Reference: *Riferimento*	20000 M3 LNG STORAGE PLANT FOR GNLMED
Job nr: *Commessa*	GH120
Subject: *Oggetto*	**Project Base Data**
Ref docs *Doc. di riferimento:*	GH120-DST-001 Technical specification

Allegati:
GH120-DST-003 Att.A – Plant locations

REV	DATE	DESCRIPTION	PREP.	CHD.	APP.
4	29/03/2024	Modified Att.A for site layout	RA	GB	FE
3	16/02/2024	Added the second marine loading arm to C bay	RA	GB	FE
2	26/10/2023	Added BIO-LNG, locations modified	RA	GB	FE

INDEX

1 SCOPE

This document resumes the project base data in terms of:

- Environment data
- Process Data
- Utilities
- Electric Supply Data

LEGEND:

CGFSS	Cargo and Gas Fuel Supply System
BL	Battery limit
BOG	Boil off gas
BOR	Boil off rate
GW	Glycol Water
IP	Ingress Protection rating
TBD	Data To Be Defined

2 APPLICABLE RULES AND REGULATIONS

Here below, there are the principal rules and standards that will be used for the design, further rules will be added during the detailed design.

RULES AND REGULATIONS	
EN 1473:2016	Liquefied natural gas installation and equipment – design of onshore installations
2014/34/EU	ATEX Directive
IEC 60079-10-1	Atmosfere esplosive – Classificazione dei luoghi – Atmosfere esplosive per presenza di gas
2014/68/EU	Direttiva concernente l'armonizzazione delle legislazioni degli Stati membri relative alla messa a disposizione sul mercato di attrezzature a pressione (PED)
2006/42/EC	Direttiva macchine

In addition, the plant is designed to fulfil the requirement from the risk-hazard study, done in compliance with the following rules:

2012/18/EU	Seveso III Directive
DLGS 105/2015	Attuazione della direttiva 2012/18/UE relativa al controllo del pericolo di incidenti rilevanti connessi con sostanze pericolose
IMPIANTI DI STOCCAGGIO GNL	Guida tecnica prevenzione incendi stoccaggi GNL set 2018
DM 09/05/2001	Requisiti minimi di sicurezza in materia di pianificazione urbanistica e territoriale per le zone interessate da stabilimenti a rischio di incidente rilevante
DM 19/03/2001	Procedure di prevenzione incendi relative ad attivita' a rischio di incidente rilevante

3 ENVIRONMENTAL DATA

ID	DESCRIPTION	VALUE
3.1	**Average daily (24h) temperature**	+20°C
3.2	**Maximum Sun bare metal temperature**	+60°C
3.3	**Design Ambient Temperature**	5 / +30°C
3.4	**Reference ambient Temperature for BOG/BOR calculation**	30°C
3.5	**Wind velocity for process calculation (Heat ingress)**	5 m/s
3.6	**Design Wind velocity**	28 m/s
3.7	**Average Relative Humidity**	76 %
3.8	**Minimum atmospheric pressure**	983 mbar
3.9	**Normal atmospheric pressure (average)**	1013 mbar
3.10	**Maximum atmospheric pressure**	1036 mbar
3.11	**Site elevation**	Sea level
3.12	**Seismic zone**	• Seismic zone 3: area with low seismic hazard • $0,05<a_g<0,15$ g – acceleration with probability of exceeding 10% in 50 years • 0,15 g – conventional maximum horizontal acceleration

