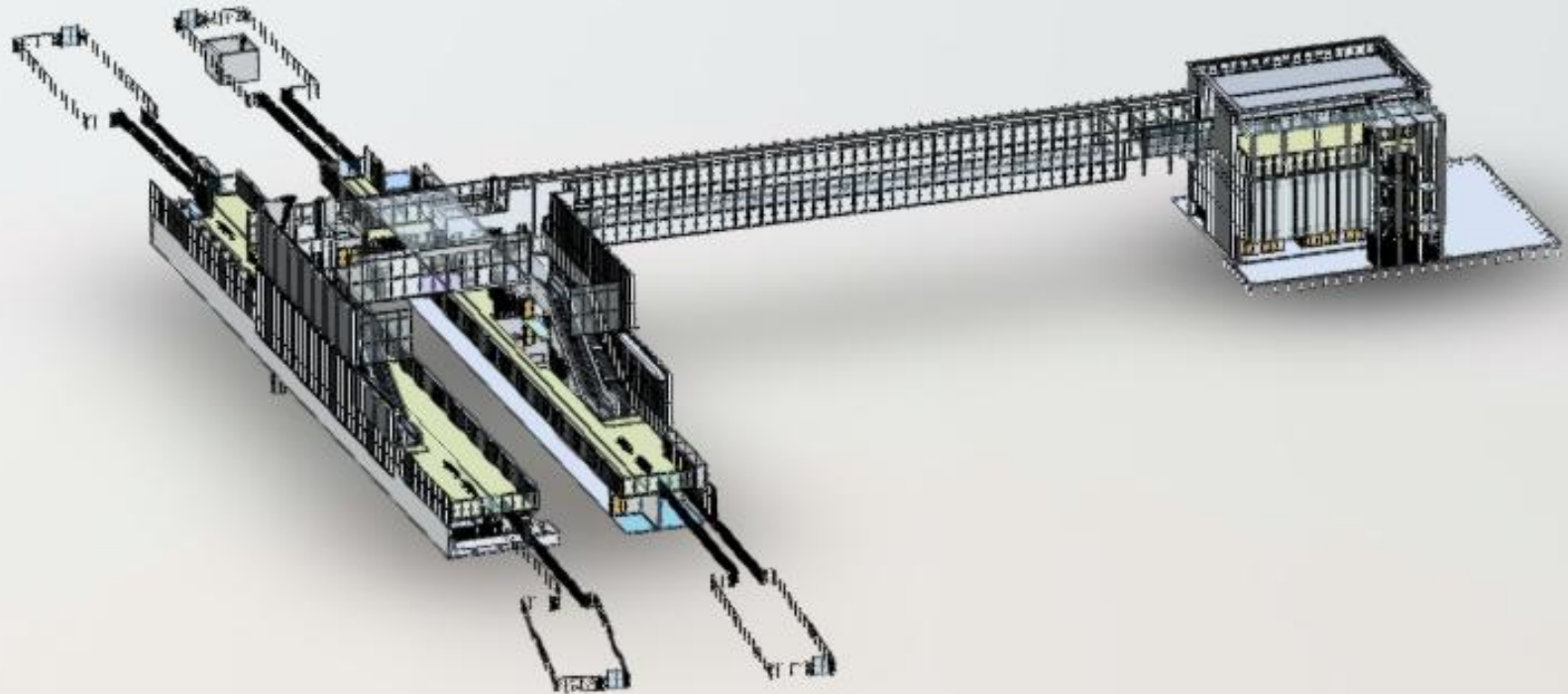
M3

1

1

0

Line M2 – Segula Station



Station Systems – Common Across All 109 Stations

Passenger Experience

Safety & Operations

Power & Infrastructure

Platform screen doors	Fire & life safety	Traction, MV & LV
Escalators	Video surveillance	UPS & standby generation
Elevators	Signaling & Train Control (GoA4)	OCS (Overhead Catenary System)
Passenger information (PIS)	SCADA	Earthing and bonding
Passenger announcement (PA)	Control & monitoring	HVAC, AHU, chillers & pumps
Automatic fare collection	Tunnel & station ventilation (C&C and Mined)	Track
Digital and communication		

Thank You & Shalom



M



MR. EMMANUEL REITZ
MLEAD - RAILWAY SYSTEMS LEAD DESIGNER

GoA4 Signaling and Associated Systems General Requirements

Emmanuel Reitz
Railway Systems Lead
Designer— MLEAD



01

Signalling and Train Control

A moving-block CBTC system delivering unattended operation across all lines

The Automation Target: GoA4



Unattended Train Operation as the normal mode

No staff on board: automatic door operation with obstruction detection, guideway protection by platform screen doors, CCTV to a staffed control centre, passenger-operated plungers, and service tailored directly to demand.

99.98%

Availability of the S&TC system and of automated GoA4 functionalities

Interoperable

All trains can travel on all three lines

SIL 4

Interlocking and ATP; ATO and ATS at SIL 2, per EN 50129

Operating Concept by Scenario

Scenario	Normal	Degraded
Passenger trains, mainline	GoA4	GoA2 / 1 / 0
Empty trains, depot and transfers	GoA4	GoA2 / 1 / 0
Maintenance vehicles, everywhere	GoA1	GoA0

Core Technical Requirements

Moving-Block CBTC

Based on the IEEE 1474 and EN 62290 suites; full in-cab signalling

One Supplier for M1 and One for M2/M3

M2/M3 considered as one signaling system. Interoperable with M1 using secondary train detection

Secondary Train Detection

Axle counters as secondary detection and at CBTC boundaries; bidirectional running on all tracks, right-hand as normal direction.

