

Contract No. ED/2018/01 –
Kai Tak development – stage 4 infrastructure at the former
runway and south apron

**Noise Barriers fronting Site 4B5
Detailed Design Plan of the
Traffic Noise Mitigation Measures**



Detailed Design Plan of the Traffic Noise Mitigation Measures

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1. SCOPE OF THIS PLAN

- 1.1 According to the condition 2.9 of the Environmental Permit EP-445/2013/B, a detailed design plan of the traffic noise mitigation measures shall be submitted to the Director four hard copies and one electronic copy of a detailed design plan of the traffic noise mitigation measures one month before population intake of any residential uses in the Runway Precinct of the Kai Tak Development.
- 1.2 The detailed design plan shall include locations, dimensions, design details and design drawings of the noise barriers and noise screening structures. Before submission to the Director, the detailed design plan shall be certified by the ET Leader and verified by the IEC as conforming to the relevant information and recommendations contained in the EIA Report and application document for Variation of Environmental Permit (Application No. VEP-612/2022).
- 1.3 This design plan demonstrates the compliance of the latest design of the noise barrier under contract ED/2018/01 with the relevant information and recommendations contained in the EIA Report and application document for Variation of Environmental Permit.

2. EXTENT OF NOISE BARRIER UNDER THIS CONTRACT

- 2.1 The extent of noise barrier provided under this Contract was shown in **Figure 1**. All the other noise barriers had been provided under another contract KL/2014/01 and plan have been submitted separately.

3. DETAILED DESIGN OF THE NOISE BARRIER

- 3.1 The detailed design drawing of the noise barrier provided under this contract was attached in **Appendix 1**. The following sections will demonstrate how our design comply with the recommendations contained in the EIA Report and application document for Variation of Environmental Permit.

General Layout

- 3.2 The general layout of the noise barrier provided under this contract was shown in **Figure 2**. The layout of the noise barrier and all the opening arrangement was in line with the proposed arrangement under VEP submission.

Overlapping Length

- 3.3 According to the table 2.1 and Figure 2.1 of the VEP submission extracted in **Appendix 2**, 34m overlapping and 23m overlapping length will be provided for the openings of noise barrier our contracts, which is in line with our design.

Material Selection

- 3.4 In our noise barrier design, the material of the panels includes PMMA panels, noise absorptive panels and aluminum panels as shown in **Figure 3**.

- 3.5 According to EPD Guidance, the noise barrier material shall be able to satisfy the requirements specified in noise barrier standard ZTV-Lsw 88, while the sound absorbent materials are desirable to be better than 0.8 at frequencies which are significant in the traffic noise spectrum.
- 3.6** The extent of noise absorptive panels to be provided was shown in **Appendix 3**. The arrangement is the same with the figure 2.1 in VEP.
- 3.7 The particular specifications to be fulfilled by the contractor under this contract is complied with the guidelines from EPD (see **Appendix 4**).
- 3.8 According to EPD Guidance, either the posts must be non-combustible and function as a fire barrier, or a length of at least 4 metres made of non-combustible elements shall be inserted in every 100 metres of noise barrier. In our contract, non-combustible sound reflective panel comply with BS EN 1793, 1794 and BS 476-4:1970 has been provided as shown in **Appendix 5**.

4. Conclusion

- 4.1 Based on the above, the detailed design of the noise barrier is considered comply with the relevant information and recommendations contained in the EIA Report and application document for Variation of Environmental Permit.

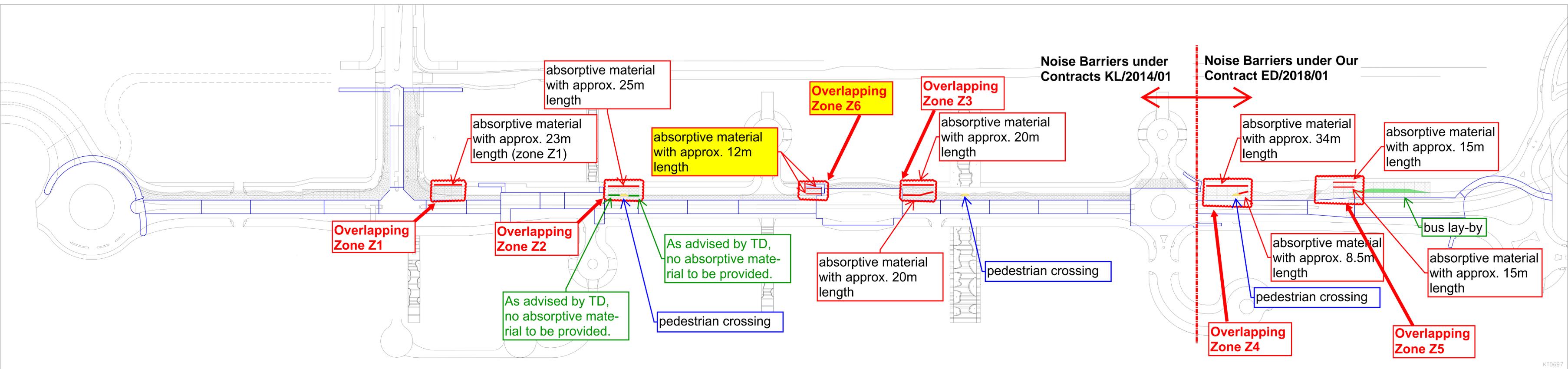
Contract No. ED/2018/01

Kai Tak development – stage 4 infrastructure at the former runway and south apron

Noise Barriers fronting Site 4B5 Detailed Design Plan of the Traffic Noise Mitigation Measures

Figure 1

Figure 1:
Coverage of Noise Barrier Under
ED/2018/01



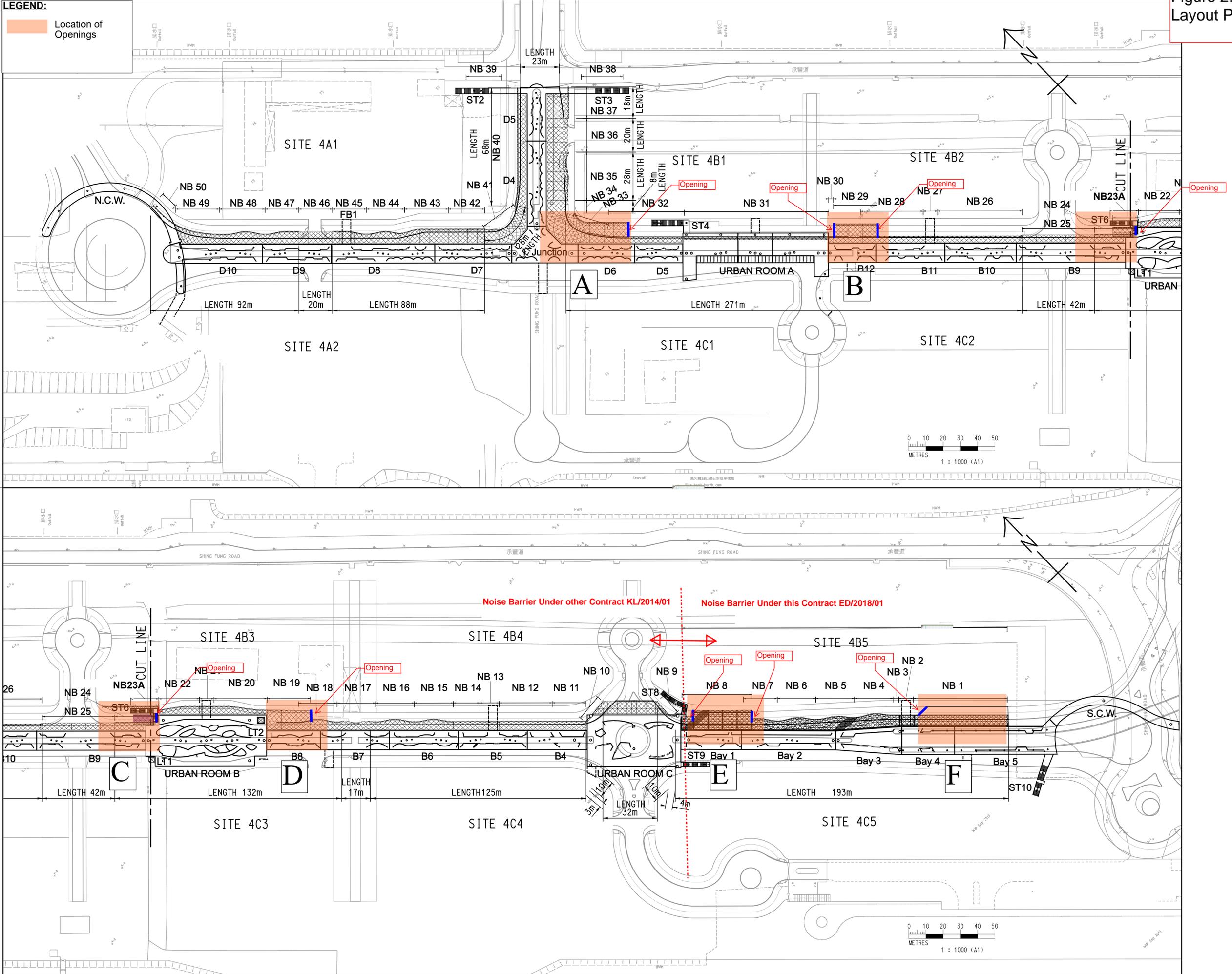
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Noise Barriers fronting Site 4B5 Detailed Design Plan of the Traffic Noise Mitigation Measures

Figure 2

Figure 2:
Layout Plan of the Noise Barrier



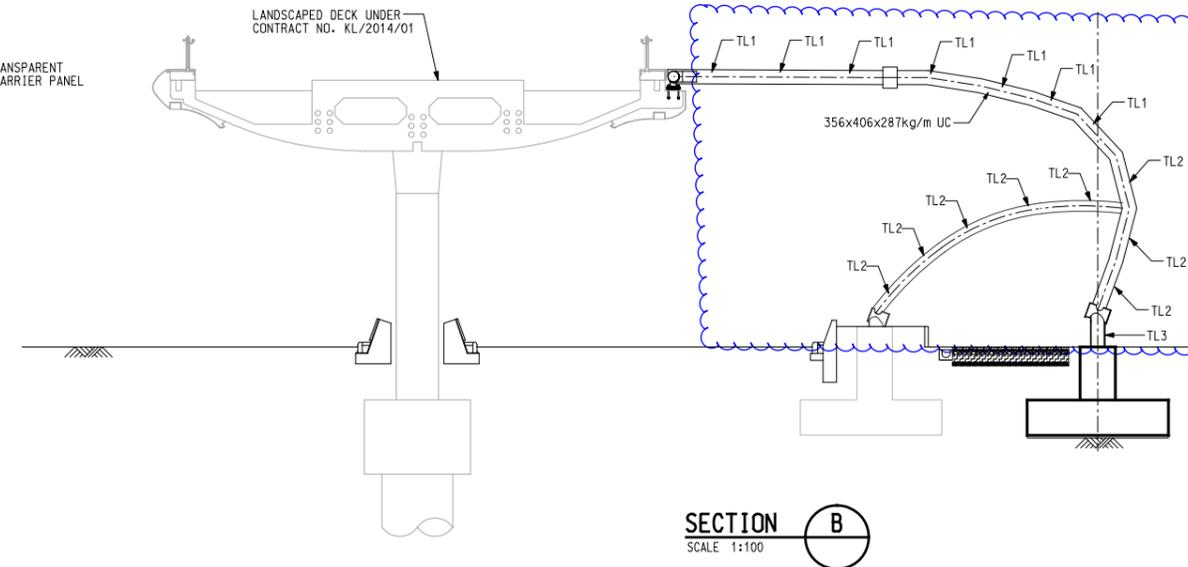
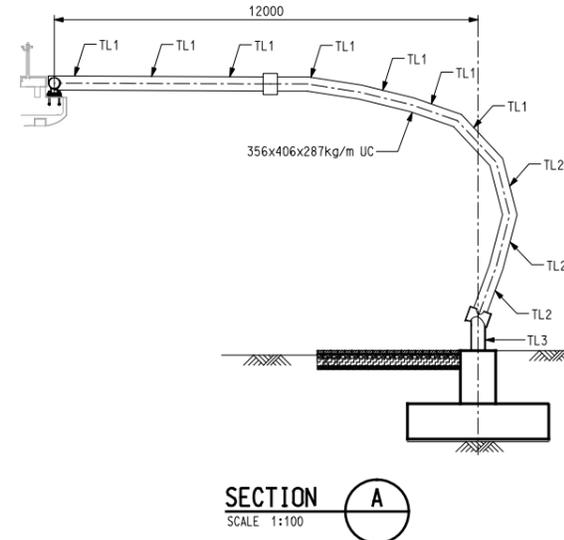
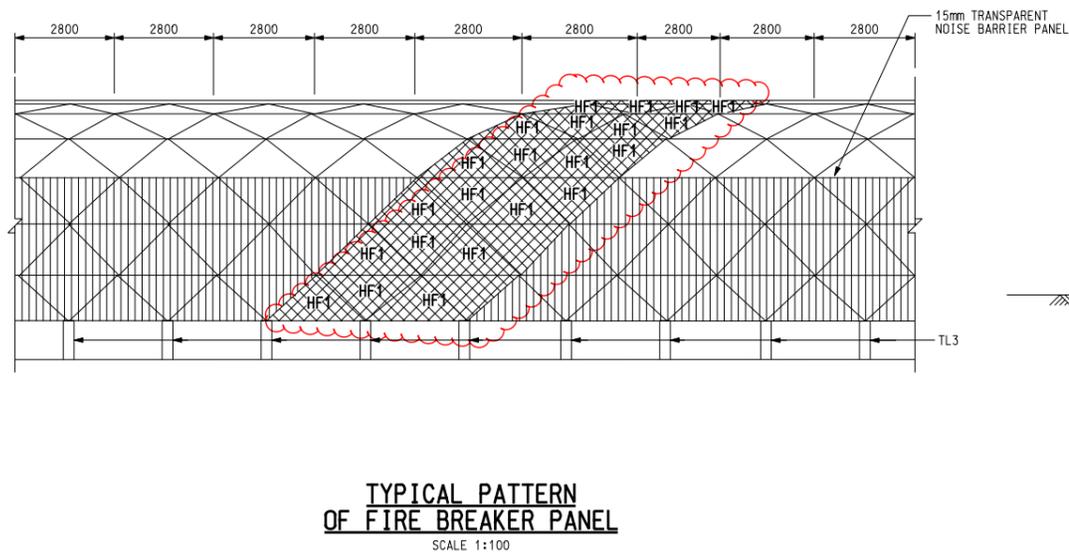
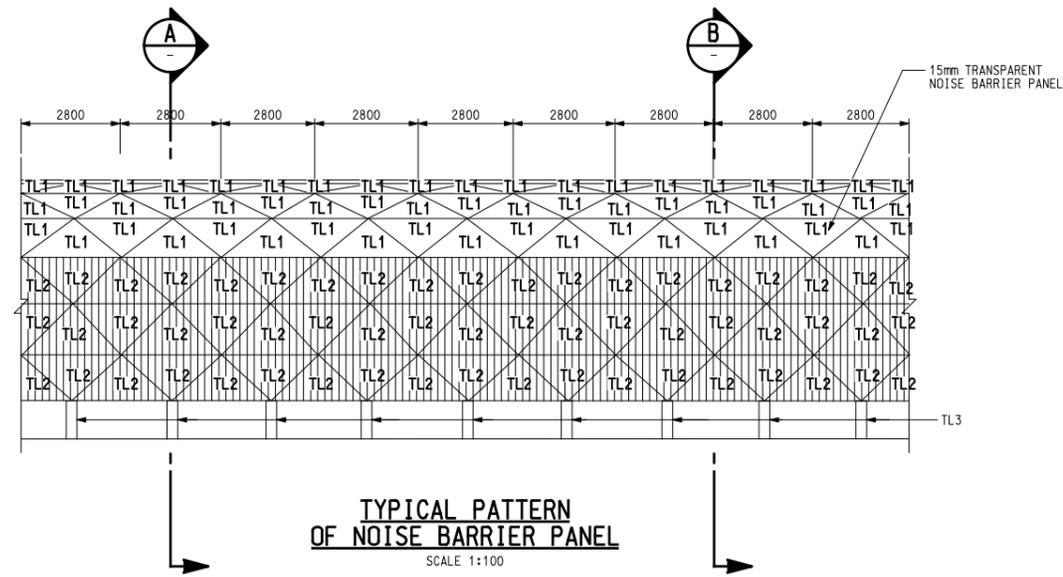
Contract No. ED/2018/01

Kai Tak development – stage 4 infrastructure at the former runway and south apron

Noise Barriers fronting Site 4B5 Detailed Design Plan of the Traffic Noise Mitigation Measures

Figure 3

**Figure 3:
Material Information of the Noise Barrier**



- ALL LEVELS ARE IN mPD METRE ABOVE HONG KONG PRINCIPAL DATUM.
- FOR GENERAL NOTES, REFER TO DRAWING NO. POC/Q1068/NB/GN/DDA/0001-0002.

Contract requirement of PMMA panels shall be referred to Appendix 4.

The extent of Noise Absorptive Panels shall be referred to Appendix 3 and the contract requirement shall be referred to Appendix 4

MATERIAL AND FINISHS SCHEME OF NOISE BARRIER WORKS

Item	Mark	Type	Location	Description	Material of Finishes	Color References
1	TL1	Translucent Noise Barrier Panel	Roof/ Slanted Noise Barrier	15mm thk. Translucent Panel with one side matt finish for Anti-glazing function	PMMA	Translucent light blue
2	TL2	Transparent Noise Barrier Panel	Vertical Wall of Noise Barrier	15mm thk. Transparent Panel with Bird Guard Colour for bird deterrent function	PMMA	Transparent light blue
3	TL3	Transparent Noise Barrier Panel	Dwarf Wall of Noise Barrier	15mm thk. Transparent Panel with Bird Guard Colour for bird deterrent function	PMMA	Transparent light blue
4	F1	Fire Breaker		Aluminium reflective noise barrier gla	Powder Coating for aluminium	RAL 9003 Off-White or similar in pantone

Information of fire breaker shall be referred to Appendix 5.



Rev.	Description of Revision	Date	Ckd.

Project Manager
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Designed: KST, Drawn: TWN, Checked: KTC
Approved: Paul Li, ICE, JUL/2019

Project
**CONTRACT NO. ED/2018/01
KAI TAK DEVELOPMENT -
STAGE 4 INFRASTRUCTURE AT THE
FORMER RUNWAY AND SOUTH APRON**

Title
**NOISE BARRIER -
MATERIALS AND COLOUR SCHEME**

Scale in A1 1 : 100
A3 1 : 200

Drawing No. **POC/Q1068/NB/CS/DDA/0001** Rev. **OA**

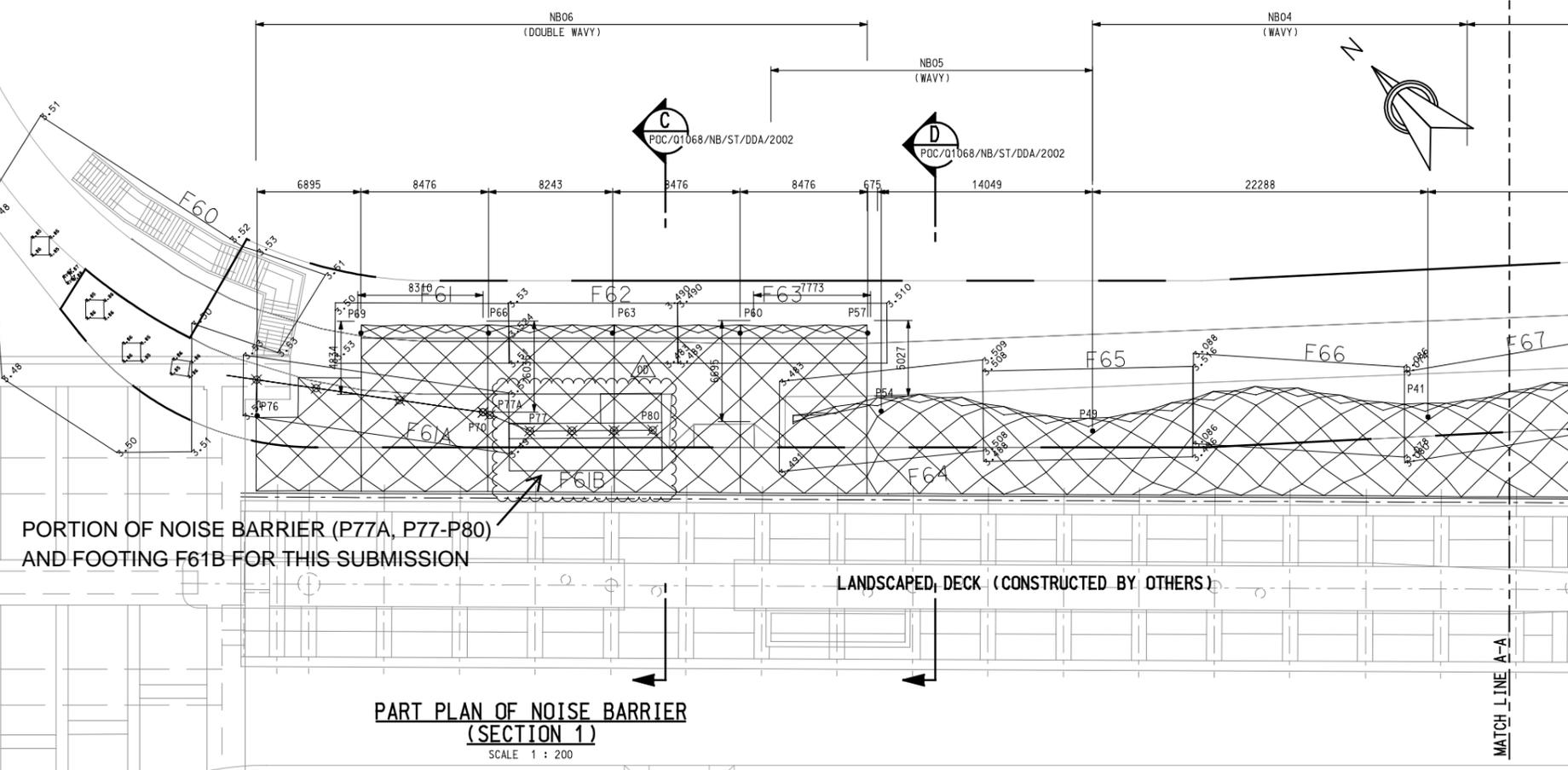
Contract No. ED/2018/01

Kai Tak development – stage 4 infrastructure at the former runway and south apron

Noise Barriers fronting Site 4B5 Detailed Design Plan of the Traffic Noise Mitigation Measures

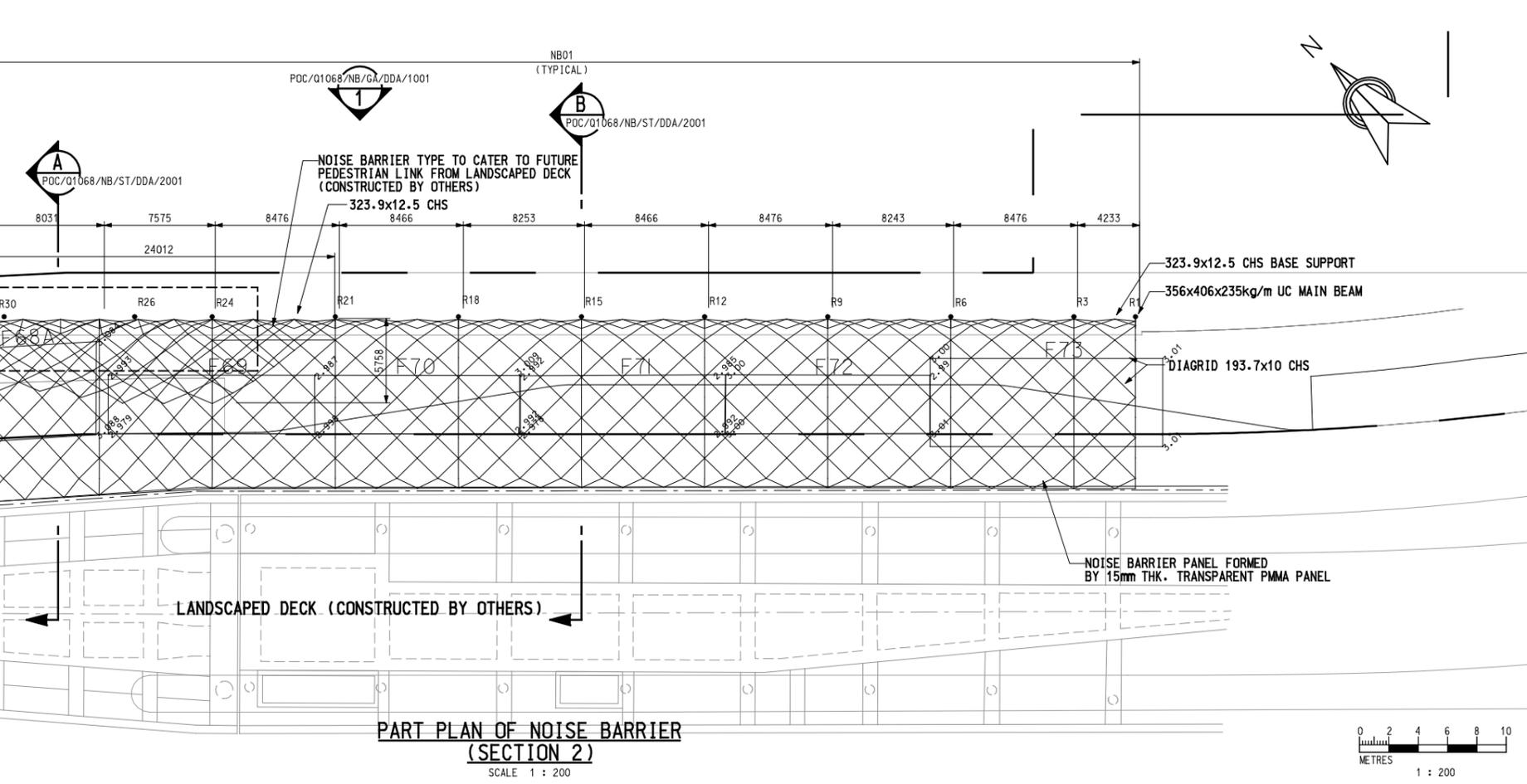
Appendix 1

Appendix 1: Detailed Design Drawing of the Noise Barrier Provided under this Contract



PORTION OF NOISE BARRIER (P77A, P77-P80) AND FOOTING F61B FOR THIS SUBMISSION

PART PLAN OF NOISE BARRIER (SECTION 1)
SCALE 1 : 200



NOISE BARRIER TYPE TO CATER TO FUTURE PEDESTRIAN LINK FROM LANDSCAPED DECK (CONSTRUCTED BY OTHERS)
323.9x12.5 CHS

NOISE BARRIER PANEL FORMED BY 15mm THK. TRANSPARENT PMMA PANEL

PART PLAN OF NOISE BARRIER (SECTION 2)
SCALE 1 : 200



- NOTES :**
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
 - ALL LEVELS ARE IN MPD METRE ABOVE HONG KONG PRINCIPAL DATUM.
 - FOR GENERAL NOTES, REFER TO DRAWING NO. POC/Q1068/NB/GA/DDA/0001-0002.

