



Engineering & testing

Railing Masters guard systems are supported by independent field load testing and P.Eng-stamped detail packages. This page publishes the measured results in full.



REVIEWED & STAMPED

PEO 100206138

31 July 2025

STAMPED REVIEW

F. Alibai, P.Eng. · PEO 100206138

Review by JRAMCO Inc. for the sole purpose of framing, glass and anchor structural adequacy, in general conformance with OBC and CDS.

DESIGN WIND LOAD

2.0 kPa

POST SPACING

1080 mm

POST HEIGHT

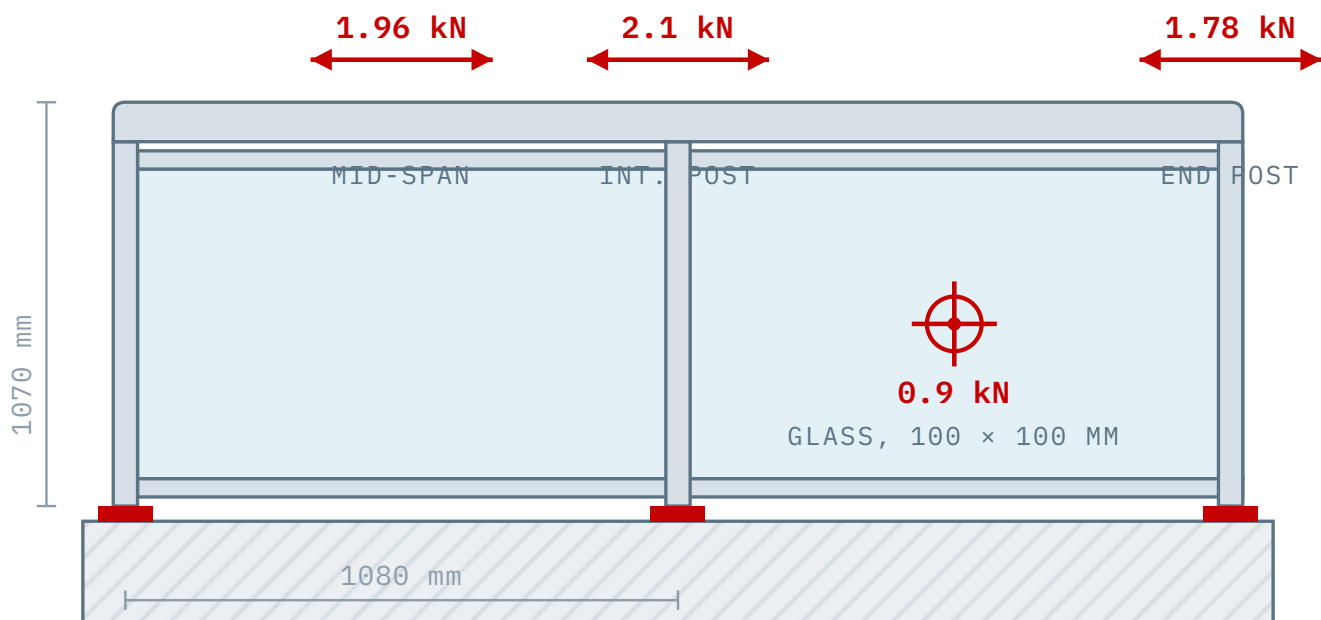
1070 mm

Drawing packages are project-generic. For a specific project, design is to be reviewed and approved by the project's professional engineer.

FIELD LOAD TEST · REPORT RT25-330-1111-01

All seven load cases passed.

Static load testing performed by JRAMCO Inc. at 110 Claireport Crescent, Unit 4, Etobicoke, Ontario on 11 November 2025, in general conformance with ASTM E935-13 and ASTM E985.



Where the loads were applied. Horizontal loads at guard height, inward and outward, at an intermediate post, an end post and the top rail at mid-span; the glass load over a 100 x 100 mm area at panel centre. Guard height 1070 mm, post spacing 1080 mm.

