

REV.	DATE	PREP.	APPR.	DESCRIPTION

JK JATIN KULRANA JK MB-MKE BOARDMAN		PROJECT: KOLKATA METRO PROJECT EAST - WEST METRO CORRIDOR
DRAWN BY: JK	NAME: JK	SIGN:
DESIGN BY: BND	TITLE: HORIZONTAL & VERTICAL ALIGNMENT WEST BOUND LINE	M Y C E L MAHESWARI RECON M Y C E L M Y C E L General Consultant Kolkata East West Metro KMRCL, Munshi Premchand Sarani Kolkata-700021 Tel: +91-33-22622942
APPROVED BY: MB	DWG NO:	SCALE: 1:1500 (A3) DATE: 16/03/2016
REV: 0	DATE:	REV: 0

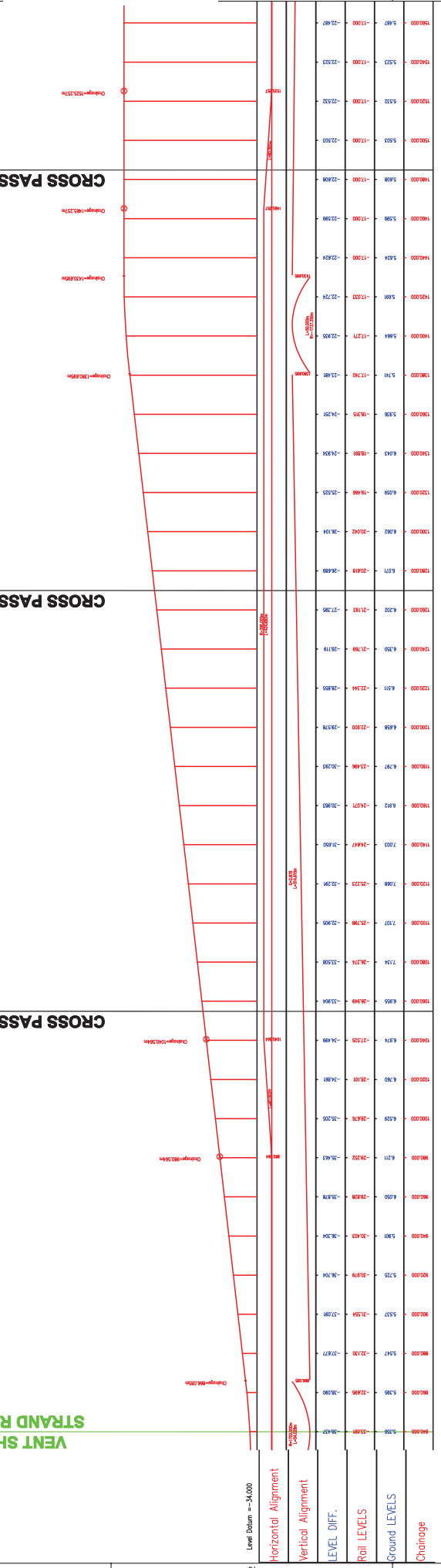
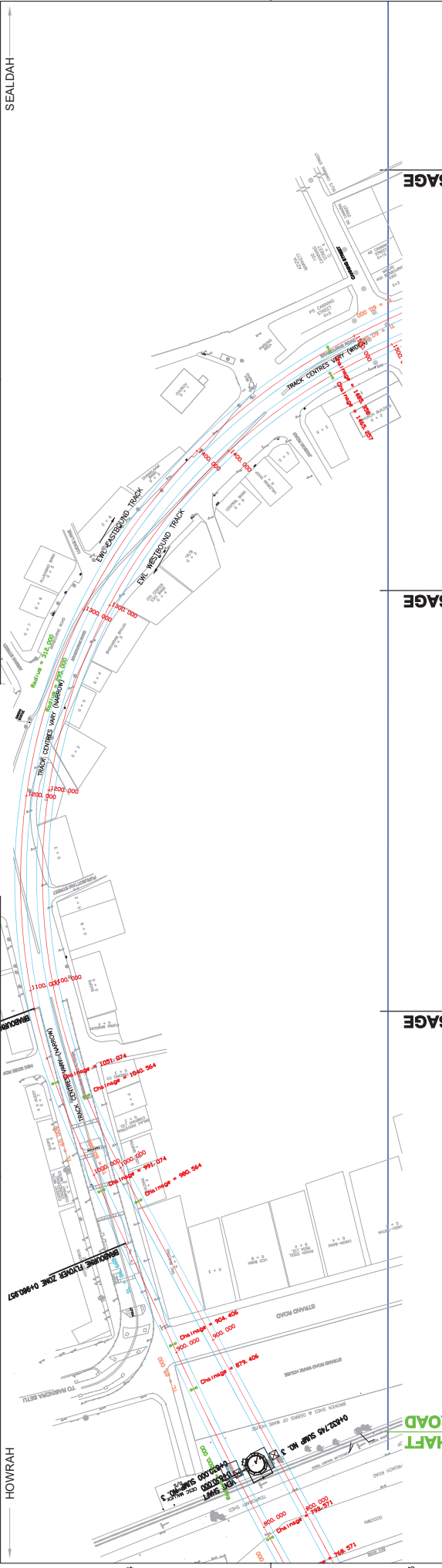
* THE LOCATION OF CROSS-PASSAGES (WITH AND WITHOUT SUMPS AND PUMPS) SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND THE CONTRACTOR'S PROPOSAL/DESIGN SHALL COMPLY THE CONTRACTORS SHALL BE PROPOSED / DETERMINED BY THE CONTRACTOR AFTER FINALIZING THE ALIGNMENT INCLUDING THE VERTICAL PROFILE OF THE SECOND LINE.

* THE GROUND LEVELS OF NEW ALIGNMENT TAKEN FROM RITES DRAWING (ANNEXURE 4.2 DATED APRIL 2015), CONSIDER THE ADJACENT SIDE LEVELS ALSO SAME.

* THE ALIGNMENT DRAWING SHOWN IS INDICATIVE ONLY. THE CONTRACTOR NEED TO DEVELOP DETAILED ALIGNMENT DRAWING BASED ON THE ABOVE AND CONSIDERING THE TOPOGRAPHIC SURVEY CONDITIONS OF BUILDINGS SURVEY AND GEOTECHNICAL INVESTIGATION CARRIED OUT BY THEM.

* THE LONGITUDINAL SECTION (PROFILE) SHOWN IN THE DRAWING IS ALONG THE WEST BOUND LINE/TUNNEL.

* THE WEST BOUND LINE/TUNNEL.



REV	DATE	PREP	APPR	DESCRIPTION

JK JATIN KULRANA INC. CHIEF ENGINEER MB. MKE BOARDMAN		NAME	JK	SIGN	
DRAWN BY	JK	DESIGNED BY	JK	CHECKED BY	BND
CHECKED BY	BND	APPROVED BY	MB	DATE	16/03/2016

PROJECT:-	KOLKATA METRO PROJECT
TITLE:-	EAST - WEST METRO CORRIDOR
SCALE:-	1:1500 (A3)
DATE:-	16/03/2016
DWG NO.	REV. 0

PROJECT:-	KOLKATA METRO PROJECT
TITLE:-	HORIZONTAL & VERTICAL ALIGNMENT
SCALE:-	1:1500 (A3)
DATE:-	16/03/2016
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SCALE:-	1:1500 (A3)
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DWG NO.	REV. 0

NOTES:

- THE ALIGNMENT DRAWING SHOWN IS INDICATIVE ONLY. THE CONTRACTOR NEED TO DEVELOP DETAILED ALIGNMENT DRAWING BASED ON THE ABOVE AND CONSIDERING THE TOPOGRAPHIC SURVEY CONDITIONS OF BUILDINGS SURVEY AND GEOTECHNICAL INVESTIGATION CARRIED OUT BY THEM.
- CONTRACTORS PROPOSAL/DESIGN SHALL COMPLY THE CONDITIONS AS SHALL BE PROPOSED/ DETERMINED BY THE CONTRACTOR AFTER FINALIZING THE ALIGNMENT INCLUDING THE VERTICAL PROFILE OF THE SECOND LINE.
- THE LONGITUDINAL SECTION (PROFILE) SHOWN IN THE DRAWING IS ALONG THE WEST BOUND LINE/TUNNEL.
- THE GROUND LEVELS OF NEW ALIGNMENT TAKEN FROM RTES DRAWING (ANNEXURE 4.2 DATED APRIL 2015). CONSIDER THE ADJACENT SIDE LEVELS ALSO SAME.



NEW MAHAKARAN STATION
CH: 2187.18

NEW MAHAKARAN STATION
CH: 2170.84

CROSS PASSAGE

CROSS PASSAGE



NOTES:

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- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMISSIONS FROM THE CONCERNED AGENCIES AND BE PROPOSED / DETERMINED BY THE CONTRACTOR AFTER FINALIZING THE ALIGNMENT INCLUDING THE VERTICAL PROFILE OF THE SECOND LINE.
- THE LONGITUDINAL SECTION (PROFILE) SHOWN IN THE DRAWING IS ALONG THE WEST BOUND LINE/TUNNEL.
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PROJECT: KOLKATA METRO PROJECT
EAST - WEST METRO CORRIDOR
TITLE: HORIZONTAL & VERTICAL ALIGNMENT
WEST BOUND LINE

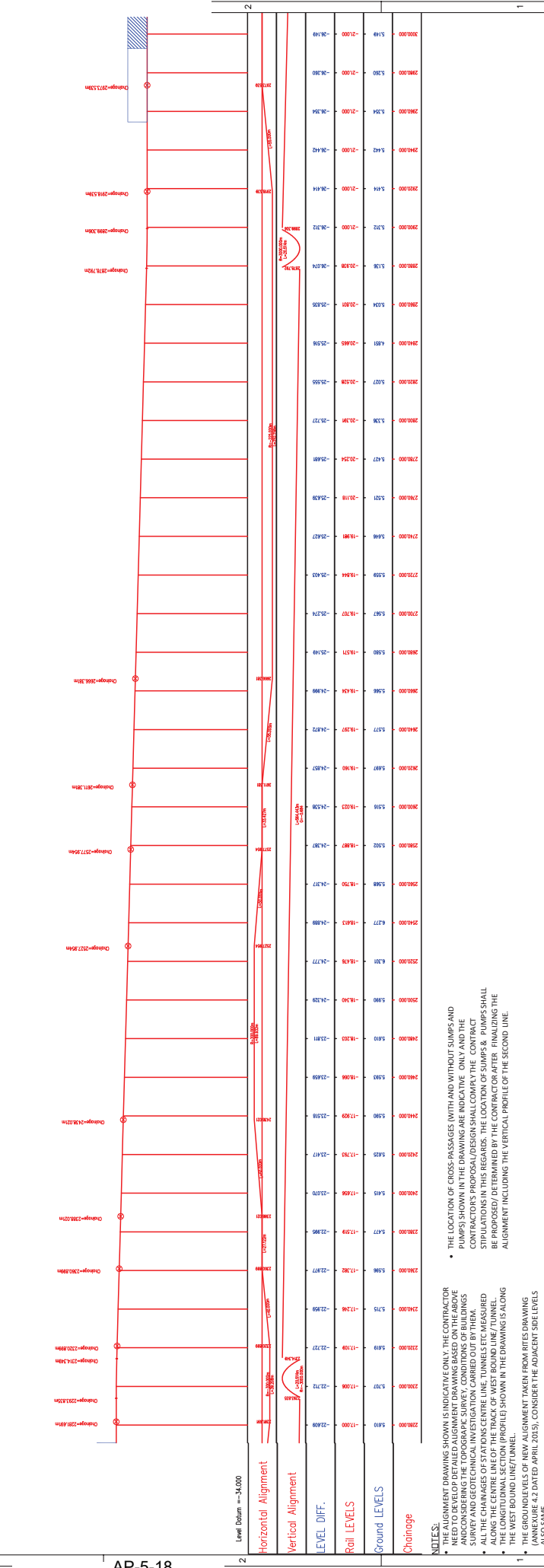
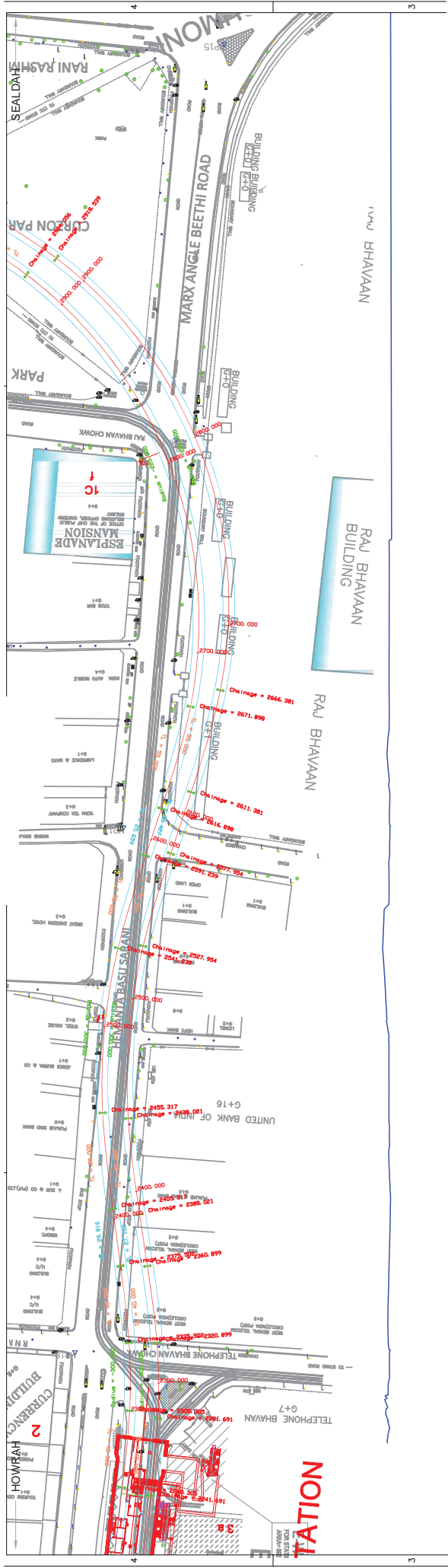
NAME: SIGN
DRAWN BY: JK
DESIGNED BY: JK
CHECKED BY: BND
APPROVED BY: MB

JK JATIN KILDIRA
MB: MKE BOARDMAN

PROJECT: KOLKATA METRO PROJECT
EAST - WEST METRO CORRIDOR
TITLE: HORIZONTAL & VERTICAL ALIGNMENT
WEST BOUND LINE

SCALE: 1:1500 (A3) DATE: 16/03/2016
REV. 0

GENERAL CONSULTANT: Kolkata East West Metro KMRCL, Munshi Premchand Sarani Kolkata-700021
TEL: +91-33-22622942



NOTES:

- THE ALIGNMENT DRAWING SHOWN IS INDICATIVE ONLY. THE CONTRACTOR NEED TO DEVELOP DETAILED ALIGNMENT DRAWING BASED ON THE ABOVE AND CONSIDERING THE TOPOGRAPHIC SURVEY, CONDITIONS OF BUILDINGS, SURVEY AND GEOTECHNICAL INVESTIGATION CARRIED OUT BY THEM.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMISSIONS AND BE PROPOSED (OBTAINED) BY THE CONTRACTOR AFTER FINALIZING THE ALIGNMENT INCLUDING THE VERTICAL PROFILE OF THE SECOND LINE.
- THE LONGITUDINAL SECTION (PROFILE) SHOWN IN THE DRAWING IS ALONG THE WEST BOUND LINE/TUNNEL.
- THE GROUND LEVELS OF NEW ALIGNMENT TAKEN FROM RTDS DRAWING (ANNEXURE 4.2 DATED APRIL 2015), CONSIDER THE ADJACENT SIDE LEVELS ALSO SAME.

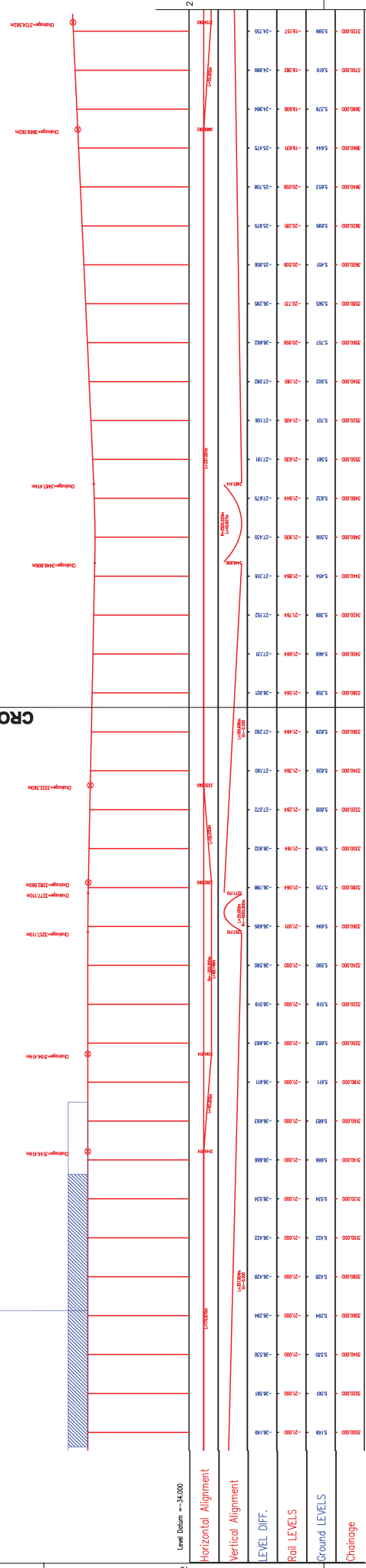
REV	DATE	PREP.	APPR.	DESCRIPTION

JK JATIN GUJARA INCORPORATED MB: MKE BOARDMAN	NAME	JK	SIGN	PROJECT:- KOLKATA METRO PROJECT EAST - WEST METRO CORRIDOR TITLE:- HORIZONTAL & VERTICAL ALIGNMENT WEST BOUND LINE DWG NO: SCALE:- 1:1500 (A3) DATE:- 16/03/2016 REV: 0
	DRAWN BY	JK		
	DESIGNED BY	BND		
	CHECKED BY	MB		

KMRC
KOLKATA METRO RAIL PROJECT
EAST-WEST METRO CORRIDOR



CROSS PASSAGE



Level Datum = +3.000

Stationing	Ground Levels	Rail Levels	Vertical Curve Data
3060.00	5.18	-21.00	
3061.00	5.20	-21.00	
3062.00	5.25	-21.00	
3063.00	5.30	-21.00	
3064.00	5.35	-21.00	
3065.00	5.40	-21.00	
3066.00	5.45	-21.00	
3067.00	5.50	-21.00	
3068.00	5.55	-21.00	
3069.00	5.60	-21.00	
3070.00	5.65	-21.00	
3071.00	5.70	-21.00	
3072.00	5.75	-21.00	
3073.00	5.80	-21.00	
3074.00	5.85	-21.00	
3075.00	5.90	-21.00	
3076.00	5.95	-21.00	
3077.00	6.00	-21.00	
3078.00	6.05	-21.00	
3079.00	6.10	-21.00	
3080.00	6.15	-21.00	
3081.00	6.20	-21.00	
3082.00	6.25	-21.00	
3083.00	6.30	-21.00	
3084.00	6.35	-21.00	
3085.00	6.40	-21.00	
3086.00	6.45	-21.00	
3087.00	6.50	-21.00	
3088.00	6.55	-21.00	
3089.00	6.60	-21.00	
3090.00	6.65	-21.00	
3091.00	6.70	-21.00	
3092.00	6.75	-21.00	
3093.00	6.80	-21.00	
3094.00	6.85	-21.00	
3095.00	6.90	-21.00	
3096.00	6.95	-21.00	
3097.00	7.00	-21.00	
3098.00	7.05	-21.00	
3099.00	7.10	-21.00	
3100.00	7.15	-21.00	
3101.00	7.20	-21.00	
3102.00	7.25	-21.00	
3103.00	7.30	-21.00	
3104.00	7.35	-21.00	
3105.00	7.40	-21.00	
3106.00	7.45	-21.00	
3107.00	7.50	-21.00	
3108.00	7.55	-21.00	
3109.00	7.60	-21.00	
3110.00	7.65	-21.00	
3111.00	7.70	-21.00	
3112.00	7.75	-21.00	
3113.00	7.80	-21.00	
3114.00	7.85	-21.00	
3115.00	7.90	-21.00	
3116.00	7.95	-21.00	
3117.00	8.00	-21.00	
3118.00	8.05	-21.00	
3119.00	8.10	-21.00	
3120.00	8.15	-21.00	

NOTES:

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- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMISSIONS AND APPROVALS FROM THE CONCERNED AUTHORITIES FOR THE PROPOSED ALIGNMENT INCLUDING THE VERTICAL PROFILE OF THE SECOND LINE.
- THE LONGITUDINAL SECTION (PROFILE) SHOWN IN THE DRAWING IS ALONG THE WEST BOUND LINE/TUNNEL.
- THE GROUND LEVELS OF NEW ALIGNMENT TAKEN FROM RTDS DRAWING (ANNEXURE 4.2 DATED APRIL 2015). CONSIDER THE ADJACENT SIDE LEVELS ALSO SAME.