LEGEND :
--- SITE BOUNDARY

Rev.	Description of Revision	Date	Ckd.
OD	GENERAL REVISION	APR 22	KST

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Designed	Drawn	Checked
KST	TWN	KTC
Approved	Paul LT	ICE
		JUL/2019

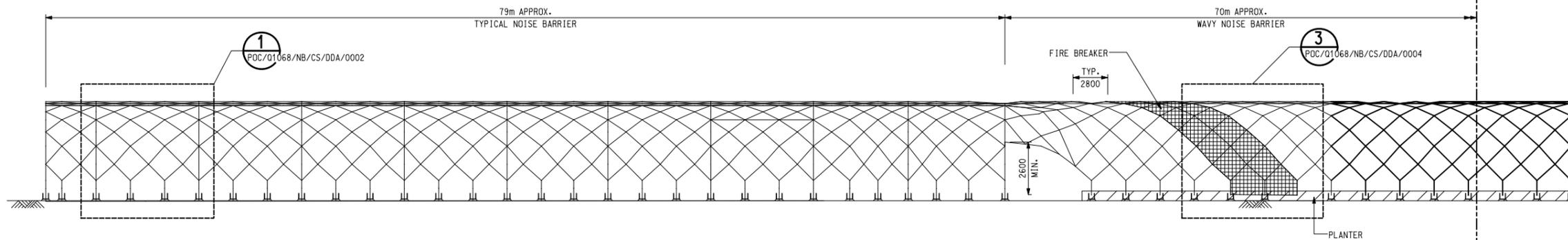
Project
CONTRACT NO. ED/2018/01
KAI TAK DEVELOPMENT - STAGE 4 INFRASTRUCTURE AT THE FORMER RUNWAY AND SOUTH APRON

Title
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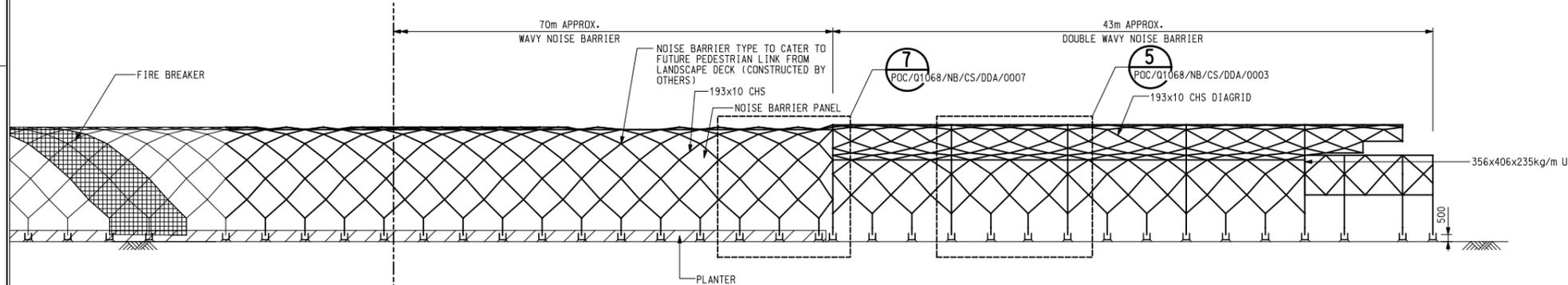
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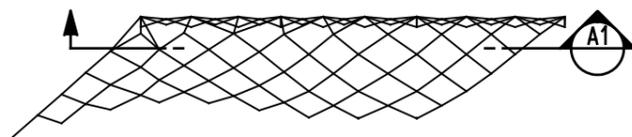
- NOTES :**
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
 2. ALL LEVELS ARE IN mPD METRE ABOVE HONG KONG PRINCIPAL DATUM.
 3. FOR GENERAL NOTES, REFER TO DRAWING NO. POC/Q1068/NB/GN/DDA/0001-0002.



ELEVATION 1
SCALE 1:100 NB/GA/DDA/0001



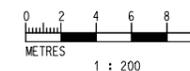
ELEVATION 1
SCALE 1:100 NB/GA/DDA/0001



DETAIL A
SCALE 1:100 NB/GA/DDA/0001



ELEVATION A1
SCALE 1:100



Rev.	Description of Revision	Date	Ckd.

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LWK LANDSCAPE

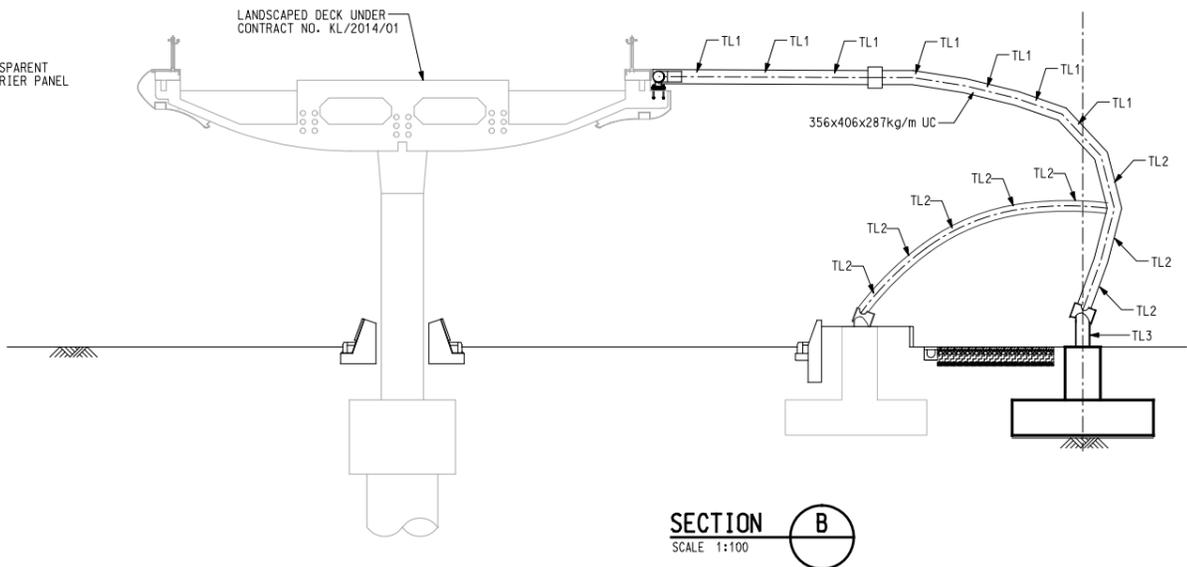
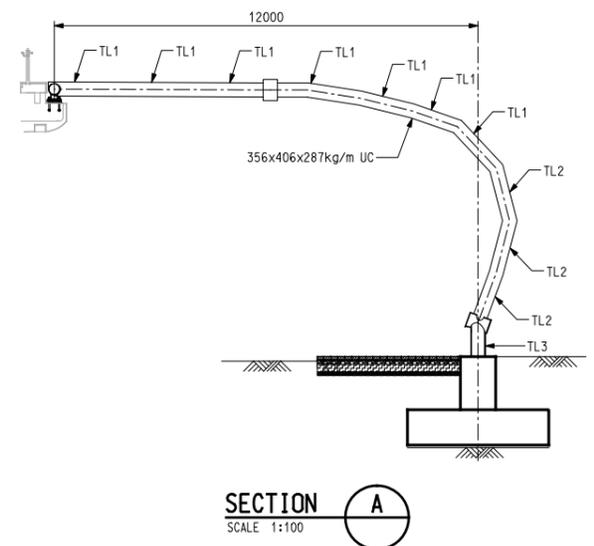
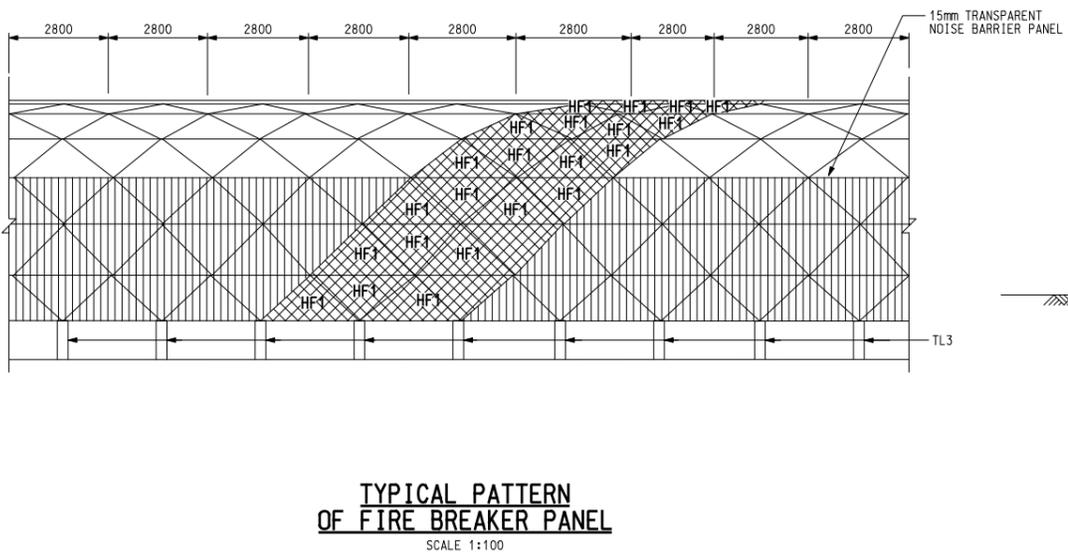
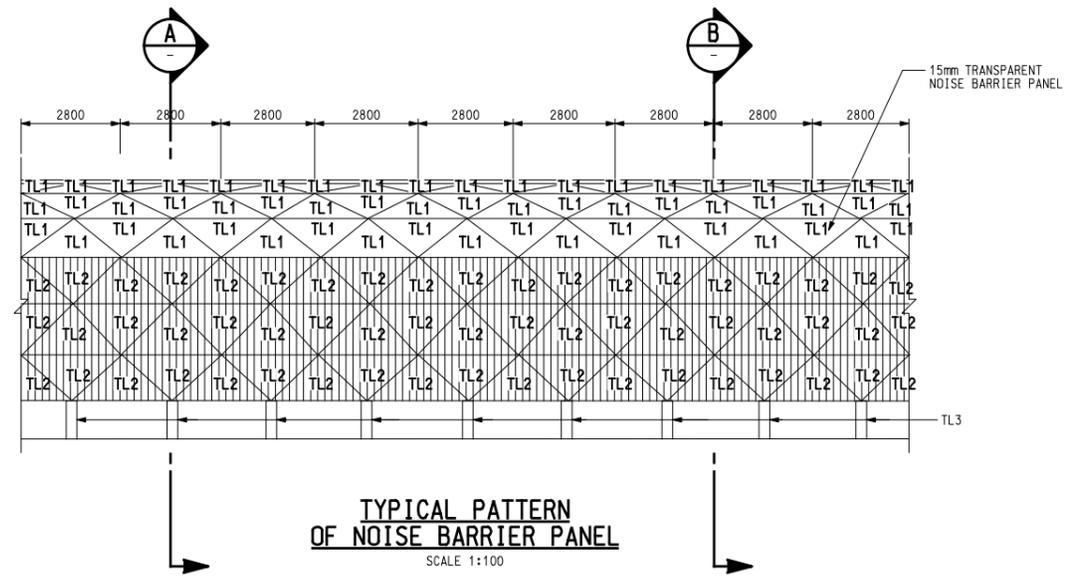
Designed: KST, Drawn: TWN, Checked: KTC
 Approved: Paul Li, ICE, JUL/2019

Project
CONTRACT NO. ED/2018/01
KAI TAK DEVELOPMENT -
STAGE 4 INFRASTRUCTURE AT THE
FORMER RUNWAY AND SOUTH APRON

Title
NOISE BARRIER -
GENERAL ELEVATION

Scale in A1: 1 : 200
 A3: 1 : 400

Drawing No. **POC/Q1068/NB/GA/DDA/1001** Rev. **OA**



- NOTES :**
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
 2. ALL LEVELS ARE IN mPD METRE ABOVE HONG KONG PRINCIPAL DATUM.
 3. FOR GENERAL NOTES, REFER TO DRAWING NO. POC/Q1068/NB/GN/DDA/0001-0002.

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LWK LANDSCAPE ARCHITECTS

Designed	Drawn	Checked
KST	TWN	KTC
Approved	Paul Li	ICE
		JUL/2019

Project
CONTRACT NO. ED/2018/01
KAI TAK DEVELOPMENT - STAGE 4 INFRASTRUCTURE AT THE FORMER RUNWAY AND SOUTH APRON

Title
NOISE BARRIER - MATERIALS AND COLOUR SCHEME

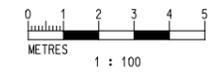
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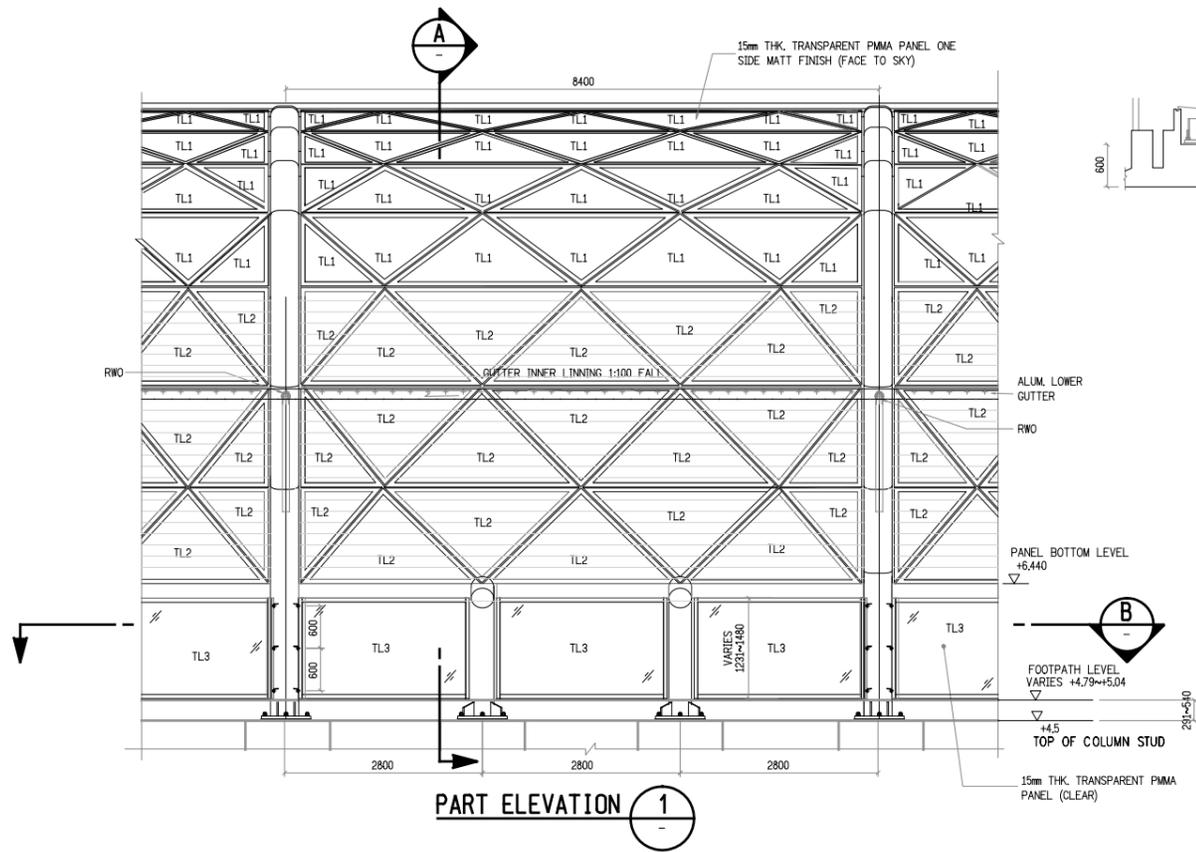
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POC/Q1068/NB/CS/DDA/0001

Rev.
OA

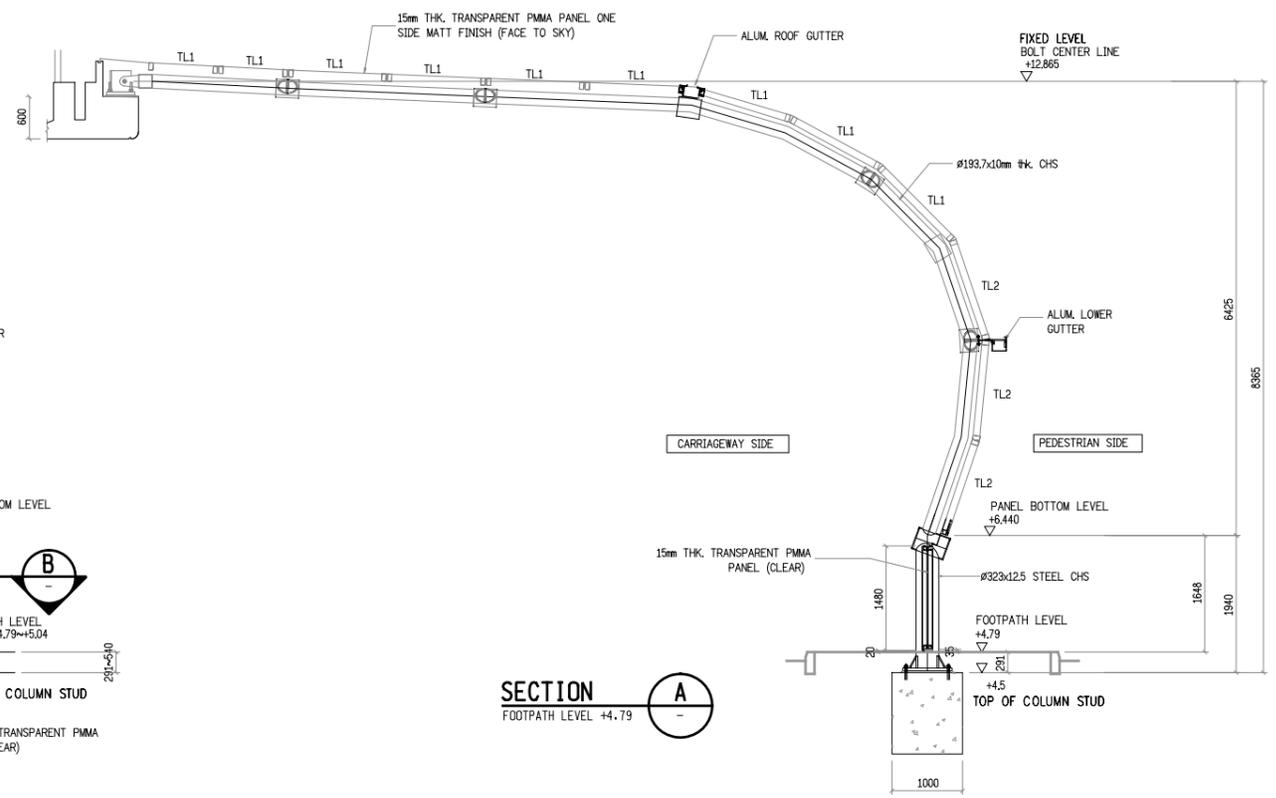
MATERIAL AND FINISHS SCHEME OF NOISE BARRIER WORKS

Item	Mark	Type	Location	Description	Material of Finishes	Color References
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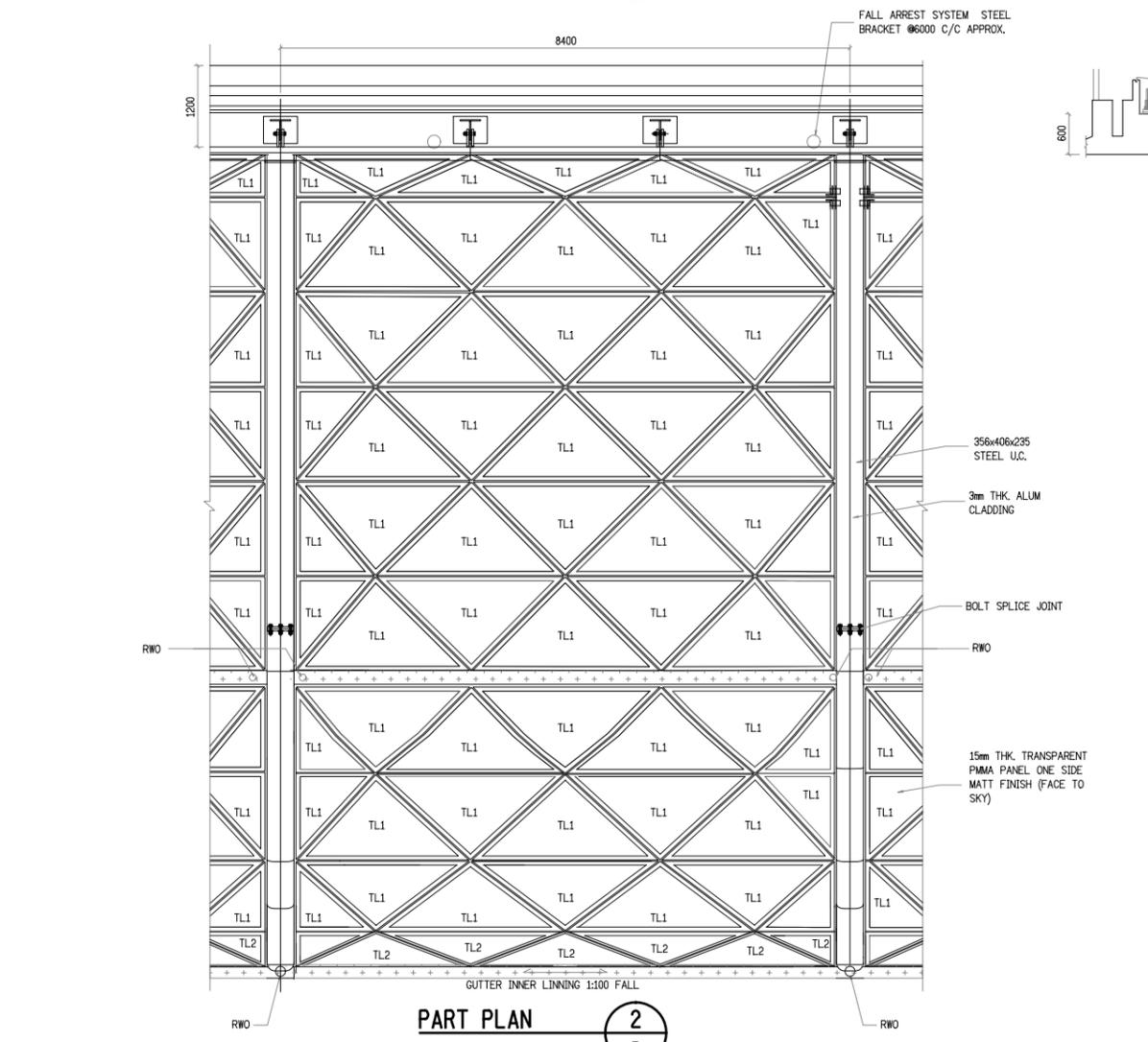




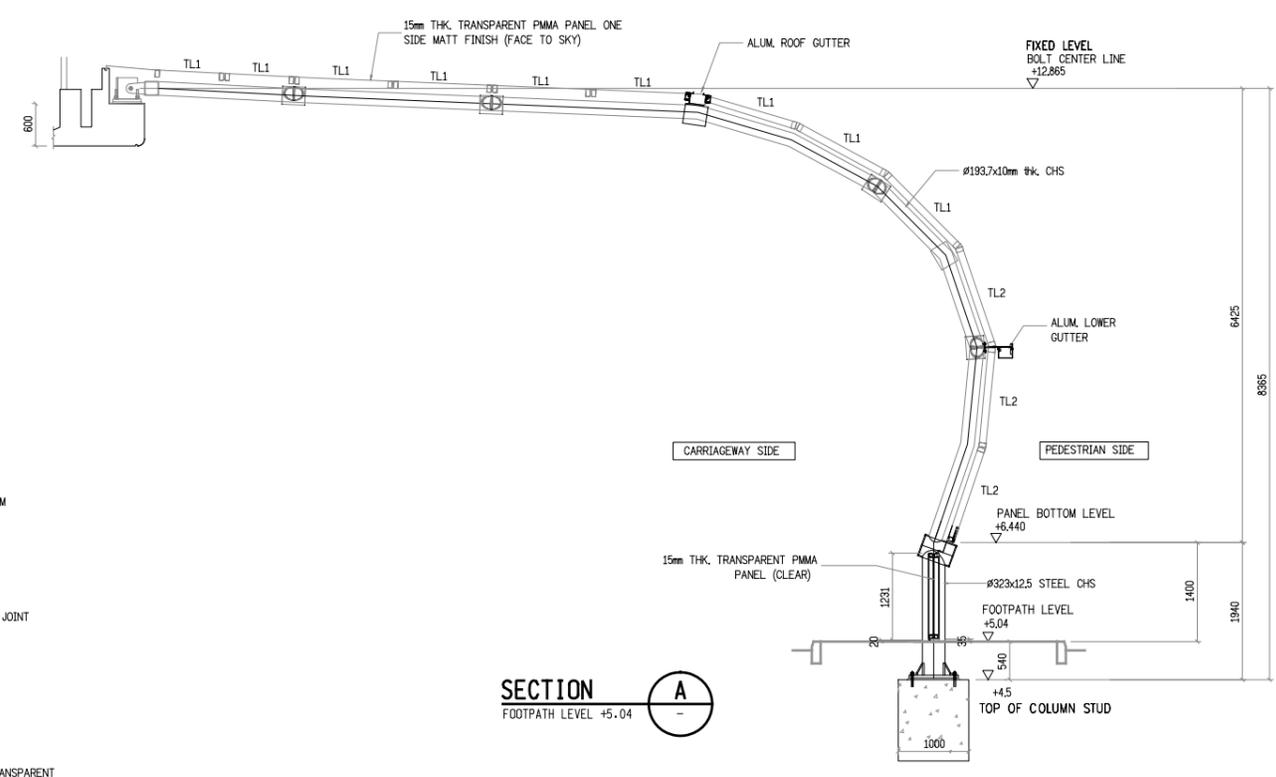
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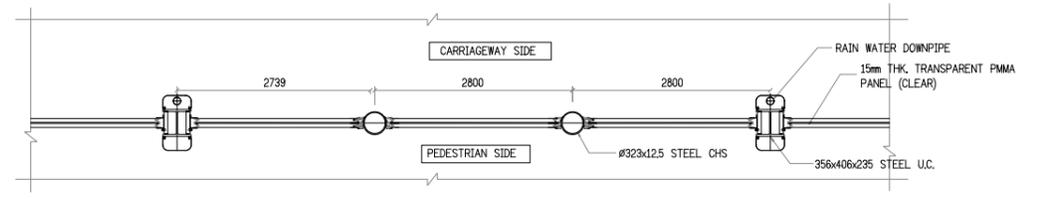
SECTION A
FOOTPATH LEVEL +4.79



PART PLAN 2



SECTION A
FOOTPATH LEVEL +5.04



SECTION B

Rev.	Description of Revision	Date	Ckd.

