BFEORE THE NATIONAL GREEN TRIBUNAL
WESTERN ZONE BENCH AT PUNE

APPEAL NO. 15 OF 2023

FEDERATION OF RAINBOW WARRIORS AND ORS. ...APPELLANTS

vs.

UOI & ORS. .... RESPONDENTS

SUR-REJIONDER ON BEHALF OF THE RESPONDENT NO.4, TO THE REJOINDER FILED BY THE APPELLANTS.

I, **SIONA BREITKOPF**, daughter of Mr. Hugo Chico, 53 years of age, Indian Inhabitant, resident of 3B, Amar Apartments, Airport Road, Chicalim,Goa, authorized signatory of the Respondent No. 4 i.e M/s South West Port Limited ("answering respondent") above named having its registered office at Site office, Berth No. 5A & 6A Mormugao Harbour Goa - 403803, do hereby solemnly affirm and state as under:

1. I state that I am the authorized signatory of the Respondent No. 4 and I am conversant with the facts of the present case and duly authorized

Breitkopf

to file the present Affidavit in sur-rejoinder. I am filing the present sur-rejoinder based on the facts which are available from the records of the Respondent No.4. The Respondent no.4, denies all and singular the averments made in the Rejoinder filed by the Appellant dated 30.11.2024 and no averment therein shall be deemed admitted for the lack of a specific traverse, unless specifically admitted herein. The averments which have not specifically been dealt with and/or denied may not be taken as having been admitted.

2. At the outset the Respondent no.4 repeats, reiterates and confirms contents of its affidavit in Reply. For the sake of avoiding prolixity the same is not reproduced herein in *verbatim*. Respondent No.4 denies all that is inconsistent therewith and contrary thereto.

3. Before dealing with the averments of the Appellants in the rejoinder dated 30.11.2024, this answering respondent finds it expedient to place on record certain subsequent developments which are necessary for proper adjudication of the present matter. The subsequent development relates to completion of construction of a Covered Shed undertaken (in terms of the condition of EC) at the

Respondent no.4's berths as a part of adoption of environment protection measures and the mechanization and modernization proposed to be carried out by the Respondent no.4 at its said berths.

4. Respondent no. 4, in its pursuit towards adopting environmentally benign practices and use of environment protection measures for sustainable growth, the Respondent no.4 terminal has adopted state-of-the art pollution control systems in order to prevent any likely pollution. At the outset, the Respondent no.4 repeats and reiterates that its activities at the said berths do not cause any pollution as sought to be wrongly contended by the Appellants. The answering respondent repeat and reiterate that the Respondent no.4, has put in place fully mechanized cargo handling systems equipped with Grab Ship Unloaders with automated sensor controlled aqua dyne water mist system, closed conveyor streams, Stacker cum Reclaimers, In-Motion-Wagon Loading System with Silo, all of which runs on PLC (Programmable Logical Control) controlled systems. All the possible points of dust emissions, i.e. hopper, transfer points, silo-loading

system are controlled by water mist system, which not only controls the dust emission but also prevents any leachate flow.

5. The Respondent no.4 states that in addition to the fully mechanized handling systems, to arrest fugitive dust emissions during stacking and reclaiming of material a pressurized closed loop Aqua Dyne Dust Suppression System with Water Sprinkler on cargo stacks is provided ensuring prevention of any fugitive emissions even during active operations. Any stacking and reclaiming operations are carried out under water sprinklers. Moreover, open areas which are concreted/paved are constantly kept clean by utilizing sweeping machines/water sprinkling as an additional mitigation.

6. The Respondent no.4 states that in order to keep up with the highest standard of pollution control measures the Respondent no.4 has implemented a covered shed, even after recognizing the huge costs involved therein and the inherent difficulties in implementation thereof in a working terminal. In order to mitigate the possibility of any airborne dust emissions and/ or surface water run-off from the cargo stockpiles, the Respondent no.4 has undertaken construction

of a permanent structured longitudinal covered shed (for brevity sake referred to as "covered shed") that will mitigate/ assuage all environmental concerns. The said longitudinal covered shed is about 320 m in length, 135 m span (Covered area: 43200 Sq. m) and 45 m high with Stacker-Reclaimers working inside. The inside-to-inside dimensions of the covered shed are around 320.0 m length x 125.0 m width x 45.0 m height for accommodating the stockpiles, with construction of internal retaining walls for each stockpile plot therein. The covered shed is expected to arrest/ marginalize any fugitive emissions, preventing fine coal particles from flying away etc., thereby reducing probable pollution in nearby surroundings, if any. Also, it would be inter alia equipped with advanced Dust Suppression and firefighting Systems inside the shed. The construction of the said permanent longitudinal covered shed had proactively commenced in June, 2023. The main shed structure is now fully completed, and only allied works—including the installation of fire-fighting systems, Dust Suppression Systems (DSS), and the fire water tank—are currently underway and are

expected to be completed by September, 2025. The estimated total cost incurred for setting up of the covered shed is Rs. 159 Crores.

Photographs demonstrating the construction of the said covered shed are annexed and marked herewith as **ANNEXURE A-1 COLLY**.

The project report for the construction of covered shed prepared by the SANYOJAN, consulting civil engineers is marked and annexed hereto as **ANNEXURE A-2**.

7. The Respondent no.4 states that the construction of the said covered shed will further obviate any likely runoff contamination, and would mitigate any environmental concerns while concomitantly enhancing operational efficiencies. It is stated that the covered shed will reduce coal dust dispersion. By enclosing coal stockpiles and handling areas, these sheds prevent dust from becoming airborne, which can significantly improve air quality in and around port areas. Advanced ventilation and filtration systems can be integrated within the sheds to capture and suppress any dust that may possibly escape, ensuring that emissions are kept to a minimum. The covered shed would

further contain any likely runoff, thus allowing for its proper treatment. By enclosing coal handling operations, noise pollution is also significantly reduced. The structures will also act as sound barriers, ensuring that operational noises are contained within the facility. Needless to state that additionally covered sheds provide a more aesthetically pleasing environment. Thus, the construction of a covered shed will not only substantially mitigate environmental concerns and contain any possible pollution if any, but in the process, would also enhance operational efficiencies, thereby resulting in a consequential capacity enhancement at Berth No. 5A & 6A without change in the stockyard area and water front area, by modernizing and mechanizing the existing facilities and systems and by putting in place state of art machinery/system. It was in fact in this context that the Respondent no.4 applied for and was granted the Environment Clearance with respect to the proposed terminal *qua* consequential capacity enhancement at Berth No. 5A and 6A at Mormugao Port, by the MOEF & CC, after taking into consideration all the relevant factors and in due compliance with the laws.

8. Thus, the Respondent no.4 have adopted all possible environmental measures and best practices. For the reasons aforesaid, the contentions of the Appellant qua the alleged pollution are bereft of any shred of merits and the same are mere *ipsi dixit* and wholly misconceived and the present appeals field by the Appellants deserve to be dismissed *in limine* at the very threshold.

9. The Respondent no.4 states that the Appellants have filed a common rejoinder in response to all the replies filed by the Respondents nos. (R-1, R-2, R-3, R-4 and R-5). Hence, the Respondent no. 4 is filing the present sur-rejoinder limited to the extent of the contentions made by the Appellants against this answering Respondent no.4 and as more particularly averred in paragraph IV to paragraph..... (which is rejoinder relating to the reply filed by R-4 Project Proponent) from Point no. 20 to 41 at page no. 2870 to page 2898 of the rejoinder filed by the Appellant. The Respondent no. 4 reserves the right to deal with the contents of the Appellant's rejoinder filed against the Replies of R-1,2,3 & 5, if need arises.

10. With respect to the contents of paragraph no. 20 of the rejoinder the Respondent no. 4 states that the Respondent no. 4 have enclosed all the relevant documents in its reply including the additional documents filed along with this sur-rejoinder.

11. With respect to the contents of paragraph no. 21 of the rejoinder the Respondent no. 4 states that there are no illegalities and irregularities behind the grant of EC. The Appellant has failed to conceive the fact that the dredging is nowhere contemplated in the present project, neither has the Respondent No.4 sought any permission for any dredging activity in the present proposal inasmuch as the same is not envisaged for the present project. The Respondent no.4 reiterates that the Appellants are merely attempting to purposely obfuscate and misrelate the Respondent no. 3 (Mormugao Port Authority's) capital dredging project with that of this Respondent no.4's present proposal and the contentions of the Appellants in respect thereof are wholly misplaced and ill-conceived and wholly out of context and the Respondent no.4 denies the same.

12. With respect to the contents of paragraph no. 22 of the rejoinder the Respondent no. 4 states that the contents of para. 22 of rejoinder are a matter of record and does not warrant specific reply. However, the Respondent no. 4 repeat and reiterate the contents of para. 11 of its reply. Anything contrary thereto is denied and disputed.

13. With respect to the contents of paragraph no. 23 of the rejoinder the Respondent no. 4 denies the Appellant's contention that the reply affidavit of the Respondent no. 4 is convoluted and repetitive. The Respondent no. 4 states that the List of Dates and Events enclosed by the Appellant are an afterthought and the same have been wholly misconceived as the said List of Dates contain irrelevant events which are not even relevant to the present issue for e.g. sr. no. 1 to 4. The Appellant has failed to explain the context and relevance of such Dates & Events at Sr. no. 1 to 4. The documents relied upon by the Appellant and the contents thereof have been cherry-picked, inasmuch as the extracts of the documents relied by the Appellants in its List of Documents have been presented in a manner only with a *mala-fide* intention to mislead this Hon'ble Court. It is pertinent to

mention that the Respondent no. 4 in its reply affidavit have suitably provided its detailed replies against the documents submitted by the Appellant and the Respondent no.4 repeats and reiterates the same.

14. With respect to the contents of paragraph no. 24 of the rejoinder the Respondent no. 4 repeat and reiterate the contents of its reply. Anything contrary thereto is denied and disputed.

15. With respect to the contents of paragraph no. 25 the contents are bare and bald denials without any plausible explanation by the Appellant. In response thereto, the Respondent no. 4 repeat and reiterate the contents of para 25 and 117 of its reply.

16. With respect to the contents of paragraph no. 26 the Respondent no,4 states that the contents therein are bare and bald denials, made without any plausible explanation by the Appellant. In response thereto, the Respondent no. 4 repeat and reiterate the contents of para 25 (iii) of its reply. The Respondent no. 4, states that GCZMA has revalidated its earlier NOC viz. GCZMA/S/17-18/19/899 dated 18.08.2017 after considering CRZ map prepared by superimposing

the project layout on the approved CZMP 2011 through the approved agency National Centre for Sustainable Coastal Management, Chenai on 16.12.2022.

17. The Respondent no.4 states that after obtaining CRZ recommendation from GCZMA in August 2017, the project got recommended for Environmental and CRZ clearance (EC) in December 2017 and again in November 2018. However, the issuance of EC from MoEF & CC was pending due to absence of an approved CZMP (Coastal Zone Management Plan) for the State of Goa.

18. The Respondent no.4 further states that subsequently thereupon the MoEF & CC approved the CZMP for the Goa state on September 2022 The MoEF & CC thereupon issued an Office Memorandum (OM) for processing of the Environment Clearance & CRZ (composite) clearance for the pending projects in the state of Goa in November 2022 Based on the above directives by the MoEFCC, respondent No.4 obtained the revised/revalidated CRZ recommendation from GCZMA in December 2022. Only after

fulfilling the above criteria and satisfactory submissions, MoEFCC granted EC and CRZ clearance in January 2023.

19. With respect to the contents of paragraph no. 27 the contents therein are denied as the Respondent no. 4 had already filed the renewal/revalidation of CRZ recommendation dated 16.12.2022 issued by GCZMA (R-16) and the same is available in public domain.

The copy of a letter dated 20.12.2022 addressed to MoEF&CC is annexed hereto and marked as **Annexure A-3.**

20. With respect to the contents of paragraph no. 28 the contents therein are denied and the Respondent no. 4 repeat and reiterate what has been stated in its reply.

21. With respect to the contents of paragraph no. 29 the Respondent no.4 denies the Appellant's contentions that pollution due to spillage of coal cannot be prevented and marine pollution stands to increase due to increase use of water trap coal dust particles. The Respondent no.

4 repeats and reiterates contents of its reply and further state that the Respondent no. 4 in its pursuit towards adopting environmentally benign practices and use of environment protection measures for sustainable growth, the terminal has adopted state- of-the art pollution control systems in order to prevent any likely pollution. At the outset the Respondent no.4 repeats and reiterates that its activities at the said berths do not cause any pollution as sought to be wrongly contended by the Appellants. The answering respondent repeat and reiterate that the Respondent no.4 SWPL has put in place fully mechanized cargo handling systems equipped with Grab Ship Unloaders with automated sensor controlled aqua dyne water mist system, accidental spill plate protection, closed conveyor streams, Stacker cum Reclaimers, In-Motion-Wagon Loading System with Silo, all of which runs on PLC (Programmable Logical Control) controlled systems. All the possible points of dust emissions, i.e. hopper, transfer points, silo-loading system are controlled by water mist system. Additionally, the fully mechanized computer-controlled handling systems, to arrest fugitive dust emissions during stacking

and reclaiming of material a pressurized closed loop Aqua Dyne Dust Suppression System with Water Sprinkler on cargo stacks is provided ensuring prevention of any fugitive emissions even during active operations. Prior to the construction of the covered shed all stacks were fully covered round the season with tarpaulins . Any stacking and reclaiming operation is carried out under water sprinklers. Moreover, open areas which are concreted/paved are constantly kept clean by utilizing sweeping machines/water sprinkling as an additional mitigation.

22. In order to keep up with the highest standard of pollution control measures the Respondent no.4 has implemented a longitudinal covered shed, even after recognizing the huge costs involved therein and the inherent difficulties in implementation in a working terminal. In order to mitigate the possibility of any airborne dust emissions and/ or surface water run-off from the cargo stockpiles, the Respondent no.4 has undertaken construction of a permanent structural shed that will mitigate/ assuage all environmental concerns.

23. The Respondent no. 4 further denies the Appellant's contention that increase in capacity will entail an increase pollution not just from handling of additional coal, but also from double the number of ships, capital dredging, double the number of coal trains (racks) and double tracking of the railway tracks. The Respondent no. 4 states that the EIA report at page 11.2 at Table 11.1 point no 3 amply clarifies that the Respondent no. 4 has not proposed any double tracking of the Railway and the facility is independent of the doubling of the tracks as the spare capacity of the present track could be sufficient to take care of the proposed enhancement also the capital dredging is nowhere contemplated in the present project, neither has the Respondent No.4 sought any permission for any dredging activity in the present proposal inasmuch as the same is not envisaged for the present project. The Respondent no.4 repeats and reiterates what it has stated in its Reply.

24. With reference to para 30 of the rejoinder the contents thereof are denied in toto. The Respondent no. 4 states that the Appellant's understanding in this regard is grossly misplaced and misconstrued

as the Respondent no. 4 in para 38 of its reply no-where admitted any pollution, none of the reports in fact show any pollution and the Respondent no.4 denies the same.

25. With reference to para 31 of the rejoinder the Respondent no. 4 repeats and reiterates that what have been stated in para 12 to 14; para 46 and para 52 of its affidavit in reply and states that the contentions of this para, as sought to be canvassed by the Appellants are wholly irrelevant and misplaced. The Appellant has made very casual statements against EAC *inter alia* that "EAC has completely failed to apply its mind", the Respondent no. 4 deprecates such generalized sweeping statements made by Appellant against the EAC. The Appellant while making such statements ought to have considered that EAC is an expert statutory body under MoEF & CC and consist of the experts from the relevant fields. The Respondent no. 4 further states that it is evident from para 13- 27 of the reply filed by MOEFCC that the EAC while appraising the Project has conscientiously evaluated, re-valuated and scrutinized the Project and sought various clarifications including clarifications on the

objections received from the State of Goa from the Respondent no. 4 on several occasions. Hence, the contentions of the Appellant in para 30 are denied in *toto* as the same are bereft of any merit. As regards the specific allegations made by the Appellant, the same are dealt in *seriatim* as under :-

i. With respect to alleged **Form I lies and concealments:** The Respondent no. 4 states that the Appellant is making false and baseless allegations of an alleged fraud in Form – I and such statements are not backed by any logical explanation or supporting documents and therefore the Respondent no. 4 denies the same as the points raised by the Appellant are completely contrary to the EIA Report prepared by WAPCOS. The relevant provisions of EIA report are highlighted below against the wrongful contentions of the Appellant.

ii. With respect to **Dredging Not required** – Sr no. 4.2 of the EIA Report under clause 4.2.2 provides as follows;-

" 4.2 IMPACTS DURING IMPLEMENTATION PHASE

4.2.2 Biological Environment

Impact on Marine Biology

The proposed project envisages modernization of material handling systems at the terminal. ***Proposed project does not involve dredging,*** *reclamation and construction in the sea, as the entire facility will be within existing terminal area. There is no need of construction of new roads, and additional land acquisition for the proposed development is not envisaged. Dredging of channel for cape size vessels is not part of the proposed project. Hence, no significant impact is anticipated due to the proposed project on marine environment."*

iii. With respect to **Double tracking not required** – Sr no. 1.4.3 of EIA Report states that "*The existing rail is*

adequate for the envisaged capacity enhancement and proposed expansion of railways is not required for the purpose"

iv. With respect to **Clearances under FCA and WPA not required** – The Respondent no. 4 repeats and reiterates what has been stated in its reply. The Respondent no.4 states that clearances under FCA and WPA are not applicable for the present project.

v. With respect to the contention that "There are no existing or planned projects with similar effects" – The Respondent no. 4 states that the same is wholly baseless and misconceived and the Respondent no.4 is no way required to respond as regards other operations.

vi. The contents of para -5 are denied in toto as the same are merely false allegations without any merit.

B) With respect to **SCOPING**

With respect to para (i), The Respondent no.4 states that the Wild life clearance for double tracking proposal was quashed for different reasons and the same is wholly irrelevant in the present case.

With respect to para (ii), Terms of Reference (TOR) – The Respondent no.4 states that the EIA report at Sr. no. 1.4 – Connectivity section clearly covers the Air, Road, Rail connectivity for the Project and also provides that doubling of rail is not required for the project.

With respect to para (iii), The Respondent no. 4 states that the master plan of 2016 of the Port Trust is also irrelevant and has no bearing on the present issue at hand, thus the Master Plan 2016 of the Mormugao Port Trust is not meant for the Respondent's extant proposal and has no relevance thereto. It is reiterated that the present project is with respect to the modernization and mechanization of the existing berths by use of state of the art technology and equipment's without consumption of any additional resources or construction on

the waterfront and does not envisage any deepening of the channel in as much as the same are wholly misconceived and irrelevant. Para iv) to (viii) are repetitive and the Respondent no. 4 repeats and reiterates what has been stated in its reply.

With respect to para (ix), The Respondent no. 4 states that EIA report at Sr no. 1.4.3 of EIA Report states that "*The existing rail is adequate for the envisaged capacity enhancement and proposed expansion of railways is not required for the purpose*". Hence the contents of this para are denied.

With respect to para (x), The Respondent no. 4 denies and disputes the contents of said paragraph.

C) With respect to **APPRAISAL**

i. In response to the contents of para i) to (iii) the Respondent denies the contents therein in toto as the Appellant has cherry picked the contents of MPT's Master Plan and has resorted to make its own fancy interpretation, inasmuch as the same is wholly misplaced and misconstrued.

26. With reference to para 31 (wrongly numbered as para 28) of the rejoinder the respondent repeat and reiterates what has been stated in its reply, However, it is clarified that the activity of the answering respondent does not involve any beneficiation process.

27. With reference to para 32 (wrongly numbered as para 29) of the rejoinder the contents are bereft of any merit and the Appellant is merely referring para's of Respondent no. 4 replies without any plausible justification against the responses given by the Respondent no. 4.

28. With reference to para 33 (wrongly numbered as para 30) of the rejoinder the Respondent denies the contentions and repeats and reiterates what has been stated in its reply.

29. With reference to para 34 (wrongly numbered as para 31) the contents are denied in *toto* as the contents are wholly baseless and we repeat & reiterate what has been states in our reply.

30. With reference to para-No. 31 (a), the Respondent no.4 states that the settlement tank is always associated with inlet and outlet which is having baffles or compartment for settling of particles at different stages. The Respondent no.4 states that the facility has 5 compartments inside the settling tank where the particles get settled and clear water is going to sea. Needless to reiterate that the GSPCB takes samples of outlet every monsoon. For the reasons aforesaid the contentions of the Appellants are far from being true and correct.

31. With reference to para-No. 31 (b), the Respondent no.4 states that the Consent to Operate dated 15.03.2022 contains a specific condition viz. 7 xxviii statement which states about submission of a detailed layout plan and settling pond arrangement within one month from CTO. It is pertinent to note that this is a repeated condition which was originally in the specific condition 7 xxviii of consent to operate dated 01.04.2019 which was duly complied by the Respondent no.4 by submitting the layout on 29.04.2019.

32. With reference to para-No. 31 (c & d), the Respondent no.4 states that GSPCB has already carried out sampling in settlement pond in monsoon, as per the report there are no exceedances of any parameter hence it is evident that the existing settlement pond is adequate and effective.

33. With reference to para 35 (wrongly numbered as para 32) the contents are denied as they are wholly irrelevant and the made due to Appellant's lacks of technical understanding. It is pertinent to note that apart from NOX, SOX, PM10 and PM2.5 there are other water discharge and water analysis reports which are carried out by MOEF approved and NABL (National Accreditation Board for Calibration and Testing of Laboratories Equipment) accredited laboratories namely M/s. Pollucon Laboratories Pvt. Ltd. which are duly uploaded by the Respondent no.4 on the said OCMMS Portal. It is pertinent to further state that GSPCB also independently carries out water analysis periodically, and therefore allegations that no studies of water pollution is completely misleading and factually incorrect.

34. With reference to para 36 (wrongly numbered as para 33), the Respondent no. 4 is enclosing herewith a copy of the ROOTS report as **Annexure A-4.**

35. With reference to para 37 (wrongly numbered as para 34) the Respondent no. 4 repeats and reiterates that what has been stated in para 87 and is enclosing herewith latest CAAQMS reports sent to GSPCB as **Annexure A-5 colly.**

36. With reference to para 38 (wrongly numbered as para 35) the contents thereof are bereft of any shred of merits and are bare conjectures and the same are denied and disputed.

37. With reference to para 39 to 44 (wrongly numbered as para 36-41) the Respondent no. 4 denies the contents therein in as much as the same are bare surmises and are baseless. We state that the EIA report prepared for the Mormugao Port Trust by WAPCOS which is a duly accredited government agency competent to carry out the studies contained therein. Also, the mechanization of the facility only

reduces the pollution. The Respondent no. 4 repeats and reiterates that what has been stated in its reply.

38. In view of the above the respondent No.4 most humbly prays that the present appeal be dismissed with cost.

39. I say that what is stated by me in forgoing paragraphs of this sur-rejoinder namely 1 to 37 are based on the records available with the office of the Respondent No. 4 and remaining paras namely [...] are as per legal advice, which I believe to be true.

DATE: 02.08.2025

PLACE: VASCO

RESPONDENT NO. 4

through its authorized signatory

MRS . SIONA BREITKOPF

identified by me

Adv. Athnaen Naik
MAH/2012/2010

Executed before me
by Siona Breitkopf

which I attest
Certified True Copy

Adv. Surajkumar N. Naik
NOTARY
STATE OF GOA
36, Ground Floor, Apna Bazar, Bldg.
VASCO-DA-GAMA, GOA - 403 802
Date : 02-08-2025
Reg. No.: 13100/2025

Annexure A-1 colly

2940

SANYOJAN CONSULTING CIVIL ENGINEERS

Annexure A-2

SOUTH WEST PORT LIMITED

Subsidiary of

JSW INFRASTRUTURE LIMITED

COVERED STORAGE SHED

DETAILED PROJECT REPORT

04/04/2023

SANYOJAN
CONSULTING CIVIL ENGINEERS
ANAND BHAGWATWAR
6, RAMA NIVAS, NEAR MEHENDALE GARAGE, ERANDWANE, PUNE - 411004.
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SANYOJAN
CONSULTING CIVIL ENGINEERS

SOUTH WEST PORT LIMITED

Subsidiary of

JSW Infrastructure Limited

Brown Field Project at GOA

CONSTRUCTION OF STRUCTURAL COVERED SHED (320 m L x 125 m W x 45 m H) AT SOUTH WEST PORT LTD. GOA

DETAILED PROJECT REPORT

ANAND PRABHAKAR BHAGWATWAR

Digitally signed by ANAND PRABHAKAR BHAGWATWAR
Date: 2023.05.22 16:42:06 +05'30'

M/S SOUTH WEST PORT. LTD.

GOA

M/S SANYOJAN CONSULTING CIVIL ENGINEERS.
PUNE

SANYOJAN CONSULTING CIVIL ENGINEERS

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SANYOJAN CONSULTING CIVIL ENGINEERS

SANYOJAN
CONSULTING CIVIL ENGINEERS

1.0 Preamble

1.1 General

Incorporated in 1997, the South West Port Limited (SWPL) marks a major milestone in the history of JSW Infrastructure Limited (JSWIL) as it is the company's first port operation. A mechanized terminal facility in Goa on the west coast of India, it was established primarily to handle the logistic needs of the JSW Steel plant at Toranagallu, Karnataka.

Because of its strategic location, SWPL proves to be a cost-effective port for the handling of coking coal and ore imports and finished steel exports. It currently operates two dedicated bulk cargo berths at Mormugao Port Authority (formerly Mormugao Port Trust) in Mormugao Goa, on a Build, Own, Operate and Transfer (BOOT) license agreement.

Located within the sheltered Mormugao Harbour, the SWPL covering an area of approximately 25 acres, allow for year long, all-weather operations. The total berth length is 450 metres, with two inline berths. Coking coal comprises the bulk of imported goods while exports are dominated by steel coils manufactured by the JSW Steel plant at Toranagallu.

1.2 Berth Details

The SWPL has two multipurpose cargo handling berths with a total capacity to handle 8.5 MMT (Million Metric Tonnes) of cargo.

Berth No.	Use	Cargo types handled	Vessel Type	Vessel capacity	LOA	Draft
5A	Export	Steel coils, slabs, long products	Handy-max	44000 MT	190M	13M
6A	Import	Coking coal & Limestone	Panamax / Cape(lightened)	134000 MT	225M/ 300M	14M

SWPL currently handles all the export-import requirements of JSW Steel plant at Toranagallu, Karnataka – i.e. coking coal, limestone and finished steel products. The total handling capacity of SWPL is determined by the Consent to Operate given by the Goa State Pollution Control Board vide their letter ref. 12/2019-PCB/95781/R000719/Amde-367 dtd. 15/03/2022. **(Refer Appendix-1)** SWPL is permitted to handle 5.5 MMT coking coal, 1.0 MMT limestone and 2.0 MMT steel products.

SWPL have the advantage of a rail head that comes right inside the Terminal, making cargo-handling easier and more efficient.

With the existing back up infrastructure installed to handle coking coal, limestone from Berth no. 6A, SWPL is in a position to discharge vessels at the rate of 50,000 MT/day in clear weather.

1.3 Back-Up Facilities/Infrastructure Specifications In SWPL

A) SWPL have the following back up infrastructure/equipment/facilities for handling all their bulk materials (coking coal /limestone).

Sr. no	Description of equipment	Qty. (nos.)	Capacity/Type
1	Gantry Ship Unloader	2	2000 TPH each
2	Mobile Harbour Crane	1	750 TPH
3	Mobile Hopper	1	1200 TPH
4	Conveyors	7	Receiving- 3000 TPH Dispatch- 2000 TPH
5	Stacker- Reclaimer	2	Stacking- 3000 TPH(max) Reclaiming-2000 TPH(max)
6	Wagon Loader	1	1800 TPH
7	Pipe Conveyor	1	Rated-2000 TPH, Design-2200 TPH
8	Silo/In-motion Wagon Loading System	1	4000 MT / 60 to 75 mins/rake
9	Wheel Loaders	5	JCB-432 ZX
10	Excavators	3	JCB JS-210

The total yard capacity for bulk cargo segregated in three plots, viz. Plot A, Plot B and Plot C is 1,80,000 MT.