Intermediate post Outward · Table 1A		PASS
Intermediate post Inward · Table 2A		PASS
Top rail, mid-span Outward · Table 1B		PASS
Top rail, mid-span Inward · Table 2B		PASS
End post Outward · Table 1C		PASS
End post Inward · Table 2C		PASS

— marks the OBC 4.1.5.14 minimum of 1.0 kN. Bars show the load actually applied.

Glass infill: concentrated load

Tested at 0.9 kN against a 0.5 kN code requirement, applied over a 100 mm × 100 mm area at panel center.

APPLIED LOAD 0.9 kN (203 lb)	CODE MINIMUM 0.5 kN
NET DEFLECTION 2.09 mm	RESIDUAL 0.09 mm

No cracking, delamination or distress at glass holders, channels or mechanical connections.

Test assembly

- Structural aluminum posts and top rail manufactured by Hydro Extrusions
- Laminated glass infill panels
- Mechanically fastened structural connections
- Mechanical anchorage into reinforced concrete slab

ANCHOR Hilti KB3 wedge anchor, ½" × 4½"	EMBEDMENT 3" (76 mm)
SUBSTRATE 6" reinforced concrete slab	

MEASURED DEFLECTION

A fraction of what the standard allows.

Deflection limits per CSA A500-16, Clause 5.5.1.6. Lower is better; the bar shows measured deflection as a share of the allowable limit.

TABLE	ELEMENT	DIRECTION	APPLIED	DEFLECTION	ALLOWABLE	UTILIZATION	
1A	Intermediate post	Outward	2.1 kN	26 mm	89 mm		29
2A	Intermediate post	Inward	2.1 kN	27.5 mm	89 mm		31
1B	Top rail, mid-span	Outward	1.96 kN	36 mm	56 mm		64
2B	Top rail, mid-span	Inward	2.1 kN	36.5 mm	56 mm		65
1C	End post	Outward	1.78 kN	30.5 mm	89 mm		34
2C	End post	Inward	1.78 kN	19 mm	89 mm		21
C	Glass infill, center	Outward	0.9 kN	2.09 mm	—	Serviceability: minimal	

Test configuration: guard height 1070 mm, post spacing 1080 mm. Deflections measured with calibrated laser displacement equipment.

STANDARDS

Tested and designed to

ASTM E935-13	Performance of Permanent Metal Railing Systems
ASTM E985	Specification for Permanent Metal Railing Systems
OBC 4.1.5.14	Ontario Building Code (2012), Loads on Guards
CSA A500-16	Deflection criteria, Clause 5.5.1.6
CSA S157	Strength design in aluminum

CODE REQUIREMENTS

OBC 4.1.5.14, loads on guards

- 0.75 kN/m or 1.0 kN concentrated load, whichever governs, applied horizontally at guard height
- 0.5 kN concentrated load applied over a 100 mm × 100 mm area to individual elements (glass infill)
- Specified wind load pressure of 2.0 kPa
- Vertical load provisions reviewed per OBC Clause 4.1.5.14(4)

PROCEDURE

How the test was run

- Horizontal loads applied incrementally and held until stabilization was achieved
- A preload of approximately 50% of target load applied and released prior to final loading, to assess residual deflection
- Deflections measured using calibrated laser displacement equipment
- Loads increased gradually to the maximum calculated design load, then released to observe permanent deformation or connection distress

OBSERVATIONS

What was recorded

- Measured deflections remained within allowable limits for all load cases
- Residual deflection after load release was within acceptable tolerances
- No structural failure, cracking, yielding, loosening or disengagement of posts, anchors, top rail, glass panels or mechanical connections was observed
- Glass infill panels resisted the specified 0.5 kN concentrated load without damage or instability
- Load–deflection behavior was linear and stable throughout each test