Project Manager
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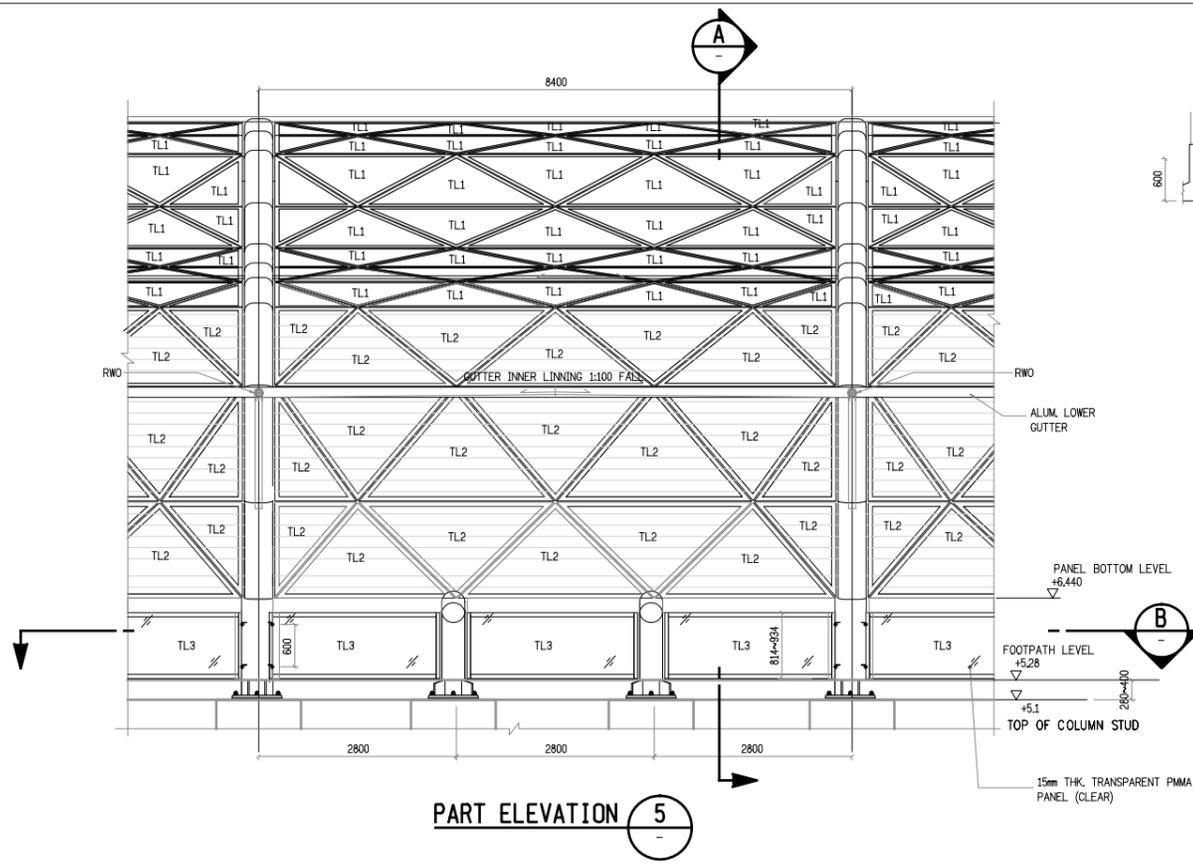
Designed: KST, Drawn: TWN, Checked: KTC
 Approved: Paul Li, ICE, JUL/2019

Project
CONTRACT NO. ED/2018/01
KAI TAK DEVELOPMENT -
STAGE 4 INFRASTRUCTURE AT THE
FORMER RUNWAY AND SOUTH APRON

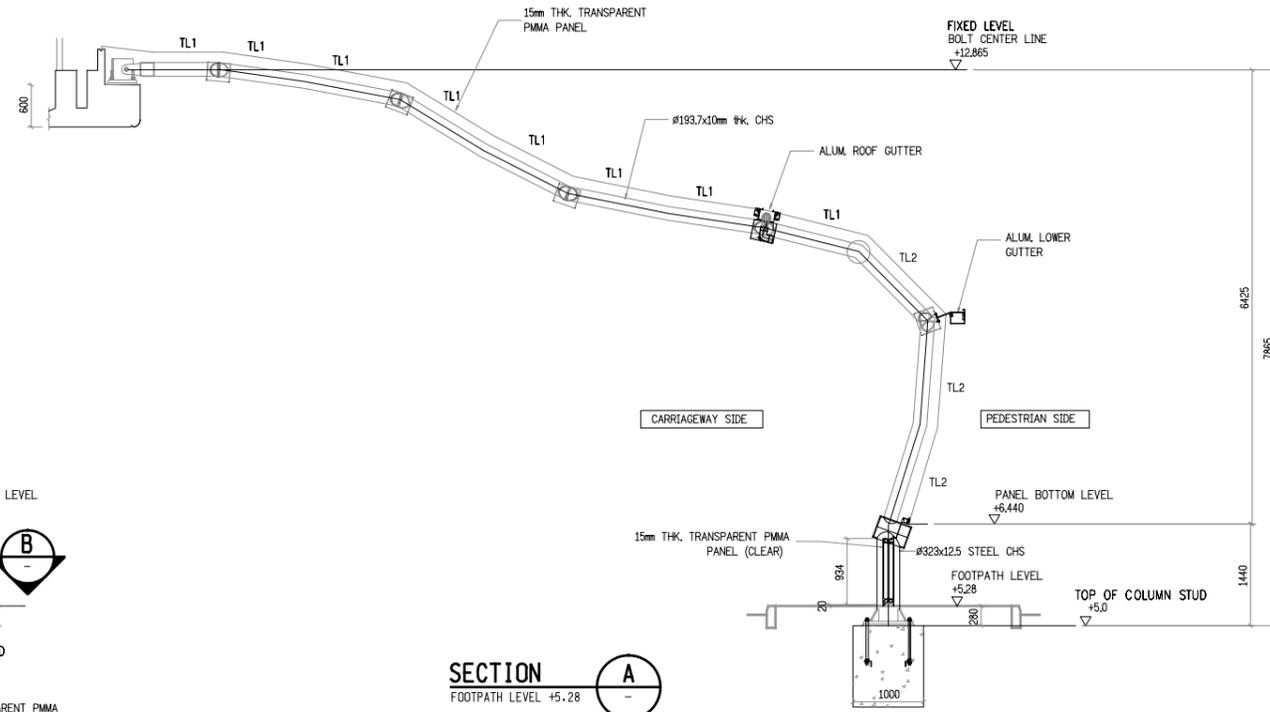
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PLAN, ELEVATION, SECTION
OF NOISE BARRIER

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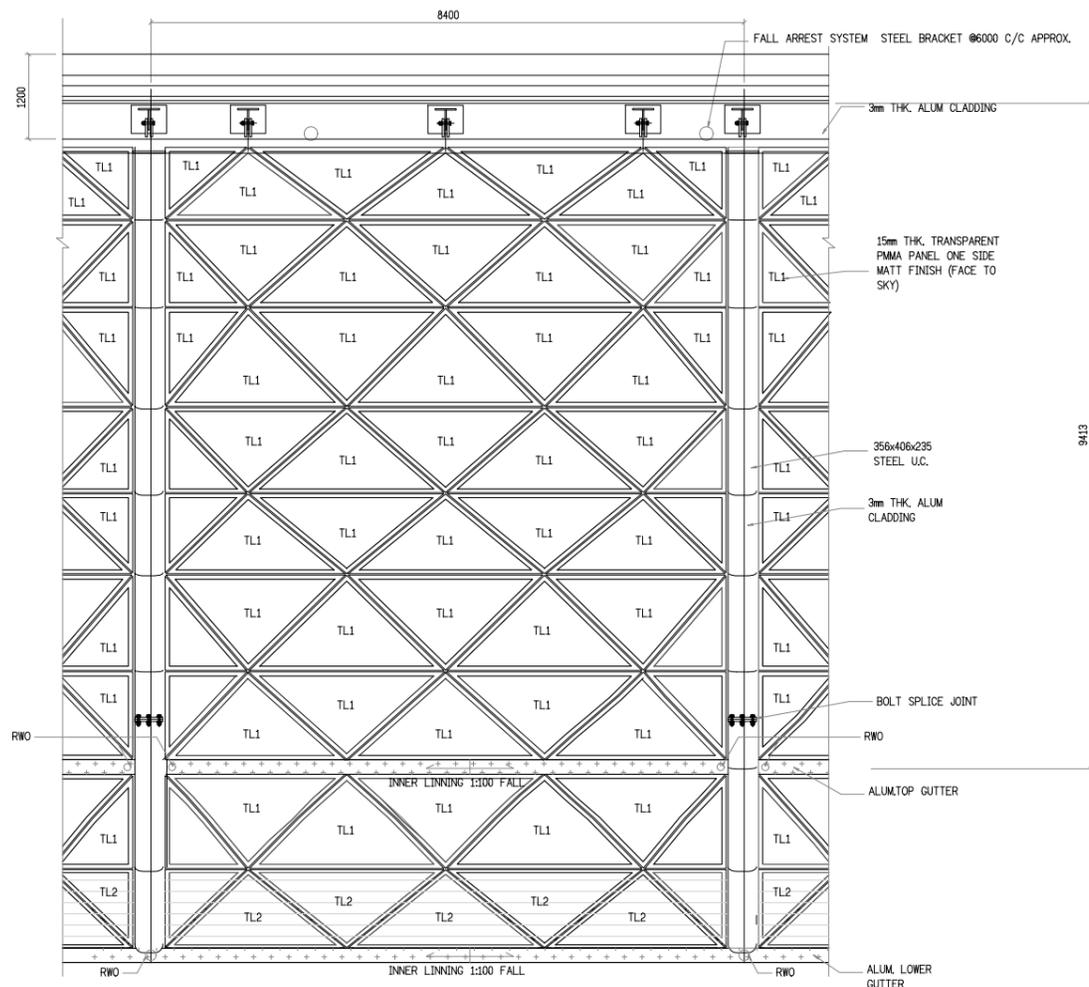
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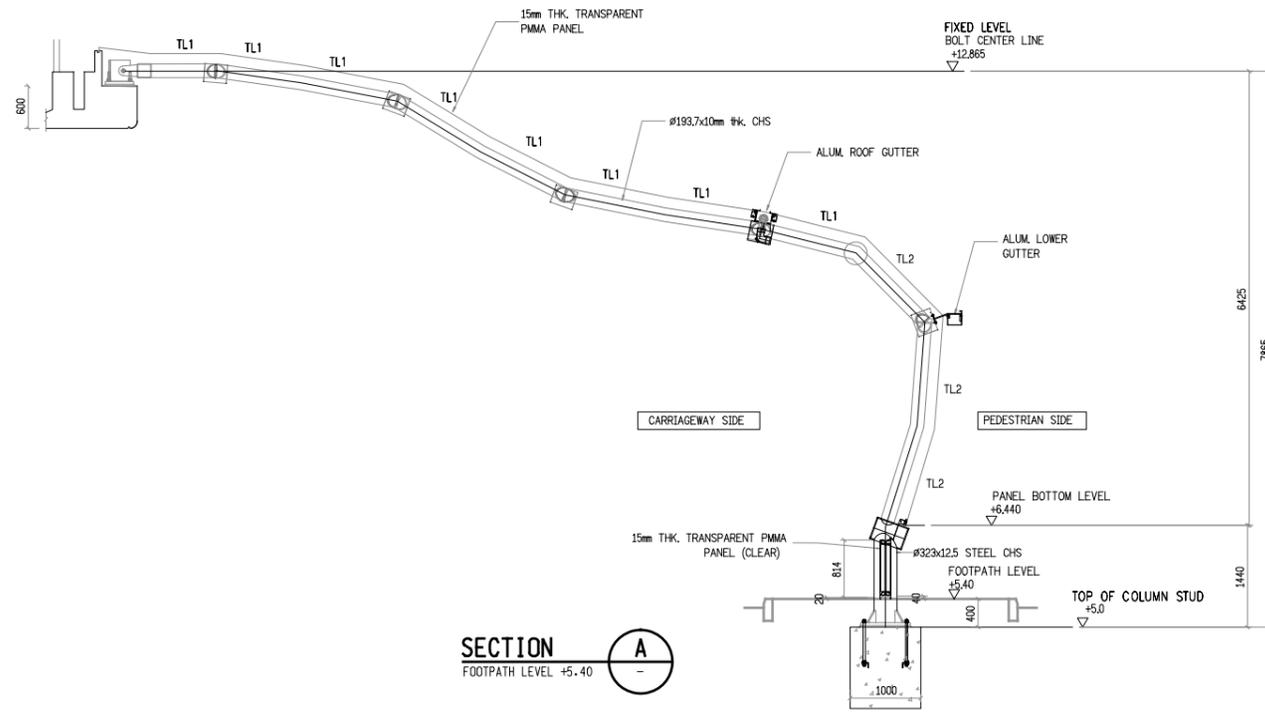
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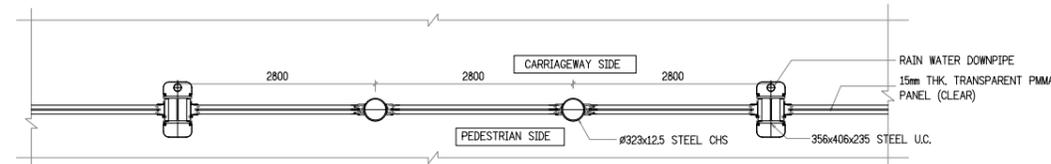
SECTION A



PART PLAN 6



SECTION B



SECTION C

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Project Manager
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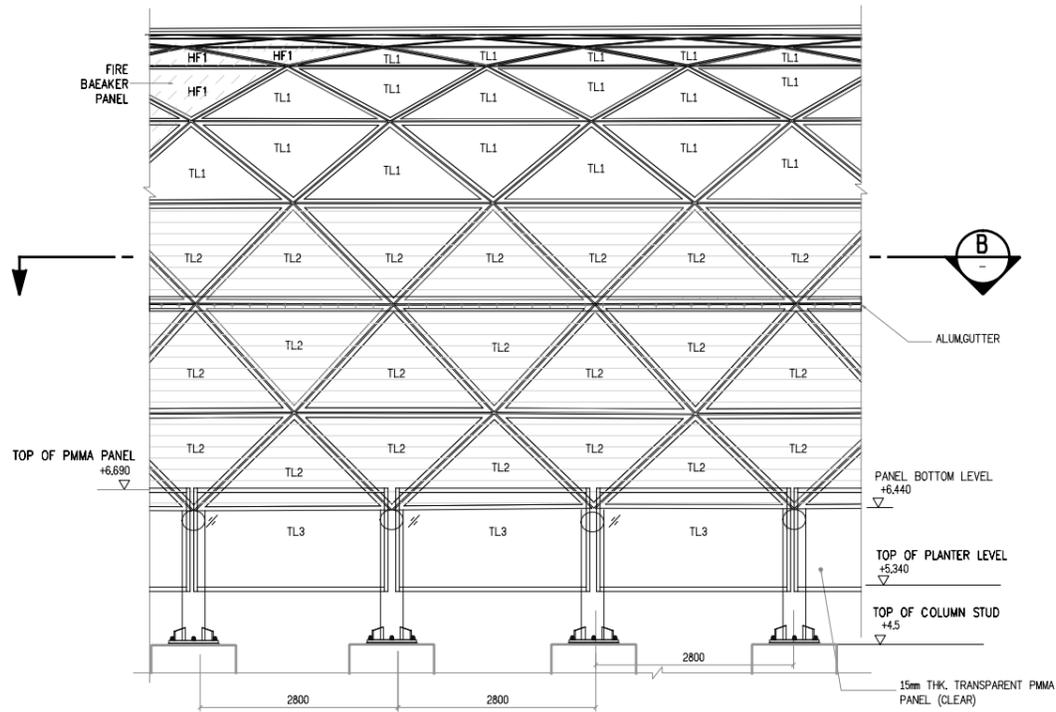
Designed	KST	Drawn	TWN	Checked	KTC
Approved			Paul Li	ICE	JUL/2019

Project
CONTRACT NO. ED/2018/01
KAI TAK DEVELOPMENT -
STAGE 4 INFRASTRUCTURE AT THE
FORMER RUNWAY AND SOUTH APRON

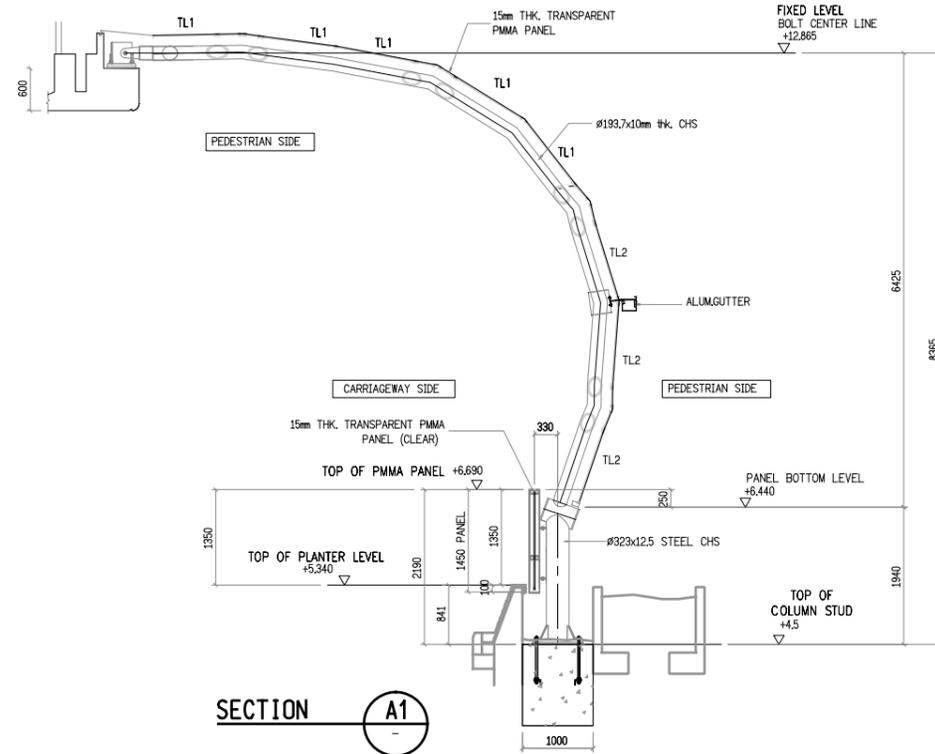
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PLAN, ELEVATION, SECTION
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Drawing No.
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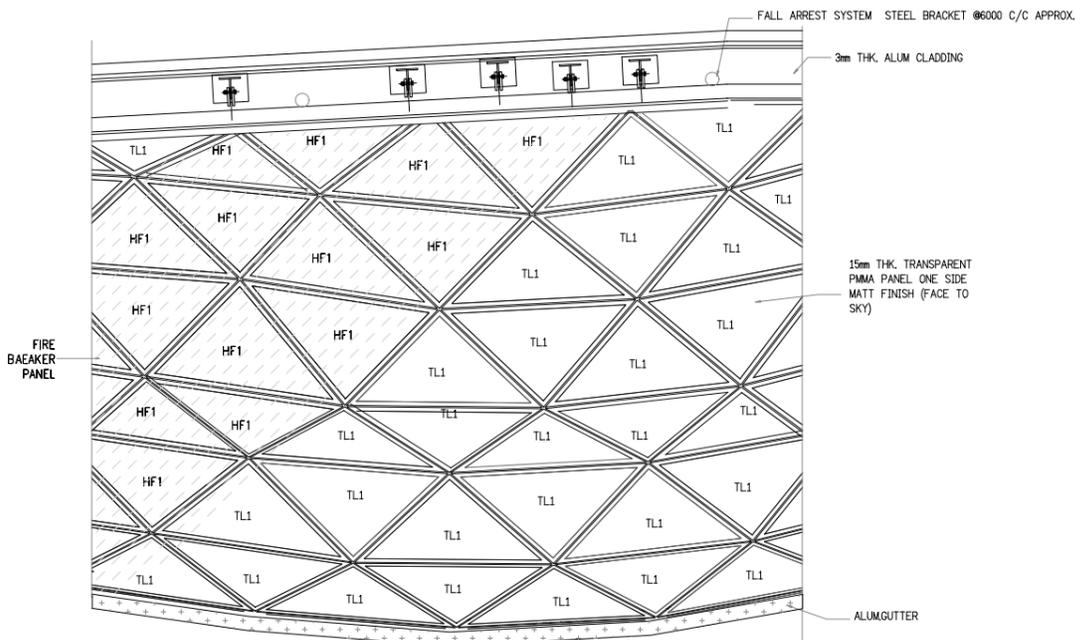


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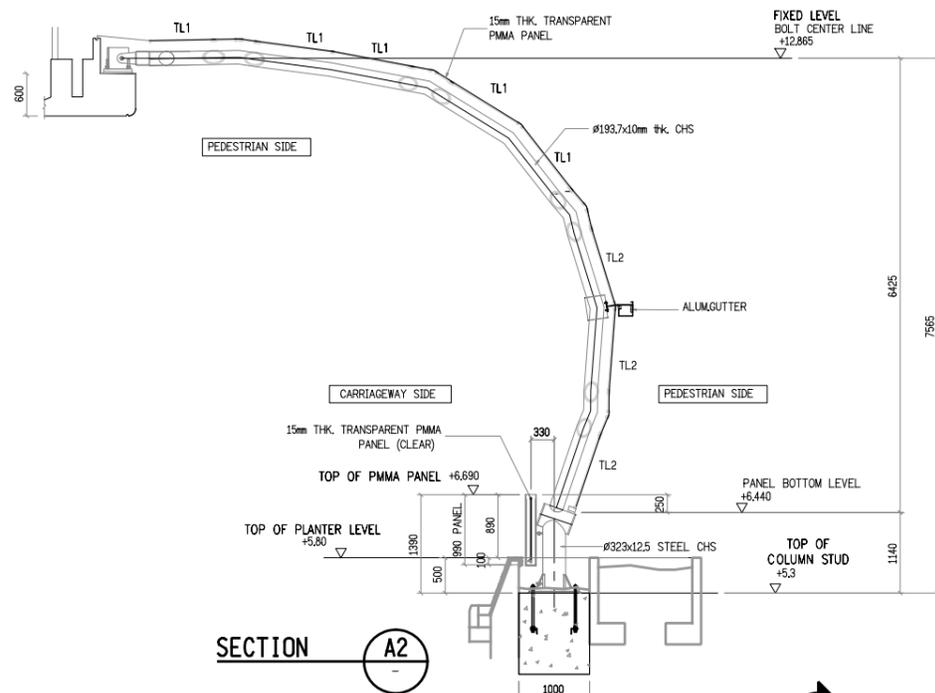


SECTION A1

PROPOSED TOP OF PLANTER LEVEL=+5.34
 PROPOSED TOP OF COLUMN STUD=+4.5

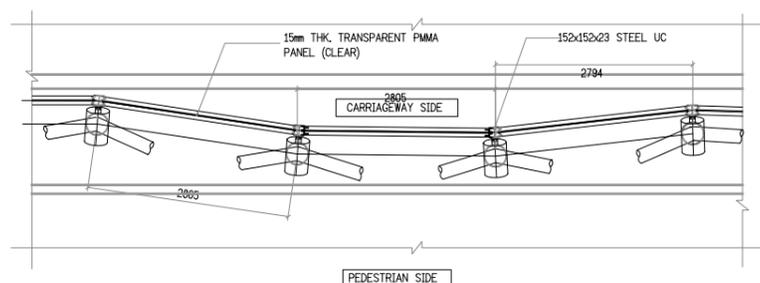


PART PLAN 4

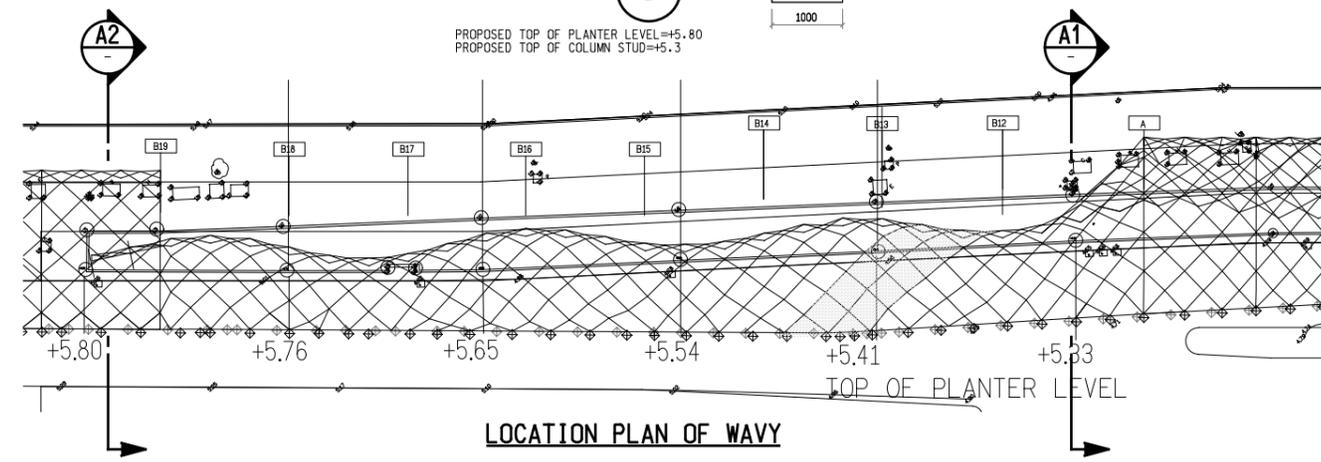


SECTION A2

PROPOSED TOP OF PLANTER LEVEL=+5.80
 PROPOSED TOP OF COLUMN STUD=+5.3



SECTION B



LOCATION PLAN OF WAVY

Rev.	Description of Revision	Date	Ckd.

Project Manager
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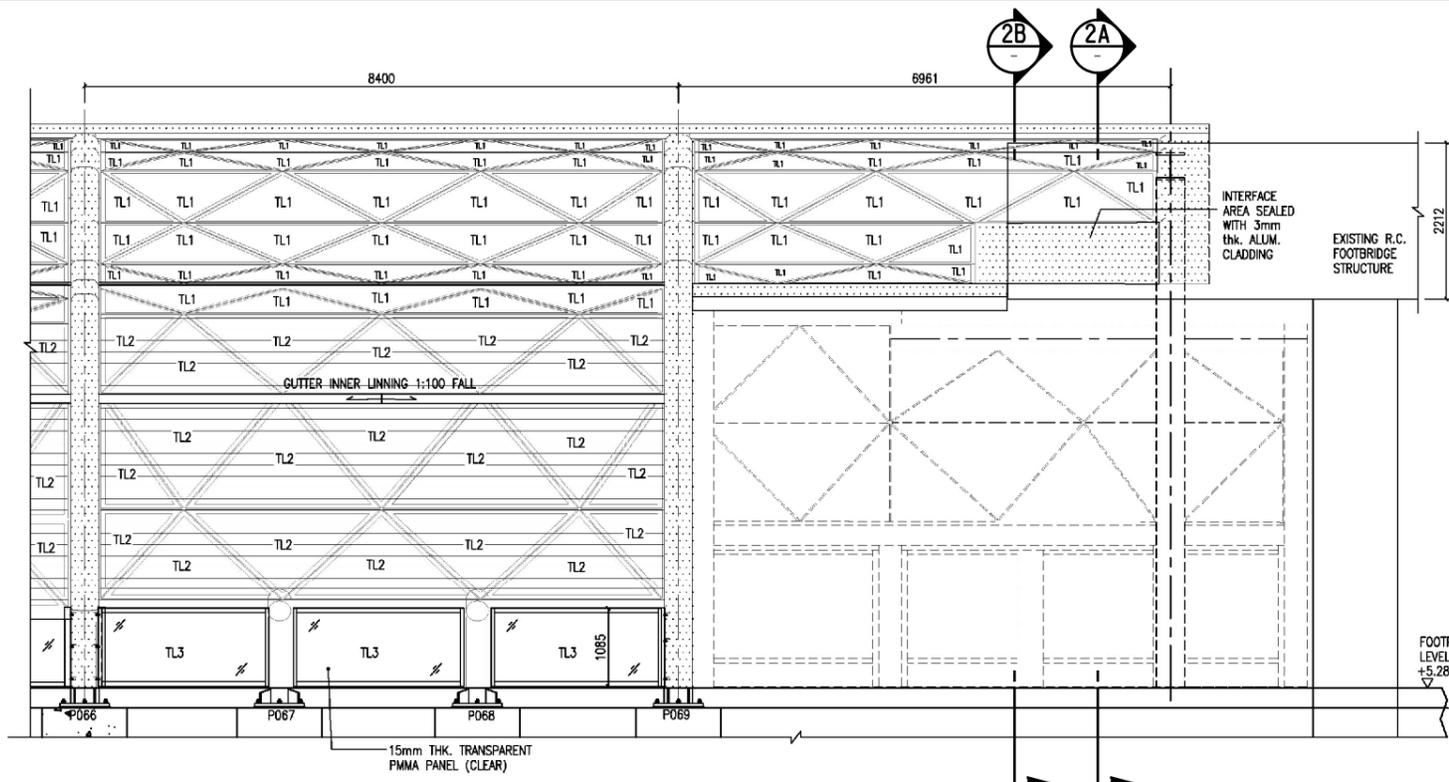
Designed: KST Drawn: TWM Checked: KTC
 Approved: Paul Li ICE JUL/2019

Project
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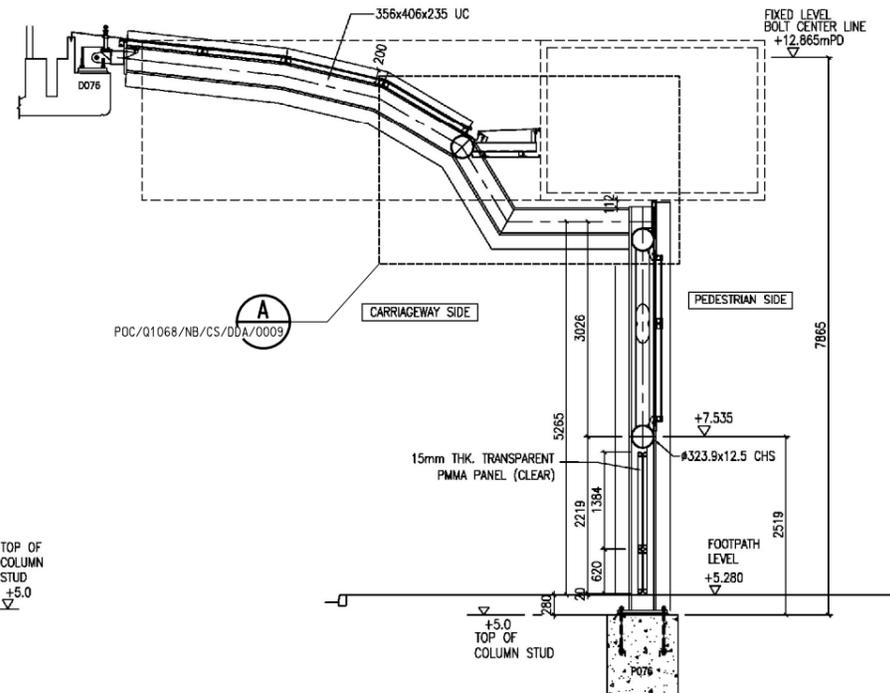
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PLAN, ELEVATION, SECTION
OF NOISE BARRIER

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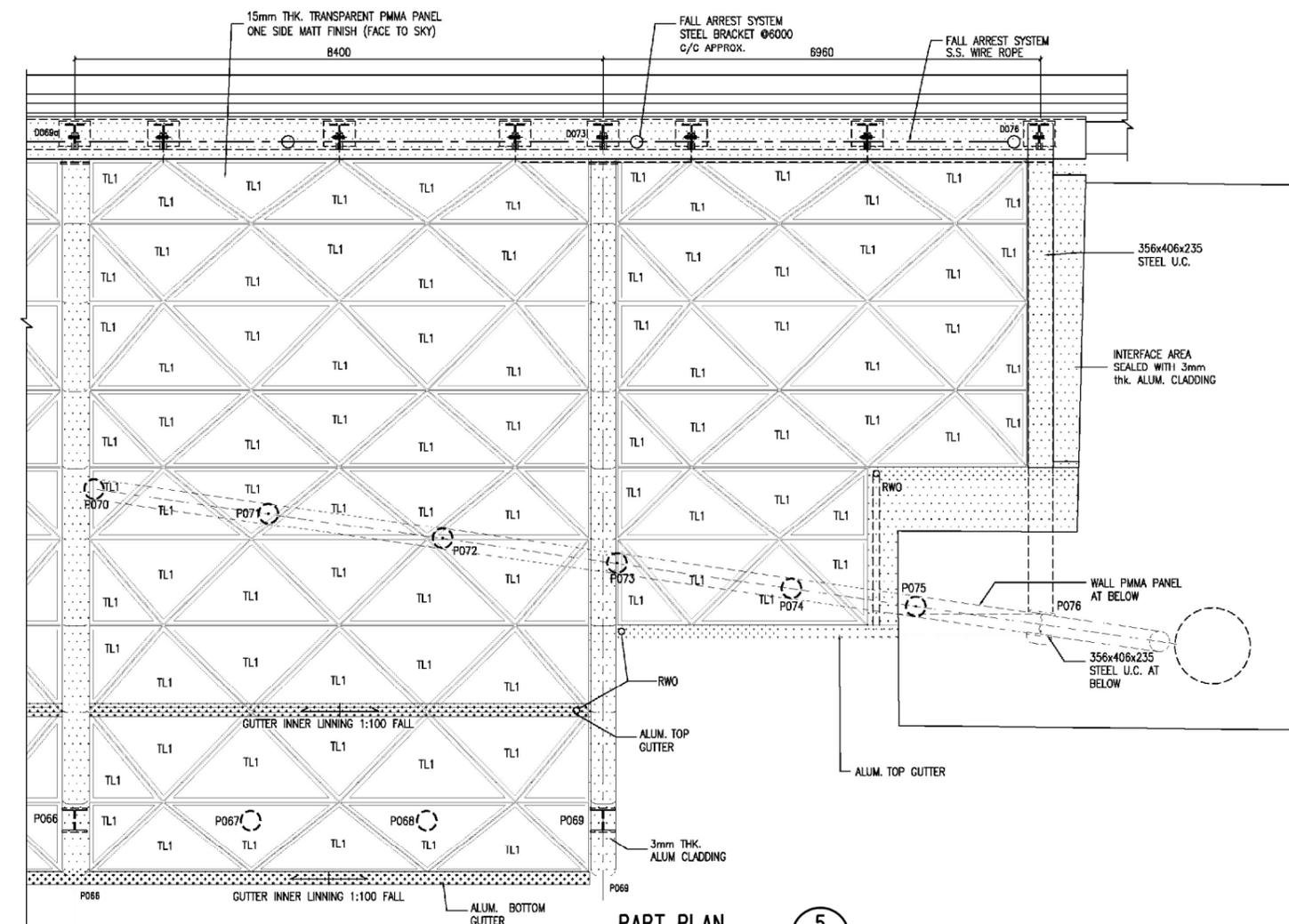
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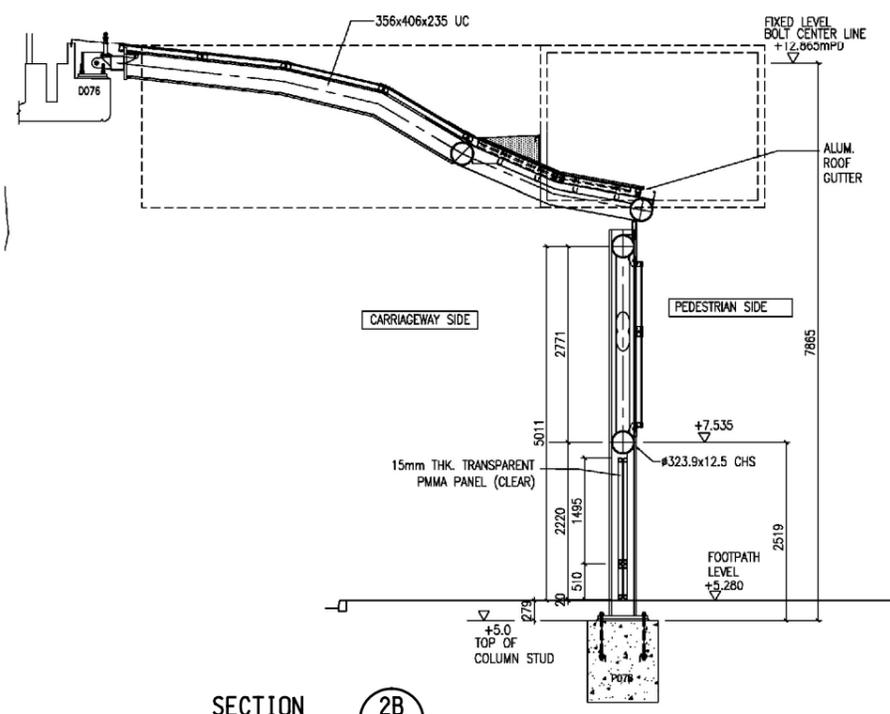
PART ELEVATION 1



SECTION 2A



PART PLAN 5



SECTION 2B

Rev.	Description of Revision	Date	Ckd.

