



**PARIKH AND KULKARNI
CONSULTING ENGINEERS
PRIVATE LTD.**

BRANCH OFF.: UNIT NO.305, 3RD FLOOR, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NR. METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI (E), MUMBAI 400 066.

TEL: 022-49686174, 022-20891367, 8591266838, 9324086350.

EMAIL: pkplmumbai@gmail.com, shivajiwandre@gmail.com.

CIN NO.: U74140MH1987PTC045079

DESIGN BASIS REPORT

FOR PROPOSED FACTORY BUILDINGS AND ALLIED WORKS

AT

PLOT T6-02, SAIF ZONE,

SHARJAH, U.A.E.

FOR

M/S CONCORD ENVIRO FZE

P.O. BOX 120940

SAIF ZONO

SHARJAH, UNITED ARAB EMIRATES

OWNER

M/S CONCORD ENVIRO FZE

P.O. BOX 120940, SAIF ZONE

SHARJAH, UNITED ARAB EMIRATES.

PROJECT MANAGEMENT CONSULTANT

PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD.

UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066.

PHONE: 9324086350, 7021352860, 022-49686174, 022-20891367

EMAIL: pkplmumbai@gmail.com, shivajiwandre@gmail.com.



**PARIKH AND KULKARNI
CONSULTING ENGINEERS
PRIVATE LTD.**

BRANCH OFF.: UNIT NO.305, 3RD FLOOR, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NR. METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI (E), MUMBAI 400 066.

TEL: 022-49686174, 022-20891367,8591266838, 9324086350.

EMAIL:pkplmumbai@gmail.com, shivajiwandre@gmail.com.

CIN NO.: U74140MH1987PTC045079

CONTENTS

DATE: 05.12.2024

Sr. No.	Description	Page No.
1)	INTRODUCTION	3
2)	EXECUTIVE SUMMARY	6
3)	PROJECT ESTIMATED COST	10
4)	PROJECT COMPLETION PERIOD	11
5)	BUILDING DESIGN DBR	12 TO 36



PARIKH AND KULKARNI CONSULTING ENGINEERS PRIVATE LTD.

BRANCH OFF.: UNIT NO.305, 3RD FLOOR, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NR. METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI (E), MUMBAI 400 066.

TEL: 022-49686174, 022-20891367,8591266838, 9324086350.

EMAIL:pkplmumbai@gmail.com, shivajiwandre@gmail.com.

CIN NO.: U74140MH1987PTC045079

1. INTRODUCTION

It is a greenfield project to develop an assembly unit to assemble systems and plants for treatment of water and wastewater and related membrane modules. The development includes construction of two buildings and a foundation to provide an open working area.

We confirm we are not related to the Company and any of its Promoters, Directors and Promoter Group members.

This document briefs the **Design Basis** of proposed assembly unit to assemble membrane elements, modules and systems as given hereunder. The document also briefs the **Basic Engineering** and **Deliverables**.

This document is prepared to define the design philosophy and carryout the basic engineering so as to provide a budgetary cost of the project.

1.1 SET-UP OF THE DOCUMENT

The basic detail engineering has been Grouped as follows:

Basic considerations	:	Starting points, underlying philosophy
Functional requirements	:	What the assembly unit must provide
Operational requirements	:	How the assembly unit shall be designed and operated
Design philosophy	:	Guideline of the design
Costing and scheduling	:	Primary budget and schedule

1.2 LOCATION AND SITE DETAILS

The site is located at:

PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.

Coordinates are : 25°20'35.8"N 55°30'10.7"E

Google location: <https://goo.gl/maps/g3fedaPqXuQ1Qhxz8>



PARIKH AND KULKARNI CONSULTING ENGINEERS PRIVATE LTD.

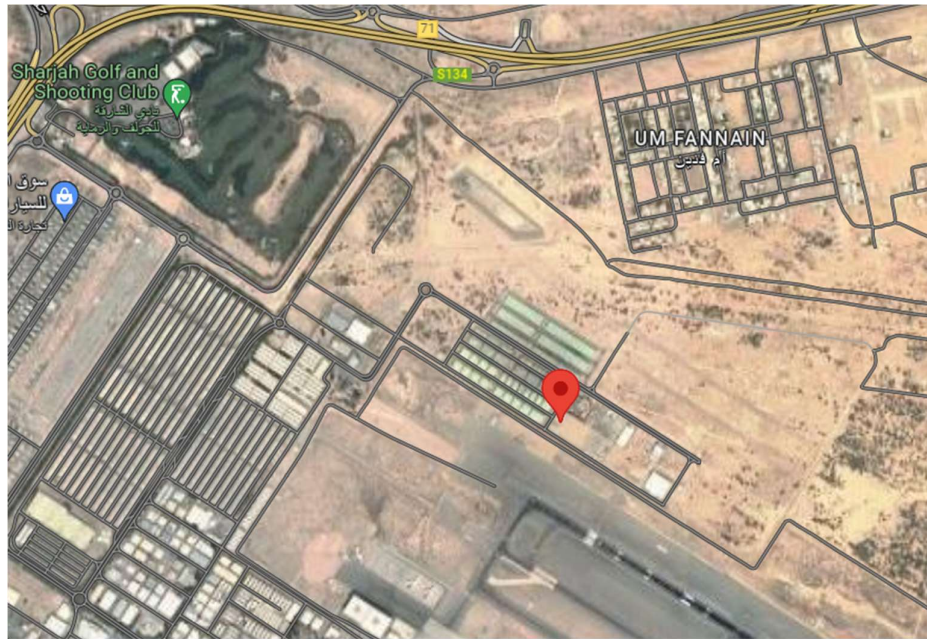
BRANCH OFF.: UNIT NO.305, 3RD FLOOR, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NR. METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI (E), MUMBAI 400 066.

TEL: 022-49686174, 022-20891367, 8591266838, 9324086350.

EMAIL:pkplmumbai@gmail.com, shivajiwandre@gmail.com.

CIN NO.: U74140MH1987PTC045079

The land has been leased from Sharjah Airport International Free Zone, Government of Sharjah. The lease is for an initial term of one year and automatically renews every year. The next renewal is due on 20th November 2025. As per the tenancy contract, the annual rent is fixed for the first 5 years and can be increased thereafter up to a maximum of 25% in each five-year term up to the 25th year.



Total Land In Sq. Ft	Land To Be Utilized In Sq. Ft. For Building I & II	Land To Be Utilized In Sq. Ft. For Assembly With Foundation	Remaining Land To Be Utilized In Sq. Ft. For Open Area
129,167	21,304	17,517	90,346

DETAILS OF LAND: "The land has been leased from Sharjah Airport International Free Trade Zone. The lease is for an initial term of one year and automatically renews every year. The annual rent can be increased up to a maximum of 25% every 5 years for a period up to 25 years"

Name of Company requesting assessment	Concord Enviro Fze
Purpose of assessment	Greenfield Construction of an assembly unit to assemble systems and plants and membrane modules
Date of assessment and validity	5 December 2024 . This assessment is valid for 2 years.