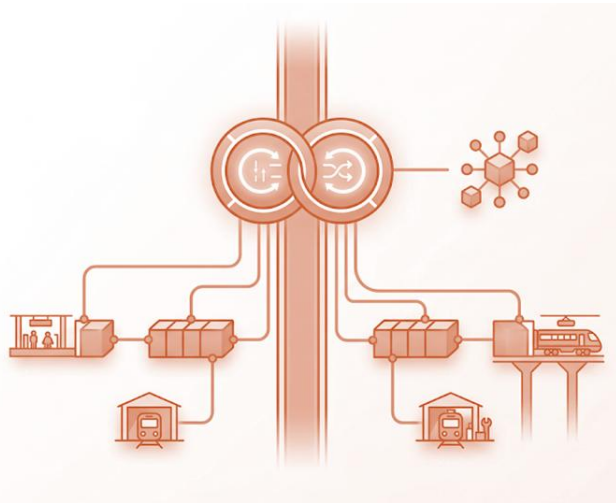
Managed Degraded Modes

Delocalisation, temporary loss of communications, remote restart of wayside and onboard ATC, and restoration of automatic operation from OCC or BOCC.

Architecture and Resilience

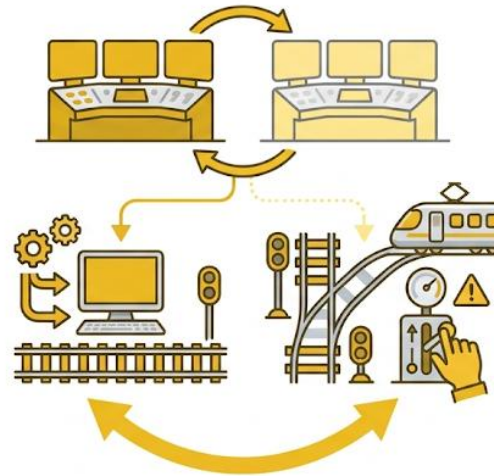
Redundant, Sectorised

- Zone controller configuration to be recommended and justified by the supplier
- Object controllers at station and depot level
- Sector size from a single station to a whole branch, balancing cost against the impact of a sector failure



Back-Up and Fallback

- The BOCC is a complete hot-standby replica of the OCC
- Local ATS takes over routing if both control centres or the central ATS are lost
- Point position indicators allow a junction to be traversed in GoA0 at cautionary speed



Communications and Cyber

- Dedicated fibre-optic wayside network in redundant, diversely routed rings — separate bores in tunnels
- Track-to-train radio in the 5.9 GHz band over two distinct channels
- EN 50159 for safety-related transmission; IEC 62443 and TS 50701 for cyber security



02

Communications

Twenty subsystems carrying every operational, passenger and maintenance service on the line

Twenty Subsystems in Four Layers

1



Transport, Radio and Hosting

Backbone Transmission Network · Radio subsystems (OURS, BGRS, WPRS) · Spectrum permits · Cellular and telephony SLAs · Data Centre · Central Clock System

2



Control and Supervision

SCADA · Network Management System · Technical Management and Monitoring · Unified Recording System · Training System · Pre-production laboratory

3



Passenger Oriented

Passenger Announcement System · Passenger Information Display · Telephony and Help Points · Advertising Display Subsystem

4



Asset and Information

Maintenance Management Information System · Document Management System · Geographical Information System

The Backbone and the Radio Layer



Backbone Transmission Network

- *One BTN per line, carrying every system between the central applications and the field equipment - including rolling stock.*
- Wide area network per line, with station and control-centre LANs and a dedicated OCC-BOCC link
- Traffic segregation, quality of service and deterministic behaviour
- Secured interconnection with other lines, NTA, the Ministry of Transport, police and emergency services
- A centralised Network Management System per line; availability target of at least 99.95%



Radio: Five Services, Six Bearers

- *Functional systems define the users and services; technical systems provide the physical means - the same bearer may serve several services.*
- OURS operational voice and data; BGRS board-to-ground; WPRS passenger Wi-Fi; EARS for emergency services; CBTC radio for signalling
- Bearers: private cellular LTE/5G, staff Wi-Fi, DMR, WWRS, passenger Wi-Fi and a Distributed Antenna System
- Continuous coverage across tunnels, stations, depots and park-and-ride facilities

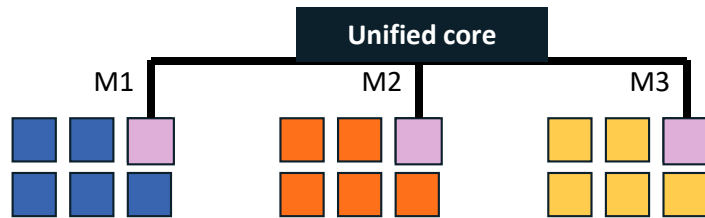
From Line Systems to Network Systems

Certain systems shall be designed once for the whole network. Two patterns are used:

Unified System

One design, deployed identically on every line

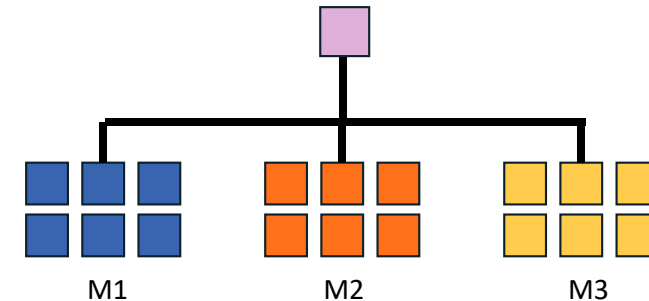
- A single central design implemented across M1, M2 and M3
- One common core solution, with each metro line connected using the same architecture
- Enables one procurement and one coherent solution for the whole network



Super System

A network layer above the three lines' own systems

- Interconnects and aggregates each line's separate system into one network-wide view
- Monitors, correlates and reports; it does not replace the line-level systems
- Each line designs its own system to interface with the Super System



Unified and Super Systems

Network-level architecture patterns: five Super Systems and five Unified Systems

SUPER SYSTEMS

TMM

Technical Management & Monitoring

Aggregates the three lines' TMM data and reports network-wide O&M KPIs.

