MMP Mitra Murni Perkasa	JETTY MMP NICKEL SMELTER PROJECT	WIKA PT WIJAYA KARYA (Persero) Tbk
MMP-DBS-100-C-0002	CIVIL AND STRUCTURES DESIGN BASIS & CRITERIA	Rev. No : 2 Page : 1 / 29

ORIGINAL

MMP Mitra Murni Perkasa
DETAIL ENGINEERING DESIGN

WIKA FOR APPROVAL
DATE 11 May 2022

PROJECT NAME : BED & DED JETTY MMP NICKEL SMELTER PROJECT

CLIENT : PT. MITRA MURNI PERKASA

CONTRACTOR : PT. WIJAYA KARYA (Persero) Tbk

PROJECT LOCATION : TELUK WARU, BALIKPAPAN - KALIMANTAN TIMUR

CONTRACT NO. : 065-1/LGL/MMP-WIKA/XII/2021

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C2	Approved with comments Work may proceed	
C3	Revise and resubmit Work may not proceed	
C4	Not Reviewed No review required / Information only	
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REVISION SHEET DESCRIPTION

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1. INTRODUCTION

1.1 GENERAL

This document contains the basic design of Civil and Structures Design Basis & Criteria , the Scope of Work is as follows:

1. Platform Control Room & Panel Room
   This platform function as a foundation for the Port Office Building that contain Control Room, Panel Room and Office.
2. Control Room & Panel Room Building Structure
   This building functions as a supporting building for control facilities at the jetty, this building contains panels and independent power sources that control electrical at the jetty.
3. Substation Building Structure
   This building functions is for supply electricity for equipment and building above the Jetty.
4. Equipment Foundation and Supports
   This will be platform for the equipment at the building.
5. Pipe Support & Pipe Sleeper
   This pipe support functions as a sleeper pipe holder where the pipe carries for hydrant, power, fuel and water

1.2 LOCATION

Location of this project at Teluk Waru, Kariangau, Balikpapan, East Kalimantan Province, Indonesia.

1.3 LANGUAGE

The language used in this document is English.

1.4 UNIT

All units used are in SI unit.

2. DESIGN CRITERIA

2.1 CONCEPT AND PHILOSOPHY OF BUILDING PLANNING

By increasing the resistance capacity of the structure against the working earthquake force, it is the basic concept used before planning an earthquake resistant construction. Either in the form of shear walls, moment resisting frame systems, bracing bonds and etc.

The conditions used are as follows:

1. During a small earthquake the main structure of the building must be undamaged and function properly. Small tolerable damage to non-structural elements is still allowed
2. During a moderate earthquake the main structure of the building may be damaged/lightly cracked but can still be repaired. Non-structural elements can be damaged but can still be replaced with new ones.
3. During a major earthquake the building may be damaged but must not completely collapse. This condition is also expected in a large earthquake whose purpose is to protect humans/building occupants to the maximum.

The design shall be in accordance with good engineering practices and in compliance with the latest editions and revisions (unless noted otherwise) of the Codes, Standards and Guidelines. The design shall take into consideration all the applicable loads and transfer them into realistic load combinations. Appropriate use of load factors and material factors is required. Deflections shall be in line with the requirements from the applicable Codes and Standards as minimum and suitable. The design shall consider the following Limit State Conditions:

- Serviceability Limit State (SLS)

  Serviceability Limit State (SLS) is a condition where when the building is damaged, it is expected that it will still function although without any improvement to the lowest extent. This limit usually used for the design of structures that should be able to function again after an earthquake, such as a fire station fire, hospital and the like. The existence of this limitation brings hope that the planned structure can last some time although it was still damaged. Some things include SLS are as follows:

a) Excessive deformation will affect wearing structure.
b) Cracks that occur too early and excessive.
c) Corrosion damage to structures.
d) Vibrations that occur on a large scale and suddenly.

- Ultimate Limit State (ULS)

  Ultimate Limit State (ULS) is a limitation that aims to ensure that the possibility of the collapse of the building is in a condition that still acceptable. Therefore the ULS process considers to events with a greater reach even though the possibility happened is small. When the structure has reached the ULS condition means structure has known conditions when receiving maximum load and reach the limit of its bearing capacity, so that the collapse of the structure can avoided. And the limitations of ULS include:

a) Loss of balance of deposits as rigid structure.
b) Collapse in critical sections in each component structure.
c) Placement of plastic joints in structural members with sufficient rotational capacity (strong column weak beam).
d) Disruption of structural stability due to excessive deformation excessive
e) Damage arising from the effect of structural collapse.
f) Deformation and cracking that causes change in the direction of the geometry of the structure.