PROJECT: KOLKATA METRO PROJECT
EAST - WEST METRO CORRIDOR
TITLE: HORIZONTAL & VERTICAL ALIGNMENT
WEST BOUND LINE

REV.	DATE	PREP.	APPR.	DESCRIPTION

AP-5-19

M Y C E L

 General Consultant Kolkata East West Metro

 KMRCL, Munshi Premchand Sarani

 Kolkata-700021

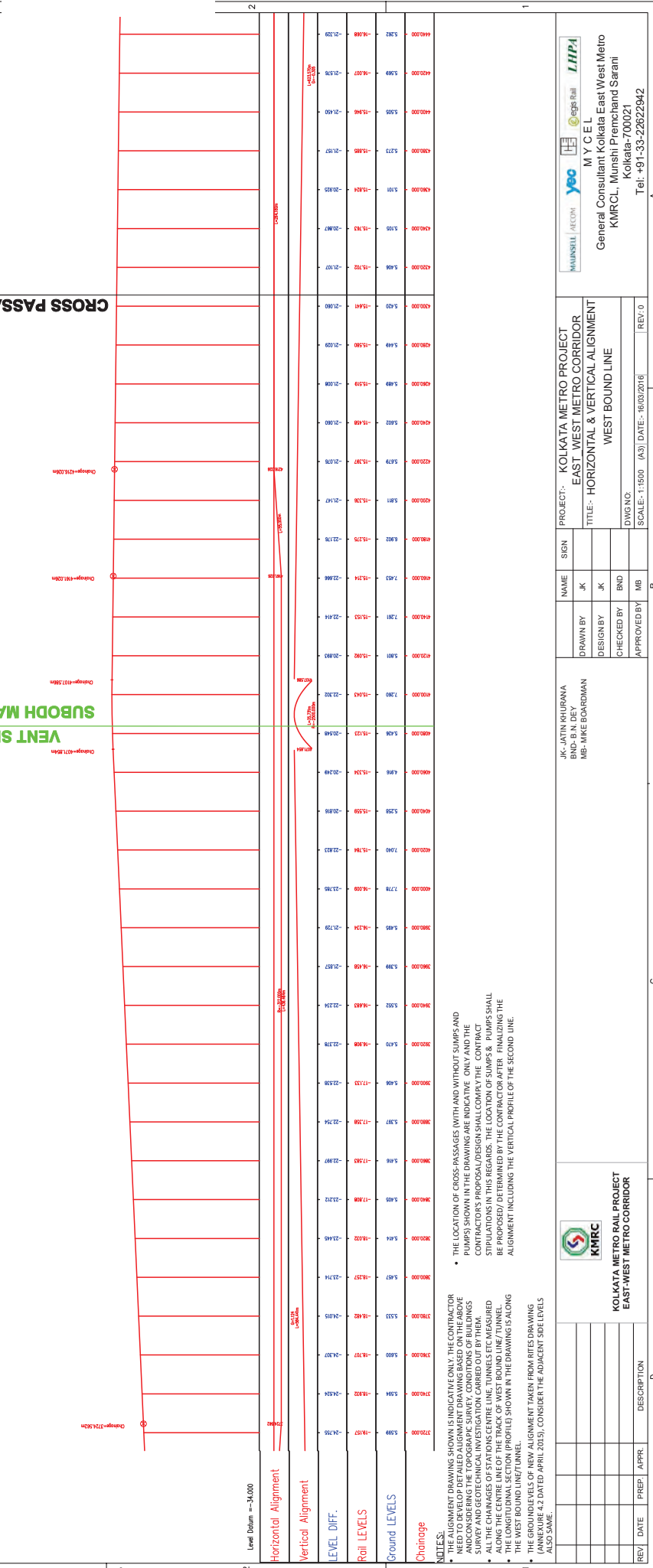
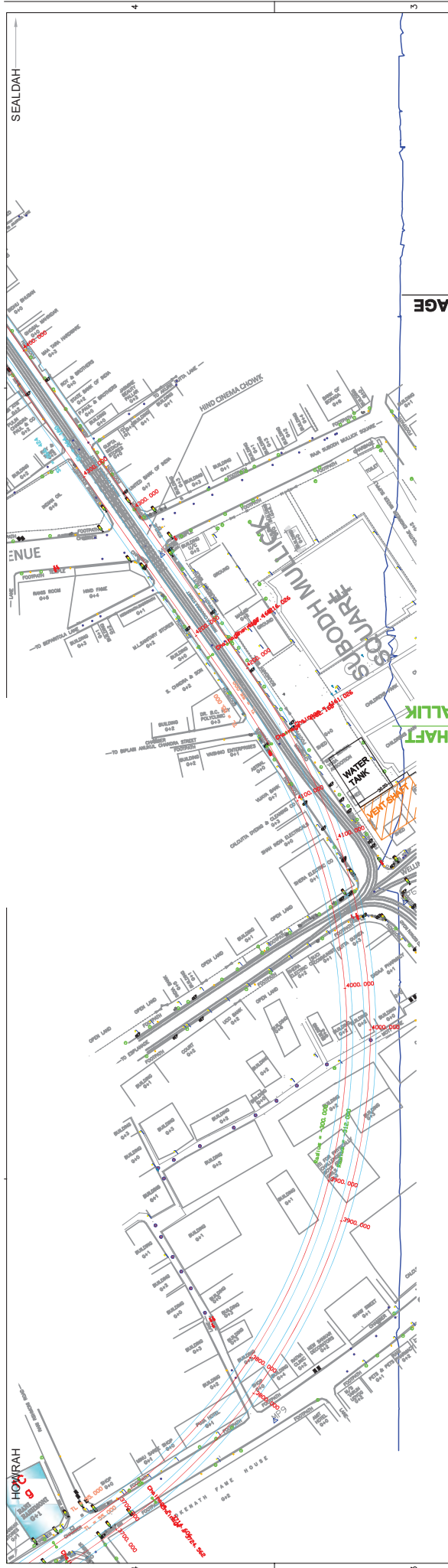
 Tel: +91-33-22622942

NAME	SIGN
JK JATIN GUPTA	JK
MB MIKE BOARDMAN	MB

DRAWN BY	DESIGNED BY	CHECKED BY	APPROVED BY
JK	JK	BND	MB

PROJECT: KOLKATA METRO PROJECT
EAST - WEST METRO CORRIDOR
TITLE: HORIZONTAL & VERTICAL ALIGNMENT
WEST BOUND LINE
 DWG NO. _____
 SCALE: 1:1500 (A3) DATE: 16/03/2016 REV: 0

KOLKATA METRO RAIL PROJECT
EAST-WEST METRO CORRIDOR

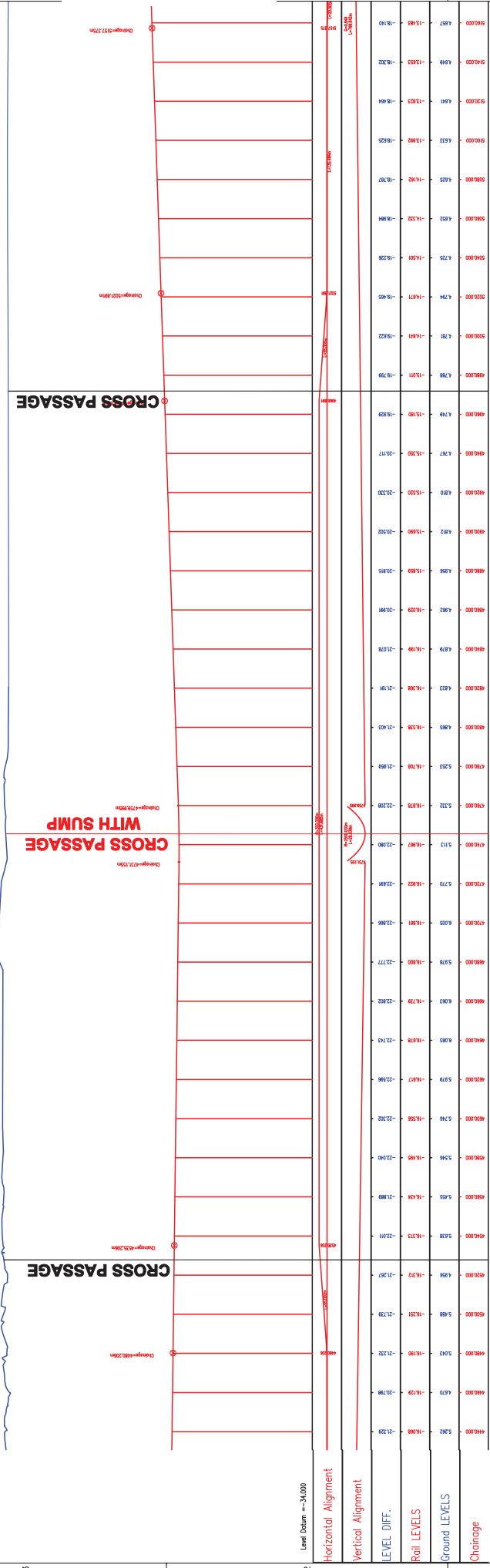
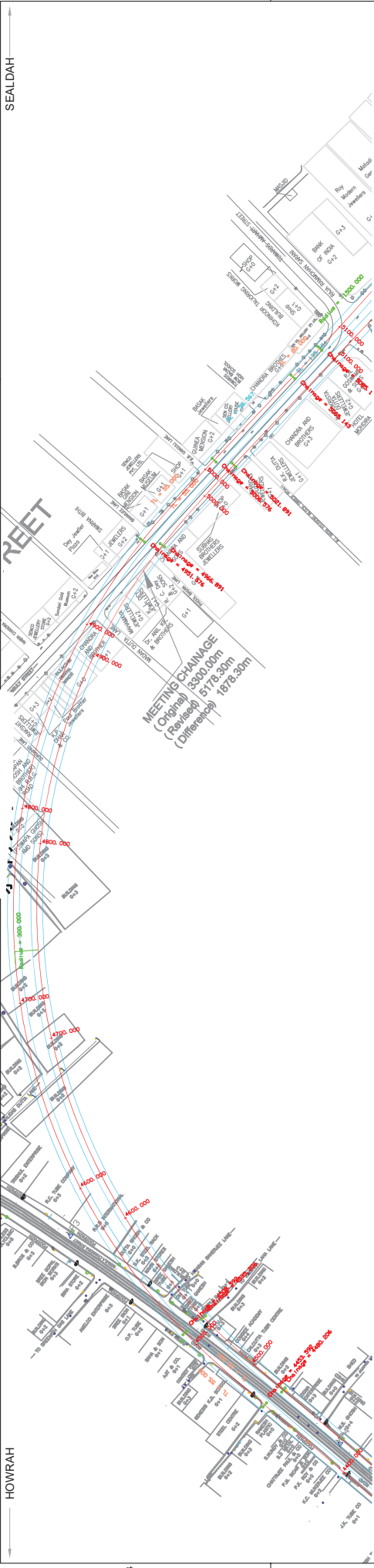


- NOTES:**
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KOLKATA METRO RAIL PROJECT EAST - WEST METRO CORRIDOR		PROJECT: KOLKATA METRO PROJECT EAST - WEST METRO CORRIDOR	
NAME SIGN		TITLE: HORIZONTAL & VERTICAL ALIGNMENT WEST BOUND LINE	
DRAWN BY JK	DESIGNED BY JK	CHECKED BY BND	APPROVED BY MB
JK JATIN KILBANA MB: MKE BOARDMAN		SCALE: 1:1500 (A3) DATE: 16/03/2016 REV: 0	

		KOLKATA METRO RAIL PROJECT EAST - WEST METRO CORRIDOR	
		M Y C E L General Consultant: Kolkata East West Metro KMRCCL, Munshi Premchand Sarani Kolkata-700021 Tel: +91-33-22622942	



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- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMISSIONS AND APPROVALS FROM THE CONCERNED AUTHORITIES.
- ALONG THE CENTRE LINE OF THE TRACK OF WEST BOUND LINE/TUNNEL.
- THE LONGITUDINAL SECTION (PROFILE) SHOWN IN THE DRAWING IS ALONG THE WEST BOUND LINE/TUNNEL.
- THE GROUND LEVELS OF NEW ALIGNMENT TAKEN FROM RITES DRAWING (ANNEXURE 4.2 DATED APRIL 2015). CONSIDER THE ADJACENT SIDE LEVELS ALSO SAME.

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LEVEL DIFF.	RAIL LEVELS	GROUND LEVELS	CHARGE
13.46	494	500.00	000.00
13.63	494	500.00	000.00
13.80	494	500.00	000.00
14.00	494	500.00	000.00
14.20	494	500.00	000.00
14.40	494	500.00	000.00
14.60	494	500.00	000.00
14.80	494	500.00	000.00
15.00	494	500.00	000.00
15.20	494	500.00	000.00
15.40	494	500.00	000.00
15.60	494	500.00	000.00
15.80	494	500.00	000.00
16.00	494	500.00	000.00
16.20	494	500.00	000.00
16.40	494	500.00	000.00
16.60	494	500.00	000.00
16.80	494	500.00	000.00
17.00	494	500.00	000.00
17.20	494	500.00	000.00
17.40	494	500.00	000.00
17.60	494	500.00	000.00
17.80	494	500.00	000.00
18.00	494	500.00	000.00
18.20	494	500.00	000.00
18.40	494	500.00	000.00
18.60	494	500.00	000.00
18.80	494	500.00	000.00
19.00	494	500.00	000.00
19.20	494	500.00	000.00
19.40	494	500.00	000.00
19.60	494	500.00	000.00
19.80	494	500.00	000.00
20.00	494	500.00	000.00
20.20	494	500.00	000.00
20.40	494	500.00	000.00
20.60	494	500.00	000.00
20.80	494	500.00	000.00
21.00	494	500.00	000.00
21.20	494	500.00	000.00
21.40	494	500.00	000.00
21.60	494	500.00	000.00
21.80	494	500.00	000.00
22.00	494	500.00	000.00
22.20	494	500.00	000.00
22.40	494	500.00	000.00
22.60	494	500.00	000.00
22.80	494	500.00	000.00
23.00	494	500.00	000.00
23.20	494	500.00	000.00
23.40	494	500.00	000.00
23.60	494	500.00	000.00
23.80	494	500.00	000.00
24.00	494	500.00	000.00
24.20	494	500.00	000.00
24.40	494	500.00	000.00
24.60	494	500.00	000.00
24.80	494	500.00	000.00
25.00	494	500.00	000.00
25.20	494	500.00	000.00
25.40	494	500.00	000.00
25.60	494	500.00	000.00
25.80	494	500.00	000.00
26.00	494	500.00	000.00
26.20	494	500.00	000.00
26.40	494	500.00	000.00
26.60	494	500.00	000.00
26.80	494	500.00	000.00
27.00	494	500.00	000.00
27.20	494	500.00	000.00
27.40	494	500.00	000.00
27.60	494	500.00	000.00
27.80	494	500.00	000.00
28.00	494	500.00	000.00
28.20	494	500.00	000.00
28.40	494	500.00	000.00
28.60	494	500.00	000.00
28.80	494	500.00	000.00
29.00	494	500.00	000.00
29.20	494	500.00	000.00
29.40	494	500.00	000.00
29.60	494	500.00	000.00
29.80	494	500.00	000.00
30.00	494	500.00	000.00

KOLKATA METRO RAIL PROJECT
EAST - WEST METRO CORRIDOR
WEST BOUND LINE

PROJECT: KOLKATA METRO PROJECT
 EAST - WEST METRO CORRIDOR
 TITLE: HORIZONTAL & VERTICAL ALIGNMENT
 WEST BOUND LINE

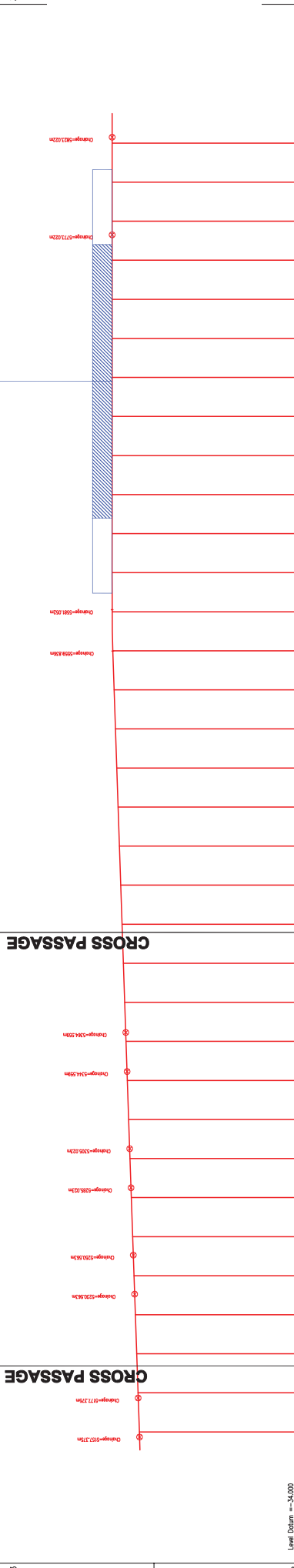
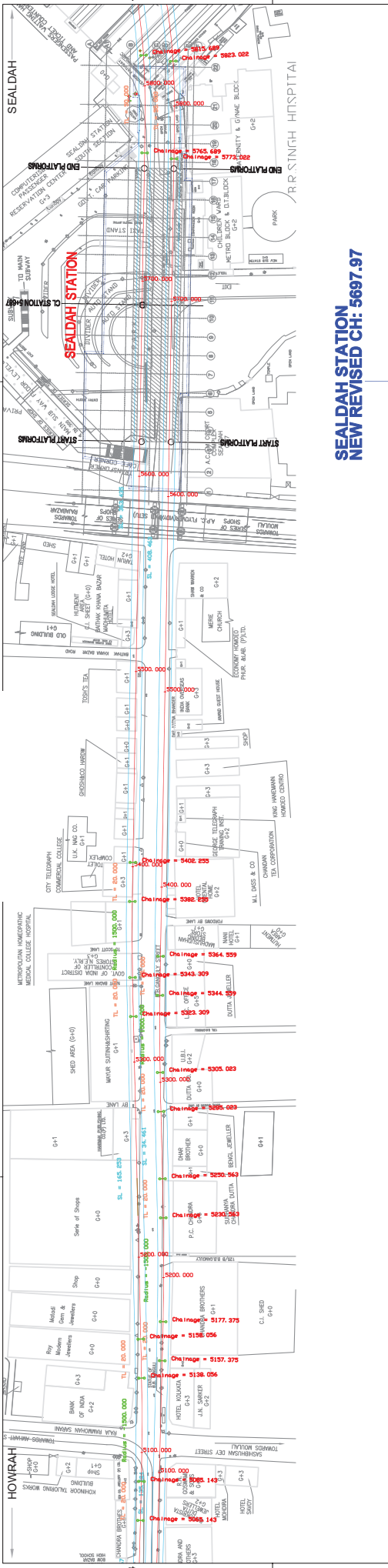
SCALE: 1:1500 (A3) DATE: 16/03/2016 REV: 0

JK JATIN KULIRANA
 INC. CHIEF ENGINEER
 MB: MKE BOARDMAN

NAME: SIGN: JK JK
 DRAWN BY: JK
 DESIGN BY: BND
 CHECKED BY: MB
 APPROVED BY: MB

KMRC
KOLKATA METRO RAIL PROJECT
EAST-WEST METRO CORRIDOR

REV	DATE	PREP	APPR	DESCRIPTION



Level Datum = +34.000

Horizontal Alignment	Vertical Alignment	LEVEL DIFF.	Rail LEVELS	Ground LEVELS	Change
518.000	518.000	-3.40	518.40	518.40	
519.000	519.000	-3.40	519.40	519.40	
520.000	520.000	-3.40	520.40	520.40	
521.000	521.000	-3.40	521.40	521.40	
522.000	522.000	-3.40	522.40	522.40	
523.000	523.000	-3.40	523.40	523.40	
524.000	524.000	-3.40	524.40	524.40	
525.000	525.000	-3.40	525.40	525.40	
526.000	526.000	-3.40	526.40	526.40	
527.000	527.000	-3.40	527.40	527.40	
528.000	528.000	-3.40	528.40	528.40	
529.000	529.000	-3.40	529.40	529.40	
530.000	530.000	-3.40	530.40	530.40	
531.000	531.000	-3.40	531.40	531.40	
532.000	532.000	-3.40	532.40	532.40	
533.000	533.000	-3.40	533.40	533.40	
534.000	534.000	-3.40	534.40	534.40	
535.000	535.000	-3.40	535.40	535.40	
536.000	536.000	-3.40	536.40	536.40	
537.000	537.000	-3.40	537.40	537.40	
538.000	538.000	-3.40	538.40	538.40	
539.000	539.000	-3.40	539.40	539.40	
540.000	540.000	-3.40	540.40	540.40	
541.000	541.000	-3.40	541.40	541.40	
542.000	542.000	-3.40	542.40	542.40	
543.000	543.000	-3.40	543.40	543.40	
544.000	544.000	-3.40	544.40	544.40	
545.000	545.000	-3.40	545.40	545.40	
546.000	546.000	-3.40	546.40	546.40	
547.000	547.000	-3.40	547.40	547.40	
548.000	548.000	-3.40	548.40	548.40	
549.000	549.000	-3.40	549.40	549.40	
550.000	550.000	-3.40	550.40	550.40	
551.000	551.000	-3.40	551.40	551.40	
552.000	552.000	-3.40	552.40	552.40	
553.000	553.000	-3.40	553.40	553.40	
554.000	554.000	-3.40	554.40	554.40	
555.000	555.000	-3.40	555.40	555.40	
556.000	556.000	-3.40	556.40	556.40	
557.000	557.000	-3.40	557.40	557.40	
558.000	558.000	-3.40	558.40	558.40	
559.000	559.000	-3.40	559.40	559.40	
560.000	560.000	-3.40	560.40	560.40	
561.000	561.000	-3.40	561.40	561.40	
562.000	562.000	-3.40	562.40	562.40	
563.000	563.000	-3.40	563.40	563.40	
564.000	564.000	-3.40	564.40	564.40	
565.000	565.000	-3.40	565.40	565.40	
566.000	566.000	-3.40	566.40	566.40	
567.000	567.000	-3.40	567.40	567.40	
568.000	568.000	-3.40	568.40	568.40	
569.000	569.000	-3.40	569.40	569.40	
570.000	570.000	-3.40	570.40	570.40	
571.000	571.000	-3.40	571.40	571.40	
572.000	572.000	-3.40	572.40	572.40	
573.000	573.000	-3.40	573.40	573.40	
574.000	574.000	-3.40	574.40	574.40	
575.000	575.000	-3.40	575.40	575.40	
576.000	576.000	-3.40	576.40	576.40	
577.000	577.000	-3.40	577.40	577.40	
578.000	578.000	-3.40	578.40	578.40	
579.000	579.000	-3.40	579.40	579.40	
580.000	580.000	-3.40	580.40	580.40	
581.000	581.000	-3.40	581.40	581.40	
582.000	582.000	-3.40	582.40	582.40	
583.000	583.000	-3.40	583.40	583.40	
584.000	584.000	-3.40	584.40	584.40	
585.000	585.000	-3.40	585.40	585.40	
586.000	586.000	-3.40	586.40	586.40	
587.000	587.000	-3.40	587.40	587.40	
588.000	588.000	-3.40	588.40	588.40	
589.000	589.000	-3.40	589.40	589.40	
590.000	590.000	-3.40	590.40	590.40	
591.000	591.000	-3.40	591.40	591.40	
592.000	592.000	-3.40	592.40	592.40	
593.000	593.000	-3.40	593.40	593.40	
594.000	594.000	-3.40	594.40	594.40	
595.000	595.000	-3.40	595.40	595.40	
596.000	596.000	-3.40	596.40	596.40	
597.000	597.000	-3.40	597.40	597.40	
598.000	598.000	-3.40	598.40	598.40	
599.000	599.000	-3.40	599.40	599.40	
600.000	600.000	-3.40	600.40	600.40	

- NOTES:
- THE ALIGNMENT DRAWING SHOWN IS INDICATIVE ONLY. THE CONTRACTOR NEED TO DEVELOP DETAILED ALIGNMENT DRAWING BASED ON THE ABOVE AND CONSIDERING THE TOPOGRAPHIC SURVEY CONDITIONS OF BUILDINGS SURVEY AND GEOTECHNICAL INVESTIGATION CARRIED OUT BY THEM.
 - THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CONCERNED AGENCIES FOR THE PROPOSED ALIGNMENT INCLUDING THE WEST BOUND LINE/TUNNEL.
 - THE LONGITUDINAL SECTION (PROFILE) SHOWN IN THE DRAWING IS ALONG THE WEST BOUND LINE/TUNNEL.
 - THE GROUND LEVELS OF NEW ALIGNMENT TAKEN FROM RITES DRAWING (ANNEXURE 4.2 DATED APRIL 2015), CONSIDER THE ADJACENT SIDE LEVELS ALSO SAME.