4 DESIGN DATA FOR ELECTRICALS AND MACHINERY

ID	Location	Min IP	Hazard. Area	Ambient Temp.	Environment	Noise Level	Painting/ Corrosion
1	INSIDE TANK	IPx8	Zone 0	-165 / +40°C	-	n.a	n.a.
2	TK1xy1 PROCESS AREA	IP 65	Zone 2	5 / +30°C	Open area	≤ 85 dB @1m [(1)]	Marine environment
3	TK1xy1 INTERCONNECTING RACK	IP 65	Zone 2	5 / +30°C	Open area	≤ 85 dB @1m [(1)]	Marine environment
4	FLARE EQUIPMENT AREA	IP 65	Zone 2	5 / +30°C	Open area	≤ 85 dB @1m [(1)]	Marine environment
5	TRUCK BAYS AREA	IP 65	Zone 1	5 / +30°C	Under shelter	≤ 85 dB @1m [(1)]	Marine environment
5.1	TRUCK BAYS AREA (SdCT)	IP 54	Zone 1	5 / +30°C	Enclosed space		Std painting for enclosed space
6	PROCESS EQUIPMENT AREA	IP 65	Zone 2	5 / +30°C	Open area	≤ 85 dB @1m [(1)]	Marine environment
7	GAS GENERATORS AREA	IP 65	Zone 2	5 / +30°C	Open area	≤ 85 dB @1m [(1)]	Marine environment
8	JETTY AREA	IP 65	Zone 2	5 / +30°C	Open area	≤ 85 dB @1m [(1)]	Marine environment
8.1	JETTY AREA (SdCB)	IP 54	Zone 2	5 / +30°C	Enclosed space		Std painting for enclosed space
9	COOLING WATER EQUIPMENT AREA	IP 65	Zone 2	5 / +30°C	Open area	≤ 85 dB @1m [(1)]	Marine environment
10	AIR/N2 EQUIPMENT AREA	IP 54	Zone 2	5 / +30°C	Enclosed space	≤ 85 dB @1m [(1)]	Std painting for enclosed space
11	FIREFIGHTING EQUIPMENT AREA	IP 54	Safe area	5 / +30°C	Enclosed space	≤ 85 dB @1m [(1)]	Std painting for enclosed space
12	MOTOR CONTROL CENTER ROOM	IP 54	Safe area	5 / +30°C	Enclosed space with ventilation	≤ 85 dB @1m [(1)]	Std painting for enclosed space
13	ENTRANCE AREA	IP 65	Safe area	5 / +30°C	Open area	≤ 85 dB @1m [(1)]	Marine environment
13.1	ENTRANCE AREA (SdCE)	IP 54	Safe Area	5 / +30°C	Enclosed space		Std painting for enclosed space
14	OFFICE AREA	IP 54	Safe area	5 / +30°C	Enclosed space	≤ 85 dB @1m [(1)]	Std painting for enclosed space
15	RAINWATER PUMPS AREA	IP 65	Safe area	5 / +30°C	Underground	≤ 85 dB @1m [(1)]	Marine environment

[1] If vendor is not able to guarantee, shall declare the achievable value, and personnel will be equipped with proper ear protection.

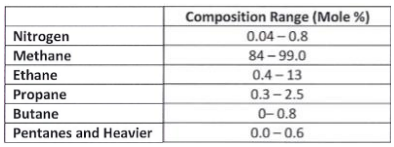
4.1 HAZARDOUS AREA DATA

For item located in hazardous area (Zone 0-1-2), following minimum requirements shall be fulfilled.

ID	DESCRIPTION	VALUE
4.1	**Group of Gas**	IIA
4.2	**Equipment Group**	II
4.3	**Type of explosive atmospheres**	G
4.4	**Protection method**	In accordance with related zone (0,1,2) - Zone 0: Ex ia - Zone 1/2: Ex ib or better, Ex d
4.5	**Temperature class**	T1 (<400°C)

5 PRODUCT SERVICES

5.1 LIQUID PRODUCT – LNG

ID	DESCRIPTION	VALUE
5.1.1	**Name**	METHANE, REFRIGERATED LIQUID or NATURAL GAS, REFRIGERATED LIQUID, with high methane content
5.1.2	**UN Number**	1972 (1)
5.1.3	**Composition Range**	
5.1.4	**Rated composition for calculation and items rated points**	
5.1.5	**Density Range**	**MIN** 420 kg/m³ | **RATED** 443 kg/m³ | **MAX** 470 kg/m³
5.1.6	**Density for structural calculation**	500 kg/m³
5.1.7	**LHV**	**MIN (8% N2)** 43,2 MJ/kg | **RATED** 49,5 MJ/kg | **MAX (100% CH4)** 50 MJ/kg[2]
	LINES DESIGN	
5.1.8	**Maximum liquid velocity**	10 m/s
5.1.9	**Design Pressure**	17 barg
5.1.10	**Design Temperature**	-165 / +40°C, for supply lines to truck/BV/vaporizer/reliquefier, loading from jetty and truck/jetty recirculation.
		-180 / +40°C, for reliqufier recirculation return lines
		-196 / +40°C, for tank loading/cooling down lines
		-196 / +60°C, for vaporizer inlet line (not insulated) for LIN vaporization

Composition Range (Mole %)	
Nitrogen	0.04 – 0.8
Methane	84 – 99.0
Ethane	0.4 – 13
Propane	0.3 – 2.5
Butane	0– 0.8
Pentanes and Heavier	0.0 – 0.6