Project Manager
CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
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LWK LANDSCAPE

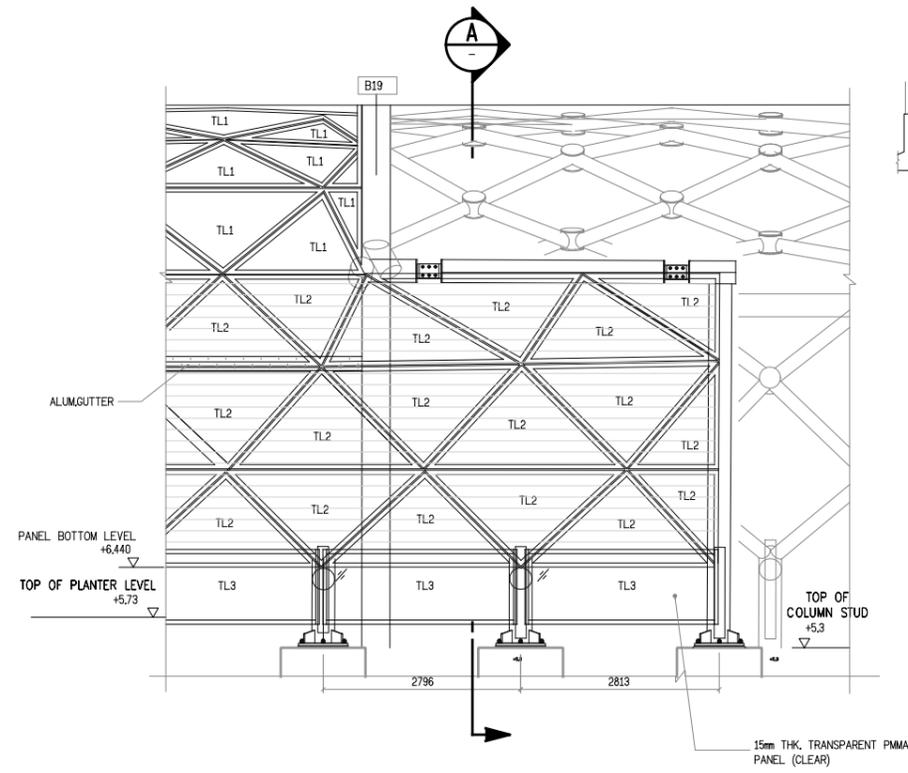
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 KAI TAK DEVELOPMENT - STAGE 4 INFRASTRUCTURE AT THE FORMER RUNWAY AND SOUTH APRON

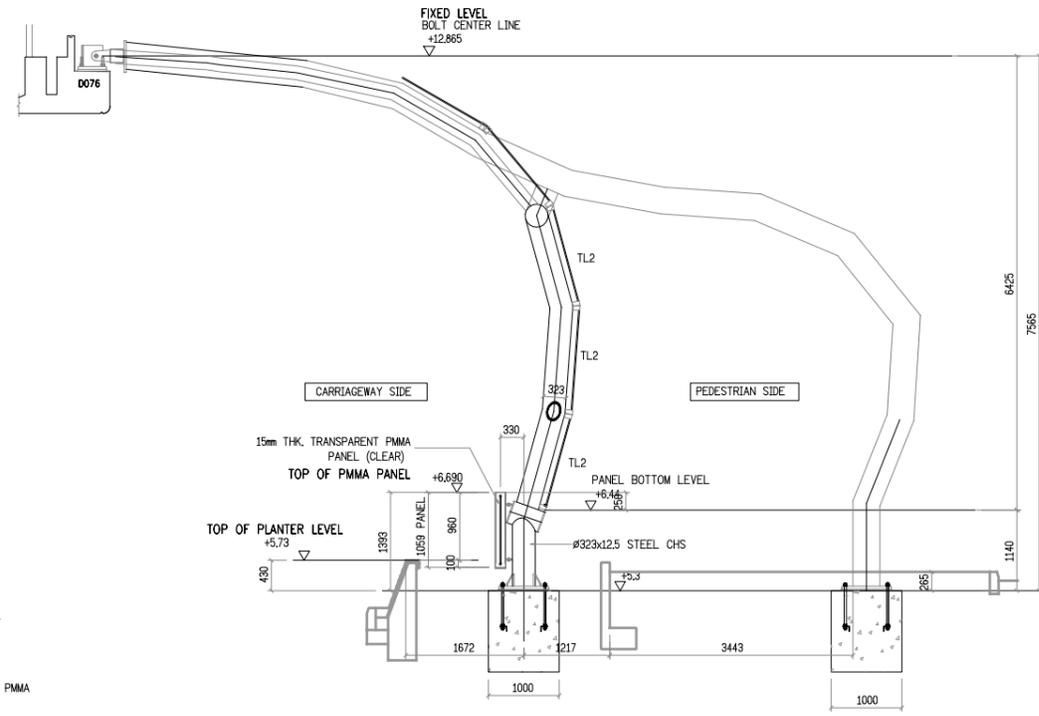
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 PANEL, PART ELEVATION, SECTION & PLAN (DOBULE WAVY)

Scale In A1 1 : 50
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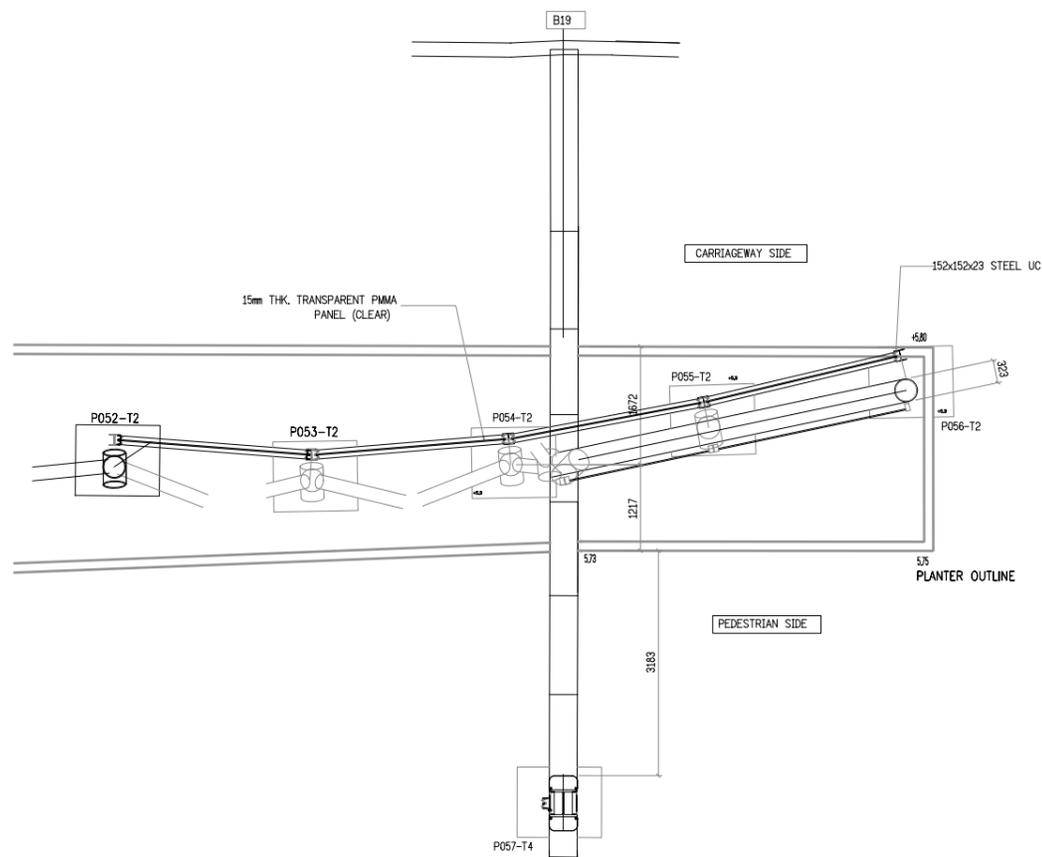
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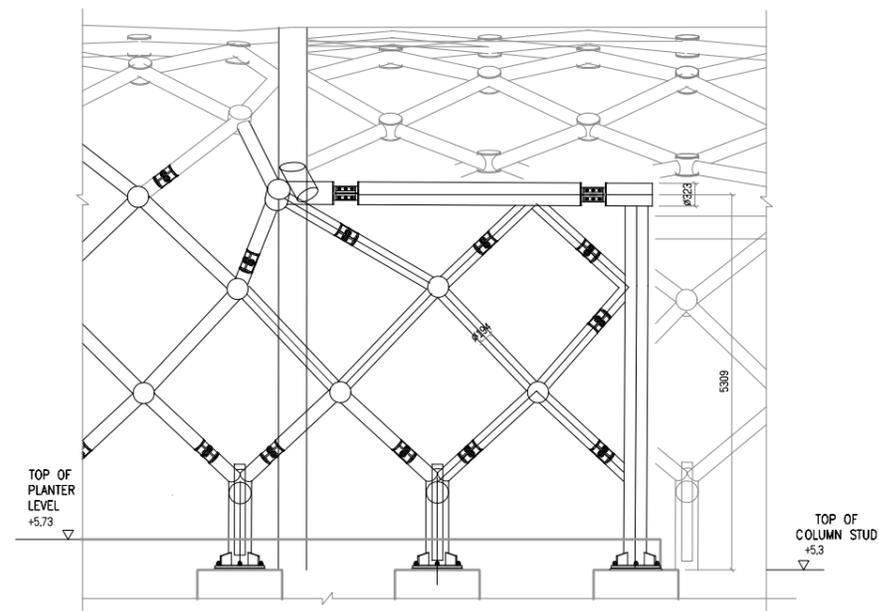
PART ELEVATION 7



SECTION A



PART PLAN 8



PART ELEVATION 8
STEEL FRAME

Rev.	Description of Revision	Date	Ckd.

Project Manager
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AECOM

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 五洋建設

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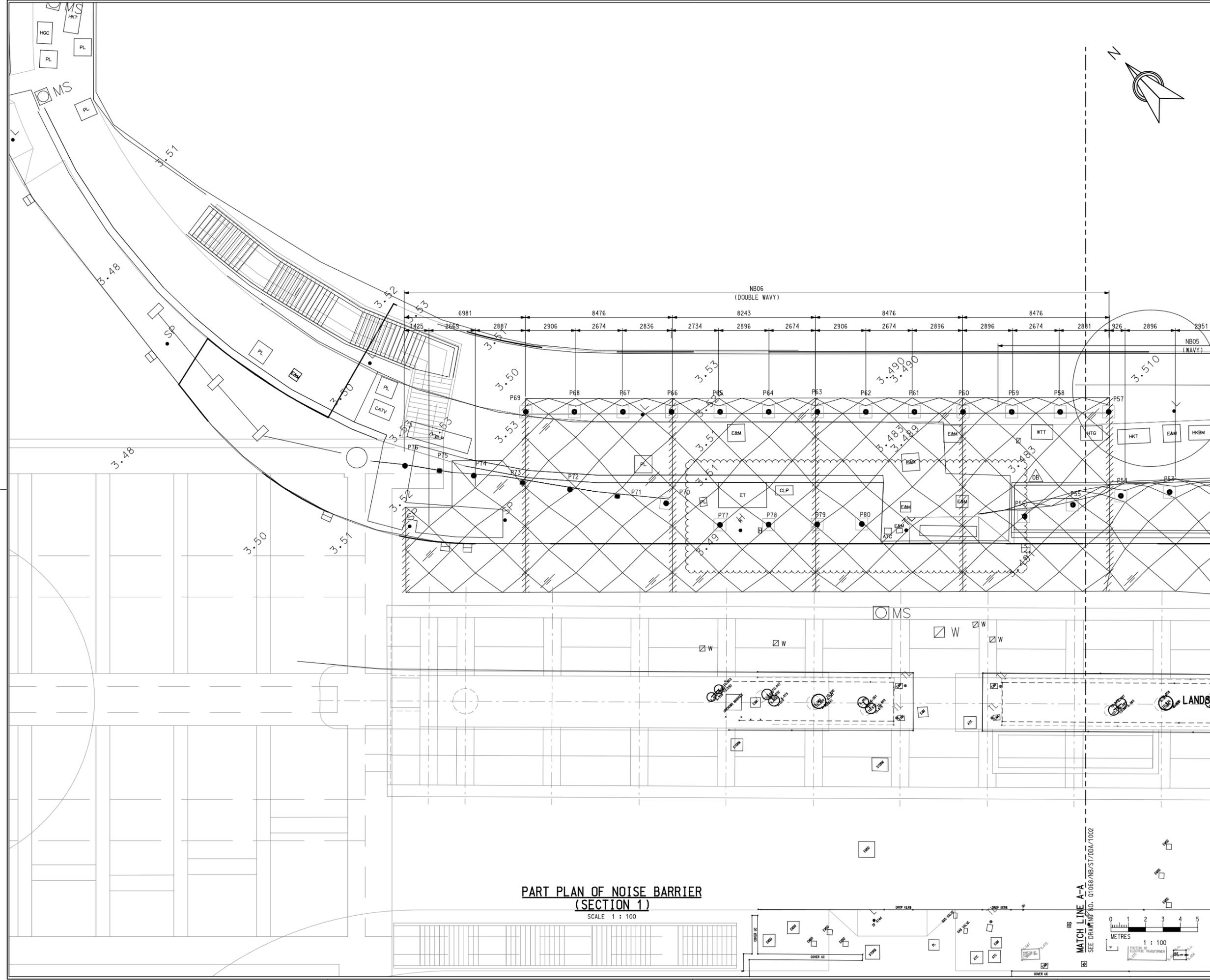
Designed	KST	Drawn	TWN	Checked	KTC
Approved				ICE	
				Paul Li	JUL/2019

Project
 CONTRACT NO. ED/2018/01
 KAI TAK DEVELOPMENT -
 STAGE 4 INFRASTRUCTURE AT THE
 FORMER RUNWAY AND SOUTH APRON

Title
**PANEL SCHEDULE
 FOR NOISE BARRIER**

Scale in A1	1 : 50
A3	1 : 100

Drawing No.
POC/Q1068/NB/CS/DDA/0007 Rev.
OA



- NOTES :**
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
 2. ALL LEVELS ARE IN mPD METRE ABOVE HONG KONG PRINCIPAL DATUM.
 3. FOR GENERAL NOTES, REFER TO DRAWING NO. POC/Q1068/NB/GN/DDA/0001-0002.

- LEGEND :**
- SITE BOUNDARY
 - [Hatched Box] 356x406x235 UC
 - [Triangle] 193.7x10 CHS
 - [Double Line] 200x200x10 SHS
 - [Wavy Line] 323.9x12.5 CHS
 - [Circle with Dot] P57 COLUMN STUD WITH POST

Rev.	Description of Revision	Date	Ckd.

Project Manager
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LWK LANDSCAPE

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 Approved: [Signature], Paul LT, ICE, JUL/2019

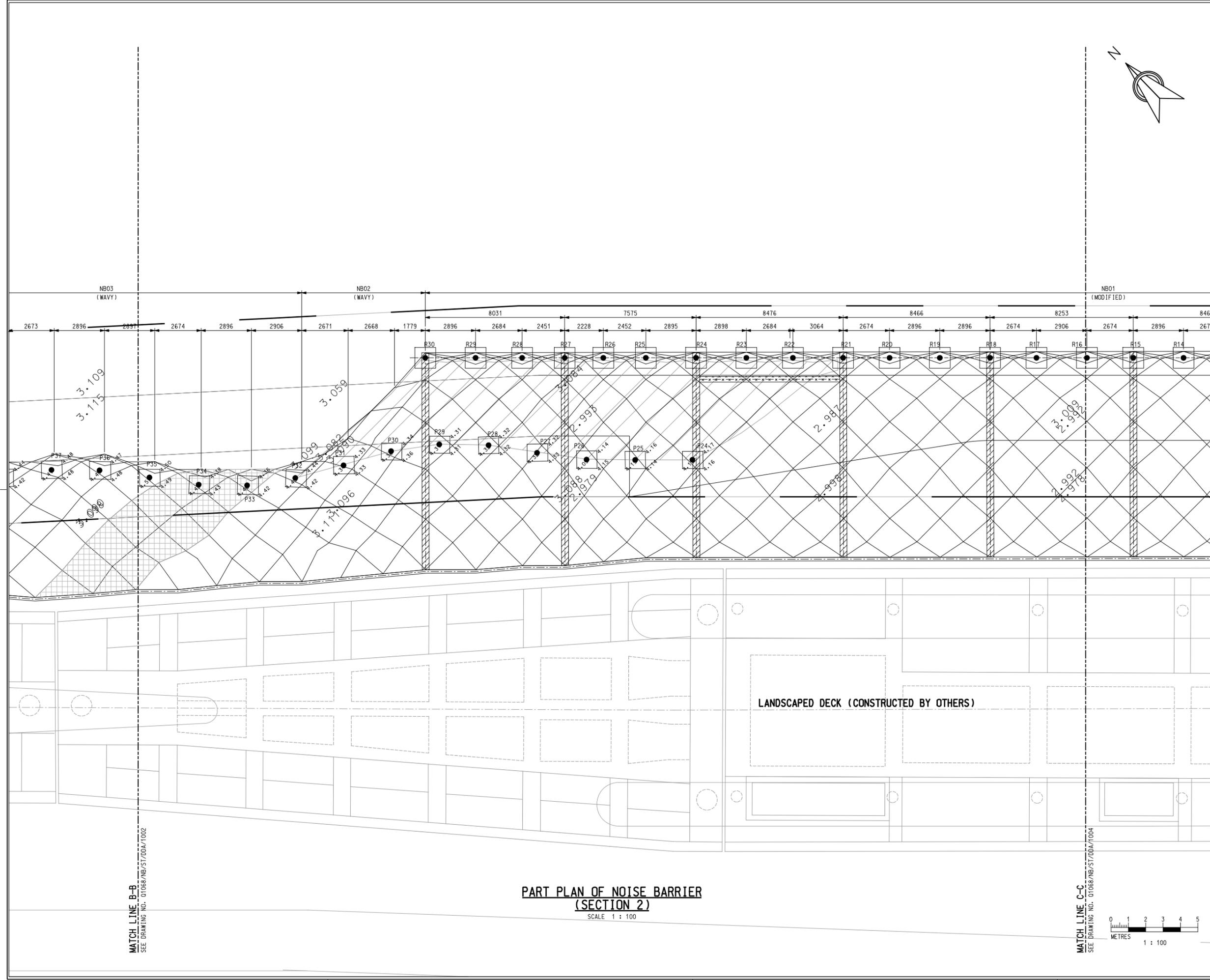
Project
CONTRACT NO. ED/2018/01
KAI TAK DEVELOPMENT -
STAGE 4 INFRASTRUCTURE AT THE
FORMER RUNWAY AND SOUTH APRON

Title
NOISE BARRIER -
SUPERSTRUCTURE
FRAMING PLAN

Scale 1m A1 1 : 100
 A3 1 : 200

Drawing No. **POC/Q1068/NB/ST/DDA/1001** Rev. **OB**

PART PLAN OF NOISE BARRIER
(SECTION 1)
 SCALE 1 : 100



- NOTES :**
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
 2. ALL LEVELS ARE IN mPD METRE ABOVE HONG KONG PRINCIPAL DATUM.
 3. FOR GENERAL NOTES, REFER TO DRAWING NO. POC/Q1068/NB/GN/DDA/0001-0002.

- LEGEND :**
- SITE BOUNDARY
 - 356x406x235 UC
 - 193x10 CHS
 - 200x200x10 SHS
 - 323.9x12.5 CHS
 - P57 COLUMN STUD WITH POST

Rev.	Description of Revision	Date	Ckd.

Project Manager
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LWK LANDSCAPE

Designed: KST Draw: TWN Checked: KTC
 Approved: Paul Li ICE JUL/2019

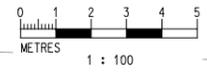
Project
CONTRACT NO. ED/2018/01
KAI TAK DEVELOPMENT -
STAGE 4 INFRASTRUCTURE AT THE
FORMER RUNWAY AND SOUTH APRON

Title
NOISE BARRIER -
SUPERSTRUCTURE
FRAMING PLAN

Scale In A1 1 : 100
 A3 1 : 200
 (SHEET 3 OF 5)

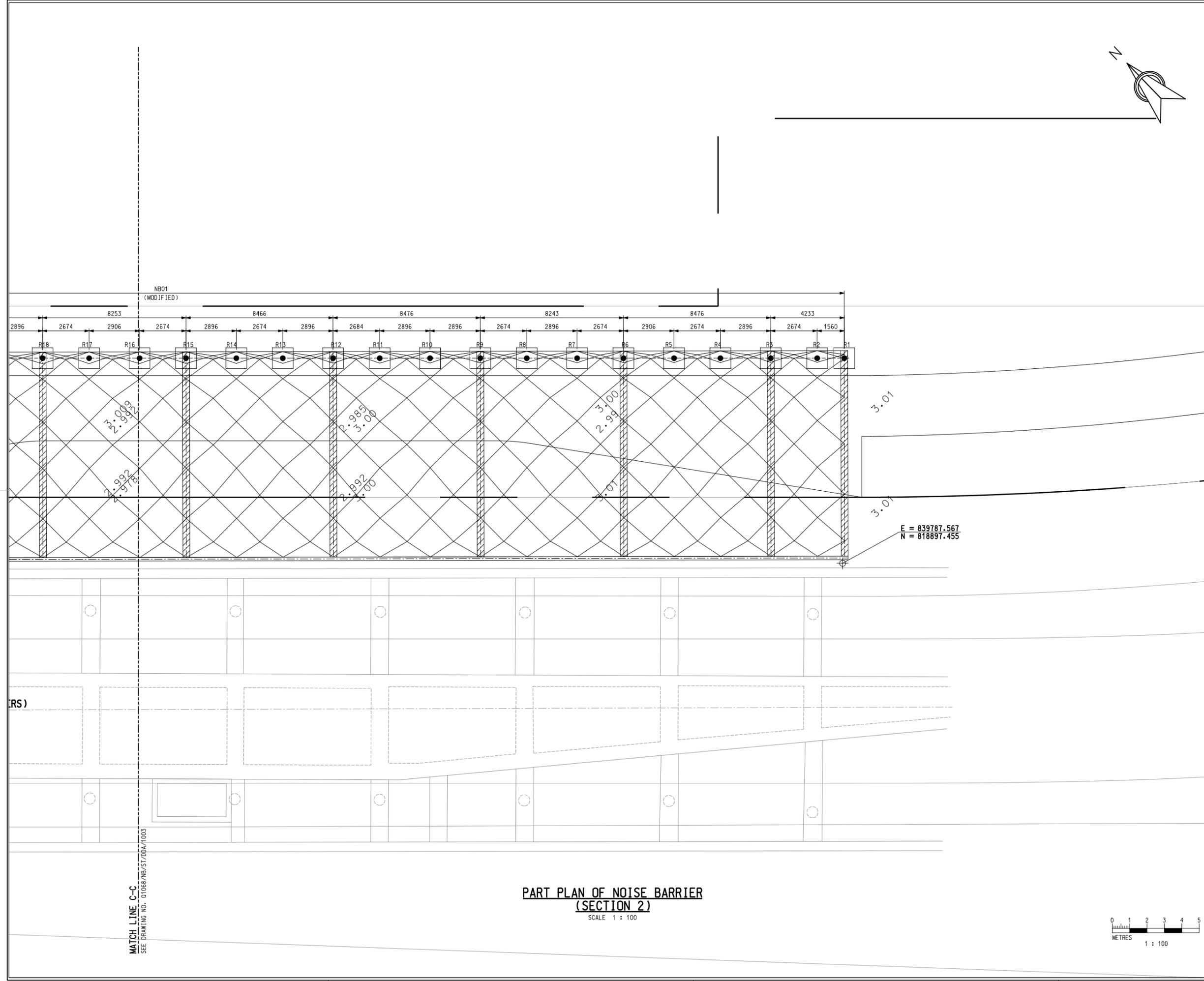
Drawing No. **POC/Q1068/NB/ST/DDA/1003** Rev. **OA**

PART PLAN OF NOISE BARRIER
(SECTION 2)
 SCALE 1 : 100



MATCH LINE B-B
 SEE DRAWING NO. 01068/NB/ST/DDA/1002

MATCH LINE C-C
 SEE DRAWING NO. 01068/NB/ST/DDA/1004



- NOTES :**
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 2. ALL LEVELS ARE IN mPD METRE ABOVE HONG KONG PRINCIPAL DATUM.
 3. FOR GENERAL NOTES, REFER TO DRAWING NO. POC/Q1068/NB/GN/DDA/0001-0002.

- LEGEND :**
- SITE BOUNDARY
 - [Symbol] 356x406x235 UC
 - [Symbol] 193x10 CHS
 - [Symbol] 200x200x10 SHS
 - [Symbol] 323.9x12.5 CHS
 - [Symbol] P57 COLUMN STUD WITH POST

Rev.	Description of Revision	Date	Ckd.

