AIT Technology Event

MRT Blue Line Extension Project
Bangkok Thailand

9 July 2013
## Executing Agency for Railway Network

<table>
<thead>
<tr>
<th>Name of Agency</th>
<th>Administrative Division</th>
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<tbody>
<tr>
<td>MRTA</td>
<td>Ministry of Transport</td>
</tr>
<tr>
<td>Mass Rapid Transit Authority of Thailand</td>
<td></td>
</tr>
<tr>
<td>BTS</td>
<td>Bangkok Metropolitan Administration</td>
</tr>
<tr>
<td>Bangkok Mass Transit System Public Company Limited</td>
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</tr>
<tr>
<td>SRT</td>
<td>Ministry of Transport</td>
</tr>
<tr>
<td>State Railway of Thailand</td>
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AIT TECHNOLOGY EVENT
MRT BLUE LINE EXTENSION PROJECT
Hua Lamphong – Bang Khae and Tao Poon – Tha Phra Sections

CURRENT OPERATING ROUTES

<table>
<thead>
<tr>
<th>Agency</th>
<th>Name of Route</th>
<th>Length of Route</th>
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<tbody>
<tr>
<td>SRT</td>
<td>Airport Rail Link</td>
<td>28.6 km (8 stations)</td>
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<tr>
<td>MRTA</td>
<td>Blue Line</td>
<td>21.7 km (18 stations)</td>
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<tr>
<td>BTS</td>
<td>Green Line (Sukhumvit Line)</td>
<td>22.3 km (22 stations)</td>
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<tr>
<td></td>
<td>Green Line (Silom Line)</td>
<td>9.3 km (10 stations)</td>
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<tr>
<td></td>
<td>Total</td>
<td>82 km (58 stations)</td>
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CURRENT CONSTRUCTION ROUTES

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<th>Name of Route</th>
<th>Length of Route</th>
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<tr>
<td>SRT</td>
<td>Red Line</td>
<td>26 km</td>
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<tr>
<td></td>
<td>Bang Sue - Rangsit</td>
<td>26 km</td>
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<td></td>
<td>6 stations</td>
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<td>SRT</td>
<td>Light Red Line</td>
<td>15 km</td>
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<tr>
<td></td>
<td>Bang Sue - Taling Chan</td>
<td>15 km</td>
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<td></td>
<td>4 stations</td>
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<td>MRTA</td>
<td>Purple Line</td>
<td>25.6 km</td>
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<td></td>
<td></td>
<td>16 stations</td>
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<td>MRTA</td>
<td>Blue Line Ext.</td>
<td>26.9 km</td>
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<tr>
<td></td>
<td></td>
<td>19 stations</td>
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<td>MRTA</td>
<td>Green Line Ext.</td>
<td>13 km</td>
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<tr>
<td></td>
<td>Bearing - Kheha Samut Prakan</td>
<td>13 km</td>
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<tr>
<td></td>
<td></td>
<td>9 stations</td>
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<tr>
<td>BTS</td>
<td>Light Green Line</td>
<td>~2.7 km</td>
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<tr>
<td></td>
<td>Talat Phlu - Bangwa</td>
<td>~2.7 km</td>
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<tr>
<td></td>
<td></td>
<td>2 stations</td>
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MRT BLUE LINE EXTENSION PROJECT
Hua Lamphong – Bang Khae and Tao Poon – Tha Phra Sections

MRT Blue Line

Contract 1 Underground Civil Works
- Design and Construction
- Distance 2.8 km.
- 2 Underground Stations:

Contract 2 Underground Civil Works
- Design and Construction
- Distance 2.6 km.
- 2 Underground Stations:

Contract 3 Elevated Civil Works
- Construction
- Distance 11 km.
- 8 Elevated Stations:

Contract 4 Elevated Civil Works
- Construction
- Distance 10.5 km.
- 7 Elevated Stations
- Depot
- Park & Ride

Contract 5 Trackwork
- Design and Construction
- Distance 27 km.
- Including Track in Depot

Existing Blue Line

Blue Line Extension
MRT BLUE LINE EXTENSION PROJECT
Hua Lamphong – Bang Khae and Tao Poon – Tha Phra Sections