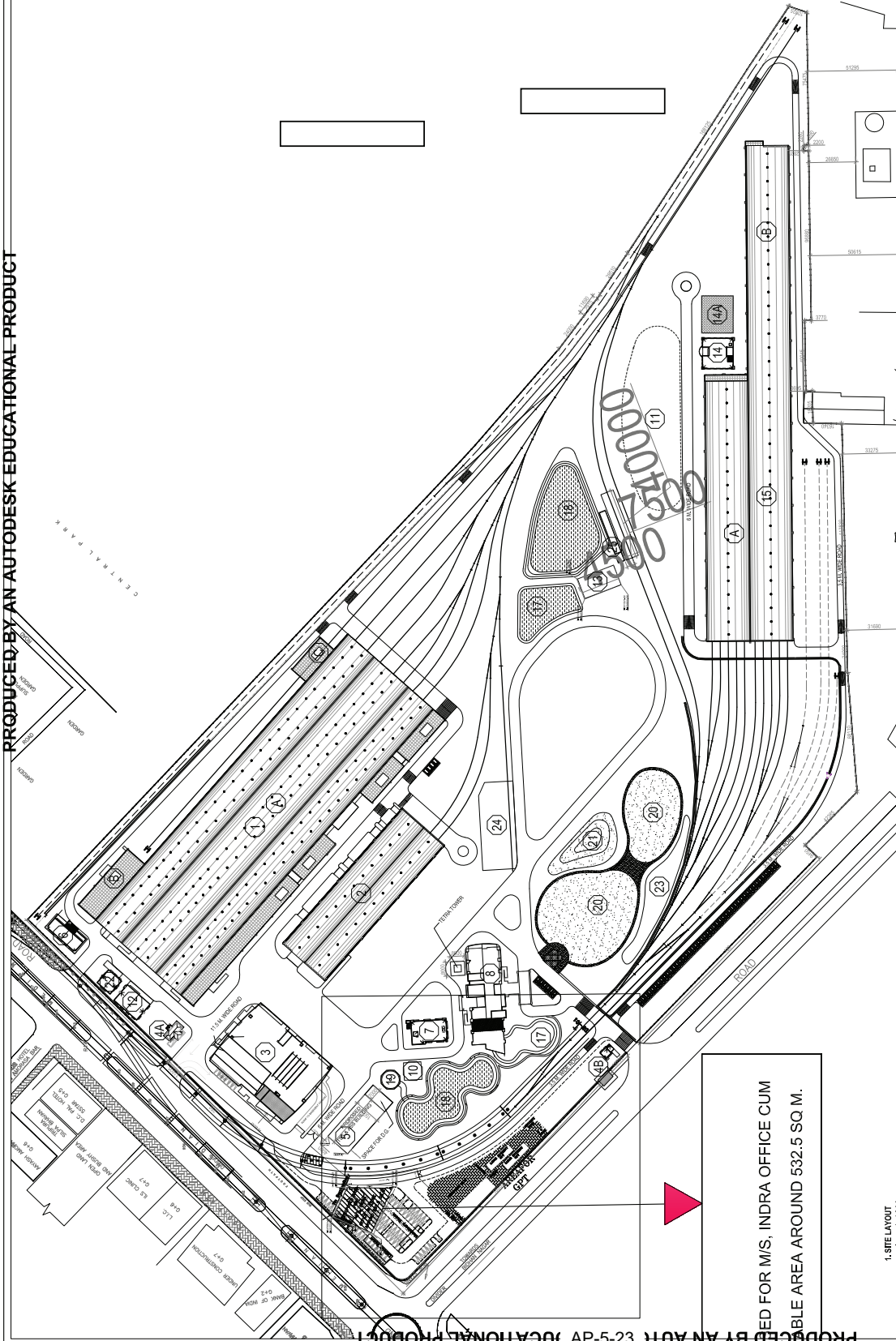
 KOLKATA METRO RAIL PROJECT EAST-WEST METRO CORRIDOR	PROJECT:- KOLKATA METRO PROJECT EAST - WEST METRO CORRIDOR	NAME: JK SIGN: JK	 M Y C E L General Consultant Kolkata East West Metro KMRCL, Munshi Premchand Sarani Kolkata-700021 Tel: +91-33-22622942
	DRAWN BY: JK DESIGN BY: JK	TITLE:- HORIZONTAL & VERTICAL ALIGNMENT WEST BOUND LINE	
	CHECKED BY: MB APPROVED BY: MB	DWG NO. REV.0 SCALE:- 1:1500 (A3) DATE:- 16/03/2016	
JK JATIN KILBANA MB: MRE BOARDMAN	REV. DATE PREP. APPR. DESCRIPTION		

添付資料 5 (2) -01 Central Park Depot Site Layout (Definitive Drawing)

ORIGINAL DRAWING SIZE A1



LEGEND NO.	BUILDING	AREA
1	WORKSHOP	217.45 X 73.75 (A) + 42.425 X 13.50 (B) + 24.45 X 10.985 (C)
2	ETU	102.01 X 31.11
3	DCCS	54.80 X 40.50
4A	GUARD HOUSE	10.09 X 6.61
4B	GUARD HOUSE	4.72 X 4.70
5	TSS & ASS (UNDER P.S CONTRACT)	32 X 15 (LAND AREA)
6	CHEMICAL STORE	21.30 X 7.30
7	CANTEEN	20.23 X 12.23
8	ADMINISTRATIVE/OCCIDCCC	54.98 X 17.70
10	PUMP HOUSE	10.00 X 10.00
11	P. WAY YARD (FUTURE)	-
12	WASTE STORE	17.30 X 12.00
13	EFFLUENT TREATMENT PLANT	-
14	DRIVERS' BOOKING OFFICE	17.59 X 17.03
14A	DRIVERS TRAINING SIMULATOR	NOT IN SCOPE
15	STABLING YARD	151.63 X 43.33 (A) + 128.76 X 24.06 (B)
16	BODY REPAIR & PAINTING BUILDING	NOT IN SCOPE
17	RETENTION POND (SHALLOW WETLAND)	-
18	WET LAND	-
19	SEDIMENTATION POND	-
20	LAWN	-
21	MOUND	-
22	CABLE STORE	9.98 X 9.98
23	SWALE	-
24	RAKE LAUNCHING YARD	NOT IN SCOPE
25	AUTO COACH WASH PLANT	NOT IN SCOPE



1. SITE LAYOUT
SCALE: 1:11250

RESERVED FOR M/S. INDRA OFFICE CUM
AVAILABLE AREA AROUND 532.5 SQ. M.

LEGEND NO.	DESCRIPTION	SYMBOL	AREA
1	BOUNDARY		38.972 ACRE
2	DEPOT TRACKS		
3	FUTURE EXPANSION TRACKS		
4	GROSS COVER		

CLIENT	Kolkata Metro Rail Corporation Limited <small>an (Public, Listed) Enterprise, Member of Financial Institutions (MFIL) - 700274.</small>
PROJECT TITLE	CONTRACT CPD DESIGN, MANUFACTURE, SUPPLY, CONSTRUCTION AND COMMISSIONING OF CENTRAL PARK DEPOT
DATE	31/05/2014
APPROVED	APPROVED
REVISIONS	

CONTRACTOR	CONSOLIDATED CONSTRUCTION CONSORTIUM LTD. <small>Members: Oshin</small>
CONSULTANT FOR CONTRACTOR	CHARBAAGH
DESIGN	Checked
APPROVAL	Approved

Issue Report	Approved for Issue
Final	Final
Working Drawing	Working Drawing
Construction Reference	Construction Reference
Drawing	Drawing
Approval	Approval

DEFINITIVE DRAWING

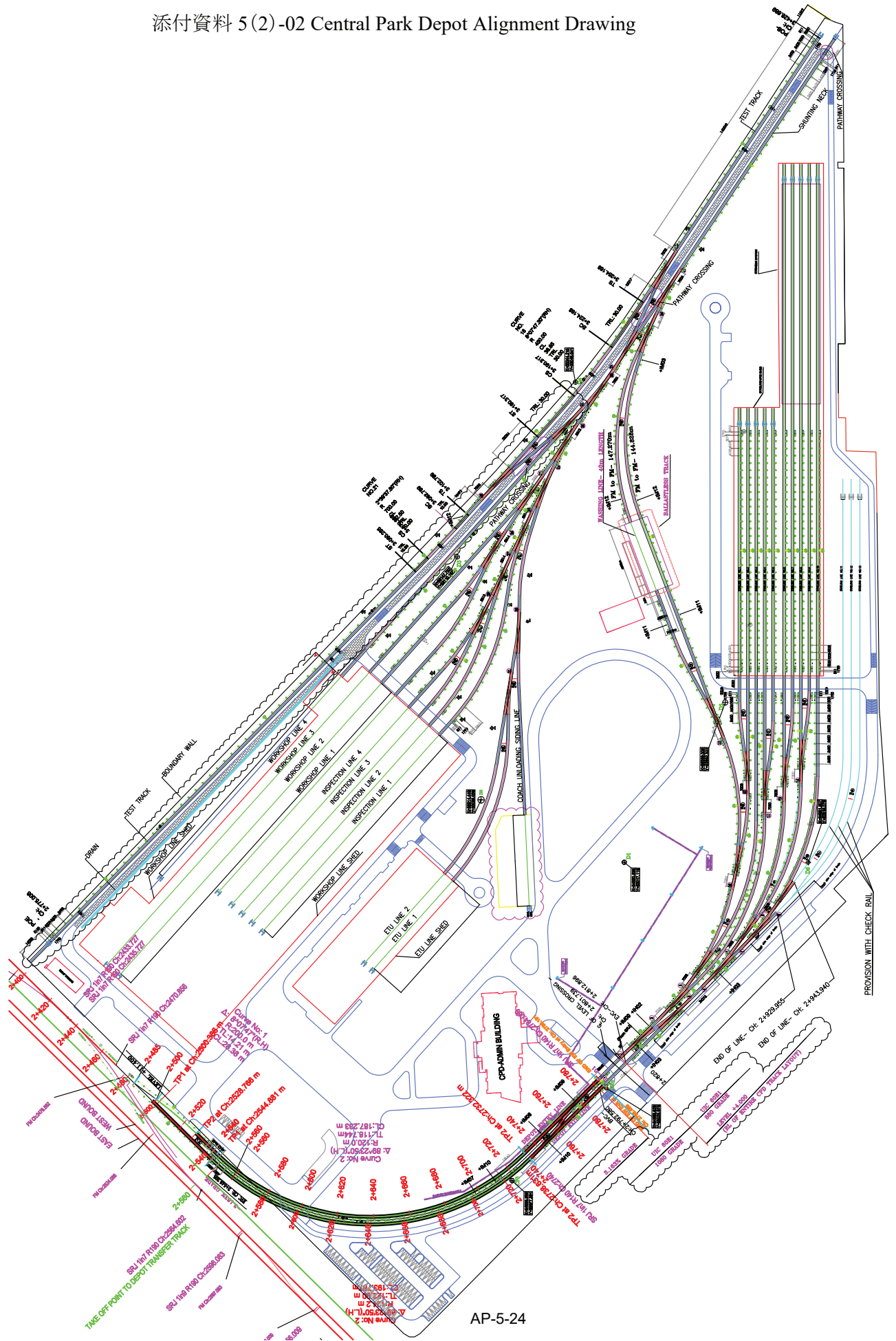
Accepted	Chief Engineer	Chief Electrical Engineer	Chief Signal & Telecommunication Engineer
Recommended	Executive Engineer		
M Y C E L	General Consultants		
Drawn	Checked	Recommended for Acceptance	
Drawing Title	CENTRAL PARK DEPOT - SITE LAYOUT		
Drawing Number	28254-CPD-C-AR-SPN-2/01		
REV	REV	REV	REV
31.05.13	31.05.13	31.05.13	31.05.13

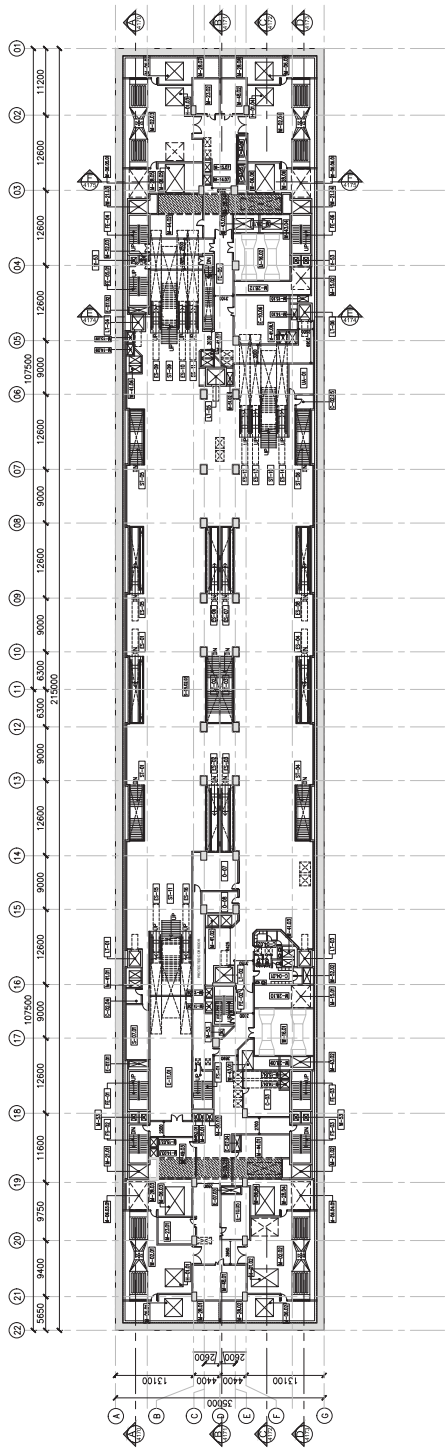
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

添付資料 5(2)-02 Central Park Depot Alignment Drawing





1 OVERALL LOWER CONCOURSE LEVEL PLAN

SCALE: 1:400

- GENERAL NOTES FOR ARCHITECTURAL DRAWINGS ONLY:**
1. ALL DIMENSION ARE IN MILLIMETERS.
 2. ALL LEVELS ARE IN METERS, INDICATING TOP OF CONCRETE (TOC) CONFIRMED AT SITE.
 3. GROUND LEVELS, WHERE SHOWN, ARE INDICATIVE, IT SHALL BE CONFIRMED AT SITE.
 4. DESIGN, REFER TO ENGR'S DETAIL DRAWINGS.
 5. ALL MINIMUM INTERNAL CLEARANCES ARE MANDATORY, SHALL BE PROVIDED AS PER ENGR'S DETAIL DRAWINGS.
 6. FLOOR FINISH INTO ACCOUNT DRAINAGE @ 1:400 SLOPE.
 7. ASSUMING FINISH LEVEL SHALL BE DERIVED FROM APPROVED FINISH LEVEL DRAWING.
 8. FOR THE LOCATION OF COLUMNS TO BE VERIFIED WITH ARCHITECTURAL DRAWINGS.
 9. ACTUAL SIZE OF CURTAIN WALL OPENINGS AS PER MEP DRAWINGS, REFER TO THE REINSTATEMENT PLAN FOR ON GROUND LEVEL.
 10. ALL R.C. WORKS TO REFER ENGINEER'S DETAIL DRAWINGS.
 11. ALL WALLS, COLUMNS & BEAMS TO BE FINISHED WITH AS PER ENGR'S DETAIL DRAWINGS.
 12. R.C. LEVELS TO BE PROVIDED OVER ALL DOORS, WINDOWS & OTHER OPENINGS WHERE NECESSARY.
 13. ALL OPENINGS TO BE SEALED WITH FIRE STOPS.

ROOM NUMBER	ROOM NAME	LENGTH (M)	WIDTH (M)	AREA (SQM)	LEVEL (M)
ME1.01	MEN'S TOILET	3.0	2.5	7.5	0.0
ME1.02	WOMEN'S TOILET	3.0	2.5	7.5	0.0
ME1.03	CHILDREN'S TOILET	3.0	2.5	7.5	0.0
ME1.04	TOILET	3.0	2.5	7.5	0.0
ME1.05	TOILET	3.0	2.5	7.5	0.0
ME1.06	TOILET	3.0	2.5	7.5	0.0
ME1.07	TOILET	3.0	2.5	7.5	0.0
ME1.08	TOILET	3.0	2.5	7.5	0.0
ME1.09	TOILET	3.0	2.5	7.5	0.0
ME1.10	TOILET	3.0	2.5	7.5	0.0
ME1.11	TOILET	3.0	2.5	7.5	0.0
ME1.12	TOILET	3.0	2.5	7.5	0.0
ME1.13	TOILET	3.0	2.5	7.5	0.0
ME1.14	TOILET	3.0	2.5	7.5	0.0
ME1.15	TOILET	3.0	2.5	7.5	0.0
ME1.16	TOILET	3.0	2.5	7.5	0.0
ME1.17	TOILET	3.0	2.5	7.5	0.0
ME1.18	TOILET	3.0	2.5	7.5	0.0
ME1.19	TOILET	3.0	2.5	7.5	0.0
ME1.20	TOILET	3.0	2.5	7.5	0.0

ROOM NUMBER	ROOM NAME	LENGTH (M)	WIDTH (M)	AREA (SQM)	LEVEL (M)
ME2.01	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME2.02	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME2.03	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME2.04	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME2.05	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME2.06	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME2.07	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME2.08	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME2.09	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME2.10	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME2.11	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME2.12	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME2.13	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME2.14	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME2.15	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME2.16	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME2.17	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME2.18	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME2.19	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME2.20	MECHANICAL ROOM	3.0	2.5	7.5	0.0

ROOM NUMBER	ROOM NAME	LENGTH (M)	WIDTH (M)	AREA (SQM)	LEVEL (M)
ME3.01	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME3.02	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME3.03	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME3.04	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME3.05	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME3.06	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME3.07	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME3.08	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME3.09	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME3.10	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME3.11	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME3.12	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME3.13	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME3.14	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME3.15	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME3.16	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME3.17	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME3.18	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME3.19	MECHANICAL ROOM	3.0	2.5	7.5	0.0
ME3.20	MECHANICAL ROOM	3.0	2.5	7.5	0.0

General Consultants :

MYCEL Kolkata Metro East West Line - General Consultant
 60/6A, Park Road, Kolkata - 700 017
 98304 300 811

REFERENCE DRAWINGS

Sl. No.	Rev.	Date	Description
1	01	14.03.2017	ISSUED AS PRELIMINARY ARCHITECTURAL DRAWING
2	02	14.03.2017	REVISED AS PER COMMENTS
3	03	14.03.2017	REVISED AS PER COMMENTS

STATION BUILDING KEY PLAN

General Contractors :

MYCEL Kolkata Metro East West Line - General Contractor
 60/6A, Park Road, Kolkata - 700 017
 98304 300 811

PROJECT MANAGER / DESIGN MANAGER / PROJECT MANAGER

DATE

DESIGNATION

PROJECT MANAGER / DESIGN MANAGER / PROJECT MANAGER

DATE

STUP

STUP CONSULTANTS PVT. LTD.

105, Main Bhuban Mohan Park, ITD Concourse Proj.
 P-11, Dhaka Road, Bhuban Mohan Park
 751003, Odisha, India
 Tel: +91 674 4099777 Fax: +91 674 4099900
 Email: info@stupconsultants.com

ITD - ITD CEM JOINT VENTURE

Surajana Jirong Consultants Prop. Ltd.
 105, Main Bhuban Mohan Park, ITD Concourse Proj.
 P-11, Dhaka Road, Bhuban Mohan Park
 751003, Odisha, India
 Tel: +91 674 4099777 Fax: +91 674 4099900
 Email: info@stupconsultants.com

KOLKATA METRO RAIL CORPORATION LTD.