Project Manager
CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
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AD+RG architecture design and research group ltd
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Designed: KST, Drawn: TWN, Checked: KTC
 Approved: Paul Li, ICE, JUL/2019

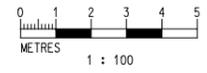
Project
 CONTRACT NO. ED/2018/01
 KAI TAK DEVELOPMENT - STAGE 4 INFRASTRUCTURE AT THE FORMER RUNWAY AND SOUTH APRON

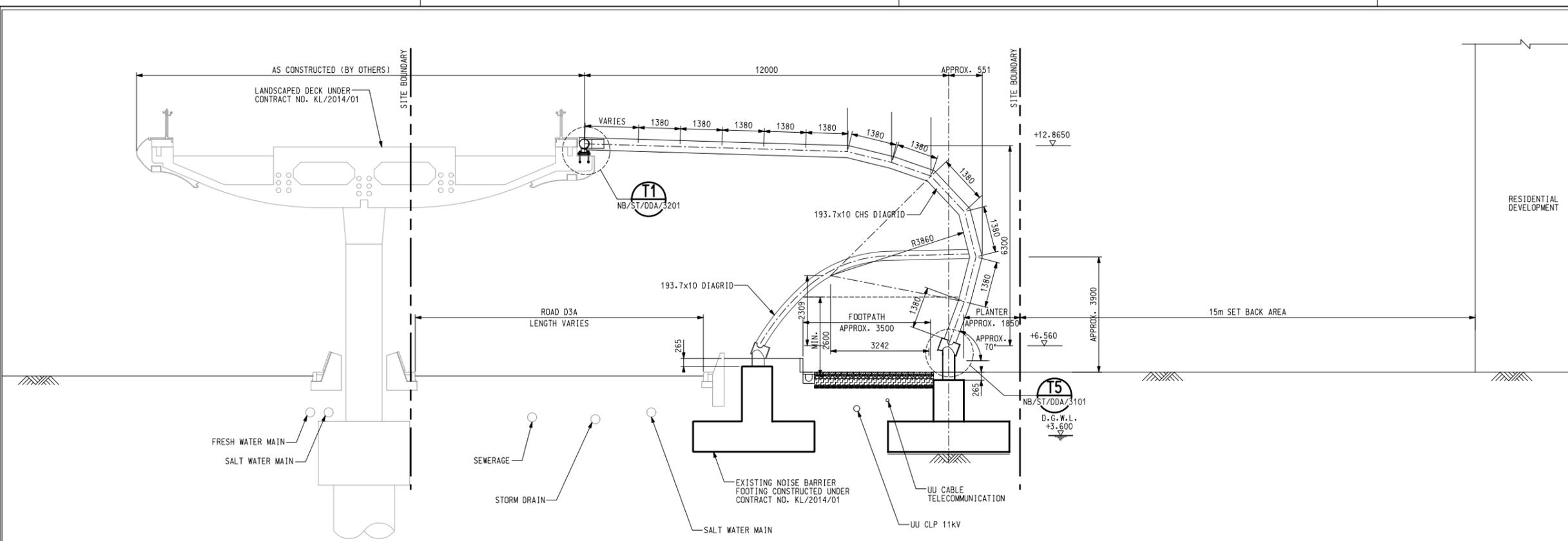
Title
NOISE BARRIER - SUPERSTRUCTURE FRAMING PLAN

Scale 1m A1 1 : 100
 A3 1 : 200

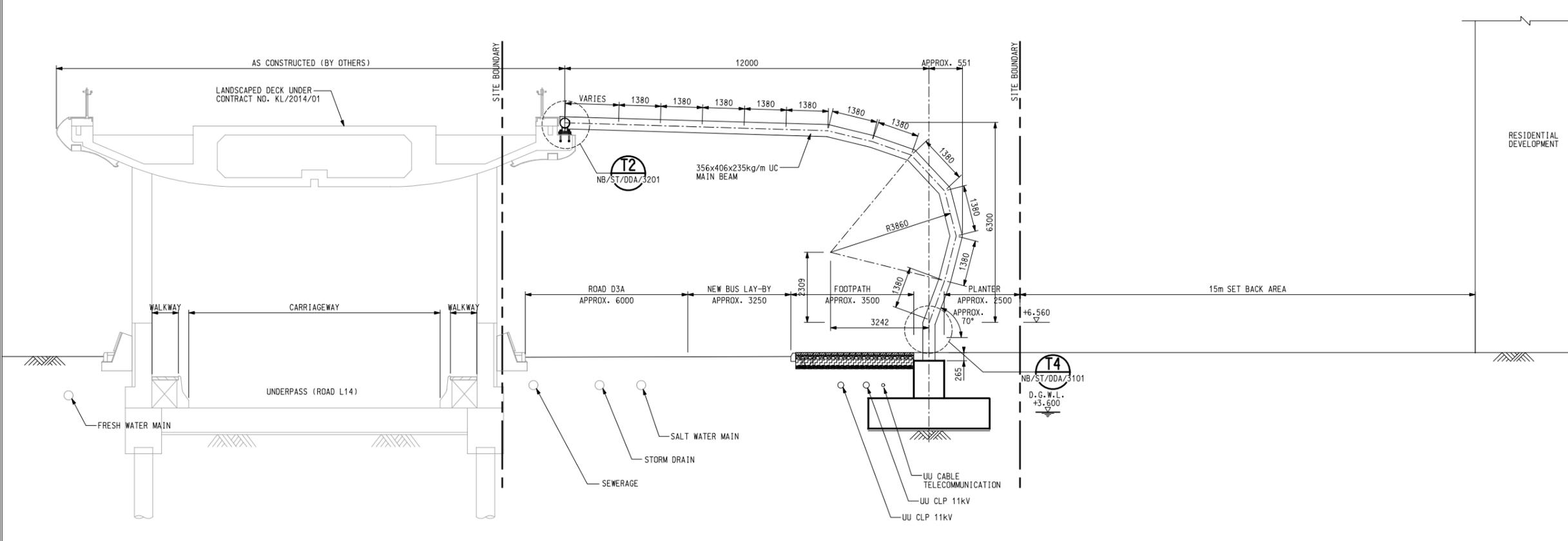
Drawing No. **POC/Q1068/NB/ST/DDA/1004** Rev. **OA**

PART PLAN OF NOISE BARRIER (SECTION 2)
 SCALE 1 : 100





SECTION A
SCALE 1:75 NB/GA/DDA/0001



SECTION B
SCALE 1:75 NB/GA/DDA/0001

- NOTES :**
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
 2. ALL LEVELS ARE IN MPD METRE ABOVE HONG KONG PRINCIPAL DATUM.
 3. FOR GENERAL NOTES, REFER TO DRAWING NO. POC/Q1068/NB/GN/DDA/0001-0002.

Rev.	Description of Revision	Date	Ckd.

Project Manager
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Approved				ICE	

Project
CONTRACT NO. ED/2018/01
KAI TAK DEVELOPMENT -
STAGE 4 INFRASTRUCTURE AT THE
FORMER RUNWAY AND SOUTH APRON

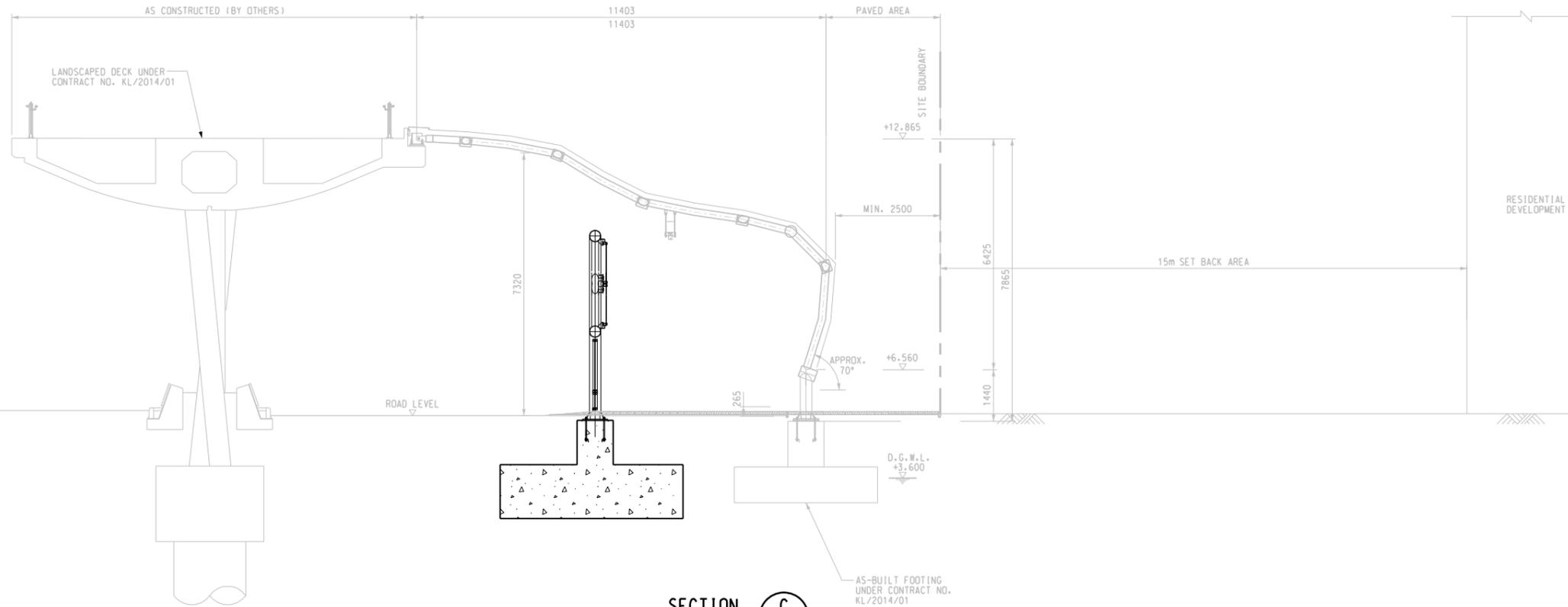
Title
NOISE BARRIER -
SUPERSTRUCTURE -
TYPICAL SECTION

Scale in A1	1 : 75
A3	1 : 150

Drawing No.
POC/Q1068/NB/ST/DDA/2001

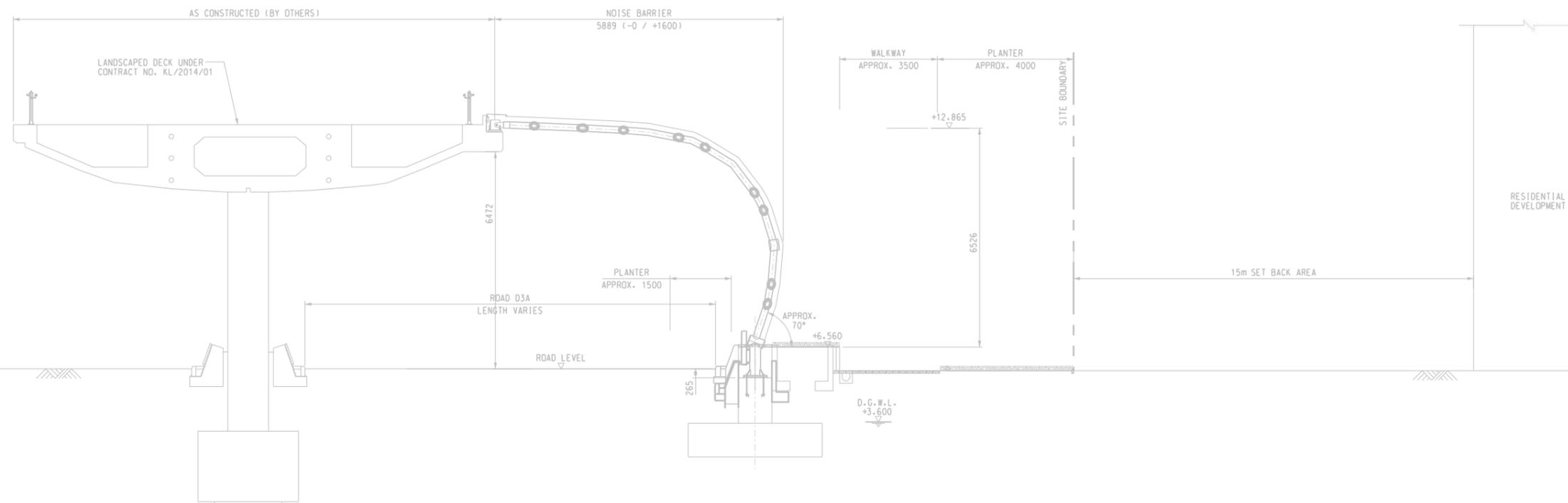
Rev.
OA

- NOTES :**
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
 2. ALL LEVELS ARE IN MPD METRE ABOVE HONG KONG PRINCIPAL DATUM.
 3. FOR GENERAL NOTES, REFER TO DRAWING NO. PDC/Q1068/NB/GN/DDA/0001-0002.



SECTION C
SCALE 1:75 NB/GA/DDA/0001

(TYPICAL SECTION OF DOUBLE WAVY NOISE BARRIER ALONG ROAD L14)



SECTION D
SCALE 1:75 NB/GA/DDA/0001

(TYPICAL SECTION OF DYNAMIC WAVY NOISE BARRIER ALONG ROAD L14)

Rev.	Description of Revision	Date	Ckd.
00	GENERAL REVISION	JUN 21	KST

Project Manager
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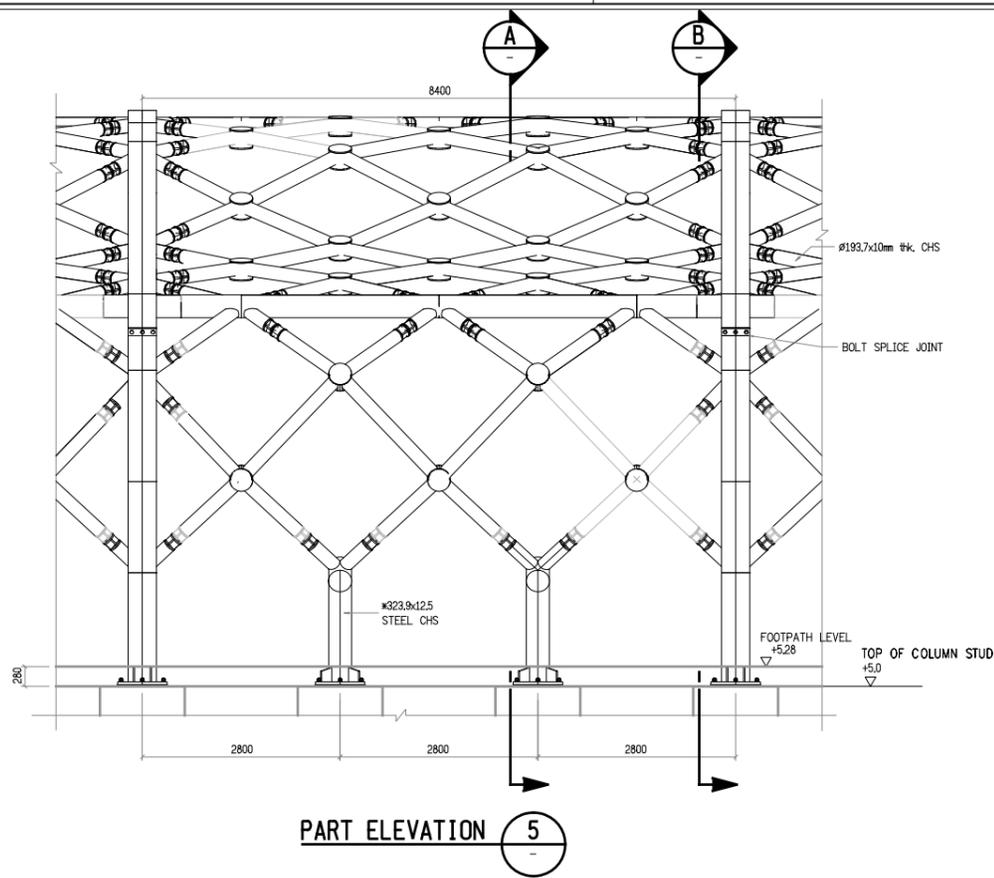
Designed	Drawn	Checked
KST	TWN	KTC
Approved		
Paul Li	JUL/2019	

Project
 CONTRACT NO. ED/2018/01
 KAI TAK DEVELOPMENT - STAGE 4 INFRASTRUCTURE AT THE FORMER RUNWAY AND SOUTH APRON

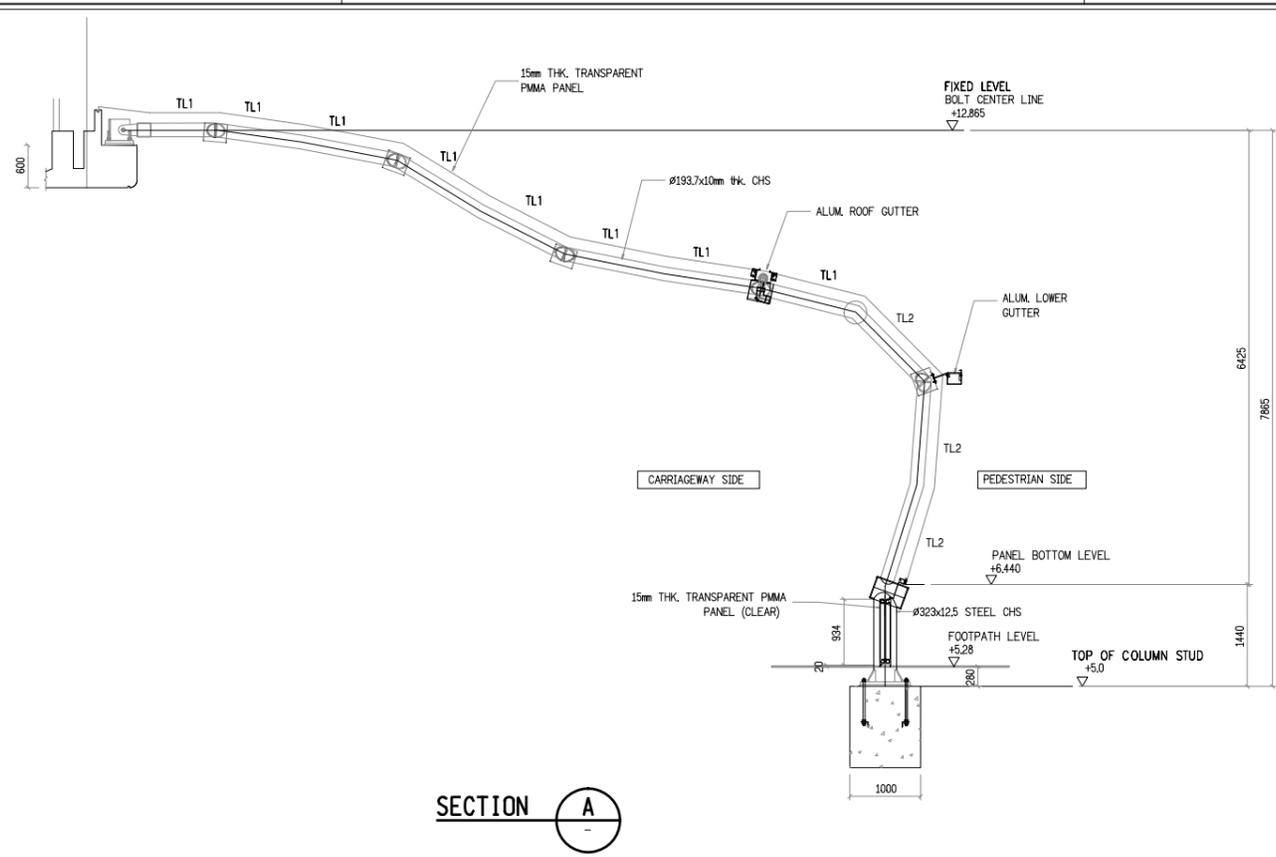
Title
 NOISE BARRIER - SUPERSTRUCTURE - TYPICAL SECTION

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1 : 75	1 : 150

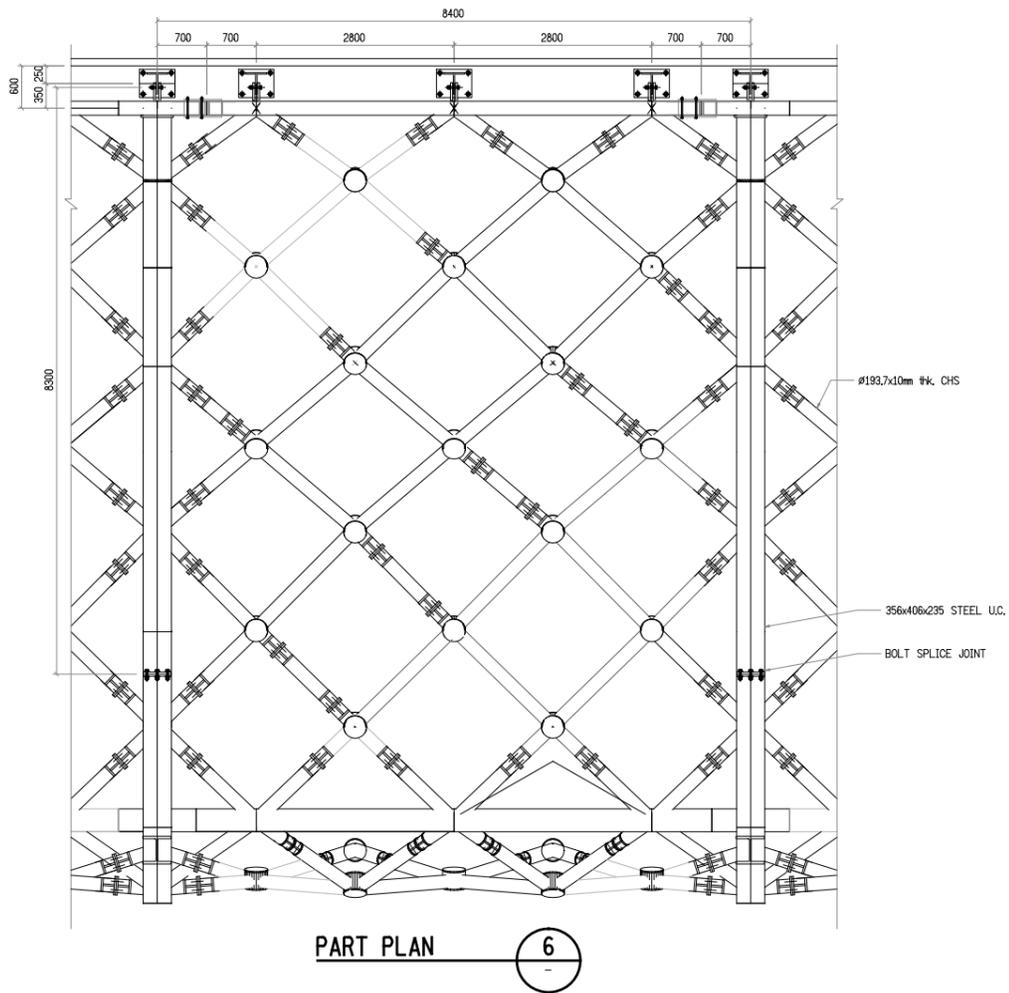
Drawing No.	Rev.
POC/Q1068/NB/ST/DDA/2002	OD



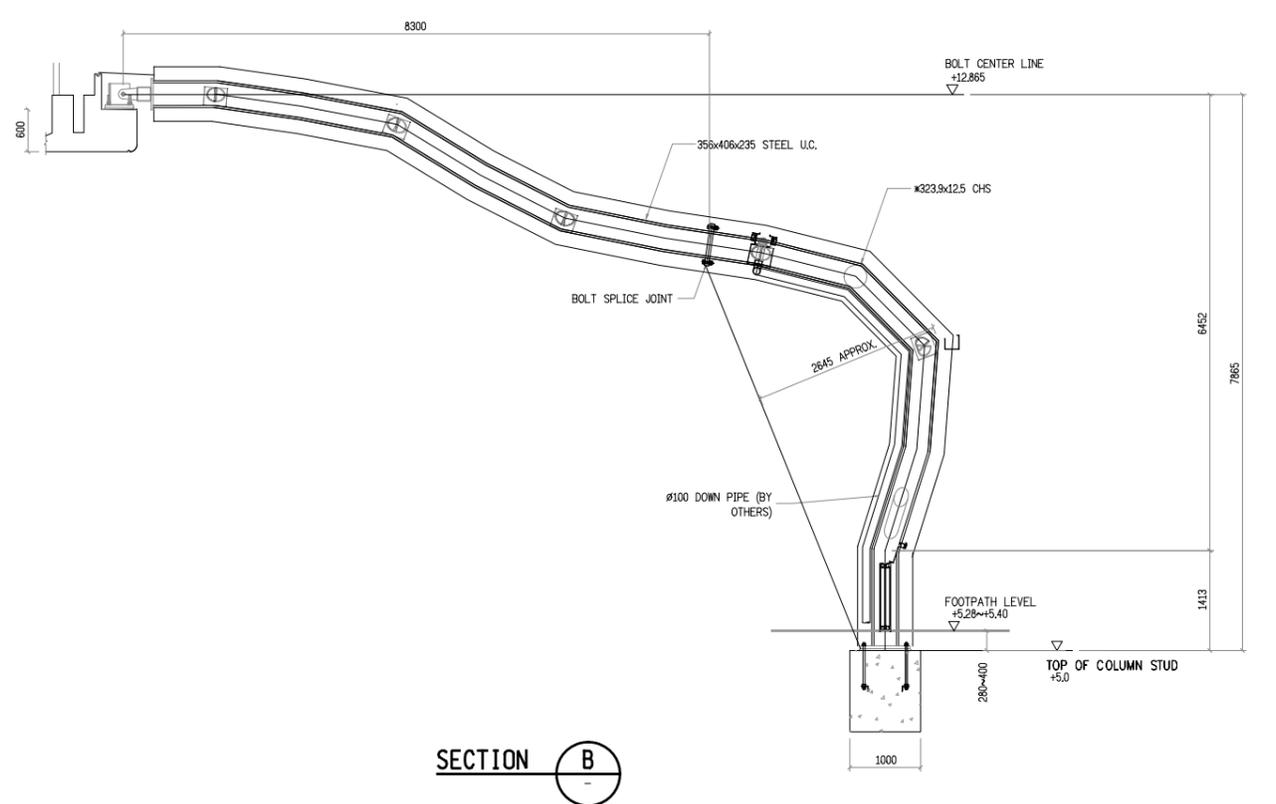
PART ELEVATION 5



SECTION A



PART PLAN 6



SECTION B

Rev.	Description of Revision	Date	Ckd.