2.2 DESIGN CODES

This building is designed using Indonesian standard for building. If there are some requirements that are not in the Indonesian standard, it will refer to international standard for building.

Indonesian Standard for Building:

- SNI 1727-2020, “Minimum Loads for Designing Buildings and Other Structures”
- SNI 1726-2019, “Earthquake Resistance Planning for Non-Building Structures”
- SNI 2847-2019, “Structural Concrete Requirements For Buildings”.

International Standard for Building:

- ACI318-19, Building Code Requirements for Structural Concrete
- IBC 2006 International Building Code
- ACI 543R-00, “Design, Manufacture and Installation of Concrete Piles
- ACI Detailing Manual
- ASCE.7-19 American Society of Civil Engineer “Minimum Design Loads and Associated Criteria for Buildings and Other Structures”
- Portland Cement Association

2.3 MATERIAL PROPERTIES

2.3.1 Concrete Material

Concrete grade is as follow:

Table 2-1 Concrete Grade

Concrete Grade	Purpose
35 MPa	General Purpose & Foundation
13 MPa	Leveling

2.3.2 Reinforcement Bars

The reinforcement shall comply with the requirement of ASTM A615 or SNI Standard.

Table 2-2 Reinforcement Bars

Rebar diameter < 13 (plain)	fy	280 MPa
	Es	200,000 MPa
Rebar diameter ≥ 13 (deformed)	Fy	420 MPa
	Es	200,000 MPa

2.3.3 Anchor Bolt

Anchor Bolt and Nuts

Standard Material	JIS G 3112 – 1995, ASTM A307 (Anchor Bolt), ASTM A325 (Bolt)
Mechanical Properties	Anchor Bolt: Yield Strength = 23.5 kN/cm^2 Tensile Strength = 38 kN/cm^2 Bolt: Yield Strength = 63.4 kN/cm^2 Tensile Strength = 82.7 kN/cm^2
Thread	- 2.0 P for Nuts size M-16 - 2.5 P for Nuts size M-20 - 2.5 P for Nuts size M-22
Nut and Washer	Grade 4.6 (min for Anchor Bolt) Grade 8.8 (min for Bolt)

2.3.4 Grouting

Cement grout: Portland cement, sand, and water sufficient for placement and hydration, minimum Compression strength

Non-shrink Grout: Premixed, packaged ferrous and non-ferrous aggregate shrink-resistant grout ASTM C1107 standard specification packaged dry, hydraulic cement grout (non-shrink)

Epoxy-Resin Grout: Two-component mineral-filled epoxy-polysulfide, ASTM C881 or A-001993, FS MMM-G-560

Tentative type of cement grouting will be discussed and decided later.

2.3.5 Checkered Plate

Checkered plate, plate must be hot dip galvanized steel plate ASTM A123 and steel used in accordance with ASTM A36 or its equivalent with a minimum thickness of 6mm.

2.3.6 Grating

Grating for ditches shall be heavy duty open grating type. Materials refer to ASTM A36 or JIS G 3101 with minimum yield strength fy 240 MPa. Bar thickness and depth shall be suitable for its intended service and loads with acceptable deflections. Grating shall be supplied hot dip galvanized.

2.3.7 PVC Pipe for Roof Drainage

Pipe must be thermoplastic, non-corrosive, insoluble in water, good insulator, strong and light

2.3.8 Deflection Control

The deflection of concrete structural member should be in accordance with the SNI 2847-2019 as following:

Table 2-3 Deflection Limit of Reinforced Concrete Member

Type of Structure Component	Deflection	Deflection Lim.
Flat roofs that do not withstand or not incorporating a non-structural components that may be damaged by large deflections	Deflection instantly by live load (L)	$\frac{\ell^{a}}{180}$
The floors were not holding back or not incorporating a non-structural components may be damaged by large deflections	Deflection instantly by live load (L)	$\frac{\ell}{360}$
Construction of the roof or floor holding or merged with other non-structural components that may be damaged by large deflections	Part of the total deflection that occurred after the installation of nonstructural components (the sum of long-term deflection, due to all the permanent work load and deflection at once, due to the addition of live load)	$\frac{\ell^{b}}{480}$
Construction of the roof or the floor holding or merged with other non-structural components may not be damaged by large deflections		$\frac{\ell^{d}}{240}$