Standard (Mole %)	
Nitrogen	0.3
Methane	94.0
Ethane	4.7
Propane	0.8
Butane	0.2
Pentanes and Heavier	0.0

5.2 VAPOUR PRODUCT – BOG

ID	DESCRIPTION	VALUE
5.2.1	**- Min N2 content** **- Max N2 content**	0% mol (pure methane) 8% mol (92 %mol methane)
5.2.2	**Composition and relevant data**	**Eq. BOG @ 0 barg, -161,8°C**

[2] For TOH capacity calculation

		Methane 91,8 % **Ethane** 0,0 **Propane** 0,0 **Butane** 0,0 **Pentanes+** 0,0 **Nitrogen** 8,2 %
LINES DESIGN		
5.2.3	**Maximum vapor velocity**	40 m/s
5.2.4	**Design Pressure**	10 barg
5.2.5	**Design Temperature**	-165 / +40 °C, for vapour header, for truck/jetty vapour return line
		-165 / +60 °C for BOG supply to GF line
		-196 / +60 °C, for vaporizer outlet (not insulated) line for LIN vaporization
5.2.6	**Temperature for process calculation**	-150 °C

5.3 GAS FUEL - GF

ID	DESCRIPTION	VALUE
5.3.1	**- Min N2 content** **- Max N2 content**	0% mol (pure methane) 8% mol (92 %mol methane)
5.3.2	**Max oil content**	n/a
5.3.3	**Working pressure range** **(free flow to gas users ramp BL)**	Min = 0.15 barg Max = 3 barg
5.3.4	**Working temperature range**	Min= -10°C (GF superheaters min inlet) Min = +0°C (GF superheaters min outlet) Max = +40°C (T ambient max)
5.3.5	**Composition/Methane Number**	As per BOG/LNG composition
LINES DESIGN		
5.3.6	**Maximum vapor velocity**	40 m/s
5.3.7	**Design Pressure**	10 barg
		1.5 barg for flare ignition line and generators inlet line
5.3.8	**Design Temperature**	+5 / +60 °C, for GF lines downstream gas superheaters
		-45 / +60 °C, for GF lines upstream gas superheaters

5.4 DRAIN – D

ID	DESCRIPTION	VALUE
LINES DESIGN		
5.4.1	**Design Pressure**	17 barg
5.4.2	**Design Temperature**	-165 / +60 °C

5.5 FLARE – F

ID	DESCRIPTION	VALUE
	LINES DESIGN	
5.4.1	**Design Pressure**	3,5 barg
5.4.2	**Design Temperature**	+5 / +60 °C
		-165 / +60 °C

5.6 LIQUEFIED NITROGEN - LN

ID	DESCRIPTION	VALUE
	LINES DESING	
5.4.1	**Maximum liquid velocity**	10 m/s
5.4.2	**Design Pressure**	17 barg
5.4.3	**Design Temperature**	-196 / +60 °C

6 UTILITIES

6.1 COOLING WATER - CW

ID	DESCRIPTION	VALUE
6.1.1	**Working Pressure @ reliquefier flange**	Min = 1 barg Max = 5 barg
6.1.4	**Reliquefier required inlet temperatures**	Min = +5°C
		Normal = +15°C
		Max = +36°C
6.1.5	**Composition**	Glycol Water 20%wt MEG
6.1.6	**Allowed Maximum Temperature rise @reliquefier IN/OUT**	7°C
LINES DESIGN		
6.1.7	**Maximum Liquid velocity**	2 m/s
6.1.8	**Design Pressure**	6 barg
6.1.9	**Design Temperature**	+60 °C

6.2 NITROGEN - N

ID	DESCRIPTION	VALUE
6.2.1	**Working Pressure range**	Min = 5,0 barg Max = 9,0 barg
6.2.2	**Minimum N2 purity**	> 95,0%vol
6.2.3	**Purity Classes** **- Dust** **- Water** **- Oil**	ISO8573-1 [2:*:1] Class 2 *: Pressure Dew Point ≤ -55 °C @ 8 barg Class 1
LINES DESIGN		
6.2.4	**Maximum Vapour velocity**	40 m/s
6.2.5	**Design Pressure**	10,0 barg
6.2.6	**Design Temperature**	+5 / +60 °C
		-165 / +40 °C, for process cryogenic purging fixed lines

6.3 INSTRUMENT AIR - IA

ID	DESCRIPTION	VALUE
6.3.1	**Working Pressure Range**	Min = 5,0 barg Max = 9,0 barg
6.3.2	**Purity Classes** **- Dust** **- Water** **- Oil**	ISO8573-1 [2:*:1] Class 2 *: Pressure Dew Point ≤ -10 °C @ 9 barg Class 1
LINES DESIGN		

