TRADE TESTED

IRIS (9.6m^2) Design Statement

A20130
14 July 2020 –Revision 2

P|09 391 1324 E| RCE@RCENGINEERS.CO.NZ W| WWW.RCENGINEERS.CO.NZ
LEVEL 6, 56 CAWLEY STREET, ELLERSLIE, AUCKLAND 1051

TRADE TESTED LOG CABIN GARDEN HOUSE IRIS (3.6M X 2.7M)

Trade Tested produce kitset log cabin garden houses made of spruce timber that can be constructed on site. Various cabin sizes and footprints are available. This design statement is specific to the Log Cabin Garden House Iris (9.6m^2).

Richards Consulting Auckland Limited has been engaged by Trade Tested to prepare a standard design statement on the maximum site loadings (wind, earthquake and snow) which the cabins can withstand.

CABIN STRUCTURAL SYSTEM

The cabin is a timber structure built up from spruce timber logs with a pitched timber roof structure. The roof purlins resist gravity, wind and snow loads on the structure. The roof is non-trafficable and as such is not designed to carry live loads. The roof loads are supported by the timber log walls. Wind and snow loads have been calculated as per AS/NZS1170.2 and AS/NZS1170.3 respectively. Sectional capacities of the timber members have been determined using Timber Structures NZS3603: 1993.

The garden shed lateral load resisting system will be provided by storm braces bolted to the external walls. The log walls span between perpendicular walls (or door mullions on the front wall) to resist the wind face loads on the structure and transfer the loadings into the storm brace system.

The cabin should be founded on a concrete slab with perimeter footings. The slab should be 100mm thick and reinforced with SE62 steel mesh in accordance with NZS 3604:2011. Refer to the typical foundation slab detail attached. The cabin foundation logs should be fixed down to the concrete slab with Hilti HUS 6 Screw Anchors (or equivalent) at 600mm crs.

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The design of the log cabin garden shed within this document are in compliance with the New Zealand Building Code (NZBC) section B1.

SERVICEABILITY CRITERIA

The following deflection limits were used for the following elements within the Log Cabin Garden House Iris (3.6m x 2.7m):

- Lateral deflection of wall logs: L/150
- Roof purlins: L/200

DESIGN LOADS AND LOAD CASES

The maximum allowable site loads for the log cabin garden shed are:

- Wind: 'Low' Wind Zone (32m/s)
- Earthquake: EQ Zone 3, Soil Class D or EQ Zone 4, Soil Class C
- Ground Snow Load: 1.5kPa

The site loads can be determined from:

- Wind: Local council wind maps found on the relevant council websites or BRANZ.co.nz
- Earthquake Zone can be determined from BRANZ.co.nz
- Snow Load: Maximum altitude for the following regions:
    - Northland, Auckland, Waikato and Bay of Plenty: No altitude limit.
    - Gisborne, Taranaki, Hawke's Bay, Manawatu-Wanganui, Wellington: 600m
    - West Coast: 600m
    - Tasman, Nelson and Marlborough: 600m
    - Canterbury: 200m
    - Otago and Southland: 300m

The following design load cases have been applied to the log cabin garden shed members:

- 0.9G + Wu (ULS for wind uplift)
- 1.2G + S (ULS downward load case)
- 1.2G + EQ (ULS for lateral load case)
- 0.9G + W_{lat} (ULS for lateral load case)
- Ws (SLS for wind related deflection)

DESIGN LIMITATIONS

The following design assumptions apply to the design manual:

- The member sizes used will be the same as those checked in the design.
- Spruce timber will be used with an E = 8GPa and f_b = 16MPa.
- The structure will be constructed as per the Trade Tested construction manual.
- The structure will be built on a site that meets the requirements of 'Good Ground' as per NZS3604:2011. 'Good Ground' is determined as firm natural soils on a site with no site stability issues, expansive soils, organic soils (peat) and low risk of liquefaction.