PARIKH AND KULKARNI CONSULTING ENGINEERS PRIVATE LTD.

BRANCH OFF.: UNIT NO.305, 3RD FLOOR, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NR. METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI (E), MUMBAI 400 066.

TEL: 022-49686174, 022-20891367, 8591266838, 9324086350.

EMAIL: pkplmumbai@gmail.com, shivajiwandre@gmail.com.

CIN NO.: U74140MH1987PTC045079

Registered office	P6 37 Sharjah Airport Free Zone, Sharjah, UAE
Particulars of the project	Setup of two buildings with mezzanine and construction of an underground water tank and development of an open area for assembly of containerized units
Project Site	PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E. Coordinates are : 25°20'35.8"N 55°30'10.7"E
Ownership of site	The site is being leased from the Sharjah Airport Free Zone
Project cost and Duration	250.00 Million INR
Present status	The land is in possession of the company. The company will initiate approvals for construction in January 2025.
Benefits expected from facility	<p>The company is investing this unit in Sharjah as it caters to the global business of the company and is the source of many raw materials that are required to assemble systems and plants for its clients. With increased assembly capacity in Sharjah, the company will be able to better meet the demand for its international clients and allow its Indian facilities to focus on the requirement of the Indian market.</p> <p>The expanded capacity will provide for its growing order book for membranes and expand its manufacturing capabilities to include new products such as waste heat evaporator modules and containerized plants</p>

The following are the details of the expanded capacity and product portfolio of the Company, upon completion of the U.A.E Project.

Facility	Expanded capacity	Products
Sharjah	Modules – 2,000 nos. per month 50,000 sq. mtrs. per year Systems – 36 units per year	Membrane modules WHE modules Containerised plants



PARIKH AND KULKARNI CONSULTING ENGINEERS PRIVATE LTD.

BRANCH OFF.: UNIT NO.305, 3RD FLOOR, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NR. METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI (E), MUMBAI 400 066.

TEL: 022-49686174, 022-20891367,8591266838, 9324086350.

EMAIL:pkplmumbai@gmail.com, shivajiwandre@gmail.com.

CIN NO.: U74140MH1987PTC045079

2. EXECUTIVE SUMMARY

2.1 ASSEMBLY UNIT DESIGN: The proposed development consists of the following-

- a) Main building is proposed to have two areas called Building I and Building II with height of 5m from plinth level which will be 600mm from made up ground level.
- b) Proposed construction at this stage is Building I and II “The constructions approvals need to be submitted to Sharjah Airport International Free Trade Zone Engineering Department as mentioned below”.
- c) Building I and II with air-conditioned Office of 2000.00Sq.ft on the Mezzanine floor.
- d) An open area is planned of 17,517sq. ft. with foundation for providing an assembly and storage area for the containerized systems and plants.
- e) Development of compound wall for the areas where there is no boundary currently.
- f) Underground water tank of 20kl capacity (Fresh water 15.00kl and Grey water 5.00kl).
- g) Overhead water tank on building I and II.
- h) Sewage collection pit.
- i) Fire water tank.
- j) Wastewater tank (2 nos. Domestic waste and Process waste).
- k) Recycled water tank.
- l) Process solid waste area 5 T bin at one location.

The assembly construction is planned for May 2025. The process to obtain approvals shall be commenced in January 2025

The Assembly Unit will assemble modules, elements and systems for water and wastewater treatment. The products will include both current and new design membrane module products and will help expand the production capacity for membrane module and systems assembly in order to cater to the international markets of the Company.

2.2 Approvals

To develop the site the following approvals will be required prior to commencement of construction activities.

Stage	Applicant	Approval	Authority	Status
-------	-----------	----------	-----------	--------



PARIKH AND KULKARNI CONSULTING ENGINEERS PRIVATE LTD.

BRANCH OFF.: UNIT NO.305, 3RD FLOOR, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NR. METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI (E), MUMBAI 400 066.

TEL: 022-49686174, 022-20891367, 8591266838, 9324086350.

EMAIL: pkplmumbai@gmail.com, shivajiwandre@gmail.com.

CIN NO.: U74140MH1987PTC045079

Pre-construction	Consultant	Civil Defense Approval	Sharjah Civil Defense (Ministry of Interior)	Not applied for. 2 months required for approval.
Pre-construction	Consultant	Electricity, Water, Sewage (Utilities) Approvals	Sharjah Electricity and Water Authority (SEWA)	Not applied for. 1 month required for approval.
Pre-construction	Consultant	Design & Engineering Approval	Engineering Department, SAIF Zone	Not applied for. 3 months required for approval.
Construction	Consultant	Building Permit	Engineering Department, SAIF Zone	Not applied for. 3 months required for approval.
Completion	Consultant	Civil Defense NOC	Sharjah Civil Defense (Ministry of Interior)	Not applied for. Up to 4 months required for approval.
Completion	Consultant	SEWA NOC	Sharjah Electricity and Water Authority (SEWA)	Not applied for. 1 month required for approval.
Completion	Consultant	SAIF Zone NOC	Engineering Department, SAIF Zone	Not applied for. 2 months required for approval.

The time period required for obtaining the above approvals is 3-4 months. Since all three authorities are based within the SAIF zone, the approvals process is seamless. As of the date of the report no approvals have been initiated. The Company will file necessary applications for the U.A.E Project with the relevant authorities for obtaining such approvals as applicable, for the post construction stages.

2.2 ASSEMBLY UNIT CRITERIA

- a) Approximate 16.5% of plot area is proposed for development which includes building I and II and further 13.57% for development of open area with foundation for assembly of containerized units.



PARIKH AND KULKARNI CONSULTING ENGINEERS PRIVATE LTD.

BRANCH OFF.: UNIT NO.305, 3RD FLOOR, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NR. METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI (E), MUMBAI 400 066.

TEL: 022-49686174, 022-20891367, 8591266838, 9324086350.

EMAIL: pkplmumbai@gmail.com, shivajiwandre@gmail.com.

CIN NO.: U74140MH1987PTC045079

- b) Assembly unit shall comply with local statutory rules and regulations. The approvals required are stated in 2.2 above.
- c) The following are the details of the expanded capacity and product portfolio of the Company, upon completion of the U.A.E Project :

Facility	Expanded capacity	Products
Sharjah	Modules – 2,000 nos. per month 50,000 sq. mtrs. per year Systems – 36 units per year	Membrane modules WHE modules Containerised plants

- d) ELECTRICITY: “The required electrical connection is 45HP.”
- e) WATER: “The required water for consumption is 20,000ltrs. Per day”

Applications for Electricity and Water connections shall be made to SEWA during the approval phase, as stated in 2.2 above. Both power and water connections are available at the leased plot from SEWA.