B) SWPL have the following back up infrastructure/equipment for export handling all their break-bulk materials (steel HR/CR coils, slabs, Wire Rod Coils and long products)

Sr. no	Description of equipment	Qty. (nos.)	Capacity
1	Electric Gantry cranes	5	35 T
2	Fork Lift Trucks	5	32T
3	Trailers	9	30 T
4	Covered sheds(CRC)	3	42,000 MT - Covered 43,000 MT - Open

1.4 Support Services

Support services are readily available at SWPL since the terminals are located within the functioning Mormugao Port Authority.

Services include

- Vessel Traffic Management System
- Tugs and launches
- Navigation aids
- Locomotive

2.0 Connectivity

The South West Port Ltd. is favorably situated within a major natural harbor, very close to the city – Vasco da Gama – with all the attendant facilities, just 3 kms away.

It is conveniently located as it is connected to two National Highways-NH 66 and NH 748 via NH 566.

SWPL also has the unique advantage of a railway connection right to its terminals, with the South West Railway rail head entering the harbour to touch the terminal and connecting to the industrial belt of northern and central Karnataka, particularly the steel industry clusters of Bellary, Hospet, which houses many steel and cement plants.

The nearest airport is the Goa International Airport, which is 6 kms from Mormugao Harbour.

The Zuari and Mandovi rivers provide inland waterway transport facilities, connecting the Mormugao Harbour — and the South West Port Ltd. — with mines and manufacturing plants in the hinterland.

3.0 NEED FOR COVERED SHED

There have been concerns brought out by environment activists in Goa about the consequential enhancement of coal cargo in Mormugao Port and its potential pollution aspect, on which basis the Government of Goa assuaged their concern, that any expansion in coal handling capacity is to be linked to enclosed operations, viz. covered shed construction.

SWPL had applied for Environment Clearance (EC) to the Ministry of Environment, Forests and Climate Change (MoEFCC) for enhancing its overall Port Terminal Capacity up to 15.0 MMTPA,
During the process of obtaining the EC, Goa Coastal Zone Management Authority (GCZMA) issued a NoC/Permission to SWPL with a precondition that "operation and handling should be done in closed shed. SWPL also submitted that coal will be stored under covered shed and have submitted a sworn affidavit dated 12/12/2017 to this regard. **(Refer Appendix 2)**. The EC process took considerable time, as its issuance was tied to the State of Goa finalizing and submitting its Coastal Zone Management Plan (CZMP) under 2011 notification to the NCZMA/MoEF & CC. The Goa CZMP got approved in November 2022 and the EC has now been issued to SWPL on 11/01/2023 vide EC Id no. EC23A033GA138407 **(Refer Appendix 3).**

Post the EC issuance, SWPL applied for the Consent to Establish from the Goa State Pollution Control Board (GSPCB), before actual commencement of the covered shed construction work. The same has been received by SWPL vide ref. no. No.12/2023-PCB/1560956/R00011399 dated 29/03/2023.(**Refer Appendix 4**)

Accordingly, SWPL is proposing to construct the structural shed of 320.0 m length x 135.0 m width x 45.0 m height for storage of its entire bulk cargoes (including coking coal and limestone) which will house yard conveyors as well as Stacker cum Reclaimers. The inside to inside dimensions of the covered shed will be 320.0 m length x 125.0 m width x 45.0 m height for accommodating the stockpiles. With the construction of internal retaining walls for each stockpile plot, the overall cargo storage volume of 1,80,000 MT is being maintained.

4.0 Geographical Location

The Port of Mormugao is situated on India's western sea-board in the latitude 15 25′ North and longitude 73 47′ East. It is 370 kms south of Mumbai. Mormugao is an open type natural harbour.

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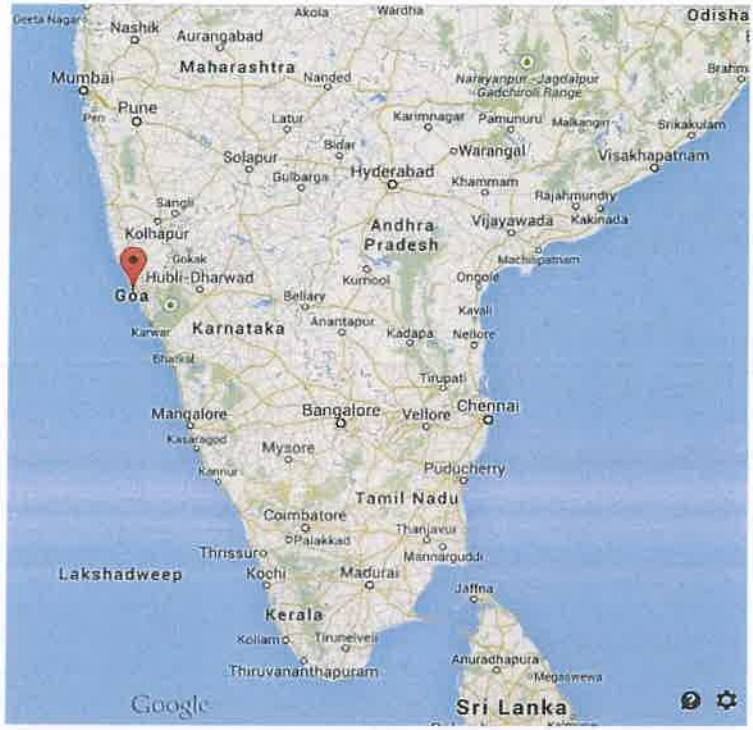

Location of the Port on the West Coast of India

4.1 Tides and Tidal Currents

The main tidal variation at Mormugao is of the order of 1.6 meters at spring tides and around 0.7 meters at neap tides. The maximum height of tide is 2.5 meters.

The following tide levels refer to Chart Datum which is 4.8 meters below the principal bench mark situated between the two wings of CME's office building at Jetty. The bench mark is 3.60 meters above I.M.S.L. (Indian Mean Sea Level).

i.	Lower low water springs near Solastices	0.00 meters
ii.	Mean lower low water	+ 0.37 meters
iii.	Mean higher low water	+ 1.05 meters
iv.	Mean Sea level	+ 1.30 meters
v.	Mean lower higher water	+ 1.78 meters
vi.	Mean higher high water	+ 2.06 meters
vii.	Higher high water springs near Solastices	+ 2.30 meters

The above information is based on Hydrographic Char no. 2020. The observations were recorded in 1969 – 70.

4.2 Climate

General

Mormugao Harbour is sheltered from high waves by the Mormugao Headland and the existing breakwater.

Rainfall

The South – West monsoon is the main rainy season. 80% of the rain falls during the months of June, July and August. The average rainfall is about 2600 mm per year.

Temperature

The maximum temperature varies from about 28 deg C in January to 32 deg C in May and the minimum temperature vary from about 21 deg C in January to 28 deg C in May.

Relative Humidity

The location of Mormugao is such that there is little variation in temperature and it has constantly high humidity. The mean percentage relative humidity is about 83% for the year. It is about 92% during August and September and 75% in December.

Visibility

Except to some extent in the monsoon months, the visibility conditions are excellent at Mormugao Harbour. There may be 3 to 4 days in a year with visibility less than 4 kms.

Wind

The mean wind speed varies from 2 on the Beaufort scale in November to 4 in July, the annual mean wind speed being 13.6 kmph. In an average year, there are 316 days with wind varying from 0 to 3 on the Beaufort scale and 48 days with winds scaling 4 to 7 on the Beaufort Scale and 1 calm day.

The predominant wind direction changes with the time of the year. During the period June – September, wind blows from the west and the south – west. During the remaining period, the wind direction is from the NE, ESE during the evening. The highest average wind speed is in the range of 30 kms per hour recorded in July 1965. The highest speed is 105 kms per hours recorded in June 1994. Winds of force more than 10 on the Beaufort scale are not expected.

4.3 Geo-Technical Information

A series of boreholes have been made along the berth alignment by SWPL. Nearly all the bore holes along this line exhibit very soft to soft marine clay, thickness varying from 3 to 13 m with 'N' value in the range of 0 to 4 followed by stiff to very stiff clay with 'N' value varying between 6-28 and undrained Cohesion Cw=1 to 2 kg/sq.cm. Medium dense to dense layer starts thereafter with 'N' value between 13 – 50 and dia. = 35 deg. Very dense layer underlays this layer with 'N' value more than 50 and highly weathered to moderately weathered rock lies thereafter.

The soil properties adopted for the design are as follows:

Level w.r.t Chart Data	Soil Type	γ (KN/cu.m)	ø °	Cw (KN/sq.m)	'N' Value
(-)8 – 12 m	Soft marine clay	18	-	5	0-4
(-)12 – 20 m	Stiff to very stiff clay	19.2	-	100	6-28
(-)20 – 30 m	Med. to Dense Sand	18	35	-	13-50
(-)30 – 35 m	Dense to very dense sand	20	40	-	30-70
(-) >40 m	Weathered to moderate weathered rock basalt	-	-	-	-

4.4 Seismic Load Earthquake Resistant Design

Mormugao is located in the seismic zone – III BIS 1893 (latest amendment). The design of the structures shall be in accordance with the requirements of the Indian Standard IS: 1893 – 1984.

4.5 Wharf Characteristics

The elevation of the existing deck was established considering the combination of the design water level and wave action. For open wharf construction, the deck elevation was selected so as to ensure that the crest of the maximum wave will always be lower than the (longitudinal) beam soffit to prevent the slamming effect of the wave crest.

a) Deck elevation : +4.8 m referred to CD

b) Length of Berth : 450 m

5. CARGO HANDLING OPERATIONS IN THE TERMINAL

5.1 Bulk Material Handling

SWPL is currently handling coking coal and limestone at Berth 6A by using a mix of multipurpose and specialized material handling equipment's cranes depending on availability and ship cargo. The entire unloading and evacuation chain of bulk cargo right from unloading from ships to conveyance to stacks, reclamation and rail wagon loading is mechanized. The Terminal does not handle any bulk cargo in non-mechanized manner (jetty dumping, loading of cargo on trucks by wheel-loaders/excavators, high-heaping of coking coal stockpiles) and does not evacuate any cargo by road route.

After the vessel is berthed at Berth no. 6A, the Jetty side Grab Ship Unloaders are stationed at the selected hatches as per the vessel discharging sequence and the unloading of coking coal/limestone begins. At the hopper level the Dust Suppression system is activated. The cargo gets discharged and is carried by the Jetty side conveyor and linked yard conveyors to the selected Stacker-Reclaimer, which stacks the bulk cargo in the appropriate plots. The plots are then covered with thick tarpaulins throughout their dwell time.

During reclaiming of coking coal only 25 mts of stacked heap is opened as per requirement of cargo. The reclaiming takes place with the mechanized handling system & the cargo is loaded in rakes with the In-Motion Wagon Loading System (IMWLS) through the Silo.

During reclaiming of limestone the stacked heap is opened as per requirement of cargo. The reclaiming takes place with the mechanized handling system & the cargo is loaded in rakes with conventional wagon loading system where the empty rake is divided into two halves and placed at railway Line no. 3 and Line no. 4 in SWPL Terminal.

5.2 Break Bulk Handling

Finished/Semi-finished steel cargo from JSW Steel Limited, Toranangallu is received by railway rakes a Railway siding of SWPL on Lines 1 and 2. The cargo is unloaded using the 5 nos. electric gantry cranes of 35.0 MT capacity and loaded on to 40 feet open trailers. The steel cargo is unloaded at designated storage locations (covered sheds and open storage spaces) as per requirement using 6 nos. 32.0 MT capacity Forklift Trucks.

After the vessel is berthed at Berth. No. 5A, the trailers are loaded back with the steel cargo using he Forklift Trucks, as per export requirement and shifted to the vessel side at the berth. The steel cargoes lifted from the berth using vessel cranes and stacked in the respective holds/hatches as per the stowage plan provided by the shippers. Stacking within the vessel hold is done utilizing Forklift Trucks.

After vessel completion steel cargoes are chocked and lashed and after the vessel masters' satisfaction, the vessel is un-berthed.

6. ENVIRONMENT CONTROLS

6.1 Air Pollution Control Measures

The SWPL already has robust Air Pollution Control Measures (APCM) to mitigate fugitive dust emissions as elucidated below.

Sr. No.	Operation	Machinery/Infrastructure	Sources of Emissions	APCM
1	Transfer of bulk cargo (mainly coking coal) from vessels to the jetty	Grab unloaders to surge Bins on the Jetty	Grabs, dumping in the Surge bins	Closed grabs, plenum water curtain at the tip of the surge bins with fogging arrangement
2	Transfer of bulk cargo from jetty to stockyard	Covered Conveyor galleries	None	Enclosed conveyance
3	Stacking	Stacker cum Reclaimer	Free fall at the time of stacking	Current water sprinkling on the falling material and also on the exposed portion of the stacked stockpile
4	Storage of Bulk Cargo	Stockyard	Airborne dusting	The stockpiles are covered with tarpaulin round the season where stacking or reclamation is not happening. Windshields on the Eastern side of the terminal (City side) to curb direct wind exposure on the stockpiles
5	Reclamation	Stacker cum Reclaimer	Cargo disturbed at the time of reclamation	Water sprinkling on the cargo being reclaimed on the exposed portion of the stacked stockpile.
6	Conveyance to wagon loading system	Pipe conveyors	None	Enclosed conveyance
7	In-motion wagon loading	IMWL system with flexi chute	Free fall during chute loading	Water Sprinkling
8	Rail wagon Conveyance	Rail Wagon Cars(Box N)	Cargo exposure to wind during Journey	Total top coverage with tarpaulin, secured with tie ropes.

6.2 Additional Environment Controls

a) 10000 sq. mtrs. Tarmac roads /open areas in the Port Terminal are paved and concreted for effective sweeping.
b) Road sprinkling being done regularly with water tanker
c) Green cover has been provided wherever feasible including creation of vertical garden on the southern boundary wall.
d) Continuous Ambient Air Monitoring Station with BL 550 for PM 10 micron and PM 2.5 micron, NoX, etc. parameters.

6.3 Raising the Environmental Standard

Having major sections of the conveying systems under enclosed environment, except where it is operationally not possible, the only open area is the stockyard, which is also covered manually with tarpaulin all year round and is exposed for a short duration during stacking and reclaiming operations only.

Since Goa has a monsoon period of 4 months (June to September), there are chances of squally weather thereby of the possibility of tearing of the tarpaulin coverings resulting into lifting of coking coal dust from the exposed coking coal stockpiles.

Also during monsoons, coking coal stack sliding takes place, thereby of the possibility of surface run-off leading to straining the capacity of the settling pond and flowing into the sea water.

Hence in order to mitigate the possibility of any airborne dust emissions/surface water run-off from the coking coal stockpiles, the SWPL is proposing to construct a permanent structural shed that will mitigate all the environmental threats and also create the window of opportunity to store higher volumes of bulk cargoes.

7. COVERED SHED SALIENT FEATURES- CIVIL

7.1 Basic Civil Data

- The soil investigation has been completed and the report is attached, basis which Design Basis Report (DBR) is prepared.
- The available plot area for construction of the covered shed is 320 m length x 135 m width x 45m height.
- Due to fixed operational infrastructure and constraints, the inside to inside plot area that will be available will be reduced to 320 m length x 125 m width x 45m height.
- Construction of straight face retaining walls of 6 mtrs height at the outer boundary of the covered shed.
- Construction of 4 nos. internal retaining walls of 1.5 mtrs height segregating the respective 3 nos. plots as well as the 2 nos. Yard conveyors and 2 nos. Stacker cum Reclaimers.
- Construction of RCC drainage systems.

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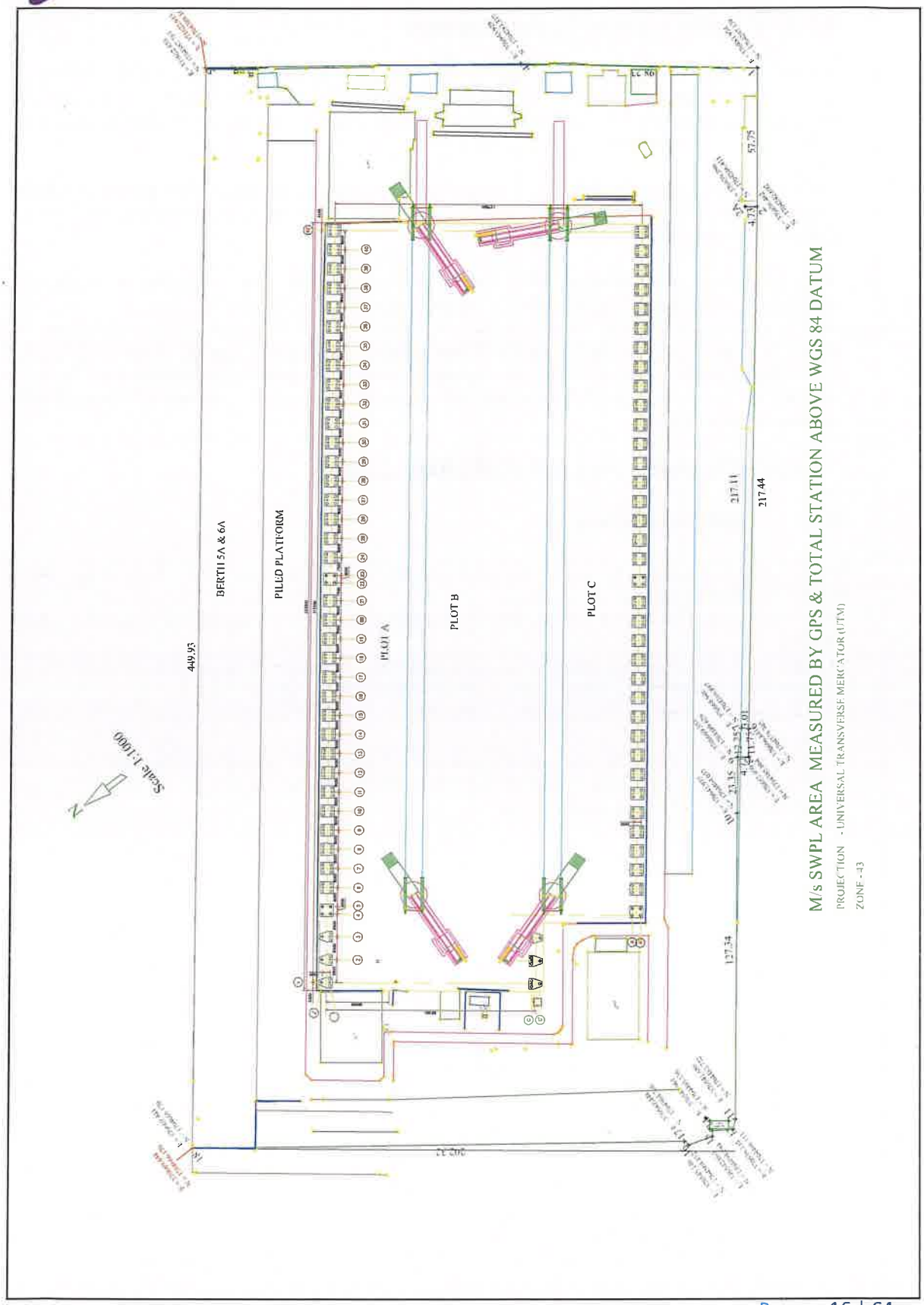

Project : Covered Shed at JSW SWPL, Goa.

7.2 Design Basis Report

7.2.1 Introduction

SWPL is planning to construct the covered Storage Shed of about 320 m length x 125 m width x 45m height in Mormugao Port, Goa

In the above context, the Client has engaged Hitech Solutions, Bangalore to provide required Civil and Structural Engineering services for the project.

This document details the Criteria for Civil Design

7.2.2 Codes and Standards

The design and specifications of the Civil Steel Construction shall, in general, be in conformitywith the latest Indian codes and standards as applicable.

List of Major Codes/Standards that is to be considered as design basis is given below in Tablebelow. All codes mentioned here are referring to latest revision

Codes/Standards	Description
IS 875(part-1) -2002	Code of Practice for Design Loads (Other than Earthquakes for Buildings and Structures) –Dead load
IS 875(part-2)-1987 (Reaffirmed 2003)	Code of Practice for Design Loads (Other than Earthquakes for Buildings and Structures) –Imposed Loads
IS 875(part-3)-2015	Code of Practice for Design Loads (Other than Earthquakes for Buildings and Structures) – Wind Loads
IS 875(part-5)-1987	Code of Practice for Design Loads (Other than Earthquakes for Buildings and Structures) – Special Loads and Combinations
IS 1893(Part-1)-2016/(Part-4)-2015	Criteria for Earthquake Resistant design of Structures
IS 2062-2011	Code of Practice for Hot Rolled, Medium and High Tensile Strength Steel
IS 456 :2000	Plain & Reinforced concrete – Code of Practice
IS 2911: Part 1: Sec 2010	Design and Construction of Pile--Foundations — Code of Practice--Part 1 Concrete Piles--Section 1 Driven Cast In-situ Concrete Piles
IS 2911: Part 1: Sec 2: 2010	Design and Construction of Pile--Foundations — Code of Practice Part 1 Concrete Piles--Section 2 Bored Cast In-situ Concrete Piles

Codes/Standards	Description
IS 2911: Part 1: Sec 3: 2010	Design and Construction of Pile--Foundations — Code of Practice Part 1 Concrete Piles--Section 3 Driven Precast Concrete Piles
IS 2911: Part 1: Sec 4: 2010	Code of practice for design and construction of pile foundations: Part 1 Concrete piles, Section 4 Bored precast concrete piles
IS 2911: Part 2: 1980	Code of practice for design and construction of pile foundations: Part 2 Timber piles
IS 2911: Part 3: 1980	Code of practice for design and construction of pile foundations: Part 3 Under-reamed piles
IS 2911: Part 4: 2013	Design and construction of pile foundations - Code of practice: Part 4 Load test on piles -

7.2.3 General Site Conditions

Mormugao Port is a Major Port on the West Coast of India has completed 134 years of glorious service to the nation's maritime trade. It is located between the Major Ports of New Mangalore and Mumbai. The Port serves the geographical regions of Goa, Karnataka and parts of Maharashtra and Andhra Pradesh. Major commodities being handled at the Port are Coking coal, Iron Ore, Petrol, Oils Lubricants and general cargo items

The nearest Airport is Goa airport 8 km

The co-ordinates of the proposed Shed location are:

Latitude : N 15° 25'

Longitude : E 73° 47'

7.2.4 Topography

The terrain in the proposed plant site is generally flat.

7.2.5 Seismic intensity

The site is in Zone–III of the seismic zoning Map of India, as per IS: 1893-2016 (Part-1). The importance factor; response factor & zone factor to be considered for design of structures against seismic forces shall be taken as per IS-1893 -2015 (Part-4).

7.2.6 Wind Speed

Based on IS: 875 (Part 3) the basic wind speed shall be 39 m/sec. This basic wind speed shall be used to determine wind load for static and dynamic analysis for all structures.

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7.2.7 Sub Surface Conditions

Sub-soil conditions and the engineering properties of different layers as revealed by the investigation are to be considered. The Geo-Technical Investigation Report for "PROPOSED COVERED SHED" Project prepared by M/s. GENSTRU Consultants Pvt. Ltd., Pune shallbe considered for the purpose and it is given below.

As per the report, the sub surface profile in general comprises of overburden of clayey gravel, gravel, clay, silty sand, clayey silt and silty gravel. The pile foundation is recommended, and the pile is expected to derive its load carrying capacity from skin friction and end bearing mostly in stratum weathered laterite rock and Meta basalt. Skin friction and end bearing resistance have been evaluated as per the guide lines given in IS: 2911 (Part 1/Sec2):2010.
As per the recommendations provided in Geo-Technical Investigation Report, the structural capacity of pile for 1000mm diameter (With M35 Concrete) shall be as below

Sl. No.	Bore Hole No.	Pile Depth in m	Safe Pile Capacities in KN	
			Vertical	Uplift
1	B-01	12	1220	440
		15	2200	700
		18	2770	1050
		24	2720	1920
		30	*	1960
2	B-02/03	12	630	400
		15	840	540
		18	1380	720
		24	1340	1070
		30	3700	1520
3	B-04	12	1680	480
		15	1190	700
		18	930	900
		24	3460	1290
		30	3650	1960

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Sl. No.	Bore Hole No.	Pile Depth in m	Safe Pile Capacities in KN	
			Vertical	Uplift
4	B-05	12	1580	400
		15	2930	670
		18	3370	1070
		24	3310	1630
		30	5770	2860
5	B-06	12	180	240
		15	1600	550
		18	920	640
		24	3750	1080
		30	*	*
6	B-07	12	490	320
		15	630	470
		18	840	600
		24	3590	1280
		30	*	*
7	B-08	12	1790	540
		15	3200	840
		18	1330	1050
		24	1620	1340
		30	2140	1720
8	B-09	12	1280	470
		15	1780	720
		18	1140	870
		24	2170	1470
		30	2670	1970
9	B-10	12	1540	340
		15	1730	480
		18	2030	680
		24	1740	910
		30	2070	1150

7.2.8 Analysis and Design Methodology

As the structure is having equal bays of 8m, Staad 3d model of plate elements shall be made for 3 bays of 8m each. The loads provided in the input assignment drawings indicated in the clause 5.1 and analyzed with load combinations indicated in clause 6

As per recommendations of the soil investigation report, pile foundations shall be considered, and foundations Design shall be carried out by Limit state method as per IS-456, SP-16.

The factor of safety for stability shall be as per 17.1.1 and 17.2 of IS 1904 except that it should be 5% more than prescribed when wind or seismic load is considered.

Top layer reinforcement shall be provided as temperature / Shrinkage reinforcement for foundations.

Side face reinforcement shall be provided for foundation, thicker than 750mm.

7.3 Basic Design Loads

7.3.1 Load from Super Structure

The loads from the super structure have been considered from the following input assignment drawings and same has been provided in annex-1.

a) M/s Xuzhou Zhongmei Hitech International Engineering Co., Ltd drawing number ZMTZ20170818-FA02- PLAN OF COVERED SHED

b) M/s Xuzhou Zhongmei Hitech International Engineering Co., Ltd drawing number ZMTZ20170818-FA01 - Technical Instruction for Shed

7.3.2 Dead Loads

Dead loads shall include the weight of the structural members and architectural appurtenances incorporated in the structure plus hung loads, if any and any other permanent externally applied loads. Self-weight of the structural members, weight of the floors, floor finishes, roofs, walls etc. shall be assumed as per the Standard values available. The weight and pressures due to soil shall be considered as per the recommendations of the Geo- technical investigation report.

7.3.3 Live Loads

Live Loads (uniformly distributed) on floors shall be as per relevant parts of IS: 875

7.3.4 Wind Load

Effective wind speed shall be taken as 39 m/s for the plant area. Reduction/increase of wind pressure on buildings/structures shall be as per IS 875 Part3-2015. For calculation of design wind speed, the following coefficients shall be applied

Probability factor for return period of 50 years.

K1	=	Risk Coefficient = 1.0
K2	=	Terrain roughness and height factor
Terrain classification	=	Category 2-aerodynamic roughness height Z0.2=0.02m
K2	=	as per clause 6.3.2.2 of IS: 875, (Part-3)
K3	=	1
=		Importance factor for Cyclone Region (only for GujaratCoast)

Hourly Mean Wind speed =Where, $\bar{V}_{z,H} = \bar{k}_{2,i} V_b$

$\bar{k}_{2,i}$ = hourly mean wind speed factor for terrain category 1

Design hourly mean wind speed at height z

$$\bar{V}_{z,d} = \bar{V}_{z,H} k_1 k_3 k_4 = \bar{V}_b k_1 \bar{k}_{2,i} k_3 k_4 \left(\frac{z}{z_{0,i}} \right)^{0.0706}$$

Turbulence Intensity for terrain category 2

$$I_{z,2} = I_{z,1} + \frac{1}{7}\left(I_{z,4} - I_{z,1}\right)$$

Wind pressure at any height above mean ground level Pz = 0.6 Vz*Vz

Where Pz	=	Design wind pressure in N/Sq.m. at Height z
Vz	=	Design wind speed in m/sec. at Height z

The design wind pressure Pd can be obtained as $P_d = K_d K_a K_c p_z$

Where K_d =Wind directionality factor as per clause 7.2.1 K_a =Area averaging factor as per clause 7.2.2

K_c =Combination factor (as per clause 7.3.3.13) the value of pd, however shall not be taken as less than 0.7 pz

7.3.5 Seismic Loads

The area falls under mild Seismic activity and considered to be in Zone-III as per IS 1893-2016 (Part1) and IS: 1893-2015 part IV.