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    - In the Auckland region, expansive soils are reasonably common. Auckland Council practice note AC2208 stipulates a minimum embedment depth of 450mm below cleared ground level for foundations. As such, foundations constructed for Palmako log cabins in the Auckland region should have a minimum embedment depth of 450mm below cleared ground level.
- No modifications are made to the structure (unless authorized in this manual).
- The cabins are not to be installed within Corrosion Zone D (sea-spray zone). Refer to BRANZ.co.nz for locations.
- The cabin has been designed for a 15-year design life.

BUILDING CONSENT EXEMPTION REQUIREMENTS

The New Zealand Building Act allows for single-storey detached buildings up to 30m^2 in floor area with prefab or kitset components to be constructed without a building consent provided the following requirements are met.

- The building does not contain sanitary facilities or facilities for the storage of potable water.
- The building does not include sleeping accommodation, unless the building is used in connection with a dwelling.
    - If the building includes sleeping accommodation, smoke alarms are required to be installed.
- The building does not include any cooking facilities.
- The building is situated further than its own height from an residential building or to any legal boundary.

DESIGN EXCLUSIONS

The following items are specifically excluded from this design manual:

- Weather and waterproofing of the shed.
- Electronic services to the cabin.
- Fire and smoke alarms.

MATERIAL AND SECTION PROPERTIES

The log cabins will be made from spruce timber members.

The structural member properties are as follows:

114x28mm wall logs	Iy = 0.21 x 10^6 mm^4
50x5 EA door mullions	Ix = 0.163 x 10^6 mm^4
90x70mm door mullions	Ix = 4.25 x 10^6 mm^4
140x44mm roof purlins	Ix = 0.15095 x 10^6 mm^4
Concrete foundations	f'c = 20MPa
Spruce timber	E = 8GPa
	f_b = 16MPa
Steel	E = 200GPa
	f_y = 300MPa

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DURABILITY

The structure has been designed with a durability for the life of the structure (15 years with maintenance) as outlined in B2. The finished floor level of the structure is to be 225mm above adjacent finished ground levels (E1).

Prior to construction of the garden cabin, the timber elements should be treated with an appropriate wood preservative i.e. a borate-based project (for example TimberSafe Multi-purpose Wood Preservative) or a Copper Naphthenate based product (for example Metalex Green Concentrated Timber Preservative). After construction, the garden shed should be painted or stained, with the chosen coating reapplied as per the product specifications.

DESIGN MANUAL NOTES

The person or people installing the garden shed should have a good understanding of the construction techniques required and abide by the following:

- Only the attached connection details shall be used.
- No substitution with the products included in this manual is permitted.
- The owner should refer to their local district council plan to ensure they meet planning requirements including, but not exclusive to, site coverage, boundary setbacks, recession planes, etc.
- The timber products used for construction should be treated with an appropriate wood preservative.
- For the log cabin to suitably resist the specified site loads, the additional 50x5 EA mullions must be installed as per the Palmako construction detail.

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APPENDICIES

- PS1
- Foundation Details
- Palmako Construction Detail for door mullions

REFERENCES

- AS/NZS1170: 2002
- NZS3603: 1993
- NZS3604: 2011

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Site Loadings Checklist					
Maximum Wind Zone	Low		Y ( )	N[1] ( )	
EQ Zone and Soil Class	Zone 3	Soil Class D	Y ( )	N ( )	NA[2] ( )
	Zone 4	Soil Class C	Y ( )	N ( )	NA ( )
Snow Region and Altitude	Northland Auckland Waikato Bay of Plenty	No altitude limit	Y ( )	N ( )	NA ( )
	Gisborne Taranaki Hawke's Bay Manawatu-Wanganui Wellington	600m	Y ( )	N ( )	NA ( )
	West Coast	600m	Y ( )	N ( )	NA ( )
	Tasman Nelson Marlborough	600m	Y ( )	N ( )	NA ( )
	Canterbury	200m	Y ( )	N ( )	NA ( )
	Otago Southland	300m	Y ( )	N ( )	NA ( )
Good Ground[3]			Y ( )	N ( )	
Distance from other buildings and legal boundaries[4]	> 2.65m		Y ( )	N ( )	

[1] If 'no' (N) ticked, then log cabin is not suitable for the proposed site.
[2] If another option has been ticked 'yes' (Y), NA may be ticked.
[3] With consideration of Auckland Council practice note AC2208.
[4] For protection against fire spread, the cabin must be situated further than its own height from another residential structure or from any legal boundary.
Note: There are other local planning requirements that will also have to be reviewed.