2.4 ASSEMBLY UNIT FUNCTIONS

- a) Administration and workers amenities.
- b) Production
- c) Quality control and QA
- d) ETP
- e) Water storage and recycling
- f) Warehousing
- g) Fire hydrant system

2.5 ASSEMBLY UNIT LOCATION

The site is located at PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E. The plot is located within Sharjah Airport International Free Zone. The SAIF zone is a Free Trade Zone developed by the Sharjah Government.

All facilities within the zone such as power, water, road infrastructure etc. are provided by the zone for which approvals are required to be made by us.



**PARIKH AND KULKARNI
CONSULTING ENGINEERS
PRIVATE LTD.**

BRANCH OFF.: UNIT NO.305, 3RD FLOOR, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NR. METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI (E), MUMBAI 400 066. **TEL:** 022-20891367, 022-28543658/57, 022-24333657, 9324083650.

EMAIL: pkplmumbai@gmail.com, shivajiwandre@gmail.com. **WEB:** www.pkpl.net,

CIN NO.: U74140MH1987PTC045079

3. PROJECT ESTIMATED COST]

Sr . No.	Description	Area	Unit	Construction Rate		Budget Amount (USD)	Budget Amount (Rupees)
				Unit Cost (USD)	Unit Cost (Rupees)		
1	Building 1	106 52	Sq. ft.	7 2.61	6,150.07	773,441. 72	65,510,513. 68
a	Mezzanine	200 0	Sq. ft.	2 7.05	2,291.14	54,100.0 0	4,582,270.0 0
2	Building 2	106 52	Sq. ft.	7 2.61	6,150.07	773,441. 72	65,510,513. 68
a	Mezzanine	200 0	Sq. ft.	2 7.05	2,291.14	54,100.0 0	4,582,270.0 0
3	Open area with foundation for assembly of containerised systems	175 17	Sq. ft.	2 4.60	2,083.62	430,918. 20	36,498,771. 54
4	Compound and Infra Works including sewage collection pit, fire water tank, overhead water tank, wastewater tank and recycled water tank	129 120	Sq. ft.	4.29	363.36	553,924. 80	46,917,430. 56
5	Underground Water Tank	200 00	litres	2.49	210.90	49,800.0 0	4,218,060.0 0
6	MEP Cost including, firefighting, internals, waste collection bin etc.	1		166,19 4.21	14,076,64 9.59	166,194. 21	14,076,649. 59
7	Miscellaneous Costs & Contingencies					95,673.2 1	8,103,520.9 5
Total Investment Required						2,951,59 3.86	250,000, 000.00

Please Note:

1. The construction cost is converted from USD to INR at an exchange rate of Rs.84.70 /USD which was prevalent on 5 December 2024.

2. The MEP costs cover the required electrical, mechanical, fire fighting, HVAC etc.



PARIKH AND KULKARNI CONSULTING ENGINEERS PRIVATE LTD.

BRANCH OFF.: UNIT NO.305, 3RD FLOOR, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NR. METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI (E), MUMBAI 400 066. **TEL:** 022-20891367, 022-28543658/57, 022-24333657, 9324083650.

EMAIL: pkplmumbai@gmail.com, shivajiwandre@gmail.com. **WEB:** www.pkpl.net,

CIN NO.: U74140MH1987PTC045079

3. The above costs are projected based on the current prices in UAE and adjusted for expected inflation for the construction period of May 2025 to August 2026. The costs are turnkey. The costs are valid for startup of construction of assembly unit up to May 2025.

4. As of the date of this report, no expenditure have been incurred on the project.

The projected fund requirement basis of the work completion is given below (in ₹ million):

Particulars	Total amount to be funded from Net Proceeds	Amount already deployed as on [December 5, 2024]	Estimated amount to be deployed from the Net Proceeds in		
			Financial Year 2025	Financial Year 2026	Financial Year 2027
Construction of Assembly Unit	250.00	Nil	N.A.	180.00	70.00

4. PROJECT COMPLETION PERIOD

Main building and allied works and plot development works: 16 months approximately.

“Commencement of work is planned for May 2025”

The expected work completion is as follows:

Work	Date of Commencement	Date of Completion
Building 1	May 2025	November 2025
Mezzanine	December 2025	April 2026
Building 2	May 2025	March 2026
Mezzanine	April 2026	June 2026
Open area with foundation for assembly of containerised systems	October 2025	March 2026
Compound and Infra Works including sewage collection pit, fire water tank, overhead water tank, wastewater tank and recycled water tank	October 2025	March 2026
Underground Water Tank	October 2025	March 2026
MEP Cost including, firefighting, internals, waste collection bins etc.	April 2026	June 2026
Miscellaneous works	July 2026	August 2026



**PARIKH AND KULKARNI
CONSULTING ENGINEERS
PRIVATE LTD.**

BRANCH OFF.: UNIT NO.305, 3RD FLOOR, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NR. METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI (E), MUMBAI 400 066. **TEL:** 022-20891367, 022-28543658/57, 022-24333657, 9324083650.

EMAIL: pkplmumbai@gmail.com, shivajiwandre@gmail.com. **WEB:** www.pkpl.net,

CIN NO.: U74140MH1987PTC045079

Date of Commercial Operations	September 2026	
-------------------------------	----------------	--

5. Electrical details: The entire land and all buildings will be covered with lighting. The cost of the electrical works is included in the MEP cost above.

6. Firefighting system details:

Both buildings and open work areas will be covered with a fire hydrant system. The cost of the fire hydrant system is included in the MEP cost above.

7. Equipment & Machinery:

The project is to develop an assembly unit for assembly of membrane elements, modules, and systems. Since the process does not involve any machinery, the project does not envisage any investment in equipment and machinery including second hand equipment and machinery.

8. BUILDING DESIGN DBR:

As mentioned below.



**PARIKH AND KULKARNI
CONSULTING ENGINEERS
PRIVATE LTD.**

BRANCH OFF.: UNIT NO.305, 3RD FLOOR, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NR. METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI (E), MUMBAI 400 066. **TEL:** 022-20891367, 022-28543658/57, 022-24333657, 9324083650.

EMAIL: pkplmumbai@gmail.com, shivajiwandre@gmail.com. **WEB:** www.pkpl.net,

CIN NO.: U74140MH1987PTC045079

PROPOSED FACTORY BUILDINGS AND ALLIED WORKS

AT

PLOT T6 – 02, SAIF ZONE,

SHARJAH, U.A.E.