Zone factor	:	0.16
Response reduction factor	:	5
Importance factor	:	1.5
Damping ratio	:	0.05

7.3.6 Coking coal Pressure on Retaining wall

Coking coal pressure is arrived from following parameters

6.2.12 Material Retained: Coking coal
6.2.13 Density of the material Stored (Coking coal): 0.8 t/cum
6.2.14 Angle of repose: 37 degrees
6.2.15 Surcharge Angle (Same as angle of repose): 37 degrees
6.2.16 Height of material Stored: 4m

7.3.7 Future Loads

Loads from future expansion shall be considered when so directed by the Client

7.3.8 Miscellaneous Loads

Miscellaneous loads shall be defined as loads that do not fit into the categories listed in this section. Typical miscellaneous loads are loads during erection, maintenance and repair or forces due to creep, shrinkage, or settlement.

7.3.9 Combination of The Loads

Load combination as per IS 1893 (part4):2015 & IS 875 (part5):1987 shall be applied.

In limit state design of reinforced & prestressed concrete structures, the following loadcombination shall be accounted for as a minimum

- 1.5 (Dead Load + Live Load)
- 1.2 (Dead load + Live Load +/- Seismic Load)
- 1.2 (Dead Load + Live Load +/- Wind Load)
- 1.5 (Dead Load +/- Seismic Load)
- 1.5 (Dead Load +/- Wind Load)
- 0.9 Dead Load +/- 1.5 Seismic Load
- 0.9 Dead Load +/- 1.5 wind Load

7.4 Parameters Considered For Design

Following grade of material is considered for design

7.4.1.1 Concrete Grade

For Piles:	M40
For Pile Cap:	M25
For Retaining wall	M25
For RCC Beams	M25
For PCC	M10

7.4.2 Reinforcement Steel

High yield strength deformed bars fy = 500 N/Sq.mm shall be used.

Sizes of bars to be adopted: 8mm, 10mm, 12mm, 16mm, 20mm, 25mm, 28mm, 32mm

7.4.3 Percentage of main reinforcement Steel

Minimum reinforcement as per Clause 26.5 of IS: 456 -2000

Pile Cap/Footing:	0.12%
Beams:	0.21%
Walls Horizontal	0.2%
Walls Vertical	0.12%
Piles	0.8%

Maximum Reinforcement

Pile Cap/Footing	: 0.04bD
Beams	: 0.04bD
Piles	: 5%

7.4.3.1 Cover to reinforcement Steel

The standard covers as per clause 26.4 of IS: 456-2000, to main reinforcement shall be as givenin general drawing shall be provided.

Slabs	:	25mm
Beams	:	35mm
Piles	:	50mm
Pile Cap	:	Bottom face-75mm, top and side face – 50mm

7.4.3.2 Lap Length to reinforcement Steel

Lap length for reinforcement bars shall be as given below (UOS in the drawings): as per IS-456, clause 26.2.1.1

Concrete Grade	Deformed Bars with Fe = 500 N/mm2
M25	49 x ϕ
M30	45 x ϕ
M35	40x ϕ

Where ϕ is diameter of bar.

7.4.3.3 Deflection Criteria

The deflection for members shall be calculated as per Annex C of Is: 456 and the control of deflection in general shall be as per clause 23.2 of IS: 456-2000.

The deflection shall generally be limited to the following

a. The final deflection due to all loads including the effect of temperature, creep and shrinkage and measured from the as-cast level of all supports of floors, roofs and all other horizontal members should not normally exceed span/250

b. The deflection including the effect of temperature, creep and shrinkage occurring after erection of partitions and the application of finishes should not normally exceed Span/350 or 20mm whichever is less

The vertical deflection limits may be generally being assumed to be satisfied if span to depth ratios are not greater than the values obtained as below

a) Basic values of span to effective depth ratios for span up to 10m
- ✓ Cantilever 7
- ✓ Simply supported 20
- ✓ Continuous 26

b) For spans above 10m, the values above may be multiplied by 10/span in meters, except for cantilevers in which case deflection calculations should be made/

c) Depending on the area and the stress of steel for tension reinforcement the values in a) Or b) shall be modified by multiplying with the modification factor as per table 4 of IS: 456

Depending on the area of compression reinforcement, the value of span to depth ratio be further modified by multiplying with the modification factor obtained in fig 5 of IS: 456

7.4.3.4 Calculation of Pile Deflections and limits

The deflection of Piles shall be calculated as per Annex C-4 of IS 2911 (Part 1/Sec 2): 2010. The deflection of pile The Pile head deflection, y shall be computed using the following equation:

Deflection,

$y = (H (e + zf)^3 \times 1o^3) / (3 EI)$ ..... for free head piles $y = (H (e + zf)^3 \times 1o^3) / (12 EI)$ ..... for fixed head piles Where

H= Lateral Load in KN

Y= deflection pf pile head in mm

E= Young's modulus of pile material, in KN/m^2

I= Moment of inertia of the pile cross-section in m^4 zf= depth to point of fixity in m; and

e = Cantilever length above ground / bed to the point of load application, in m

The limits of deflections are as per the guidelines given in IS: 2911 part-IV:2013 and based on safe lateral load capacity of the pull shall be taken as the least of the following. (And these displacements are at the cut-off level of the pile)

- Fifty percent of the final load at which the total displacement increases to 12mm
- Final load at which the total displacement corresponds to 5mm
- Load corresponding to any other specified displacement as per performance requirements.

7.4.4 Crack Control

The crack width for RCC members shall be calculated as per Annex F of IS: 456 and the limitations shall be as per clause 43 of IS: 456

a) In general, for flexural members the spacing requirements for reinforcements provided in clause 26.3.2 should be sufficient to control the flexural cracking. If greater spacing are required, the expected crack width should be checked by formula given in Annex F

b) Cracks due to bending in a compression member subjected to design axial load greater than 0.2fck Ac, where fck is the characteristic compressive strength of concrete and Ac is area of the gross section of member, need not be checked. A member subjected to lesser load than 0.2fckAc may be considered as flexural member for crack control mentioned in a)

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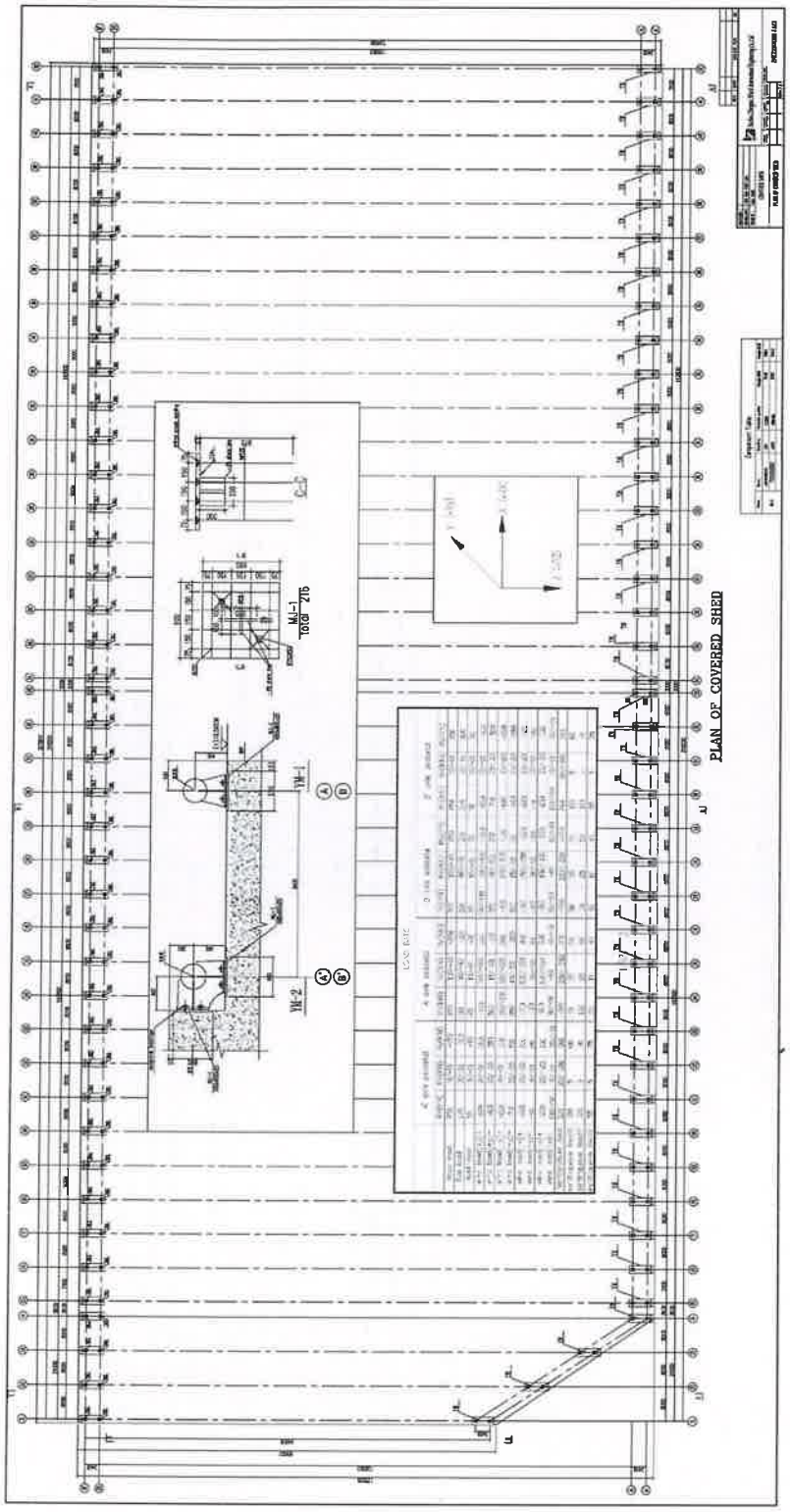

Project : Covered Shed at JSW SWPL, Goa.

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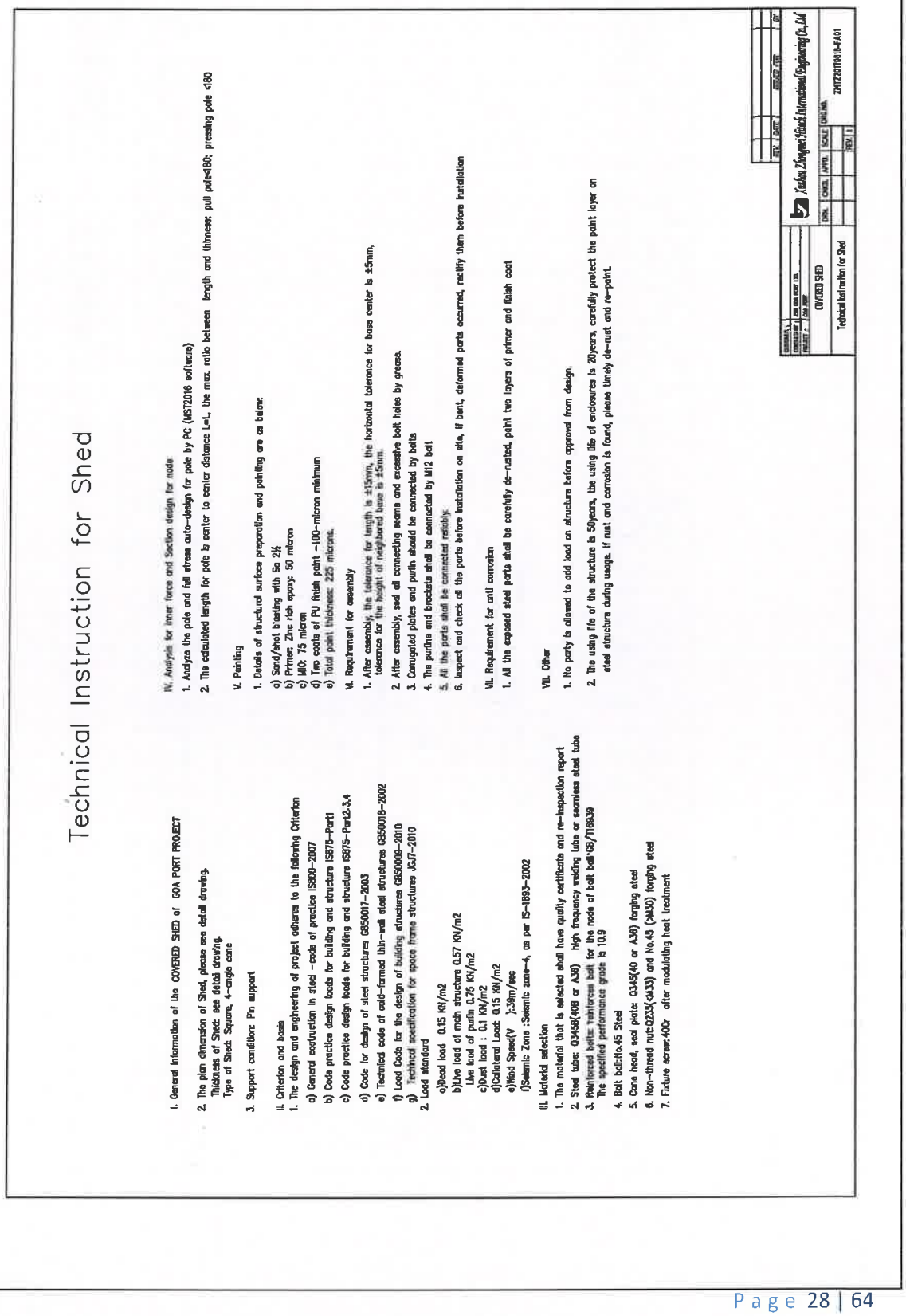

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8. COVERED SHED SALIENT FEATURES- STRUCTURAL

8.1 Technical Specifications of Structural Shed

Construction of semicircular dome of 320 m length x 135 m width x 45 m height with end covering with gable wall. Proposed to either utilize space frame or pre-fabricated structural design.

8.1.1 Scope of Work

Engineering, Design, Manufacturing, Fabrication, supply, supervision, Inspection of the steel Space frame / Pre-fabricated systems/ pre- fabricated structure in complete accordance with the contract drawings and all provisions of the specification.

8.1.2 Design Criteria

1. The steel Space frame / Pre-fabricated structure shall conform to the standards and requirements of all applicable building codes governing the project site.

2. Building shall be designed for 50 years' life.

3. The design calculations shall be checked and validated with respect to input loads and service conditions as per specification for member forces, deflections, reactions etc. and certified by an independent proof consultant to be engaged by covered shed vendor. All design calculations, manufacturing and erection drawings shall be approved by the proof consultant. The consultant shall be based in India and will be approved by SWPL.

4. All expenses towards above point-3 shall be included in the supply and erection price.

5. After approval of the engineering calculations the drawing shall be prepared and the same shall be certified as good for manufacture and shall bear the signature and seal of the authorized representative of the manufacturer.

6. The Space frame / Pre-fabricated structure engineering, design, fabrication and erection shall conform to the requirements of approved national or international standard and Code of Standard Practice of latest adoption.

7. The Space frame / Pre-fabricated structure shall be engineered to withstandthe following load applications:
The self-weight of the Space frame / Pre-fabricated structure and secondary frames,plus

a. Live Load = 0.75 KN/ Sq. m. (0.75 KN/Sq. m on purlin and 0.57 KN/Sq.m on structure)
b. Dust Load = 0.1 KN/ Sq. m.
c. Collateral Load = 0.15 KN/ Sq. m.
d. Wind Load = Basic wind speed shall be taken as per BIS 875 (latest amendment)
e. Seismic zone- III, BIS 1893 (latest amendment)
f. The Space frame / Pre-fabricated structure shall be engineered for all required load combinations in accordance with latest IS specifications.
g. It is proposed to use M: 15 grade for all plain concrete.
h. All structural concrete shall be M: 35/M: 40 grade.
i. All reinforcing steel shall be Fe-500 – TMT
j. All structural steel shall be YST-310 or 350 grade tubes (SHS, RHS, CHS).
k. All gratings for walkways shall be hot dip galvanized to 75-micron zinc coating thickness.

l. All roofing sheets shall be pre-coated Trapezoidal Galvalume sheets. Roof lighting will be with polycarbonate sheets.
m. All Connection bolts shall be high strength HSFG bolts 10.9S grade with locknuts.

8.2 Execution

8.2.1 Site Visit & Examination

a. To understand the site conditions, present infrastructure, site requirements etc., the covered shed manufacturer shall visit the site before submission of offer.
b. After placement of order, manufacturer to examine the Space frame / Prefabricated anchorage locations prior to commencing assembly and erection. If any defects or errors are discovered erection shall not proceed until the general vendor makes satisfactory corrections.

8.2.2 Erection

a. Erection shall be accomplished by an experienced erector approved by the manufacturer in accordance with Part 1 - paragraph 1.3.B.

b. Erection of the Space frame / Pre-fabricated structure shall be completed in accordance with the Space frame / Pre-fabricated structure manufacturer's erection drawings as approved by the Architect and as directed by the manufacturer's recommendations.

c. All components shall be assembled into their final configuration either from scaffolding or ground assembled and hoisted into the final position.

d. All framing shall be true and plumb with configurations as shown on the erection drawings.

e. Adequate care shall be taken during the erection process to insure members are not connected in such a manner that might introduce secondary stresses.

f. Tightening of bolts from the pipe of tube end cones to the spherical nodes shall be accomplished correctly to assure all members rest flush on the flat compression surfaces of the nodes.

g. Adequate temporary supports or bracing shall be provided to insure the Spaceframe / Pre-fabricated structure's stability during the erection process.

h. The completed Space frame / Pre-fabricated structure shall comply with AISC or equivalent international standard erection tolerances and with the erectiondrawing requirements.

8.2.3 Final Inspection

The completed Space frame / Pre-fabricated structure shall undergo a full and complete final inspection by space frame manufacturer's erection expert & SWPL representative and certify that the finished product has been erected in accordance with the manufacturer's approved erection drawings, Standards and contract documents.

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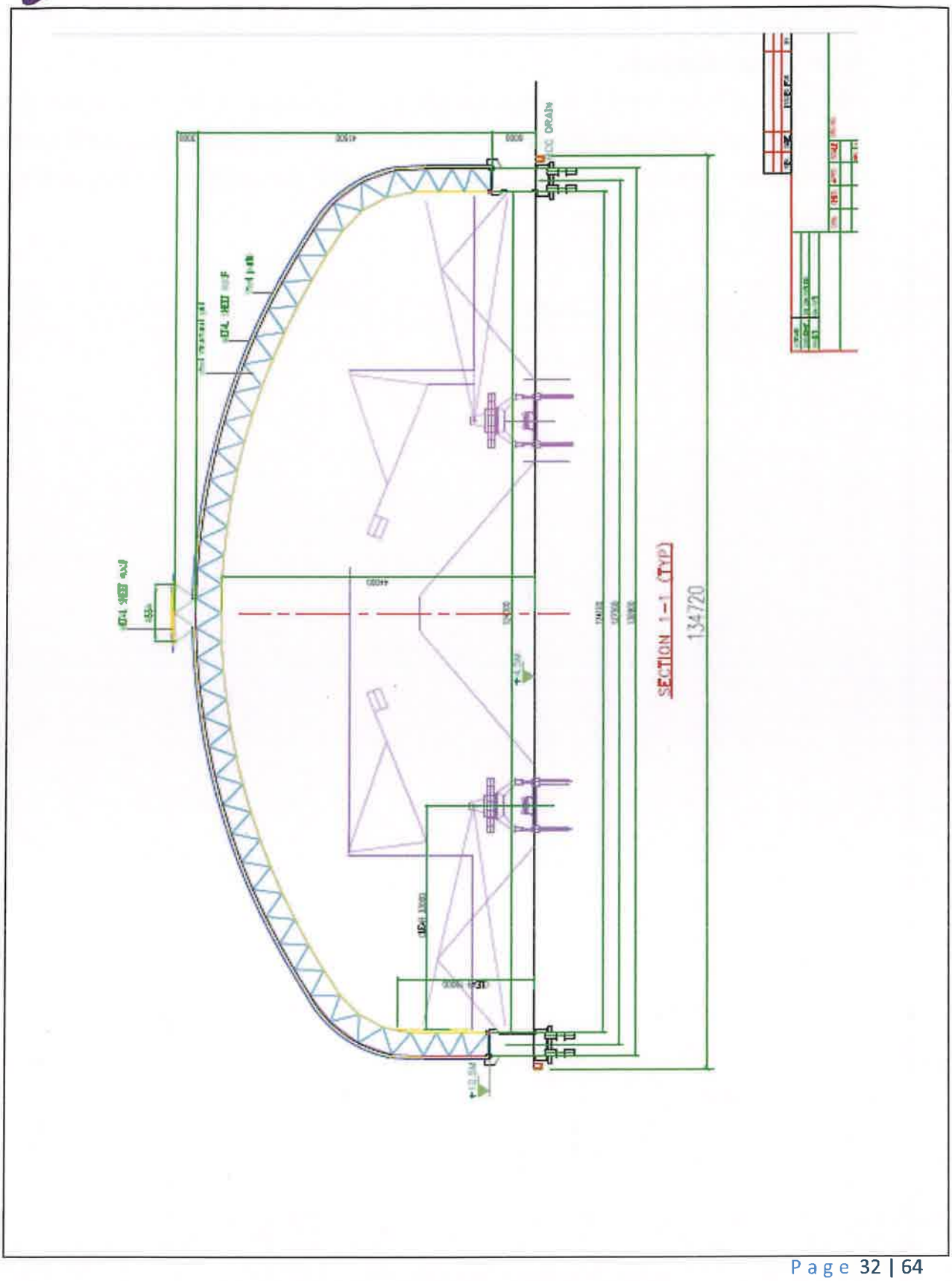

Project : Covered Shed at JSW SWPL, Goa.

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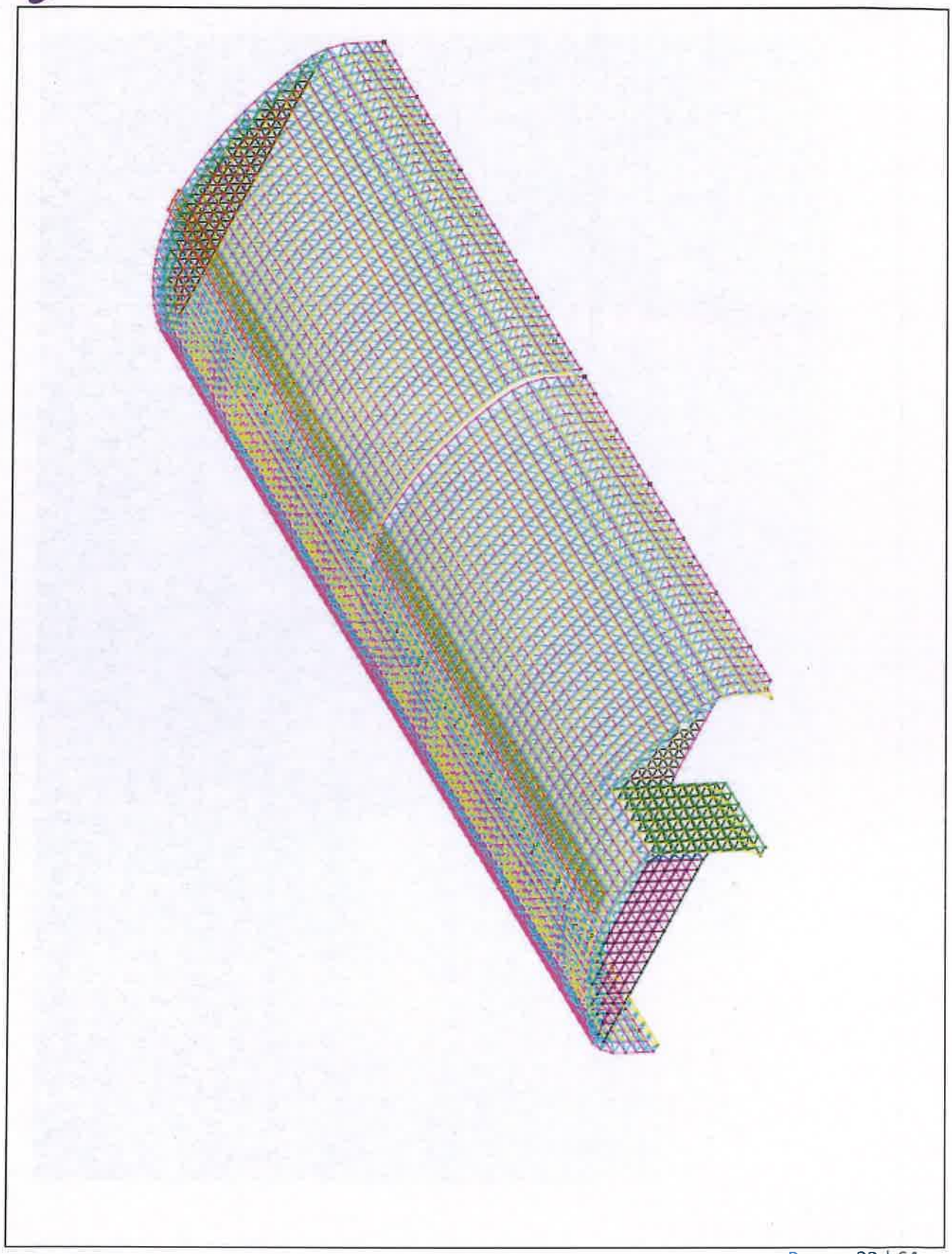

Project : Covered Shed at JSW SWPL, Goa.

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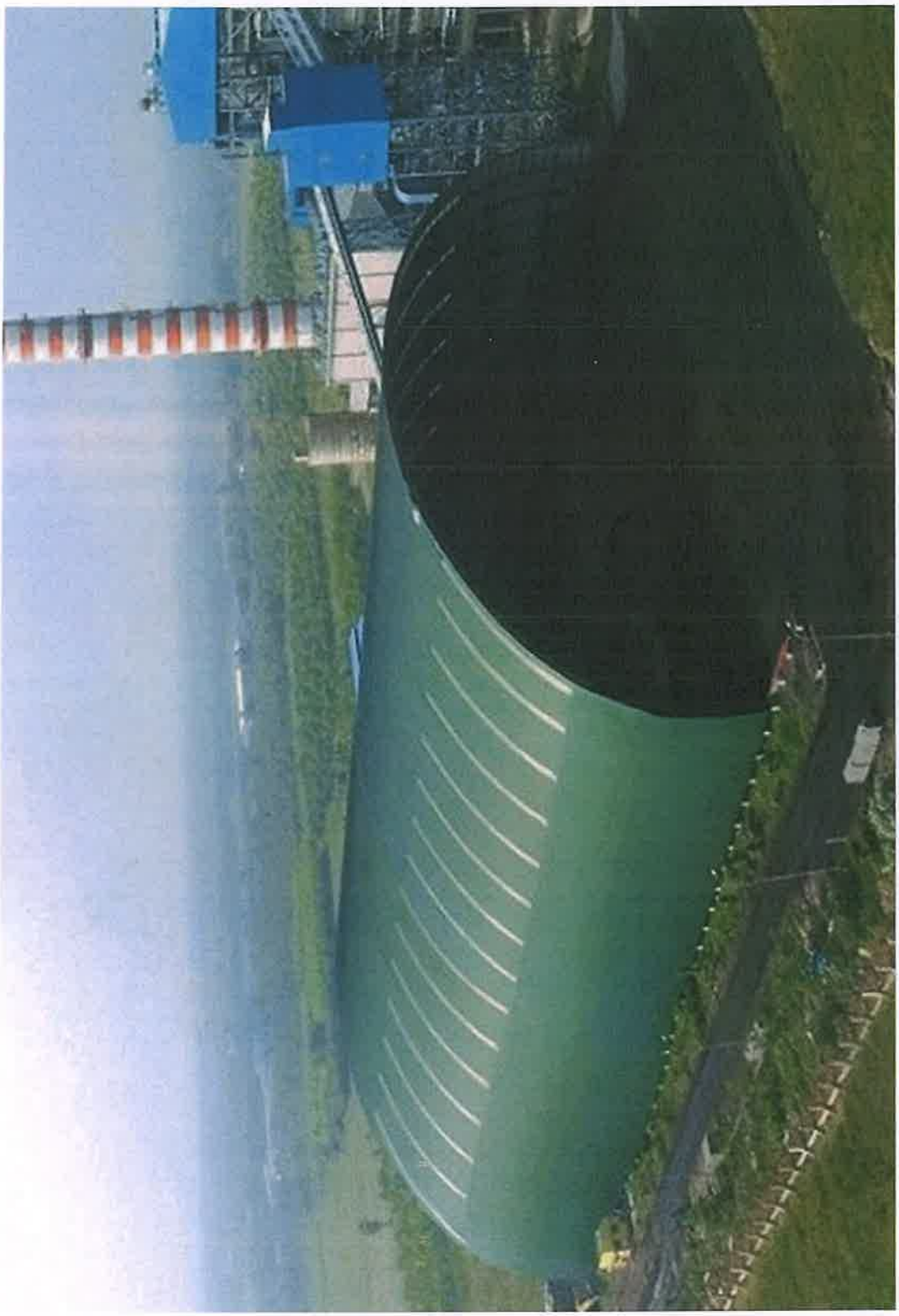

Project : Covered Shed at JSW SWPL, Goa.