Building Code Clause(s).....B1 .....

PRODUCER STATEMENT – PS1 – DESIGN

(Guidance on use of Producer Statements (formerly page 2) is available at www.engineeringnz.org)

ISSUED BY:....Richards Consulting Engineers Limited .....(RCE) .....
(Design Firm)

TO:..... Trade Tested Limited NZ .....
(Owner/Developer)

TO BE SUPPLIED TO:..... All Territorial Authorities within New Zealand .....
(Building Consent Authority)

IN RESPECT OF:... Palmalko Timber Log Gardern Shed Iris 9.6m^2 Cabin.....
(Description of Building Work)

AT:..... .....
(Address)

Town/City: ..... **LOT**.....**DP** .....**SO**.....
(Address)

We have been engaged by the owner/developer referred to above to provide:
.....engineering design of the Silencio Louvre System standard design tables.....
(Extent of Engagement)

services in respect of the requirements of Clause(s) …B1 .....of the Building Code for:
All ☐ or Part only ☒ (as specified in the attachment to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with: AS/NZS 1170:2011, NZS 3603:1993 and;

☒ Compliance Documents issued by the Ministry of Business, Innovation & Employment.....B1/VM1 & B1/VM4.....or
(verification method / acceptable solution)

☐ Alternative solution as per the attached schedule.....

The proposed building work covered by this producer statement is described on the drawings titled:

… Installation Manual, Log cabin FR28-3829.....;
together with the specification, and other documents set out in the schedule attached to this statement.

On behalf of the Design Firm, and subject to:
Site verification of the following design assumptions:
(i) site loadings have been calculated correctly
(ii) all other assumptions stated within the design statement have been satisfied/accounted for

I **believe on reasonable grounds** that a) the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code and that b), the persons who have undertaken the design have the necessary competency to do so. I also recommend the following level of construction monitoring/observation:

☐CM1 ☐CM2 ☐CM3 ☐CM4 ☐CM5 (Engineering Categories) or ☐ as per agreement with owner/developer (Architectural)

I, ...Nicholas Baker..... am: ☒ CPEng …1016657.....# ☐ Reg Arch .....#
(Name of Design Professional)

I am a member of : ☒ Engineer New Zealand ☐ NZIA and hold the following qualifications:.....BE(hons).....
The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than $200,000*.
The Design Firm is a member of ACENZ: ☐

SIGNED BY .....Nicholas Baker.....(signature).....
(Name of Design Professional)

ON BEHALF OF .....Richards Consulting Auckland Limited.....Date…20 November 2020 This PS1 is valid for 1 year only.....
(Design Firm)

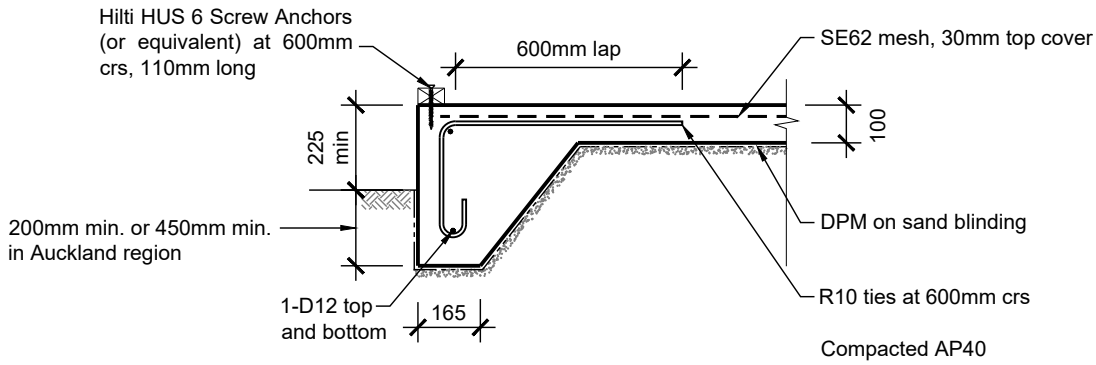
Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of $200,000.*

This form is to accompany Form 2 of the Building (Forms) Regulations 2004 for the application of a Building Consent.