CONTRACT 002 : DESIGN AND CONSTRUCTION OF UNDERGROUND SECTION FROM ESPRANDE STATION TO SURAJANA STATION

ESPLANADE STATION

OVERALL LOWER CONCOURSE LEVEL PLAN

SCALE: 1:400

DATE: 20-06-2017

PROJECT NO: UC2-P-ESP-AR-4103

DESIGN NO: UC2-P-ESP-AR-4103

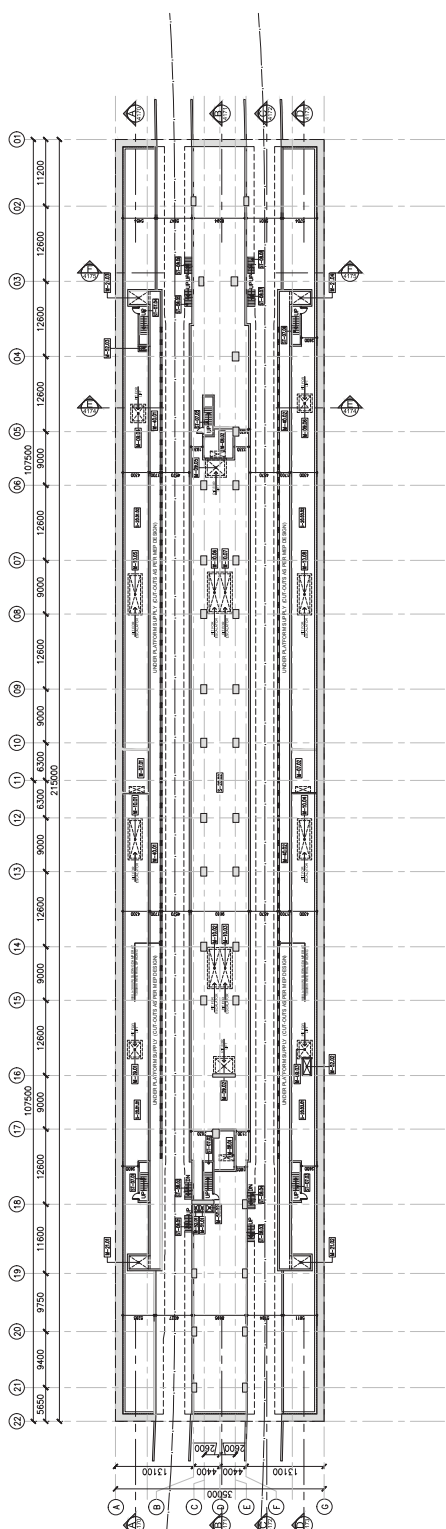
DATE: 20-06-2017

SCALE: 1:400

DATE: 20-06-2017

PROJECT NO: UC2-P-ESP-AR-4103

DESIGN NO: UC2-P-ESP-AR-4103



1 OVERALL UNDER PLATFORM LEVEL PLAN

SCALE: 1:400

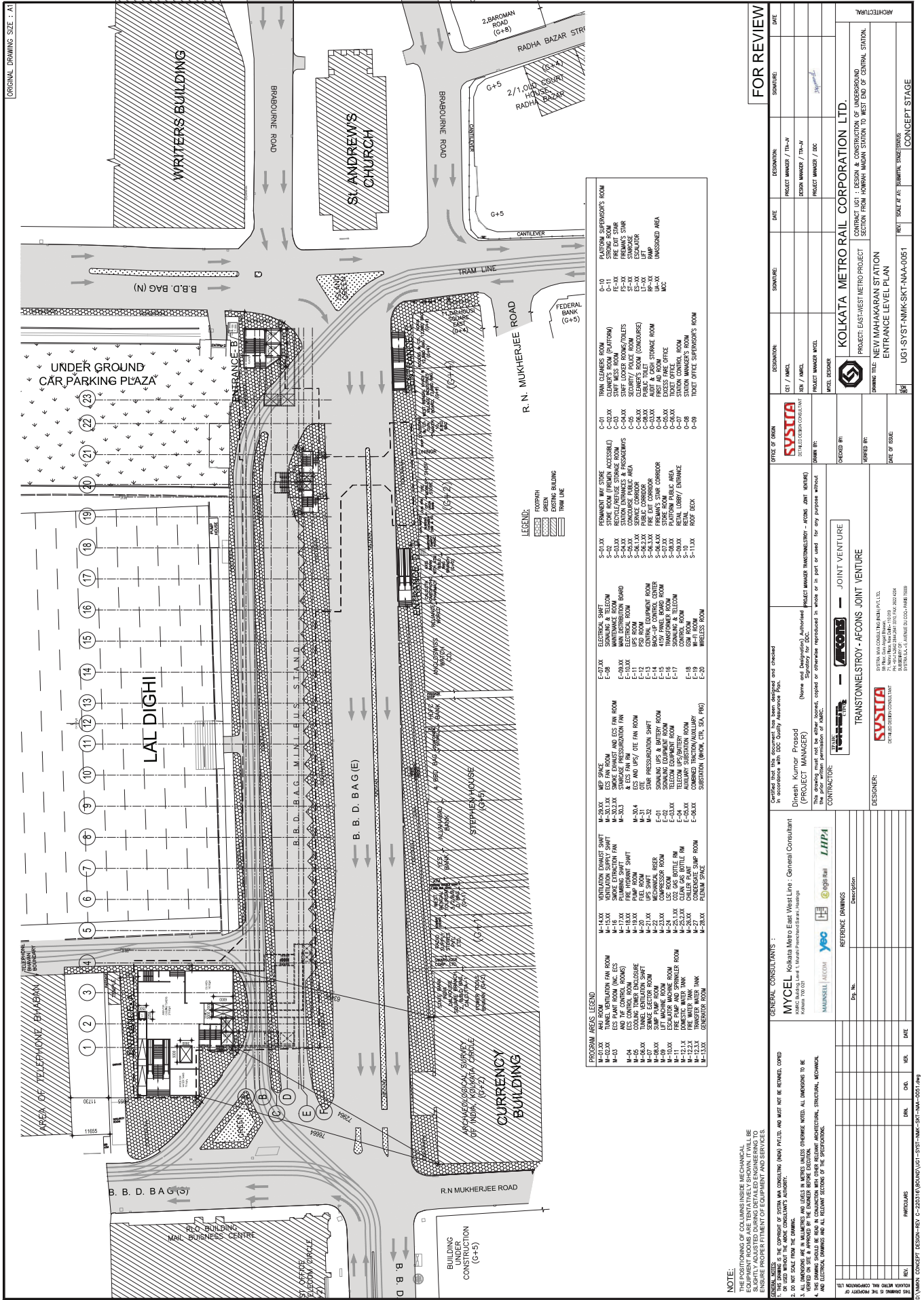
ROOM NUMBER	ROOM NAME	LENGTH X WIDTH (M)	ROOM AREA (SQM)
ME01	MECHANICAL ROOM	7.15 X 4.2	30.13
ME02	MECHANICAL ROOM	7.15 X 4.2	30.13
ME03	MECHANICAL ROOM	7.15 X 4.2	30.13
ME04	MECHANICAL ROOM	7.15 X 4.2	30.13
ME05	MECHANICAL ROOM	7.15 X 4.2	30.13
ME06	MECHANICAL ROOM	7.15 X 4.2	30.13
ME07	MECHANICAL ROOM	7.15 X 4.2	30.13
ME08	MECHANICAL ROOM	7.15 X 4.2	30.13
ME09	MECHANICAL ROOM	7.15 X 4.2	30.13
ME10	MECHANICAL ROOM	7.15 X 4.2	30.13
ME11	MECHANICAL ROOM	7.15 X 4.2	30.13
ME12	MECHANICAL ROOM	7.15 X 4.2	30.13
ME13	MECHANICAL ROOM	7.15 X 4.2	30.13
ME14	MECHANICAL ROOM	7.15 X 4.2	30.13
ME15	MECHANICAL ROOM	7.15 X 4.2	30.13
ME16	MECHANICAL ROOM	7.15 X 4.2	30.13
ME17	MECHANICAL ROOM	7.15 X 4.2	30.13
ME18	MECHANICAL ROOM	7.15 X 4.2	30.13
ME19	MECHANICAL ROOM	7.15 X 4.2	30.13
ME20	MECHANICAL ROOM	7.15 X 4.2	30.13
ME21	MECHANICAL ROOM	7.15 X 4.2	30.13
ME22	MECHANICAL ROOM	7.15 X 4.2	30.13

ROOM NUMBER	ROOM NAME	LENGTH X WIDTH (M)	ROOM AREA (SQM)
ME01	MECHANICAL ROOM	7.15 X 4.2	30.13
ME02	MECHANICAL ROOM	7.15 X 4.2	30.13
ME03	MECHANICAL ROOM	7.15 X 4.2	30.13
ME04	MECHANICAL ROOM	7.15 X 4.2	30.13
ME05	MECHANICAL ROOM	7.15 X 4.2	30.13
ME06	MECHANICAL ROOM	7.15 X 4.2	30.13
ME07	MECHANICAL ROOM	7.15 X 4.2	30.13
ME08	MECHANICAL ROOM	7.15 X 4.2	30.13
ME09	MECHANICAL ROOM	7.15 X 4.2	30.13
ME10	MECHANICAL ROOM	7.15 X 4.2	30.13
ME11	MECHANICAL ROOM	7.15 X 4.2	30.13
ME12	MECHANICAL ROOM	7.15 X 4.2	30.13
ME13	MECHANICAL ROOM	7.15 X 4.2	30.13
ME14	MECHANICAL ROOM	7.15 X 4.2	30.13
ME15	MECHANICAL ROOM	7.15 X 4.2	30.13
ME16	MECHANICAL ROOM	7.15 X 4.2	30.13
ME17	MECHANICAL ROOM	7.15 X 4.2	30.13
ME18	MECHANICAL ROOM	7.15 X 4.2	30.13
ME19	MECHANICAL ROOM	7.15 X 4.2	30.13
ME20	MECHANICAL ROOM	7.15 X 4.2	30.13
ME21	MECHANICAL ROOM	7.15 X 4.2	30.13
ME22	MECHANICAL ROOM	7.15 X 4.2	30.13

- GENERAL NOTES FOR ARCHITECTURAL DRAWINGS ONLY:**
1. ALL DIMENSIONS ARE IN MILLIMETERS.
 2. ALL LEVELS ARE IN METERS, INDICATING TOP OF CONCRETE (TOC).
 3. GROUND LEVELS, WHERE SHOWN, ARE INDICATIVE, IT SHALL BE CONFIRMED AT SITE.
 4. DESIGN, REFER TO ENGR'S DETAIL DRAWINGS.
 5. ALL MINIMUM INTERNAL CLEARANCES ARE MANDATORY & SHALL BE TO FORM FACING INTO ACCOUNT DRAINAGE @ 1:400 SLOPE.
 6. ASSUMED FINISH LEVEL SHALL BE DERIVED FROM APPROVED FOR LOCATION OF COLUMNS TO BE VERIFIED WITH ACTUAL SIZE OF COLUMN AND OPENINGS AS PER MEP DRAWINGS.
 7. REFER TO THE REINSTATEMENT PLAN FOR ON GROUND.
 8. ALL R.C. WORKS TO REFER ENGINEER'S DETAIL DRAWINGS.
 9. ALL WALLS, COLUMNS & BEAMS TO BE FINISHED WITH AS PER R.C. LEVELS TO BE PROVIDED OVER ALL DOORS, WINDOWS & OTHER OPENINGS WHERE NECESSARY.
 10. ALL OPENINGS TO BE SEALED WITH FIRE STOPS.

<p>STATION BUILDING KEY PLAN</p>		<p>General Consultants :</p> <p>MYCEL Kolkata Metro East West Line - General Consultant 60/6A, Park Street, Kolkata - 700 001</p>		<p>Project Location: Kolkata Metro East West Line - Station Building</p>	
<p>General Contractors :</p> <p>KOLKATA METRO RAIL CORPORATION LTD. CONTRACT NO. : RESON AND CONSTRUCTION OF UNDERGROUND SECTION FROM ESPANADE STATION TO SURBAHS SAKHAR</p>		<p>Project Director / Design Manager / Project Manager:</p> <p>CE E.T. / MRCCL</p>		<p>Project Location: Kolkata Metro East West Line - Station Building</p>	
<p>MEP CONSULTANTS :</p> <p>STUP CONSULTANTS PVT. LTD. P-11, Chugh Road, New Chugh, Kolkata - 700 009 Tel: 91-93-2009977, 2300743031 Email: info@stup.com</p>		<p>Project Location: Kolkata Metro East West Line - Station Building</p>		<p>Project Location: Kolkata Metro East West Line - Station Building</p>	
<p>DATE OF ISSUE: 20-06-2017</p>		<p>SCALE: 1:400</p>		<p>DATE: _____</p>	
<p>PROJECT LOCATION: Kolkata Metro East West Line - Station Building</p>		<p>PROJECT LOCATION: Kolkata Metro East West Line - Station Building</p>		<p>PROJECT LOCATION: Kolkata Metro East West Line - Station Building</p>	
<p>PROJECT LOCATION: Kolkata Metro East West Line - Station Building</p>		<p>PROJECT LOCATION: Kolkata Metro East West Line - Station Building</p>		<p>PROJECT LOCATION: Kolkata Metro East West Line - Station Building</p>	

添付資料 5(3)-02 General Drawing Set (New Mahakaran Station)



FOR REVIEW

DATE	REVISION	DATE	REVISION
	PROJECT MANAGER / TR-JF		
	DESIGN MANAGER / TR-JF		
	PROJECT MANAGER / JOC		

SYSTRA
INFRASTRUCTURE CONSULTANTS

TRANSTONNELSTROY - AFCONS JOINT VENTURE

KOLKATA METRO RAIL CORPORATION LTD.
PROJECT: EAST-WEST METRO PROJECT
SECTION FROM HOWRAH MAIN STATION TO WEST END OF CENTRAL STATION

NEW MAHAKARAN STATION
ENTRANCE LEVEL PLAN

UOI: UG1-SYST-NAIK-SKT-NA-0051

PROGRAM AREAS LEGEND

M-01.0X	ARET ROOM
M-02.0X	TUNNEL VENTILATION FAN ROOM
M-03.0X	ESS CONTROL ROOMS
M-04.0X	ESS CONTROL ROOM
M-05.0X	TUNNEL VENTILATION SHAFT
M-06.0X	SMOKE EXHAUSTOR ROOM
M-07.0X	LEFT MACHINE ROOM
M-08.0X	RIGHT MACHINE ROOM
M-09.0X	ESR PUMP AND SUPPLY ROOM
M-10.0X	DOMESTIC WATER TANK
M-11.0X	TRANSFER WATER TANK
M-12.0X	GENERATOR ROOM

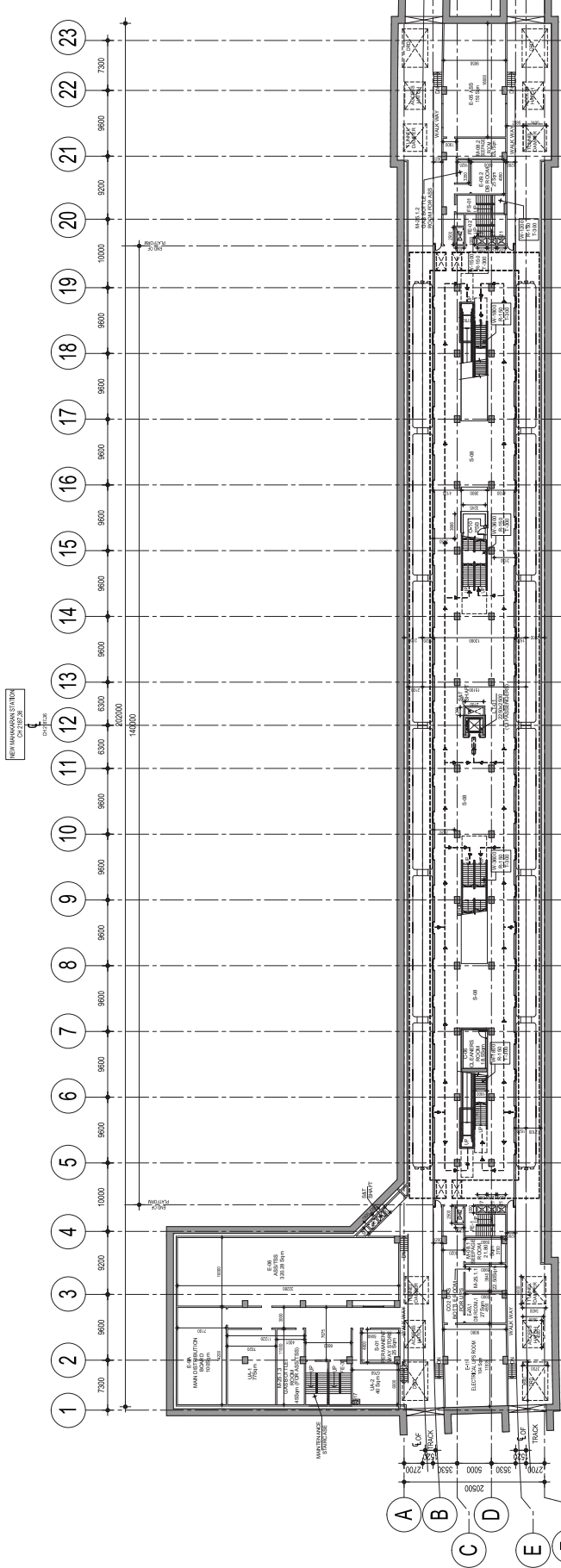
GENERAL CONSULTANTS :

MYCEL Kolkata Metro East West Line - General Consultant
Kolkata Metro Rail Corporation Limited
Kolkata - 700 027

MAHESHI AECOM **yoc** **digital** **LHPA**

NOTE:

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- DO NOT SCALE FROM THIS DRAWING.
- ALL DIMENSIONS ARE IN MILLIMETRES AND LEVELS IN METRES UNLESS OTHERWISE NOTED. ALL DIMENSIONS TO BE SHOWN IN THIS DRAWING SHOULD BE MADE IN CONJUNCTION WITH OTHER RELATED ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL, CIVIL, AND SANITARY DRAWINGS AND ALL RELATED NOTIFICATIONS OF THE SPECIFICATIONS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE RELEVANT AUTHORITIES.



PLATFORM LEVEL PLAN
SCALE 1:500

PROGRAM AREAS LEGEND	DESCRIPTION
M-01.0X	PLATF. SUPERVISOR'S ROOM
M-02.0X	PLATF. SUPERVISOR'S ROOM
M-03.0X	PLATF. SUPERVISOR'S ROOM
M-04.0X	PLATF. SUPERVISOR'S ROOM
M-05.0X	PLATF. SUPERVISOR'S ROOM
M-06.0X	PLATF. SUPERVISOR'S ROOM
M-07.0X	PLATF. SUPERVISOR'S ROOM
M-08.0X	PLATF. SUPERVISOR'S ROOM
M-09.0X	PLATF. SUPERVISOR'S ROOM
M-10.0X	PLATF. SUPERVISOR'S ROOM
M-11.0X	PLATF. SUPERVISOR'S ROOM
M-12.0X	PLATF. SUPERVISOR'S ROOM
M-13.0X	PLATF. SUPERVISOR'S ROOM
M-14.0X	PLATF. SUPERVISOR'S ROOM
M-15.0X	PLATF. SUPERVISOR'S ROOM
M-16.0X	PLATF. SUPERVISOR'S ROOM
M-17.0X	PLATF. SUPERVISOR'S ROOM
M-18.0X	PLATF. SUPERVISOR'S ROOM
M-19.0X	PLATF. SUPERVISOR'S ROOM
M-20.0X	PLATF. SUPERVISOR'S ROOM
M-21.0X	PLATF. SUPERVISOR'S ROOM
M-22.0X	PLATF. SUPERVISOR'S ROOM
M-23.0X	PLATF. SUPERVISOR'S ROOM
M-24.0X	PLATF. SUPERVISOR'S ROOM
M-25.0X	PLATF. SUPERVISOR'S ROOM
M-26.0X	PLATF. SUPERVISOR'S ROOM
M-27.0X	PLATF. SUPERVISOR'S ROOM
M-28.0X	PLATF. SUPERVISOR'S ROOM
M-29.0X	PLATF. SUPERVISOR'S ROOM
M-30.0X	PLATF. SUPERVISOR'S ROOM
M-31.0X	PLATF. SUPERVISOR'S ROOM
M-32.0X	PLATF. SUPERVISOR'S ROOM
M-33.0X	PLATF. SUPERVISOR'S ROOM
M-34.0X	PLATF. SUPERVISOR'S ROOM
M-35.0X	PLATF. SUPERVISOR'S ROOM
M-36.0X	PLATF. SUPERVISOR'S ROOM
M-37.0X	PLATF. SUPERVISOR'S ROOM
M-38.0X	PLATF. SUPERVISOR'S ROOM
M-39.0X	PLATF. SUPERVISOR'S ROOM
M-40.0X	PLATF. SUPERVISOR'S ROOM
M-41.0X	PLATF. SUPERVISOR'S ROOM
M-42.0X	PLATF. SUPERVISOR'S ROOM
M-43.0X	PLATF. SUPERVISOR'S ROOM
M-44.0X	PLATF. SUPERVISOR'S ROOM
M-45.0X	PLATF. SUPERVISOR'S ROOM
M-46.0X	PLATF. SUPERVISOR'S ROOM
M-47.0X	PLATF. SUPERVISOR'S ROOM
M-48.0X	PLATF. SUPERVISOR'S ROOM
M-49.0X	PLATF. SUPERVISOR'S ROOM
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M-92.0X	PLATF. SUPERVISOR'S ROOM
M-93.0X	PLATF. SUPERVISOR'S ROOM
M-94.0X	PLATF. SUPERVISOR'S ROOM
M-95.0X	PLATF. SUPERVISOR'S ROOM
M-96.0X	PLATF. SUPERVISOR'S ROOM
M-97.0X	PLATF. SUPERVISOR'S ROOM
M-98.0X	PLATF. SUPERVISOR'S ROOM
M-99.0X	PLATF. SUPERVISOR'S ROOM
M-100.0X	PLATF. SUPERVISOR'S ROOM

NOTE:
1. THE DRAWING IS THE PROPERTY OF SYSTEM WA CONSULTING (PVT) LTD. AND MUST NOT BE REPRODUCED, COPIED OR NOT SCALE FROM THE DRAWING.
2. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS IN METERS UNLESS OTHERWISE NOTED. ALL WORKSHOPS TO BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS.
3. THIS DRAWING SHOULD BE READ IN CONNECTION WITH OTHER RELATED ARCHITECTURAL, STRUCTURAL, MECHANICAL AND ELECTRICAL DRAWINGS AND ALL RELEVANT SECTIONS OF THE SPECIFICATIONS.

GENERAL CONSULTANTS :
MYCEL Kolkata Metro East West Line - General Consultant
Kolkata Metro East West Line
Kolkata Metro Ltd
Kolkata 700 027

DESIGNER:
MAUNSELL | AECOM | yoc | egypt | LHPA

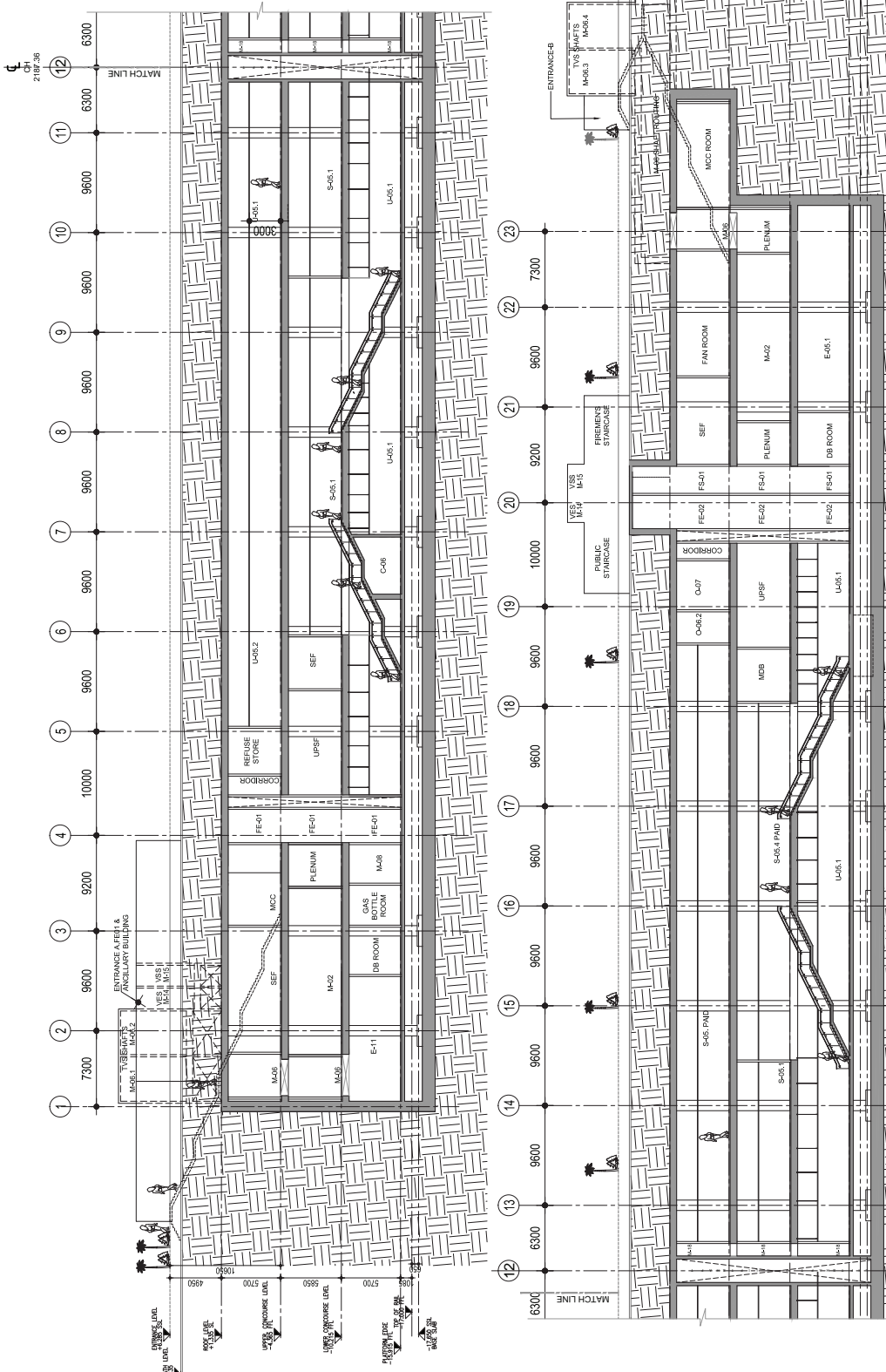
CONTRACTOR:
TRANSNELLSTROY - AFCONS JOINT VENTURE

PROJECT MANAGER (PROJECT MANAGER):
Dinesh Kumar Prasad
(Name and Designation) Authorized
This drawing must not be altered, copied or otherwise reproduced in whole or in part or used for any purpose without the prior written permission of M.M.C.