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9. COVERED SHED SALIENT FEATURES- ELECTRICAL

- Total 90 nos. LED fittings @ 350 Watts proposed to be installed
- Expected power consumption 31.50 KW
- Illumination levels at ground level is 50 lux and on machine 70 lux

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10.0 COST ESTIMATES

SUMMARY OF DETAILED ESTIMATE FOR CONSTRUCTION OF COVERED SHED (135m wide X 320m length X 45m Height) AT SWPL

SR NO	DESCRIPTION	ESTIMATED COST (Rs)
1	**CIVIL COST**	**86,15,69,620.00**
A	FOUNDATION AND SUB SURFACE SERVICES FOR THE CONSTRUCTON OF COVERED SHED	72,41,81,340.00
B	1.8M HIGH INNER RETAINING WALL	11,97,27,520.00
C	CONSTRUCTION RCC DRAIN (L700m X W1.2m X D1.5m- 2nos)	1,13,36,260.00
D	CONSULTANCY CHARGES FOR CIVIL DESIGN	3,24,500.00
E	LEASE CHARGES FOR LAND FROM MoPT (3500 SQM)	60,00,000.00
2	**STRUCTURAL COST**	**79,31,58,229.90**
A	DESIGN, MANUFACTURE & SUPPLY OF SPACE FRAME WITH HARDWARE & SUPPORT FRAME	55,20,84,466.90
B	ERECTION OF SPACE FRAME FOR COVERED SHED	19,22,66,368.00
C	PROCUREMENT OF TRAPEZOIDAL PROFILE SHEETS 0.6MM THICKNESS, CLADDING, GABBLE & TRIMS, ETC.	4,88,07,396.00
3	**ELECTRICAL COST**	**1,57,27,514.00**
A	DISMANTLING & SHIFTING OF HIGH MAST	24,81,384.00
B	ELECTRIFICATION OF COVER SHED	1,32,46,130.00
4	**IT COST**	**59,02,810.00**
5	**DUST SUPPRESSION SYSTEM COST**	**1,47,41,598.40**
6	**FIRE FIGHTING SYSTEM COST**	**2,99,16,811.60**
A	CIVIL AND MECHANICAL INFRASTRUCTURE	1,48,93,972.00
B	STP WATER INFRASTRUCTURE	1,50,22,839.60
	TOTAL STRUCTURAL, CIVIL & ELECTRICAL COST	**1,72,10,16,583.90**
	CONTIGENCIES (3%)	**5,16,30,497.52**
	GRAND TOTAL COST	**1,77,26,47,081.42**
	SAY	**177.30 Cr**

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DETAILED ESTIMATE OF CIVIL WORKS

S.No.	Item Description	Quantity	Unit	Rate(Rs.) (Inclusive of GST)	Amount (Rs.)
A	**FOUNDATION AND SUB SURFACE SERVICES FOR THE CONSTRUCTON OF COVERED SHED**				
1	Mobilisation & Demobilisation of Piling Equipment	1	Lumsum	14750000	1,47,50,000.00
2	Setting of pile Rig	320	Each set	5900	18,88,000.00
3	Boring in piles 900 mm dia	7750	M	5900	4,57,25,000.00
4	Boring in Laterite Boulders 900 mm dia :	1550	M	8850	1,37,17,500.00
5	Boring in weathered rock 900 mm dia	620	M	8850	54,87,000.00
6	Boring in Hard rock	850	M	10620	90,27,000.00
7	Liner Fabrication	1400	MT	118000	16,52,00,000.00
8	Liner driving	9300	M	2950	2,74,35,000.00
9	Concreting in Piles (M35) 900 mm dia	7600	CUM.	15340	11,65,84,000.00
10	Reinforcement in Piles 900 mm dia	900	MT	106200	9,55,80,000.00
11	Dressing of pile head 900 mm dia	320	Nos	5900	18,88,000.00
12	Pile Tests 900 mm Dia	16	Nos	236000	37,76,000.00
13	Pile integrity Test 900 mm dia	16	Nos	3540	56,640.00
14	Repair to dismantaled RE wall of Fascia block below the deck	480	Sqm	2950	14,16,000.00
15	Dimantaling of old RCC Wall	300	CUM.	5900	17,70,000.00
16	Excavation in soft soil	16000	CUM	826	1,32,16,000.00
17	Excavation in laterite	1500	CUM	1652	24,78,000.00
18	Soling with Laterite Boulders	3000	CUM	3540	1,06,20,000.00
19	HDPE sheet	2500	SQM	944	23,60,000.00
20	PCC M 15	1100	CUM	9440	1,03,84,000.00
21	RCC M30(Pile Caps, counterfort columns, Pardi, Retaining wall and plinth beams)	6800	Cum	14160	9,62,88,000.00
22	Shuttering (Pile Caps, counterfort columns, Pardi, Retaining wall and plinth beams)	27000	SQM	1416	3,82,32,000.00
23	Reinforcement	1700	MT	17700	3,00,90,000.00
24	Fixing Foundation bolts with nuts	52	MT	53100	27,61,200.00
25	MS inserts	50	MT	135700	67,85,000.00
26	Non-shrink grout	25	CUM	118000	29,50,000.00
27	Weep Holes 75mm PVC	1500	Each set	2478	37,17,000.00
				Total inclusive of GST	**72,41,81,340.00**

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B	**1.8M HIGH INNER RETAINING WALL**				
1	Earthwork	4000.0	M3	354	14,16,000.00
2	Laterite Soling	260.0	M3	2124	5,52,240.00
3	PCC M15	200.0	M3	8260	16,52,000.00
4	RCC M30	850.0	M3	9440	80,24,000.00
5	Formwork/Shuttering	6000.0	M2	944	56,64,000.00
6	Reinforcing Steel	35.0	MT	112100	39,23,500.00
7	Weep Holes 50Mm Dia	1300.0	EA	177	2,30,100.00
8	Thermocol For Expansion Joint	20.0	M2	177	3,540.00
9	Fixing Of Ms Inserts 200X600X10Mm	5.0	MT	147500	7,37,500.00
10	Dismantling Of Existing Crash Barrier	131.0	MT	59000	77,29,000.00
	TOTAL(INCLUSIVE OF GST) COST FOR ONE RE-WALL				**2,99,31,880.00**
	TOTAL COST (INCLUSIVE OF GST) OF 4 NOS RETAINING WALLS (PLOTB-2NOS, PLOT A&C-1NO. EACH)				**11,97,27,520.00**
C	**CONSTRUCTION OF RCC DRAIN (L700m X W1.2m X D1.5m- 2nos)**				
1	Earthwork	1600.0	M3	354.00	5,66,400.00
2	PCC M15	70.0	M3	8260.00	5,78,200.00
3	RCC M30	384.0	M3	9440.00	36,24,960.00
4	Formwork/Shuttering	2800.0	M2	944.00	26,43,200.00
5	Reinforcing Steel	35.0	MT	112100.00	39,23,500.00
	TOTAL(INCLUSIVE OF GST) COST				**1,13,36,260.00**

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DETAILED ESTIMATE OF STRUCTURAL WORKS					
S.No.	**Item Description**	**Quantity**	**Unit**	**Rate (Rs.) (Inclusive of GST)**	**Amount (Rs.)**
A	**DESIGN, MANUFACTURE & SUPPLY OF SPACE FRAME WITH HARDWARE & SUPPORT FRAME**				
	Design, manufacture & supply of space frame with hardware & support frame	3638	Ton	151755	55,20,84,465.90
B	**ERECTION OF SPACE FRAME FOR COVERED SHED**				
	Erection of space frame for covered shed	1	Each	192266368	19,22,66,368.00
C	**PROCUREMENT OF TRAPEZOIDAL PROFILE SHEETS 0.6MM THICKNESS, CLADDING, GABBLE & TRIMS, ETC.**				
i	procurement of trapezoidal profile sheets 0.6mm thickness, cladding, gabble & trims, etc.	56403	Sqm	696	3,92,67,768.60
ii	Procurement of transculent sheets 2mm thickness (10% of all sheets).	6267	Each	1522	95,39,627.40
				TOTAL INCLUSIVE OF GST	**79,31,58,229.90**

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DETAILED ESTIMATE OF ELECTRICAL WORK					
Sr. No	**Particulars**	**Unit**	**Qty.**	**Rate(Rs)**	**Amount(Rs)**
A	**DISMANTLING & SHIFTING OF HIGH MAST**				
1	Services Charges For Dismantling Of High Mast	EA	3	199900	5,99,700.00
2	Services Charges For Shifting Of Dismantled High Mast Material -Storage	LS	3	47728	1,43,184.00
3	Civil Foundation For High Mast As Per Finalized Location	EA	3	380000	11,40,000.00
4	Services Charges For Re-Installation Of High Mast Towers	EA	3	199500	5,98,500.00
				Total Amount Inclusive Of GST	**24,81,384.00**
B	**ELECTRIFICATION WORK FOR COVERED SHED**				
1	**Lighting Transformer 20kva**				
i	Supply Of Lighting Transformer 20kva	EA	2	45600	96,000.00
ii	Services Shifting & Installation Charges Of Lighting Transformer 20kva	EA	2	9500	20,000.00
2	**Luminaries 350w 250v Led Including The Aviation Lamp**				
i	Supply Of Luminaries 350w 250v Led	EA	120	38000	48,00,000.00
ii	Services For Shifting & Installation Of Luminaries 350w 250v Led	EA	120	2090	2,64,000.00
3	**Cable Trays**				
i	Supply of cable trays perforated type 200mm X 25mmx25mm	MTR	700	475	3,50,000.00
ii	Services for installation of cable trays perforated type 200mm X 25mmx25mm	MTR	700	332.5	2,45,000.00
4	**Cables**				
i	Power Cables 4c X 50sqmm Aluminium For Shed Lighting & For High mast Shifting	MTR	2320	475	11,60,000.00
ii	Laying Charges For Power Cables 4c X 50sqmm	MTR	2320	237.5	5,80,000.00
iii	Termination Charges For Power Cables 4c X 50sqmm	EA	60	1425	90,000.00
iv	Power Cables 4c X 4sqmm Copper	MTR	2470	445.55	11,58,430.00
v	Laying Charges For Power Cables 4c X 4sqmm	MTR	2470	114	2,96,400.00
vi	Termination Charges For Power Cables 4c X 4sqmm	EA	150	845.5	1,33,500.00
vii	Power Cables 4c X 2.5sqmm Copper	MTR	2400	266	6,72,000.00
viii	Laying Charges For Power Cables 4C X 2.5sqmm	MTR	2400	121.6	3,07,200.00
ix	Termination Charges For Power Cables 4c X 2.5sqmm	EA	400	684	2,88,000.00
5	**Junction Boxes**				
i	Supply Of Junction Boxes	EA	200	1092.5	2,30,000.00

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ii	Services For Installation Charges Of Junction Boxes	EA	200	190	40,000.00
6	Lightning Conductors				
i	Supply Of Lightning Conductors	EA	4	25650	1,08,000.00
ii	Services For Installation Of Lightning Conductors	EA	4	5225	22,000.00
iii	Supply of copper strip for lightning conductor 4mmx25mm or copper cable	MTR	500	807.5	4,25,000.00
iv	Services For Installation Of Lightning Conductors On Insulators	MTR	500	855	4,50,000.00
7	**Earthing**				
I	Supply Of GI Coated Earth strips 4mmx25mm	MTR	500	171	90,000.00
Ii	Services For Installation Of Earth Strips 4mmx25mm	MTR	500	114	60,000.00
Iii	Supply Of Earth Pits Ashlok Make	EA	10	8550	90,000.00
Iv	Services For Installation Charges Of Earth Pits Ashlok Make	EA	10	3800	40,000.00
8	**Steel**				
I	Supply Of Ms Angles For Cable Tray Support & Installation Of Light Fittings	TON	3.4	76000	2,72,000.00
Ii	Services For Fabrication Of Cable Tray Support, Luminaries, Junction Boxes Etc.	TON	3.4	38000	1,36,000.00
9	**Panels**				
i	Supply Of Emergency Lighting 6kva Ups With Batteries	EA	3	66500	2,10,000.00
ii	Services For Shifting, Installation And Commissioning Of 6kva Ups & Batteries	EA	3	9500	30,000.00
iii	Supply Of Panels For Power Supply Distribution	EA	6	71250	4,50,000.00
iv	Services For Shifting And Installation Of Panels	EA	6	9975	63,000.00
10	**Hardware Bolts And Nuts**	TON	0.58	114000	69,600.00
				Total Amount Inclusive Of GST	**1,32,46,130.00**

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DETAILED ESTIMATE FOR IT INFRASTRUCTURE				
Sr. No.	**Description**	**UOM**	**Qty.**	**Total Price**
1	Axis IP Camera	Lump sum	1	21,00,000.00
2	VMS software.	Lump sum	1	4,10,000.00
3	Server, Storage	Lump sum	1	12,00,000.00
4	Monitoring System At Central Level & Client PC At Each Plant Level	Lump sum	1	1,40,000.00
5	Network Active Components	Lump sum	1	7,46,000.00
6	Network Passive Fiber & Copper	Lump sum	1	1,90,450.00
7	Rack & JB Enclosure	Lump sum	1	1,30,000.00
8	Electrical Active & Passive	Lump sum	1	4,09,500.00
9	Passive & Hardware	Lump sum	1	95,060.00
10	Services For Installation	Lump sum	1	4,81,800.00
			Total Amount inclusive of GST	**59,02,810.00**

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DETAILED ESTIMATE FOR DUST SUPPRESSION SYSTEM						
Sr. no.	**Description**	**UOM**	**Qty**	**Mat Unit Rate (Rs) inclsive of GST**	**Inst. Unit Rate inclsive of GST (Rs)**	**Amt (Rs)**
1	Spray Gun for both side of plots	No	20	8850	1180	2,00,600.00
2	65NB pipes & fitting	No	2060	4012	1180	1,06,95,520.00
3	Cabling for pipes	Lot	6	23600	11800	2,12,400.00
4	Main Cable 4sqmm x 24 core	M	350	3540	590	14,45,500.00
5	Solenoid Valves	No	20	11564	590	2,43,080.00
6	Globe Valve (65NB)	No	20	4602	590	1,03,840.00
7	Gate Vave (65NB)	No.	2	14160	1180	30,680.00
8	Non return valve double platted Advance make ISI marked with gasket, & nuts bolts (65NB)	No	2	7009.2	1180	16,378.40
9	Structure fabrication	Ton	6	94400	47200	8,49,600.00
10	Excavation for laying pipe across plot	M3	400	0	1180	4,72,000.00
11	Replacement of Existing Pumps	EA	2	212400	23600	4,72,000.00
					TOTAL INCLUSIVE OF GST	**1,47,41,598.40**

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DETAILED ESTIMATE FOR FIRE FIREFIGHTING SYSTEM				
Sr. No.	**Description**	**UOM**	**Qty**	**Estimated cost(Rs.)**
A	**CIVIL AND MECHANICAL INFRASTRUCTURE**			
1	CIVIL-Construction of Fire Pump room & foundation for Pumps	Lumpsum	1	12,77,822.00
2	CIVIL-Laying of pipe line upto J6C1 CWT tower	Lumpsum	1	13,76,647.00
3	CIVIL-Construction of additional Water tank	Lumpsum	1	22,27,545.00
4	MECHANICAL-Fire hydrant system-Supply & Services	Lumpsum	1	1,00,11,958.00
B	**STP WATER INFRASTRUCTURE**	Lumpsum	1	1,50,22,839.60
			Total inclusive of GST	**2,99,16,811.60**

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11. COST ESTIMATES AS PER QUOTES OBTAINED BY SWPL

S. No	Particulars	Total estimated cost (₹ in million)	Name of vendor/supplier	Date of quotation/ purchase order	Validity of the quotation
A.	**Civil works**				
1.	Foundation and sub surface services for the constructon of covered shed	724.18	M/s Paresh Constructions	04.01.2023	30.04.2023
2.	1.8m high inner retaining wall	119.73	M/s RNA Constructions	26.12.2022	31.10.2023
3.	Construction RCC drain (L 700m x W 1.2m x D 1.5m- 2nos)	11.33	M/s RNA Constructions	26.12.2022	31.10.2023
4.	Consultancy charges for civil design	0.33	M/s Sanyojan Consulting Engineers	25.01.2023	30.09.2023
5.	Lease charges for land from MoPT (3500 sq.) *(considering 22 months)*	6	Mormugao Port Trust	07.10.2022	06.10.2023
B.	**Structural works**				
6.	Design, manufacture & supply of space frame with hardware & support frame	552.08	M/s JSSL	03.01.2023	30.04.2023
7.	Erection of space frame for covered shed	192.27	M/s JSSL	03.01.2023	30.04.2023
8.	Procurement of trapezoidal profile sheets 0.6mm thickness, cladding, gabble & trims, etc.	48.81	M/s Jai Ganesh Ispat	14.03.2023	14.09.2023
C.	**Electrical works**				
9.	Dismantling & Shifting of High mast	2.48	M/s Prabha Electricals	27.12.2022	31.12.2023
10.	Electrification of Covered Shed	13.25	M/s Prabha Electricals	27.12.2022	31.12.2023
D.	**IT infrastructure**				
11.	IT infrastructure	5.90	M/s Techser Power Solutions	15.03.2023	14.09.2023
E.	**Dust suppression system**				
12.	Dust suppression system (DSS)	14.74	M/s Leo Enterprises	10.03.2023	31.10.2023
F.	**Firefighting system**				
13	Fire Fighting System (FFS)	10.01	M/s Leo Enterprises	10.03.2023	31.10.2023
14	Construction of Fire pump room & foundation for pumps	1.28	M/s Sai Krupa Engineering & constructions	10.03.2023	31.10.2023
15	Laying of FFS pipe line up to J6C1 CWT tower	1.38	M/s Sai Krupa Engineering & constructions	10.03.2023	31.10.2023
16	Construction of additional water tank for FFS	2.23	M/s Sai Krupa Engineering & constructions	10.03.2023	31.10.2023
17	STP Water Infrastructure	15.02	M/s RNA Constructions	25.01.2023	31.10.2023

12. PROJECT IMPLEMENTATION

12.1 Approvals Required & Current Status

Maintaining environmental conditions is a promise we have to keep for the next generation. Hence as per the prevailing environmental laws and guidelines all new projects in the infrastructure as well as the other sectors require environmental clearance before they are allowed to resume operations or start production as the case may be. The laws are equally applicable to Greenfield projects as well as Brownfield projects under execution/to be executed.

a) South West Port Limited has recently obtained the Environment Clearance (EC) from the Ministry of Environment & Climate Change for their Capacity Enhancement which entails construction of the covered shed for stockpiles on 11/01/2023 vide EC Identification No.EC23A033GA138407. **See Appendix 3.**

b) SWPL applied for Consent to Establish (CtE) from the Goa State Pollution Control Board **(Refer Appendix 4)** before beginning of the construction of the Covered Shed. The estimated time to obtain the CtE is 2 months form the date of application.

c) After Completion of the covered shed project, South West Port Limited will have to obtain Consent to Operate from Goa State Pollution Control Board.

Authority	Initial approvals		Final approvals	
	Nature of approval	Stage at which approval is required and status	Nature of approval	Stage at which approval is required
Ministry of Environment, Forest and Climate Change	Environmental clearance	Obtained on January 11, 2023	Environmental clearance	Not applicable.
Goa State Pollution Control Board	Consent to Establish under Air (Prevention and Control of Pollution) Act, 1981 and Water (Prevention and Control of Pollution) Act, 1974	Obtained on March 29, 2023	Consent to Operate under the Air (Prevention and Control of Pollution) Act, 1981 and Water (Prevention and Control of Pollution) Act, 1974	After construction of covered shed

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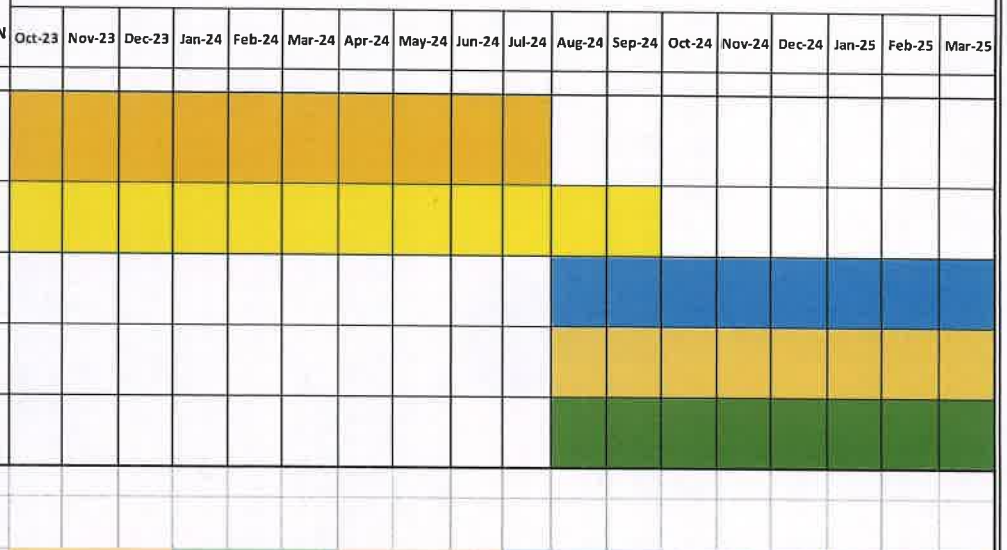
12.2 Project Schedule

JSW COVERED SHED FOR SWPL BERTH NO 5A & 6A AT MORMUGAO PORT TRUST(SPAN 135M X LENGTH 320M X HEIGHT 45 M)

COST OF PROJECT: 172.10 Cr

SR NO	SCHEDULE FOR MOBILIZATION, ERECTION AND COMMISSIONING / ACTIVITIES	ACTUAL TIME REQUIRED (MONTHS)	DATE OF COMMENCEMENT	DATE OF COMPLETION
1	CIVIL FOUNDATION AND SUB SURFACE WORK WORK (PILE FOUNDATION & INTERNAL & EXTERNAL RETAINING WALL)	10	01.10.2023	31.07.2024
2	SUPPLY AND ERECTION OF STRUCTURAL SHED	12	01.10.2023	30.09.2024
3	ELECTRIFICATION OF SHED	8	01.08.2024	31.03.2025
4	IT INFRASTRUCTURE	8	01.08.2024	31.03.2025
5	DSS, FFS AND OTHER MISC WORKS	8	01.08.2024	31.03.2025
		Amount in Crores		
	QUATERLY BUDGET UTILISATION	**172.10**		



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Appendix 1.0

GOA@60

GOA STATE POLLUTION CONTROL BOARD
गोंय राज्य प्रदूषण नियंत्रण मंडळ

(An ISO 9001-2015, ISO 14001:2015, ISO 45001:2018 Certified Board)

Phone Nos. : 0832-2407700
2407701, 2407702
2407703

Tel/Fax No. : 0832-2407700

Email Ids:
Chairman, GSPCB: chairman-gspcb.goa@nic.in
Member Secretary GSPCB: ms-gspcb.goa@nic.in
Office: mail.gspcb@gov.in

No.12/2019-PCB/95781/R000719/ Amde-367 Date: 15 /03/2022

Renewal of Consent to Operate under Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 & under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981 and Renewal of Authorization under Rule 6(i) of the Hazardous and other Wastes (Management and Transboundry Movement) Rules 2016 as amended thereafter

[To be referred as Water Act, Air Act and HW (M & T) Rules respectively]

RENEWAL OF CONSENT TO OPERATE AND AUTHORIZATION is hereby granted to:

M/S. SOUTH WEST PORT LTD
(Represented by: CAPTAIN ANURAG BHAGAULIWAL)
(Berth No. 5a & 6a)
(Red Category)

Chalta No. 1 of P.T. Sheet
No. 7, Site Office building,
Berth No. 5A & 6A,
Mormugao Harbour, Mormugao – Goa.

Located in the area declared under the provisions of the Water Act. Air Act and Authorization under the provisions of HW (M.H & T) Rules, subject to the provisions of the Act and the Rules and the Orders that may be made further and subject to the following terms and conditions:

1. This Consent to operate is issued in supersession of the earlier consent orders issued vide order No. 5/2580/04-PCB/C1-4313 did 06/07/2018. No. 5/356/18-PCB/C1-5403 dtd 25/02/2019. No. 12/2019-PCB/95781/R000719 did 01/04/2019. Amend No. 5/356 18-PCB Amde-25 dtd 22/08/2019. Amend No. 12/2019-PCB/95781/R000719/19889/Amde-73 dtd 18/03/2020. Amend No. 12/2019-PCB/95781/R000719/1801/Amde-126 dtd 11/08 2020. Corrigendum No. 12/2019-PCB/95781/R000719/1801/Amde-130 dtd 19/08 2020. Corrigendum No. 12/2019-PCB/95781/R000719/1801/Tech/24140 dtd 26/03/2021. Corrigendum No. 12/2019-PCB/95781/R000719/1801/Tech/24322 dtd 30/03/2021 & Amend No 12/2019-PCB/95781/R000719/341/Made/249 dtd 25/05/2021 and is valid up to **07/12/2023.**

2. This Consent to operate and Authorization is valid for the manufacture of:

Sr. No	Description	Quantity
1.	Handling of Coal/coke (Import)	5.5 MMTPA, however 0.4 MMT per month from February to May with a leverage 10% to finish the shipment. The total quantity to be handled during February to May will be restricted to 1.6 MMTPA, 1.95 MMT to be handled during the month of June to September with a leverage 10%

Near Pilerne Industrial Estate, Opp. Saligao Seminary, Saligao, Bardez, Goa 403 511

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		to finish the shipment and 0.4875 MMT Per Month to be handled equally during the month of October to January with a leverage 10% to finish the shipment.
2.	**Limestone (Import)**	**1 MMT/annum**
3.	**Steel Product (export)**	**2 MMT/annum**

3. CONDITIONS REQUIRED TO BE COMPLIED UNDER THE WATER ACT:

(i) The daily quantity of industrial effluent from the factors shall not exceed **NIL.**

(ii) The daily quantity of domestic effluent in the factors shall not exceed **8 KLD.**

(iii) **Domestic Effluent treatment and Disposal:-**
The domestic wastewater shall be treated in a properly designed septic tank and discharged on land for Percolation through soak pit of adequate size within the factors premises.

(iv) **The unit should empty septic tank and soak pit periodically through night soil tankers for safe disposal and submit the copies of the receipts to the Board on regular basis.**

(v) A good house-keeping shall be maintained within the factory premises. All pipes, valves and drains shall be maintained in leak-proof condition, Hour washings shall be maintained to the effluent collection system only and shall not be allowed to find was in open areas.

(vi) Runoff from coal stock yard shall be collected and treated for removal of heavy metals and quality to be monitored for heavy metals, phenols and organic carbons before disposal and should meet the general standards for discharge of environmental pollutant (Part A. schedule VI. Marine coastal area) Environment (Protection) Act 1986 and submit the reports to the Board.

(vii) **Non-Hazardous Solid Waste:**
All the Solid wastes arising in the premises shall be properly classified and disposed off to the satisfaction of the Board.