FOR

M/S CONCORD ENVIRO

P.O. BOX 120940

SAIF ZONO

SHARJAH, UNITED ARAB EMIRATES

STRUCTURAL DESIGN NOTE

CIVIL DESIGN CRITERIA

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.							
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES									
CONSULTANT		MAIN CONTRACTOR			DESIGN CONSULTANT				
PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .		_____			_____				
DOC No. :01-CIVIL Design Criteria		CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

TABLE OF CONTENTS

1.0	GENERAL	Page no
1.1	Introduction.....	4
1.2	Scope.....	4
1.3	Units of measurement.....	4
2.0	DESIGN STANDARDS & CODES OF PRACTICES.....	4
3.0	LOADS.....	6
3.1	Dead weight of materials.....	6
3.2	Dead loads.....	7
3.3	Imposed loads.....	8
3.4	Surcharge loads.....	10
3.5	Earth pressure.....	10
3.6	Crane loads.....	10
3.7	Wind loads.....	11
3.8	Seismic loads.....	11
4.0	STRUCTURAL DESIGN PROGRAMS.....	11
4.1	Structural Idealization	12
5.0	DESIGN DETAILS.....	12
5.1	Concrete works.....	12
5.1.1	Materials.....	12
5.1.2	Loads.....	14
5.1.3	Load combinations.....	14
5.1.4	Design.....	16
5.1.5	Cover to Reinforcement.....	16
5.1.6	Anchorage length & Lap length.....	17

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.							
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES									
CONSULTANT		MAIN CONTRACTOR			DESIGN CONSULTANT				
PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .		_____			_____				
DOC No. :01-CIVIL Design Criteria		CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

5.1.7	Concrete below ground.....	18
5.1.8	Deflection.....	18
5.2	Expansion Joints.....	19
5.3	Stability.....	19
5.4	Fire resistance.....	19
5.5	Foundation.....	19
5.5.1	Protections for Foundation.....	19
5.5.2	Transformer Fire walls.....	20
5.5.3	Retaining walls.....	20
5.6	Masonry.....	20
5.7	Compound wall.....	21
5.8	Detailing.....	21
5.9	Structural Steel.....	21
5.9.1	Materials.....	21
5.9.2	Moment capacity.....	22
5.9.3	Maximum slenderness.....	22
5.9.4	Deflections.....	23
5.9.5	Connections.....	23
5.9.5.1	Ordinary bolts.....	23
5.9.5.2	Welding.....	26
6.0	DRAINAGE & PLUMBING.....	27
7.0	PAVEMENT WORKS	28
7.1	Pavement Type.....	28
7.2	Thickness of Surfacing	28

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.						
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES								
CONSULTANT		MAIN CONTRACTOR			DESIGN CONSULTANT			
PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .		_____			_____			
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

1.0 GENERAL

1.1 INTRODUCTION

M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES proposed three buildings and allied works as well as pavement and allied infra works at Plot T6 – 02, SAIF Zone, Sharjah, U.A.E.

1.2 SCOPE

This document describes the general requirements and various design parameters that are to be considered in the design of buildings/structures and other services/utilities for proposed work.

1.3 UNITS OF MEASUREMENT

The units of measurement adopted in design shall be the SI system of units.

2.0 DESIGN STANDARDS AND CODES OF PRACTICES

All design shall be prepared in accordance with British Standards and codes of practices. Seismic analysis shall be as per UBC 1997 & Dubai Municipality Regulations. Various codes of practices being referred to are listed below. Any other British code not listed shall also be considered.

- BS 4 Structural steel sections
- BS EN 197-1 Specification for ordinary and rapid hardening Portland cement
- BS 648 Schedule of weights of building materials
- BS 419 SO metric precision hexagon bolts, screws and Nuts
- BSI BS 4027 Specification for Sulfate resisting Portland Cement.
- BS 4190 ISO metric black hexagon bolts, screws and nuts.
- BS EN 10025 Hot Rolled Products of non Alloy structural Steel

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.						
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES		MAIN CONTRACTOR					DESIGN CONSULTANT	
CONSULTANT		PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .						
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

- BS 4848 Specification for Hot Rolled structural steel Sections
- BS 4449 Specification for hot rolled bars for the Reinforcement of concrete
- BS 8666 Specification for scheduling, dimensioning, Bending and cutting of steel reinforcement for concrete
- BS 4483 Specification for steel fabric for Reinforcement of Concrete.
- BS 5628 Code of practice for structural use of Masonry
- BS 5950 Structural use of steelwork in building
- BSI BS 6031 Code of practice for earthwork
- BS 6323 Structural steel tubes
- BSI BS EN 12056-3 Loading for building
 - Part 1 Code of practice for dead and imposed loads
 - Part 2 Code of practice for wind loads
 - Part 3 Code of practice for imposed roof loads.
- BSI BS EN 1997-1 Code of practice for foundations
- BS 8007 Code of practice for design of concrete structures for retaining aqueous liquid.
- BSI BS 8110-1 Structural use of concrete
- BS EN 752 Part1-4 Code of practice for Building drainage
- CIRIA SP31 Guide to concrete construction in Gulf region Special Publication 31.
- UBC 1997 Earthquake resistant design of structures.
- BSI BS 812-100 Code of practice for Testing Aggregates
- BS EN 12620+A1 Specifications for Aggregates from National Sources
- BS EN 12390-4 Testing of concrete
- BSI BS 4550-0 Method of Testing of Cement
- BS 5075 Concrete Admixtures
- BS 5606 Guide in Accuracy in buildings.
- BS 6073 Pre cast Concrete Masonry Units
- BSI BS 5328 Methods for specifying concrete mixes.
- BSI BS EN ISO 14688-1 Code for practice for Site Investigation.

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.						
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES								
CONSULTANT		MAIN CONTRACTOR			DESIGN CONSULTANT			
PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .		_____			_____			
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

Note: All the used standards shall be of latest edition.

3.0 LOADS

3.1 Dead weight of materials

- Reinforced cement concrete 25.00 kN/m³
 - Floor screed 24.00 kN/m³
 - Lightweight concrete 12.00 kN/m³
 - Structural Steel 78.50 kN/m³
 - Unit weight of water 10.00 kN/m³
 - 20 mm Thick Plaster 20.00 kN/m³
 - Unit weight of soil
 - 0.0 to 3.0 m 17.00 kN/m³
 - 3.0 to 5.3 m 21.00 kN/m³
 - 5.3 to 8.0 m 23.00 kN/m³
 - **Partition load**
 - Hollow Block weight (for block 400x200x200) 16.00 kN/m³
 - Thermal Block Work (for block 400x200x250) 16.00 kN/m³
 - Solid Block work (for block 400x200x250) 21.00 kN/m³
- *OR actual weight as per the Manufacturer's catalogues whichever is greater.
- Cement mortar 20.00 kN/m³
 - Ceramic Floor Tiles 0.04x24= 1.00 kN/m²

3.2 DEAD LOADS

3.2.1 GROUND FLOOR

Insulation & Water proofing system	0.25 kN/m ²
Floor Finishes	2.0 kN/m ²
Services Cable trays, bus duct, small equipments, false ceiling & Raised floor HVAC PIPES	2.5 kN/m ²
Partitions	2.0 kN/m ² or actual

CLIENT	PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.							
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES	MAIN CONTRACTOR				DESIGN CONSULTANT			
CONSULTANT	PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .							
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

3.2.3 MEZZANINE FLOOR LOADS

Floor Finishes.	2.00 kN/m ²
Services Cable trays, bus duct, small equipments, false ceiling & Raised floor HVAC PIPES	1.50 kN/m ²
Partitions	2.0 kN/m ² or actual
400 thk Light weight Concrete	5 kN/m ²

3.2.4 ROOF FLOOR LOADS

Roof Loads Cement Sand Screed average 125 mm thk. (Minimum 50 mm)	3.00 kN/m ²
Services Cable trays, bus duct, small equipments, false ceiling & Raised floor HVAC PIPES	1.5 kN/m ²
40 thick Concrete tiles over 40 mm sand mortar under bed.	2.0 kN/m ²
50mm thick Insulation & Water proofing system	0.25 kN/m ²

Note - Partition loads - As line loads on the beam if any (or) as a line load on a strip of the slab if no beams.