RICHARDS
CONSULTING | ENGINEERS

PROJECT TITLE
TRADE TESTED LIMITED

Reference:	A20130	By:	JDS
Date:	FEB 2021	Sketch:	



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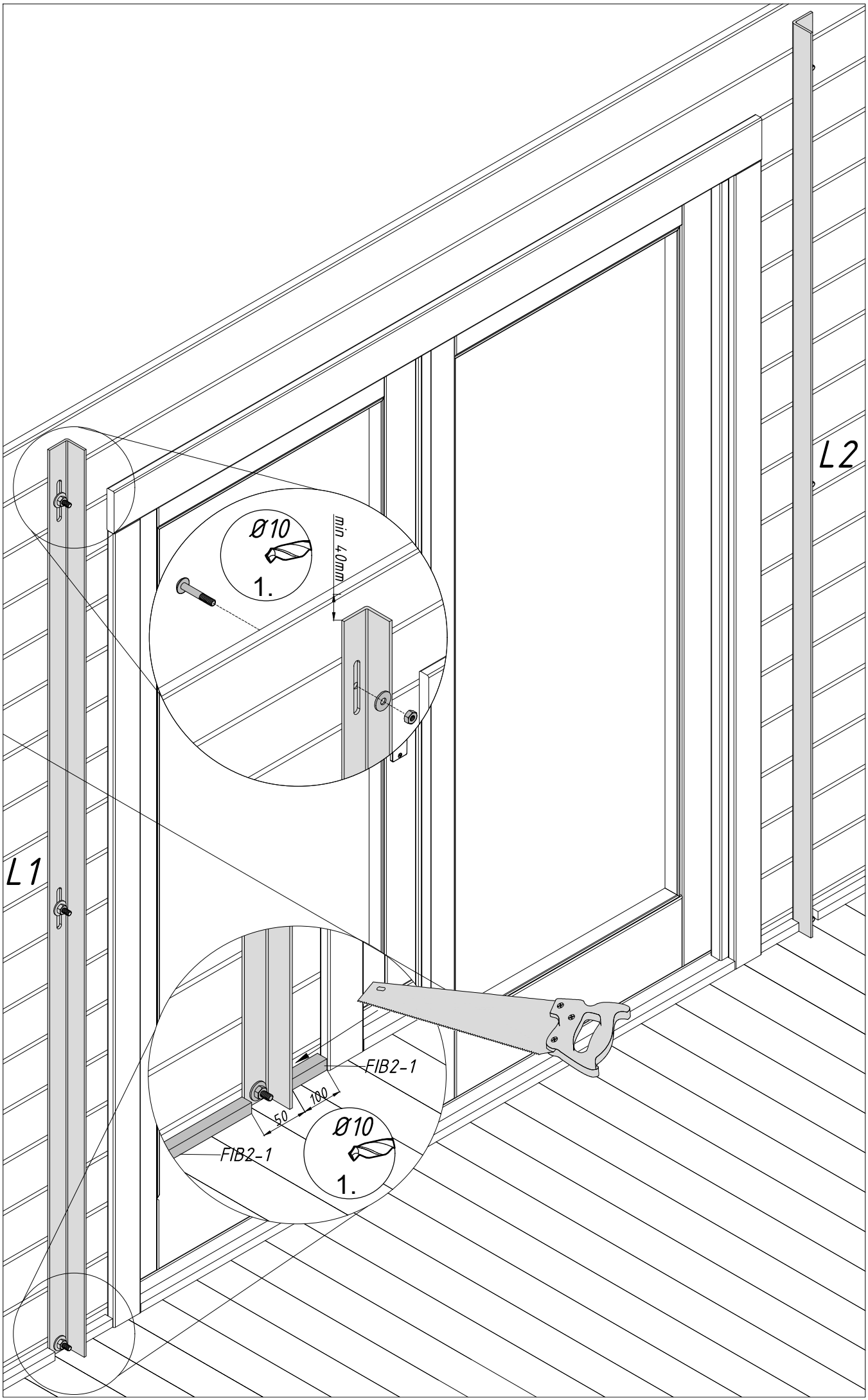
CONCRETE PERIMETER FOOTING