ISS

Information Security System

Integrative SIEM/IDS monitoring across the three lines' security systems, interfaced to INCD.

CSOC

Cyber Security Operation Centre

Single control room at HaRishonim depot monitoring cyber incidents on all three lines.

MMIS

Maintenance Mgmt Information System

Multi-tenant platform managing all three lines, each keeping its own database.

PSIMS

Physical Security Info Mgmt System

Unified security and safety overview across the network for the Crisis Management Group.

UNIFIED SYSTEMS

AFC

Automatic Fare Collection

Unified central back-office, fare gates, ticketing machines and points of sale.

CSMOA

Customer Services Mgmt Oriented Apps

CRM, contact centre, passenger web and mobile app, lost and found, queue management.

EARS

Emergency Agencies Radio System

Radio for Home Front Command, police, fire and medical services across all three lines.

DMRS

Digital Mobile Radio System

Operational digital radio combining operational and passenger radio network-wide.

DAS

Distributed Antenna System

In-building and tunnel coverage across stations, depots and park-and-ride facilities.

03

Platform Screen Doors

Full-height doors at every station for all lines, opened only under CBTC command

Platform Screen Doors System at a Glance

SIL 3

Certified control architecture, with a fail-safe interface to the SIL 4 signalling

30 Years

Design life of the metallic structure; 15 years for electro-mechanical equipment

6 Million

Operational cycles to be demonstrated under nominal piston effect

± 900 Pa

Maximum piston effect withstood; ± 250 Pa nominal, per EN 17168

Typical PSD

- Automatic Sliding Doors, one per train door and aligned with it
- Emergency Exit Doors between adjacent sliding doors; Platform End Doors at extremities
- Local Control Panel, Door Control Units and Platform Isolation Controller; interfaces to CBTC, SCADA and power; earthing and bonding

Operating Sequence

- Platform and train doors open simultaneously, so no gap ever gives access to the track
- Departure is authorised only once every platform door and train door is confirmed closed and locked
- Obstacle detection releases the affected door and retries; after three attempts it stays open pending staff intervention

Safety and Degraded Modes

- A 'closed and locked' safety loop conditions train entry and departure
- Any emergency door opening immediately stops all trains approaching the station
- On loss of power the UPS keeps doors operational for at least 30 minutes and five cycles per platform

Core Technical Requirements

Proven, Revenue-Service Solutions

Architectures recommended and justified by the supplier, with evidence from operating GoA4 railways - particularly for onboard redundancy and zone controller configuration.

Seamless Interfaces

All systems, subsystems, unified systems and super systems must have flawless integration at all levels.

Through-Life Commitment

Condition monitoring down to the line replaceable unit, hot-swappable units, minimised track access, obsolescence management and software support for the system lifetime.

Safety and Cyber Evidence

RAMS to EN 50126, functional safety to EN 50129, cyber security to IEC 62443 and TS 50701.

In Summary

Safety Carried by Loops, Levels and Evidence

SIL 4 interlocking and ATP, a SIL 3 PSD control architecture with a fail-safe interface to the signalling, and a 'closed and locked' loop conditioning every train movement.

Resilience Designed in at Every Level

A fully redundant, sectorised signalling architecture, a hot-standby back-up control centre, a dedicated and diversely routed backbone, and a redundant radio layer.

A GoA4 Railway from Day One

Moving-block CBTC delivering unattended operation on the mainline, in the depots and across all lines, with GoA2, GoA1 and GoA0 available as degraded modes.