2.3.9 Story Drift Control (Displacement)

Story drift shall not exceed the allowable story drift, should be in accordance with SNI 1726-2019 as obtained from table below:

Table 2-4 Allowable Story Drift

Structure	Risk Category I or II	Risk Category III	Risk Category IV
Structures, other than masonry shear wall structures, 4 stories or less above the base as defined in Section 11.2, with interior walls, partitions, ceilings, and exterior wall systems that have been designed to accommodate the story drifts.	$0.025h_{sx}$[c]	$0.020h_{sx}$	$0.015h_{sx}$
Masonry cantilever shear wall structures[d]	$0.010h_{sx}$	$0.010h_{sx}$	$0.010h_{sx}$
Other masonry shear wall structures	$0.007h_{sx}$	$0.007h_{sx}$	$0.007h_{sx}$
All other structures	$0.020h_{sx}$	$0.015h_{sx}$	$0.010h_{sx}$

[a] h_{sx} is the story height below Level x.
[b] For seismic force-resisting systems comprised solely of moment frames in Seismic Design Categories D, E, and F, the allowable story drift shall comply with the requirements of Section 12.12.1.1.
[c] There shall be no drift limit for single-story structures with interior walls, partitions, ceilings, and exterior wall systems that have been designed to accommodate the story drifts. The structure separation requirement of Section 12.12.3 is not waived.
[d] Structures in which the basic structural system consists of masonry shear walls designed as vertical elements cantilevered from their base or foundation support which are so constructed that moment transfer between shear walls (coupling) is negligible.

2.3.10 Concrete Cover

This item and building will not direct contact with sea water. Concrete cover for all structural elements is shown in the following table, in accordance with the SNI 2847-2019.

Table 2-5 In-Situ Concrete Cover

Exposure	Component Structure	Reinforcement	Min. Cover (mm)
Concrete is Cast Directly on the Ground and Always in touch With the Ground	All	All	75
Concrete Contact With the Ground or the Weather:	All	D19 To D57	50
		D16 , Wire Ø13 Or D13 And Smaller	40
Concrete That is Not Directly Related to the Weather or Concrete is Not Directly Contact With the Ground	Plate, Ribbed Plate And Wall	D43 And D57	40
		D36 Bar And Smaller	20
	Beams, Columns, Pedestals And Stem Pull	Main Reinforcement, Stirrup, Stirrup Tie, Spiral And Stirrup Restraint	40

Table 2-6 Pre-cast Concrete Cover

Exposure	Component Structure	Reinforcement	Min Cover (Mm)
Concrete is Cast Directly on the Ground and Always in touch With the Ground	All	All	75
Concrete Contact With the Ground or the Weather:	Plate, Ribbed Plate And Wall	All	25
	Other	All	40
Concrete That is Not Directly Related to the Weather or	Plate, Ribbed Plate And Wall	All	20
		Main Reinforcement	40

Exposure	Component Structure	Reinforcement	Min Cover (Mm)
Concrete is Not Directly Contact With the Ground	Beams, Columns, Pedestals And Stem Pull	Stirrup, Stirrup Tie, Spiral And Stirrup Restraint	25

2.4 DESIGN LOCAL CONDITIONS

2.4.1 Earthquake Response Acceleration

The seismic design for structure and facilities in this project will be based on Indonesia Seismic Code SNI 1726-2019, with return period of seismic event is 2500 years. Parameters and site coefficients to create response spectrum curve in project location shall be determined from seismic maps which are provide by the Indonesian seismic code. The value that can be obtained from these maps are PGA (Peak Ground Acceleration), Ss (response spectral acceleration parameter MCER for T=0.2 sec) and S1 (response spectral acceleration parameter MCER for T=1.0 sec).

2.4.2 Wind Pressure

As per the contract and the local regulation, all structure shall be designed to withstand wind pressure resulting from the basic wind velocity (at a height of 10 m, with return period of 50 years). Wind load shall be determined in accordance with ASCE 7-19. The basic wind speed (V) is defined in accordance with ASCE 7-19 as three-second gust speed at 10 m above the ground in exposure C. The basic wind speed to be used in the design is 30 m/s.

2.4.3 Rain Load

According to SNI 1727-2020, Each portion of a roof shall be designed to sustain the load of all rainwater that will accumulate on it if the primary drainage system for that portion is blocked plus the uniform load caused by water that rises above the inlet of the secondary drainage system at its design flow.