6.3.3	**Maximum Vapour velocity**	40 m/s
6.3.4	**Design Pressure**	10,0 barg
6.3.5	**Design Temperature**	+5 / +60 °C

6.4 PLANT AIR – PA

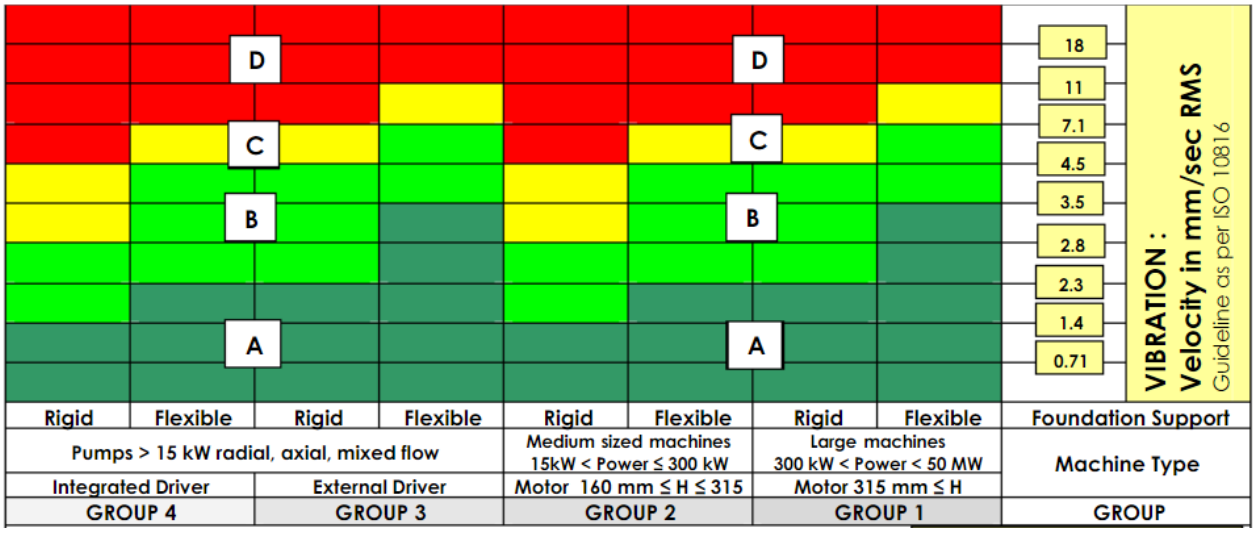
ID	DESCRIPTION	VALUE
6.4.1	**Working Pressure Range**	Min = 8,0 barg Max = 9,0 barg
6.4.2	**Pressure Dew Point**	<-10°C @ 7,0 barg
6.4.3	**Purity Classes** - **Dust** - **Water** - **Oil**	ISO8573-1 [2:4:3] Class 2 Class 4: Pressure Dew Point ≤ 3°C @ 9 barg Class 3
	LINES DESIGN	
6.4.4	**Maximum Vapour velocity**	40 m/s
6.4.5	**Design Pressure**	10,0 barg
6.4.6	**Design Temperature**	+5 / +60 °C