Thank You & Shalom





MRS. HELEN MAOR
NTA – PROCUREMENT DIRECTOR

Infra 2 PQ

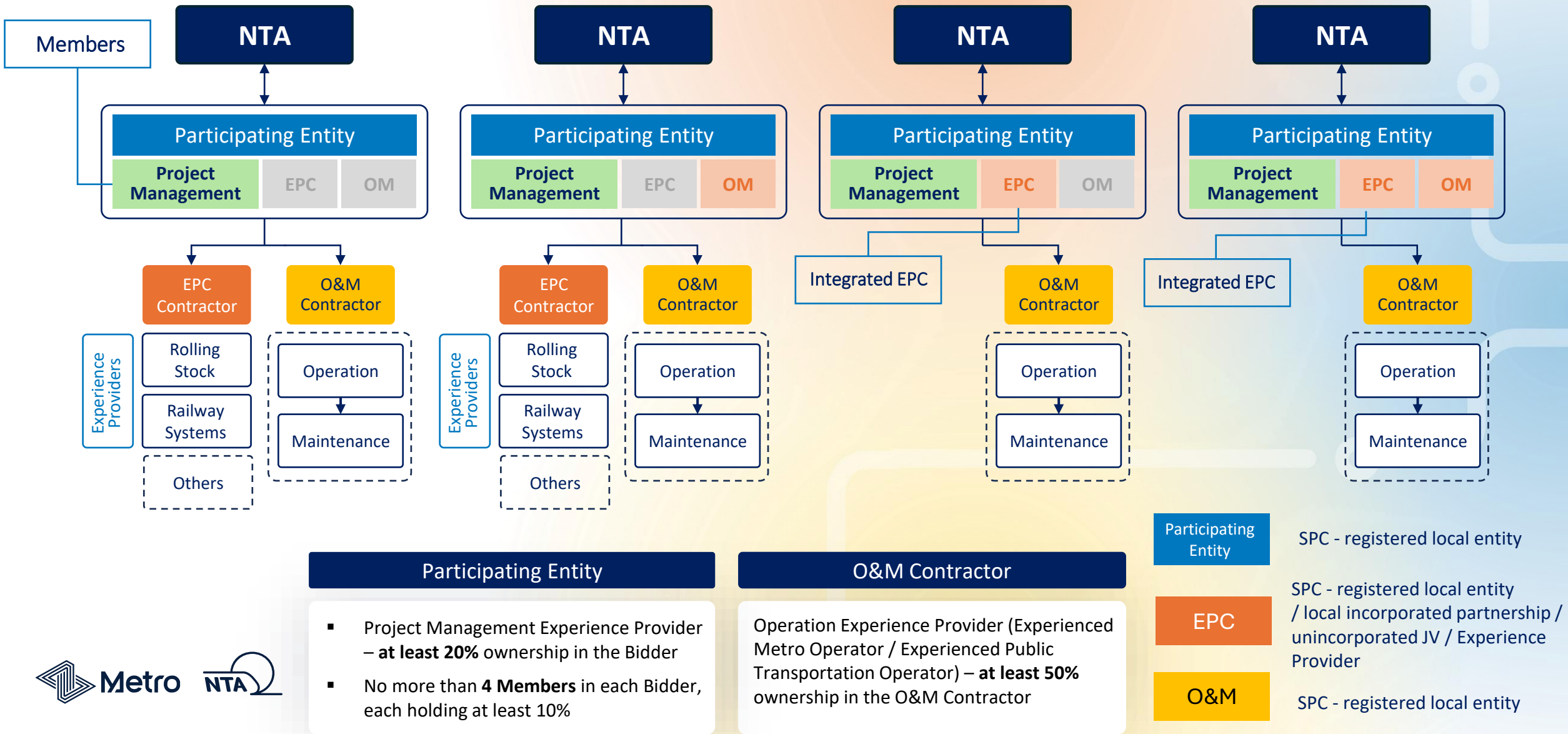
Overview and General Requirements

Helen Maor

Procurement Director -NTA



Acceptable Structures – Examples



Overview of Professional Threshold Requirements

#	Threshold Requirements	Review Stage – Compliance with Professional Eligibility Requirements
1	Design and Installation of Railway Systems	Pre-Qualification
2	Rolling Stock	
3	Project Execution, Management and Organization	
4	Maintenance	
5	Metro Operation / Public Transportation Operation	
6	Signaling System	Tender Phase

Principles of Threshold Requirements for Experience in the Design and Installation of Railway Systems

1 Experience in Railway Systems 2 Experience in Rolling Stock 3 Experience in Project Management 4 Experience in Maintenance 5 Experience in Operation	Threshold Requirements	January 1, 2011 - ending on the Pre-Qualification Submission Date Experience Provider on behalf of the Participant Completed as a Main Contractor: (i) The Design and Installation of Traction power Systems, OCC Systems and CBN for at least 3 Metro Lines or LRT Lines which are not part of the same Network; and (ii) At least 1 of such Metro Lines or LRT Lines, (i) consists of not less than 20 km of Routes; and (ii) has been in commercial operation for at least 2 consecutive years following its Completion Metro Line Shall mean a Metro line consisting of at least 5 km of Routes LRT Line Shall mean an LRT line consisting of at least 5 km of Routes
--	-----------------------------------	--

Principles of Threshold Requirements for Experience in Rolling stock

1

Experience in Railway System

2

Experience in Rolling Stock

3

Experience in Project Management

4

Experience in Maintenance

5

Experience in Operation

Threshold Requirements

January 1, 2011 - ending on the Pre-Qualification Submission Date

Experience Provider on behalf of the Participant, in its capacity as Manufacturer:

- (i) Designed, manufactured, supplied and commissioned into commercial operational service Cars for at least 3 projects; and**
- (ii) in at least 1 of the referenced projects, the number of Cars Designed, manufactured, supplied and commissioned into commercial operational service was at least 80; and**
- (iii) in each of the other referenced projects, the number of Cars Designed, manufactured, supplied and commissioned into commercial operational service was at least 50; and**
- (iv) at least 1 of the reference projects was a Driverless Metro Line**

Cars	Shall mean Metro passenger cars with a minimum length of 16 meters
Metro Line	Shall mean a Metro line consisting of at least 5 km of Routes
Driverless	Shall mean, with respect to a Metro Line, that the Metro Line operates with automated train control of at least grade of automation 2 (GOA2), such that train movement functions (including starting, stopping, and speed regulation) are performed automatically without continuous manual driving

Principles of Threshold Requirements for Experience in Project Execution, Management and Organization Experience

1

Experience in
Railway System

2

Experience in
Rolling Stock

3

Experience in
Project
Management

4

Experience in
Maintenance

5

Experience in
Operation

Threshold Requirements

January 1, 2015 - ending on the Pre-Qualification Submission Date

Experience Provider on behalf of the Participant Completed, as a Main Contractor,