Sr. no.	Type of segregated solid waste	Quantity	Disposal
1.	Scrap steel	1600 Tons Annum	Sale for Recycle registered with GSPCB
2.	Wooden planks	1040 Tons Annum	Sale for Recycle and Reuse
3.	Other solid waste	0.12Tons Month	Given to MMC/MPT garbage disposal site

(viii) The unit should implement rain water harvesting and ground water re-charge measures in consultation and approval of the Water Resource Department. Govt of Goa and Directorate of Industries. Trade and Commerce. Govt. of Goa.

4. CONDITIONS REQUIRED TO BE COMPLIED UNDER THE AIR ACT:

(i) The unit shall maintain and operate air pollution control system of adequate capacity for the following equipments

Sr No.	Name of Equipments / Installation	No. of Installation	Capacity	SO2 Kg/Hr	NOx	HC	CO	PM
					(g/kw-hr)			
1.	D.G. Set	02	1500 KVA	7.36	9.2	1.3	3.5	0.3
2.	D.G. Set	1	125 KVA	1.44	9.2	1.3	3.5	0.3

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3.	D.G. set	1	100 KVA	1.29	9.2	1.3	3.5	0.3
4.	D.G. set	1	2000 KVA	7.36	9.2	1.3	3.5	0.3
5.	D.G. set	1	250KVA	3.24	9.2	1.3	3.5	0.3

(ii) The applicant shall observe the following standards for D. G. Sets ≥ 1000 KVA

Sr. No	Parameters	Limits
1.	Nox(as NO2)	1100 ppmv (as 15%O2)Dry basis in ppmv
2.	NMHC(as C)	150 mg/Nm3 (at 15% O2)
3.	Particulate Matter	75 mg/Nm3 (at 15 % O2)
4.	CO	150 mg/Nm3 (at 15 % O2)
5.	Sulphur Content in Fuel	Less than 2%

(iii) The unit shall erect the chimney(s) of the following specifications:

Sr. No	Chimney attached to	Height
1.	D.G. set 1500 KVA	30 Mtrs
2.	D.G. set 125 KVA	3 Mtrs
3.	D.G. set 100 KVA	2 Mtrs
4.	D.G. set 2000 KVA	30 Mtrs
5.	D.G. set 250 KVA	3 Mtrs

(iv) The unit shall observe the following standards:-

Sr. No	Type of fuel	Quantity /hr
1.	H.S.D. (for D.G. set of 1500 KVA)	220 Ltrs /hr
2.	H.S.D. (for D.G. set of 125 KVA	20 ltrs/hr
3.	H.S.D. (for D.G. set of 100 KVA	18 ltrs/hr
4.	H.S.D. (for D.G. set of 2000 KVA	394 Ltrs/hr
5.	H.S.D. (for D.G. set of 250 KVA	45 Ltrs/hr

(v) The Stack Port Hole and Platform is to be designed as per CPCB guidelines Method 1 Part 1 of Stack Monitoring – Material & methodology for isokinetic sampling

(vi) The unit should comply with all the standards for D.G. Sets prescribed at Sr. no. 94, 95 and 96 of Schedule I of the Environment (Protection) Rules, 1986.

(vii) The unit should carry out emission monitoring from the stacks once in a year from a laboratory recognized by Ministry of Environment and Forest under the Environment Protection Act, 1986 and the result shall be submitted to this Board.

(viii) The unit shall take adequate measures for control of noise levels from its own sources within the premises in respect of noise. The limits are as follows

Category of Area/ Zone	Limits in dB (A) Leq	
	Day time	Night time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Silence Zone	50	40

Day time is reckoned between 6 a.m. to 10 p.m. and night time is reckoned between 10 p.m. to 6 a.m.

(ix) Adequate mitigation measures shall be taken to control emissions of SO_2, NO_x, $PM_{2.5}$, RSPM. Applicant shall achieve following Ambient Air Quality standards:

SO_2	Not to Exceed (Annual Average)	50 µg/ m^3
	Not to Exceed (24 hours)	80 µg/ m^3

NO_x	Not to Exceed (Annual Average)	40 µg/ m^3
	Not to Exceed (24 hours)	80 µg/ m^3
PM_{10}	Not to Exceed (Annual Average)	60 µg/ m^3
	Not to Exceed (24 hours)	100 µg/ m^3
$PM_{2.5}$	Not to Exceed (Annual Average)	40 µg/ m^3
	Not to Exceed (24 hours)	60 µg/ m^3

All other parameters should meet the standards specified in NAAQS notification dated 16th November 2009 the relevant industry

(x) **Unit has to ensure that the online CAAQMS system is operated continuously and always remains connected to Boards server.**

(xi) The applicant shall maintain wind breaking walls/barriers.

(xii) The applicant shall maintain dust containment cum suppression system.

(xiii) The applicant shall maintain metalled road within the premises.

(xiv) The applicant shall carry out regular cleaning and wetting of ground within the plot to suppress dust pollution.

(xv) The applicant shall plant fast growing trees along the periphery/compound wall of the plot to arrest dust pollution.

(xvi) The applicant shall take all the necessary steps to maintain the good and healthy ambient air quality in and around the plot.

(xvii) Continuous water sprinkling shall be carried out on the top of the heap at regular intervals to prevent dusting, fire & smoke. During loading/unloading, fixed pipe with sufficient water storage and pump shall be installed.

(xviii) The applicant shall ensure regular sweeping of coal from internal and main road and also ensure that there is space for free movement of vehicles at the surrounded area.

(xix) Fixed pipeline should be installed for sprinkling of water to ensure that total plot area is covered with adequate water tank of compatible storage.

(xx) The applicant shall provide adequate fire fighting measure to avoid any fire and shall ensure that there is no explosive or chemical reaction in storage yard.

(xxi) The applicant shall store coal in such a way that coal heap should not be higher than 9 meters and clear distance between two adjoining heap at G.L. should be 5 meters, so that in case of fire, approach is available.

(xxii) Proper drainage system shall be provided in all coal storage area so that water drained from sprinkling is collected at a common tank and can be reused after screening through the coal silt

5. **CONDITIONS REQUIRED TO BE COMPLIED UNDER THE HAZARDOUS WASTES (MANAGEMENT, HANDLING AND TRANSBOUNDRY MOVEMENT) RULES 2008:**

(i) The unit is hereby granted authorization to operate a facility for collection, storage and disposal of hazardous wastes as specified below:

Sr. No.	Category	Type of waste	Quantity	Mode of disposal
1.	5.1	Used/Spent oil	12.5	To recycler registered with CPCB and

			MT/annum	having valid authorization of SPCB
2.	5.2	Waste residues Containing oil	2.0 MT/annum	To be sent to M/s Ponda Envocare Ltd. at Pissurlem Industrial Estate for incineration

(ii) The authorizer shall comply with the provisions of the Environment (Protection) Act, 1986 and the rule made thereunder.

(iii) The person authorized shall not rent, lend, sell or transfer or otherwise transport the hazardous waste without obtaining prior permission of the Goa State pollution Control Board.

(iv) Any unauthorized change in personnel, equipment or working conditions as mentioned in the application by the person authorized shall constitute a breach of his authorization.

(v) It is a duty of the authorized person to take permission of the Goa State Pollution Control Board to close down the facility.

(vi) The inner bottom surfaces of the tank shall be impervious enough to prevent leakage or seepage of these wastes into the sub surface soil or ground water.

(vii) The occupier shall maintain a manifest system as per Rule 19 for disposal of hazardous wastes to ensure that these wastes are delivered to the designated facility preventing pilferage and clandestine disposal due to unforeseen events that may occur during transit.

(viii) The manifest shall be endorsed by the dispatcher, transporter and receiver of hazardous wastes. The endorsed copy shall be furnished to the Goa State Pollution Control Board.

(ix) Under no circumstances the hazardous waste shall be disposed to unauthorized facilities.

(x) The occupier shall maintain the records for collection, storage and disposal of hazardous waste in Form 3 of as per Hazardous and other Waste (Management & Transboundary Movement) amended rules 2018.

(xi) The occupier shall furnish monthly returns for collection, storage and disposal of hazardous waste through online consent management and monitoring system (OCMMS).

(xii) The unit shall put up an online board (minimum size 6x4 Feet) at prominent location near the main gate providing details as follows in English and Konkani languages:-

- Hazardous Waste category number.
- Hazardous Waste quantity number.
- Treatment facility for each category.
- Mode of disposal for each category.
- Hazardous Waste Authorization number, date and validity period.
- Water Consent number, date and validity period.
- Air Consent number, date and validity period.
- Quantity and Nature of Hazardous Chemicals being used.

(xiii) The occupier shall ensure that the Hazardous Wastes are not allowed to be stored for more than 90 days.

(xiv) The unit shall submit annual returns in prescribed format to the Board for financial year by 30th June of every year for the previous financial year.

6 GENERAL CONDITIONS:

(i) The unit shall not change or alter the quantity, quality of discharge, temperature or the mode of the effluent/ emission or hazardous wastes or control equipments provided for without previous permission of the Board.

(ii) The unit shall provide facility for collection of samples of effluent, air emissions and hazardous wastes to the Board staff.

(iii) An application in prescribed form along with the prescribed fees for renewal of Consent shall be submitted at least 60 days before the expiry of validity of this Consent. An application for renewal of Consent submitted after expiry of the validity shall accompany with penalty of 50% of the Consent fees in addition to the prescribed consent fees.

(iv) The Board shall be forthwith informed of any accident or unforeseen event involving discharge of any poisonous, noxious or polluting matter into a stream or well or on land or into the atmosphere, as result of such discharge water/ air is being polluted.

(v) This Consent to Operate is granted without any prejudice to any of the permission(s) required under any law, by laws and regulations in force.

(vi) This Consent does not entitle the party to commence activities until and unless all the other Permissions
as required under the relevant statutes are obtained by the party and this Consent to Operate is confined to matters arising out of the Air Act and Water Act only

(vii) The Board reserves the right to amend or add any conditions in this consent and the same shall be binding on the applicant.

(viii) The unit shall submit to this office, the Environmental Statement Report in Form V for the Financial Year ending April to March by 30th September of the succeeding year as per the provisions of the rule 14 of the Environment (Protection) (Second Amendment) Rules, 1992.

(ix) Reliable flow meter shall be installed to maintain record of water consumption/waste water generation per day. The records so maintained shall be made available to the Board officials whenever required.

(x) The industry shall bear the cost of analysis / monitoring in case of complaints received by the Board/ reinspections due to non compliances observed by the Board & monitoring carried by the Board.

(xi) The unit shall submit the details of the Public Liability Insurance Policy under the PLI Act 1991, to the Board office as applicable.

(xii) The unit shall submit returns for disposal of batteries under the Batteries (Management & Handling) Rules 2001, if applicable.

(xiii) The unit shall submit returns for disposal of e - waste under the E- Waste Management Rules 2016 as amended thereafter, if applicable.

(xiv) The unit shall submit returns for disposal of plastic waste under the Plastic Waste Management Rules 2016 as amended thereafter, if applicable.

(xv) Unit shall improve the housekeeping at wagon loading point and submit compliance report to this office.

7. SPECIFIC CONDITIONS

i. Take into consideration Best Available Technology (BAT) or Good International Industry Practices (GIIP).w.r.t DUST MANAGEMENT when determining air quality management techniques, generally and in specific cases ,including during expansion or up gradations .

ii. Use enclosures (detachable if required) on conveyors or chutes and telescoping arm loaders, hoppers to reduce spillage and dust; also, minimize the distance between the working area and trucks/trains being loaded to reduce the area exposed to fugitive dust generation and area that has to be swept/cleaned. free fall of material should be avoided.

iii. Cover the cargo stock pile with an impervious tarpaulin, adequately anchored, as soon as possible after loading/unloading and adjusting the cover as material is removed from the pile thereby ensuring maximum closure of the pile and minimum exposure to existing weather conditions.

iv. Maintain pile size/volume to maximum height specified by the Board or consistent with customer demand, transportation schedules and materials cost, whichever is lesser, to reduce the amount of material exposed to weather to conditions; and for the shortest time as possible. Dry cargo pile heights should remain low, to minimize material from becoming airborne.

v. Insert the ship loader or loading mechanism in the ship's hold before loading/unloading begins. All ship loader booms should be fitted with fogging sprays at the loading chute.

vi. Periodically clean the drainage channels and properly dispose of the sediment as per applicable regulations .Storm drainage channels / holding tanks should not be discharge directly into surface waters without prior Consent of the Board and compliance verification.

vii. Use dust suppression system, bag house, screw conveyors and vacuum collecting equipment wherever practical in the handing and further prevention of dispersion of fine ,granular or powdery material .

viii. Establish the Dust Extinction Moisture (DEM) for the various cargoes handles as applicable and ensure that all ore/coal /bauxite /sawdust/other powder form of material (directly or indirectly derived) brought into, stockpiled and unloaded/loaded through the MPT is at, or above, the Dust Extinction Moisture (DEM) for that particular material type. DEM as well as any specific characteristics such as hydrophobicity which would indicate that practices relying on water application would be effective enough or ineffective. Both the DEM and hydrophobicity of ore/coal/bauxite/sawdust/other powder form of material (directly or indirectly derived) should be determined and the reports of the same should be submitted to the Board including their respective material (or mineral) characteristics of the material.

ix. Use water cannons /sprinklers on all stockpile areas to maintain the Dust Extinction Moisture (DEM) of the product and prevent dust emissions associated with wind erosion. Use of low – volume misting nozzles directed along the raw material stream. Use of water addition nozzles in conjunction with the low volume misting nozzles where the raw material is not at DEM.

x. Explore the use of total or partly retractable permanent enclosures for stock pile handling areas, during loading /unloading or installation of an additional windscreen (height to be established keeping in mind
,the elevation height of the hill top residences and the structural stability ,of the same)adjacent to the road adjoining MPT and the residences, whichever is feasible ,for control of dust generation with extraction to suitable bag or appropriate filters to minimize fugitive dust emissions, thereby controlling material loss.

xi. Consider predominant wind patterns when stock piling, avoiding dry and conditions where possible. Spray stockpiles immediately prior to strong wind events or dry weather conditions.

xii. Consider removal if materials from the bottom of piles to minimize dust re-suspension.

xiii. In Mobile reclaimers, the bucket wheel reclaimers can be fitted with two sets of nozzles (one set to spray the face of the stockpile immediately ahead of and behind the cutting wheel, and the second set to spray into the raw material stream as it cascades out of the buckets into the transfer chute and onto the conveyor.

xiv. Where practicable during expansion, designing new facilities to minimize travel distance from ships off- loading and on –loading facilities to storage areas.

xv. Provide details of water source for sprinklers and provide flow meters to the sprinkling systems line and submit daily readings of input and output at the end of the month to the Board.

xvi. Noise sources in ports include cargo handling, vehicular traffic ,and loading /unloading containers and ships to be identified ,controlled and regulated within defined time frames keeping in view the distribution of population density.

xvii. Permanently stabilize entire work areas /transportation routes to minimize fugitive dust emissions within three month from date of order. Consideration may be given to the use of Compacted Clay, due to its low tendency to crack ,in consultation with concerned experts.

xviii. The unit shall renew the bank guarantee of Rs.1crore with a validity period of one year, within 10 days from the date of issue of this consent for ensuring compliance of the consent conditions and including condition of capping of handling as per Sr.no.2. The same will be forfeited incase of any noncompliance.

xix. Unit has to submit Monthly cargo handling data to the Board by subsequent month and maintain the records of the same.

xx. For the purpose of source apportionment study in respect of dusty cargo handled in MPT including coal, the unit shall jointly/ severally contribute periodically toward the expenses incurred for the said study to MPT.

xxi. The unit should have a complete plan of arrival of ships and the permitted handling capacity shall be strictly adhered.

xxii. If cargo is dispatched by Wagons then all the wagons should be properly covered by Tarpaulin & tied neatly in order to avoid spillage during transport. The unit should also study on the aspects of having a mechanized system for closing the wagons and submit a action plan for the same.

xxiii. The unit shall comply to the guidelines and DUST Mitigation measures in handing Construction material and C and D waste issued by Central Pollution Control Board and are placed on Board website goaspcb. gov. in

xxiv. MPT should share the weather forecast to the handlers at the port immediately on receipt.

xxv. The port handlers shall install cameras at the stacking premises, which could be accessed by the board and MPT within 3 months of this issue of consent.

xxvi. Coal Stacks should be covered and sprinkling should be carried out when loading/unloading activity of coal is in progress.

xxvii. Cargo-related operations at the MPT berths is permitted upto a wind-speed of 30 km/ hr. with the strict-adherence to the following conditions:

a) Normal operations permitted upto a wind-speed of 28 km/hr. (i.e. Beaufort scale – 04).
b) Precautionary measures should be in place with proportionate scaling-down Operations when the wind speed exceeds 28 km/hr. (i.e. Beaufort scale – 05)
c) All operations should stop at a wind-speed of 30 km/hr.
d) Wind speed is not applicable during rainy season from June to September.
e) Conditions from a to c are not applicable for green/non dusty cargo.

xxviii. The port facility should submit a action plan within one month with a detailed layout plan and settling pond arrangements to ensure that no rain water contaminated with coal enters water body

xxix. The unit shall install vertical garden and maintain the same wherever possible within the port and periphery and submit action plan within one month.

xxx. The unit shall operate and maintain continuous noise monitoring at the boundary of the unit and the CAAQMS location and connect to Board server.

xxxi. **Monitoring of SO^2 and PM2.5 emission from diesel operated gantry cranes, fork lifts, electric and hydraulic cranes and FLTs and report to Board every six months to the Board.**

To,
M/S. SOUTH WEST PORT LTD
(Represented by: CAPTAIN ANURANG BHAGAULIWAL)
(Berth No. 5a & 6a)
Chalta No. 1 of P.T. Sheet No. 7,
Site office building, Berth No 5A & 6A,
Mormugao Harbour, Mormugao – Goa.

Copy to:- 1 Accounts Section
2 Concerned File
3 Guard File

Received Consent fee of: The Capital Investment of the unit is Rs. 51189.33

Challan no.	Amount	Date
015	Rs. 14,12,500/- (Air & Water Consent fees)	08/01/2019
2466	Rs. 3000/- (Amendment fees)	14/03/2022

(Dr. Shamila Monteiro)
Member Secretary
Goa State Pollution Control Board

Page 10 of 10

Appendix 2

SANYOJAN
CONSULTING CIVIL ENGINEERS

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SHAMA RAM AREA DELHI REG. NO. 2682 NOTARY GOVT. OF INDIA

प्रधान मुद्रांक कार्यालय, मुंबई
प.मु.कि.क्र. ८०००९४
19 SEP 2017
सक्षम अधिकारी
श्री. प्र. ना. चिंचघरे

To,

The Ministry of Environment, Forest and Climate Change
Govt. of India,
Indira Paryavaran Bhavan, Jor Bagh Road,
New Delhi 110 003

Affidavit

M/s South West Port Limited (SWPL), a company incorporated under the Companies Act, 1956 having CIN No U45203GA1997PLC002369 having its registered address 1st Floor Port Users Complex, Mormugao Harbour Goa 403803 has applied to the Ministry of Environment, Forest and Climate Change for Environmental and CRZ Clearance under the Environmental Impact Assessment Notification, 2006, and Coastal Regulation Zone Notification, 2011 for the project **"Terminal Capacity Enhancement by Modernization at Berth 5A-6A, Mormugao Port for handling coal and coal products, iron ore and limestone including unitised and steel products at Mormugao Port Trust, Mormugao, Goa"**. [F.No.10-5/2015-IA.III]

With Reference to the above, we undertake that;

i. We shall not carry out transportation of coal cargo by road, and

SHAMA RAM AREA DELHI REG. NO. 2682 NOTARY GOVT. OF INDIA

SANYOJAN CONSULTING CIVIL ENGINEERS

ii. We shall implement a longitudinal covered shed for storage of coal cargo in the Terminal after necessary approvals are granted for its erection.

The Corporate office of the company is located at JSW Centre, Bandra Kurla Complex, Bandra (East), Mumbai 400 051.

Date: 12.12.2017

Place: MUMBAI

for **M/s South West Port Ltd.**

SOUTH WEST PORT LTD.

(Authorised Signatory)

NOTARY SHAMA RANI AREA DELHI REG. NO. 2682 GOVT OF INDIA

ATTESTED

NOTARY PUBLIC

14 DEC 2017

Appendix 3

SANYOJAN
CONSULTING CIVIL ENGINEERS

ENVIRONMENTAL CLEARANCE

PARIVESH
(Pro-Active and Responsive Facilitation by Interactive, and Virtuous Environment Single-Window Hub)

Government of India
Ministry of Environment, Forest and Climate Change
(Impact Assessment Division)

To,

The Vice President Projects
SOUTH WEST PORT LIMITED
JSW Centre,
JSW Infrastructure Limited,
Bandra Kurla Complex,
Bandra East,
Mumbai,,Mumbai City,Maharashtra-400051

Subject: Grant of Environmental Clearance (EC) to the proposed Project Activity under the provision of EIA Notification 2006-regarding

Sir/Madam,

This is in reference to your application for Environmental Clearance (EC) in respect of project submitted to the Ministry vide proposal number IA/GA/MIS/26758/2015 dated 15 Jul 2017. The particulars of the environmental clearance granted to the project are as below:

1.	**EC Identification No.**	**EC23A033GA138407**
2.	**File No.**	10-5/2015-IA-III
3.	**Project Type**	Modernization
4.	**Category**	A
5.	**Project/Activity including Schedule No.**	7(e) Ports, Harbours
6.	**Name of Project**	Proposed Terminal Capacity Enhancement At Berth 5A-6A of Mormugao Port for Handling Coal And Coal Products, Iron Ore And Limestone including Unitised and Steel Products
7.	**Name of Company/Organization**	SOUTH WEST PORT LIMITED
8.	**Location of Project**	Goa
9.	**TOR Date**	19 Jun 2015

The project details along with terms and conditions are appended herewith from page no 2 onwards.

Date: 11/01/2023

(e-signed)
Amardeep Raju
Scientist E
IA - (INFRA-1 sector)

Note: A valid environmental clearance shall be one that has EC identification number & E-Sign generated from PARIVESH.Please quote identification number in all future correspondence.

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Appendix 4

SANYOJAN
CONSULTING CIVIL ENGINEERS

GOA STATE POLLUTION CONTROL BOARD
गोंय राज्य प्रदूषण नियंत्रण मंडळ
(An ISO 9001-2015, ISO 14001:2015, ISO 45001:2018 Certified Board)

Phone Nos : 0832- 2407700,
2407701, 2407703

Email Ids:
Chairman, GSPCB: chairman-gspcb.goa@nic.in
Member Secretary, GSPCB: ms-gspcb.goa@nic.in
Office: mail.gspcb@gov.in

No.12/2023-PCB/1560956/R00011399 **Date: 29/03/2023**

Consent to Establish under Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 & under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981
[To be referred as Water and Act Air Act respectively]

CONSENT TO ESTABLISH is hereby granted to:

M/s. SOUTH WEST PORT LTD
(Represented by: Captain Anurang Bhagauliwal)
(Berth No. 5A& 6A)
(Red Category)

Chalta No. 1 of P.T. Sheet No. 7,
Site office building, Berth No. 5A &6A,
Mormugao Harbour, Mormugao - Goa

Located in the area declared under the provisions of the Water Act and Air Act, subject to the provisions of the Act and the Orders that may be made further and subject to the following terms and conditions:

1. The Consent to Establish is valid upto commissioning of the unit or 3 years whichever is earlier.

2. This Consent to Establish is valid for the operation of:

Sr. No	Description	Capacity
1.	**Construction of Covered Storage Shed**	**320 m L x 125m W x 45 m H at existing Plot A, Plot B and Plot C**

3. **CONDITIONS REQUIRED TO BE COMPLIED UNDER THE WATER ACT:**

(i) The daily quantity of industrial effluent from the factory shall not exceed NIL.

(ii) The daily quantity of domestic effluent from the factory shall not exceed **NIL.**

(iii) **Non-Hazardous Solid Waste:**
All the Solid wastes arising in the premises shall be properly classified and disposed off to the satisfaction of the Board.

4. **CONDITIONS REQUIRED TO BE COMPLIED UNDER THE AIR ACT:**

(i) The unit shall take adequate measures for control of noise levels from its own sources within the premises in respect of noise. The limits are as follows

Category of Area/ Zone	Limits in dB (A) Leq	
	Day time	Night time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Silence Zone	50	40

Day time is reckoned between 6 a.m. to 10 p.m. and night time is reckoned between 10 p.m. to 6 a.m.

5. **GENERAL CONDITIONS:**

(i) The applicant shall not change or alter the quantity, the rates of discharge, temperature and the mode of disposal of the effluent without previous written permission of the Board.

(ii) The applicant shall provide facilities for collection of the samples to the Board staff.

(iii) The industry shall discharge the treated effluents preferably on land for irrigation/ gardening/ lawn within their own premises or re-use after suitable treatment.

(iv) Stack heights for a (Diesel generator set(s) shall be as follows:

(a) Diesel Generator set(s): The minimum height of the stack to be provided with each generator shall be as per the formula $H = h + \sqrt[0.2]{KVA}$ where H = total height of the stack in meters, h = height of the building in meters where the generators is installed and KVA = total generator capacity of the set in KVA.

The generator shall be installed in a closed area with a silencer and suitable noise absorption systems so as to comply with the ambient noise level standards as mentioned below:

The ambient noise level shall not exceed 75 dB (A) at a distance of 5 meters from the source.

(v) The applicant shall provide ports in the chimney / stack and facilities such as ladder, platform etc. as per the directions of Pollution Control Board for monitoring the air emissions and the same shall be open for inspection and use the Board's staff. The chimney / stack attached to various sources of emissions shall be designated by numbers such as S-1, S-2, etc. and these shall be painted/ displayed to facilitate identification.

(vi) The industry shall implement the following Rules and Regulations notified by the Ministry if Environment and Forests, Govt. of India.

a) Hazardous & other Wastes (Management & transboundary movement) Rules, 2016 as amended thereafter;

b) Manufacture, storage and Import of Hazardous Chemicals Rules, 1989;

c) Rules for the Manufacture, Use, Import and Storage of Hazardous Micro – organism / - Genetically Engineered Organisms or Cell, 1989.

(vii) There shall not be any perceptible odour outside the premises.

(viii) All the Rules and Regulations notified by the Ministry of Environment and Forests, Govt. of India in respect of noise pollution control measures shall be followed to avoid nuisance to public.

(ix) Notwithstanding anything contained in this conditional letter of consent, the Board hereby reserves its right and powers under section 27(2) of the Water (Prevention and Control of Pollution) Act 1974 and under section 21(4) of the Air (Prevention and Control of Pollution) Act 1981 to review any or all the conditions imposed hereby.

(x) Any change in the details made after the submission of the application/ after obtaining the Consent to Establish shall be brought to the notice of the Board immediately.

(xi) This Consent to Establish is granted without any prejudice to any other permissions(s) required under any laws, bye – laws and regulations in force.

(xii) The unit should obtain permission from the Forest Department/ Wild Life Board wherever applicable.

(xiii) The unit should implement rain water harvesting and ground water re-charge measures in consultation and approval of the Water Resource Department, Government of Goa and Directorate of Industries, Trade and Commerce, Government of Goa, before submitting an application for Consent to Operate.

(xiv) The unit/ generator shall be responsible for safe and scientific collection, transportation, treatment and disposal of Bio-Medical Waste as per the provisions made under the Bio-Medical Waste (Management) Rules, 2016. Any activity as defined under BMW (M) Rules has to obtain a separate Authorization from Goa State Pollution Control Board.

(xv) The unit should obtain all permissions / approvals as required under the prevalent Rules / Acts in force.

(xvi) The unit shall apply for Consents to Operate of the Board as required under section 25(1) (b & c) of the Water (Prevention and Control of Pollution) Act, 1974 and under section 21 of the Air (Prevention and Control of Pollution) Act, 1981 in the prescribed application form, 45 days before commissioning of the plant

(xvii) Reliable flow meter shall be installed to maintain record of water consumption / waste water consumption per day. This records so maintained shall be made available to the Board officials whenever required.

(xviii) The unit shall bear the cost of analysis / monitoring in case of complaints received by the Board/ reinspections due to non compliances observed by the Board & monitoring carried by the Board.