Project Manager
CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT EAST DEVELOPMENT OFFICE

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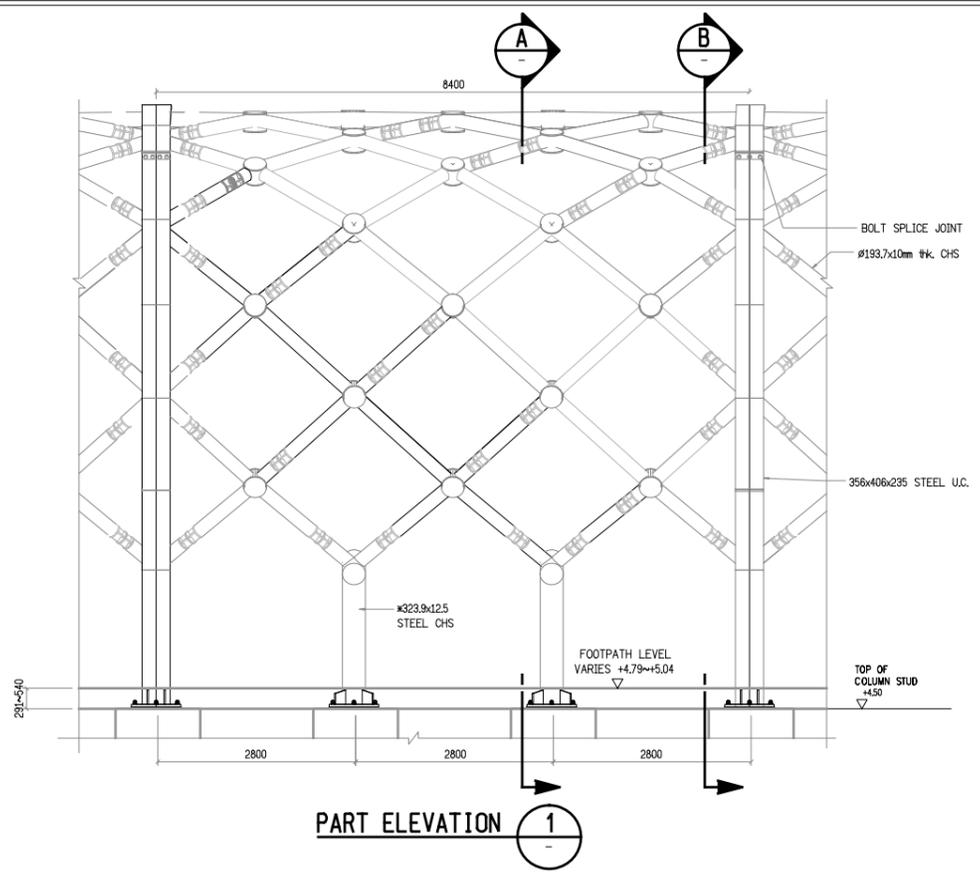
Designed	KST	Drawn	TWN	Checked	KTC
Approved	Paul Li			ICE	JUL/2019

Project
CONTRACT NO. ED/2018/01
KAI TAK DEVELOPMENT - STAGE 4 INFRASTRUCTURE AT THE FORMER RUNWAY AND SOUTH APRON

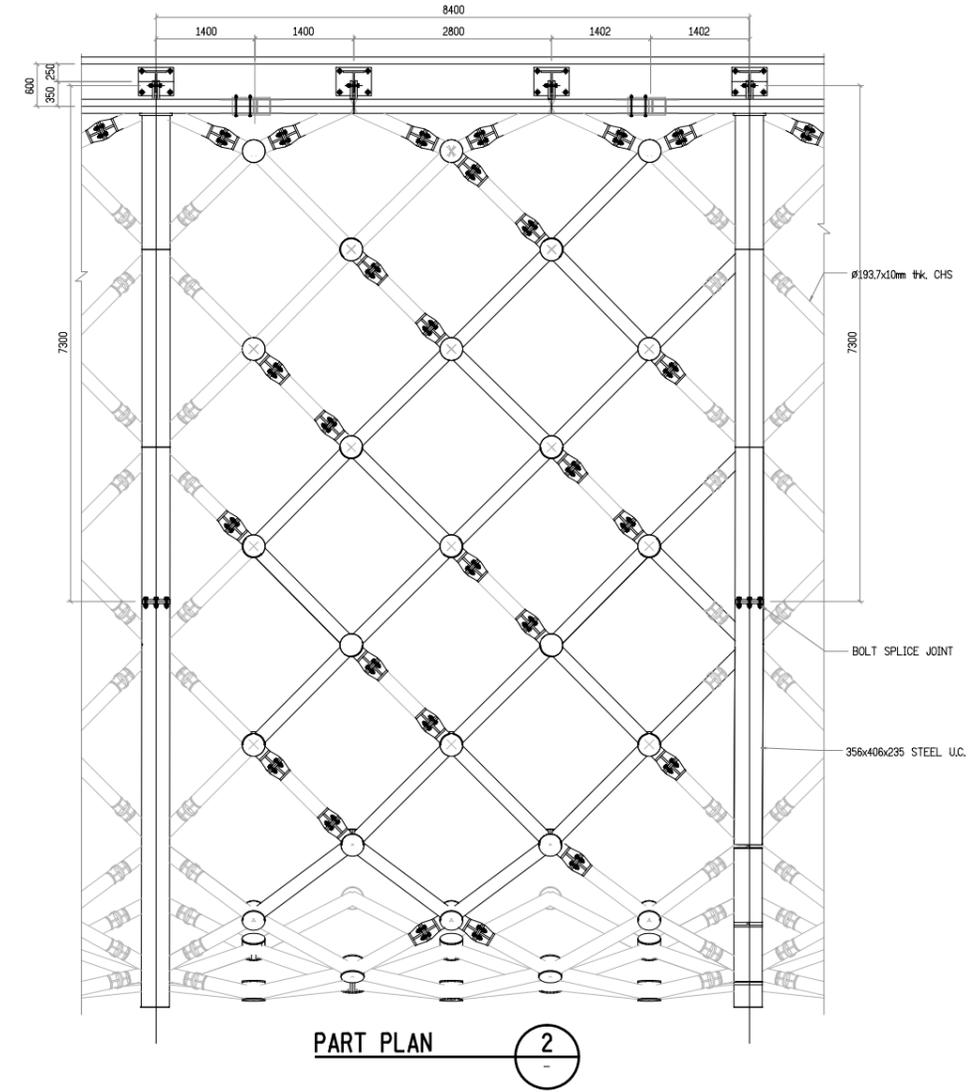
Title
PLAN, ELEVATION, SECTION STRUCTURE STEELWORK

Scale in A1	1 : 50
A3	1 : 100

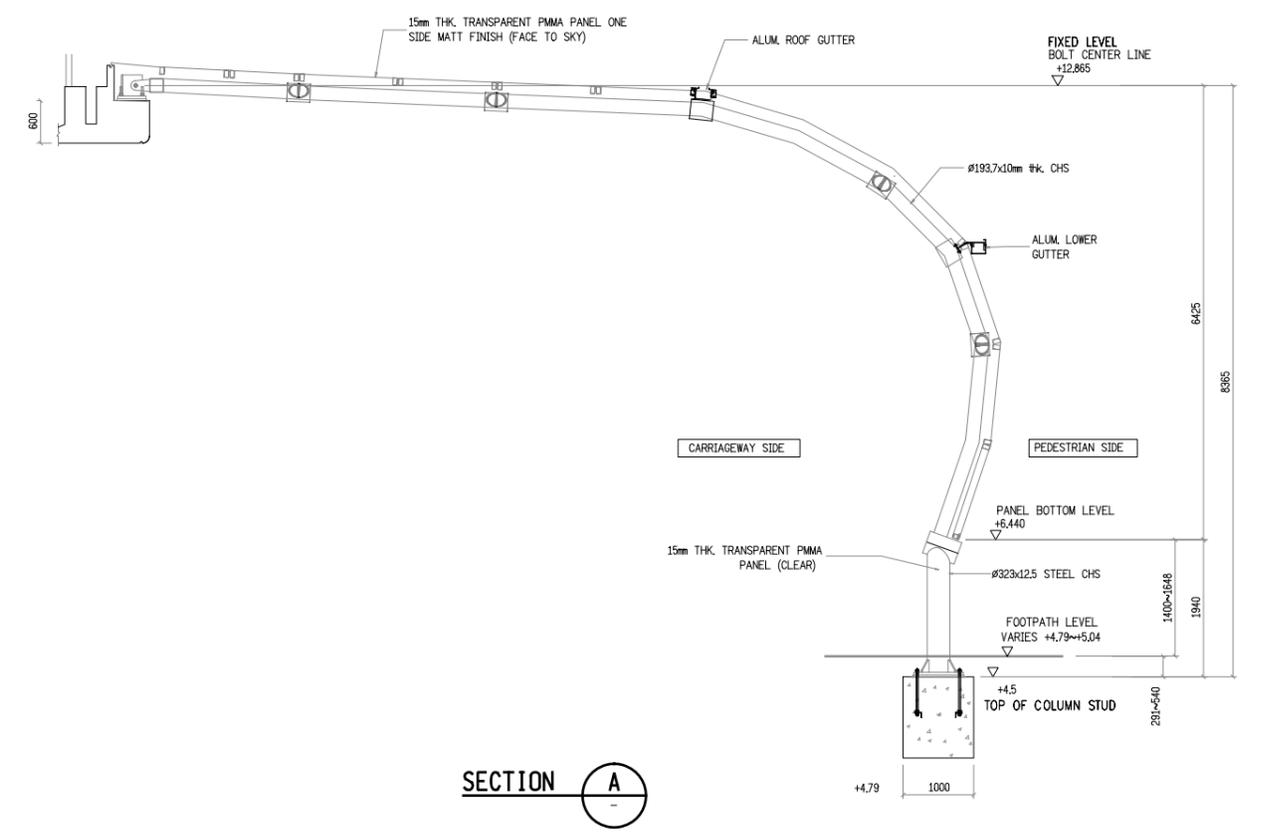
Drawing No.	POC/Q1068/NB/ST/DDA/3301	Rev.	OA
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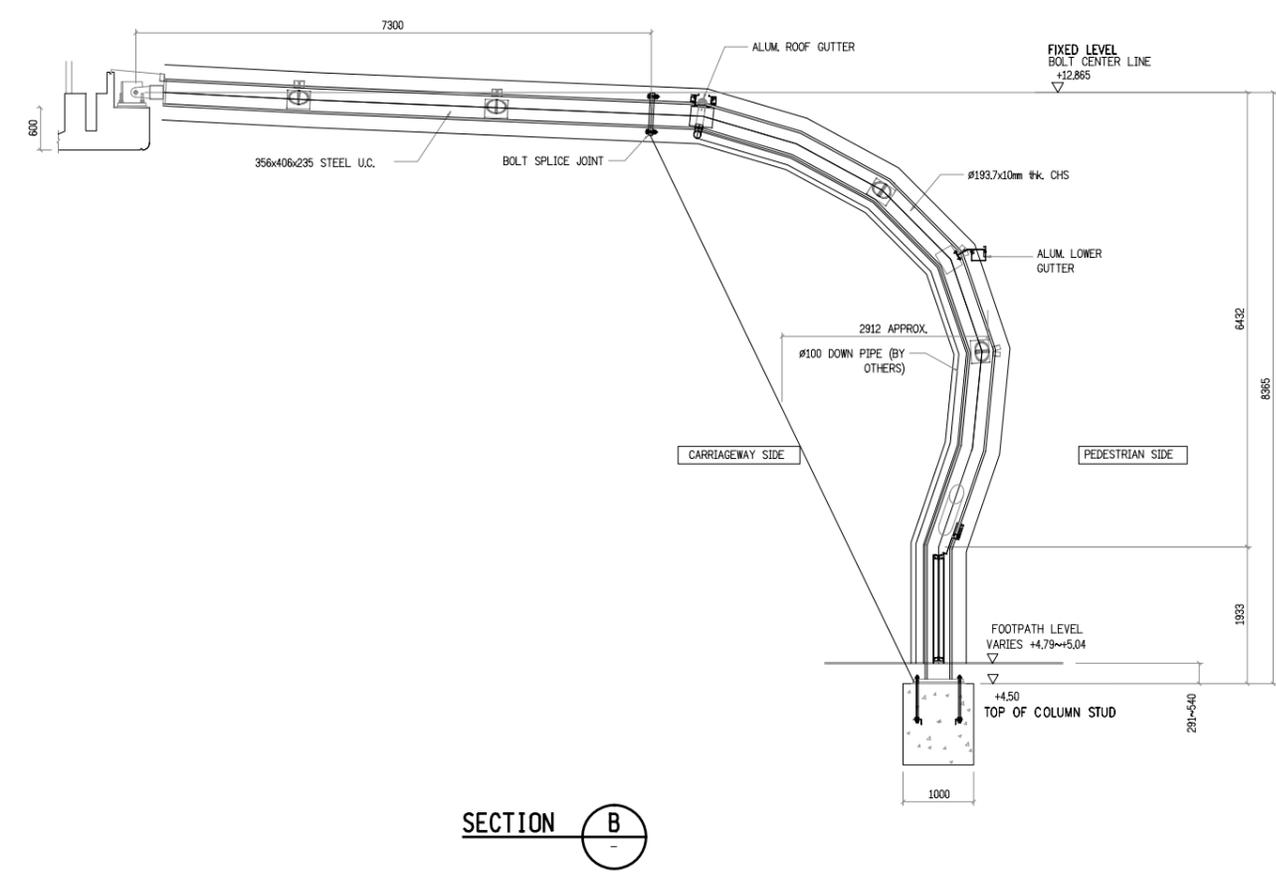
PART ELEVATION 1



PART PLAN 2



SECTION A



SECTION B

Rev.	Description of Revision	Date	Ckd.

Project Manager
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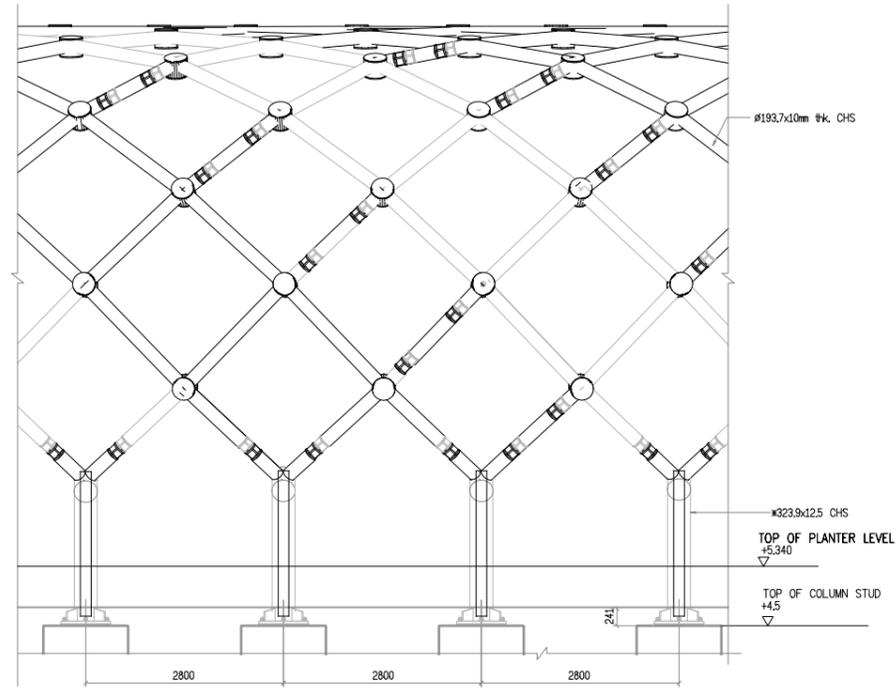
Designed: KST, Drawn: TWN, Checked: KTC
 Approved: Paul Li, ICE, JUL/2019

Project
CONTRACT NO. ED/2018/01
KAI TAK DEVELOPMENT -
STAGE 4 INFRASTRUCTURE AT THE
FORMER RUNWAY AND SOUTH APRON

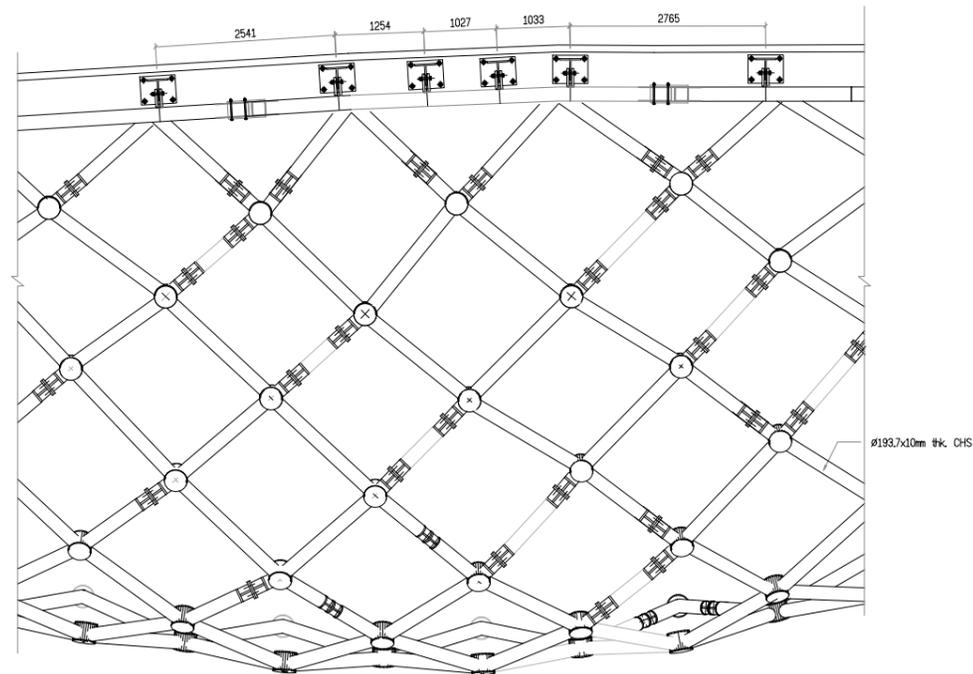
Title
PLAN, ELEVATION, SECTION
STRUCTURE STEELWORK

Scale in A1: 1:50
 A3: 1:100

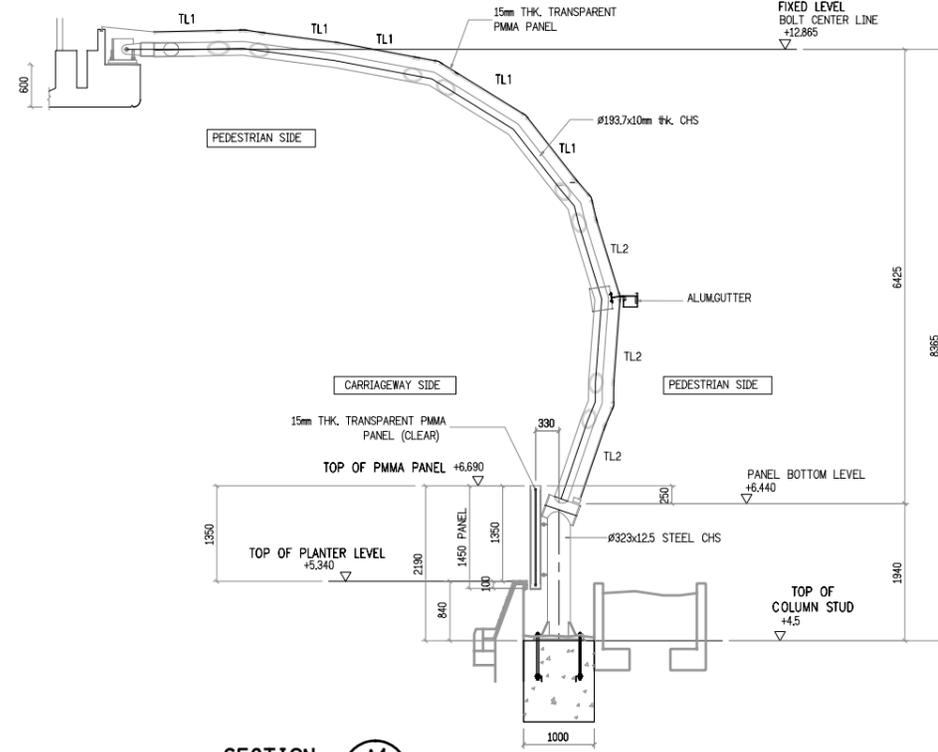
Drawing No. **POC/Q1068/NB/ST/DDA/3302** Rev. **OA**



PART ELEVATION 3

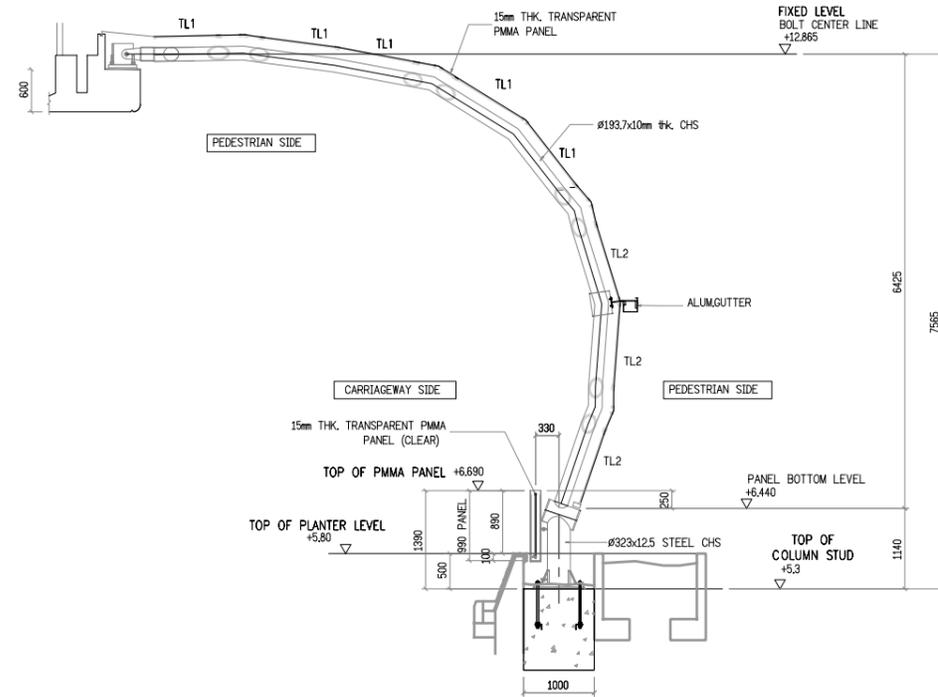


PART PLAN 2



SECTION A1

PROPOSED TOP OF PLANTER LEVEL=+5.35
PROPOSED TOP OF COLUMN STUD=+5.1



SECTION A2

PROPOSED TOP OF PLANTER LEVEL=+5.80
PROPOSED TOP OF COLUMN STUD=+5.3

Rev.	Description of Revision	Date	Ckd.

Project Manager
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Supervisor
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Designed: KST Drawn: TWN Checked: KTC
 Approved: Paul Li ICE JUL/2019

Project
CONTRACT NO. ED/2018/01
KAI TAK DEVELOPMENT -
STAGE 4 INFRASTRUCTURE AT THE
FORMER RUNWAY AND SOUTH APRON

Title
PLAN, ELEVATION, SECTION
STRUCTURE STEELWORK

Scale In A1 1 : 50
 A3 1 : 100

Drawing No. **POC/Q1068/NB/ST/DDA/3303** Rev. **OA**

Contract No. ED/2018/01

Kai Tak development – stage 4 infrastructure at the former runway and south apron

Noise Barriers fronting Site 4B5 Detailed Design Plan of the Traffic Noise Mitigation Measures

Appendix 2

2. ROAD TRAFFIC NOISE IMPACT REVIEW

- 2.1.1 The proposed openings to the noise barriers at Road D3A and Road D4A will not change the road nature, alignment, road surface, gradient, traffic capacity or traffic composition.
- 2.1.2 Given the above information, the only factor that may affect the noise assessment results would be the effectiveness of overlapping noise barriers at the openings of road sections D6, B12, B9, B8, ST9 Bay 1, Bay 4, and Bay 5.
- 2.1.3 According to Section 4.5 of the ‘Guidelines on Design of Noise Barriers’ jointly published by Environmental Protection Department and Highways Department, one face of the parallel barrier provided in front of the openings should be with absorptive material; and length of all parallel barrier provided in front of the openings should be at least several times of the width of the gap/opening ($3x$) or $x + 2y$, where x is the width of the gap and y is the spacing of the two barriers, whichever is larger.
- 2.1.4 The width of opening gap and length of parallel barriers at each opening are summarized in following table:

Table 2.1 Width of Opening Gap and Length of Parallel Barriers at Each Opening

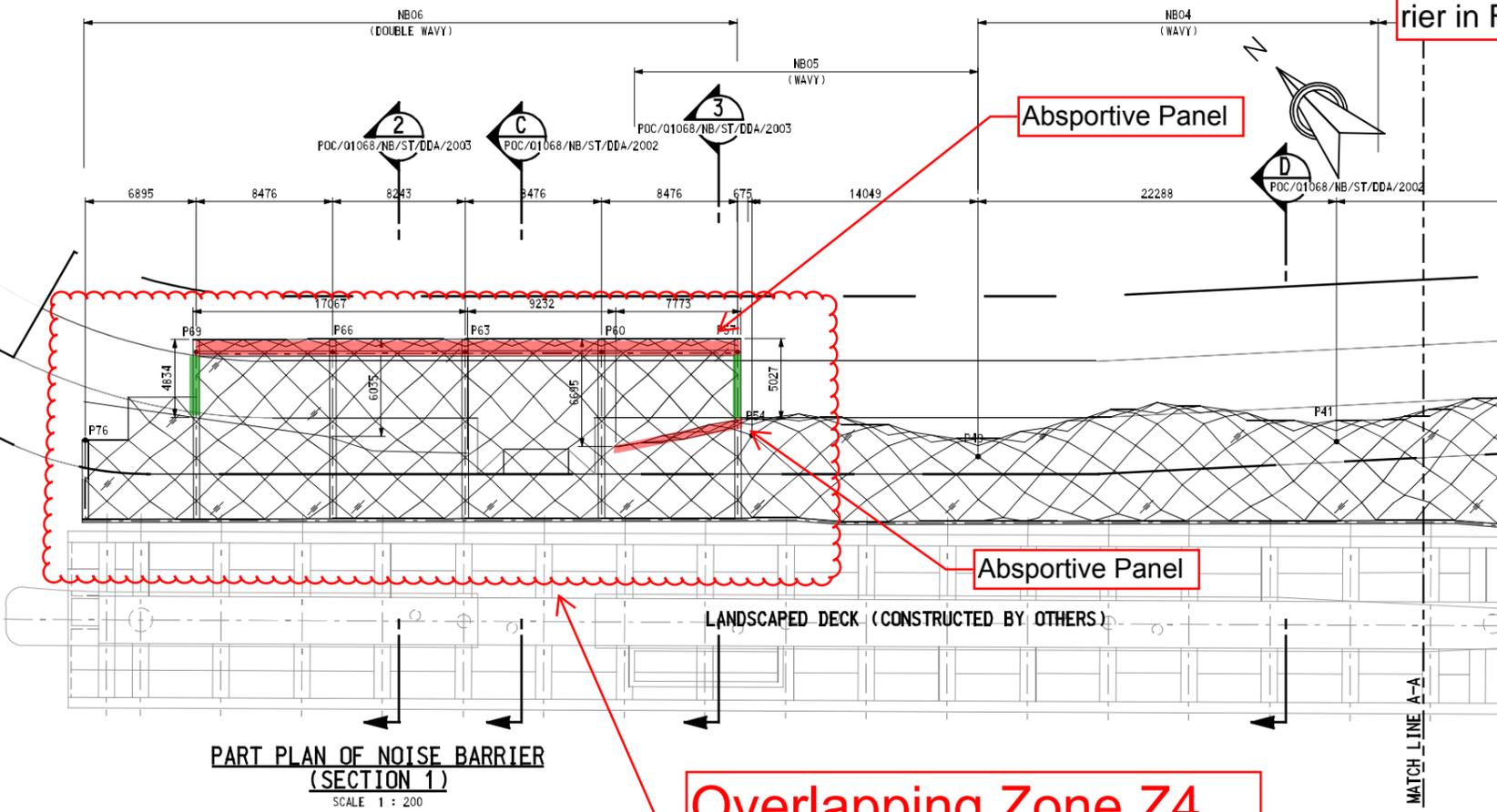
Openings	Width of Opening Gap (m)	Length of Parallel Barriers (m)	Figure Reference
Opening_4 of barrier adjacent to road section D6	6.4	22.4	<i>Figure 2.1</i> Section A
Opening_3 of barrier adjacent to road section B12	7.5	25.2	<i>Figure 2.1</i> Section B
Opening_2 of barrier adjacent to road section B9	3.2	11.2	<i>Figure 2.1</i> Section C
Opening_2 of barrier adjacent to road section B8	6.1	19.6	<i>Figure 2.1</i> Section D
Opening_1 of barrier adjacent to road section ST9 Bay 1	7.5	34.3	<i>Figure 2.1</i> Section E
Opening_5 of barrier adjacent to road section ST9 Bay 4 and Bay 5	5.0	22.9	<i>Figure 2.1</i> Section F

- 2.1.5 The location and design of the proposed noise barriers can be referred to the drawings shown in *Figure 2.1*. The length of overlapping barriers has been designed as at least several times of the width of the gap/opening ($3x$) or $x + 2y$, where x is the width of the gap and y is the spacing of the two barriers, whichever is larger. As such, it is determined that the noise barrier effect is not affected by the design change, and no adverse traffic noise impact would be anticipated with the proposed change.
- 2.1.6 The current design of the overlapping barriers follows the ‘Guidelines on Design of Noise Barriers’ published by the Environmental Protection Department. The length of the overlapping barriers is sufficient to prevent the degradation of acoustic performance. Further, to prevent acoustic performance degradation, a combination of a curved designed and absorptive type panels is proposed in the design of the noise barriers to avoid multiple reflections between parallel barriers. The absorptive panels are proposed to be installed at the lower extent of the overlapping barriers and is detailed in *Figure 2.1*. As such, it is determined that the noise barrier effect is not affected by the design change, and no adverse traffic noise impact would be anticipated with the proposed change.
- 2.1.7 Since the approval of the EIA report, the sites southwest of Road D3A, namely 4A2, 4C1, 4C2, and 4C3 have been rezoned from “Commercial” to “Residential” use. As the proposed openings will not change

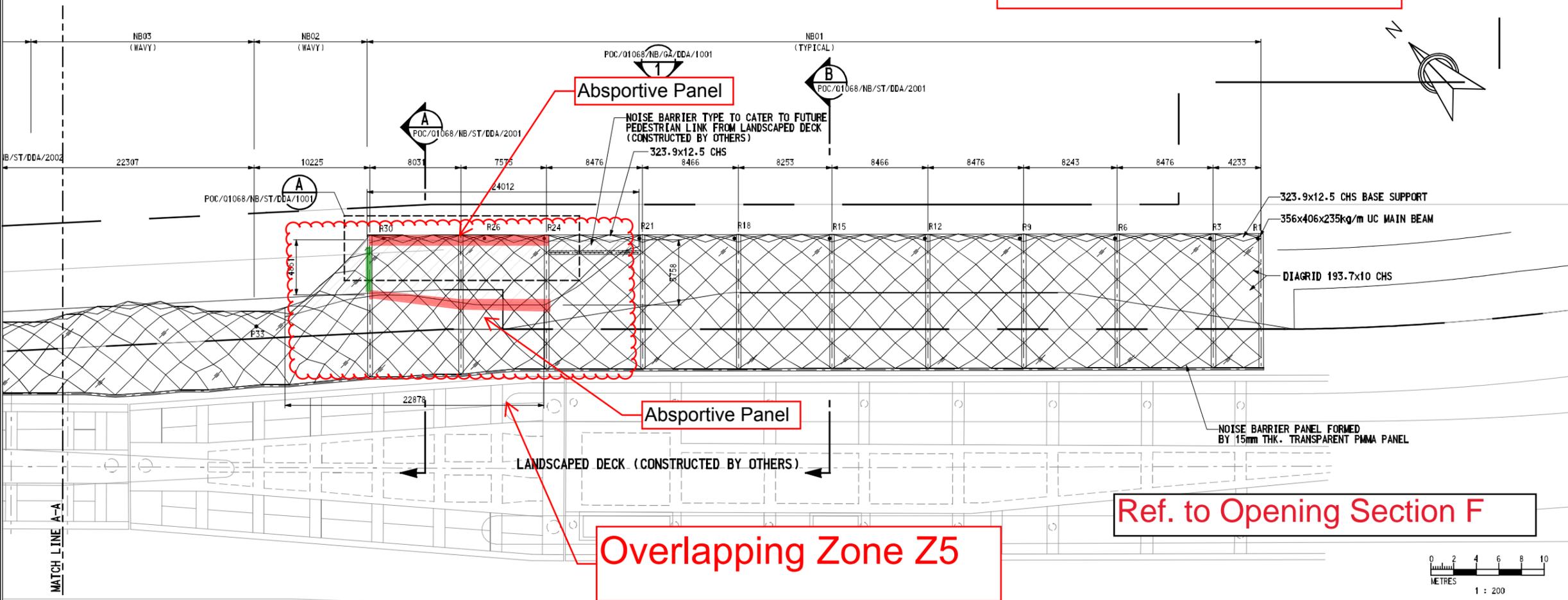
Ref. to Opening Section E

Appendix 2:
Layout Plan of the Noise Bar-
rier in Figure 2.1 of VEP

Opening of Noise Barrier



Overlapping Zone Z4



Overlapping Zone Z5

Ref. to Opening Section F

FOR GENERAL NOTES, REFER TO DRAWING NO. POC/Q1068/NB/GA/DDA/0001-0002.