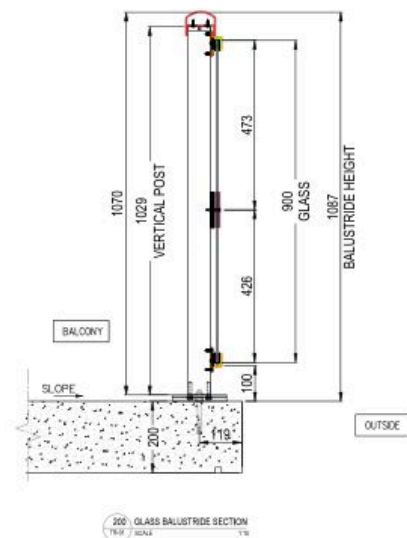
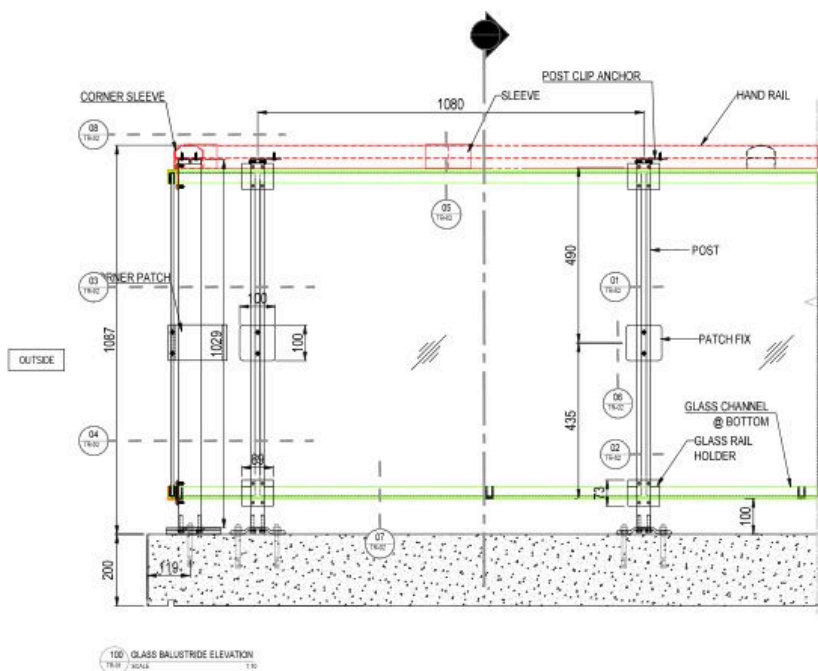
Based on field testing observations and measured performance, JRAMCO Inc. confirms that the tested Railing Masters Inc. aluminum balcony guardrail system complies with the structural performance requirements of the Ontario Building Code (2012) and applicable ASTM standards. The system demonstrates adequate strength, stiffness, and connection integrity under prescribed service loads and is considered structurally satisfactory for its intended application.

— JRAMCO Inc., Field Test Report RT25-330-1111-01. Certified mill test reports from Hydro Extrusions are available on request and confirm that all aluminum extrusions supplied are within specified alloy and temper tolerances and meet applicable material standards.

STAMPED PACKAGES

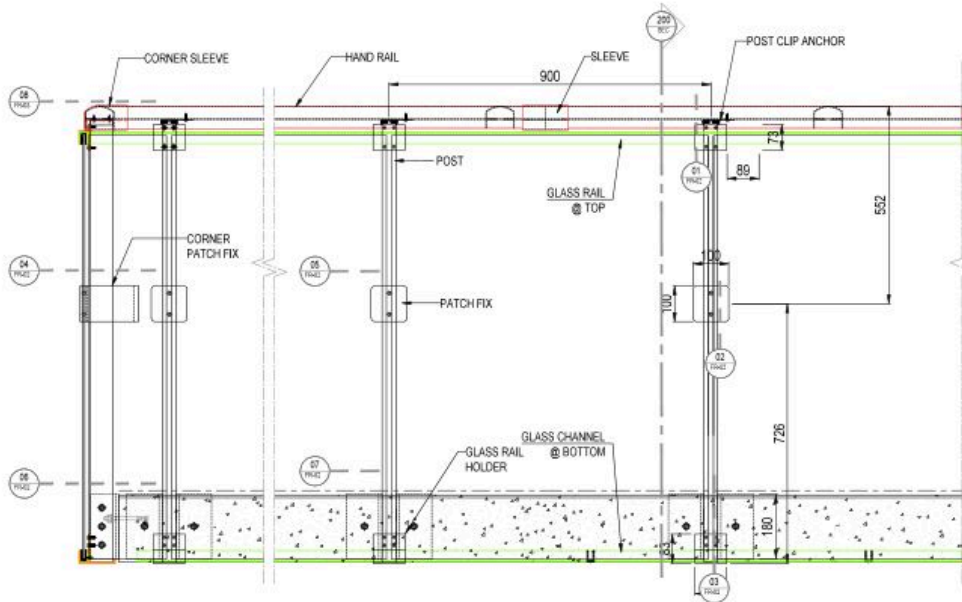
Four detail sets, reviewed and stamped.