FOR REVIEW

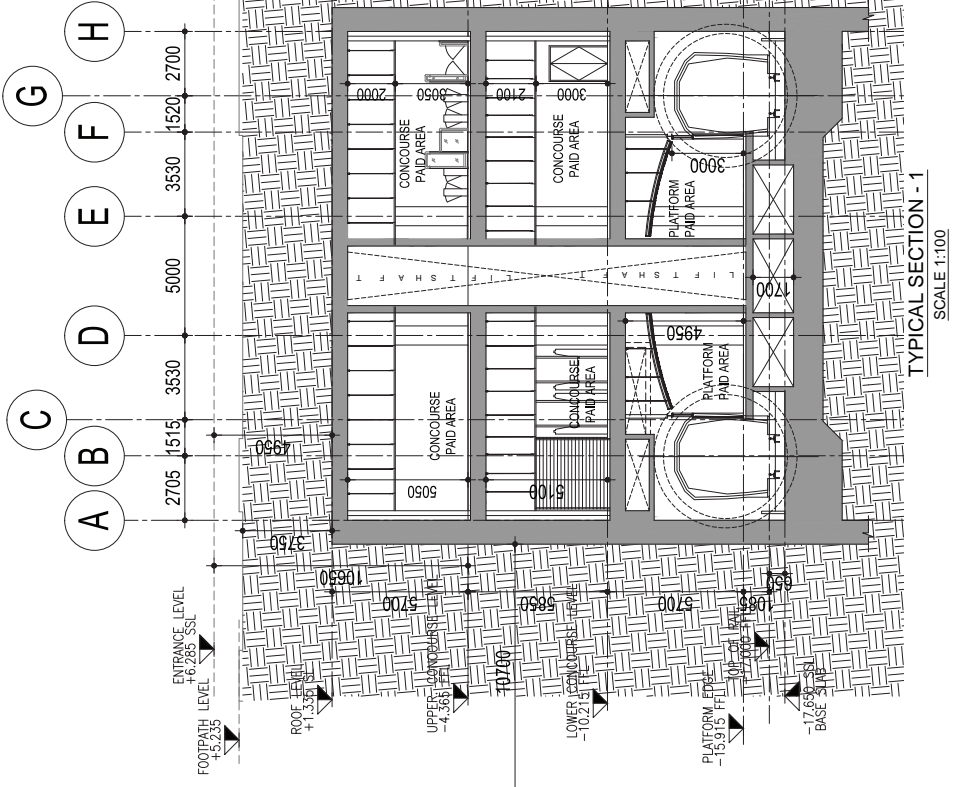
DATE	REVISION	BY	DATE	REVISION	BY

DATE: 08/08/2023
SCALE: 1:500
PROJECT: KOLKATA METRO RAIL CORPORATION LTD.
SECTION: SECTION FROM HOWRAH MAIN STATION TO WEST END OF CENTRAL STATION.
DRAWING TITLE: UG1-SYST-ANK-SKT-NA-A-056A
DATE OF ISSUE: 08/08/2023
REV: 01
SCALE AT ALL DIMENSIONS: 1:500
CONCEPT STAGE

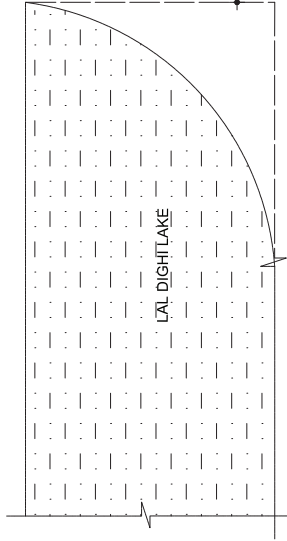


FOR REVIEW

<p>NOTE: 1. THE DRAWING IS THE PROPERTY OF SYSTEM WAS CONSULTING (PVT) LTD. AND MUST NOT BE REPRODUCED, COPIED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, WITHOUT THE WRITTEN PERMISSION OF SYSTEM WAS CONSULTING (PVT) LTD. 2. DO NOT SCALE FROM THE DRAWING. 3. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS IN METERS UNLESS OTHERWISE NOTED. ALL DIMENSIONS TO BE SHOWN ON THIS DRAWING SHOULD BE MADE IN CONJUNCTION WITH OTHER RELATED ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL AND CIVIL DRAWINGS AND ALL RELEVANT SECTIONS OF THE SPECIFICATIONS.</p>		<p>GENERAL CONSULTANTS : MYCEL - Kolkata Metro East West Line - General Consultant 108, Park Street, Kolkata - 700 017 MAUNSELL AECOM yoc digital LHPA</p>		<p>DESIGNER: TRANSSTONNELSTROY - AECOM JOINT VENTURE SYSTEMS CONSULTANTS PVT. LTD. 7, New Market, Kolkata - 700 019 SUBSIDIARY OF SYSTEMS CONSULTANTS (INDIA) PRIVATE LIMITED</p>		<p>CONTRACTOR: TRANSSTONNELSTROY - AECOM JOINT VENTURE TRANSSTONNELSTROY - AECOM JOINT VENTURE SYSTEMS CONSULTANTS PVT. LTD. 7, New Market, Kolkata - 700 019 SUBSIDIARY OF SYSTEMS CONSULTANTS (INDIA) PRIVATE LIMITED</p>		<p>OWNER: KOLKATA METRO RAIL CORPORATION LTD. PROJECT: EAST-WEST METRO PROJECT SECTION FROM KOLHARI MAJIDAN STATION TO WEST END OF CENTRAL STATION. TYPICAL LONG SECTION</p>		<p>DATE: 21/07/2023 DATE: 21/07/2023 DATE: 21/07/2023</p>	
<p>PROJECT MANAGER / TR-J PROJECT MANAGER / TR-J PROJECT MANAGER / TR-J</p>		<p>DESIGNER: PROJECT MANAGER / TR-J PROJECT MANAGER / TR-J</p>		<p>DATE: 21/07/2023 DATE: 21/07/2023 DATE: 21/07/2023</p>		<p>DATE: 21/07/2023 DATE: 21/07/2023 DATE: 21/07/2023</p>		<p>DATE: 21/07/2023 DATE: 21/07/2023 DATE: 21/07/2023</p>		<p>DATE: 21/07/2023 DATE: 21/07/2023 DATE: 21/07/2023</p>	



TYPICAL SECTION - 1
SCALE 1:100



NOTE:
 1. THE POSITIONING OF COLUMNS INSIDE MECHANICAL EQUIPMENT ROOMS ARE TENTATIVELY SHOWN. IT WILL BE SUBJECT TO THE REQUIREMENTS OF THE CONTRACT. ENSURE PROPER FITMENT OF EQUIPMENT AND SERVICES.
 2. ALL DIMENSIONS ARE IN MILLIMETRES AND LEVELS IN METRES UNLESS OTHERWISE NOTED. ALL DIMENSIONS TO BE SHOWN IN THIS DRAWING SHOULD BE ALSO IN CONNECTION WITH OTHER RELATED ARCHITECTURAL, STRUCTURAL, MECHANICAL AND ELECTRICAL DRAWINGS AND ALL RELEVANT SECTIONS OF THE SPECIFICATIONS.
 3. DO NOT SCALE FROM THE DRAWING.
 4. THIS DRAWING SHOULD BE READ IN CONNECTION WITH OTHER RELATED ARCHITECTURAL, STRUCTURAL, MECHANICAL AND ELECTRICAL DRAWINGS AND ALL RELEVANT SECTIONS OF THE SPECIFICATIONS.

GENERAL CONSULTANTS :
MYCEL - Kolkata Metro East West Line - General Consultant
 201, Sector 1, Habibraji, Bhubaneswar, Odisha
 Kolkata - 751023
MAINTENANCE | **ALCON** | **yoc** | **digital** | **LHFA**

CONTRACTOR: TRANSSTONNELSTROY - AFCONS JOINT VENTURE
DESIGNER: **SVSISTA**
 DETAIL DESIGN CONSULTANT
 815, NEW COLLEGE ROAD, RAJENDRA NAGAR, KOLKATA - 700016
 SUBSIDIARY OF: **SVSISTA** - A MEMBER OF SVS GROUP OF INSTITUTIONS

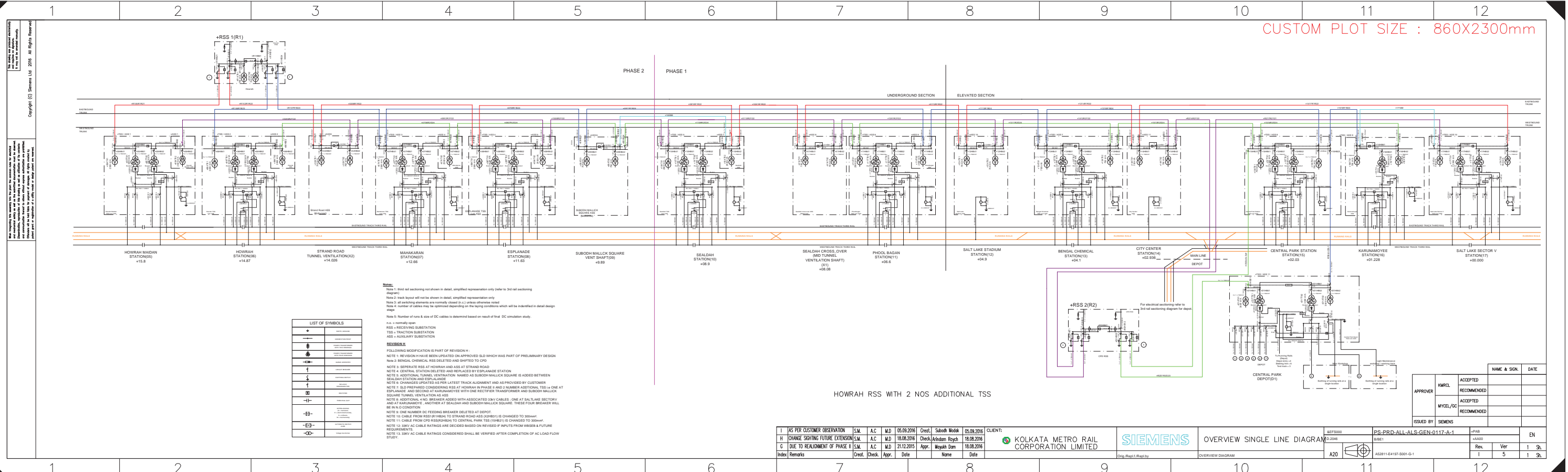
FOR REVIEW

DATE	REVISION	DATE	REVISION
	PROJECT MANAGER / TM-Y		PROJECT MANAGER / TM-Y
	DESIGN MANAGER / TM-Y		DESIGN MANAGER / TM-Y
	PROJECT MANAGER / SOC		PROJECT MANAGER / SOC
	SCALE		SCALE
	PROJECT MANAGER / SOC		PROJECT MANAGER / SOC

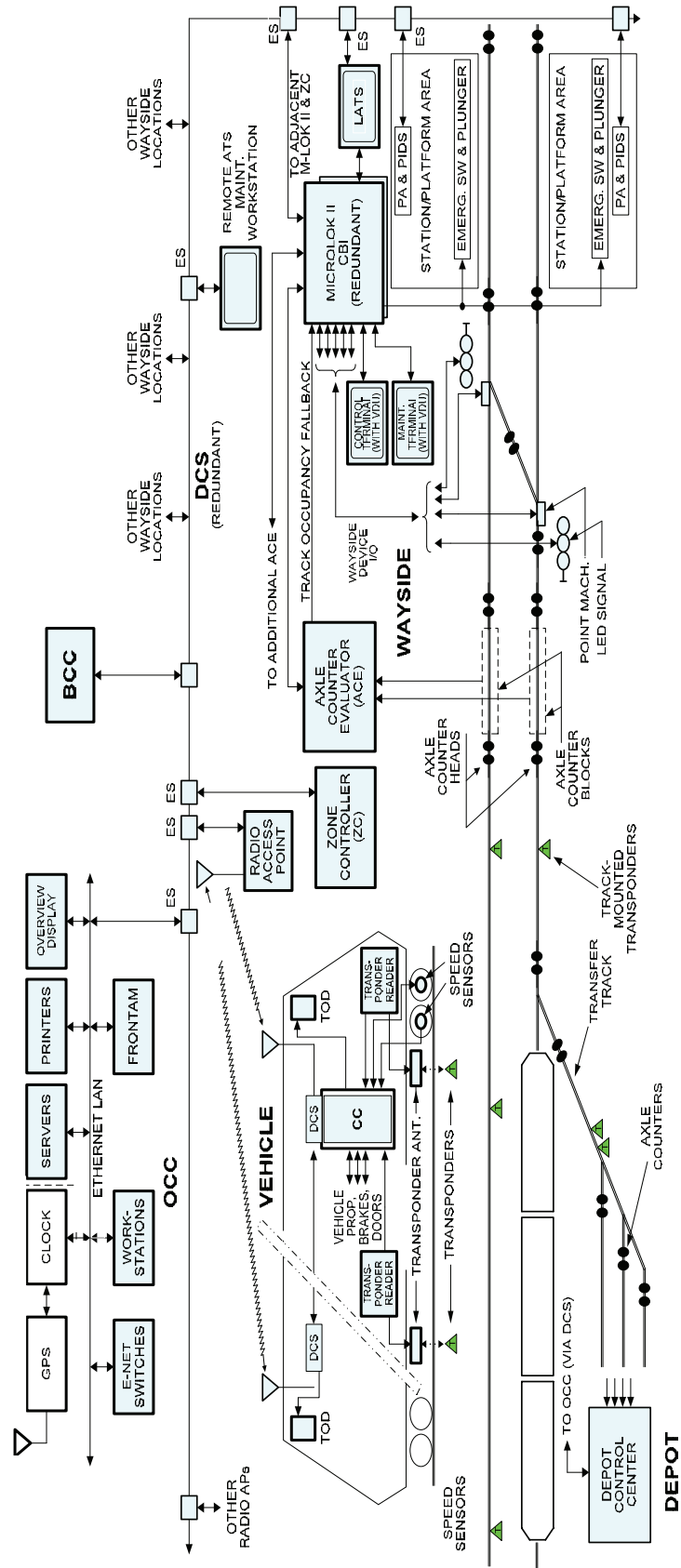
PROJECT: KOLKATA METRO EAST-WEST METRO PROJECT
 CONTRACT: UG1 - DESIGN & CONSTRUCTION OF UNDERGROUND SECTION FROM KOLKATA METRO STATION TO WEST END OF GENERAL STATION.
 DRAWING TITLE: NEW MAHAKARAN STATION
 TYPICAL SECTION
 UG1-SYST-ANIK-SKT-MA-A-0056
 SCALE: 1:100
 SHEET NO: 1 OF 1
 DRAWING NO: 10000000000000000000
 DATE OF ISSUE: 2024-07-15

添付資料 5 (4) Overview Single Line Diagram (Electrical Power)

CUSTOM PLOT SIZE : 860X2300mm



添付資料 5 (5) Overview Diagram (Signaling and Telecommunication)



添付資料 5 (6) Comparison Table of Signaling and Train Control System

Comparison S&T based on the DPR

Signaling and Train Control System

Item	Kolkata (Revised DPR, Volume 2, January 2016) Section 3.7	Mumbai (DPR Colaba-Bandra-SEEPZ, 2011) Chapter 3.3	Chennai (DPR Aug 2008) Chapter 4.3
Standards,	Cenelec, IEC, BS, IS, ITU-T, etc.	Cenelec, IEC, BS, IS, ITU-T	Cenelec, IEC, BS, IS, ITU-T
Design Headway	Not specified	2.5 minutes	Not specified
Operational headway	3 minutes	3 minutes	Not specified
Interlocking System	Computer based Interlocking, Line side signals to protect points. Local control from workstation locally as backup.	Computer based Interlocking, Fail safe Line side signals to protect points. Local control from workstation locally as backup.	Computer based Interlocking, Fail safe Line side signals to protect points. Local control from workstation locally as backup.
Train Detection	Audio Frequent Track circuits on running section, test track and in depot. For train detection and track to train communication	Coded Audio Frequent Track circuits shall be used for vehicle detection and for transmission of data from track to train.	Audio Frequent Track circuits shall be used for vehicle detection and for transmission of data from track to train.
Point machine	110 V DC or 3 phase 380 V AC In depot preferable trailable	110 V DC or 3 phase 380 V AC In depot preferable trailable	110 V DC or 3 phase 380 V AC In depot preferable trailable
Signal	To protect the points	LED type	LED type
Automatic Train Protection	Cab signaling, Continuous monitoring of maximum	Cab signaling, Continuous monitoring of maximum	Cab signaling, Continuous monitoring of maximum

Item	Kolkata (Revised DPR, Volume 2, January 2016) Section 3.7	Mumbai (DPR Colaba-Bandra-SEEPZ, 2011) Chapter 3.3	Chennai (DPR Aug 2008) Chapter 4.3
	<p>speed and brake curve.</p> <p>Maintain safety distance between trains,</p> <p>Monitoring of stopping point,</p> <p>Monitoring of Direction of travel and roll back</p> <p>Automatic braking if necessary</p>	<p>speed and brake curve.</p> <p>Maintain safety distance between trains,</p> <p>Monitoring of stopping point,</p> <p>Monitoring of Direction of travel and roll back</p> <p>Automatic braking if necessary</p> <p>Fouling detection</p>	<p>speed and brake curve.</p> <p>Maintain safety distance between trains,</p> <p>Monitoring of stopping point,</p> <p>Monitoring of Direction of travel and roll back</p> <p>Automatic braking if necessary</p>
Automatic Train Operation	<p>Run trains automatically from station to station and open.</p> <p>Driver shall close the doors and press a button when ready to depart.</p>	<p>Run trains automatically from station to station and open.</p> <p>Driver shall close the doors and press a button when ready to depart.</p>	<p>Future – run trains automatically from station to station and open. PSD</p>
Train Supervision and Control Office	<p>Automatic Route setting,</p> <p>Monitor train operation,</p> <p>Remote control of stations,</p>	<p>Automatic Route setting,</p> <p>Automatic Train Regulation,</p> <p>Continuous tracking of train position,</p> <p>Display panel,</p> <p>Workstation interface</p> <p>Adjustment of station dwell time,</p> <p>Link to passenger information system for online information,</p> <p>Computation of train schedule and timetable.</p>	<p>Automatic Route setting,</p> <p>Automatic Train Regulation,</p> <p>Continuous tracking of train position,</p> <p>Display panel,</p> <p>Workstation interface</p> <p>Adjustment of station dwell time,</p> <p>Link to passenger information system for online information,</p> <p>Computation of train schedule and timetable.</p>

Item	Kolkata (Revised DPR, Volume 2, January 2016) Section 3.7	Mumbai (DPR Colaba-Bandra-SEEPZ, 2011) Chapter 3.3	Chennai (DPR Aug 2008) Chapter 4.3
Train Depot	Audio frequent track circuit for depot operation. Preferable trailable point machine All lines in depot, except shunting lines, shall be controlled by interlocking.	Audio frequent track circuit for depot operation. Preferable trailable point machine	Audio frequent track circuit for depot operation. Preferable trailable point machine Depot control independent from main line control, All lines in depot, except shunting lines, shall be controlled by interlocking.