R = 0.0098 (ds + dn) kN/m2

dh = Additional depth of water on the undeflected roof above the inlet of the secondary drainage system at its design flow (hydraulic head) (mm)

ds = Depth of water on the undeflected roof up to the inlet of the secondary drainage system when the primary drainage system is blocked (static head) (mm)

According to SKBI-1.3.53.1987 – Loading Planning for Houses and Buildings: Speed of rainwater load is calculated (40-0.8α) kg/m2, where α roof inclination in degree, with maximum limitation load is lesser than 20 kg/m2.

3. DESIGN LOAD

Design load is designed according to the load that occurs on the structure.

3.1 DEAD LOAD

Dead load as the self-weight of the structural members. Specific gravity of material used in this structure is as follow:

Reinforced Concrete = 2.400 ton/m^3

Steel = 7.850 ton/m^3

Lean Concrete = 2.200 ton/m^3

Cement Mortar = 2.000 ton/m^3

Cement = 1.600 ton/m^3

3.2 SUPERIMPOSED DEAD LOAD

Superimposed dead load will be applied to the structure such as follow.

Brickwall = 250 kg/m^2

Mechanical Electrical = 25 kg/m^2

Ceiling = 18 kg/m^2

Finishing Floor = 24 kg/m^2

3.3 LIVE LOAD

Live load can be uniformly distributed live load or concentrated live load. Uniformly live load and concentrated live load applied in this project in accordance with SNI 1727-2020, “Minimum Loads for Designing Buildings and Other Structures”, Table 4.3-1 page 26 to 29.

Table 3-1 Minimum Uniformly Distributed Live Load, L_O and Concentrated Live Load

Occupacy or Use	Uniiform Load psf (kN/m2)	Concentrated Load lb (kN)
Access floor systems		
Office use	50 (2.4)	2.000 (8.9)
Computer use	100 (4.79)	2.000 (8.9)

Occupacy or Use	Uniiform Load psf (kN/m2)	Concentrated Load lb (kN)
Roofs		
Ordinary flat, pitched, and curved roofs	20 (0.96)	
Roofs used for roof gardens	100 (4.79)	
Roofs used for assembly purposes	Same as occupancy served	
Roofs used for other occupancies		
Awnings and canopies		
Fabric construction supported by a skeleton structure	5 (0.24) Nonreducible	
Screen enclosure support frame	5 (0.24) nonreducible and applied to the roof frame members only, not the screen	200 (0.89) applied To supporting roof frame members only
All other construction		
Primary roof members, exposed to a work floor	**20 (0.96)**	
Single panel point of lower chord of roof trusses or any Point along primary structural members supporting roofs over manufacturing, storage warehouses, and repair garages		2,000 (8.9)
All other primary roof members	300 (1.33)	
All roof surfaces subject to maintenance workers	300 (1.33)	

For this, live load will be 250 kg/m2 (2.4 kN/m2) and live roof live load will be 100 kg/m2 (0.96 kN/m2) and this load will be applied to building only, for other have own requirement.

3.4 SEISMIC LOAD

The seismic design for structure and facilities in this project will be based on Indonesia Seismic Code SNI 1726-2019, with return period of seismic event is 2500 years.

Parameters and site coefficients to create response spectrum curve in project location shall be determined from seismic maps which are provide by the Indonesian seismic code. The value that can be obtained from these maps are PGA (Peak Ground Acceleration), S_S (response spectral acceleration parameter MCER for T=0.2 sec) and S_1 (response spectral acceleration parameter MCER for T=1.0 sec). The parameter of seismic load as follow:

PGA = 0.056g
S_S = 0.109
S_1 = 0.080
Site Class = D
Important Factor = 1

3.5 WIND LOAD

According SNI 1727 – the minimum design wind load for this building is shown below:

- Building Risk Category
- Basic Wind Speed, V = 30 m/s
- Wind Load Parameter
- Directional Factor, KD
- Exposure Category
- Topographic Factor, KZT
- Gust Effects, G = 0.85
- Enclosure Classification
- Internal Pressure Coefficient, GCPI
- Velocity Pressure Exposure Coefficient KZ or KH
- Velocity Pressure, q or qh
- External Pressure Coefficient, Cp or CN
- Wind Pressure, p

BASIC WIND SPEED

The basic wind speed, V, used in the determination of design wind loads on buildings and other structures shall be determined from authorized institution and risk category.