Elevation and section sheets from each package. The full sets, with connection details and materials lists, are on the resources page.

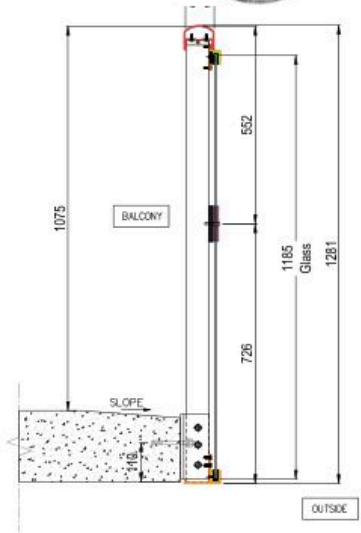


RAILING MASTERS INC. 719 CLAREMONT CRESCENT UNIT #4 ETOBICOKE, ON M9B 6P3 1 (416) 238-7368 info@railingmasters.ca	PROJECT:	CLIENT:	NOTES	REVISIONS	DRAWING NO.	ISSUED TO:	DRAWING TITLE	REVISION
	DESIGN ARCHITECTS:	STRUCTURAL CONSULTANT:	1. ALL DIMENSIONS ARE IN MILLIMETERS. 2. ALL LEVELS ARE IN METERS UNLESS OTHERWISE NOTED.	NO. DATE DESCRIPTION	TR-01	☐ CONCEPT ☐ TEND ☐ P/LC DRAWING ☒ SHOP DRAWING ☐ ADVANCE COPY ☐ FOR REFERENCE	TOP OF SLAB RAILING ELEVATION AND SECTION	01 PROJECT NO.
				00 17-01-2025 INITIALS: TOP OF SLAB BALUSTRADE DRAWING	DRAWN BY:			
				01 21-01-2025 UPDATES AS PER NEW CORNER DETAIL AND GLASS	CHECKED BY:			
					APPROVED BY:			
			DATE OF ISSUE				SHEET SIZE - A3 SCALE AS SHOWN	