**Contractors**

**Contract 1:** Design and Build Underground Civil Works

*Italian-Thai Development PCL*
*Contract Value: 11,400 Million Baht*

**Contract 2:** Design and Build Underground Civil Works

*CH. Karnchang PCL*
*Contract Value: 10,700 Million Baht*

**Contract 3:** Build Elevated Civil Works

*SH-UN Joint Venture*
*Contract Value: 11,300 Million Baht*

**Contract 4:** Build Elevated Civil Works

*SINO-THAI Engineering & Construction PCL*
*Contract Value: 13,300 Million Baht*

**Contract 5:** Design and Construction of Trackwork

*CH. Karnchang PCL*
*Contract Value: 5,000 Million Baht*

**Project Management Consultant**

*Index International Group Co., Ltd*

*Dorsch Consult Asia Co., Ltd*

*Lanna Engineering Consultant Co., Ltd*

*Arun Chaiseri Consulting Engineers Co., Ltd*

*Merlin’s Solutions International Co., Ltd*

*Contract Value: 726 Million Baht*

**Construction Supervision Consultant**

*MAA Consultants Co., Ltd*

*Utility Design Consultants Co., Ltd*

*Tesco Co., Ltd*

*D2 Consult Asia Co., Ltd*

*Epsilon Co., Ltd*

*Moh and Associates Inc.*

*Nippon Koei Co., Ltd*

*Contract Value: 1,200 Million Baht*
Project Details: Underground Structures

Tunnel
Key Plan and Profile

MRT Blue Line Extension Project (Underground Civil Works)
Contract 1: Hua Lamphong - Sanam Chai Section

C&C

Wat Mangkon
BS10

East - Upper TBM 1-2

West - Lower TBM 1-1

C & C

Key Plan

Assume Ground Level + 0.00 (at +101.50 approx.)

Existing Hua Lamphong Station

(Westbound & Eastbound)

(DW 0.60m Bk.)

IV Shaft-1

IV Shaft-2

Sanam Chai
BS12

Wat Burapha
BS11

Escavation Level

IV Shaft-1

IV Shaft-2

Sanam Chai
BS12

C & C

Project Information
1. Underground Station 2 Nos.

- BS10-Wat Mangkon Station
- BS11-Wat Burapha Station
2. Cut and Cover Tunnel at Hua Lamphong 1 Nos.
3. Tunnel excavation

- TBM 1-1 excavation length (incl. stations) 2,780 m
- TBM 1-2 excavation length (excl. stations) 2,389 m

4. Other works

- Ventilation and Sinking Shaft 3 Nos.
- Bridge Underpass

Remark: The above changes will be confirmed later

Work Sequence
- TBM commences driving the westbound (lower) tunnel from launching at Cut & Cover (C&C) towards Wat Mangkon Station (BS10).
- TBM drives through the lower slab level of Wat Mangkon Station (BS10), continue driving through Wat Burapha Station (BS11) until ending at the Sanam Chai Station retrieval shaft (BS12).
- TBM will be dismantled and then transported back to the launching station at Hua Lamphong where it will be re-assembled to re-launch for the eastbound (upper) tunnel.
- TBM re-launch driving the eastbound (upper) tunnel toward Wat Mangkon Station (BS10) and Wat Burapha Station (BS11) until it finish the work at Sanam Chai Station. Due to the stations excavation and concrete slab are finished prior to TBM coming, the TBM will be slide pass through the station.
MRT BLUE LINE EXTENSION PROJECT
Hua Lamphong - Bang Khae and Tao Poon - Tha Phra Sections

Tunneling Plan
MRT Blue Line Extension Project (Underground Civil Works)
Contract 2: Sanam Chai - Tha Phra Section

Sanam Chai BS12

Chao Phraya River
IV Shaft 3

Itsaraphap BS13

Westbound Tunnel
Cut & Cover C&C

Profile

Ground Level + 0.00 (+103.50 approx.)