(i) at least 2 Infrastructure Projects

(i) each of which with a Contract Value of at least NIS 750 Million; and

(ii) all of which with an aggregated Contract Value of not less than NIS 2,000 Million

Infrastructure
Project

Shall mean a project for the design and construction of a large-scale infrastructure, including any of the following: (i) heavy rail; (ii) LRT; (iii) Metro; (iv) road; (v) tunnel; (vi) desalination facility; (vii) hospital; (viii) power generation facility; (ix) seaport; or (x) airport

Principles of Threshold Requirements for Experience in Maintenance

1

Experience in
Railway System

2

Experience in
Rolling Stock

3

Experience in
Project
Management

4

Experience in
Maintenance

5

Experience in
Operation

Threshold Requirements

January 1, 2015 - ending on the Pre-Qualification Submission Date

Experience Provider on behalf of the Participant:

- (i) acted, for at least 2 consecutive years, as a Main Contractor for the Maintenance of a Metro Line or Metro Lines, consisting (in the aggregate) of not less than 30 km of Routes; and
- (ii) all referenced projects (in the aggregate) include the Maintenance of at least 80 Cars; and
- (iii) at least 1 referenced project includes the Maintenance of at least 1 Depot

Metro Line

Shall mean a Metro line consisting of at least 5 km of Routes

Cars

Shall mean Metro passenger cars with a minimum length of 16 meters

Principles of Threshold Requirements for Experience in Metro Operation

1

Experience in
Railway System

2

Experience in
Rolling Stock

3

Experience in
Project
Management

4

Experience in
Maintenance

5

Experience in
Operation

Threshold Requirements

January 1, 2020 - ending on the Pre-Qualification Submission Date

Experience Provider on behalf of the Participant:

- (i) acted as a Main Contractor for the Operation of at least 1 Metro Line, consisting of not less than 10 km of Routes, for at least 4 consecutive years; and
- (ii) acted as a Main Contractor for the Operation of 1 or more additional (different) Metro Line(s), consisting, in the aggregate, of not less than 20 km of Routes, for at least 12 consecutive months with respect to each such Metro Line(s); and
- (iii) all reference projects were Driverless Metro Lines

Metro Line

Shall mean a Metro line consisting of at least 5 km of Routes

Driverless

Shall mean, with respect to a Metro Line, that the Metro Line operates with automated train control of at least grade of automation 2 (GOA2), such that train movement functions (including starting, stopping, and speed regulation) are performed automatically without continuous manual driving

Operation Scheme Alternatives

1

Experience in
Railway System

2

Experience in
Rolling Stock

3

Experience in
Project
Management

4

Experience in
Maintenance

5

Experience in
Operation

Alternative “A” - Metro Operator

The Experienced Metro Operator



The Experienced Metro Operator shall lead the **overall management and coordination** of Project operations, holding **at least 50% control of the O&M Contractor**

Alternative “B” - Public Transportation Operator

The Experienced Public Transportation Operator



The Experienced Public Transportation Operator will lead Project operations as an O&M Shareholder with **at least 50% control of the O&M Contractor**

The Experienced Metro Operator shall provide **services** under an agreement with the O&M Contractor



In each alternative, an Experience Metro Operator is required to be identified as part of the PQ process

Principles of Threshold Requirements for Experience in Public Transportation Operator

1

Experience in
Railway System

2

Experience in
Rolling Stock

3

Experience in
Project
Management

4

Experience in
Maintenance

5

Experience in
Operation

Threshold Requirements

2020 - ending on the Pre-Qualification Submission Date

Experience Provider on behalf of the Participant:

Option A – Bus Operation Experience

- (i) Has been acting, continuously, as a Main Contractor for the Operation of at least 1 Bus Network in an Urban Area (in whole or in part) in Israel; and
- (ii) during such period, managed, a fleet of at least 300 buses in Israel; and
- (iii) during such period, managed an annual ridership of at least 12,000,000 passengers on bus lines in Israel

Option – Light Rail Operation Experience

- (i) has been acting as a Main Contractor for the Operation of at least 1 LRT Line in Israel, consisting of not less than 10 km of Routes for at least 2 continuous years

Bus Network

A network comprised of at least 5 bus lines.