TOP OF SLAB RAILING · SHEET TR-01 / TR-02 · REV. 01



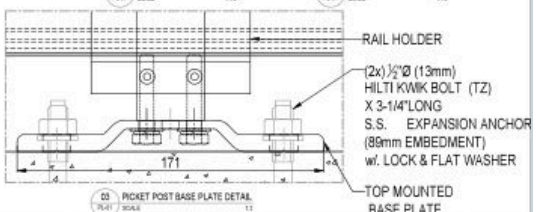
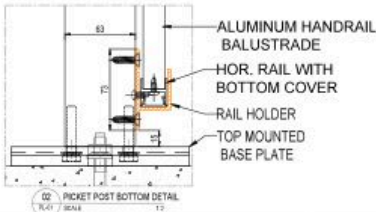
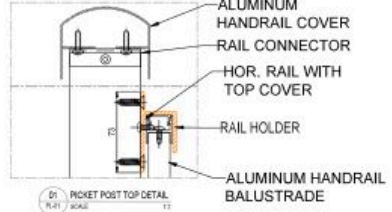
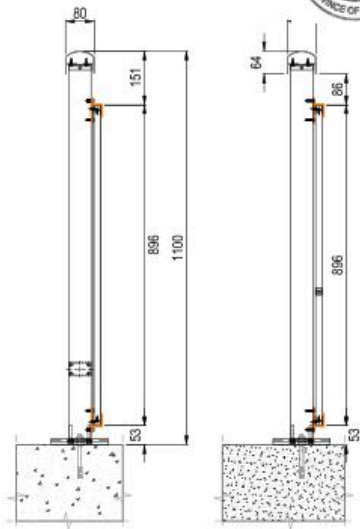