Chao Phraya River
IV Shaft 3

Project Information:
1. Underground Station
   - BS12 - Sanam Chai Station
   - BS13 - Itsaraphap Station
2. Cut & Cover at Tha Phra Section
3. Intervention Shaft
4. Tunnel Excavation
   - TBM 1-1 - Westbound
   - TBM 1-2 - Eastbound
   - 2,113.687 m
   - 665.344 m

Obstruction:
1. Bridge of Khlong Kha Muang Doem 1 Nos.
2. Bridge of Khlong Bangkod Yai 1 Nos.
3. TBM can cutting D-Wall at Soft Eye with GFRP Strength of Concrete 400 lce.

Key Plan

Sanam Chai BS12

12
Project Details: Elevated Structures

- Typical Structure
- Portal Frame
- Portal Frame over Underpass
- Structure for Long Span
- Chao Phraya River Crossing Bridge at Bang Pho
- Space Truss at Bang Plat Intersection
Stations and Buildings

Typical Elevated Station Plans and Long Section

Typical Elevated Station Cross Section

Typical Elevated Station
MRT BLUE LINE EXTENSION PROJECT
Hua Lamphong – Bang Khae and Tao Poon – Tha Phra Sections

Depot & Park and Ride Buildings
Commencement Date: 4 April 2011 (Civil)

Contract Completion: 5 June 2016 (Civil)
Current Progress: Contract 1
MRT BLUE LINE EXTENSION PROJECT
Hua Lamphong – Bang Khae and Tao Poon – Tha Phra Sections

Hua Lamphong, Cut & Cover
Klong Pradung Krungkasem Construction
BS10 Wat Mangkon Station
BS10 Wat Mangkon Station
BS11 Wang Burapha Station : Bridge Underpinning
Current Progress: Contract 2
BS12 Sanam Chai Station
BS12 Sanam Chai Station – Pipe Roofing
BS12 Sanam Chai Station
BS13 Itsaraphap Station
Cut & Cover
MRT BLUE LINE EXTENSION PROJECT
Hua Lamphong – Bang Khae and Tao Poon – Tha Phra Sections

Cut & Cover, Tunnelling
Current Progress : Contract 3

MRT BLUE LINE EXTENSION PROJECT
Hua Lamphong – Bang Khae and Tao Poon – Tha Phra Sections

Existing Blue Line

Blue Line Extension

Contract 3 – Elevated Civil Works

Map showing the extension of the Blue Line from Hua Lamphong to Bang Khae and Tao Poon to Tha Phra sections.
Construction of Pier-head at P-BN10-05 – Zone 1

Construction of Pier-head at P-BN10-06 – Zone 1

Construction of DSRS Structure at Pier at P-BN10-18 – Zone 1
Bored Piling Ø 0.35m (Dry Process) for Land Bridge at BN11/5 Bang Pho Station - Zone 1
Balance cantilevering construction at P3 (P-BN11-05) Chao Phraya River Crossing

Balance cantilevering construction at P4 (P-BN11-06) Chao Phraya River Crossing
Construction of Pile Cap at P-BN11-12 – Zone 2

Construction of Pier-head at P-BN11-13 – Zone 2
Installation Segment BN12/4 to BN12/5
Bang Or Station – Zone 2
Installation Cross Beam concourse Level Grid Line 4
Bang Phlat Station – Zone 2
Construction of Pier-head at P-BN13-13 – Zone 2
Construction of Barrette Pile (0.80x2.70m) at BN14/2 (L:F)
Sirindhorn Station – Zone 3

Construction of Barrette Pile (0.80x2.70m) at BN14/4 (L:E)
Sirindhorn Station – Zone 3
Construction of Pile Cap at P-BN15-16 BCL at Boromratchonni – Zone 3
Installation of Crossbeam Interface Segment (IF) at BN16/3 (Concourse Level) Bang Khun Non Station – Zone 5

Installation of Crossbeam Interface Segment (IF) at BN16/4 (Concourse Level) Bang Khun Non Station – Zone 5
LG2: Erection of Main Truss (Right) at P-BN16-10/P-BN16-09 – Zone 5

LG2: Assembly Main Truss (Left) at P-BN16-10/P-BN16-09 – Zone 5
LG1: Segments Erection at Span P-BN17-46 / P-BN18/1 – Zone 5
Installation of Crossbeam Segment at BN18/3
(Platform Level)
Charn Sanit Wong Station – Zone 5