LRT Line

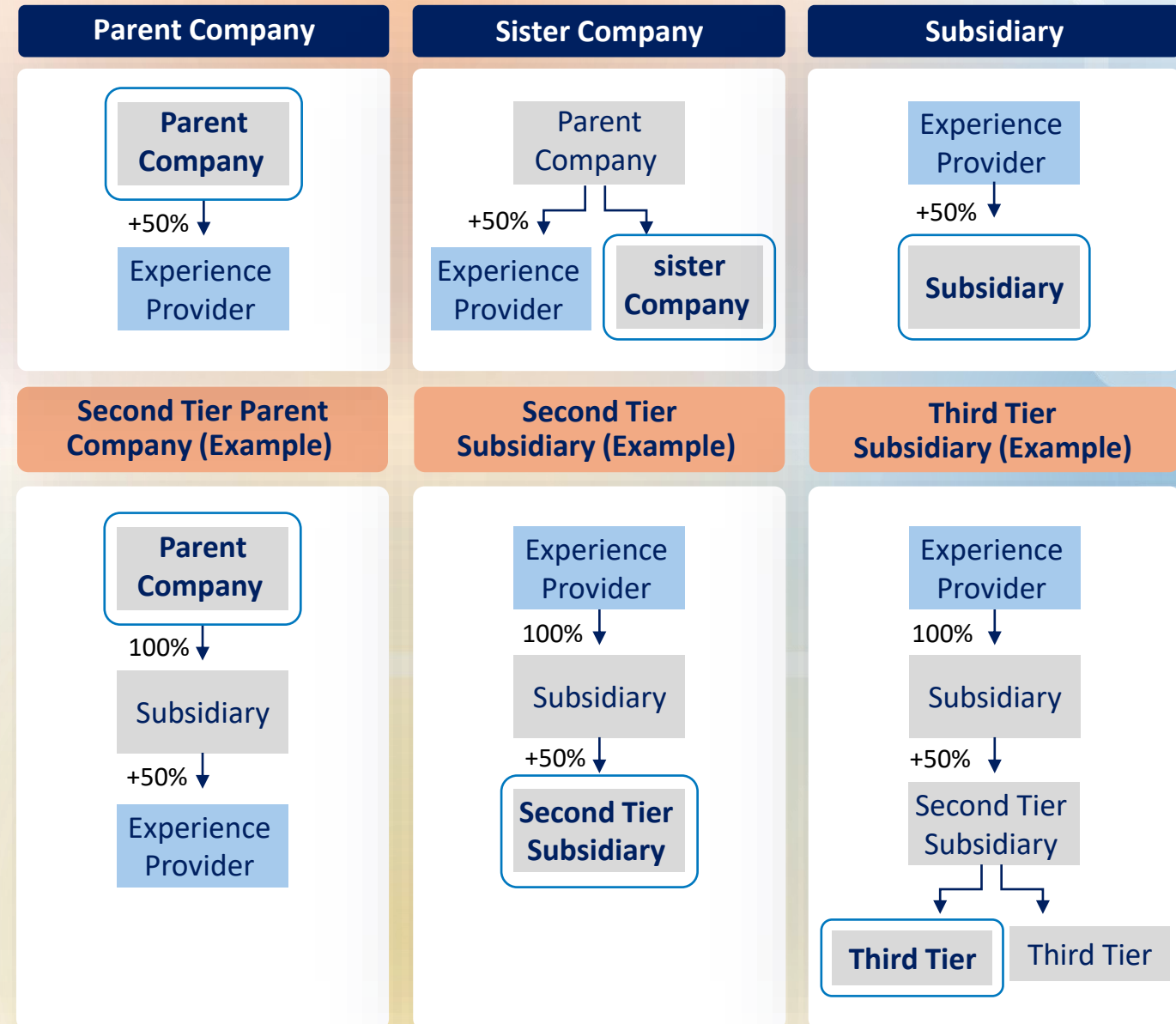
Shall mean an LRT line consisting of at least 5 km of Routes

Provisions with Respect to Projects Executed by an Associated Party

Entities Experience Providers can rely on:

An Experience Provider may present and rely on projects which were executed by any of the following Entities:

- **Parent Company** - An Entity which Effectively holds (directly or indirectly) more than 50% of all Means of Control in the Experience Provider
- **Sister Company** - An Entity in which the direct Parent Company of the Experience Provider directly holds more than 50% of all Means of Control
- **Subsidiary** - An Entity in which the Experience Provider Effectively holds (directly or indirectly) 50% of all Means of Control
- **SPV** - A special purpose company, a special purpose partnership or a special purpose joint venture in which the Experience Provider Effectively holds (directly or indirectly) at least 26% of all Means of Control, provided that, with respect to a special purpose partnership or special purpose joint venture, all Entities which directly held the Means of Control of such special purpose partnership or special purpose joint venture, were responsible, jointly and severally, for the execution of the referenced project



Financial Pre-Qualification Requirements

1	Turnover	3,250 (Million NIS) (According to the proportional share of each Member of the Participant)	
2	Equity	11 Million NIS for every 1% Holdings (1,100 Million NIS in total)	
3	Operating Cash Flow	Weighted average cash flow Weighted Average Operating Cash Flow for the three most recent consecutive annual Financial Statements is not negative	Alternative A
		Capital erosion test The ratio between the weighted average cash flow from operating activities over the last three financial statements, or the cash flow from the most recent year (in absolute value) and the equity is less than 25%	Alternative B
4+5	Additional Requirements	Absence of a going concern warning	
		Accounting standards in accordance with a recognized standard	