(xix) The unit shall submit the details of the Public Liability Insurance Policy under the PLI Act 1991, to the Board office as applicable

(xx) The unit shall submit returns for disposal of batteries under the Batteries (Management & Handling) Rules 2022, if applicable.

(xxi) The unit shall submit returns for disposal of e - waste under the E- Waste (Management) Rules 2016 as amended thereafter, if applicable.

(xxii) The unit shall submit returns for disposal of plastic waste under the Plastic Waste (Management) Rules 2016 as amended thereafter, if applicable.

(xxiii) The unit shall comply to the Guidelines and DUST Mitigation measures in handling Construction material and C & D waste issued by central Pollution Control Board and are placed on Board website goaspcb.gov.in", if applicable

SANYOJAN CONSULTING CIVIL ENGINEERS

(xxiv) The unit has to obtain no objection certificate from the Central Ground water Authority, or the concerned state authority for any ground water abstraction, if applicable.

To,
M/s. SOUTH WEST PORT LTD
***(Represented by:* Captain Anurang Bhagauliwal)**
(Berth No. 5a & 6a)
Chalta No. 1 of P.T. Sheet No. 7,
Site office building, Berth No. 5A &6A,
Mormugao Harbour, Mormugao- Goa

Copy to:

1. Accounts Section
2. Concerned File
3. Guard File

Received Consent fee of: **The Capital Investment of the unit is Rs. 165 Crores /-**

Receipt no.	Amount	Date
1972	Rs. 4,63,794/- (CTEExpansion fees)	21/01/2023

SANJEEV SHASHIKANT JOGLEKAR
Digitally signed by SANJEEV SHASHIKANT JOGLEKAR
Date: 2023.03.29 12:06:33 +05'30'

Member Secretary I/c
Goa State Pollution Control Board

3008

Annexure A-3

SOUTH WEST PORT LIMITED

Regd. Off. : 1st floor, Port Users Complex
Mormugao Harbour, Goa - 403 803. India.
CIN : U45203GA1997PLC002369
Phone : 0832 - 252 3000
Fax : 0832 - 252 3008
Website : www.jsw.in

Date: 20.12.2022

To,
The Director (Infra-I)
Impact Assessment Division (IA-III)
Ministry of Environment Forest & Climate Change (MoEF&CC)
Indira Paryavaran Bhawan, Jor Bagh Road
New Delhi- 110 003

20/12/22

Sub: Proposed Terminal Capacity Enhancement at Berth 5A-6A of Mormugao Port for Handling Coal and Coal Products, Iron Ore and Limestone including Unitised and Steel Products at Mormugao Port Trust, Mormugao, Goa by M/s South West Port Ltd.- Environmental and CRZ Clearance (IA/GA/MIS/26758/2015; F. No. 10-5/2015-IA-III)

Dear Sir,

Dear Sir,

In continuation to our letter dated 9th Sep 2022 and our e-mail dated 16th Nov 2022 enclosing enclosing the superimposed map & report along all supporting documents, we are pleased to attach herewith the letter from Director (Environment & CC) / Member Secretary (GCZMA), Department of Environment & Climate Change, Govt of Goa, duly revalidating the CRZ Recommendation given by GCZMA and also stating that there is no change in CRZ Classification as per the GCZMA Recommendation and the present map prepared as per approved CZMP 2011.

In this regard, we request you to kindly issue an Environmental and CRZ Clearance (EC) letter for further implementation of the project.

Your kind cooperation in this matter is highly appreciable and obliged.

Thanking You.
Sincerely Yours'

20/12/22

Jayanta Roy
Senior Vice President

Encl: As Above

Corporate Office : JSW Centre,
Bandra Kurla Complex,
Bandra (East), Mumbai - 400 051

Phone : +91 22 4286 1000
Fax : +91 22 4286 3000

Annexure 4

Interpretation of **Ambient Air Quality** Information of the **Mormugao Port Trust Source Complex** with respect to Operation of **South West Port**

Vasco da Gama, Goa

prepared for

South West Port Ltd.
MPT Old Office Building, I Floor
Mormugao Harbour
Vasco da Gama, Goa - 403001

prepared by

ROOTS EHS Advisory
201, Gokulesh, 5 Gokul Society
Vasna Jakat Naka
Vadodara, Gujarat - 390 021

March, 2018

Interpretation of Ambient Air Quality Information of the Mormugao Port Trust Source Complex with respect to Operation of South West Port Vasco da Gama, Goa

South West Port Ltd.
MPT Old Office Building, I Floor Mormugao Harbour
Vasco da Gama, Goa – 403001

ROOTS EHS Advisory
201, Gokulesh, 5 Gokul Society
Vasna Jakat Naka
Vadodara, Gujarat - 390 021

March, 2018

Document Code	:	ROOTS/SWP/AAQ/208.03-01
Prepared by	:	Nitin Tiwari (nitin@rootsehs.com)
Approved by	:	Dr. Shobha Kamath (shobha@rootsehs.com)
Copyright	:	ROOTS EHS Advisory, Vadodara
Disclaimer	:	Prepared by ROOTS EHS Advisory, Vadodara for South West Port, MPT, Vasco da Gama, Goa. ROOTS EHS Advisory, Vadodara does not guarantee or provide any representations or warranties with respect to Client's use, interpretation or application of the findings, conclusions, and/or suggestions herein. Inferences drawn in this document are based on site visits undertaken in January and February, 2018, primary information provided by the SWP Ltd. and information available in public domain.
Key references	:	1. Annual Reports of Goa State Pollution Control Board, 2004-05 to 2015-16 2. Bureau of Indian Standards, IS 5182, (Part 14) : 2000 (Reaffirmed 2010), METHODS FOR MEASUREMENT OF AIR POLLUTION, Part 14. Guidelines for Planning the Sampling of Atmosphere, Second Revision 3. CPCB, NATIONAL AMBIENT AIR QUALITY MONITORING SERIES : NAAQMS/2003-04, Guidelines for Ambient Air Quality Monitoring, April, 2003

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Sr.	Title
I	Pictures of fugitive emission control technologies utilised in the Terminal
II	AAQ analysis results of the Terminal of last six months
III	Detail of status of compliance of Consent to Operate (CtO) (No. 5/2580/04-PCB/C1-3090)

Abbreviations

AAQ	Ambient Air Quality
APCM	Air Pollution Control Measures
BAT	Best Available Technology
BPT	Best Practicable Technology
CAAQMS	Continuous Ambient Air Quality Monitoring Station
CtO	Consent to Operate
DG	Diesel Generator
GSPCB	Goa State Pollution Control Board
JSW	Jindal South West
MoEFCC	Ministry of Environment, Forest and Climate Change
MOHP	Mechanical Ore Handling Plant
MPT	Mormugao Port Trust
MT	Metric Ton
NAAQS	National Ambient Air Quality Standard
RSPM	Respirable Suspended Particulate Matter
SCADA	Supervisory Control and Data Acquisition
SWP	South West Port
SWPL	South West Port Ltd.

Chapter 01
Introduction

Chapter 01
Introduction

1.1 JSW South West Port

M/s South West Port Ltd. (SWPL), a Jindal South West Group company (JSW) has been operating two, continuous quey berths, namely berth no. 5A and 6A in the Mormugao Port Trust (MPT) on Build-Own-Operate-Transfer licence agreement since 2004 for Group's captive cargo, mainly to cater to Group's steel plant at Vijaynagar, Toranagallu, Karnataka for its raw material feed (iron ore, lime store and coal) and finished products evacuation. With the ongoing expansion of the steel plant requiring larger movements of cargo, the Terminal serves a strategic cost-cutting and efficiency measure for the JSW Group.

Although the Terminal occupies an insignificantly miniscule portion of the total MPT area (4.06 ha of total 221 ha, 2.08 % of the total area), it is responsible for handling significant amount of the total traffic of MPT and is an important source of revenue for the MPT.

Location of the Terminal in the MPT area in the north of the Sada headland and west of the Vasco da Gama town is shown in **Figure 1.1.**

Figure 1.1 Location of the SWP Terminal in MPT area, Vasco da Gama

Facilities at the ISO 9001, 14001, OSHAS 18001 and ISPS compliant South West Port Terminal (Terminal) include two, 450 m long berths (berth 5A - 201 m long, berth 6A - 240 m long), Mobile harbor and grab

quay ship unloaders, mechanized wagon loading system connected by closed conveying system, fully mechanized cargo handling systems, integrated air pollution control systems (barriers, containment and active suppression), rail head within the terminal area, automated and mechanized controls and online monitoring systems. The Terminal is conveniently located as it is connected to two National Highways — NH 17 and NH 4A; NH4A connects to the Mumbai-Bengaluru NH 14. The Terminal, however, does not move any cargo by the road route; it depends on the Indian Railways (SWR, 285 km from Vasco to Torangallu via Londha, Dharwar, Hubli, Gadag) for moving entire volume of its cardo. Rail route from the Terminal to Torangallu is shown in **Figure 1.2**.

Figure 1.2 Rail route from the Terminal to Vijaynagar Steel Plant, Torangallu

The Terminal has capacity to handle in excess of 10 MTPA of diverse bulk and break bulk cargo. Plans are underway to increase the handling capacity by another 4-5 MTPA by debottlenecking and modernization. The terminal has handled around 70 MMT and 19,000 rakes since its inception.

Disguised features of the Terminal are given in the following **Table 1.1.**

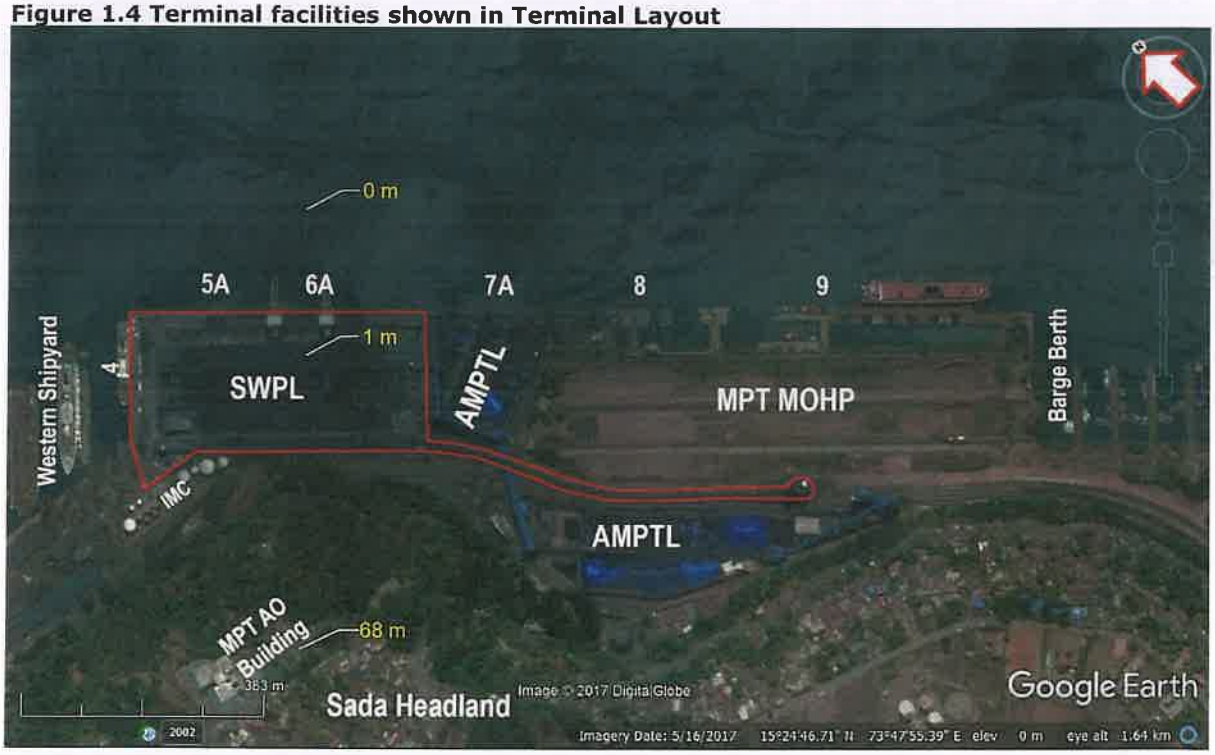
Table 1.1 Features of the SWP Terminal

- Closest port to the steel industry cluster of Bellary-Hospet in Karnataka
- Located within a major port with all related advantages
- Rail head within the terminal area making transportation by rail easier
- 450 m long berth
- Fully mechanised cargo handling systems
- One Mobile Harbor crane, two Grab Ship Unloaders, Surge hoppers
- Two Stackers cum Reclaimers, Covered conveyors
- RCC/interlocking paver roads, Rotary broom sweeping machines
- 3 x 40 m x 350 m stockpiles (geotextile covered), ScR to Silo pipe conveyor
- Mechanised batch wagon loading system connected by closed conveying system
- Manual assisted and inspected Geotextile covering of rakes
- Air pollution monitoring systems
- Sprinkling carried out with static/fixed sprinklers fed with pressurised water from a 40 HP, four stage pump (one plus one standby) fitted on a 700 kl reservoir
- Geotextile-on-structural-frame wind barrier of 12 m height
- Terminal control (including Pollution Control measures) on SCADA

Closer view of the Terminal is shown in **Figure 1.3**. Terminal facilities as mentioned in Table 1.1 are shown in layout of the Terminal in **Figure 1.4**.

Figure 1.3 Closer view of the Terminal

Figure 1.4 Terminal facilities shown in Terminal Layout



1.2 Purpose and Scope of the present Study

The Terminal was directed to install a Continuous Ambient Air Quality Monitoring Station by Goa State Pollution Control Board (GSPCB) vide a Notice of Direction under Section 31(A) read with Section 21 of the Air (Prevention and Control of Pollution) Act, 1981, No. 1/25/12-PCB/8867, dated 4th February, 2016 in accordance with the renewed Consent to Operate dated 10th April, 2015, Condition no 6(xi) (Originally in the Consent to Operate under Section 21 of the Air Act, 1981, No. 6/857/04-PCB/8180, dated 23rd February, 2011, Sr. no. 9.) .

A CAAQMS of Environment Assey, Austria was installed over the Canteen building in the terminal since 12th March, 2016. The CAAQMS monitors the following parameters on a continuous basis.

a. PM10
b. PM2.5
c. SO2
d. NOx
e. CO

The CAAQMS gives real-time parameter value on a display on the instrument panel and records the data internally which can be accessed through a software on the computer.

The canteen building at the south west corner of the Terminal was chosen as most representative location for logging of Ambient Air Quality (AAQ) as it was in the unhindered path of air from the Stackers cum Reclaimers (ScR), which are the only significant source of fugitive emissions from the Terminal (after employment of an active Dust Suppression System – continuous sprinkling of water in the area of working of the ScRs, either during stacking, or by bucket-wheel reclamation of bulk cargo). The location served the following merit for installation of CAAQMS.

a. Straight path of air from the sources of fugitive emissions
b. Away from general traffic of MPT
c. Away from other similar operations (Terminal of M/s Adani Mormugao Port Terminal Pvt. Ltd.) which handles similar cargo (coal), albeit under an inferior system of handling.

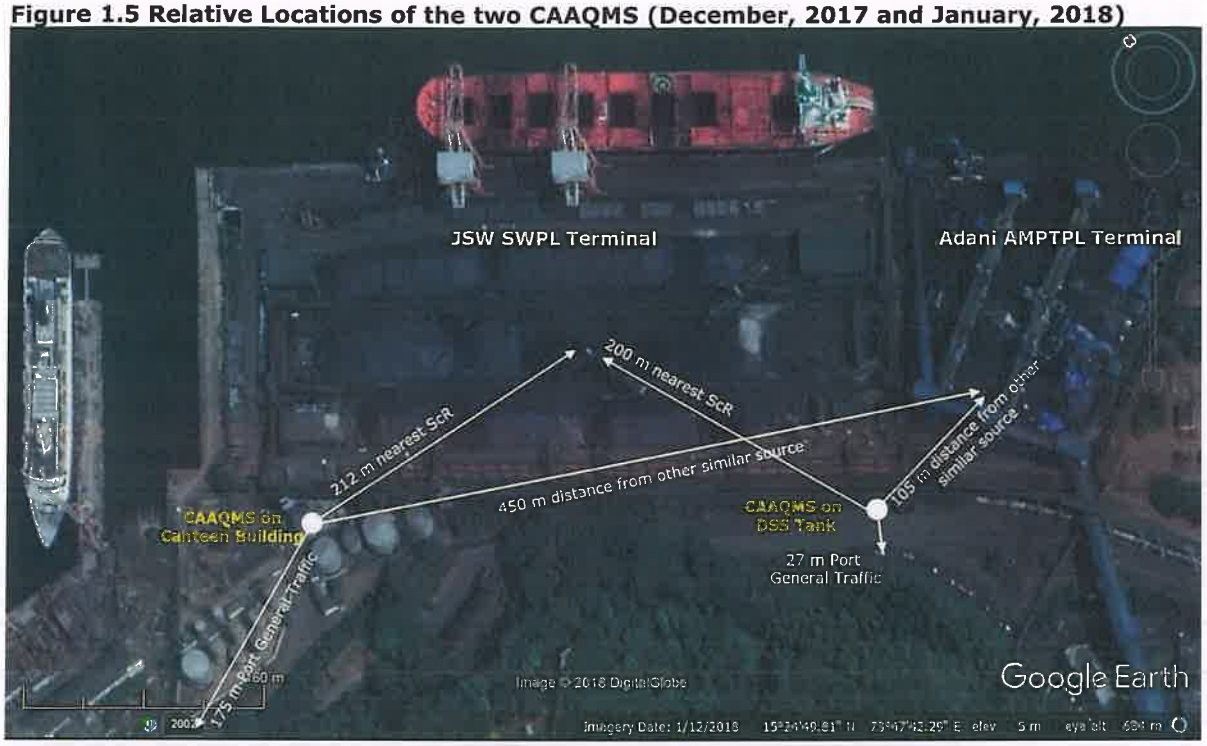
There are several correspondences on record since 2016 wherein the GSPCB has asked the SWP Terminal to shift the CAAQMS to a location closer to the eastern boundary of the Terminal, closer to the Berth 7 operations, which were contested by the SWP Terminal on grounds of representativeness, the proposed location being closer to another similar source of fugitive emissions, railway operations and general traffic of the MPT. The CAAQMS was shifted to above the DSS tank, a location of GSPCB direction in January, 2018 in compliance of the Show Cause Notice under Section 31(A) of the Air (Prevention and Control of Pollution) Act, 1981 and Section 33(A) of the Water (Prevention and Control of Pollution) Act, 1974, No. 1/25/-17-PCB/LD-95 dated 30th November, 2017. Relative locations of the two CAAQMS is shown in **Figure 1.5.**

ROOTS EHS Advisory, Vadodara was approached by the SWPL in end of February, 2018 for providing assistance in interpretation of CAAMS and other AAQ data in possession of SWPL, procured from MPT, provided by GSPCB and those in public domain. The AAQ information was perused, the Terminal site and other AAQ monitoring sites in the MPT area and Vasco da Gama were visited and the AAQ data has been interpreted with respect to Operation of South West Port, Vasco da Gama, Goa.

The Report tries to enquire into the following matters;

a. The fugitive emission control system installed in the Terminal, and its effectiveness
b. Whether there is any significant correlation of cargo handled at the Terminal and particulate pollution levels at Vasco da Gama
c. Whether the CAAQMS at the earlier and the present location satisfies the criteria of 'representativeness'
d. Whether the old/new location can be termed as 'Source' data or 'Ambient' data
e. Whether there are possibilities of non-operation/background contributions in the CAAQMS logging

Figure 1.5 Relative Locations of the two CAAQMS (December, 2017 and January, 2018)



The Repot is distributed in the following Chapters:

Chapter 01	Introduction, about JSW South West Port, need for the study
Chapter 02	Sources of fugitive emissions from Terminal's operation, control systems, the MPT source complex, other sources of particulate emissions, emission control systems in other berths of MPT
Chapter 03	AAQ in Vasco da Gama and its co-relation with cargo handled at the JSW SWP Terminal
Chapter 04	Suitability of CAAQMS location in the Terminal

Chapter 02
MPT Source Complex and SWP's Particulate Emissions Control System

Chapter 02
MPT Source Complex and SWP's Particulate Emission Control System

2.1 MPT Source Complex

MPT area is an Emission Source Complex with several type of material handling operations being carried out on the several berths and their respective berth back up area as shown in **Figure 1.3** and **Figure 1.4** of Chapter 01.

Mormugao is an open natural harbour and has a natural promontory known as Mormugao Headland. The harbour is protected by a breakwater of 550 m long and a mole of 270 m long. The approach channel is about 6 km long. The port was envisaged using the protruding headland which provides partial shelter from the SW winds and monsoonal waves. The Harbour is fairly well protected and tranquil.

Berths 5A and 6A are bordered by Western India Shipyard and MPT Cruise Passenger Terminal on the west and Adani's Murmugao Port Terminal Pvt. Ltd. on the east. MPT's berths 8, 9 and barge berths are further east of the Adani's Terminal. Vasco da Gama town is about 2.5 km SE from the Terminal. MPT's establishment is on Sada about a km from the terminal in the south on the headland.

The old berths 1 to 3 are leased out to Western India Shipyard Ltd, for installing a modern ship repair facility. It was commissioned in the year 1995. The length of the berths is approx. 331 m.

Berth No. 4 is under the operation and management of Mormugao Port and was commissioned in the year 2010. This berth is being used for small crafts only. It is a RCC constructed. The length of the berth is approx. 190 m.

Berth No. 7 is leased out to Adani Mormugao Port Terminal Pvt. Ltd. for handling of merchant coal for trading purpose. This berth with a length of 300 m is equipped with two mobile harbour cranes, The material handling system consists of conveyor systems, two tripping conveyors in the yard closer to the berth and one stacker cum reclaimer unit in the other yard parallel to the berth. An in-motion wagon loading system with a silo is provided for faster evacuation through rail. Two truck loading stations are provided for evacuation through trucks. Road trucks are the prime mode of evacuation of coal cargo from the terminal at present.

Berth No.8 is a Liquid cargo handling berth. The commodities like POL product, Furnace oil, Ammonia and other liquid products are being handled and managed by private agencies at this port. Berth No. 9 is dedicated for the handling of iron ore with mechanical ore handling plant (MOHP) and is leased to Vedanta Ltd. The berth is presently not working due to non-availability of iron ore. The length of the berth no. 8 and 9 are 260 m 360 m respectively.

Berth No. 10 and 11 are under the operation and management of MPT. The berths commissioned in 1985 and 1994 respectively are being used as general cargo berths. There are three dedicated storages provided for material export/import purpose at berth no. 10 and 11 which belongs to Mormugao Port. At present, wood chips have been stored in open shed and steel coils have been stored in closed shed.

Based on the cargoes being handled at various berths at present, particulate emissions of non-point source, fugitive nature are generated from coal and wood chip operations. Fugitive emissions are also generated from vehicular movement from vehicle and locomotive exhausts, and spillage of road truck cargo. Other than the Port, there are no significant sources of point or non-point sources of industrial or commercial particulate emissions.

2.2 Status of Particulate Emission Control System a SWP Terminl

2.2.1 Sources of Particulate Emissions and Control Measures at the Terminal

The Terminal handles Coal, Coke, Coking coal, Lime stone, HR Coil, Steel slabs, Steel plates, etc. It is proposing to handle Iron ore and other ores, and unitised steel products in the capacity enhancement scenario.

The SWP Terminal features totally mechanised operations and is at par with any advanced state-of-art bulk port terminal in the world in terms of design and operational philosophy. The points of generation of particulate emissions have been identified in the entire material handling system chain and have been mated with most appropriate fugitive emission control systems. The status of evolution of technology and efficacy has been classified into BAT – Best Available Technology and BPT - Best Practicable Technology. The operation train, sources of particulate emissions and in-built Air Pollution Control Measures are described in **Table 2.1** below.

Table 2.1 Sources of Particulate Emissions from the Terminal

Sr.	Operation	Machinery	Sources of Emissions	APCM	Type of Technology and Reliability of Operation
1	Transfer of bulk cargo (mainly coal) from vessels to the Jetty	Grab unloaders to Surge Bins on the Jetty	Grabs, dumping in the Surge Silos	Closed grabs, plenum curtain in the top of the Surge Bins with fogging arrangement	BAT, most reliable and consistent
2	Transfer of bulk cargo from Jetty to windrows stacks	Covered conveyors	None	Enclosed conveyance	BAT, most reliable and consistent
3	Stacking	Stacker cum reclaimer	Free fall at the time of stacking	Co current water sprinkling on the falling material and also on the exposed portion of the stacking stockpile	BAT, most reliable and consistent
4	Storage of bulk cargo	Stock windrows	Windborne dusting	The stockpiles are covered with geotextile on all portions where stacking or reclamation is not happening.	BPT, highly reliable and consistent
				Wind curtains around the Terminal to reduce direct wind exposure on the stockpiles	BPT, highly reliable and consistent
5	Reclamation	Bucket wheel reclamation	Cargo disturbed at the time of reclaimation	Water sprinkling on the material being reclaimed on the exposed portion of the stacking stockpile	BPT, reliable and effective except in extreme meteorological conditions, needs supplementation of Wind Barriers
6.	Conveyance to Wagon Loading	Pipe conveyors	None	Enclosed conveyance	BAT, most reliable and consistent
7.	In-motion wagon loading	IMWL system with flexi chute	Free fall during chute loading	Water sprinkling	BAT, most reliable and consistent

8.	Rail wagon conveyance	Rail wagon cars (Box N)	Cargo exposure to wind during journey	Total top coverage with geotextile, secured with ropes at the margin	BAT, most reliable and consistent

Pictures of fugitive emission control technologies utilised in the Terminal are given in **Annex I.**

It is evident from the above table that the terminal is employing the best available technology for control of particulate emissions from every stage of its operation, and is undoubtedly and visibly far ahead of the other dusty cargo operations in the MPT. It is also one of the best bulk cargo handling Terminals in the country in terms of berth productivity and fugitive particulate emission control systems in the country, and its fugitive particulate emission control systems exceed some of the foreign load posts from where the bulk cargo is dispatched to the Terminal.

2.2.2 Status of Evolution of the Terminal's Mechanization and Fugitive Particulate Emission Control Systems

Higher level of integration of fugitive particulate emission control systems are possible with higher levels of mechanization of bulk cargo handling in a Port Terminal.

The levels of mechanizations in Port Terminals handling bulk cargo with propensity of fugitive particulate emissions, and integration with fugitive particulate emissions control technologies is given in **Table 2.2**.

Table 2.2 Levels of Mechanization and Integration of Fugitive Particulate Emissions Control Technologies

Extent of Mechanization Level	Status of Mechanization of Material Handling System	Fugitive Particulate Emissions Control System	Status of Operators at MPT
I	Use of MHC, Jetty dumping, carting to stockpiles, high heaping with BH, payloading to trucks	No FPECS possible	--
II	Use of quay unloaders, conveyors to stockpiles, **tipping conveyors**, heap manipulation with dozers. payloading to trucks	FPECS possible only at surge bin	--
III	Use of **quay unloaders**, **covered conveyance** to stockpiles, **ScR**, **carting** to load point, payloading to trucks	FPECS possible only up to ScR	MPT operations
IV	Use of quay unloaders, covered conveyance to stockpiles, ScR, **covered stockpiles**, covered conveyance to **silo-chute railway rake loading system**, **rake covering**	FPECS at all points (except ScR manipulation under sprinkling)	SWPL Terminal
V	Use of quay unloaders, covered conveyance to stockpiles, **ScR inside longitudinal shed**, covered conveyance to silo-chute railway rake loading system, rake covering	Total value chain FPECS	Proposed level of SWPL Terminal

2.2.3 Status of Implementation of Pollution Control Systems per World Bank Sector Specific Guidelines

The Environmental Management Practices for bulk cargo handling at the SWP Terminal are in total synchronization with the ENVIRONMENTAL, HEALTH, AND SAFETY GUIDELINES FOR PORTS, HARBORS, AND TERMINALS, World Bank, February, 2017.