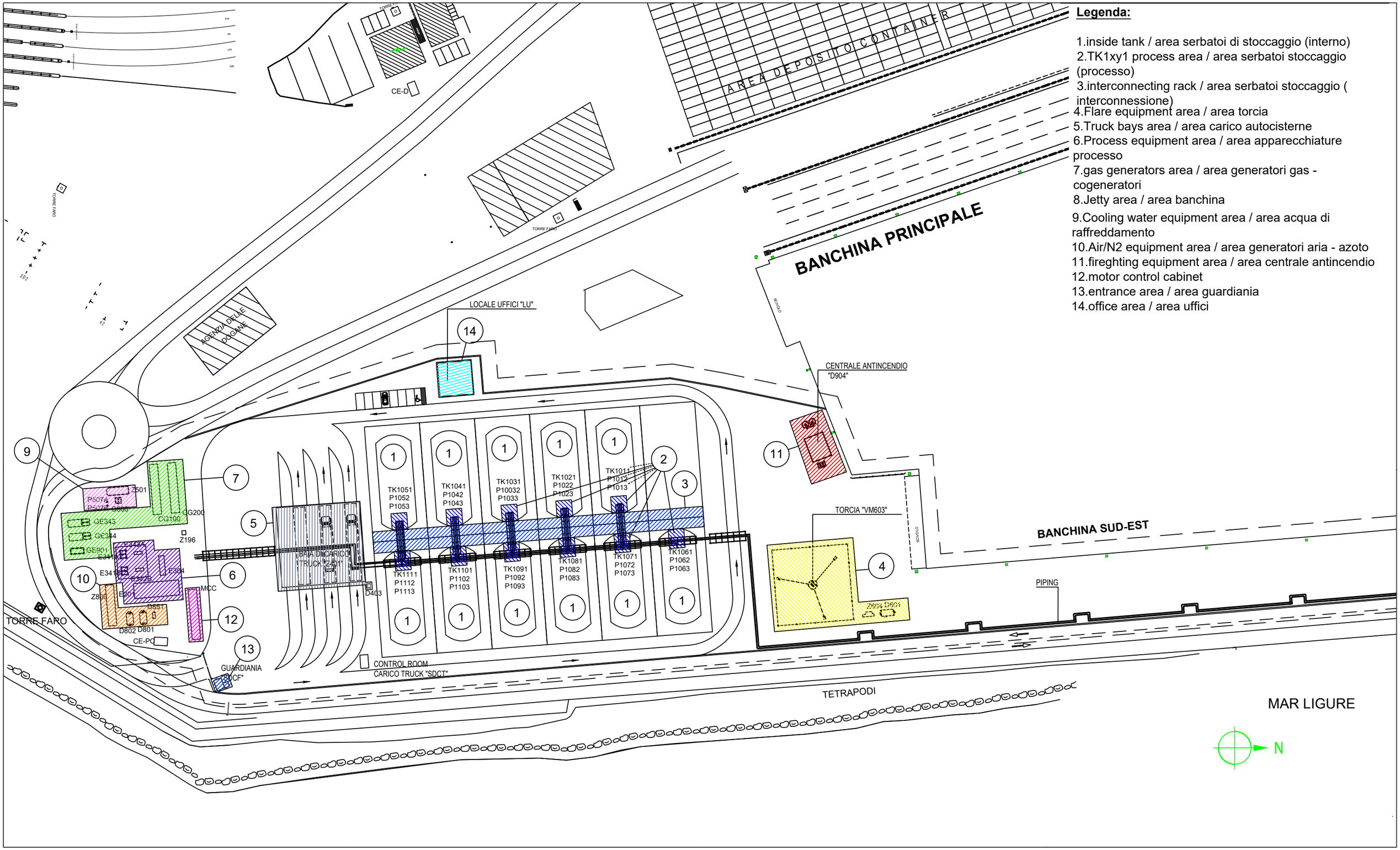
7 ELECTRIC INSTALLATION DATA

ID	DESCRIPTION	VALUE
7.1	**Main power**	AC / 400 V / 50 Hz / 3 ph + n
7.2	**Control Panels, Electric heaters**	AC / 220 V / 50 Hz / 1 ph. + n or 1ph + 1 ph
7.3	**Instrumentation, Signal processing**	DC / 24 V
7.4	**Voltage variations**	Steady ≤ 2.5%
7.5	**Frequency variations**	Steady ≤ 1.5% Max dip ≤ 10%
7.6	**Harmonic distorsion**	≤ 5%

8 VIBRATION

ID	DESCRIPTION	VALUE
10.1	**Vibration produced by Machinery/ Equipment**	In accordance to ISO10816 -ZONE B below





Legenda:

1. inside tank / area serbatoi di stoccaggio (interno)
2. TK1xy1 process area / area serbatoi stoccaggio (processo)
3. interconnecting rack / area serbatoi stoccaggio (interconnessione)
4. Flare equipment area / area torcia
5. Truck bays area / area carico autocisterne
6. Process equipment area / area apparecchiature processo
7. gas generators area / area generatori gas - cogeneratori
8. Jetty area / area banchina
9. Cooling water equipment area / area acqua di raffreddamento
10. Air/N2 equipment area / area generatori aria - azoto
11. fireghting equipment area / area centrale antincendio
12. motor control cabinet
13. entrance area / area guardiania
14. office area / area uffici

LEGENDA

vedi sh. 1

BANCHINA PRINCIPALE

N

JETTI CONTROL ROOM
CARICO NAVI "SDCB"

BRACCI DI CARICO
NAVE "BC701"

PIPING

BANCHINA SUD-EST

8

PUNTO DI ATTRACCO
"ACCOSTO C"

MAR LIGURE