Installation of Crossbeam Segment at BN18/4
(Platform Level)
Charn Sanit Wong Station – Zone 5
### Project Progress Chart

#### MRT BLUE LINE EXTENSION PROJECT

**Project Progress Chart as of 30 June 2013**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Start Date</th>
<th>Completion Date</th>
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</thead>
<tbody>
<tr>
<td>Zone 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zone 2</td>
<td></td>
<td></td>
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<tr>
<td>Zone 3</td>
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<td>Zone 4</td>
<td></td>
<td></td>
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<tr>
<td>Zone 5</td>
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</tbody>
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#### SYMBOLS

- Single: Single for Completion
- Double: Double for Completion
- Total: Total for Completion
- Range: Range for Completion

#### Key Dates

- Zone 1: 12/07 Assembly
- Zone 2: 07/07 Assembly
- Zone 3: 07/07 Assembly
- Zone 4: 07/07 Assembly
- Zone 5: 07/07 Assembly

#### Milestones

- Zone 1: HG 31 – 35 Span
- Zone 2: HG 31 – 35 Span
- Zone 3: HG 31 – 35 Span
- Zone 4: HG 31 – 35 Span
- Zone 5: HG 31 – 35 Span

#### Progress

- Zone 1: 80% complete
- Zone 2: 70% complete
- Zone 3: 60% complete
- Zone 4: 50% complete
- Zone 5: 40% complete

#### Schedule

- Zone 1: As per completion
- Zone 2: As per completion
- Zone 3: As per completion
- Zone 4: As per completion
- Zone 5: As per completion

#### Notes

- G2 Assembly: "Note from G2 Assembly" (Ensure G2 Assembly is completed)

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**Progress as of 30 June 2013**

- Time Expired: 89 Days
- Time Remaining: 348 Days
- Progress: 33.60%
- Variance: -56.40%
Current Progress : Contract 4
Installation of Launcher Support at P-BN18-05 to P-BS15-06 Charan Sanitwong Rd.
Column Work at P-BS13-09
Near Transition Area
Column Work at P-BS14-20
Phet Kasem Rd.

Column Work at P-BS14-28
Phet Kasem Rd.
BS-15/5 Bang Phai Station
BS-16/3 Bang Wa Station
BS-17/5 Phet Kasem 48 Station
MRT BLUE LINE EXTENSION PROJECT
Hua Lamphong – Bang Khae and Tao Poon – Tha Phra Sections

BS-18/6 Phasi Charoen Station
BS-19/6 Bang Khae Station
BS-20/5 Lak Song Station
Fixing Reinforcing Bars for Ground Floor Slab at Park & Ride Building No.1
# MRT Blue Line Extension Project

## Progress Report for Elevated Structure

### New Segment

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<thead>
<tr>
<th>Portal Frame</th>
<th>Pier Base</th>
<th>Column Step 4</th>
<th>Column Step 3</th>
<th>Column Step 2</th>
<th>Column Step 1</th>
<th>Pier Name</th>
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### Box Segment

<table>
<thead>
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<th>Portal Frame</th>
<th>Pier Base</th>
<th>Column Step 4</th>
<th>Column Step 3</th>
<th>Column Step 2</th>
<th>Column Step 1</th>
<th>Pier Name</th>
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### Pier Name

<table>
<thead>
<tr>
<th>Pier Name</th>
<th>Pier Base</th>
<th>Column Step 4</th>
<th>Column Step 3</th>
<th>Column Step 2</th>
<th>Column Step 1</th>
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**Weekly Progress Report (17/04/56 to 23/04/56)**

**Page 1 of 4**

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**Report By : Asst. Engineer CSCEC - CSK**
MRT BLUE LINE EXTENSION PROJECT
Hua Lamphong – Bang Khae and Tao Poon – Tha Phra Sections

Current Progress: Contract 5

Existing Blue Line

Blue Line Extension

Contract 5 Trackwork
Incoming Material (3rd Rail Component).
Stock Yard No.2. Bang Kean, Ayutthaya
Concrete Sleeper Factory Inspection
Site Office/Yard and Site Shop-Fabrication for Trackworks Installation.
Thank you for your attention