SCALE 1:20


L1
L2
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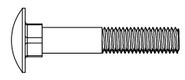
Pos	SPECIFICATION-STÜCKLISTE-NOMENCLATURE-ELEMENTI-ESPECIFICATIÓN	Pcs	Profile (mm)	Length (mm)
M10x60	Bolt -Schloss-schraube -Boulon- Bullone- Perno- M10x60mm 	6		
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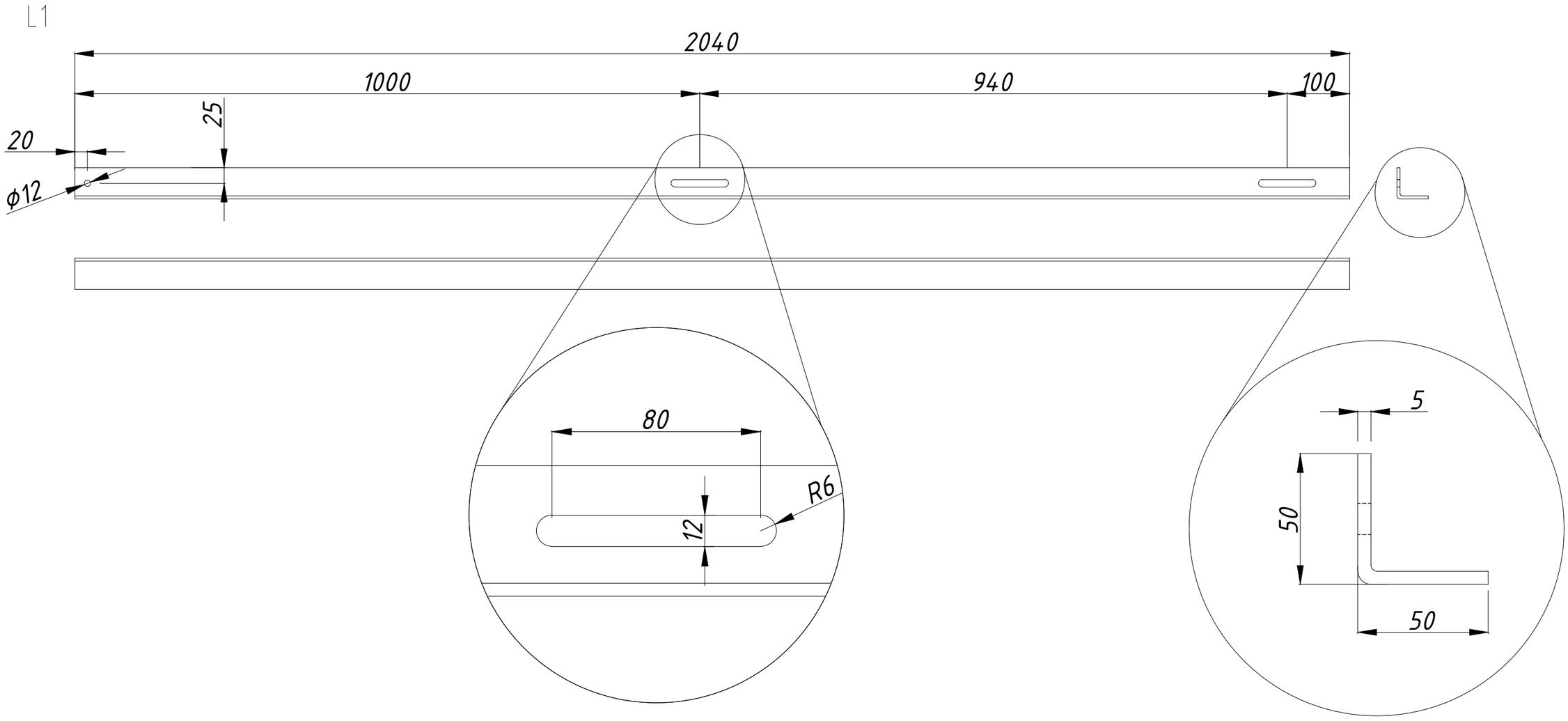
10x30	Washer- Dichtscheibe- Joint- Rondella- Arandela- 10x30mm 	6		