1.1 IMPOSED LOADS

1.1.1 Ground Floor Loads

VARIOUS EQUIPMENTS AS DETAILED BELOW	As per manufacturer's specification
Platforms, walkways, Chequered plate & grating covers.	3.00 kN/m ²
Services Cable trays, small equipments, false ceiling, Raised floor & HVAC pipes	2.50 kN/m ³

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.							
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES		MAIN CONTRACTOR			DESIGN CONSULTANT				
CONSULTANT		PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .							
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA	

3.3.3 MEZZANINE Floor Loads

Office, Store, Record Room, Corridor etc.	10 kN/m ² or as per manufacture's specification, whichever is greater.
---	---

3.3.4 Roof Floor Loads

Accessible Roof	1.50 kN/m ²
Inaccessible Roof	0.75 kN/m ²

3.3.5 Fire pump house building & others

Fire Pump room. (Ground floor)	8.0 kN/m ²
--------------------------------	-----------------------

Fire water tank	As per Manufacturer's Specification
Toilet & pantry	3.00 kN/m ²
Outdoor & indoor RC covers (Other than Road Crossings)	20.0 kN/m ²
Outdoor RC covers (At Road Crossings)	33.33 kN/m ²
STAIRS & LANDING	5.00 kN/m ²

3.4 SURCHARGE LOADS

Surcharge of SLW 60 as DIN 1072 will be considered in the analysis & design of all underground structure for the vehicular traffic in the vicinity of the structure, Subject to minimum of 33.33 kN/m².

3.5 EARTH PRESSURE

Earth pressure for walls of tanks etc. (with propped support condition) will be calculated using coefficient of at –rest earth pressure. Earth pressure for cantilever walls like cable trenches will be calculated based on active earth pressure.

Unit weight of soil shall be as per section 3.1 of loads in this design criterion. Other soil parameters shall be considered in the design as per soil investigation report.

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.						
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES								
CONSULTANT		MAIN CONTRACTOR			DESIGN CONSULTANT			
PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .		_____			_____			
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

3.6 CRANE LOADS (Refer Cl 7.0 of BSI BS EN12056-3 Part I)

- a) For loads acting vertically, the maximum static wheel loads shall be increased by 25% for an electric overhead crane or 10% for a hand-operated crane.
- b) For the horizontal forces acting transverse to the rails the following percentage of the combined weight of the crab and the load lifted shall be considered.
10% for an electric overhead crane
5% for a hand-operated crane
- c) For horizontal force acting along the rails,
5% of the static wheel load
- d) The crane manufacturer data if more conservative an electrically operated crane of 7.5 MT capacities in building no. 2 and 3 will be considered.

Monorail load of 2MT will be considered fir Fire Pump room.

Crane Loads are considered as Live Loads.

3.7 WIND LOADS

Wind load shall be calculated based on the specification and as per BSI BS EN 12056 Part 2 ,Using standard methods

Effective Wind speed – 45 m / sec

Dynamic wind pressure $q_s = 0.613 V_e^2$

$$= 1.24 \text{ KPa}$$

Surface Pressure, $P_e = q_s.C_{pe}.C_a$

3.8 SEISMIC LOADS

Seismic analysis shall be carried out as per UBC 1997 and also as per UBC code with Zone (2A).

Therefore the design seismic base shear V_b shall be calculated as per UBC 1997.

Importance Factor = 1.00 considered.

W is Seismic weight of building.

Note: The base shear for wind load and seismic load should be calculated and the design shall be carried out for the governing load case.

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.						
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES		MAIN CONTRACTOR					DESIGN CONSULTANT	
CONSULTANT								
PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .		_____					_____	
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

4.0 STRUCTURAL DESIGN PROGRAMS

Structural design will depend on a group of structural programs as listed below:

ETABS Nonlinear.

Staad-Pro

SAFE

Excel sheets

All designs/checks will be controlled by the British Standards and by the other approved codes of practice.

4.1 STRUCTURE IDEALIZATION

The main building structure comprising of three parts called building 1, 2 and 3 (Ground floor including Mezzanine on part area) is idealized in ETABS as a space frame and each beam and column in the structure is modeled as a line member. The shear walls and floor slabs are modeled as shell elements. The raft is modeled as a slab with shell elements. Area springs are assigned to these shell elements to model soil support to raft.

5.0 DESIGN DETAILS

5.1 Concrete works

5.1.1 Materials

a) Cement

For super structure - OPC, OPC + (GGBS or Micro silica)

For Sub structure - ASTM Type II or OPC / As per Soil investigation report

b) Concrete

The concrete grade used in the various works shall be as follows:

All structural concrete:

The min. cement content for substructure shall be 400 kg/m³

The min. cement content for superstructure shall be 370 kg/m³

Maximum cement content for any structural concrete shall be 480 Kg/m³

Grade C40 with 20 mm downgraded coarse aggregates

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.						
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES								
CONSULTANT		MAIN CONTRACTOR			DESIGN CONSULTANT			
PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .								
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

Maximum free water/Cement ratio-0.42
Compressive strength at 28 days – 40 N/mm²

Pre cast Concrete:
Grade C40 with 20 mm down graded coarse aggregates
Compressive strength at 28 days – 40 N/mm²

Blinding & Plain cement concrete:
Grade C20 with 20 mm down graded coarse aggregates.
Compressive strength at 28 days – 20 N/mm²
Minimum thickness of blinding concrete shall be 75 mm.

c) Reinforcement

Steel reinforcement shall be Type 2: deformed, complying with BS 4449. For design, the specified characteristic strength considered will be as follows:

Grade of steel	Characteristic strength (N/mm ²)
Grade 250	250
Grade 460	460

Diameter of reinforcement bar

Used shall be : 8, 10, 12, 16, 20, 25 & 32

Maximum length of bar : 12 m

d) Welded wire mesh

Steel fabric reinforcement will comply with BS 4483. The preferred range of designated fabric types will be as per table 1 of BS 4483, grade of steel S355.

e) Material strength & allowable stresses as per BSI BS 8110 Part I & II

i) For C40 Concrete:

E Concrete = 28 kN/mm²

E Steel = 200 kN/mm²

Fcu = C40 (40N/mm²)

FY = 460 N/mm²

Coefficient of thermal expansion of concrete = $8 \times 10^{-6} / ^\circ \text{C}$

Poisson's ratio = 0.2

* Note: Steel conforming to BS 4449.