V = 30 m/s

WIND DIRECTIONALITY

Wind directionality factor, KD, shall be determined from table below.

Table 3-2 Wind Directionality Factor K_D

Structure Type	Directionality Factor KD
Buildings	
Main Wind Force Resisting System	0.85
Components and Cladding	0.85
Arched Roofs	0.85
Chimneys, Tanks, and Similar Structures	
Square	0.90
Hexagonal	0.95
Octagonal	0.95
Round	0.95
Solid Freestanding Walls, Roof Top	0.85
Equipment and Solid Freestanding and Attached Signs	0.85
Trussed Towers	
Triangular, square, or rectangular	0.85
All other cross sections	0.95

EXPOSURE

For each wind direction considered, the upwind exposure shall be based on ground surface roughness that is determined from natural topography vegetation, and constructed facilities.

SURFACE ROUGHNESS CATEGORIES

A ground surface roughness within each 45o sector shall be determined for a distance upwind of the site as defined below:

- Surface Roughness B
  Urban and suburban areas, wooded areas, or other terrain with numerous, closely spaced obstructions that have the size of single-family dwellings or larger.
- Surface Roughness C
  Open terrain with scattered obstruction that have heights generally less than 9.1m. This category includes flat, open country, and grasslands.
- Surface Roughness D
  Flat, unobstructed areas and water surfaces. This category includes smooth mud flats, salt flats, and unbroken ice.

EXPOSURE CATEGORIES

- Exposure B
  For buildings or other structures with a mean roof height less than or equal to 9.1m, Exposure B shall apply where the ground surface roughness, as defined by Surface Roughness B, prevails in the upwind direction for a distance greater than 457m. For buildings or other structures with a mean roof height greater than 9.1m, Exposure B shall apply where Surface Roughness B prevails in the up win direction for a distance greater than 792m or 20times the height of the building or structures, whichever is greater.
- Exposure C
  Exposure C shall apply for all cases where Exposure B or D does not apply.
- Exposure D
  Exposure D shall apply where the ground surface roughness, as defined by Surface Roughness D, prevails in the upwind direction for a distance greater than 1524m or 20times the building or structure height, whichever is greater. Exposure D shall also apply where the ground surface roughness immediately upwind of the site is B or C and the site is within a distance 183m or 20 times the building or strucure height, whichever is greater, from and Exposure D condition as a defined in the previous sentence.

TOPOGRAPHY

TOPOGRAPHY EFFECTS

Wind speed-up effects at isolated hills, ridges, and escarpments constituting abrupt changes in the general topography, located in any exposure category, shall be included in the determination of the wind loads when the site condition and location of buildings and other structures meet all the following condition

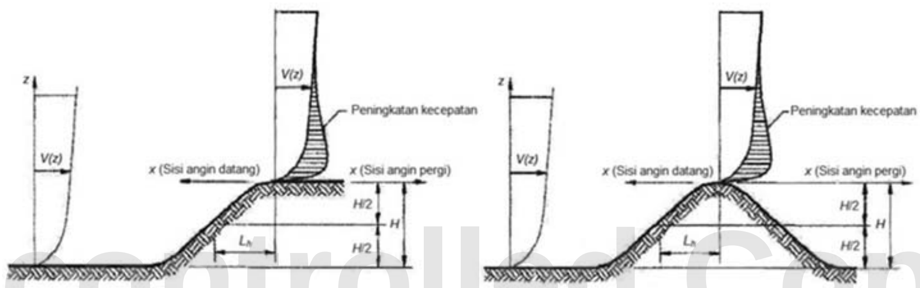

Figure 3-1 Escarpment and 2D Ridge

Table 3-3 Topographic Multipliers for Exposure C

Topographic Multipliers for Exposure C										
H/Lh	K1Multiplier			x/Lh	K2Multiplier		x/Lh	K3Multiplier		
	2D Ridge	2D Escarp-ment	3D Axis-metrical Hill		2D Ridge	All other cases		2D Ridge	2D Escarp-ment	3D Axis-metrical Hill
0.20	0.29	0.17	0.21	0.00	1.00	1.00	0.00	1.00	1.00	1.00
0.25	0.36	0.21	0.26	0.50	0.88	0.67	0.10	0.74	0.78	0.67
0.30	0.43	0.26	0.32	1.00	0.75	0.33	0.20	0.55	0.61	0.45
0.35	0.51	0.30	0.37	1.50	0.63	0.00	0.30	0.41	0.47	0.30
0.40	0.58	0.34	0.42	2.00	0.50	0.00	0.40	0.30	0.37	0.20
0.45	0.65	0.38	0.47	2.50	0.38	0.00	0.50	0.22	0.29	0.14
0.50	0.72	0.43	0.53	3.00	0.25	0.00	0.60	0.17	0.22	0.09
				3.50	0.13	0.0	0.70	0.12	0.17	0.06
				4.00	0.00	0.00	0.80	0.09	0.14	0.04
							0.90	0.07	0.11	0.03
							1.00	0.05	0.08	0.02
							1.50	0.01	0.02	0.00
							2.00	0.00	0.00	0.00