LEGEND :
--- SITE BOUNDARY

Rev.	Description of Revision	Date	Ckd.

Project Manager
CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT EAST DEVELOPMENT OFFICE

Supervisor
AECOM

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MANNINGS (Asia) Consultants Limited

AD+RG ARCHITECTURE DESIGN AND RESEARCH GROUP LTD
LWK L.A.M. WONG & PARTNERS

Designed	KST	Drawn	TWN	Checked	KTC
Approved				ICE	

Project
CONTRACT NO. ED/2018/01
KAI TAK DEVELOPMENT - STAGE 4 INFRASTRUCTURE AT THE FORMER RUNWAY AND SOUTH APRON

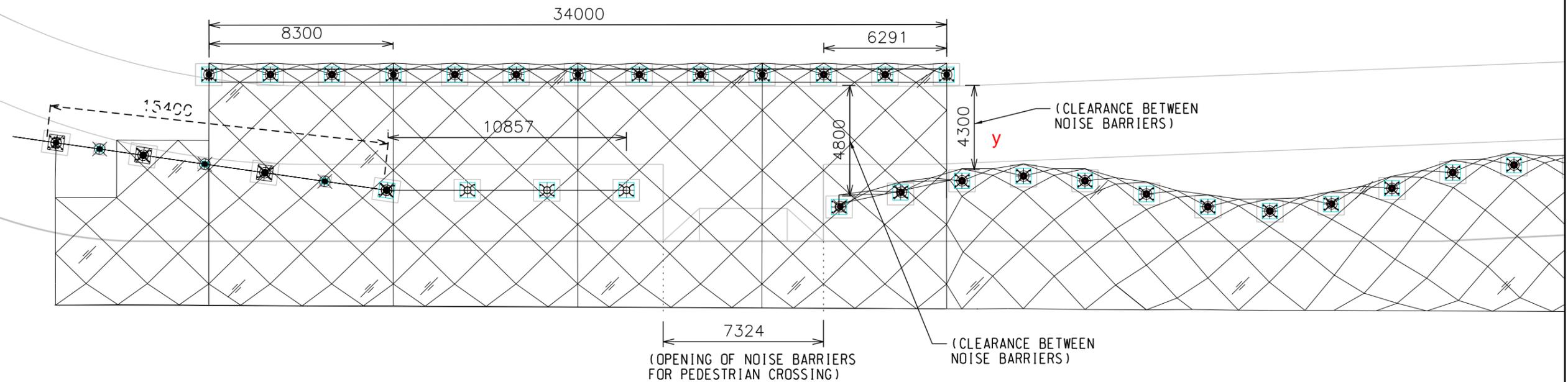
Title
NOISE BARRIER - GENERAL ARRANGEMENT

Scale In A1	1 : 200
A3	1 : 400

Drawing No. POC/Q1068/NB/GA/DDA/0002
Rev. OA



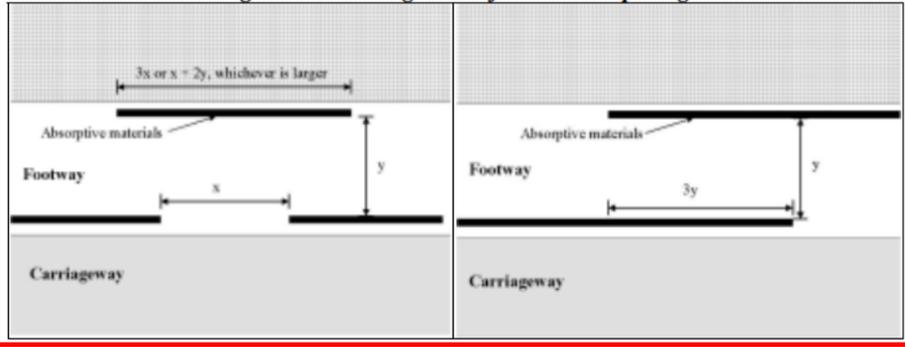
SITE 4B5



Extracted from Guidelines on Design of Noise Barriers

Where access point is to be provided for pedestrian but doors are not practical, then, another section of parallel barrier should be provided in front of the access point to avoid degrading of the acoustic performance. One face of this barrier should be provided with absorptive materials to avoid multiple reflections between parallel barriers. The length of this additional barrier should be at least several times of the width of the gap/opening (3x) or as a rough guide, $x + 2y$, where x is the width of the gap and y is the spacing of the two barriers, whichever is larger. See the figure below for different arrangements at the opening. The exact length required should be worked out during detail design stage having considered standard acoustical principles and practices.

Figure 4.5.1 Arrangement of barriers at opening



$x = 7324\text{mm}$
 $y = 4300\text{mm}$
 $3x = 3 \times 7324 = 21972\text{mm}$
 $x + 2y = 7324 + 2 \times 4300 = 15924\text{mm}$
 Provided $34000\text{mm} > 3x$ and $x + 2y$

SITE 4C5

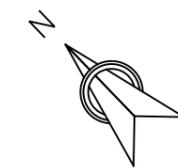


EXTENT OF OVERLAPPING NOISE BARRIERS IN THE VICINITY OF PEDESTRIAN CROSSING

CONTRACT NO. ED/2018/01 - KAI TAK DEVELOPMENT
STAGE 4 INFRASTRUCTURE AT THE FORMER RUNWAY AND SOUTH APRON

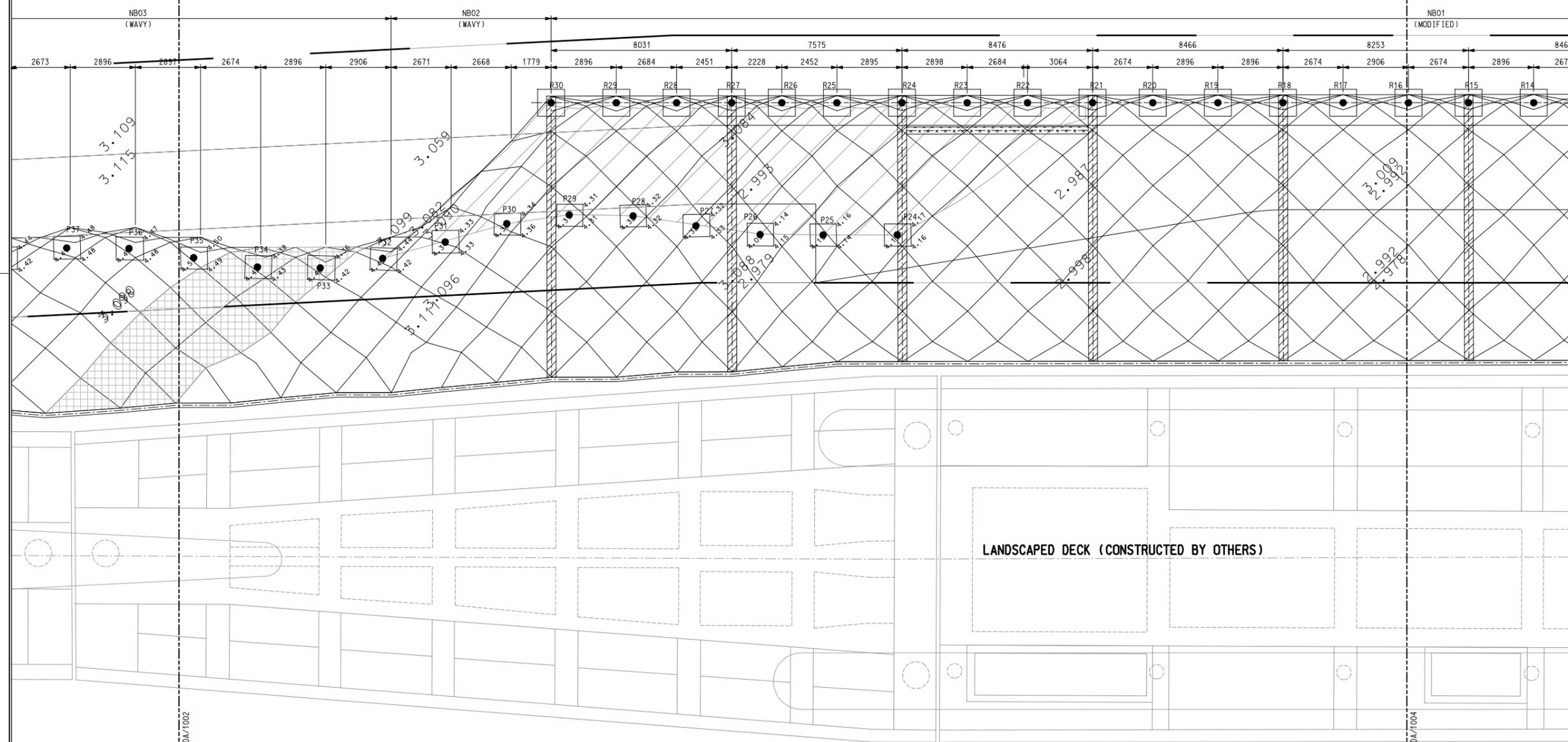
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SCALE	1 : 200 (A3)	DATE	29 SEPT 2021		
DRAWN BY	JY	CHECKED BY	AN	APPROVED BY	CC
SITE SKETCH No. ED201801/SK/067					REV -

Appendix 2: Calculation of Overlapping Length



$y = 5m$
 overlapping length (vertical part) = $15.5m > 3y$
 overlapping length (enclosure part) = $23m > 3y$

- LEGEND :**
- SITE BOUNDARY
 - 356x406x235 UC
 - 193x10 CHS
 - 200x200x10 SHS
 - 323.9x12.5 CHS
 - P57
COLUMN STUD WITH POST



Rev.	Description of Revision	Date	Ckd.

Project Manager
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 五洋建設

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AD+RG architecture design and research group ltd
LWK LANDSCAPE

Designed KST Drawn TWN Checked KTC
 Approved Paul Li ICE JUL/2019

Project
CONTRACT NO. ED/2018/01
KAI TAK DEVELOPMENT -
STAGE 4 INFRASTRUCTURE AT THE
FORMER RUNWAY AND SOUTH APRON

Title
NOISE BARRIER -
SUPERSTRUCTURE
FRAMING PLAN

Scale In A1 1 : 100
 A3 1 : 200
 (SHEET 3 OF 5)

Drawing No. **POC/Q1068/NB/ST/DDA/1003** Rev. **OA**

PART PLAN OF NOISE BARRIER
(SECTION 2)
 SCALE 1 : 100



MATCH LINE B-B
 SEE DRAWING NO. 01068/NB/ST/DDA/1002

MATCH LINE C-C
 SEE DRAWING NO. 01068/NB/ST/DDA/1004

Contract No. ED/2018/01

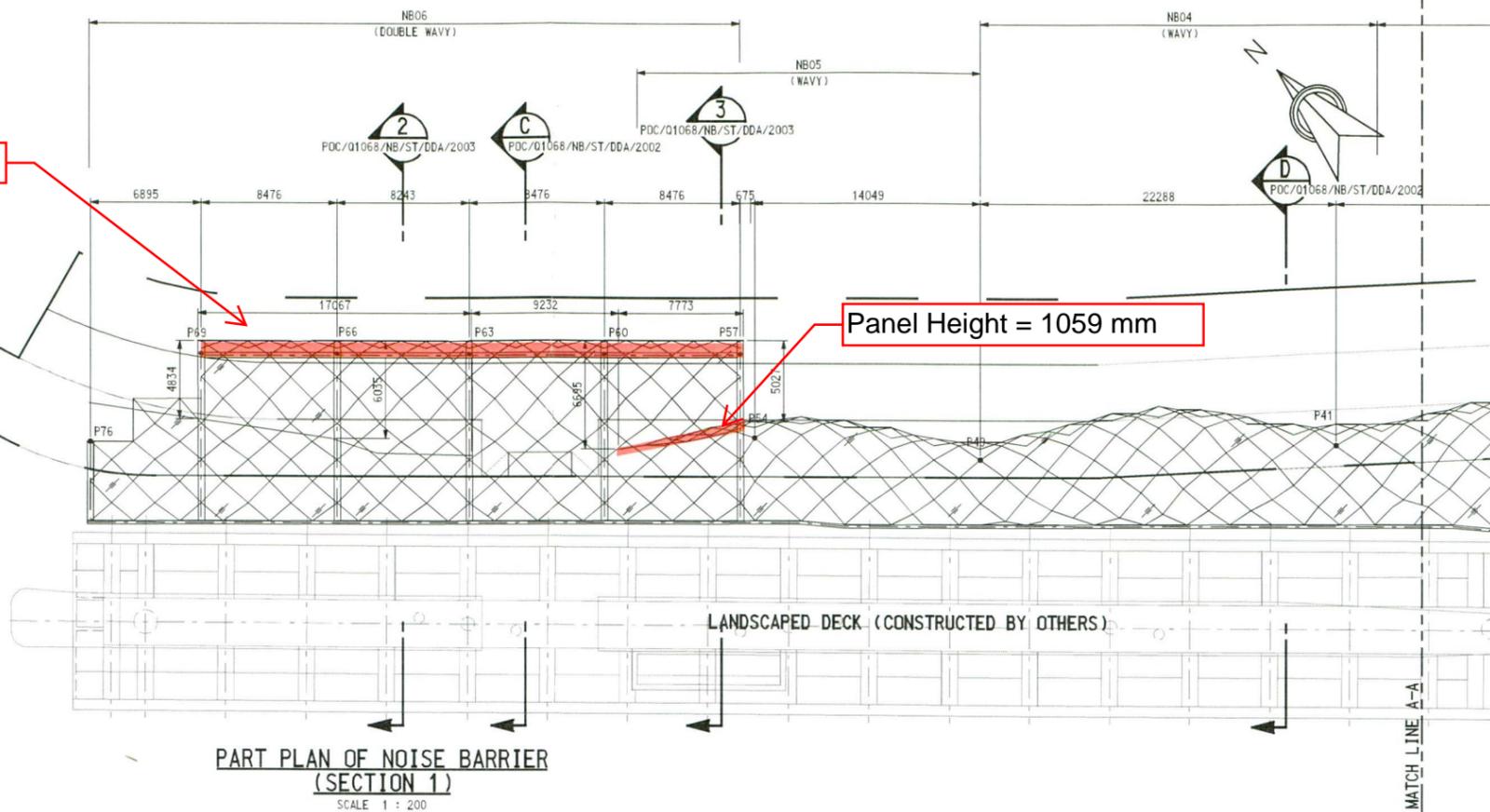
Kai Tak development – stage 4 infrastructure at the former runway and south apron

Noise Barriers fronting Site 4B5 Detailed Design Plan of the Traffic Noise Mitigation Measures

Appendix 3

Panel Height = 934mm

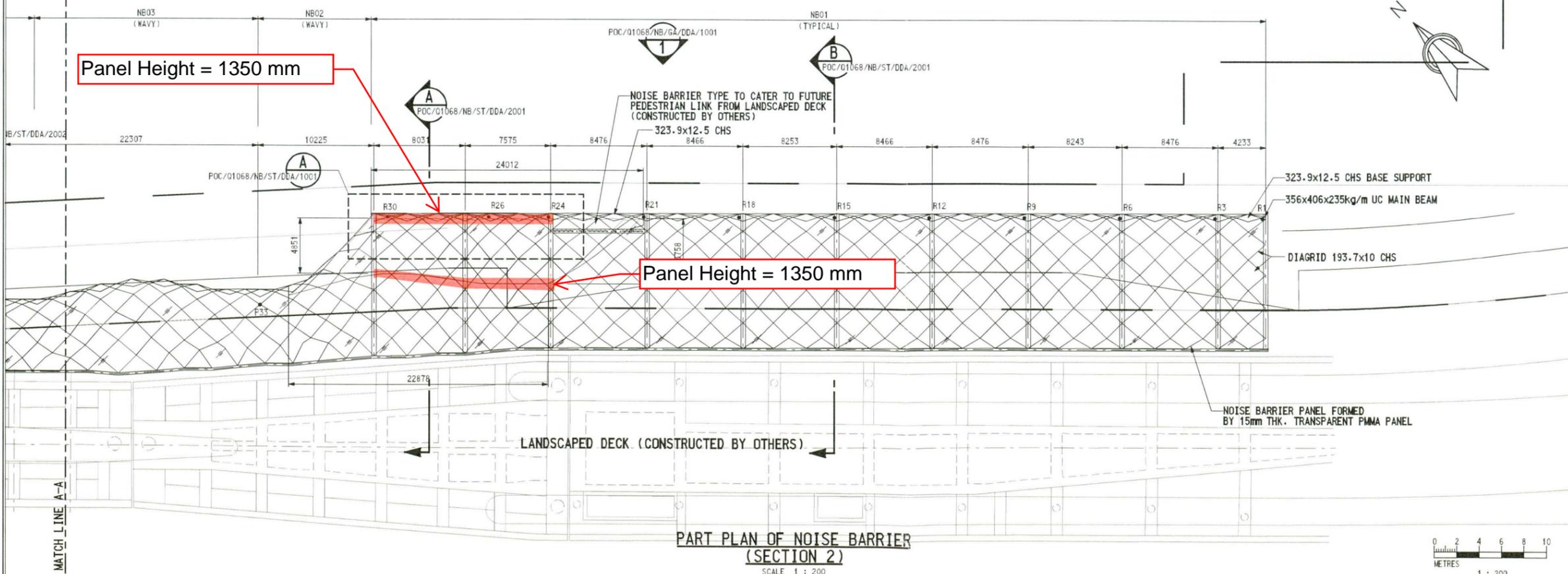
Panel Height = 1059 mm



PART PLAN OF NOISE BARRIER (SECTION 1)
SCALE 1 : 200

Panel Height = 1350 mm

Panel Height = 1350 mm



PART PLAN OF NOISE BARRIER (SECTION 2)
SCALE 1 : 200

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. ALL LEVELS ARE IN MFD METRE ABOVE HONG KONG PRINCIPAL DATUM.
3. FOR GENERAL NOTES, REFER TO DRAWING NO. POC/Q1068/NB/GN/DDA/0001-0002.

LEGEND :

--- SITE BOUNDARY

Rev.	Description of Revision	Date	Ckd.

Project Manager
CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
 EAST DEVELOPMENT OFFICE

Supervisor
AECOM

Contractor
PENTA OCEAN CONSTRUCTION CO. LTD.
 五洋建設

Contractor Designer
MANNINGS (Asia) Consultants Limited

AD+RG architecture design and research group ltd
LWK LANDSCAPE

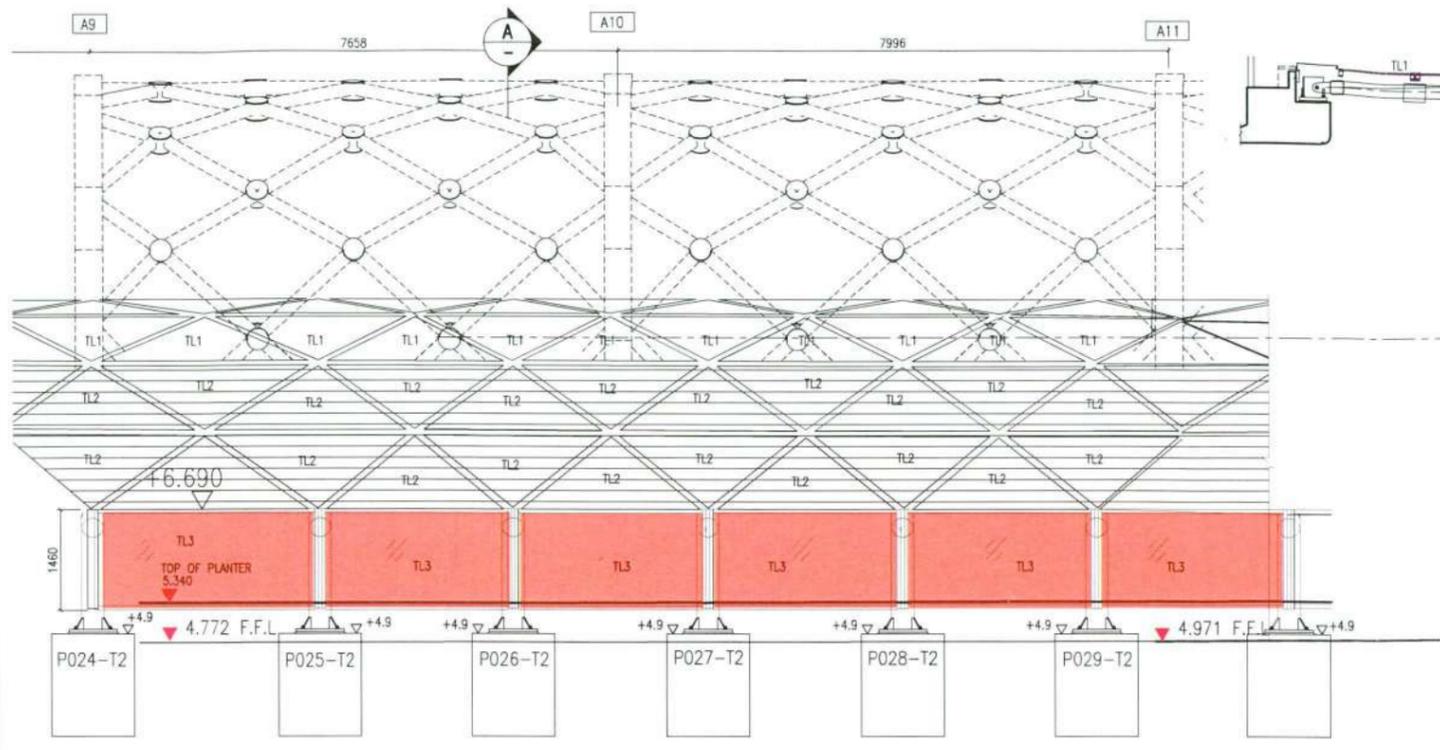
Designed	KST	Drawn	TWN	Checked	KTC
Approved	Paul LT	ICE			

Project
 CONTRACT NO. ED/2018/01
 KAI TAK DEVELOPMENT - STAGE 4 INFRASTRUCTURE AT THE FORMER RUNWAY AND SOUTH APRON

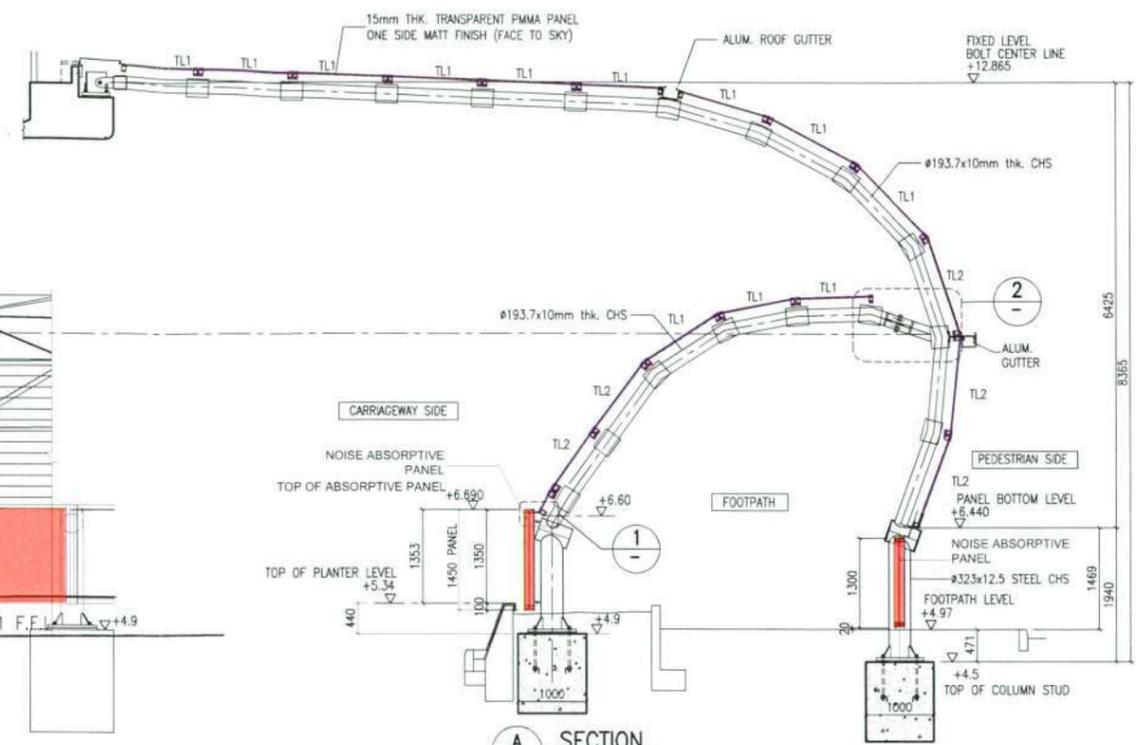
Title
NOISE BARRIER - GENERAL ARRANGEMENT

Scale In A1	1 : 200
A3	1 : 400

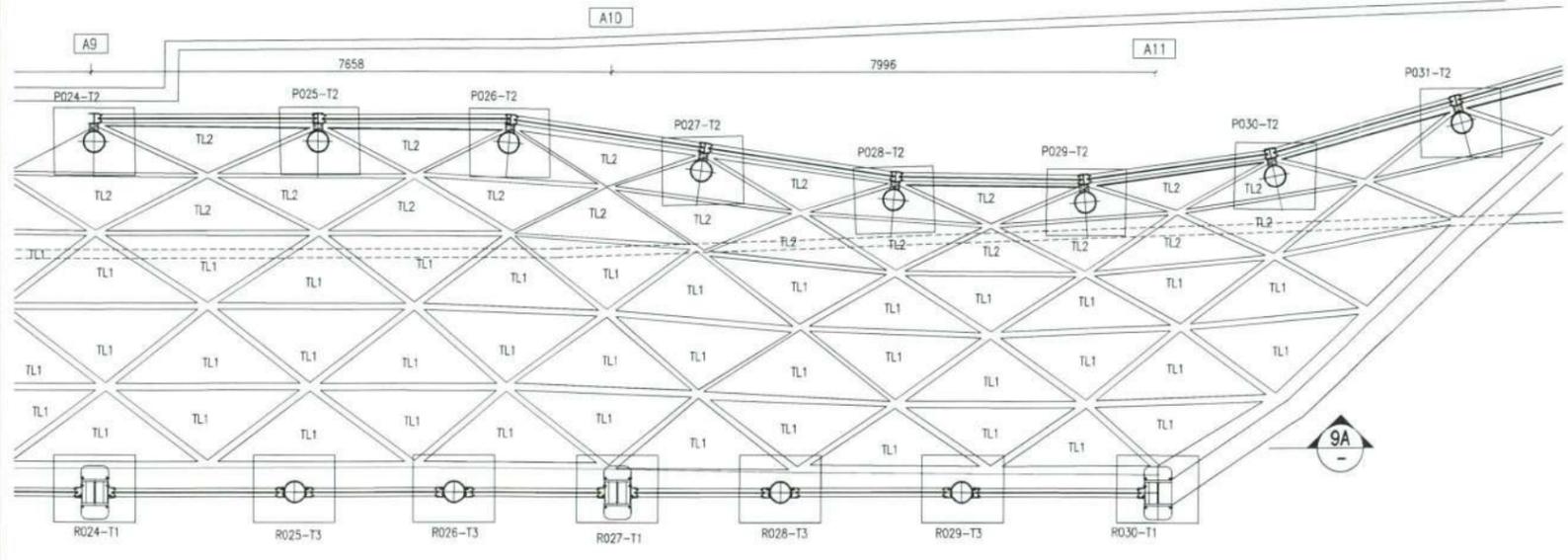
Drawing No. **POC/Q1068/NB/GA/DDA/0002** Rev. **OA**