L1



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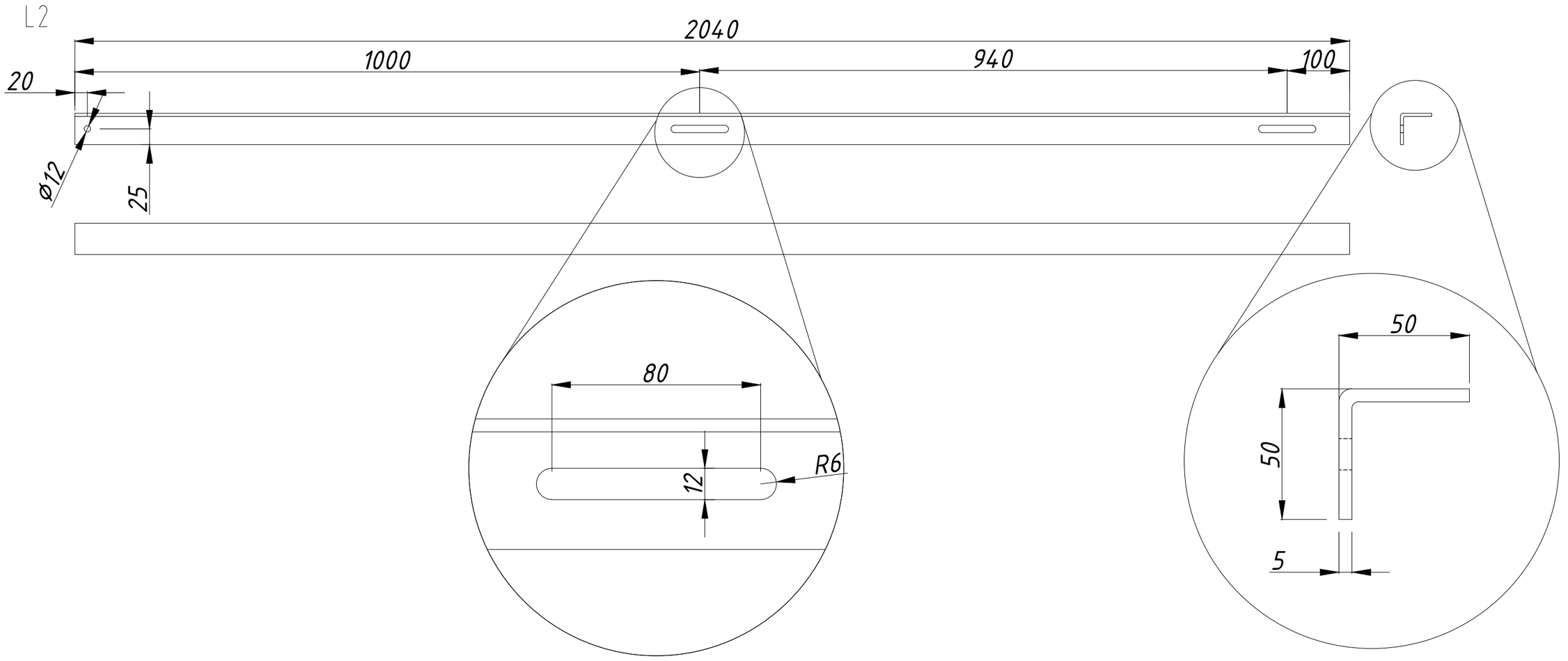

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Page 1/1