GUST EFFECTS

GUST EFFECTS FACTOR

The gust-effect factor for a rigid building or other structure is permitted to be taken as 0.85.

APPROXIMATE NATURAL FREQUENCY

The approximate lower bound natural frequency (na), in hertz, of concrete or structural steel buildings is permitted to be determined from one of the following equations:

na = 22.2 / h 0.8

where:

h = mean roof height (ft)

VELOCITY PRESSURE

VELOCITY PRESSURE EXPOSURE COEFFICIENT

Based on the exposure category determined above, a velocity pressure exposure coefficient, Kz or Kh, as applicable, shall be determined from table below. For a site located in a transition zone between exposure categories that is near to a change in ground surface roughness, intermediate values of Kz or Kh.

Table 3-4 Velocity Pressure Exposure Coefficient, Kh dan Kz

Height above Ground Level, z		Exposure		
ft	m	B	C	D
0 – 15	0.0 - 4.6	0.57	0.85	1.03
20	6.1	0.62	0.90	1.08
25	7.6	0.66	0.94	1.12
30	9.1	0.70	0.98	1.16
40	12.2	0.76	1.04	1.22
50	15.2	0.81	1.09	1.27
60	18.0	0.85	1.13	1.31
70	21.3	0.89	1.17	1.34
80	24.4	0.93	1.21	1.38
90	27.4	0.96	1.24	1.40
100	30.5	0.99	1.26	1.43

VELOCITY PRESSURE

Velocity Pressure, qz, evaluated at height z above ground shall be calculated by the following equation

qz = 0.613 . Kz . Kzt . Kd . Ke . Vc

where:

qz : Velocity Pressure at Height z (N/m^2)

Kz : Velocity Pressure Exposure Coefficient

Kzt : Topographic Factor

Kd : Wind Directionality Factor

Ke : Ground Elevation Factor

Vc : Basic Wind Speed

G : Gust Factor

WIND LOAD

Design wind load for all the height is determined by the following equation:

P = q G Cp- qi G Cpi

where:

q : qz, for windward walls evaluated at height z above the ground

q : qh, for leeward walls, sidewalls, and roofs evaluated at height h.

qi : qz, for windward walls, sidewalls, leeward walls, and roofs of enclosed buildings, and for negative internal pressure evaluation in partially enclosed buildings.

qi : qh, for positive internal pressure evaluation in partially enclosed buildings where height z is defined as the level of the highest opening in the building that could affect the positive internal pressure

G : gust effect factor

Cp : external pressure coefficient

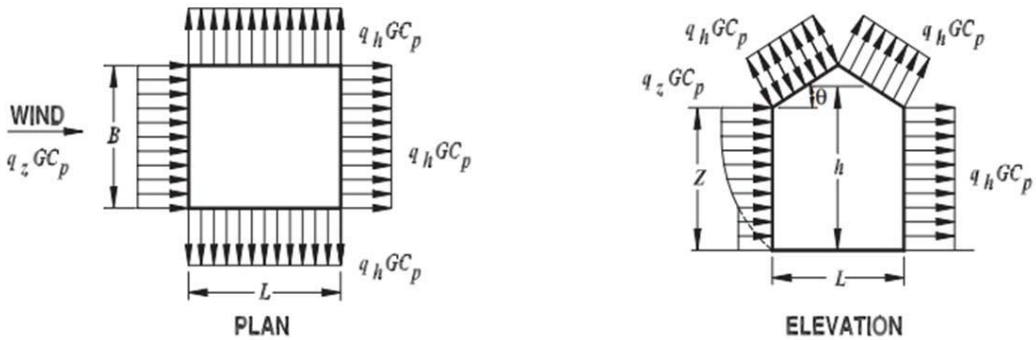

Figure 3-2 External Pressure Diagram

Table 3-5 External Pressure Coefficients (Cp)