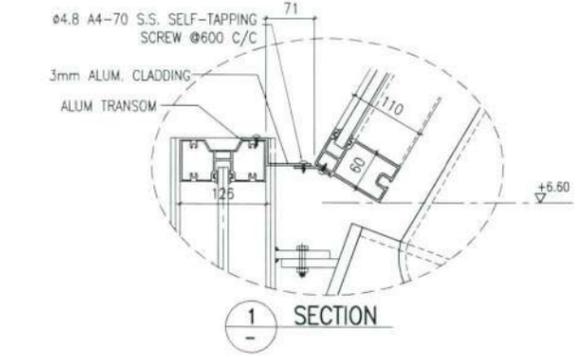
9A PART ELEVATION



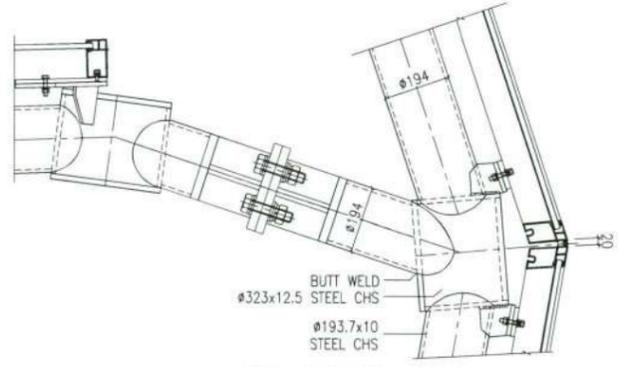
SECTION A



9 PART PLAN



1 SECTION



2 SECTION

LEGEND:

REV.	DESCRIPTION	INITIAL	DATE
C	GENERAL REVISION	LHH	20/10/20
B	GENERAL REVISION	LHH	29/9/20
A	GENERAL REVISION	LHH	5/8/20

PROJECT MANAGER:
 CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
 EAST DEVELOPMENT OFFICE

SUPERVISOR:

CONTRACTOR:

CONTRACTOR DESIGN:

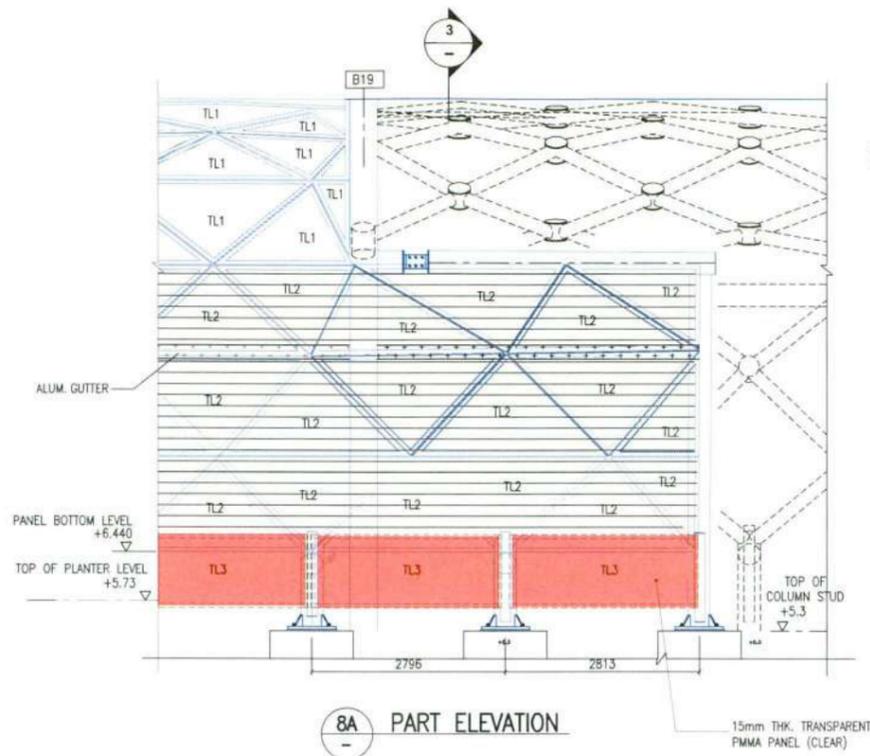
 AD+RG LWK

PROJECT KAI TAK DEVELOPMENT
 STAGE 4 INFRASTRUCTURE AT THE FORMER RUNWAY & SOUTH APRON

TITLE
 PANEL PLAN & SECTION (WAY)

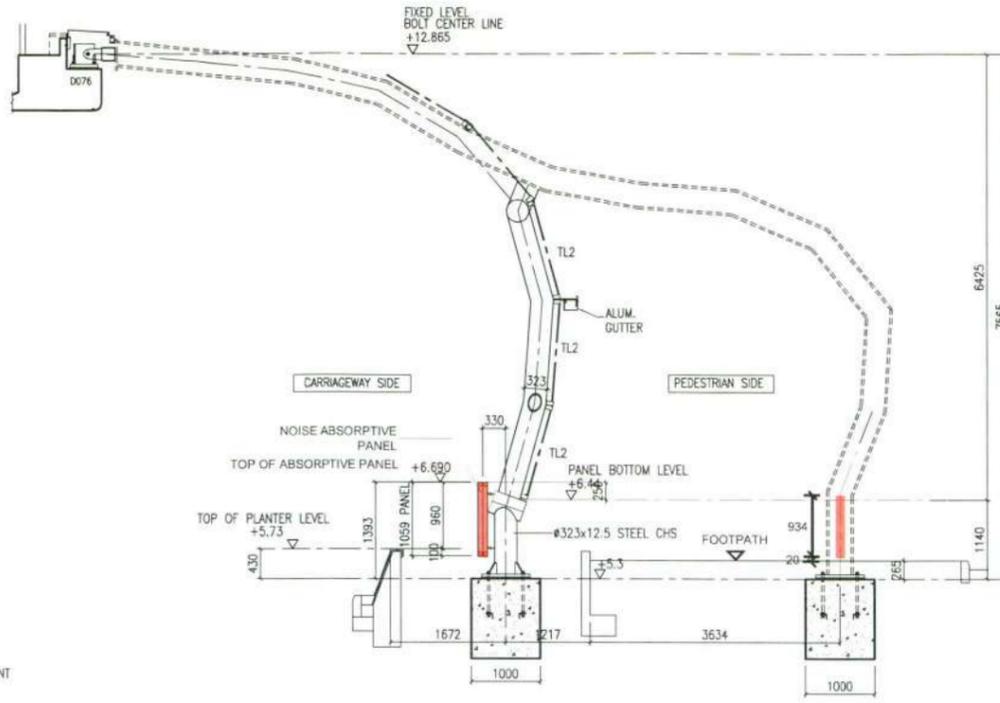
SCALE	1:50 (A1)	DRAWN	LHH
DATE	03APR2020	CHECKED	IVAN LI
DWG. NO.	C2081-NB-E07	REV.	C

KPa ENGINEERING LIMITED



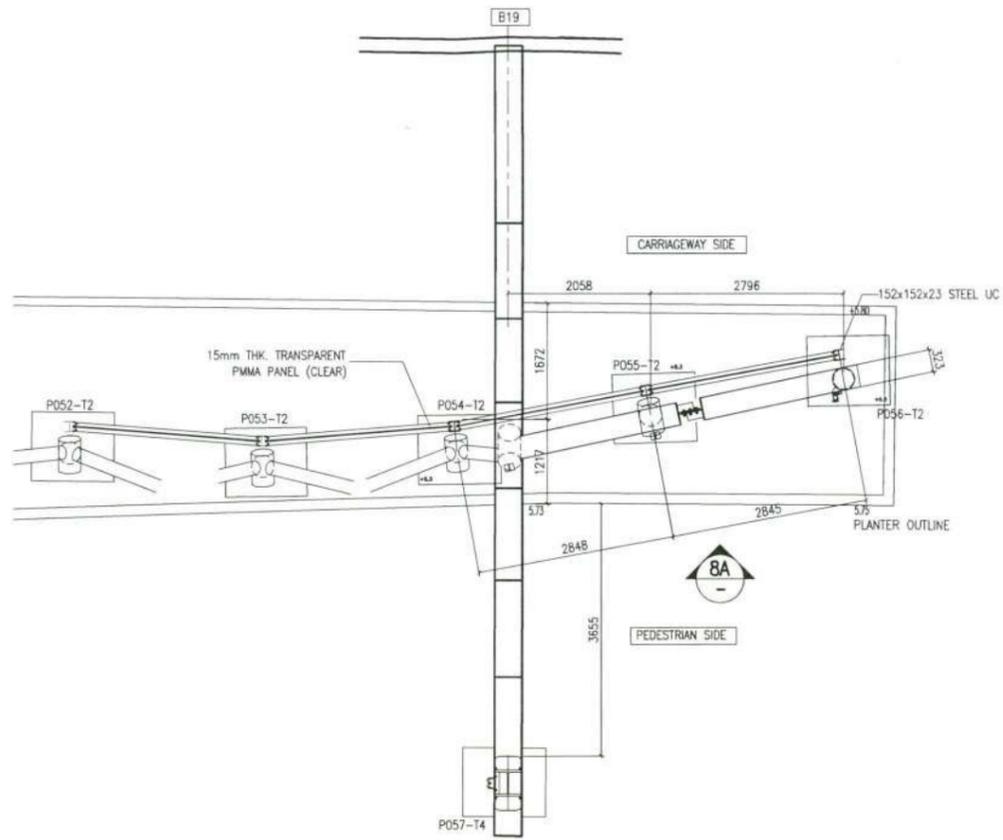
8A PART ELEVATION

15mm THK. TRANSPARENT PMMA PANEL (CLEAR)

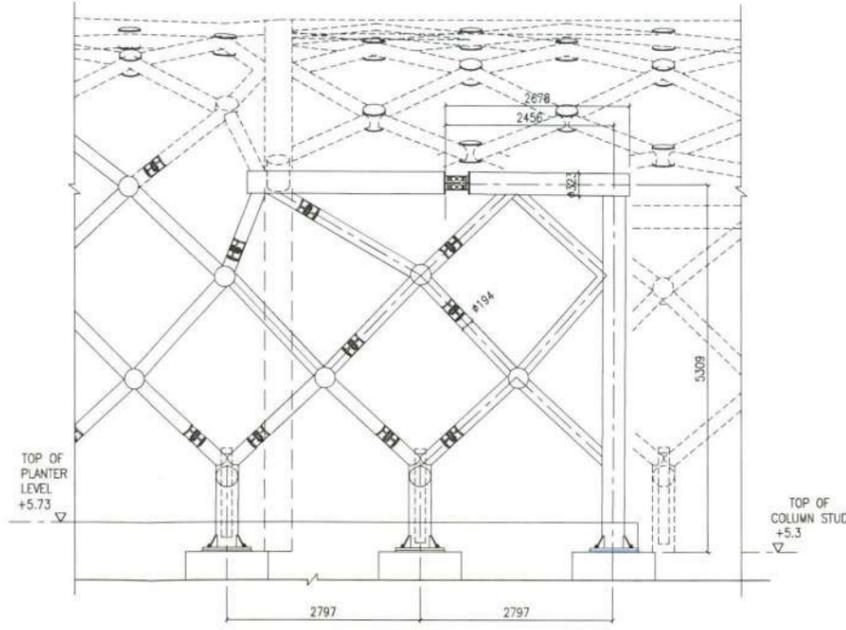


3 SECTION

SECTION 3



8 PART PLAN



8 S02 PART ELEVATION STEEL FRAME

LEGEND:

REV.	DESCRIPTION	INITIAL	DATE
C	GENERAL REVISION	LHH	20/10/20
B	GENERAL REVISION	LHH	29/9/20
A	GENERAL REVISION	LHH	5/8/20

PROJECT MANAGER:
 CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
 EAST DEVELOPMENT OFFICE

SUPERVISOR:

CONTRACTOR:

CONTRACTOR DESIGN:

PROJECT KAI TAK DEVELOPMENT
 STAGE 4 INFRASTRUCTURE AT THE FORMER RUNWAY & SOUTH APRON

TITLE
 PANEL PLAN & SECTION (WAVY)

SCALE	1:50 (A1)	DRAWN	LHH
DATE	03APR2020	CHECKED	IVAN LI
DWG. NO.	C2081-NB-E06	REV.	C

KPa ENGINEERING LIMITED

Contract No. ED/2018/01

Kai Tak development – stage 4 infrastructure at the former runway and south apron

Noise Barriers fronting Site 4B5 Detailed Design Plan of the Traffic Noise Mitigation Measures

Appendix 4

(7) Structural steelwork shall be fabricated and installed by a contractor on the List of Approved Suppliers of Materials and Specialist Contractors for Public Works in the “Structural Steelwork” category.

(8) All detailed designs, drawings and calculations carried out/prepared by the *Contractor* or the appointed designer in connection with the Noise Barrier *works* shall be subject to checking by an Independent Checking Engineer. The Independent Checking Engineer means the person, firm or company employed by the *Contractor*, having a corporate membership of Hong Kong Institution of Engineers or equivalent, and responsible for the independent checking of the *Contractor’s* work, whose qualifications, skill and experience are deemed satisfactory by the *Employer* and who shall be independent of the Designer and the *Contractor*.

MATERIALS

<i>Alternative materials</i>	39.02	The materials used for noise barrier panels shall be PMMA/ Polycarbonate or absorptive type where appropriate. Alternatives which are in full compliance with the requirements of the material may also be considered. Complete details of the proposed alternative material shall be furnished to the <i>Supervisor</i> for acceptance.
------------------------------	-------	--

<i>Transparent noise barrier panels</i>	39.03	<p>(1) Transparent noise barrier panels and their associated fixing details shall be designed by the <i>Contractor</i> to the requirements as stated in Clause 39.13.</p> <p>(2) The panels shall be of proprietary brand and produced by a manufacturer with the relevant requirements in ISO 9001:2008 certification or equivalent. They shall bear the manufacturer’s brush mark.</p> <p>(3) The panels shall be supplied with dimensions to suit the framing arrangement.</p> <p>(4) The panels shall have a weighted sound reduction index of at least 25dB which shall be tested in accordance with ZTV-Lsw 88 or JIS 1416.</p> <p>(5) The panels shall be ultra-violet light resistant.</p>
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<i>Warranty</i>	39.04	The noise barrier panels shall carry a warranty on the properties specified in the Specification. The warranty shall be provided by the <i>Contractor</i> and transferred to the Government of the Hong Kong Special Administrative Region.
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<i>PMMA panels</i>	39.05	<p>(1) (a) Polymethyl Methacrylate (PMMA) transparent noise barrier panels shall be either extruded or cast fully satisfying the ZTV-Lsw 88 noise barrier standard and the requirements of this Specification.</p>
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- (b) The PMMA transparent noise barrier panels shall possess the following properties :
- (i) light transmittance of at least
 - 90% for clear panel.
 - 75% for coloured panel.
 - 68% for translucent panel.
 - (ii) tensile strength of at least 65 N/mm².
 - (iii) modulus of elasticity of at least 2900 N/mm².
 - (iv) fire retardant property complying with the requirements in EN 1794-2 Annex A Class 2.
 - (v) stone impact resistance complying with the requirements in EN 1794-1 Annex C.
 - (vi) impact strength as Class A complying with BS 6206.
 - (vii) no emission of noxious fumes or leachates as a result of fire.

(2) The *Contractor* shall guarantee the panel properties at the end of the 10 -year period, which shall include but not limited to the following :

- (a) light transmittance loss not exceed 5% from the original value.
- (b) tensile strength of at least 50 N/mm².
- (c) modulus of elasticity of at least 2600 N/mm².
- (d) colour difference shall be less than 20 units of ΔE_{ab} to DIN 6174.
- (e) no mottling.
- (f) no loss in acoustic property, fire retardant property and stone impact resistance.

Polycarbonate panels 39.06

- (1) (a) Polycarbonate transparent noise barrier panels shall be coextruded (i.e. fusion), with weather protection on both sides against UV radiation from sunlight and for avoidance of coating failure. Unless specified otherwise in the Specification, requirements in ZTV-Lsw 88 shall be fulfilled.

- (b) The polycarbonate transparent noise barrier panels shall possess the following properties :
- (i) light transmittance of at least
 - 80% for clear panel.
 - 65% for coloured panel.
 - 60% for translucent panel.
 - (ii) tensile strength of at least 55 N/mm².
 - (iii) modulus of elasticity of at least 2100 N/mm².
 - (iv) fire retardant property complying with the requirements in EN 1794-2 Annex A Class 2.
 - (v) stone impact resistance complying with the requirements in EN 1794-1 Annex C or JIS K 6735.
 - (vi) fire spread property complying the requirements of Class 1 or 2 Surface Spread of Flame under BS 476 Part 7.
 - (vii) impact strength as Class A complying with BS 6206.

(2) The *Contractor* shall guarantee the panel properties at the end of the 10 -year period, which shall include but not limited to the following :

- (a) light transmittance loss not exceeding 7% from the original value.
- (b) tensile strength of at least 45 N/mm².
- (c) modulus of elasticity of at least 1800 N/mm².
- (d) yellowing index shall be less than 10 to ASTM D 1925 or JIS 7103.
- (e) no mottling.
- (f) no loss in acoustic property, fire retardant property and stone impact resistance.

Absorptive noise barrier panels 39.07

(1) The absorptive noise barrier panels shall be of both sides highly absorbing noise barrier element comprising, inter alia, front and rear perforated panels and dampening panels both sides with a minimum thickness of 120mm satisfying Sound Absorption Standard to DIN 52212, $\Delta LA_{\alpha, str.} : \min. 8dB$, or accepted products having equivalent functions or performance. The partition between the aluminium perforated panels shall comprise cement bonded wood chipboard, damping panels both sides from 40mm thick rockwool of $100kg/m^3$, front of which covered with black glass fleece.

The absorptive noise barrier panels shall be made of seawater resistant aluminium to DIN 1725/1 with synthetic powder coating. The absorptive noise barrier panels shall comply with Noise Dampening Standard to DIN 52210: $\Delta LA_{R, Str.} : \min. 25dB$ and Noise Barrier Standard to ZTV-Lsw88. The panel manufacturer shall be awarded certification to ISO 9001 and provide a guarantee on retaining of quality satisfying all the requirements in accordance with ZTV-Lsw88 standard throughout a period of 10 years.

(2) The pattern of the perforation on the panels shall be subject to the *Supervisor's* acceptance. The percentage of perforation shall be 30% minimum. The external colours of the absorptive noise barrier panels shall be subject to the confirmation by the *Supervisor*.

(3) The absorptive noise barrier panels and the in-fill materials shall be weather resistant. Repeated cycles of soaking by water and subsequent drying shall not affect the acoustic performance and durability of the panels.

(4) The external and internal acoustical sealing located inside and outside of the absorptive noise barrier panels shall be extruded siliconized Ethylene Propylene Diena Monomer (EPDM) type gasket profile with hardness of 60 degree shore and with quality compatible with the noise barrier panels. Such gaskets shall be supplied by the noise barrier panel manufacturer and supported by an original test report.

Main structural steel frames and mountings 39.08

(1) Main structural steel frames and foundation details shall be designed by the *Contractor*. He shall ensure the compatibility of the frame design with the noise barrier panels.

(2) NOT USED.

(3) All steelworks of noise barriers shall comply with Section 18 of the Specification.

Contract No. ED/2018/01

Kai Tak development – stage 4 infrastructure at the former runway and south apron

Noise Barriers fronting Site 4B5 Detailed Design Plan of the Traffic Noise Mitigation Measures

Appendix 5



Acou || Safe

PRODUCT IDENTIFICATION

AcouSafe is high performance aluminium sound absorptive panels. The powder coating provides durable, weather resistance and wide range of colour choice to client.

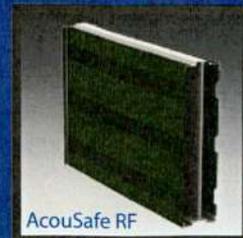
- AcouSafe RF : Sound reflection panel without any perforation
- AcouSafe SS : Sound absorption panel with one side perforation
- AcouSafe DS : Sound absorption panel with both sides perforation
- AcouSafe WL : Sound absorption panel for wall lining
- AcouSafe Roof : Fire breaker/sound reflective panel for roof

ADVANTAGES OF ACOUSAFE

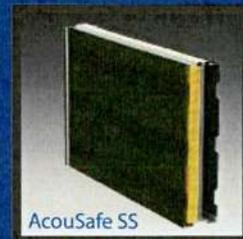
- Stable in strong wind
- Highly dirt resistant
- Low maintenance
- Easy for installation
- Integrated drainage system
- Unlimited possibilities combine with our other elements
- Comply with BS EN 1793 and BS EN 1794

STRUCTURE

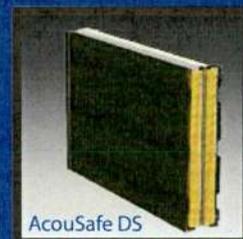
- High rigidity extruded aluminium profiles
- Perforated aluminium corrugation sheet
- Connected by a tongue and groove system
- Dimensions :
 - Max. 5m span
 - Standard 500mm high



AcouSafe RF



AcouSafe SS



AcouSafe DS



AcouSafe WL



AcouSafe Roof

TECHNICAL DATA

	ACOUSAFE RF	ACOUSAFE SS	ACOUSAFE DS	ACOUSAFE WL	ACOUSAFE ROOF
Sound Absorption DLa (dB)	Up to 12				
Sound Insulation DLr (dB)	Up to 24	Up to 30	Up to 30	N/A	Up to 24
Weight (kg/m ²)	16	24 up to 45	27 up to 31	8 up to 12	22 up to 25

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E-mail : ftsgz@fugro.cn
Website : www.fugro.cn



Client Ref. : -

Page 1 of 3

Report No. : 171167FU170041

**REPORT ON NON-COMBUSTIBILITY TEST FOR BUILDING PRODUCTS****Information Supplied by Client**

Client : KPA ENGINEERING LTD
 Client Address : 1907-1915, THE OCTAGON, 6 SHA TSUI ROAD, TSUEN WAN, N.T., H.K.
 Project : TUEN MUN NB
 Location : --
 Sample Description : FIRE BREAKER PANEL
 For details, see Appendix A

Laboratory Information

Lab. Sample I.D. : FU170041
 Date Received : 24/05/2017
 Date Test Started : 25/05/2017
 Date Test Completed : 26/05/2017
 Test Method : BS 476:part 4:1970 (AMD 2483 and 4390)

Test Results

Lab. Sample I.D.	FU170041/1	FU170041/2	FU170041/3	Specification of non-combustibility on BS 476:part 4:1970 Cl. 8
Time of flame continuously (s)	0	0	0	<10
Temperature rise of furnace above initial furnace temperature (°C)	0	2	1	<50
Temperature rise of specimen centre above initial furnace temperature (°C)	0	0	0	<50

Conclusion: The test results comply with the requirement of BS 476:part 4:1970 and the sample is deemed non-combustible.

Remarks: 1. The sample was not sampled by FTSGZ and the test results relate only to the sample(s) tested.
 2. The photos of sample are shown on pages 3 of this report.

Checked by: ChenDate: 06/06/2017Approved Signatory: J. CaiDate: 06/06/2017

FU-R-1(31/05/2014)

Yan Cai Sheng (Chief Engineer)

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Client Ref. : -
Report No. : 171167FU170041

Page 2 of 3

REPORT ON NON-COMBUSTIBILITY TEST FOR BUILDING PRODUCTS

Appendix A - Sample Details

(Unless stated otherwise, all values are nominal, and all information in this Sample Details supplied by the sponsor.)

Name and address of the sponsor	KPA ENGINEERING LTD 1907-1915, THE OCTAGON, 6 SHA TSUI ROAD, TSUEN WAN, N.T., H.K.
Name and address of the manufacturer/supplier	ACOU SYSTEM LTD 1907-1915, THE OCTAGON, 6 SHA TSUI ROAD, TSUEN WAN, N.T., H.K.
General description	ALUMINIUM FIRE BREAKER
Brand Name	Nil
Model	ACOUSAFE ROOF FIRE BREAKER PANEL
Product reference	Nil
Generic type of product	Nil
Material & composition for composite product	ALUMINIUM
Nominal thickness	Nil
Nominal density	Nil
Nominal mass per unit area	Nil
Colour	White

FU-R-1(31/05/2014)

The Hong Kong Accreditation Service (HKAS) has accredited Fugro Technical Services (Guangzhou) Limited (Reg. No. 170-TEST) under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories. The results shown in this report were determined by this laboratory in accordance with its terms of accreditation. The copyright of this report is owned by Fugro Technical Services (Guangzhou) Limited. It may not be reproduced except with prior written approval from the issuing laboratory.

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Client Ref. : -
Report No. : 171167FU170041

Page 3 of 3



REPORT ON NON-COMBUSTIBILITY TEST FOR BUILDING PRODUCTS



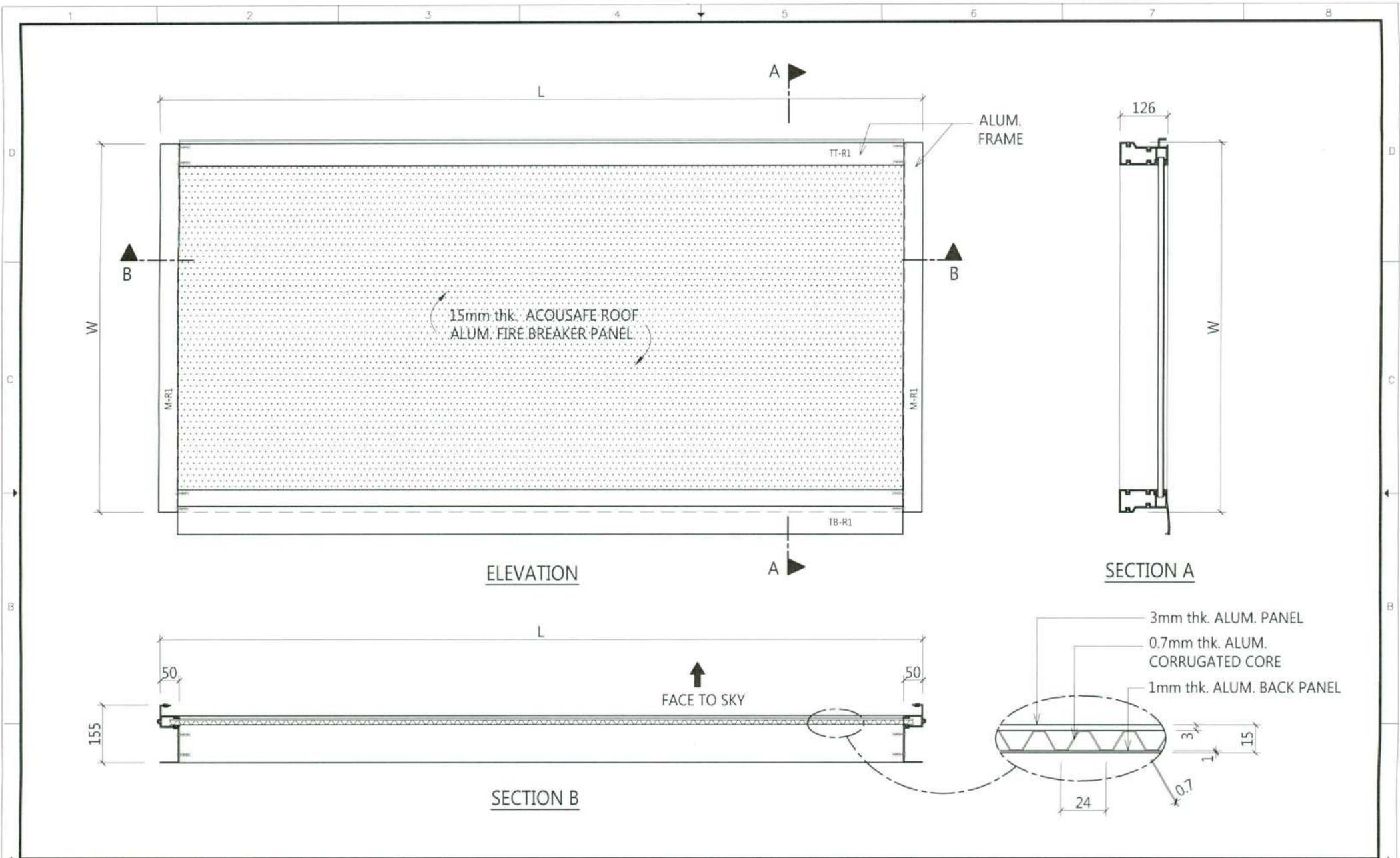
Before test - Sample ID: FU170041



After test - Sample ID: FU170041

**** End of Report ****

FU-R-1(31/05/2014)



Project :		Noise Barrier Project							
Panel Type :	AcouSafe Roof Fire Breaker Panel	Coating	POWDER COATING	Colour	Mark No.	F1	QTY.		
DWG. No.	NB-F1	Rev.	Scale	N.T.S.	Date	DEC 2015	Drawn by	CAD	Approved by