Thank You & Shalom





MR. BARAK KIRSCHNER
B&K – MANAGING PARTNER

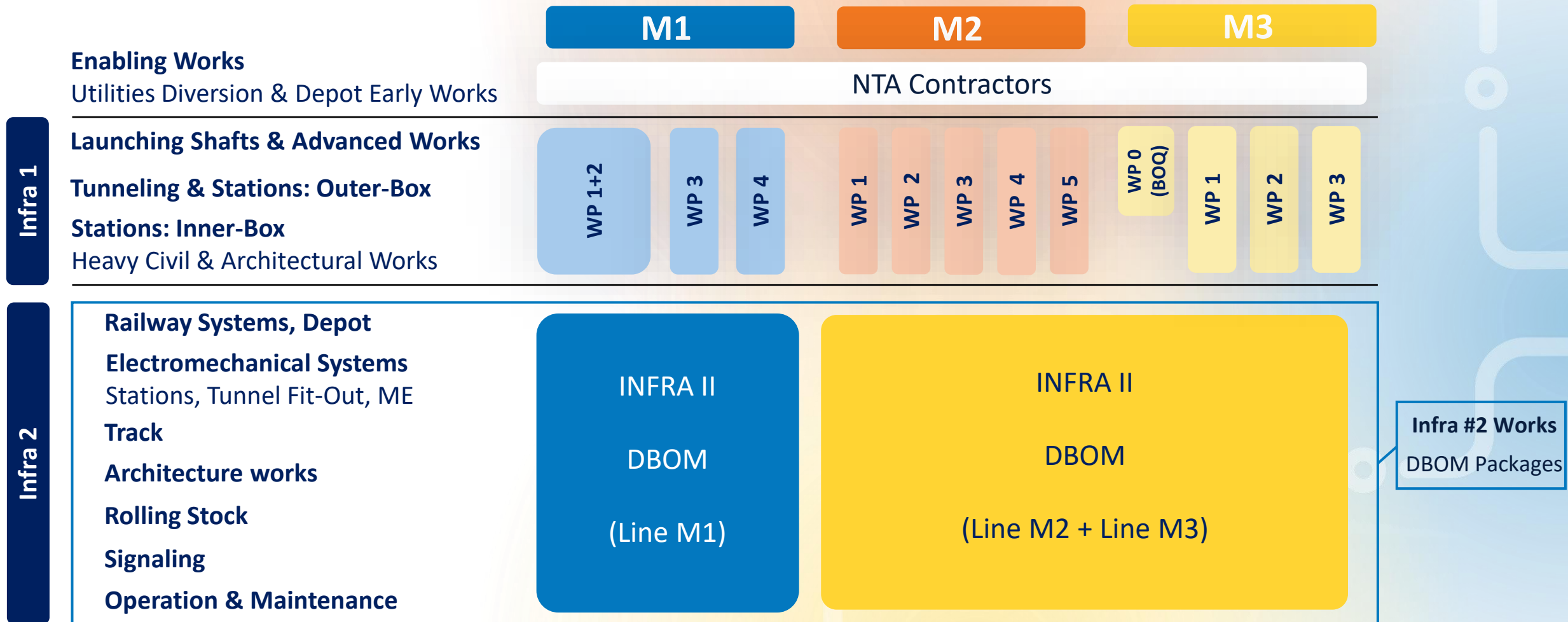
Infra II

Commercial Mechanism & Risk Allocation

Barak Kirschner
Partner – B&K



Procurement Strategy



Infra 2 Building Blocks



Nominating 2 Different Infra 2
Successful Bidders (M1 / M2-M3)



Balancing Between Quality
vs. Price Proposal



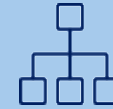
DBOM – Fully Integrated
Responsibility



Contract Term – 15-20 Years
From Initial Operation



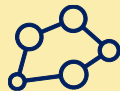
Opening to Service
in 3 Sub-Stages



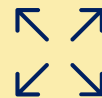
Super / Unified Systems
(Network Approach)



Interfaces With Infra 1 –
Mandatory Requirements for Both
Infra 1 and Infra 2 Successful Bidders



Freedom and Flexibility to Decided
on Bidder's Structure (Including
Identity of Main Contactors)



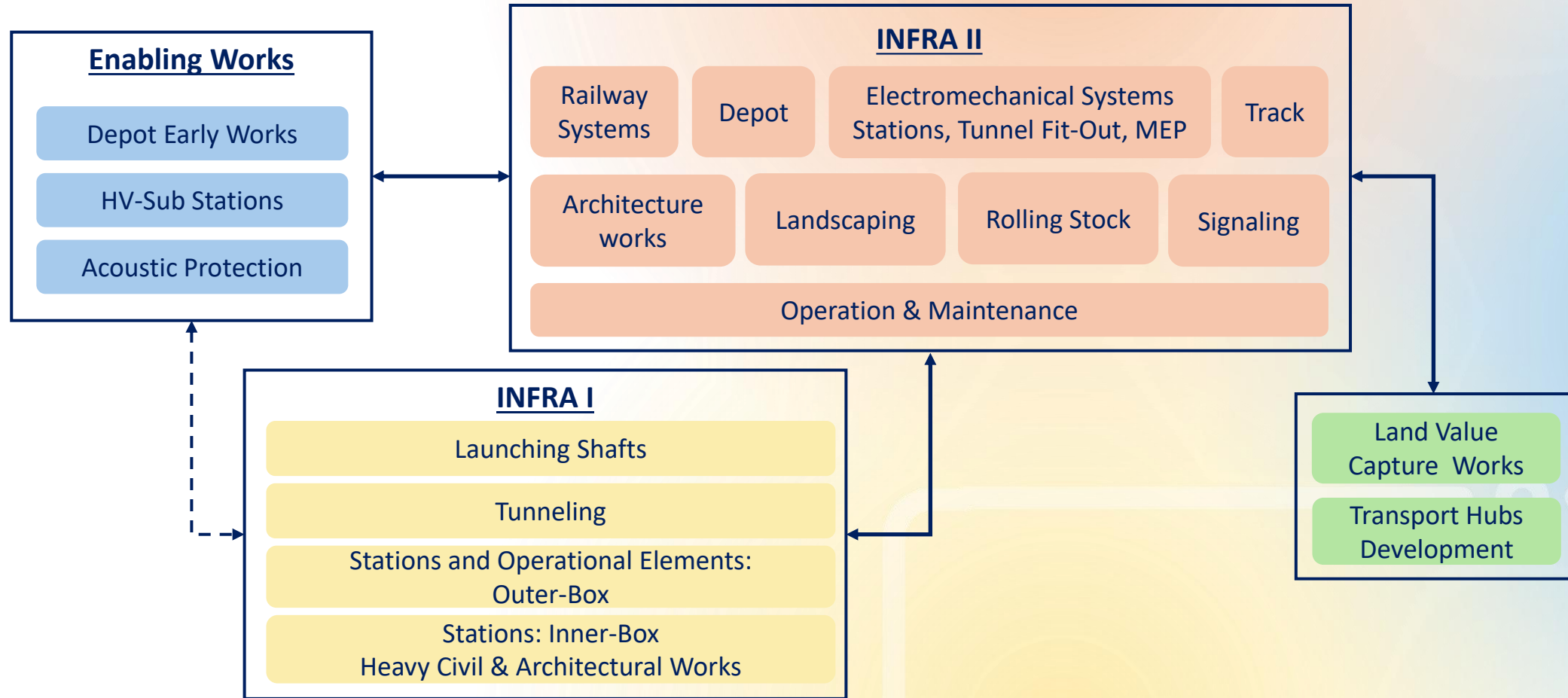
Option to Extend Services –
Construction and Operation
of Stage 2