Surface	L/B	Cp	Use with
Windward Wall	All values	0.8	qz
Leeward Wall	0 – 1	-0.5	qh
	2	-0.3	
	≥ 4	-0.2	
Sidewall	All values	-0.7	qh

Table 3-6 Roof Pressure Coefficients (Cp)

Wind Direction	Windward									Leeward		
	Angle (degree)									Angle (degree)		
	h/L	10	15	20	25	30	35	45	≥60	10	15	≥20
Normal to Ridge for ≥10 0	≤ 0.25	-0.7 -0.18	-0.5 0.0	-0.3 0.2	-0.2 0.3	-0.2 0.3	0.0 0.4	0.0 0.4	0.01	-0.3	-0.5	-0.6
	0.5	-0.9 -0.18	-0.7 -0.18	-0.4 0.0	-0.3 0.2	-0.2 0.2	-0.2 0.3	0.0 0.4	0.01	-0.5	-0.5	-0.6
	≥ 1.0	-1.3 -0.18	-1.0 -0.18	-0.7 -0.18	-0.5 0.0	-0.3 0.2	-0.2 0.2	0.0 0.4	0.01	-0.7	-0.6	-0.6
Normal to Ridge for < 10 and Parallel to Ridge for All θ	≤ 0.5	Horizontal Distance from Windward Edge			Cp		Value is provided for interpolation purposes Value can be reduced linearly with area overwhich it is applicable as follows					
		0 to h/2			-0.9, -0.18							
		h/2 to h			-0.9, -0.18							
		h to 2h			-0.5, -0.18		Area			Reduction Factor		
		> 2h			-0.3, -0.18		< 100 ft2 (9.3 m2)			1.0		
	≥ 1.0	0 to h/2			-1.3, -0.18		250 ft2 (23.2 m2)			0.9		
		> h/2			-0.7, -0.18		>1000 ft2 (92.9 m2)			0.8		

3.6 PIPE LOAD

Pipeline at jetty head will be placed inside the trench which located on the deck of jetty along the outer side of the structure. At trestle and causeway, pipeline is located at one side of along the trestle and causeway. These pipes should be considered as an additional load. For basic design and analysis, pipe loads on structure have been covered by distributed live load.

3.7 ELECTRICAL & INSTRUMENT LOAD

For Electrical & Instrument load, can be seen from table below.

Table 3-7 Electrical Load for Port Office

ELECTRICAL LOAD FOR PORT OFFICE	
DESCRIPTION	**WEIGHT (KG)**
LP-02 CONTROL ROOM LIGHTING PANEL	150
LP-03 OUTDOOR LIGHTING PANEL	150
AC UPS	800
BATTERY FOR AC UPS	100