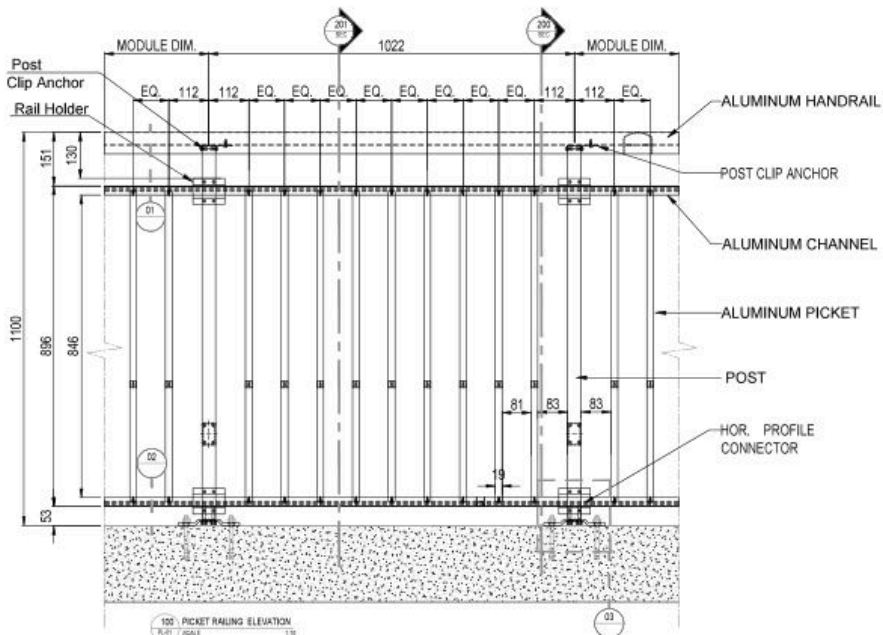
100' FACE MOUNTED GLASS BALUSTRADE ELEVATION
1:10 SCALE



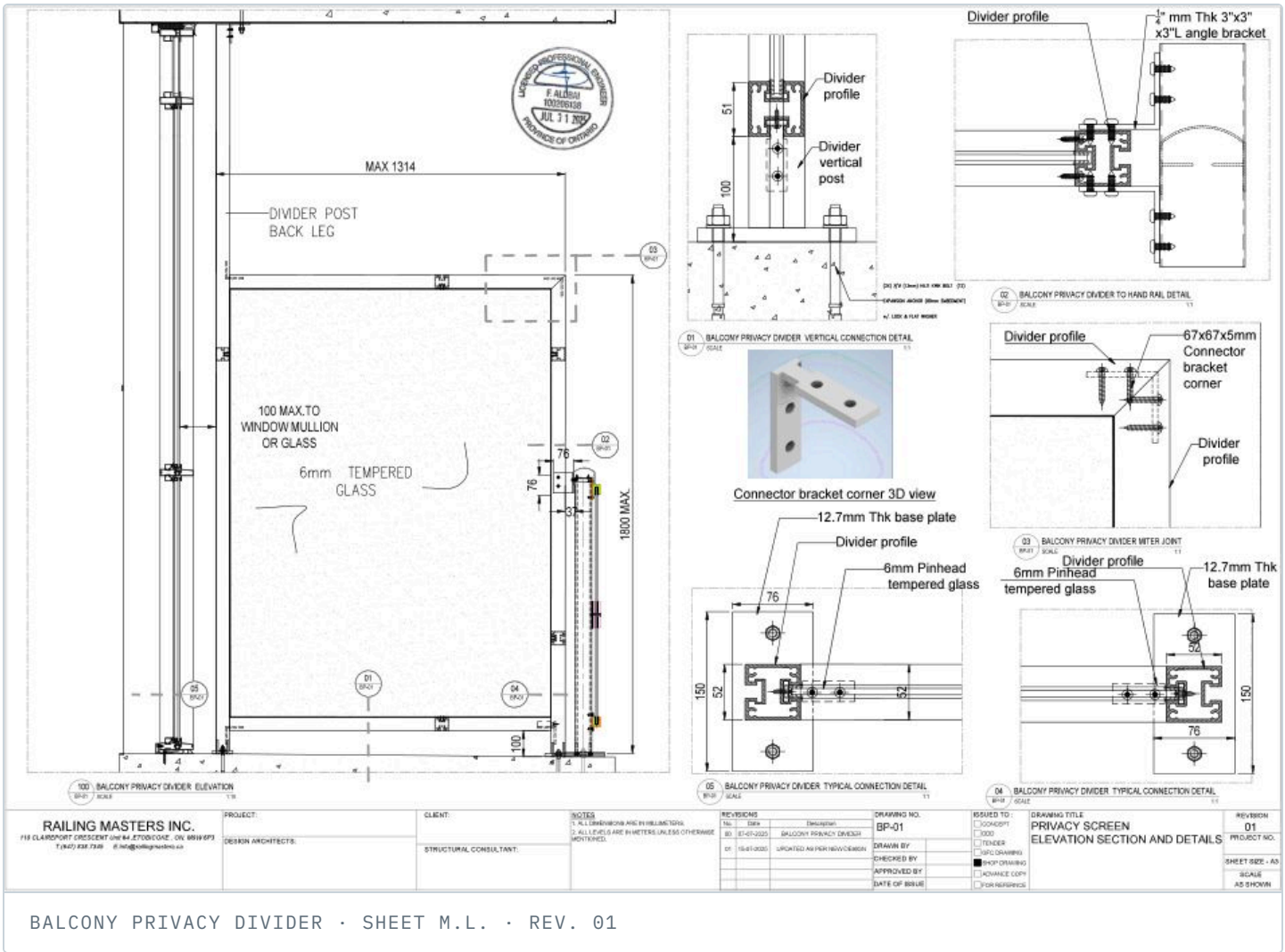
200' FACE MOUNTED GLASS BALUSTRADE SECTION
1:10 SCALE