The specific recommendation of the Guidelines and adherence by the Terminal is shown in **Figure 2.1**

Figure 2.1 Adherence of World Bank EHS Guideline Recommendation for Environmental Management by the Terminal

- Cover storage and handling areas, where practicable (e.g., store pulverized coal and pet-coke in silos);
- Install dust suppression mechanisms (e.g., water spray);
- Use telescoping arms and chutes to minimize free fall of materials and eliminate the need for slingers;
- Regularly sweep docks and handling areas, truck and rail storage areas, and paved roadway surfaces, and use vacuum collectors at dust-generating activities;
- Use slurry transport, pneumatic or continuous screw conveyors, and covering other types of conveyors;
- Minimize dry cargo pile heights and contain piles with perimeter walls and/or wind break fencing;
- Remove materials from the bottom of piles to minimize dust re-suspension;

The Terminal is compliant of the AAQ standards stipulated in the Consent and Authorization of the GSPCB as is evident in the monitoring results carried out by a NABL Accredited Laboratory on a monthly frequency. The AAQ analysis results of last six months are given in **Annex II**.

Chapter 03
AAQ in Vasco da Gama, Correlation with Cargo Handling of SWPL Terminal

Chapter 03
AAQ in Vasco da Gama, Correlation with Cargo Handling of SWPL Terminal

3.1 AAQ in Vasco da Gama

GSPCB has been monitoring the AAQ of Vasco da Gama since over a decade as part of CPCB's National Air Monitoring Programme. The sampling station is affixed on the Fuse Call Office, in front of the Vasco Railway Station, in the middle of the Vasco town and is a representative station for AAQ measurement of residential area. The AAQ data has been made public by the GSPCB in their Annual Reports, available on the GSPCB's website sine 2004 onwards and is available for scrutiny by general public. The Annual reports are voluminous and have not been made part of this Report.

Under the NAMP programme the Board continued to monitor the ambient air quality at Vasco, MPT at Mormugao, Panaji, Codli, Honda Junction, Usgao-Pale, Amona, Assanora, Bicholim and Curchorem, Mapusa, Margao, Ponda, Tilamol - Quepem, Sanguem, Tuem Industrial Estate, Cuncolim Industrial Esate and Kundaim Industrial Estate. AAQ samples are collected at each station twice a week, as per the standard norms for ambient air quality monitoring, and summary parameters like PM10, PM2.5, SO_2 and NOx are analyzed.

In the Annual Report of 2101-11, it was reported that the particulate levels were exceeding the standards on some occasions. However, the levels were reported below standards consistently in the Annual Reports of 2011-12, 2102-13, 2013-14, 2014-15 and 2015-16 (the last published Annual Report).

The above authoritative and scientifically rigorous reporting of AAQ of Vasco da Gama is adequate indicator of the AAQ status of the residential and commercial neighbourhood of the MPT Source Complex.

Special reference is cited from the minutes of 119th GSPCB Board meeting of 28th January, 2016 (page no. 29/206), statement of the Board's Chairman in reference with agenda Item 19 "*Chairman informed the members that M/s. Adani Mormugao Port Terminal Pvt. Ltd. (Berth No.7) were issued Consent to Operate for handling 5.2 million tons/ annum of coal/ coke and M/s. South West Port Ltd (Berth No.5A and 6A) to handle 5.5 million metric tons/ annum for Coaking Coal/ Coke . Chairman further informed that as per records available with the Board of Ambient Air Quality Monitoring at Fire Brigade station of Mormugao Port Trust indicated that PM10 readings exceeded the permissible limits on 14 out of 24 readings. He further informed that the Ambient Air Quality Monitoring readings for PM10 at the Fuse Call Office of Electricity Department, Vasco da Gama indicated at on 3 occasions out of 24, the readings exceeded the permissible limits.*"

The weak correlation between the AAQ of MPT Source Complex and that of Vasco da Gama indicates that the pollution levels experienced by the town is not significantly due to MPT operations. High levels of particulates may be due to local sources, construction and vehicular traffic being the two major contributors of particulates. The inference is strengthened in high level of particulates reported in the Annual Reports for Mapusa and Panaji where no industrial activity is present.

3.2 AAQ in Vasco da Gama, its Correlation with Cargo Handling of SWPL Terminal

The Terminal is located inside a notified and designated industrial zone – Port of Goa under the administrative control of Mormugao Port Trust. The nearest habitations to the Port are Sada, MPT Colony, Vasco city are at 1km, 0.8km and 4-5 km away, respectively. The Terminal is notably the farthest cargo handling operation from the town of Vasco *da* Gama.

The Terminal is located in an embayment and with heavy foliage vegetation between the Terminal and Headland Sada plateau which act as a mitigation measures for pollution. The rail corridor through which Terminal's material is evacuated is also inside the designated Right of Way of the Indian Railways. With the above, no part of the material handling activity of the Terminal is utilising or encroaching upon any common public infrastructure or causing pollution.

Cargo handling at the Terminal is carried out with utmost care. Specific provisions have been made in the entire material handling chain to ensure minimum possible generation of fugitive particulates from our bulk cargo handling operations by providing appropriate (BAT – Best Available Technology) Air Pollution Control Measures (APCMs) at each and every location where there is propensity of generation of particulate emissions. The good handing practices are emphasised below.

- The Terminal handles coal (metallurgical and Coke) with inherent moisture content of about 10% which makes it less prone to dusting.
- Bulk cargoes are handled with special purpose quay unloaders equipped with locking grab buckets and discharge hoppers. Cargo is moistened at this point with plenum water fogging ring.
- Moistened coal is taken by a series of covered conveyor belts to stockpile. Stacking and reclamation of cargo is carried out in mechanised fashion by use of Stacker-cum-Reclaimers, under continuous sprinkling of water.
- The part of stockpile which is not in use is kept covered by geotextile (tarpaulin).
- Reclaimed coal is transferred to a silo using pipe conveyors (the Best Available Technology for conveyance of bulk cargo with zero dust emissions).
- Wagon loading is carried out with flexible chutes inside an enclosed area at the bottom of the Silo. The wagons thereafter are immediately covered from top with custom cut and stringed tarpaulin sheets and secured with ropes from the top margins, thus not leaving any possibility of in-travel spillage or dusting.
- The stock piles are maintained at a height in compliance with the directives of Goa State Pollution Control board (GSPCB) issued from time to time. In addition, a 12 m tall geotextile wind barrier has been erected around the stockpiles.
- The Terminal does not have any continuous point sources of pollution. The two DGs installed in the Terminal as critical back-up power are operated intermittently, and on demand. The DGs are provided with 30 meters stack. Latest DG stack monitoring carried out by Akanksha Analytical and Research Lab, Pune (recognised by the MoEFCC, Govt. of India under EP Act, 1986 indicate that emissions are within the standards stipulated by GSPCB in their Consent to Operate (No. 5/2580/04-PCB/C1-3090) dated 21 July, 2017.
- All inbound and outbound cargo handled in the Terminal is transported in railway rakes. The railway siding of about 400 meters is part of the Terminal backup. The Terminal does not carry any cargo by road route using truck lorries utilising any public road infrastructure and thereby do not cause any pollution.

The Terminal is compliant of all the conditions relating to pollution stipulated in the Consent to Operate (CtO) (No. 5/2580/04-PCB/C1-3090). Details of the status of compliance is given in **Annex III.**

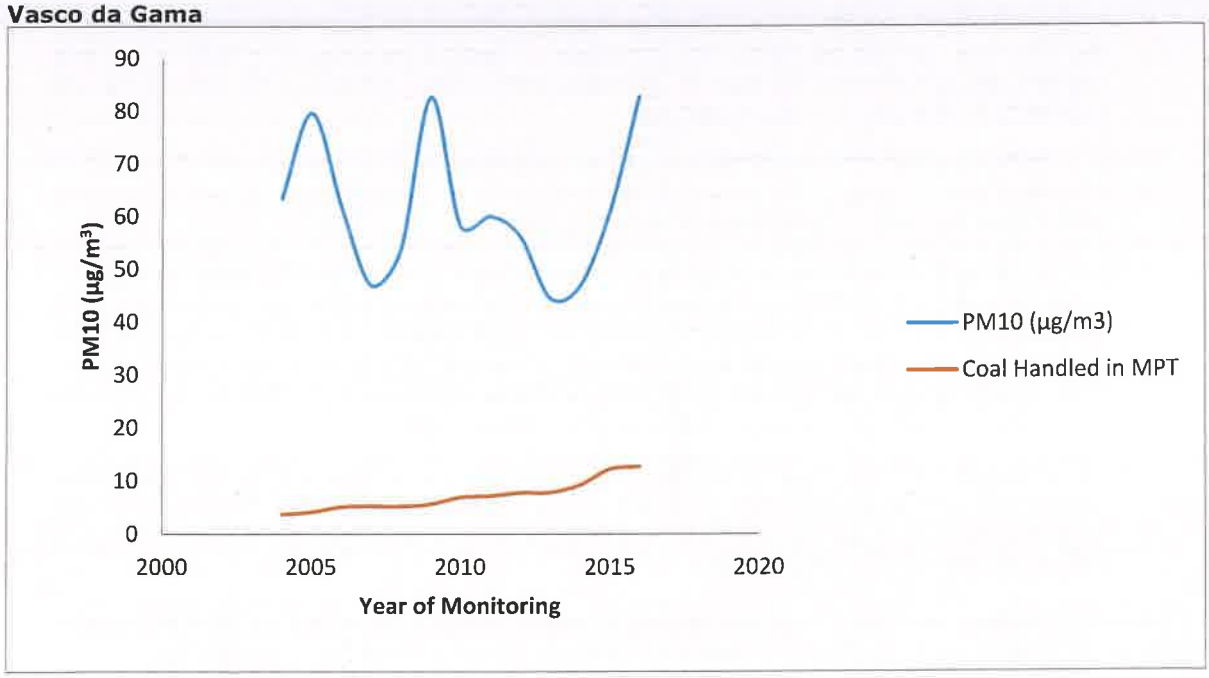
There is no positive and significant statistical co-relation of the levels of particulate pollution in the Vasco da Gama town and the quantity of material handled by the Terminal in the last decade. The quantity of material handled at the Terminal since 2004 and the PM10 levels (RSPM levels pre NAAQS, 2009) are given in **Table 3.1** and **Figure 3.1**.

Table 3.1 Quantity of Material Handled at the Terminal since 2004 and the PM10 levels at Vasco da Gama

Year	PM10 (µg/m³)	Coal Handled in MPT	Statistical Co-relation
2004	63.4	3.71	
2005	79.6	4.12	
2006	62.0	5.09	
2007	46.9	5.28	
2008	53.6	5.2	
2009	82.6	5.64	
2010	58.2	6.93	0.035[1]
2011	60.0	7.2	
2012	56.2	7.8	
2013	44.5	7.86	
2014	46.8	9.27	
2015	60.6	12.2	
2016	82.7	12.7	

The above absence of significant co-relation can be easily observed in the graph showing the material handled and AAQ status of Vasco da Gama.

Figure 3.2 Quantity of Material Handled at the Terminal since 2004 and the PM10 levels at Vasco da Gama



It is quite evident that the average values of particulates are not related to the material handled by the Terminal. The sharp rise and fall of the particulate levels between 2005, 2010 and rise in 2016 are not in synchronization with the gradual and steady growth of cargo handled by the Terminal. It also infers that the fugitive particulate emission control systems are working in a effective and satisfactory manner.

[1] Weak positive linear relationship

Chapter 04
Suitability of CAAQMS location in the Terminal

Chapter 04
Suitability of CAAQMS location in the Terminal

4.1 CAAQMS Location in 2017 and 2018

An automatic, continues, real-time data logging type Continuous AAQ Monitoring Station of Environment Assey, Austria was installed on the canteen building at the south west corner of the Terminal since February, 2016 in compliance of Board's Consent to Operate dated 10th April, 2015.

The canteen building at the south west corner of the Terminal was chosen as most representative location for logging of Ambient Air Quality (AAQ) as it was in the unhindered path of air from the Stackers cum Reclaimers (ScR), which are the only significant source of fugitive emissions from the Terminal (after employment of an active Dust Suppression System – continuous sprinkling of water in the area of working of the ScRs, either during stacking, or by bucket-wheel reclamation of bulk cargo). The location served the following merit for installation of CAAQMS.

a. Straight path of air from the sources of fugitive emissions
b. Away from general traffic of MPT
c. Away from other similar operations (Terminal of M/s Adani Mormugao Port Terminal Pvt. Ltd.) which handles similar cargo (coal), albeit under an inferior system of handling.

There are several correspondences on record since 2016 wherein the GSPCB has asked the SWP Terminal to shift the CAAQMS to a location closer to the eastern boundary of the Terminal, closer to the Berth 7 operations, which were contested by the SWP Terminal on grounds of representativeness, the proposed location being closer to another similar source of fugitive emissions, railway operations and general traffic of the MPT. The CAAQMS was shifted to above the DSS tank, a location of GSPCB direction in January, 2018 in compliance of the Show Cause Notice under Section 31(A) of the Air (Prevention and Control of Pollution) Act, 1981 and Section 33(A) of the Water (Prevention and Control of Pollution) Act, 1974, No. 1/25/-17-PCB/LD-95 dated 30th November, 2017. Relative locations of the two CAAQMS is shown in **Figure 1.5,** Chapter 01**.**

4.1.1 Guidelines for siting of AAQ Monitoring Stations

Following guidelines are available in the country to address the suitability and representativeness of an AAQ sampling location.

1. Bureau of Indian Standards, IS 5182, (Part 14) : 2000 (Reaffirmed 2010), METHODS FOR MEASUREMENT OF AIR POLLUTION, Part 14. Guidelines for Planning the Sampling of Atmosphere, Second Revision
2. CPCB, NATIONAL AMBIENT AIR QUALITY MONITORING SERIES : NAAQMS/2003-04, Guidelines for Ambient Air Quality Monitoring, April, 2003

Summary requirements of the above Guidelines and whether the two CAAQMS fulfil them are discussed in the **Table 4.1**.

Table 4.1 Summary requirements of AAQ Siting Guidelines and suitability of the CAAQM Stations

Sr.	Requirement	Reference	CAAQM at Canteen building	Suitability	CAAQM at DSS Tank	Suitability
1.	In an industrial area, information should be obtained on the type of industries including their number, fuel used, composition of fuel, pollutants emitted etc.	4.1 Background Information, (i) Source and Emissions	Particulates registered form the specific Terminal operation with possibility of generation of fugitive particulates, closest distance from the operation of ScRs (100 – 200 m from the ScR reach on the stockpile)	Suitable	Particulates registered form the specific Terminal operation (200 m from the Terminal ScR) in addition to the operations of the coal handling operations of Berth 7 (105 m from the CAAQMS) , giving a false positive Adani with possibility of generation of fugitive particulates, closest distance from the operation of ScRs (100 – 200 m from the ScR reach on the stockpile). Refer Annual Windrose of Goa (IMD Station code 43195), Annual, 2015 shown in **Figure 1.1**, Chapter 01 which shows that stronger winds blow from the east to west side with almost equal frequency.	Grossly unsuitable
	Information on number and distribution of sources should be collected. This information will help in identifying which pollutants can be expected in an	As above	As above	Suitable	As above	Grossly unsuitable

	area and thus should be measured. The stations should be located at locations where maximum ground level concentrations are expected.	As above	As above	Suitable	As above	Grossly unsuitable
2.	Meteorological data with respect to temperature, relative humidity, wind speed and direction should be collected. Predominant wind direction plays an important role in determining location of monitoring stations.	4.1 Background Information, (iii) Meteorological Information	As above	Suitable	As above	Grossly unsuitable

3.	A site is representative if the data generated from the site reflects the oncentrations of various pollutants and their variations in the area. It is not easy to specify whether the location of the station is satisfactory or not, however it may be checked by making simultaneous measurements at some locations in the area concerned. The station should be located at a place where interferences are not present or anticipated. The instrument must be located in such a place where free flow of air is available. The instrument should not be located in a confined place, corner or a balcony.	4.2.2 Selection of Monitoring Location, (a) Representative Site	As above Unhindered, straight path of air from the ScRs and other activities of the terminal	Suitable Suitable	No rationale/basis of analysis exists for relocation of the CAAQMS to the DSS tank. The CAAQMS of adjescent Berth 7 is away from the site of operation and not inside the premise of operation, unlike the SWP Terminal, due to which the readings of the two CAAQMS cannot be compared. Free flow of air at the DSS CAAQMS may be hindered/effected by the movement of railways at its immediate north	Grossly unsuitable Unsuitable
4.	Sampling in the vicinity of unpaved roads and streets results in entrainment of dust into the samplers from the movement of vehicles. Samplers are therefore to	4.2.2 Selection of Monitoring Location, (b) Comparability, (iii)	The CAAQMS was more than 175 from the general cargo traffic of MPT	Suitable	Busy MPT road carrying cargoes traffic on dusty roads is within 30 m of the CAAQMS	Grossly unsuitable

	be kept at a distance of 200 m from unpaved roads and streets.					
5.	(One of the major sources of RSPM are vehicles especially diesel vehicles. Site for measuring RSPM should be located where number of such vehicle are high.)	4.2.3 Selection of Pollutants, 3. Criteria for RSPM/PM_{10} measurements	The CAAQMS was more than 175 from the general cargo traffic of MPT, thereby notregistering false positve due to particulates of cargo carrying heavy diesel vehicles	Suitable	Busy MPT road carrying cargoes by heavy diesel vehicles within 30 m of the CAAQMS, contributing false positive measurement	Grossly unsuitable

From the above guidelines, it is evident that the site of CAAQMS enforced by the GSPCB is not suitable and is/will record false positive readings with respect of particulate emissions.

Annex I

Pictures of Fugitive Emission Control Technologies utilised in the Terminal

Annex I

Water sprinkling at the Cargo Hopper through the Aquadyne System

Cargo being transported through the closed Conveyor equipped with Water Sprinklers

Annex I

Water sprinkling through Aquadyne System in closed Conveyors for Cargo transportation

Coal Cargo with Stack Height of 7-9 m and covered with Tarpaulin

Annex I

Coal stacking and reclaiming with Continuous Water Sprinkling to Control Fugitive Emissions

Cargo being transported in a closed Pipe Conveyor to eliminate Emissions during Conveyance

Annex I

Pay Loader/Backhoe Type Box Loaders not used. Cargo Rake Cars covered immediately after loading.

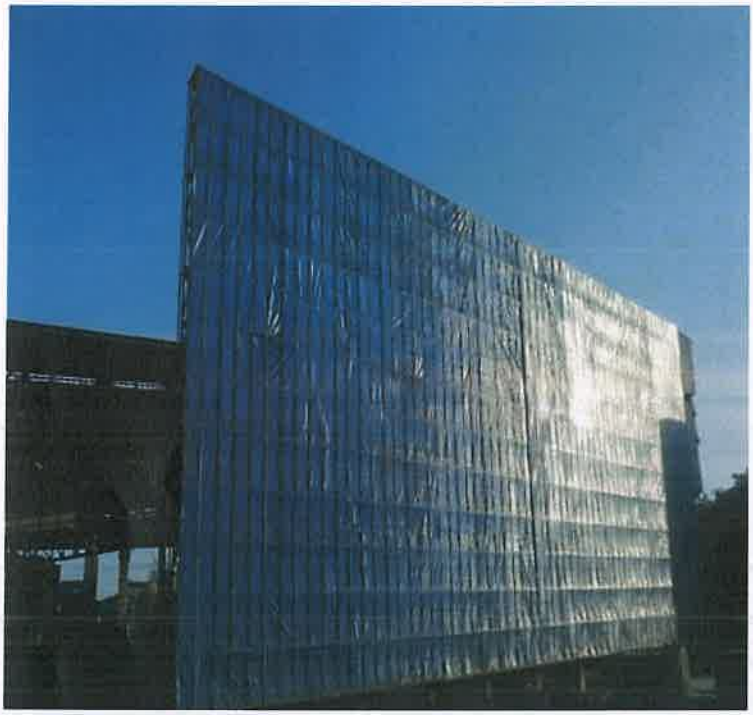
Water sprinkling on Paved Yard, Roads to Control transportation generated Fugitive Emissions

Annex I

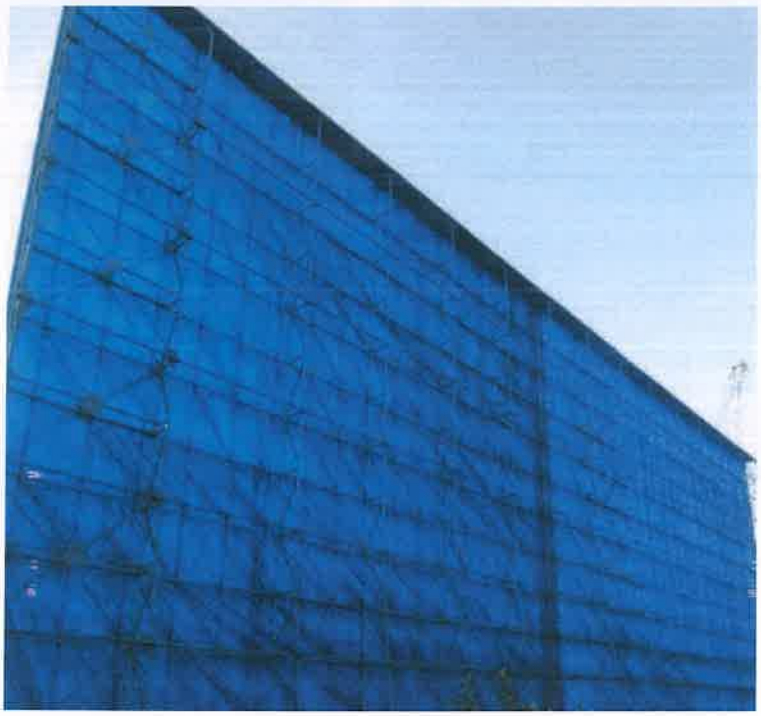
Regular sweeping of Berths, Roads and Paved Surfaces using Mechanical Suction Sweeper Machine

Regular sweeping of Berths, Roads and Paved Surfaces using Mechanical Suction Sweeper Machine

Annex I



Wind Shields of 14 m Height to prevent Air Borne Dust Pollution



Wind Shields of 14 m Height to prevent Air Borne Dust Pollution

Annex I

No pollution in Steel handling

CAAQM installed at Site (Canteen building)

Annex I

Covered Sheds for CRC Storage

Covered Sheds for CRC Storage

Annex II

Ambient Air Quality Analysis Results of the Terminal of Last Six Months

Annex II

Ambient Air Quality Analysis Results – April, 2017

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Approved from "AGMARK" Vide fileNo.11036/15/99/Lab./2727

AL/TR/AM/33-875/17-18 **Date 02/05/2017**

CERTIFICATE OF ANALYSIS

AMBIENT AIR QUALITY REPORT

Ref. No.: Ref. No.: GEC/JSW/AAQM/2016-17-/april-2017/009

Work Order No.: SWPL/16-17/0950003117 dated :24.06.2016

Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.

Report for the Month of APRIL – 2017

LOCATION ⟶	Berth No. 5A & 6A of South West Port Limited.							
Date of Sampling	18/04/2017	21/04/2017	24/04/2017	26/04/2017	30/04/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
Particulate Matter (<2.5µ)	46	42	47	48	45	60	($\mu g/m^3$)	Gravimetric
Particulate Matter (<10µ)	75	76	77	78	79	100	($\mu g/m^3$)	Gravimetric
SO_2 Conc.	28	27	31	33	32	80	($\mu g/m^3$)	Improved West & Gaeke
NO_x Conc.	31	33	32	35	36	80	($\mu g/m^3$)	Modified Jacob & Hochheiser

Remarks:

Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2016; **Due Date:** 22/05/2017
Calibration Certificate No.:
TS/CAL/2016/4639/16, TS/CAL/2016/4639/17 &
TS/CAL/2016/4639/18, TS/CAL/2016/4639/19

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For Akanksha Analytical & Research Lab

Lab In charge

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Annex II

Ambient Air Quality Analysis Results – April, 2017

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Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
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Particulate Matter (<10µ)	75	76	77	78	79	100	($\mu g/m^3$)	Gravimetric
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Remarks:

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Ambient Air Quality Analysis Results – April, 2017

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Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.

Report for the Month of APRIL – 2017

LOCATION ⟶	Location SS-2 of South West Port Limited.							
Date of Sampling	01/04/2017	04/04/2017	07/04/2017	10/04/2017	13/04/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
Particulate Matter (<2.5µ)	43	44	46	47	49	60	($\mu g/m^3$)	Gravimetric
Particulate Matter (<10µ)	75	72	75	76	79	100	($\mu g/m^3$)	Gravimetric
SO_2 Conc.	24	23	25	27	31	80	($\mu g/m^3$)	Improved West & Gaeke
NO_x Conc.	32	34	37	36	34	80	($\mu g/m^3$)	Modified Jacob & Hochheiser

Remarks:
Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2016; **Due Date:** 22/05/2017
Calibration Certificate No.:
TS/CAL/2016/4639/16, TS/CAL/2016/4639/17 &
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Ambient Air Quality Analysis Results – April, 2017

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NO_x Conc.	30	32	34	36	37	80	($\mu g/m^3$)	Modified Jacob & Hochheiser

Remarks:
Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2016; **Due Date:** 22/05/2017
Calibration Certificate No.:
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Annex II

Ambient Air Quality Analysis Results – June, 2017

AKANKSHA ANALYTICAL & RESEARCH LAB

Environment Laboratory Recognized by MoEF, Govt. New Delhi,
Under E.P. Act 1986, vide GR No. S.O. 1680 (E) Sr. No. 63
An ISO 9001:2008, OHSAS18001:2007 Certified company
Approved from "AGMARK" Vide fileNo.11036/15/99/Lab./2727

AL/TR/AM/35-087/17-18 **Date 01/07/2017**

CERTIFICATE OF ANALYSIS

AMBIENT AIR QUALITY REPORT

Ref. No.: GEC/JSW/AAQM/2016-17/JUNE 2017/011
Work Order No.: SWPL/16-17/0950003117 dated :24.06.2016
Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.

Report for the Month of JUNE – 2017

LOCATION ⟶	Berth No. 5A & 6A of South West Port Limited.							
Date of Sampling	02/06/2017	04/06/2017	07/06/2017	11/06/2017	14/06/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
Particulate Matter (<2.5µ)	38	39	48	49	42	60	(µg/Nm^3)	Gravimetric
Particulate Matter (<10µ)	72	71	75	71	73	100	(µg/Nm^3)	Gravimetric
SO_2 Conc.	28	25	27	29	30	80	(µg/Nm^3)	Improved West & Gaeke
NO_x Conc.	33	35	32	34	34	80	(µg/Nm^3)	Modified Jacob & Hochheiser

Remarks:
Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2017; Due Date: 22/05/2018
Calibration Certificate No.:
TS/CAL/2017/469/1, TS/CAL/2017/469/2 &
TS/CAL/2017/469/3, TS/CAL/2017/469/4
* Sampal Collected By Global Environmental Consultants

For Akanksha Analytical & Research Lab

Lab In charge

Office & Lab: S. No. 613, Plot No.5, Ganga Dham, Phase I, Opp. Ganga Landmark Row-Houses,
Bibwewadi, Pune-411037. Phone: 020-24240030 | E-mail: akankshalab2007@gmail.com

Annex II

Ambient Air Quality Analysis Results – June, 2017

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AL/TR/AM/35-088/17-18 **Date 01/07/2017**

CERTIFICATE OF ANALYSIS

AMBIENT AIR QUALITY REPORT

Ref. No.: GEC/JSW/AAQM/2016-17/JUNE 2017/011
Work Order No.: SWPL/16-17/0950003117 dated :24.06.2016
Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.

Report for the Month of JUNE – 2017

LOCATION ⟶	Berth No. 5A & 6A of South West Port Limited.							
Date of Sampling	17/06/2017	21/06/2017	24/06/2017	26/06/2017	28/06/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
Particulate Matter (<2.5µ)	45	44	46	43	44	60	(µg/Nm^3)	Gravimetric
Particulate Matter (<10µ)	73	75	73	74	75	100	(µg/Nm^3)	Gravimetric
SO_2 Conc.	25	23	25	26	27	80	(µg/Nm^3)	Improved West & Gaeke
NO_x Conc.	32	33	31	35	33	80	(µg/Nm^3)	Modified Jacob & Hochheiser

Remarks:
Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2017; **Due Date:** 22/05/2018
Calibration Certificate No.:
TS/CAL/2017/469/1, TS/CAL/2017/469/2 &
TS/CAL/2017/469/3, TS/CAL/2017/469/4
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AL/TR/AM/35-089/17-18 **Date 01/07/2017**

CERTIFICATE OF ANALYSIS

AMBIENT AIR QUALITY REPORT

Ref. No.: GEC/JSW/AAQM/2016-17/JUNE 2017/011
Work Order No.: SWPL/16-17/0950003117 dated :24.06.2016
Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.