Balanced Risk Allocation –
Owner vs. Contractor

Interface Map

Project Delivery Timeline



Tender Main Principals

$$\text{Final Score} = A\% * TPS + B\% * PPS$$

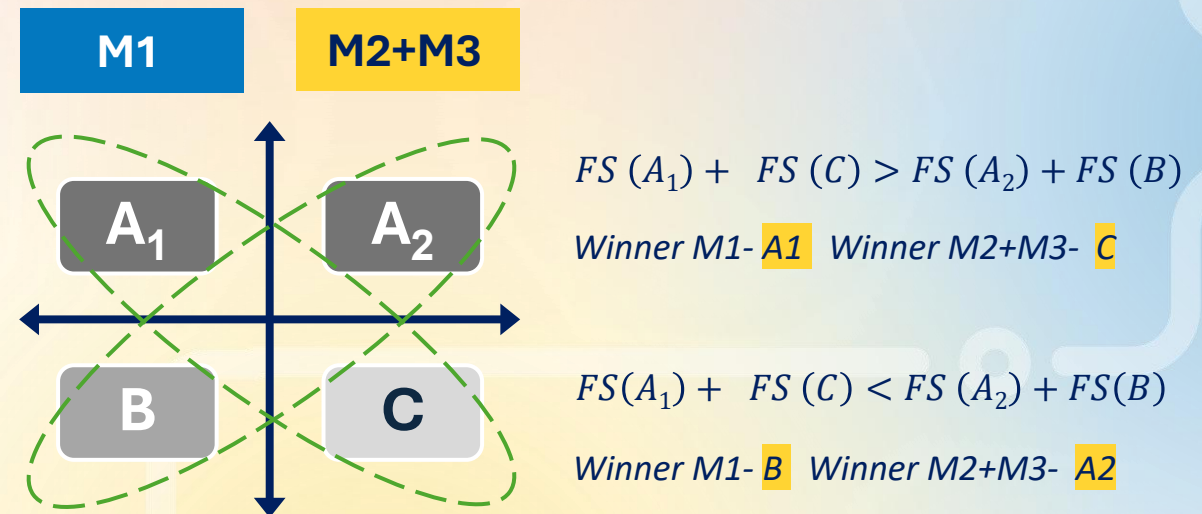
TPS = Technical (Quality) Proposal Score

PPS = Price Proposal Score

Reimbursement of Bid Preparation Costs

- Unsuccessful Bidders shall be entitled to reimbursement of partial Bid preparation costs, subject to a pre-determined cap
- Eligibility requires proof of expenses (process will be detailed in the ITB document)

Submission for Both Work Packages (M1 / M2-M3)



Price Proposal Main Principals

Price Proposal Main Components

Construction

1

Lump Sum – Project's Design & Build

2

Options – Stage 2, Additional Trains/Cars

3

Basket of Exchange Rate and Indices

Operation and Maintenance

1

Operation Cost

2

Maintenance and LCC Costs

3

Basket of Exchange Rate and Indices

Payment Principals

Payment Principals

Payment During Construction

1

Advance Payments

2

Interim Payments Based on Progress

3

Final Payment for Completion a Milestone

Payment During O&M Period

1

Operation Payment (Fixed / Variable)

2

Maintenance Payment (Fixed / Variable)

3

Incentives and Performance Based Payments

Risk Allocation - Site

	Contractor	Owner
Site Access and Handover Process		▼
Site Availability Date (SAD)		▼
Mobilization Sites	▼	
Unknown Utilities and Infrastructure		▶
Antiquities and Findings		▶

Risk Allocation - Design and Permitting

	Contractor	Owner
Reference Design Provided by Owner	▼	
Mandatory Structures Provided by Owner		▼
Permits and Approvals		▼
Environmental Protection (including noise and vibration)	▼	

Risk Allocation - Risks & Securities

	Contractor	Owner
Liquidated Damages		
Guarantees (Bonds)		
Limit of Liability		
Reimbursement of Bid Submission costs		

Risk Allocation - Payments and Currencies

	Contractor	Owner
Indexation and Inflation	☐	☒
Foreign Exchange Rates (EUR/USD)	☐	☒
Advance Payments	☒	☐
Interim Payments during Construction	☐	☒

Risk Allocation - Interfaces & Integration

	Contractor	Owner
Interfaces DB-O&M Contractors	▼	
Interfaces and Connection to HV Sub-Stations		▼
Unified / Super Systems	▼	
Common / Transfer Stations	▼	
Connection and Interface to BOCC	▼	

Risk Allocation - O&M



Thank You & Shalom





MR. AVRAHAM FURST
NTA - SPOKEPERSON