Telecommunication System and Transmission Media

Item	Kolkata (Revised DPR, Volume 2, January 2016) Section 3.8	Mumbai (DPR Colaba-Bandra-SEEPZ, 2011) Chapter 3.4	Chennai (DPR Aug 2008) Chapter 4.4
Optical Cable	Yes	Yes	Yes
System network	SDH STM-4 155 MHz based system	SDH STM-4 and, Gigabit Ethernet	? (page missing)
Telephone Exchange	30 port EPABX at each station, 3x 512 port EPABX, 1 at OCC, 1 at intermediate station and 1 at other depot	128 port EPABX at each station, 256 port EPABX at terminal station, 256 port EPABX at OCC/Depot	30 port EPABX at each station, 60 port EPABX at terminal station, 100 port EPABX at OCC/Depot

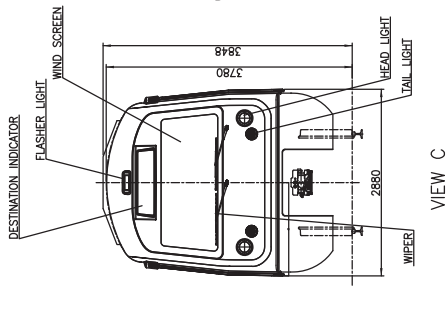
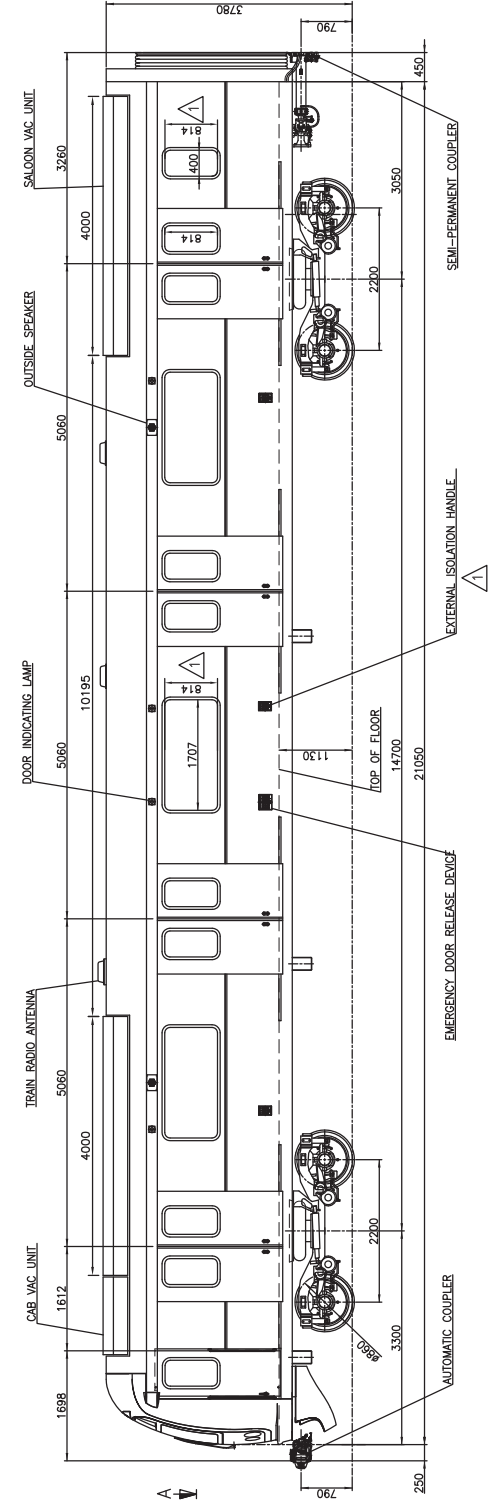
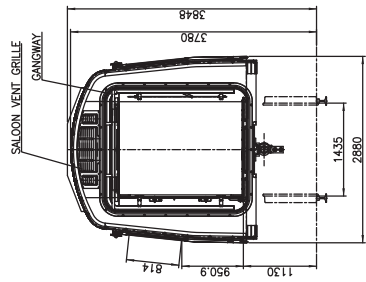
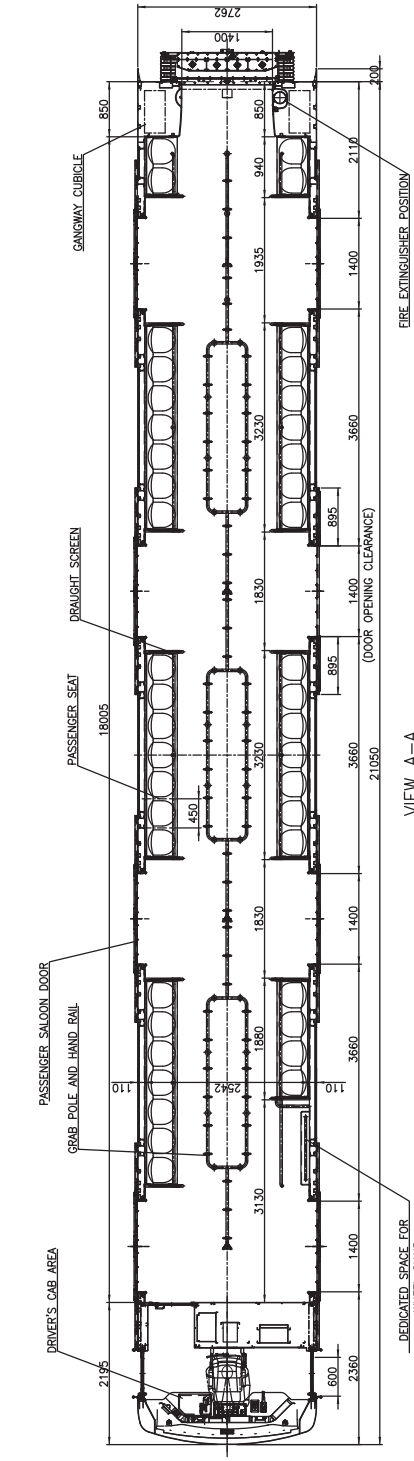
Mobile Radio Communication	Tetra/APCO25 technology 400/800 MHz	Tetra technology 400/800 MHz	Tetra technology 400/800 MHz
Passenger Announcement System	Yes, for local announcements and announcements from OCC	Yes, for local announcements and announcements from OCC	Yes, for local announcements and announcements from OCC
CCTV System	Yes	Yes	Yes
Centralized Clock System	Yes	Yes	Yes
Passenger Information Display System	Yes, bilingual LED/LCD-type	Yes, bilingual	Yes, bilingual
Network Monitoring and Management	Yes	Yes	Yes
NP SCADA	(Section 3.8.2.2-viii) Specified under Telecom. For underground portion to monitor tunnel ventilation and Environmental control, electric and hydraulic systems	(Section 3.7.12) Specified under Ventilation and Air-conditioning system. Tunnel ventilation as well as smoke management to be controlled from OCC.	(Section 9.15) Specified under Ventilation and Air-conditioning system. A comprehensive remote control and monitoring system for operation and control of tunnel ventilation system will be installed, to be controlled from OCC through SCADA.

添付資料 5 (7) General Rolling Stock Design Drawing (DM Car)

DATE	BY	CHKD	REV	NO.
19/05/2024	1000-1000	1000-1000	1000-1000	1000-1000
19/05/2024	1000-1000	1000-1000	1000-1000	1000-1000
19/05/2024	1000-1000	1000-1000	1000-1000	1000-1000
19/05/2024	1000-1000	1000-1000	1000-1000	1000-1000

PRELIMINARY

QUALITY OF WORK SHALL BE AS PER COMPANY SPEC. THE D.D. SHALL BE SUBMITTED TO THE CUSTOMER FOR APPROVAL. THE CUSTOMER SHALL BE RESPONSIBLE FOR THE DESIGN OF THE ROLLING STOCK. THE CUSTOMER SHALL BE RESPONSIBLE FOR THE DESIGN OF THE ROLLING STOCK. THE CUSTOMER SHALL BE RESPONSIBLE FOR THE DESIGN OF THE ROLLING STOCK.



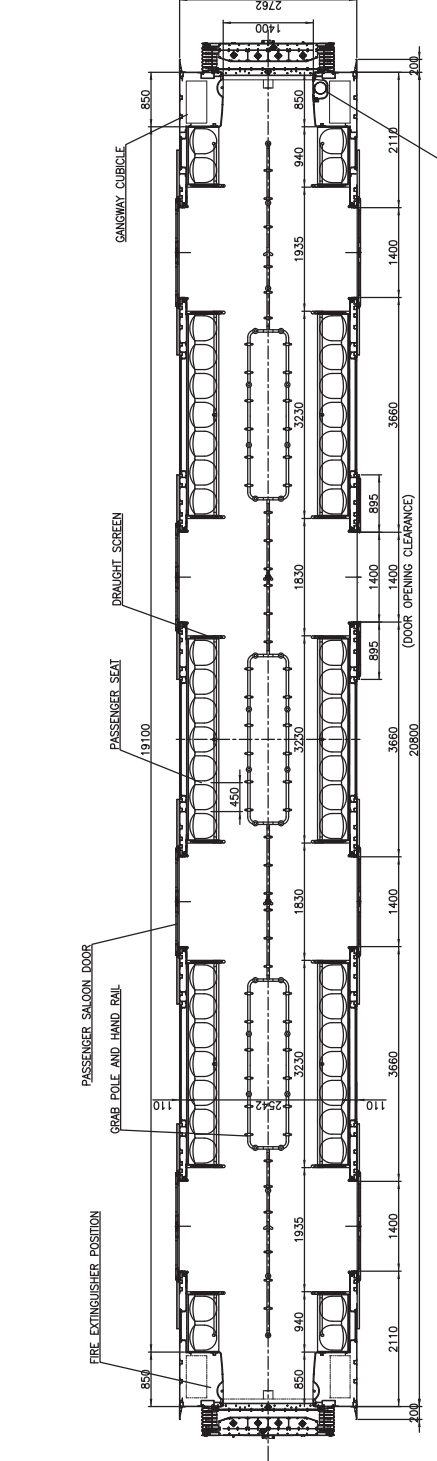
SEATED PASSENGER CAPACITY	43 + 1 DRIVER
STANDING PASSENGER CAPACITY	283
TOTAL PASSENGER CAPACITY	326 + 1 DRIVER
WHEEL CHAIR	1
MAXIMUM DESIGN SPEED	90 KM/H
MAXIMUM OPERATIONAL SPEED	80 KM/H
NOMINAL VOLTAGE	750 V DC

S.No.	QTY	PART / ITEM No.	DESCRIPTION	SIZE	CORPNY DETAILS	MR. NO.
1	1		KMRC RSI3R) METRO CARS			
2	1		GENERAL ARRGT (DM Car)			
3	1					
4	1					
5	1					
6	1					
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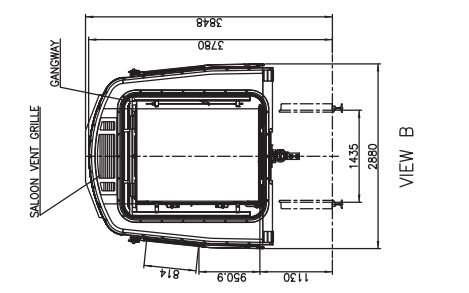
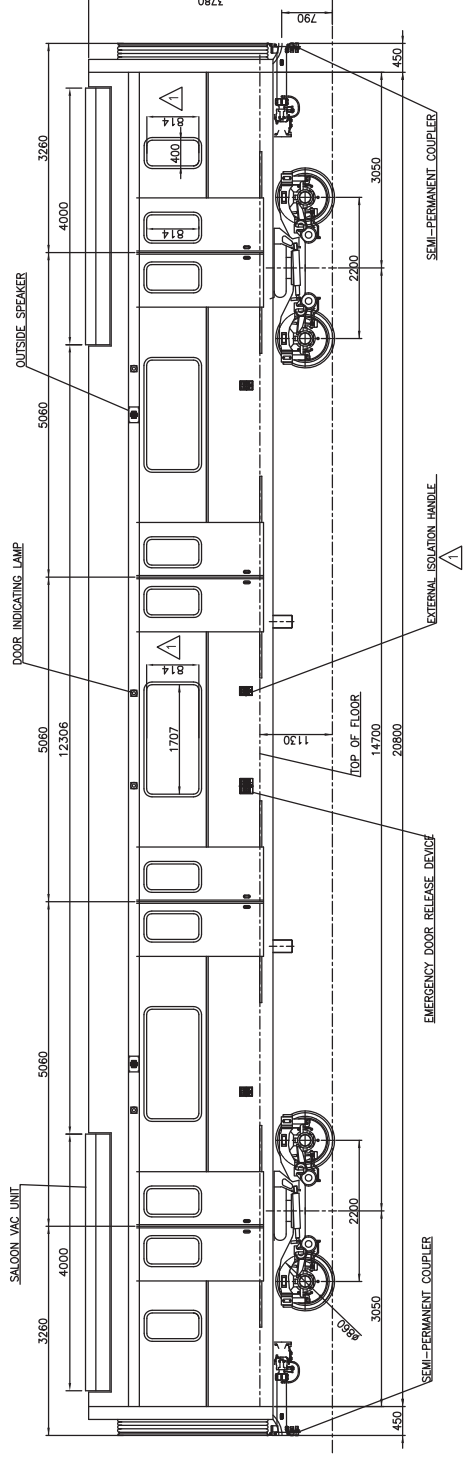
942-00002P

BEML LIMITED

NO.	DESCRIPTION	UNIT	QUANTITY																
			1	2	3	4	5	6	7	8	9	10	11						
			PRELIMINARY																
1	AP-548	NO.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1



VIEW A--A



VIEW B

SEATED PASSENGER CAPACITY	50
STANDERS (PERSONS/m ²) TOTAL	304
WHEEL CHAIR	354
MAXIMUM DESIGN SPEED	90 KM/H
MAXIMUM OPERATIONAL SPEED	80 KM/H
NOMINAL VOLTAGE	750 V DC

SYMBOL	CITY	PARTY / ITEM NO	DESCRIPTION	SIZE	COMPANY DETAILS	REV
△			KMRC RS(3R) METRO CARS			
△			DESIGNED BY			
△			CHECKED BY			
△			DATE			
△			DRAWN BY			
△			CHECKED BY			
△			DATE			
△			DRAWN BY			
△			CHECKED BY			
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△			DATE			

DESIGNED BY	APRIL K. PRAKASH	DATE	01/02/2016
CHECKED BY	RAMESH B. M. THEPPANNA	DATE	03/02/2016
DRAWN BY	CHANDRA S. SINDHIL KUMAR	DATE	01/02/2016
CHECKED BY	CHANDRA S. SINDHIL KUMAR	DATE	01/02/2016
SCALE	AS SHOWN		
SHEET NO.	1	TOTAL SHEETS	1
PROJECT NO.	942-00004P		

[Reference] Approval Status of Design Documents, Manufacturing and Installation

(1) Status of Design Documents

As described above Ansaldo STS, KMRCL and GC are in discussion to change the technology for the ATP/ATO system.

Due to that reason, many S&T Final Design documents have not yet been approved.

Many other documents that are not impacted by this change have also not been approved or even submitted. The table below gives an overview of the status of Final Design:

Table 1 Status of Final Design Documents Telecommunication

Subsystem	Design Title	Rev.	Status
FOTS- Fibre Optics Transmission System	Final Design – FOTS Subsystem, Doc. No: KMRC – 31151	02	Not approved
Telephone system	Final Design –Telephone Subsystem, Doc No: KMRC-31551	01	Not approved
TETRA Radio	Final Design – Radio (TETRA) Subsystem - Phase I, Doc. No: KMRC – 32051	02	Not approved
BBRS-Broadband Radio System	Final Design – Final Design - BBRS Subsystem – Phase I, Doc. No: KMRC- 32551	01	Not approved
CCTV System			Not submitted
PAS-Public Address System			Not submitted
PIDS-Passenger Information Display System	Final Design - PIDS Subsystem - Phase I, Doc. No: KMRC – 34551	03	Not approved
MCS-Master Clock System	Final Design - MCS Subsystem - Phase I, Doc. No: KMRC – 35351	03	Approved
ACS-Access Control System	Final Design - Access Control System. Doc. No: KMRC-33551	03	Not approved
CSS-Communication System Supervisor	Final Design - CSS Subsystem – Phase I Doc. No: KMRC – 35051	02	Not approved

Source: JICA Study Team

In addition to the above Final Design documents, other documents such as Installation Method Statements and Specification Documents of the Telecom subsystems have been submitted by Ansaldo STS and have

been reviewed by GC. The review comments have been submitted to Ansaldo STS for modification of the documents.

Table 2 Status of other Documents for Telecommunications

Subsystem	Design Title	Rev.	Status
TETRA Radio	Installation Method Statement – TETRA Radio System, Doc. No: KMRC – 32052 Rev.02.	02	Not approved
Fibre Optics Transmission	Installation Method Statement FOTS Doc no. KMRC 31152	02	Not approved
PIDS	Installation Method Statement- PIDS Subsystem – Doc. No. KMRC – 34552	02	Not approved
Telephone system	Installation Method Statement - Telephone System, Doc. no. KMRC-31552	01	Not approved
Master Clock System	Installation Method Statement- MCS Subsystem Doc. No. KMRC – 35352	02	Not approved
Access Control System	Installation Method Statement- ACS Doc. no. KMRC – 33552	02	Not approved
Master Clock System	Master Clock Subsystem - Specifications, Doc. no. KMRC-35354	02	Not approved
Telephone system	Telephone Subsystem - Specifications Doc. no. KMRC-31554.	02	Not approved
Fibre Optics Transmission	FOTS Subsystem - Specifications Doc. no. KMRC-31154.	02	Not approved
BBRS	BBRS Subsystem Specification Doc. no. KMRC-32554	01	Not approved
PIDS	PIDS Subsystem Specification Doc. no. KMRC.34554	03	Not approved
Access Control System	ACS Subsystem Specification Doc. no. KMRC.33554	03	Not approved
CSS	CSS Subsystem Specification Doc. no. KMRC. 35054	03	Not approved
FAT	Factory Testing Plan	02	Not approved
Commissioning Plan	Commissioning Plan – Telecom, Doc. no. KMRC-11527	02	Not approved

Source: JICA Study Team

Ansaldo STS informed the study team that some of their vendors / Sub-Contractors left the project due to

shifting of the project schedule, which resulted in the delay in submission of the modified telecom documents. Required level of correspondences have been made by GC on this subject and the matter is being expedited with priority.

Table 3 Status of other Documents for Signalling

Functional Area	Document Title	Document No. KMRC-	Status
Central	Central ATC Human-Machine Interface Requirements Specifications	25200	Approved with Comments
Central	Central ATC System Software Validation Test Plan (SVTP)	25014	Approved with Comments
Central	C-ICDD – Central ATC – TVS SCADA	25005	Approved with Comments
Wayside	Indoor Signalling Wires & Cables Specification	27502	Approved with Comments
Vehicle	ATC Driver MMI Design	26201	Approved with Comments
Wayside	SER Interface Wiring Material Details	27501	Approved with Comments
System	ATC System Requirements/ Traceability Specification, Compliance	21216	Approved with Comments
Vehicle	ADU Software Design Document	26203	Approved with Comments
Central	Central ATC Hardware Test Plan (HTP)	25013	Approved with Comments
Wayside	Power Distribution Panel Design Phase 1- Karunamoyee	27202	Approved with Comments
Wayside	Power Distribution Panel Design Phase 1- Salt Lake Sector V	27201	Approved with Comments
Wayside	Wayside ATC Test Plan	27061	Approved with Comments
Wayside	Power Distribution Panel Design Phase 1- Bengal Chemical	27205	Approved with Comments
Wayside	Wayside Depot Double Line Track Plan	27005	Approved with Comments
Wayside	Crank Handle Key Device Specification	27503	Approved with Comments

Functional Area	Document Title	Document No. KMRC-	Status
Wayside	Cabinet, Rack, Location Box and Augustaction Box General Arrangement	27504	Approved with Comments
Wayside	Installation Method Statement – Emergency Stop Switch	2B301_8	Approved with Comments
Wayside	W-ICDD - Rolling Stock Shunting Requirements	27056	Approved
Wayside	Installation Method Statement – LX Gate	2B301_11	Approved with Comments
Wayside	Power Distribution Panel Design Phase 1 – Phool Bagan	27207	Approved with Comments
Wayside	Installation Method Statement – Point Machines	2B301_10	Approved with Comments
Wayside	Axle Counter Specification	27401_004	Approved with Comments
Vehicle	Vehicle ATP Application Software Requirements Specification	26003	Rejected, To be resubmitted
Wayside	W-ICDD- Emergency Stop Switch	27050	Approved
Vehicle	Vehicle ATC Test Plan	26002	Rejected, To be resubmitted
Vehicle	ADU Software Requirements Specification	26202	Rejected, To be resubmitted
Wayside	Wayside Hardware Circuit Design Salt Lake Sector V	27157	Rejected, To be resubmitted
Wayside	Wayside Mainline Double Line Track Plan (Phase 1)	27002	Rejected, To be resubmitted
Vehicle	Vehicle ATC Overall Rack FAT Procedure	26030	Rejected, To be resubmitted
Wayside	Wayside Hardware Circuit Design Phase 1 - Central Park	27156	Rejected, To be resubmitted
Training	Signalling and Telecommunications- Training Plan	22000	Rejected, To be resubmitted
Central	LATS Software Screen Design – Central Park Interlocking Area	25027	Rejected, To be resubmitted
Central	LATS Software Screen Design – Salt Lake Sector V – Interlocking Area	25028	Rejected, To be resubmitted
S&T PS	Power Load Calculation and UPS Capacity – Phase 1	27055	Rejected, To be resubmitted

Functional Area	Document Title	Document No. KMRC-	Status
Wayside	Installation Method Statement – AF-904 Track Equipment	2B301_4	Rejected, To be resubmitted
Wayside	Installation Method Statement – Signals	2B301_6	Rejected, To be resubmitted
System	ATC System Requirements/Traceability Specification – Traceability, Design	21217	Rejected, To be resubmitted
Wayside	Installation Method Statement – Marker Boards	2B301_12	Rejected, To be resubmitted
Wayside	Power Distribution Panel Design Phase 1 – Salt Lake Stadium	27206	Rejected, To be resubmitted
Wayside	Construction and Installation Plan	2B300	Rejected, To be resubmitted
Wayside	Power Distribution Panel Design Phase 1 – Sealdah	27208	Rejected, To be resubmitted

Source: JICA Study Team

Because Final Design documents are not approved, no installation documents and drawings are approved.

(2) Status of Manufacturing and Installation

Installation of S&T has not started yet. The Table 4 and Table 5 below show which products are approved for manufacturing.