RAILING MASTERS INC. 719 CLAREMONT CRESCENT UNIT 84 ZIMMERMAN, ON M9B 6P3 T (416) 233-7338 E info@railingmasters.ca	PROJECT:	CLIENT:	NOTES	REVISIONS	DRAWING NO.	ISSUED TO:	DRAWING TITLE	REVISION
	DESIGN ARCHITECTS:	STRUCTURAL CONSULTANT:	1. ALL DIMENSIONS ARE IN MILLIMETERS.	No. Date Description	FR-01	☒ CONCEPT	FACE OF SLAB RAILING ELEVATION AND SECTION	02
			2. ALL LEVELS ARE IN METERS UNLESS OTHERWISE NOTED.	01 10-01-2025 FACE OF SLAB RAILING ELEVATION AND SECTION DRAWING		☐ TENDER		
				02 15-07-2025 Corner handrail connection added		☒ FOR DRAWING		
				03 21-07-2025 Updated sleeve and post connector		☐ FOR REFERENCE		
						☐ FOR PERMIT		
						DATE OF ISSUE		
								SHEET SIZE - A3
								SCALE
								AS SHOWN

FACE OF SLAB RAILING · SHEET FR-01 / FR-02 · REV. 02



RAILING MASTERS INC. 719 CLAREMONT CRESCENT UNIT #104 ETOBICOKE, ON M9W 6P9 TEL: (416) 238-7368 E-MAIL: info@railingmasters.ca	PROJECT:	CLIENT:	NOTES 1. ALL DIMENSIONS ARE IN MILLIMETERS. 2. ALL LEVELS ARE IN METERS UNLESS OTHERWISE NOTED.	<table><tr><th>REV</th><th>DATE</th><th>DESCRIPTION</th></tr><tr><td>01</td><td>07-07-2020</td><td>PICKET RAILING DRAWING</td></tr><tr><td>02</td><td>08-07-2020</td><td>TOP RAIL AND CONNECTOR UPDATED TO DRAWING ACCORD</td></tr><tr><td>03</td><td>14-01-2021</td><td>UPDATED AS PER NEW VERSION</td></tr></table>	REV	DATE	DESCRIPTION	01	07-07-2020	PICKET RAILING DRAWING	02	08-07-2020	TOP RAIL AND CONNECTOR UPDATED TO DRAWING ACCORD	03	14-01-2021	UPDATED AS PER NEW VERSION	DRAWING NO. P.R.	ISSUED TO: ☐ CONCEPT ☐ TENDER ☐ P&L DRAWING ☒ SHOP DRAWING ☐ ADVANCE COPY ☐ FOR REFERENCE	DRAWING TITLE PICKET RAILING ELEVATION SECTION AND DETAILS	REVISION 02
	REV	DATE	DESCRIPTION																	
	01	07-07-2020	PICKET RAILING DRAWING																	
	02	08-07-2020	TOP RAIL AND CONNECTOR UPDATED TO DRAWING ACCORD																	
03	14-01-2021	UPDATED AS PER NEW VERSION																		
DESIGN ARCHITECTS:	STRUCTURAL CONSULTANT:	DRAWN BY	CHECKED BY	APPROVED BY	PROJECT NO.															
		DATE OF ISSUE						SHEET SIZE - A3												
								SCALE AS SHOWN												



COMPONENT SCHEDULE

Component schedule

Extracted from the stamped materials lists. Fastener schedules are the standard specification; project-specific engineering may vary them.

COMPONENT	ALLOY	SPECIFICATION
Base plate	6061-T6	Anchored to concrete with $2 \times \frac{1}{2}" \phi$ (13 mm) $\times \frac{3}{4}"$ Hilti Kwik Bolt TZ stainless expansion anchors, 89 mm embedment, with lock and flat washer.
Railing post	6061-T6	Base plate bolted to post with $4 \times \frac{5}{16}" - 18 \times 1\frac{3}{4}"$ unpainted fully threaded S.S. T316 bolts, washer and lock washer. $4 \times \frac{3}{8}" - 18$ tapped to min. $1\frac{5}{8}"$.
Glass rail holder	6061-T6	Fastened to post with $4 \times \#12 \times 1"$ painted pan-head self-tapping stainless screws.
Glass channel	6061-T6	Fastened to glass rail holder with $2 \times \#10 \times \frac{1}{2}"$ painted pan-head self-tapping stainless screws.
Hand rail	6061-T6	Fastened to post clip anchor with $2 \times \#10 \times \frac{3}{4}"$ painted pan-head self-tapping stainless screws.
Post clip anchor	6061-T6	Installed at top of post, fastened each side of post and to underside of handrail with $2 \times \#10 \times \frac{3}{4}"$ painted pan-head self-tapping stainless screws.
Connecting sleeve, 127 mm	6061-T6	Expansion joint at every 50 ft (1520 mm), fastened with $2 \times \#10 \times \frac{3}{4}"$ screws on one side only. Located where handrail is mounted between two posts; $4 \times \#10 \times \frac{3}{4}"$ screws, 2 each side.
Corner sleeve, 160 mm	6061-T6	Fastened to handrail with $4 \times \#10 \times \frac{3}{4}"$ pan-head self-tapping stainless screws, 2 screws each direction.
End cap	6061-T6	Painted end cap fastened to stainless angle with $2 \times \#10 \times \frac{3}{4}"$ painted pan-head self-tapping stainless screws.
Stainless angle	S.S.	$25 \text{ mm} \times 25 \text{ mm} \times 2 \text{ mm}$ thick $\times 76 \text{ mm}$ long, fastened to end cap and to underside of handrail with $\#10 \times \frac{3}{4}"$ screws.
Glass patch	6061-T6	5 mm neoprene gasket, 3 mm painted aluminum flat $100 \times 100 \text{ mm}$, 1.5 mm double-sided tape each side of glass; fastened to post with $2 \times \#12 \times 1\frac{3}{4}"$ painted flat-head self-tapping stainless screws.

COMPONENT	ALLOY	SPECIFICATION
Gaskets & shims	—	1.5 mm double-sided tape between glass rail holder and glass channel. PVC horseshoe shims between glass channel and rail holder. Channel gasket inserted into glass channel; rubber gasket at each glass end.