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.						
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES		MAIN CONTRACTOR					DESIGN CONSULTANT	
CONSULTANT								
PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .								
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

Shear stress (BSI BS 8110 Part I clause 3.5.5.2)

Maximum shear stress at any section shall not exceed $0.8 \times \sqrt{f_{cu}}$ or 5 N/mm^2 whichever is lesser.

For C40: $0.8 \times \sqrt{40} = 5.05 \text{ N/mm}^2 > 5.00 \text{ N/mm}^2$

Combined shear and Torsion BSI BS 8110 Part II clause 2.4.5

The sum of shear and torsional stresses shall not exceed

$$\begin{aligned} \text{Exceed } V_{tu} &= 0.8 \times \sqrt{40} \\ &= 5.06 \text{ N/mm}^2 \end{aligned}$$

Design shall comply with requirements as per table 2.4 thereof.

Design ultimate bond stress (BSI BS 8110 Part I table 3.26)

For bars in tension $= 0.50 \times \sqrt{40}$
 $= 3.16 \text{ N/mm}^2$

For bars in compression $= 0.63 \times \sqrt{40}$
 $= 3.98 \text{ N/mm}^2$

Bearing stress inside bends (BSI BS 8110 Part I table 3.12.8.25.2)

The design bearing stress shall be calculated as given below

$$\text{bearing stress} = \frac{F_{bt}}{r\phi} \leq \frac{2f_{cu}}{1 + 2(\phi/a_b)}$$

r = Internal radius of bent.

ϕ Diameter of bar.

a_b = c/c distance between bar

5.1.2 Loads

Various loads to be considered for design shall be as indicated in item 3.0 of this design criterion.

5.1.3 Load combinations

The following load combinations as per UBC-97 shall be considered to determine the maximum stress condition on the structural member. Wind and Seismic loads are considered not to occur simultaneously.

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.						
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES		MAIN CONTRACTOR					DESIGN CONSULTANT	
CONSULTANT								
PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .		_____					_____	
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

I. Load combination for Ultimate Limit State (ULS).

- a) 1.4 Dead + 1.6 Imposed
- b) 1.4 DL + 1.6 Imposed + 1.0 Blast
- c) 1.4 Dead + 1.6 Imposed + 1.6 Crane Load
- d) 1.2 (Dead + Imposed ± Wind)
- e) 1.0 Dead ± 1.4 Wind
- f) 1.4 Dead ± 1.4 Wind
- g) 1.4 Dead + 1.4 Earth
- h) 1.4 Dead + 1.6 Imposed+ 1.4 Earth
- i) 1.1(0.9DL ± 1.0EXUBC ± 0.3EYUBC)
- j) 1.1(0.9DL ± 0.3EXUBC ± 1.0EYUBC)
- k) 1.1(1.2 DL + 1.0 Imposed ± 1.0EXUBC ± 0.3EYUBC)
- l) 1.1(1.2 DL + 1.0 Imposed ± 0.3EXUBC ± 1.0EYUBC)

II. Load combination for the Serviceability Limit State (SLS).

- a.) Dead + Imposed
- b.) Dead + Imposed + Blast
- c.) Dead + Imposed + Crane Load
- d.) Dead + Imposed ± Wind
- e.) Dead ± Wind
- f.) Dead + Earth
- g.) Dead + Imposed + Earth
- h.) Dead + Imposed + Uplift (GWT)*
- i.) 0.9DL ± EXUBC/1.4
- j.) 0.9DL ± EYUBC/1.4
- k.) 1.0DL ± 1.0/1.4EXUBC ± 0.3/1.4EYUBC
- l.) 1.0DL ± 0.3/1.4EXUBC ± 1.0/1.4EYUBC
- m.) 1.0DL + 1.0 Imposed ± 0.75(EXUBC/1.4 ± 0.3EYUBC/1.4)
- n.) 1.0DL + 1.0 Imposed ± 0.75(EYUBC/1.4 ± 0.3EXUBC/1.4)

For calculating Earthquake forces analysis 100 % of live load for all floors shall be considered

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.						
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES								
CONSULTANT		MAIN CONTRACTOR			DESIGN CONSULTANT			
PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .		_____			_____			
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

* GWT- Ground water table

b) **Safety factors**

Minimum factor of safety for overturning in SLS condition	1.5
Minimum factor of safety for sliding in SLS condition	1.5
Minimum factor of safety for Flotation in SLS condition(BS 8007:1987)	1.1

5.1.4 Design

The structure will be designed for Ultimate limit state & Serviceability limit state for the worst combination of Dead loads, Live loads, Crane loads, Wind loads and Seismic loads as applicable. All water or liquid retaining structures shall be designed and checked as per BS 8007 for maximum crack width of 0.20 mm.

In raft design, all reactions were exported to another software-SAFE. The straining actions were checked and raft was designed accordingly.

5.1.5 Clear cover to reinforcement

Concrete cover to outer most reinforcing bar shall be as follows.

All members in contact with soil or blinding	=	75 mm
Columns above ground level	=	40 mm
Beam bottom / top / sides, RC walls	=	40 mm
Slab bottom/ top	=	40 mm
Internal Faces of Basement wall	=	40 mm
Slab / Precast covers	=	40 mm

Note:

- (i) Cover noted is the outside bar regardless of whether it is main or secondary reinforcement.
- (ii) For water or liquid retaining structures, the cover shall be 50 mm minimum.

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.						
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES		MAIN CONTRACTOR					DESIGN CONSULTANT	
CONSULTANT		PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .						
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

5.1.6 Anchorage lengths & lap lengths

The ultimate anchorage bond lengths and lap lengths, as multiples of bar size as indicated in Table 3.27 of BSI BS 8110 Part I, as follows

Concrete cube strength 40 N/mm ²	As multiples of bar size	
Reinforcement type	Grade 250mm plain	Grade 460 Deformed type 2
Tension anchorage & lap length	34	35
1.4 x Tension lap	48	49
2.0 x Tension lap	68	70
Compressive Anchorage length	27	28
Compressive lap length	34	35

The lap length should be increased by a factor 1.4:

- When a lap occurs at the top of section as cast and minimum cover is less than twice the size the lapped reinforcement.
- Where the clear distance between adjacent laps less than 75mm
Or six times the size of the lapped reinforcement.

If both the conditions (a) & (b) occur then lap length should be increased by a factor of 2.0

Minimum lap shall not be less than 50 times the bar size or 300mm whichever is greater.

Lap Location shall be staggered and shall not be at the same location.

Steel fabric Reinforcement

Ultimate anchorage bond lengths as multiples of bar size.