As explained earlier in this section, there is a possibility to change from the earlier approved Original Equipment Manufacturer (OEM). Ansaldo STS is in process to submit the new OEM's. The currently approved OEM's are given below:

Table 4 Approval Status of Suppliers for Telecommunications

No.	Subsystem	Status	OEM
1a.	FOTS - SDH	Approved	ALCATEL
1b.	FOTS - PCM/MUX	Approved	Loop Telecom (Taiwan)
1c.	FOTS- GE	Approved	ALCATEL
1d.	OFC Cable	Approved	STERLITE
2a	Telephony	Approved	1. ABS India Pvt. Limited (ALCATEL) for EPABX & Direct lines

No.	Subsystem	Status	OEM
			2. NICE for CDRS
2b.	Emergency Telephones	Not approved	Koontech
3	TETRA	Approved	Motorola
3a.	Leaky Coaxial Cable	Approved	Radio Frequency Systems GmbH
4	BBRS	Approved	RADWIN
5	CCTV	Not approved	ASTS has been advised to propose IP based camera. ASTS to submit the proposal
6	PIDS	Approved	SOLARI
7	PAS	Approved	1. ASL for Overall subsystem 2. PENTON for speakers
8	ACS	Approved	RBH
9	MCS	Approved	Mobatime
10	CSS	Approved	ALCATEL
11	Telecom Cables	Not Submitted	TBD*
12	Work stations and Servers	Approved	HP

Source: JICA Study Team

Table 5 Status of Suppliers for Signalling

No.	MATERIALS	Approval	OEM
1	INTERLOCKING MATERIALS	APPROVED	ASTS
2	POINT MACHINE	APPROVED	Vossloh
3	Cable Out Door	APPROVED	Ravicab Cables Pvt Ltd
4	Cable Indoor	APPROVED	Ravicab Cables Pvt Ltd
5	RELAY	APPROVED	CGL
6	MAIN SIGNAL	APPROVED	GAEC
7	SHUNT SIGNAL	APPROVED	GAEC
8	ROUTE SIGNAL	APPROVED	Electrans
9	MIMIC PANEL	APPROVED	DELTA
10	Work stations and Servers	APPROVED	HP
11	Crank Handle	APPROVED	Kiran Infra
12	ELDs	APPROVED	Anu Vidyut
13	Carbone Controller	APPROVED	ASTS
14	CARBORNE ATC PERIPHERAL	APPROVED	ASTS

No.	MATERIALS	Approval	OEM
	EQUIPMENT		
15	IXL, ZC, CARDFILE, CPU,PSU,SYNC,CIP. CABLING ADDL MAT	APPROVED	ASTS
16	Level Crossing Gate	APPROVED	Heindz India
17	UPS & Battery	APPROVED	Interim approval for two OEM (Emerson & Schneider) has been provided, however Ansaldo STS have not yet finalized the contract with the vendor.
18	SER pre-wire materials	APPROVED	<p>Various components:</p> <ul style="list-style-type: none"> • Terminals: PHOENIX • EN Rack Terminals: L & W INDUSTRIES • 48-pin coupler: Erni and Harting • Plug Couplers: TE CONNECTIVITY • 9-pin D connector: FCI • NV miniature Relay: OMRON • Diode, Tranzorb, SA, Fuse: CDIL, Little Fuse and SCHURTER • Key Switch: TEKNIC
19	Power Distribution Panel	APPROVED	<p>Integrated Design provided by Gallant with various OEMs.</p> <ul style="list-style-type: none"> • Rectifier, DC-DC converter, Fan controller: GALLANT • Transformers: Electrostar • Cabinets: Rittal • AC digital Voltmeter/Ammeter: Konzerv • Current Tx, DC Voltmeter/Ammeter: Rishabh • Various MCB, MCCB, Indication lamp, distribution blocks: Schneider • SPD: OBO Bettermann • Terminals: PHOENIX

Source: JICA Study Team

CONTRACTOR SUBMISSION to GC

To : General Consultant
Attn. : The Project Manager
Subject : **Design Data Submission**

Submission No. : DDS/0493
Activity ID : N/A
Subject 1 : Station
Subject 2 : Design Report
Date : 18 January 2017

Submission Title : **Station Sizing and Egress Analysis Report for Esplanade Station**

Description

[Reference : Contract UG2,the Employer's Requirements Section C, Clause 5.1]

We refer to the above Reference, please find enclosed the Station Sizing and Egress Analysis Report for Esplanade Station for your approval or Notice of No Objection (as per Contract UG2,SCC Clause 14, Sub-Clause 5.3).

Your kind approval to this matter will be highly appreciated

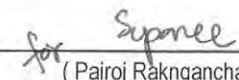
Yours faithfully,
For ITD-ITD CEM JOINT VENTURE


Rupak Sarkar
Project Director

Encl:	1. Station Sizing and Egress Analysis Report for Esplanade Station	1 Copy
	2. Permanent Work Design Certificate	2 Pages
	3. Document/Drawing List	1 Page
	4. Review Sheet	1 Page

Cc: The Chief Engineer -1 KMRCL (with encl.)
ITD- ITD Cem, Design Integration, (with encl.)

Originator : 
(Montra Ngamsa-ngar)
Dy. Design Integration Manager

Approved by : 
(Pairoj Raknganchang)
Design Integration Manager

PERMANENT WORK DESIGN CERTIFICATE

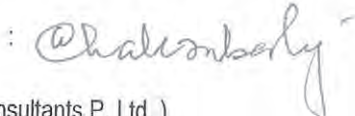
This Design Certificate refers to submission no. **DDS/0493** which comprises the **Preliminary Design Submission** in respect of : **Station Sizing and Egress Analysis Report for Esplanade Station**

The contents of this submission are scheduled in Section A below.

We certify that :

- (a) the design of the Permanent Work, as illustrated and described in the documents schedule in Section A below, complies with the Employer's Requirements and the **Contractor's Technical Proposals**,
- (b) an in-house check has been undertaken and completed to confirm the completeness, adequacy and validity of the design of the Permanent Works as illustrated and described in the documents scheduled in Section A below,
- (c) all necessary and required approvals relating to the design of the Permanent Works, as illustrated and described in the documents scheduled in Section A below, have been obtained and copies of such approvals are annexed at Section C below,
- (d) all effects of the design comprising the submission on the design of adjacent or other parts of the Works have been fully taken into account in the design of those parts. **(This will be applied in case of a submission covering a part of the permanent works only).**

Signed



(for STUP Consultants P. Ltd.)

Name : Amit Chakraborty

Position : Project Manager

Date : 17 January 2017

.../This Design...

- 2 -

This Design Certificate is issued by the Designer on the basis that it has exercised all the skill and care to be expected of a professionally qualified and competent designer experienced in work of similar nature and scope as the Works in the performance of its duties relating to the preparation, review, checking and certification of design of the Permanent Works.

Signed : 

f (for ITD ITD-CEM Joint Venture)

Name : Rupak Sarkar
Position : Project Director

Date : 18 January 2017

SECTION A :

Submission no. : **DDS/0493** comprises the following :

Drawings : **N/A**

Documents : **See attached list of document(s)**

SECTION B : N/A

SECTION C : N/A



Italian-Thai Development Public Company Limited
ITD Cementation India Limited

Contract UG2

Design and Constnction of underground section
from Central Station to Subhas Sarobar

Document/Drawing List

No.	Rev.	Title	To GC Ref.	Date	From GC Ref.	Date	Status
11548/ESP/DD/REPORT-01	0	Station Sizing and Egress Analysis Report	DDS/0493	18-Jan-17			Under Review by GC

Ref. : DDS/0493

Date : 1/18/2017

Status

Under Review by GC

Checked by : *Biswajit*

Mr. Biswajit Lodh

Number: DDS / 0493
 Other.....

- Phase:
- Preliminary Design
 - Definitive Design
 - Construction Ref. Drawing
 - Working Drawing
 - DAS
 - As-Constructed Drawing
 - Report, Spec., Manual and etc.
 - Interface: Design
 - Interface: Construction
 - Final Design
 - Planning
 - Material
 - Testing and Monitoring
 - Method Statement
 - Construction
 - QA
 - Safety
 - Other.....

- Area:
- General
 - Survey and Geotechnical
 - Temporary
 - Utilities
 - Traffic and Pavement
 - Station and Cut/Cover
 - Tunnel
 - NCR
 - CAR
 - Permit to Load
 - Other

Submission start date:

Item	List of items to be reviewed	Reviewed by			Responsible
		Initial	Sign	Date	
1	Review output meet in put's requirements of ITD-ITD CEM JV? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (see reason) <input type="checkbox"/> Not apply or to be carried out by concerned party (complete item 8.3)				ITD-ITD CEM JV Submission Originator
2	Review objective evidence of quality assurance procedure(s) <input type="checkbox"/> Not satisfy (see reason) <input checked="" type="checkbox"/> Satisfy or satisfy with following condition(s):				
3	Review contract's requirement(s) 3.1 This submission is required and within ITD-ITD CEM JV's scope of work in the Contract <input type="checkbox"/> No (see reason). <input checked="" type="checkbox"/> Yes 3.2 Submit according to contract's requirement(s) clause :				
4	Review stage <input checked="" type="checkbox"/> New submission (if not fill below and item 5) <input type="checkbox"/> Refer to previous submission: DDS/..... Phase: <input type="checkbox"/> Prelim Status: <input type="checkbox"/> Under review by: <input type="checkbox"/> GC <input type="checkbox"/> Def. <input type="checkbox"/> No. Objection/Consented <input type="checkbox"/> ITD-ITD CEM JV <input type="checkbox"/> CRD <input type="checkbox"/> No. Objection/Consented with comment(s) <input type="checkbox"/> Amberg <input type="checkbox"/> Working/DAS <input type="checkbox"/> Comment(s) <input type="checkbox"/> JURONG <input type="checkbox"/> Report <input type="checkbox"/> Has already been endorsed for construction <input type="checkbox"/> Other.....				
5	Review comment(s) on previous submission whether it has been addressed? <input type="checkbox"/> No (see reason); <input type="checkbox"/> Yes <input type="checkbox"/> No comment(s) has been made				
6	Review for submission preparation 6.1 Agree to submit to GC or? <input type="checkbox"/> Not agree (complete item 6.3) <input checked="" type="checkbox"/> Yes (complete item 6.2 and 6.3) 6.2 Approval of concerned party is required? <input type="checkbox"/> No (see reason) <input checked="" type="checkbox"/> Yes 6.3 Complete draft submission or response <input checked="" type="checkbox"/> Complete			18-1-17	
7	Review project schedule 7.1 Activity number 7.2 Plan to submit to GC on date: 7.3 Plan for approval from GC on date:				ITD-ITD CEM JV Planner
8	Submission/response preparation 8.1 Review document status and update DBMS as applicable 8.2 Complete 1st draft review by originator 8.3 Review approval of concern party as applicable (agreed to submit) and amended as comment(s)				ITD-ITD CEM JV DBMS User
9	Review draft submission/response 9.1 Review document submission number /subject/title 9.2 Review submission content/comment(s) of 8.3 9.3 Review Content on certificate (as applicable)				ITD-ITD CEM JV Submission Originator
10	Final stage review of submission/response 10.1 Review steps and signed off of reviewer/DBMS User 10.2 Review document submission number/subject/title 10.3 Review enclosure(s) 10.4 Review certificate form (as applicable)				Chief Submission/Doc. Control of Design Integration Department
Reviewed Originator by: <i>Montra Ngamsa-ngar</i> (Mr. Montra Ngamsa-ngar) Dated: 16-1-17		Authorized for Submission by: <i>Supanee</i> (Mr. Pairo Rakganchang) Date: 18 January 2017			
11	Review date and signed off <input type="checkbox"/> Completed				ITD-ITD CEM JV DBMS User

STUP Consultants Pvt. Ltd.



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Kolkata – 700 017
Phone – (91) (033) 40109797
Fax – (91) (033) 2280 7531
E-mail – kolkata@stupmail.com

**OFFICE OF ORIGIN
KOLKATA**

OWNER

**KOLKATA METRO RAIL CORPORATION LIMITED
EAST WEST METRO PROJECT**

CONTRACTOR CLIENT

ITD – ITD CEM JOINT VENTURE

PROJECT

**DESIGN AND CONSTRUCTION OF UNDERGROUND STATION AT
ESPLANADE (CONTRACT UG2)**

TITLE

STATION SIZING AND EGRESS ANALYSIS REPORT

DATE	REV. NO.	MODIFICATION / PURPOSE OF ISSUE	PREPARED	CHECKED	APPROVED	
					INITIALS	SIGNATURE
16/01/2017	R0	For Approval	ANP	STS	AMD	<i>[Signature]</i>

DATE

16.01.2017

SHEETS

1 + 19 =
20 Pages

NOTE NO.

11548/ESP/DD/REPORT-01

APPROVED
Joint Vice President

[Signature]
Amit Chakraborty

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1 INTRODUCTION

1.1 Study context and objectives

Kolkata Metro Rail Corporation Ltd (KMRCL) is constructing the Kolkata East-West metro corridor, connecting Salt Lake Sector-V and Howrah Maidan with twelve intermediate stations. The line consists of six elevated and six underground stations. The underground stretch was divided into two packages for tendering and construction purpose and package UG-02 is awarded to ITD-ITDCM JV for construction. The alignment of the underground section from Sealdah to Howrah has been changed and interchange station with N-S metro corridor has been changed and proposed at the Esplanade station.

This report details the Esplanade station sizing assessment undertaken, to verify the station design compliance of public spaces to KMRCL's design standards and ensure sufficient provision of capacity to meet the forecast passenger usage of the stations and long term growth.

1.2 Structure of the Report

The remainder of this report is structured as the following:

- Section 2 describes the design objectives of the scheme and standards used in the analysis;
- Section 3 detail the sizing assessment undertaken for ESPLANADE Station only, verifying their proposed layout and circulation elements against KMRCL's design requirements for normal and delayed conditions.
- Section 4 provides the details of Level of Service (LOS) assessment for each vertical links (i.e. stairs and escalator combined) between the different levels for the station.
- Section 5 provide details emergency evacuation calculation to full-fill the NFPA-130 requirement

2 BASIS AND ASSUMPTIONS

2.1 Design Criteria

The sizing assessment of the ESPLANADE Station has been developed on the basis of UG-02 contract documents and DPR of Alternate route of East-West Metro Corridor between Brabourne Road and Sealdah Section with the passenger flow and operational figures available. The design criteria for the planning and design of KMRCLL stations aim to ensure consistency and functionality of the layout, providing a system-wide identity. A key requirement is the provision of a station layout offering adequate capacity for the movement of passengers under a range of operational scenarios: normal and peak period conditions.

2.2 Description of Station Design

The proposed ESPLANADE station is an Interchange Metro station. It is a cut-and-cover underground station planned adjacent to the Existing ESPLANADE Station of North-South Corridor.

It is located on the Esplanade Tram and Bus depot. The station box starts from Jawaharlal Nehru Road and S. N. Banerjee Road intersection and extends up to the Curzon Park.

The station is a cut-and-cover box construction having three principal levels and a mezzanine level below ground. The lower level is the platform level and the level consists of an island platform, two side platforms and Electrical and MEP rooms at the both end. Apart from normal passenger stair cases and escalators, there are additional fire escape staircases at both ends for emergency evacuation to upper-concourse level which is considered as point of safety for evacuating passenger in emergency scenario. The middle principal level is the lower concourse level with public zone at the middle and Back-of-House at both ends. The upper level is the upper concourse and mainly consists of public area at the middle and back of house at the end.

The proposed Esplanade Station is Major interchange station with existing Station of N-S corridor as well as with proposed Joka-BBD Bag Metro line. Two Entrance at ground level at the two ends of the station for catchment passengers from ground. One major entrance is proposed near from Jawaharlal Nehru Road and S. N. Banerjee Road intersection, another Major entrance is proposed at the Esplanade tram and bus stand compound near Curzon park. At the Mezzanine level which is the level of the concourse of the existing N-S station, interchange between the N-S corridor and Joka-BBD bag line has been proposed in line with the DPR.

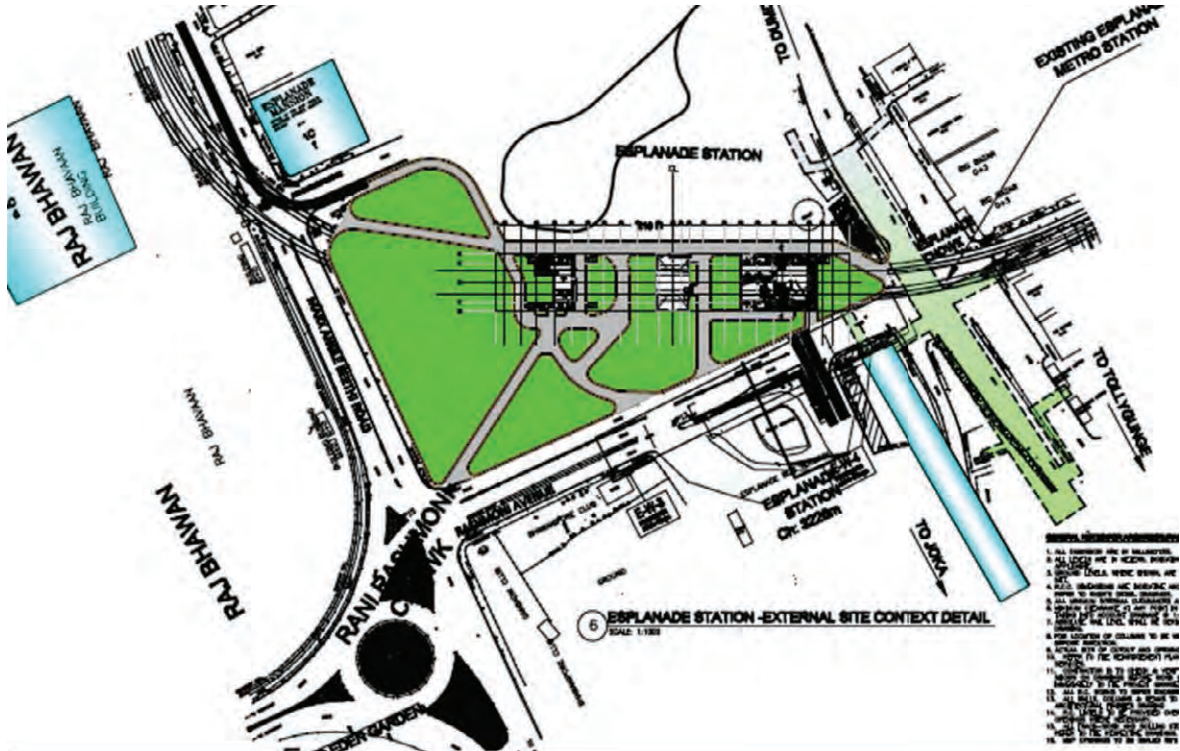


Figure 1: Site Plan

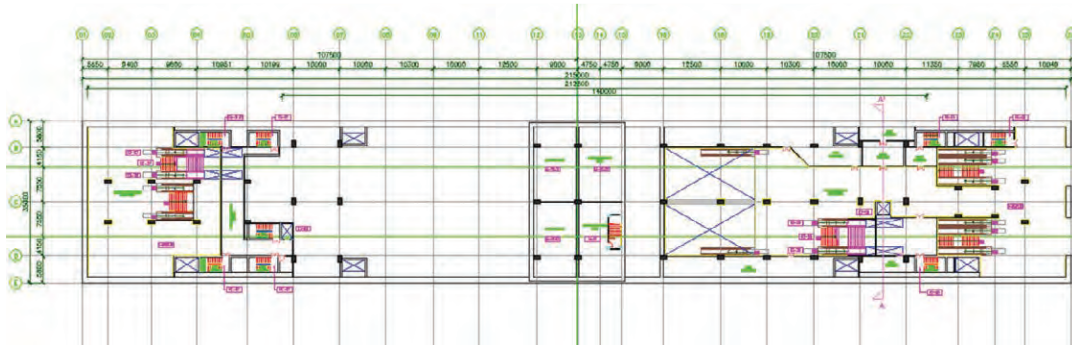


Figure 2: Mezzanine Level Plan

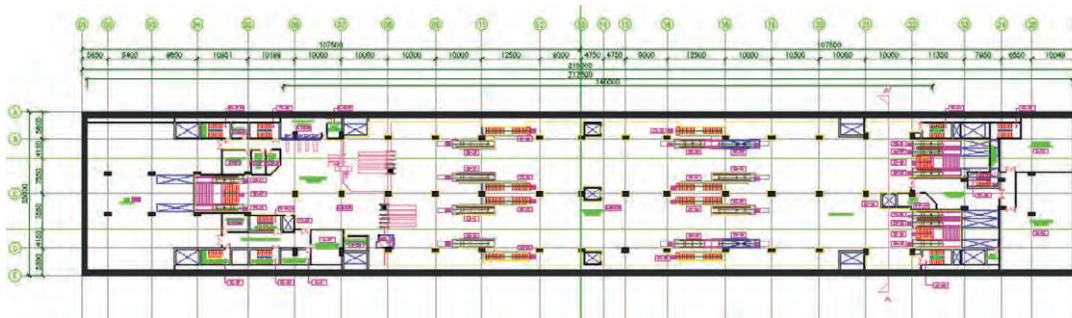


Figure 3: Upper Concourse level plan

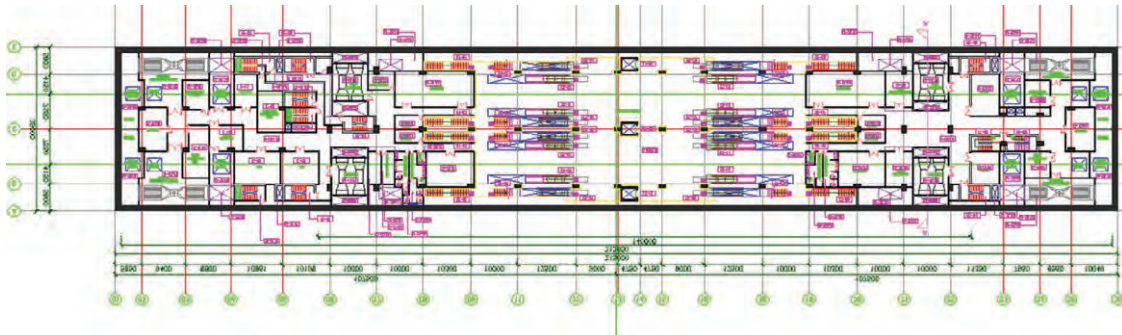


Figure 4: Lower Concourse Level

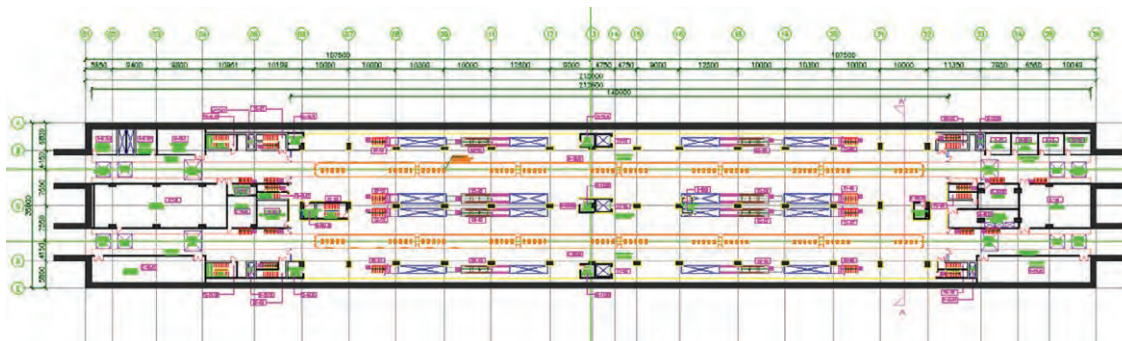


Figure 5: Platform Level Plan

2.3 Forecast Patronage Demand

The peak hour passenger demand for forecast year 2035 has been portrayed in the DPR of Alternate route of East-West Metro Corridor between Brabourne road and Sealdah Section. Based upon the values provided in DPR for ridership as above a mathematical analysis has been carried out to arrive on load distribution on East bound line and West bound line of the E-W UG Esplanade station. **Table 1-** details the peak hour figures considered in the static calculations.

Table 1- Passenger Forecast for year-2035

Passenger Forecast year 2035											
Station Name	East Bound Line (Howrah to Sector-V)				West Bound Line (Sector-V to Howrah)				Total Boarding	Total Alighting	Station Load
	Boarding	Alighting	Section Load		Boarding	Alighting	Section Load				
Esplanade	11696	18696	32000	(Mahakaran to Esplanade)	11854	12854	22000	(Sealdah to Esplanade)	23550	31550	55100
			25000	(Esplanade to Sealdah)			21000	(Esplanade to Mahakaran)			

Table 2: Passenger Split between different lines and ground

Catchment Zone	Passenger per Hour	Boarding/Entering passengers per hour	Alighting/Exiting passengers per hour
Interchange Passenger With N-S	19700	8420	11280
Interchange Passenger With Joka-BBD Bag	17800	7608	10192
Catchment Passenger From Ground	17600	7522	10078

3 ESPLANADE STATION

3.1 Ground level design

As the link between the station concourse and the street, the station entrances should be easily identified and accessible to all passengers.