Table 3-8 Instrument Load for Port Office

INSTRUMENT LOAD FOR PORT OFFICE	
DESCRIPTION	**WEIGHT (KG)**
PLC PANEL	400
TELECOMM PANEL	400
FACP PANEL	10

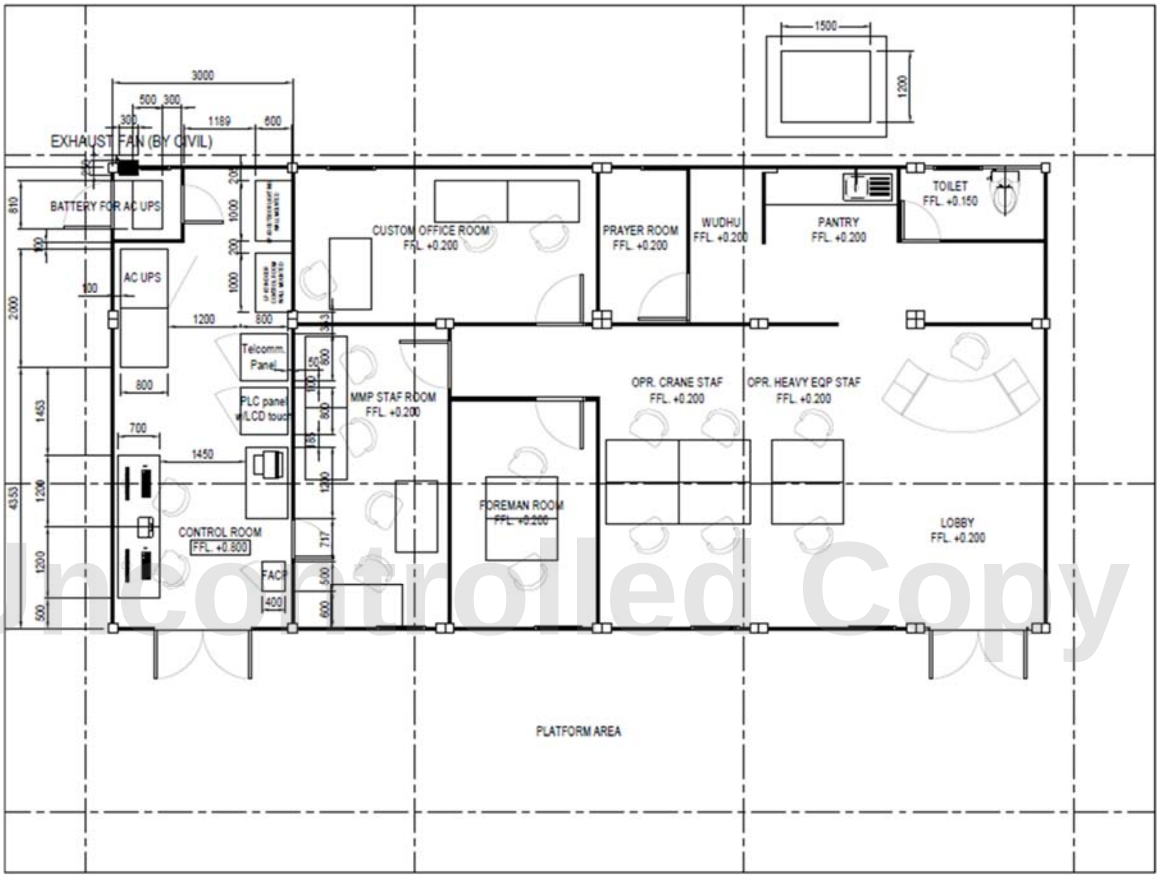

Figure 3-3 Layout Electrical & Instrument Load Port Office

3.8 EQUIPMENT LOAD

For equipment load, can be seen from table below.

Table 3-9 Equipment Load for Substation

EQUIPMENT FOR SUBSTATION BUILDING		
NO	**DESCRIPTION**	**WEIGHT (KG)**
1	MW SWITCHGEAR A 11 Kv, 50Hz, 3Ph, 3W, 630A, 31.5kA, 1sec	7830
2	MW SWITCHGEAR B 11 Kv, 50Hz, 3Ph, 3W, 630A, 31.5kA, 1sec	7830
3	TRANSFORMER A 11/0.4 kV, ONAN, Dyn11, 800 KVA Z% = 5	4675
4	TRANSFORMER B 11/0.4 kV, ONAN, Dyn11, 800 KVA Z% = 5	4675
5	LV SWICTGEAR A, 400V, 50Hz, 3Ph, 4W, 1250A, 50kA, 1sec	8700
6	LV SWICTGEAR B, 400V, 50Hz, 3Ph, 4W, 1250A, 50kA, 1sec	8700
7	SUBSTATION LIGHTING PANEL	300
8	BATTERY	500
9	BATTERY MCCB BOX	40
10	DC CHARGER UPS 110VDC	1200

4. LOAD COMBINATION

The following represent the standard of performance for structural element of main building.

Load combination shall be designed to ensure application of the worst load combination for sizing of, and determination of maximum stress levels in the individual members of the structure.

Load combination are using based on SNI-1726-2019 “Earthquake Resistance Planning for Non-Building Structures”, as described the following:

Load Combination for Unfactored Load Design:

1. D
2. D + L
3. D + (Lr or R)
4. D + 0.75L + 0.75(Lr or R)
5. D + (0.6W or 0.7E)
6. D + 0.75 (0.6 W) + 0.75 L+0.75(Lr or R)
7. 0.6D + 0.6W
8. D + 0.7E
9. D + 0.525E + 0.75L
10. 0.6D + 0.7E

Load Combination for Factored Load Design:

1. 1.4D
2. 1.2D + 1.6L + 0.5(Lr or R)
3. 1.2D + 1.6(Lr or R) + (L or 0.5W)
4. 1.2D + 1.0W + L + 0.5(Lr or R)
5. 1.2D + 1.0E + L
6. 0.9D + 1.0W
7. 0.9D + 1.0E

Symbol:

D	=	Dead Load	Lr	=	Live Roof Load
E	=	Earthquake Load	R	=	Rain Load
L	=	Live Load	W	=	Wind Load