Concrete Grade C40 Wire mesh Grade 460 N/mm ²
--

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.						
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES								
CONSULTANT		MAIN CONTRACTOR			DESIGN CONSULTANT			
PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .		_____			_____			
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

Reinforcement type	Grade 460 Deformed type 2
Tension anchorage & lap length	27
1.4 x Tension lap	38
2.0 x Tension lap	54
Compressive Anchorage length	22
Compressive lap length	27

The lap length should be increased by a factor 1.4:

- Where the minimum cover is less than twice the size of the lapped reinforcement.
 - Where the clear distance between adjacent laps is less than 75mm Or six times the size of the lapped reinforcement.
- If both the conditions (a) & (b) occur then lap length should be increased by a factor of 2.0

Minimum lap length not be less than 250mm.

5.1.7 Concrete below ground

Concrete below ground for Raft and Walls shall be designed as water excluding structures. The water bar shall be provided in all construction joints below the ground level in addition to any joint which may be detailed on the drawing. Waterproofing systems (membranes, protection board, water bar, joint fillers, sealants etc.) shall be as per specification and to be used strictly in accordance with the manufacturer's instruction. Details shall be developed with potential suppliers during the design stage.

5.1.8 Deflection

For RC beams, the span/effective depth ratio shall be as per BSI BS 8110-1 table 3.9 in 3.4.6.3. This is in order to limit the total deflection.

5.2 EXPANSION JOINTS

Expansion joint will be provided if the length of the building or compound wall exceeds 45m. Adequate steel required resisting shrinkage and thermal stresses as per codes and standards would be provided if required.

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.						
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES		MAIN CONTRACTOR					DESIGN CONSULTANT	
CONSULTANT		PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .						
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

5.3 STABILITY

The building will be designed as Intermediate moment resisting frames (IMRF) providing resistance to lateral loads due to wind and seismic forces as per UBC 97 by flexural action of Structural members.

5.4 FIRE RESISTANCE

As per DEWA specifications:

The structure will be designed for a Fire Resistance of 2 hours Fire Rating.

5.5 FOUNDATION

Foundations shall be designed as per specification and soil investigation report. Where the ground is excavated locally for small area for any reason below the underside of proposed foundation, the void shall be filled with concrete C15.If ground water table appears during excavation works, dewatering shall be provided.

5.5.1 Protection of Foundations

A. MAIN BUILDING

All concrete faces in contact with earth, including foundations shall be protected with **4.00mm** thick SBS modified bituminous membrane having non-woven polyester reinforcement of minimum 260 gm/sqm.

B. Boundary wall.

The substructure shall be protected with bituminous waterproofing membrane of minimum **1.50mm** thick self-adhesive type.

5.5.2 Retaining walls

Retaining walls will be designed for the worst combination of earth pressure, hydrostatic pressure & surcharge as applicable.

5.6 MASONRY

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.						
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES		MAIN CONTRACTOR			DESIGN CONSULTANT			
CONSULTANT		PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .						
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

Design of all block work will be carried out in accordance with various provisions of BS 5628

Pre cast concrete blocks shall be in accordance with BS 6073 and shall have a compressive strength of 7.0 N/mm² average for 10 blocks calculated on the gross area of block

Minimum strength of individual block equals to 6.0 N/mm²

Over all U-value shall possess Thermal Conductivity “U” (BTU/hr sq. ft F) not greater than 0.1 BTU/hr sq. ft. for walls and roofs not greater than 0.078 BTU/hr sq. ft. F.

The various types of block work walls used shall be as follows:

S/No	Location	Description
1	Internal	200 mm thick solid block work
2	External	250 mm thick Thermal block consisting of 2-100 mm thick leaves with 50 mm insulation infill.
3	Toilet partition	100 mm thick Solid block work

5.7 COMPOUND WALL

Compound wall & footings will be designed for a basic wind speed of 45 m/sec as per specification with an importance factor of 1.0. If road is within 2 m from compound wall then, Surcharge of SLW 60 as DIN 1072 will be considered in the analysis & design subject to minimum of 33.3 kN/m².

The analysis and design will be carried out for the worst combination of earth pressure & surcharge. Passive resistance of soil inside the plot will be considered as applicable. Expansion joints 25 mm wide will be provided in compound wall at a maximum spacing of 12.0 m c/c.

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.						
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES		MAIN CONTRACTOR					DESIGN CONSULTANT	
CONSULTANT		PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .						
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

5.8 DETAILING

Preparation of bar bending schedule will conform to BS: 8666. The Reinforcement Detailing shall be done as per IMRF of UBC 97 for Zone 2A.

5.9 STRUCTURAL STEEL

5.9.1 Materials

All structural steel should comply to BS EN 10025

Painting system shall comprise of:

- 2-Component inorganic Zinc silicate Primer 75 micron DFT
- 2-Component polyamide cured epoxy with natural micaceous iron oxide 100 micron DFT
- 2-component polyurethane finishing coat – 40 micron DFT.

Design strengths (p_y) as per Table 9 BS 5950- 1:2000

Steel grade	Thickness less than or equal to (mm)	Section plates p_y (N/mm^2)
S275	16	275
	40	265
	63	255
	80	245
	100	235
S355	16	355
	40	345
	63	335
	80	325
	100	315

5.9.2 Moment capacity

The moment capacity of the section is based on the sectional properties of the member and the slenderness of the section and is calculated as per the provisions of BS 5950-1:2000

5.9.3 Maximum slenderness (Refer Cl 4.7.3.2 of BS 5950-1990)

The value of slenderness shall not exceed the following:

- For members resisting loads other than wind loads : 180

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.						
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES		MAIN CONTRACTOR					DESIGN CONSULTANT	
CONSULTANT		PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .						
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

b) For members resisting self weight and wind loads only : 250

c) For any member normally acting as tie but subject to Reversal of stress resulting from the action of wind : 350

5.9.4 Deflections

The maximum permissible deflections shall be as specified in table 8 of BS 5950-1:2000 and as given by crane manufacturer, whichever is critical.

a. Crane Girders

Crane gantry girders vertical deflection Span/600
Crane gantry girders Horizontal deflection Span/500

b. Allowable vertical deflection of beams due to imposed load

Cantilevers

Length/180

Beams carrying plaster or other brittle finish Span/360
Others beams (Except Purlins and sheeting rails) Span/300

c. Horizontal Deflection of columns due to imposed and wind load

Top of Columns in single storey buildings except portal frames Height/200

5.9.5 Connections

5.9.5.1 Ordinary bolts:

Ordinary bolts shall conform to various provisions of BS 3692 & BS 4190

Shear capacity:

Shear capacity P_s = ps As (Refer cl 6.3.2 of BS 5950-1:2000)

Where ps = Shear strength
As = shear area

Bearing capacity:

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.						
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES		MAIN CONTRACTOR					DESIGN CONSULTANT	
CONSULTANT								
PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .								
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

The bearing capacity of bolt

$$P_{bb} = d t p_{bb} \text{ (Refer Cl 6.3.3.2 of BS 5950-1:2000)}$$

Where

- d = nominal diameter
- t = thickness of the connected ply
- p_{bb} = bearing strength