- The width of entrances should be sized on the basis of the forecast passenger demand but should be no less than 1.8 metres ;
- Entrances should have a closure device for securing the station during non-operational hours and as a mean of crowd control;
- Step free access to the concourse should be provided by lift(s) for passengers with reduced mobility. Ramps shall be provided where a change in level is not negotiable by lift; and,
- Lift(s) should be connected to the street pavement by a two metre wide paved access.

3.2 Concourse level Design

Design requirements



- The concourse area should be divided into two distinct areas – the paid and unpaid areas – by AFC gate arrays and security barriers;
- Where more than one concourse is planned (not applicable here), paid areas should be connected to allow staff access and provide alternative means of passenger access; and,
- Station facilities in the concourse should be positioned clear of the main areas of circulation

At both unpaid concourse areas, the following can be found:

- Ticket offices
- Ticket gate lines
- Luggage screening facilities;

3.2.1 Ticketing

Ticket vending facilities are to be installed in the unpaid side of the concourse, consisting of ticket issuing windows and passenger operated automatic machines (POM).

It is assumed that the proposed East-West metro corridor, N-S metro corridor and Joka-BBD metro line to adopt common ticketing system and interchange passengers will buy ticket at beginning station and are not required to purchase ticket during interchange with other lines.

The following assumptions are made in determining the ticketing Calculation:

- For the design purpose 60% of the passengers are considered to use smartcard
- 10% of smartcard user to top up their smartcard
- Rate of Service for each TIW / POM assumed to be 5 passengers per minute.

Table 3- Requirement assessment for ticketing facilities

1. TIW &POM REQUIREMENT	East Entrance			West Entrance		
Total Boarding passengers per hour	3761	pax/hr		3761	pax/hr	
Smart card holders @60%	2257	pax/hr		2257	pax/hr	
Smart Card top Up passenegers @10%	226	pax/hr		226	pax/hr	
Ticket Buyers @40%	1504	pax/hr		1504	pax/hr	
Thus total passengers served in peak hour	1730	pax/hr		1730	pax/hr	
Thus total passengers served in peak minute	28.8	pax/min		28.8	pax/min	
Rate of Service for each TIW / POM	5.00	pax/min		5.00	pax/min	
Required number of TIW / POM	5.77	Nos.		5.77	Nos.	
No. of TIW Provided (Normal passengers)	6			6		
No. of POM Provided (Normal passengers)	0	Nos.		0	Nos.	
Total number of TIW/POM provided	6	Nos.	OK	6	Nos.	OK
No. of TIW for reserved for PHY. Challenged and elderly pepole	1			1		

3.2.2 AFC Gate line

Automatic fare control Gate line shall be installed to control the flow between paid and un-paid area of concourse.

The following design criteria shall be adopted for the requirements of ticket gates:

- Each ticket gate shall cater for 35 passengers per minute.
- Wide Access gate shall be provided for disabled passengers.

Table 4- Requirement assessment for AFC gates

1. AFC GATES REQUIREMENT	East Entrance (at Con. Level)			West Entance (At ground level)		
As per Tender all gates reversible type						
Disabled gates at each at Exit & Entry array	2	Nos.		2	Nos.	
Alighting Passenegers per minute	101	pax/min		101	pax/min	
Boarding Passengers per minute	75	pax/min		75	pax/min	
Capacity of Entry Exit gates	35	pax/min		35	pax/min	
Exit Gates needed by calculation	2.88	Nos.		2.88	Nos.	
Entry Gates needed by Calculation	2.15	Nos.		2.15	Nos.	
Exit Gates provided	3	Nos.	OK	3	Nos.	OK
Entry Gates provided	3	Nos.	OK	3	Nos.	OK
Disabled gates provided	2	Nos.	OK	2	Nos.	OK

3.2.3 Luggage screening facilities

Luggage screening machines may be provided in front of each inbound ticket gate line as per requirement of the KMRCLL and detail requirement shall be as decided upon by security expert.

3.2.4 Queuing Run-offs

Design requirements

Run-off space is to be provided at all circulation elements and passenger service facilities to allow for queuing space to avoid disruption of other passenger movements. KMRCLL requires provision of minimum queuing space which are summarized in the table below and compared with the minimum distances proposed in the design.

Station element	KMRCLL Standard	Provision in the design
• Add-Value Machines (from face):	2400mm	>2400 mm
• Card Readers (from face):	2400mm	>2400 mm
• Customer Service Centre (from counter edge):	2400mm	>2400 mm



• Escalators (from working points):	8000mm	>8000 mm
• Lifts (from threshold):	2400mm	>2400 mm
• Stairs (from working points):	4000mm	>4000 mm
• Ticket Gates and Smart Card Gates (from face):	6000mm	>6000 mm
• Ticket Sales Windows (from counter edge):	2400mm	>2400 mm
• Ticket Vending Machines (from face):	2400mm	>2400 mm

3.3 Platform Design

3.3.1 Platform length

Platform design standards require the length of the platforms to be 140 metres long to allow for six-car train operation.

3.3.2 Platform Width

Absolute minimum platform clear-width from the platform edge to a fixed structure(i.e. wall, stairs, etc. longer than two metres) is required to be 3.0 metres. The clear width between the platform edges to isolated obstructions such as support columns (less than twometers wide) is required to be 2.5 metres minimum in width.

However, platform widths are to be determined to cater for forecast patronage demand under the scenario:

3.3.2.1 Normal Service

An average area of 0.5m² per passenger is considered desirable under these circumstances. The required platform width for the design peak condition shall be calculated using the following formula:

- Required Platform Width = $0.6m + (FxSlx0.5) / PL$ Where:
- F = Peak one minute flow of boarding passengers entering onto a platform
- Sl = Service Interval (minutes)
- PL = Platform Length

3.3.2.2 Delayed Service

The minimum platform width shall also be checked for against the following criteria for a delayed service scenario (for an island platform configuration, the area between the boundaries of the two platform faces can be included in the calculation).

A delay in service of 2 missed headways is assumed in one direction in the peak hour. Therefore 3 headways of accumulated passengers are gathered on the platform.

A full crush loaded train is required to be evacuated on the platform.



An average of 0.2 square meters per passenger is acceptable under delayed service condition.

The train will not move from the platform until passengers have begun clearing the platform and hence the 600 mm unoccupied zone adjacent to the platform edge need not be allowed for.

$$\text{Required Platform Width} = (3 \times \text{SI} \times \text{F} \times 0.2 + \text{TL}) / \text{PL}$$

Where:

- F = Peak one minute flow of boarding passengers entering onto a platform
- SI = Service Interval
- TL = Train Load
- PL = Platform Length

The minimum platform width requirement and available area per passengers are shown below.

Table 5-Platform Width Requirement in Normal and Delayed Condition

Esplanade Station	NORMAL SERVICES			DELAYED SERVICES	
	East Bound Line (Howrah to Sector-V)				
North Side Platform					
F=Peak minute boarding Passengers	117	Pass/min		117	Pass/min
Calculated Platform width required	1.41	m		1.88	m
Minimum Platform Width provided	3.50	m		3.50	m
Total Area of the Platform	490.00	Sqm	(Excluding Circulation space)	562.00	
Available Waiting Area of Passengers	364.00	Sqm		520.00	Sqm
Area per Wating passengers	1.24	Sqm/Pass		0.31	Sqm/Pass
	LOS-A			LOS-D	
Central Platform-01					
F=Peak minute boarding Passengers	117	Pass/min		117	Pass/min
Calculated Platform width required	1.41	m		1.88	m
Platform Width provided	3.50	m		3.50	m
Total Area of the Platform	490.00	Sqm	(Excluding Circulation space)	562.00	Sqm
Available Waiting Area of Passengers	364.00	Sqm		520.00	Sqm
Area per Wating passengers	1.24	Sqm/Pass		0.31	Sqm/Pass
	LOS-A			LOS-D	
West Bound Line (Sector-V to Howrah)					
South Side Platform					
F=Peak minute boarding Passengers	119	Pass/min		119	Pass/min

Calculated Platform width required	1.42	m		1.89	m
Platform Width provided	3.50	m		3.50	m
Total Area of the Platform	490.00	Sqm	(Excluding Circulation space)	562.00	Sqm
Available Waiting Area of Passengers	364.00	Sqm		520.00	Sqm
Area per Waiting passengers	1.23	Sqm/pass.		0.31	Sqm/Pass
	LOS-A			LOS-D	
Central Platform-02					
F=Peak minute boarding Passengers	119	Pass/min		119	Pass/min
Calculated Platform width required	1.42	m		1.89	m
Platform Width provided	3.50	m		3.50	m
Total Area of the Platform	490.00	sqm	(Excluding Circulation space)	562.00	Sqm
Available Waiting Area of Passengers	364.00	sqm		520.00	Sqm
Area per Waiting passengers	1.23	Sqm/pass.		0.31	Sqm/Pass
	LOS-A			LOS-D	

4 PEDESTRIAN FLOW ANALYSIS FOR VERTICAL LINKS

This technical note forecasts the pedestrian levels of service for the proposed ESPLANADE Metro Station using static analysis techniques. The aim of the assessment is to understand if the design has sufficient capacity to handle the number of passenger at peak times.

The following section analyses the passenger flow of stairways and escalators between each of the levels within the station.

4.1 Escalator and Staircase between Platform to concourse

In ESPLANADE Station total 8 no of Escalators and 8 nos of staircases have been provided in three platforms for passenger movement between concourse and platform level.

Table 6: Vertical Circulation Element between Platform and lower Concourse

Platform	No of Staircase	Width of each stair	Total Width of Stair	No of Escalators
North Side Platform	2	1.8 m	3.6 m	2 (1-up / 1-down)
Central Platform	4	1.8 m	5.4 m	4 (2-up / 2-down)
South Side Platform	2	1.8 m	3.6 m	2 (1-up / 1-down)

It is assumed that

- The passenger distribution in the each platform is uniform.
- East bound passengers split equally into north and central platform (01)
- West bound passengers split equally into south and central platform (02)
- Two escalators will operate in upward direction while two will operate in the downward direction.

- Passenger will use staircase when the escalators reaches its capacity flow rate.
- All escalators will be reversible type to match passenger movement demand.

The following table illustrates the passenger flow in various vertical component of circulation.

Table 7- Passenger flow in Vertical Circulation Elements between Platform and Concourse

Vertical Circulation Element between Platform and Concourse											
	North Side Platform				Central Platform				South Side Platform		
Capacity of Escalator	150				150				150		
Peak Minute boarding Passenger flow	117	Pass. (50% of East bound boarding passengers)			236	Pass. (50% of East bound + 50% west bound boarding passengers)			119	Pass. (50% west bound boarding passengers)	
Number of Escalator in Down direction	1				2				1		
Passenger per Escalator	117	Pass/min			118	Pass/min			119	Pass/m in	
Area per passengers in Escalator	0.29	Sqm/P ass	LOS-E		0.29	Sqm/P ass	LOS-E		0.28	Sqm/P ass	LOS-E
Down -Direction Passenger to use Staircase	0	Pass			0	Pass			0	Pass	
Peak Minute Alighting passenger flow	187	Pass. (50% of East bound Alighting passengers)			316	Pass. (50% of East bound + 50% west bound Alighting passengers)			129	Pass. (50% west bound Alighting passengers)	
Number of Escalator in Up direction	1				2				1		
Passenger per Escalator	150	Pass/min			150	Pass/min			129	Pass/m in	LOS-F
Area per passengers in Escalator	0.23	Sqm/P ass	LOS-E		0.23	Sqm/P ass	LOS-E		0.26	Sqm/P ass	LOS-E
Up-Direction Passenger to use Staircase	37	Pass			16	Pass			0	Pass	
Total Passenger to use Staircase	37				16				0		
Total Staircase Width	3.6	m			5.4	m			3.6	m	
Passenger flow rate in stair Case	10	Pass/m-min	LOS-A		3	Pass/m-min	LOS-A		0	Pass/m -min	

The same vertical circulation elements are repeated between lower concourse and upper concourse level; hence the passenger flow will remain same between lower concourse and upper concourse.

4.2 Escalator and Staircase between Concourse to Ground and Interchange Subway

There are four entry/exit points at ground level at ESPLANADE station. The Escalators and Staircase configuration of these entry/exit structures and assumed passenger split are as listed below.

Table 8- Passenger Split of various entrances

Entrance	Circulation Element	Numbers	Width (m)	Directions	Passenger split
Entrance-01 (West Side)	Escalators	02	1.0	1-Up and 1-Down	50% of catchment passenger from ground
	Staircase	01	2.7	Bi-directional	
Entrance-02 (East Side)	Escalators	02	1.0	1-Up and 1-Down	50% of catchment passenger from ground
	Staircase	01	3.6	Bi-directional	
Passage-01 (N-S interchange)	Escalators	03	1.0	2-Up and 1-Down	Full N-S interchange passenger
	Staircase	01	2.4	Bi-directional	
Passage-02 (Joka –BBD bag interchange)	Escalators	03	1.0	2-Up and 1-Down	Full Joka –BBD interchange passenger
	Staircase	01	2.4	Bi-directional	

Table 9-Passenger flow in Vertical Circulation Elements between Concourse toGround

Virtical Circulation Element from Concourse to Ground						
	West Side Entrance			East Side Station		
Peak Minute boarding Passenger flow	75	Pass. (50% of catchment passenger from Ground)		75	Pass. (50% of catchment passenger from Ground)	
Peak Minute Alighting passenger flow	101	Pass. (50% of catchment passengers from ground)		101	Pass. (50% of catchment passengers from ground)	
Capacity of Escalator (1m wide, step speed-0.65m/s)	150	Pass./min		150	Pass./min	
Passenger flow in down direction	75	Pass.		75	Pass.	
Number of Escalator in Down direction	1			1		
Passenger per Escalator	75	Pass/min		75	Pass/min	
Area per passengers in Escalator	0.45	sqm/pass	LOS-D	0.45	sqm/pass	LOS-D
Passenger to use Staircase	0	Pass		0	Pass	
Passenger flow in Up direction	101	Pass.		101	Pass.	
Number of Escalator in Up direction	1			1		
Passenger per Escalator	101	Pass/min		101	Pass/min	

Area per passengers in Escalator	0.34	sqm/pass	LOS-D	0.34	sqm/pass	LOS-D
Passenger to use Staircase	0	Pass		0	Pass	
Total Passenger to use Staircase	0	Pass.		0	Pass.	
Total Staircase Width	2.7	m		3.6	m	
Passenger flow rate in stair Case	0	Pass/m-min	LOS-A	0	Pass/m-min	LOS-A

Table 10: Passenger flow in Vertical Circulation Elements between Concourse to Ground

Vertical Circulation Element from Concourse to Interchange Subway						
	N-S interchange			Joka-BBD Bag interchange		
Peak Minute boarding Passenger flow	168	Pass.		152	Pass.	
Peak Minute Alighting passenger flow	226	Pass.		204	Pass.	
Capacity of Escalator (1m wide, step speed-0.65m/s)	150	Pass./min		150	Pass./min	
Passenger flow in down direction	168	Pass.		152	Pass.	
Number of Escalator in Down direction	1			1		
Passenger per Escalator	150	Pass/min		150	Pass/min	
Area per passengers in Escalator	0.23	sqm/pass	LOS-E	0.23	sqm/pass	LOS-E
Passenger to use Staircase	18	Pass		2	Pass	
Passenger flow in Up direction	226	Pass.		204	Pass.	
Number of Escalator in Up direction	2			2		
Passenger per Escalator	113	Pass/min	LOS-E	102	Pass/min	LOS-E
Area per passengers in Escalator	0.30	sqm/pass	LOS-E	0.33	sqm/pass	LOS-D
Passenger to use Staircase	0	Pass		0	Pass	
Total Passenger to use Staircase	18	Pass.		2	Pass.	
Total Staircase Width	2.4	m		2.4	m	
Passenger flow rate in stair Case	8	Pass/m-min	LOS-A	1	Pass/m-min	LOS-A

5 EMERGENCY EVACUATION

This note is to demonstrate that the preliminary station designs for Kolkata Metro rail line-03, package-07 meet the employer's requirements in respect of Emergency evacuation.

5.1 NFA 130 requirement

- Platform occupant load to be evacuated platform in 4 minutes or less
- Platform occupant load to be facilitated to reach a safe zone in 6 minutes or less.

5.2 Data and Assumptions

- System Headway used for egress calculations for the station is assumed to be 2.5 minutes, complying with the requirement of Outline Design Criteria.



- Service disruption of 5 minutes as specified in the contract is considered for calculating platform occupant load
- Escalators operating in the egress direction will remain running and will be calculated with a capacity of 121ppm as per the Design Criteria. One escalator in the egress direction will be discounted at each level of the station. Escalators operating against the egress direction are assumed to be stopped and reverse the direction in accordance with requirement as laid down in NFPA 130.
- Trains on the non-incident line is considered to be operating in normal condition and entraining and alighting passenger to be considered for simultaneous stopping of the train in the island platform with the incident train.
- Platform Occupant load to be calculated on the basis of station loads corresponding to the system capacity of 72,000 PHPDT.
- Crush train is considered 3000 passengers as specified in the contract.
- Peak minute surge factor is 1.2.
- Concourse level is considered as point of safe zone.

5.3 Platform Occupant Load

With the available passenger forecast data and contract requirement, the platform occupant load (POL) is calculated to be 3633 passengers distributed unevenly over three platforms. Refer attachment-1 for detail analysis of POL calculations.

5.4 Egress analysis

Egress analysis for Esplanade station has been portrayed below. It can be seen from the analysis that the POL is able to be evacuated from the platform in less than 4 minutes and reach a safe zone (Concourse level is considered safe zone in this case) within 6 minutes.

Table 11-Emergency egress Analysis

Emergency Egress from Platform to Concourse

Design Year 2035

Egress Element	Numbers	Width (m)	Total width (m)	p/m-min	p/min
<u>South side Platform-01 to Lower concourse (Upwards)</u>					
Public Area stairs Type 1	2	1.8	3.6	55	198
Escalators - Excluding <i>one escalator considered out of service</i>	1	1	1	55	55
Emergency Stairs type 1	2	1.25	2.5	55	138
					391
<u>Central Platform to Lower concourse (Upwards)</u>					
Public Area stairs Type 1	4	1.8	7.2	55	396
Escalators - Excluding <i>one escalator considered out of service</i>	3	1	3	55	165
Emergency Stairs type 1	2	1.25	2.5	55	138



699					
<u>North side Platform to Lower concourse (Upwards)</u>					
Public Area stairs Type 1	2	1.8	3.6	55	198
Escalators - Excluding <i>one escaltor considered out of service</i>	1	1	1	55	55
Emergency Stairs type 1	2	1.25	2.5	55	138
391					

TEST 1 - Evacuate platform occupant load to concourse in 4 minutes or less

South Side Platform POL=	1524			
Time to evacuate South Platform = (POL/egress capacity)=	3.90	minutes	OK	
Central Platform POL=	1817			
Time to evacuate Central Platform = (POL/egress capacity)=	2.60	minutes	OK	
North Side Platform POL=	292			
Time to evacuate North Platform = (POL/egress capacity)=	0.75	minutes	OK	
Total POL=	3633			
Total Concourse occupant Load (COL)=	2636			

Egress Element	Numbers	Width (m)	Total width (m)	p/m-min	p/min
<u>South side Platform-01 to Lower concourse (Upwards)</u>					
Public Area stairs Type 1	8	1.8	14.4	55	792
Escalators up Running total- Excluding <i>one escalator considered out of service</i>	7	1	7	55	385
1177					

Lower concourse level flow time=	2.24
Waiting time at Lower concourse level	0.00

Walking time for longest distance route

	Meters	m/min	min
<u>Platform to safe area</u>			
On Platform T ₁	30	37.7	0.796
Platform to Lower Concourse T ₂	6.15	14.6	0.421
On Lower Concourse T ₃	20	37.7	0.531



Lower Concourse to Upper concourse T_4	6.6	14.6	0.452
Total walking time $T=T_1+T_2+T_3+T_4$			2.200

TEST 2 - Evacuate Platform occupant load from most remote point on platform to point of safety in 6 minutes or less

W_p (waiting time at platform exits) = $F_p \cdot T_1$		3.11	
Total Exit time = $T + W_p + W_f + W_c$			5.31 OK

Check for Area of Safe Zone (As concourse is safe zone)

Area of Upper Concourse Public area	2500	sqm	
Evacuating Passenger at Concourse level	2636	s	
Area per Passenger (at safe zone)	0.95	>=0.2 sqm/passenger , Hence OK	



Attachment-01

Passenger Forecast year 2035												
Station Name	East Bound Line (Howrah to Sector-V)				West Bound Line (Sector-V to Howrah)				Total Boarding	Total Alighting	Station Load	
	Boarding	Alighting	Section Load		Boarding	Alighting	Section Load					
Esplanade	11696	18696	32000	(Mahakaran to Esplanade)	11854	12854	22000	(Sealdah to Esplanade)	23550	31550	55100	
			25000	(Esplanade to Sealdah)			21000	(Esplanade to Mahakaran)				

ASSUMPTION

Peak minute Surge Factor	1.2
Train frequency (Headway) in minute	2.5
Duration of Service Disruption in minute	6
Train Crush Load	1626

Peak mintute Flow Rate

Station Name	East Bound Line (Howrah to Sector-V)				West Bound Line (Sector-V to Howrah)				Total peak minute Boarding	Total peak minute Alighting	Total peak minute Station Load
	Peak minute boarding Load	Peak minute Alighting Load	Peak minute Section/train Load		Peak minute boarding Load	Peak minute Alighting Load	Peak minute Section/train Load				
Esplanade	234	374	640		237	257	440		471	631	1102
			500				420				

Platform Occupant Load Calculation

Station Name	CASE-01					CASE-02					MAX DESIGN POL
	Incident line (Howrah to Sector-V)		Non-Incident Line (Sector-V to Howrah)			Non-Incident line (Howrah to Sector-V)		Incident Line (Sector-V to Howrah)			
	Entraining Load	Train Load	Entraining Load	Train Load	POL	Entraining Load	Train Load	Entraining Load	Train Load	POL	
Esplanade	1404	1626	593	0	3622	585	0	1422	1626	3633	3633



North Side Platform		
	POL= 292	
Entraining Load=	292	Train Load 0



Train Load = Train will not stop at non-incident line

Central Platform		
Entraining Load=	292	Train Load 0
	POL= 1817	
Entraining Load=	711	Train Load = 813

Train Load = 1626



South Platform		
Entraining Load=	711	Train Load = 813
	POL= 1524	