Capacity of connected Part: (Refer Cl 6.3.3.3 of BS 5950-1:2000)

The bearing capacity

$$P_{bs} = K_{bs}.d. t. p_{bs} \leq 0.5 K_{bs}.e. t. p_{bs}$$

(Refer Cl 6.3.3.3 of BS 5950-1:2000)

Where

- p_{bs} = Bearing strength of the connected parts.
- d = Nominal diameter of bolt.
- e = Edge distance
- t = The thickness of part

Tension capacity Pt = pt At (Refer Cl 6.3.4.3 of BS 5950-1:2000)

Where

- pt = tension strength
- At = tensile stress area

Combined shear and tension:

$$F_s / P_s + F_t / P_t \leq 1.4 \text{ (Refer Cl 6.3.4.4 BS 5950-1:2000)}$$

Where

- F_s = Applied shear
- F_t = Applied tension
- P_s = Shear capacity
- P_t = Tension capacity

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.						
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES		MAIN CONTRACTOR			DESIGN CONSULTANT			
CONSULTANT		PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .						
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

Strength of bolts: (Refer Table 30 &31 & 34 of BS 5950-1:2000)

<i>Bolt Grade</i>	Gr 4.6 N/mm ²	Gr 8.8 N/mm ²	Other grades of bolts N/mm ²
Shear strength, ps	160	375	0.4 Ub
Bearing strength, pbb	460	1000	0.7 (Ub + Yb)
Tension strength, pt	240	560	0.7 Ub but ≤ Yb

Where Yb = specified minimum yield strength of the bolt
Ub = Specified minimum ultimate tensile strength of the bolts

Bearing strength pbs of connected parts for ordinary bolts in clearance holes, pbs (Refer Table 32 of BS 5950-1:2000)

<i>S 275</i> N/mm ²	<i>S 355</i> N/mm ²	<i>S460</i> N/mm ²	<i>Other grades of steel N/mm²</i>
pbs =460	pbs =550	pbs =670	pbs =0.67 (Us + Ys)

Where Ys = specified minimum yield strength of the Steel
Us = Specified minimum ultimate tensile strength of the Steel

5.9.5.2 Welding

Fillet welds (Refer Table 37 of BS 5950-1:2000)

The design strength of fillet weld pw shall be as follows:

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.						
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES		MAIN CONTRACTOR					DESIGN CONSULTANT	
CONSULTANT		PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .						
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

Steel Grade	Electrode classification			Other types
	35	42	50	
S275	220	(220)a	(220)a	$pw = 0.5 Ue \text{ but } \leq 0.55 Us$
S355	(220)b	250	(250)a	
S460	(220)b	(220)b	280	
a. Over –matching electrodes. b. Under-matching electrodes. Not to be used for penetration butt Welds				

Where U_e = minimum tensile strength of the electrode based on all weld tensile tests specified in BS 709
 U_s = specified minimum ultimate tensile strength of the steel

Design rules for fillet welds (Refer Cl 6.8.7.2 of BS 5950-1:2000)

The vector sum of the design stress due to all forces and moments transmitted by the weld should not exceed the design strength.

The design stress in a fillet weld should be calculated on a thickness equal to the effective throat size

Design strength of butt welds (Refer Clause 6.9.1 of BS 5950-1:2000)

The design strength of a full or partial penetration butt weld should be taken as equal to that of the parent metal.

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.						
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES								
CONSULTANT		MAIN CONTRACTOR			DESIGN CONSULTANT			
PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .		_____			_____			
DOC No. :01-CIVIL Design Criteria	CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

Minimum size of weld shall be 6 mm.

6.0 DRAINAGE & PLUMBING:

The various systems identified for the project is as follows:

- a) Storm/ surface water drainage
- b) Sewage drainage
- c) Chemical discharge
- d) Indoor potable water

Surface water & sewage drainage shall be separate system. While the surface water shall be collected in main drains leading to a soak away/ holding tank, the sewage drainage will be collected through a system of underground pipes and lead to a septic tank of 6.50 m³ capacity for 20 persons or connected to the DM drain system. UPVC material pipes shall be used for the system.

Plant waste water will be collected to an underground water tank, the capacity for which shall be based on, to contain all waste water and 30 minutes of fire water.

Fire pump house Diesel tank drainage system shall be connected to oil manholes. Fire pump deluge spray system drain shall be connected to storm water network. Chemical discharge will lead to acid/alkali resistant tile lined reinforced concrete neutralization pit.

Manholes will be provided at every change of alignment or gradient or at every 15 m maximum internal and 45 m maximum external in straight run.

The storm water drainage will be designed based on hourly maximum rainfall intensity for roof 75 mm./hr and for site 15 mm/hr.

7.0 Pavement works

7.1 Pavement type

The following types of pavement are to be provided:

Type I

- a) Interlocking concrete blocks to roads within the substation area for vehicular traffic.
- b) Interlocking concrete blocks other than those provided for vehicular traffic.

7.2 Thickness of surfacing

The thickness of surfacing and the types of construction of pavement are detailed as under.

CLIENT		PROJECT: PROPOSED MAIN BUILDING (THREE PARTS) AND ALLIED WORKS AT PLOT T6 – 02, SAIF ZONE, SHARJAH, U.A.E.							
M/S CONCORD ENVIRO, P.O. BOX 120940, SAIF ZONO, SHARJAH, UNITED ARAB EMIRATES									
CONSULTANT		MAIN CONTRACTOR			DESIGN CONSULTANT				
PARIKH AND KULKARNI CONSULTING ENGINEERS (P) LTD. UNIT NO.305, BLUEROSE INDUSTRIAL PREMISES CO-OP SOC. LTD. NEAR METRO MALL, WESTERN EXPRESS HIGHWAY, BORIVALI EAST, MUMBAI 400 066. PHONE: 9324086350, 7021352860, 022-249686174, 022-20891367 EMAIL: pkplmumbai@gmail.com , shivajiwandre@gmail.com .		_____			_____				
DOC No. :01-CIVIL Design Criteria		CALS. BY	WS	DATE 22.05.2022	CHK BY	SCG	DATE 22.05.2022	SHEET : 1	REV No.- RA

Type I a) Access for vehicular access.

Tolerance

- | | |
|-------------------------------|--------------|
| 1) Interlocking block | 80 mm ±3 mm |
| 2) Laying sand course | 50 mm |
| 3) Polythene | 0.5 mm thick |
| 4) Road base after compaction | 200 mm |
| 5) Compacted sub grade | 150 mm |

Type I b) Access for walkways.

- | | |
|-------------------------------|--------------|
| 1) Interlocking block | 60 mm ±3 mm |
| 2) Laying sand course | 50 mm |
| 3) Polythene | 0.5 mm thick |
| 4) Road base after compaction | 200 mm |
| 5) Compacted sub grade | 150 mm |