Report for the Month of JUNE – 2017

LOCATION ⟶	Location SS-2 of South West Port Limited.							
Date of Sampling	02/06/2017	04/06/2017	07/06/2017	11/06/2017	14/06/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
Particulate Matter (<2.5µ)	39	40	47	48	41	60	(µg/Nm^3)	Gravimetric
Particulate Matter (<10µ)	7-	72	74	73	72	100	(µg/Nm^3)	Gravimetric
SO_2 Conc.	27	25	26	28	32	80	(µg/Nm^3)	Improved West & Gaeke
NO_x Conc.	34	33	31	32	35	80	(µg/Nm^3)	Modified Jacob & Hochheiser

Remarks:
Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2017; Due Date: 22/05/2018
Calibration Certificate No.:
TS/CAL/2017/469/1, TS/CAL/2017/469/2 &
TS/CAL/2017/469/3, TS/CAL/2017/469/4
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AL/TR/AM/35-090/17-18 **Date 01/07/2017**

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AMBIENT AIR QUALITY REPORT

Ref. No.: GEC/JSW/AAQM/2016-17/JUNE 2017/011

Work Order No.: SWPL/16-17/0950003117 dated :24.06.2016

Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.

Report for the Month of JUNE – 2017

LOCATION ⟶	Location SS-2 of South West Port Limited.							
Date of Sampling	17/06/2017	21/06/2017	24/06/2017	26/06/2017	28/06/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
Particulate Matter (<2.5µ)	46	45	47	44	43	60	($\mu g/Nm^3$)	Gravimetric
Particulate Matter (<10µ)	73	76	73	72	73	100	($\mu g/Nm^3$)	Gravimetric
SO_2 Conc.	24	22	23	25	26	80	($\mu g/Nm^3$)	Improved West & Gaeke
NO_x Conc.	31	34	32	34	30	80	($\mu g/Nm^3$)	Modified Jacob & Hochheiser

Remarks:

Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)

Last Calibrated Date: 23/05/2017; **Due Date:** 22/05/2018

Calibration Certificate No.:
TS/CAL/2017/469/1, TS/CAL/2017/469/2 &
TS/CAL/2017/469/3, TS/CAL/2017/469/4

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AL/TR/AM/37-680/17-18 **Date 01/10/2017**

CERTIFICATE OF ANALYSIS

AMBIENT AIR QUALITY REPORT

Ref. No.: GEC/JSW/AAQM/2017-18/SEPT 2017/001
Work Order No.: SWPL/17-18/0950004266 dated :07.09.2017
Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.

Report for the Month of September – 2017

LOCATION ⟶	Berth No. 5A & 6A of South West Port Limited.							
Date of Sampling	01/09/2017	05/09/2017	09/09/2017	12/09/2017	16/09/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
Particulate Matter (<2.5µ)	37	38	47	48	42	60	($\mu g/m^3$)	Gravimetric
Particulate Matter (<10µ)	71	72	74	73	70	100	($\mu g/m^3$)	Gravimetric
SO_2 Conc.	27	24	26	28	30	80	($\mu g/m^3$)	Improved West & Gaeke
NO_x Conc.	32	34	33	35	34	80	($\mu g/m^3$)	Modified Jacob & Hochheiser

Remarks:
Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2017; **Due Date:** 22/05/2018
Calibration Certificate No.:
TS/CAL/2016/4639/16, TS/CAL/2016/4639/17 &
TS/CAL/2015/4639/18, TS/CAL/2016/4639/19
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AL/TR/AM/37-681/17-18 **Date 01/10/2017**

CERTIFICATE OF ANALYSIS

AMBIENT AIR QUALITY REPORT

Ref. No.: GEC/JSW/AAQM/2017-18/SEPT 2017/001
Work Order No.: SWPL/17-18/0950004266 dated :07.09.2017
Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.

Report for the Month of September – 2017

LOCATION ⟶	Berth No. 5A & 6A of South West Port Limited.							
Date of Sampling	19/09/2017	23/09/2017	25/09/2017	28/09/2017	31/09/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	—	—	—
Particulate Matter (<2.5µ)	37	38	47	48	40	60	($\mu g/m^3$)	Gravimetric
Particulate Matter (<10µ)	71	70	74	72	74	100	($\mu g/m^3$)	Gravimetric
SO_2 Conc.	27	24	26	28	30	80	($\mu g/m^3$)	Improved West & Gaeke
NO_x Conc.	32	34	31	33	35	80	($\mu g/m^3$)	Modified Jacob & Hochheiser

Remarks:
Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2017; **Due Date:** 22/05/2018
Calibration Certificate No.:
TS/CAL/2016/4639/16, TS/CAL/2016/4639/17 &
TS/CAL/2015/4639/18, TS/CAL/2016/4639/19
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AL/TR/AM/37-682/17-18 **Date 01/10/2017**

CERTIFICATE OF ANALYSIS

AMBIENT AIR QUALITY REPORT

Ref. No.: GEC/JSW/AAQM/2017-18/SEPT 2017/001
Work Order No.: SWPL/17-18/0950004266 dated :07.09.2017
Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.

Report for the Month of September – 2017

LOCATION ⟶	Location SS-2 of South West Port Limited.							
Date of Sampling	01/09/2017	05/09/2017	09/09/2017	12/09/2017	16/07/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
Particulate Matter (<2.5µ)	37	36	47	48	43	60	(µg/m^3)	Gravimetric
Particulate Matter (<10µ)	71	72	76	72	74	100	(µg/m^3)	Gravimetric
SO_2 Conc.	27	26	29	28	30	80	(µg/m^3)	Improved West & Gaeke
NO_x Conc.	32	34	31	33	35	80	(µg/m^3)	Modified Jacob & Hochheiser

Remarks:
Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2017; Due Date: 22/05/2018
Calibration Certificate No.:
TS/CAL/2016/4639/16, TS/CAL/2016/4639/17 &
TS/CAL/2015/4639/18, TS/CAL/2016/4639/19
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AL/TR/AM/37-683/17-18 **Date 01/10/2017**

CERTIFICATE OF ANALYSIS

AMBIENT AIR QUALITY REPORT

Ref. No.: GEC/JSW/AAQM/2017-18/SEPT 2017/001
Work Order No.: SWPL/17-18/0950004266 dated :07.09.2017
Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.

Report for the Month of September – 2017

LOCATION ⟶	Location SS-2 of South West Port Limited.							
Date of Sampling	19/09/2016	23/09/2016	25/09/2016	28/09/2016	31/09/2016	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
Particulate Matter (<2.5µ)	37	38	47	48	43	60	($\mu g/m^3$)	Gravimetric
Particulate Matter (<10µ)	71	72	74	70	72	100	($\mu g/m^3$)	Gravimetric
SO_2 Conc.	27	26	25	28	29	80	($\mu g/m^3$)	Improved West & Gaeke
NO_x Conc.	32	34	31	33	32	80	($\mu g/m^3$)	Modified Jacob & Hochheiser

Remarks:
Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2017; **Due Date:** 22/05/2018
Calibration Certificate No.:
TS/CAL/2016/4639/16, TS/CAL/2016/4639/17 &
TS/CAL/2015/4639/18, TS/CAL/2016/4639/19
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AL/TR/AM/38-004/17-18 **Date 01/11/2017**

CERTIFICATE OF ANALYSIS
AMBIENT AIR QUALITY REPORT

Ref. No.: GEC/JSW/AAQM/2017-18/OCT 2017/001
Work Order No.: SWPL/17-18/0950004266 dated :07.09.2017
Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.

Report for the Month of OCTOBER – 2017

LOCATION ⟶	Berth No. 5A & 6A of South West Port Limited.							
Date of Sampling	01/10/2017	04/10/2017	08/10/2017	11/10/2017	15/10/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
Particulate Matter (<2.5µ)	40	42	45	46	48	60	($\mu g/m^3$)	Gravimetric
Particulate Matter (<10µ)	71	73	74	73	75	100	($\mu g/m^3$)	Gravimetric
SO_2 Conc.	26	25	26	27	28	80	($\mu g/m^3$)	Improved West & Gaeke
NO_x Conc.	32	33	34	33	35	80	($\mu g/m^3$)	Modified Jacob & Hochheiser

Remarks:
Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2017; **Due Date:** 22/05/2018
Calibration Certificate No.:
TS/CAL/2017/4639/16, TS/CAL/2017/4639/17 &
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AL/TR/AM/38-005/17-18 **Date 01/11/2017**

CERTIFICATE OF ANALYSIS

AMBIENT AIR QUALITY REPORT

Ref. No.: GEC/JSW/AAQM/2017-18/OCT 2017/002
Work Order No.: SWPL/17-18/0950004266 dated :07.09.2017
Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.

Report for the Month of OCTOBER – 2017

LOCATION ⟶	Berth No. 5A & 6A of South West Port Limited.							
Date of Sampling	18/10/2017	22/10/2017	24/10/2017	27/10/2017	30/10/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
Particulate Matter (<2.5µ)	41	42	43	47	46	60	($\mu g/m^3$)	Gravimetric
Particulate Matter (<10µ)	72	75	73	70	74	100	($\mu g/m^3$)	Gravimetric
SO_2 Conc.	25	23	27	26	28	80	($\mu g/m^3$)	Improved West & Gaeke
NO_x Conc.	31	33	32	31	30	80	($\mu g/m^3$)	Modified Jacob & Hochheiser

Remarks:
Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2017; Due Date: 22/05/2018
Calibration Certificate No.:
TS/CAL/2017/4639/16, TS/CAL/2017/4639/17 &
TS/CAL/2017/4639/18, TS/CAL/2017/4639/19
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AL/TR/AM/38-006/17-18 **Date 01/11/2017**

CERTIFICATE OF ANALYSIS
AMBIENT AIR QUALITY REPORT

No.: GEC/JSW/AAQM/2017-18/OCT 2017/003
Work Order No.: SWPL/17-18/0950004266 dated :07.09.2017
Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.

Report for the Month of OCTOBER – 2017

LOCATION ⟶	Location SS-2 of South West Port Limited.							
Date of Sampling	01/10/2017	04/10/2017	08/10/2017	11/10/2017	15/10/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
Particulate Matter (<2.5µ)	38	41	44	46	42	60	($\mu g/m^3$)	Gravimetric
Particulate Matter (<10µ)	73	76	75	74	72	100	($\mu g/m^3$)	Gravimetric
SO_2 Conc.	25	23	24	27	31	80	($\mu g/m^3$)	Improved West & Gaeke
NO_x Conc.	32	34	33	35	32	80	($\mu g/m^3$)	Modified Jacob & Hochheiser

Remarks:
Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2017; **Due Date:** 22/05/2018
Calibration Certificate No.:
TS/CAL/2017/4639/16, TS/CAL/2017/4639/17 &
TS/CAL/2017/4639/18, TS/CAL/2017/4639/19
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AL/TR/AM/38-007/17-18 **Date 01/11/2017**

CERTIFICATE OF ANALYSIS

AMBIENT AIR QUALITY REPORT

No.: GEC/JSW/AAQM/2017-18/OCT 2017/004

Work Order No.: SWPL/17-18/0950004266 dated :07.09.2017

Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.

Report for the Month of OCTOBER – 2017

LOCATION ⟶	Location SS-2 of South West Port Limited.							
Date of Sampling	18/10/2017	22/10/2017	24/10/2017	27/10/2017	30/10/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
Particulate Matter (<2.5µ)	38	39	44	47	44	60	($\mu g/m^3$)	Gravimetric
Particulate Matter (<10µ)	76	73	75	71	72	100	($\mu g/m^3$)	Gravimetric
SO_2 Conc.	26	25	27	31	30	80	($\mu g/m^3$)	Improved West & Gaeke
NO_x Conc.	31	33	34	30	32	80	($\mu g/m^3$)	Modified Jacob & Hochheiser

Remarks:

Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2017; **Due Date:** 22/05/2018
Calibration Certificate No.:
TS/CAL/2017/4639/16, TS/CAL/2017/4639/17 &
TS/CAL/2017/4639/18, TS/CAL/2017/4639/19
* Sampal Collected By Global Environmental Consultants

For Akanksha Analytical & Research Lab

Lab In charge

Office & Lab: S. No. 613, Plot No.5, Ganga Dham, Phase I, Opp. Ganga Landmark Row-Houses, Bibwewadi,
Pune-411037. Phone: 020-24240030 | E-mail: akankshalab2007@gmail.com

Annex II

Ambient Air Quality Analysis Results – November, 2017

AKANKSHA ANALYTICAL & RESEARCH LAB
Environment Laboratory Recognized by MoEF, Govt. New Delhi,
Under E.P. Act 1986, vide GR No. S.O. 1680 (E) Sr. No. 63
An ISO 9001:2008, OHSAS18001:2007 Certified company
Approved from "AGMARK" Vide fileNo.11036/15/99/Lab./2727

AL/TR/AM/38-321/17-18 **Date- 01/12/2017**

CERTIFICATE OF ANALYSIS
AMBIENT AIR QUALITY REPORT

Ref. No.: GEC/JSW/AAQM/2017-18/NOV 2017/001
Work Order No.: SWPL/17-18/0950004266 dated :07.09.2017
Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.

Report for the Month of NOVEMBER – 2017

LOCATION ⟶	Berth No. 5A & 6A of South West Port Limited.							
Date of Sampling	02/11/2017	05/11/2017	09/11/2017	12/11/2017	16/11/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
Particulate Matter (<2.5µ)	40	42	45	46	48	60	($\mu g/m^3$)	Gravimetric
Particulate Matter (<10µ)	71	73	74	73	75	100	($\mu g/m^3$)	Gravimetric
SO_2 Conc.	26	25	26	27	28	80	($\mu g/m^3$)	Improved West & Gaeke
NO_x Conc.	32	33	34	33	35	80	($\mu g/m^3$)	Modified Jacob & Hochheiser

Remarks:
Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2017; **Due Date:** 22/05/2018
Calibration Certificate No.:
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TS/CAL/2017/4639/18, TS/CAL/2017/4639/19
* Sample Collected By Global Environmental Consultants

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AL/TR/AM/38-322/17-18 **Date- 01/12/2017**

CERTIFICATE OF ANALYSIS
AMBIENT AIR QUALITY REPORT

Ref. No.: GEC/JSW/AAQM/2017-18/NOV 2017/002
Work Order No.: SWPL/17-18/0950004266 dated :07.09.2017
Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.
Report for the Month of NOVEMBER – 2017

LOCATION →	Berth No. 5A & 6A of South West Port Limited.							
Date of Sampling	19/11/2017	23/11/2017	25/11/2017	28/11/2017	30/11/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	—	—	—
Particulate Matter (<2.5µ)	42	43	44	48	47	60	(µg/m^3)	Gravimetric
Particulate Matter (<10µ)	70	73	71	72	75	100	(µg/m^3)	Gravimetric
SO_2 Conc.	22	24	25	24	26	80	(µg/m^3)	Improved West & Gaeke
NO_x Conc.	31	34	30	32	31	80	(µg/m^3)	Modified Jacob & Hochheiser

Remarks:
Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2017; **Due Date:** 22/05/2018
Calibration Certificate No.:
TS/CAL/2017/4639/16, TS/CAL/2017/4639/17 &
TS/CAL/2017/4639/18, TS/CAL/2017/4639/19
* Sample Collected By Global Environmental Consultants

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AL/TR/AM/38-323/17-18 **Date- 01/12/2017**

CERTIFICATE OF ANALYSIS
AMBIENT AIR QUALITY REPORT

Ref. No : GEC/JSW/AAQM/2017-18/NOV 2017/003
Work Order No.: SWPL/17-18/0950004266 dated :07.09.2017
Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.

Report for the Month of NOVEMBER – 2017

LOCATION →	Location SS-2 of South West Port Limited.							
Date of Sampling	02/11/2017	05/11/2017	09/11/2017	12/11/2017	16/11/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
Particulate Matter (<2.5µ)	37	40	43	46	44	60	($\mu g/m^3$)	Gravimetric
Particulate Matter (<10µ)	72	71	70	74	73	100	($\mu g/m^3$)	Gravimetric
SO_2 Conc.	23	24	25	27	26	80	($\mu g/m^3$)	Improved West & Gaeke
NO_x Conc.	30	34	33	32	31	80	($\mu g/m^3$)	Modified Jacob & Hochheiser

Remarks:
Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2017; **Due Date:** 22/05/2018
Calibration Certificate No.:
TS/CAL/2017/4639/16, TS/CAL/2017/4639/17 &
TS/CAL/2017/4639/18, TS/CAL/2017/4639/19
* Sample Collected By Global Environmental Consultants

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AL/TR/AM/38-324/17-18 **Date- 01/12/2017**

CERTIFICATE OF ANALYSIS
AMBIENT AIR QUALITY REPORT

Ref. No .: GEC/JSW/AAQM/2017-18/NOV 2017/004
Work Order No.: SWPL/17-18/0950004266 dated :07.09.2017
Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.

Report for the Month of NOVEMBER – 2017

LOCATION ⟶	Location SS-2 of South West Port Limited.							
Date of Sampling	19/11/2017	23/11/2017	25/11/2017	28/11/2017	30/11/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
Particulate Matter (<2.5µ)	36	37	40	46	45	60	($\mu g/m^3$)	Gravimetric
Particulate Matter (<10µ)	72	71	74	71	72	100	($\mu g/m^3$)	Gravimetric
SO_2 Conc.	25	24	26	32	31	80	($\mu g/m^3$)	Improved West & Gaeke
NO_x Conc.	28	30	32	29	31	80	($\mu g/m^3$)	Modified Jacob & Hochheiser

Remarks:
Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2017; Due Date: 22/05/2018
Calibration Certificate No.:
TS/CAL/2017/4639/16, TS/CAL/2017/4639/17 &
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Ambient Air Quality Analysis Results – December, 2017

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AL/ TR /39-308/17-18 **Date: 01/01/2018**

CERTIFICATE OF ANALYSIS

AMBIENT AIR QUALITY REPORT

Ref. No.: GEC/JSW/AAQM/2017-18/DEC 2017/001
Work Order No.: SWPL/17-18/0950004266 dated :07.09.2017
Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.

Report for the Month of DECEMBER – 2017

LOCATION ⟶	Berth No. 5A & 6A of South West Port Limited.							
Date of Sampling	02/11/2017	05/11/2017	09/11/2017	12/11/2017	16/11/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
Particulate Matter (<2.5µ)	39	41	44	43	45	60	($\mu g/m^3$)	Gravimetric
Particulate Matter (<10µ)	70	72	73	71	72	100	($\mu g/m^3$)	Gravimetric
SO_2 Conc.	25	22	24	26	27	80	($\mu g/m^3$)	Improved West & Gaeke
NO_x Conc.	33	32	31	34	35	80	($\mu g/m^3$)	Modified Jacob & Hochheiser

Remarks:
Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2017; **Due Date:** 22/05/2018
Calibration Certificate No.:
TS/CAL/2017/4639/16, TS/CAL/2017/4639/17 &
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AL/ TR /39-309/17-18 **Date: 01/01/2018**

CERTIFICATE OF ANALYSIS

AMBIENT AIR QUALITY REPORT Ref.

No.: GEC/JSW/AAQM/2017-18/DEC 2017/002
Work Order No.: SWPL/17-18/0950004266 dated :07.09.2017
Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.
Report for the Month of DECEMBER – 2017

LOCATION →	Berth No. 5A & 6A of South West Port Limited.							
Date of Sampling	19/11/2017	23/11/2017	25/11/2017	28/11/2017	30/11/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
Particulate Matter (<2.5µ)	43	42	41	45	44	60	($\mu g/m^3$)	Gravimetric
Particulate Matter (<10µ)	71	72	74	71	73	100	($\mu g/m^3$)	Gravimetric
SO_2 Conc.	21	23	22	20	24	80	($\mu g/m^3$)	Improved West & Gaeke
NO_x Conc.	30	33	31	32	33	80	($\mu g/m^3$)	Modified Jacob & Hochheiser

Remarks:
Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2017; **Due Date:** 22/05/2018
Calibration Certificate No.:
TS/CAL/2017/4639/16, TS/CAL/2017/4639/17 &
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AL/ TR /39-310/17-18 **Date: 01/01/2018**

CERTIFICATE OF ANALYSIS

AMBIENT AIR QUALITY REPORT

No.: GEC/JSW/AAQM/2017-18/DEC 2017/003

Work Order No.: SWPL/17-18/0950004266 dated :07.09.2017

Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.

Report for the Month of DECEMBER – 2017

LOCATION ⟶	Location SS-2 of South West Port Limited.							
Date of Sampling	01/12/2017	04/12/2017	08/12/2017	11/12/2017	15/12/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
Particulate Matter (<2.5µ)	36	39	41	43	42	60	($\mu g/m^3$)	Gravimetric
Particulate Matter (<10µ)	70	72	71	75	72	100	($\mu g/m^3$)	Gravimetric
SO_2 Conc.	22	25	23	26	27	80	($\mu g/m^3$)	Improved West & Gaeke
NO_x Conc.	31	33	32	31	30	80	($\mu g/m^3$)	Modified Jacob & Hochheiser

Remarks:

Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2017; **Due Date:** 22/05/2018
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AL/ TR /39-311/17-18 **Date: 01/01/2018**

CERTIFICATE OF ANALYSIS

AMBIENT AIR QUALITY REPORT

No.: GEC/JSW/AAQM/2017-18/DEC 2017/004

Work Order No.: SWPL/17-18/0950004266 dated :07.09.2017

Name of the Industry: M/S. South West Port Limited. Marmugao, GOA.

Report for the Month of DECEMBER – 2017

LOCATION →	Location SS-2 of South West Port Limited.							
Date of Sampling	18/12/2017	22/12/2017	24/12/2017	27/12/2017	30/12/2017	National AAQM Std	Unit	Method
Time of Sampling	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	(24Hrs.)	---	---	---
Particulate Matter (<2.5µ)	35	36	41	45	44	60	($\mu g/m^3$)	Gravimetric
Particulate Matter (<10µ)	71	73	72	70	73	100	($\mu g/m^3$)	Gravimetric
SO_2 Conc.	24	26	25	31	32	80	($\mu g/m^3$)	Improved West & Gaeke
NO_x Conc.	27	29	31	28	32	80	($\mu g/m^3$)	Modified Jacob & Hochheiser

Remarks:

Instrument Used: Ambient fine dust sampler 2.5µ/ADS 10µ
(Manufactured by M/S. Asha Enviro Engineers)
Last Calibrated Date: 23/05/2017; **Due Date:** 22/05/2018
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Annex III

Details of the Status of Compliance of Consent to Operate (No. 5/2580/04-PCB/C1-3090)

Annex III

Details of the Status of Compliance of Consent to Operate (No. 5/2580/04-PCB/C1-3090)

The Terminal is compliant of all pollution control measures.

The Terminal is compliant of all the conditions relating to pollution.

Summary compliances off the Terminal are stated as under.

Sr.	Conditions stipulated by GSPCB	Compliances done by SWPL
(i)	The unit shall maintain and operate air pollution control system of adequate capacity for the following equipment.	Complied. The flue gases are dispersed into the atmosphere in a 30 m tall stack. Stack monitoring carried out by M/s Akanksha Analytical and Research Lab, Pune (recognised by the MoEFCC, Govt. of India under EP Act, 1986 (GR No. S, O. 1680 (€), Sr. 63)) shows that the DGs are compliant with the stipulated conditions.

Sr. No.	Name of Equipment /Installations	No. of Installations	Capacity	SO_2 kg/hr	NOx (g/Kw-hr)	HC (g/Kw-hr)	CO (g/Kw-hr)	PM (g/Kw-hr)
1.	DG Set	02	1500 KVA	7.36	9.2	1.3	3.5	0.3

Sr.	Conditions stipulated by GSPCB	Compliances done by SWPL
(ii)	The applicant shall follow following standards for the D.G. sets >= 1000 KVA	Complied. Stack monitoring carried out by M/s Akanksha Analytical and Research Lab, Pune (recognised by the MoEFCC, Govt. of India under EP Act, 1986 (GR No. S,O. 1680 (€), Sr. 63)) shows that the DGs are compliant with the stipulated conditions.

Sr. No	Parameters	Limits
1.	NOx (as NO_2)	1100 ppmv (as 15% O_2) dry basis in ppmv
2.	NMHC (as C)	150 mg/Nm^3 (at 15% O_2)
3.	Particulate matter	75 mg/Nm^3 (at 15% O2)
4.	CO	150 mg/Nm^3 (at 15% O_2)
5.	Sulphur Content in Fuel	Less than 2%

Sr.	Conditions stipulated by GSPCB	Compliances done by SWPL
(iii)	The unit shall erect chimney(s) of the following specifications	Complied. The chimneys attached to the DGs in the Terminal are 30 m high.

Sr. No.	Chimney attached to	Height
1.	D.G. Set	8 m

Annex III

Details of the Status of Compliance of Consent to Operate (No. 5/2580/04-PCB/C1-3090)

<table>
<tr><td>(iv)</td><td>The unit shall observe the following standards.</td><td>Complied.

The DGs installed at the Terminal are for backup power in case of power outage and are not operated on a continuous basis as base-load source. The diesel consumption in the DGs have been observed well within the quantity permitted by GSPCB.

<table>
<tr><th>Sr. No.</th><th>Type of fuel</th><th>Quantity/hr</th></tr>
<tr><td>1.</td><td>HSD (for DG Set of 1500 KVA)</td><td>220 litres/hr</td></tr>
</table>
</td></tr>
<tr><td>(v)</td><td>The stack port hole and platform is to be designed as per CPCB Guidelines Method 1 Part 1 of Stack Monitoring – Material & methodology for isokinetic sampling</td><td>Complied.

Port hole and platform on the DG set chimney has been provided in accordance with the applicable CPCB guidelines. The same has been verified by the GSPCB in their visits.</td></tr>
<tr><td>(vi)</td><td>The unit should comply with all the standards for DG sets prescribed at Sr. no. 94, 95 and 96 of Schedule I of the Environment (Protection) Rules, 1986.</td><td>Complied.</td></tr>
<tr><td>(vii)</td><td>The unit should carry out emission monitoring from the stacks once in an year from a laboratory recognised by the Ministry of Environment and Forest under the Environment Protection Act, 1986 and the result shall be submitted to this Board.</td><td>Complied.

Stack monitoring is carried out by M/s Akanksha Analytical and Research Lab, Pune (recognised by the MoEFCC, Govt. of India under EP Act, 1986 (GR No. S,O. 1680 (€), Sr. 63)).</td></tr>
<tr><td>(viii)</td><td>The unit shall take adequate measures for control of noise levels from its own sources within the premises in respect of noise. The limits are as follows.

<table>
<tr><th rowspan="2">Category of Area/Zone</th><th colspan="2">Limits in dB (A) Leq</th></tr>
<tr><th>Day time</th><th>Night time</th></tr>
<tr><td>Industrial Area</td><td>75</td><td>70</td></tr>
<tr><td>Commercial Area</td><td>65</td><td>55</td></tr>
<tr><td>Residential Area</td><td>55</td><td>45</td></tr>
<tr><td>Silence Zone</td><td>50</td><td>40</td></tr>
</table>
Day time is reckoned between 6 a.m. to 10 p.m. and night time is reckoned between 10 p.m. and 6 p.m.</td><td>All the DGs are installed inside acoustic enclosure/enclosed rooms with acoustic treatment.

Noise level monitoring is carried out by M/s Akanksha Analytical and Research Lab, Pune (recognised by the MoEFCC, Govt. of India under EP Act, 1986 (GR No. S,O. 1680 (€), Sr. 63)).</td></tr>
<tr><td>(ix)</td><td>Adequate mitigation measures shall be taken to control emissions of SO_2, NOx,</td><td>The Terminal has installed particulate pollution control systems at all the points</td></tr>
</table>

Annex III

Details of the Status of Compliance of Consent to Operate (No. 5/2580/04-PCB/C1-3090)

<table>
<tr><td></td><td>$PM_{2.5}$, RSPM. Applicant shall achieve following ambient air quality standards.

<table>
<tr><td>SO_2</td><td>Not to Exceed (Annual Average)</td><td>50 µg/m^3</td></tr>
<tr><td></td><td>Not to Exceed (24 hours)</td><td>80 µg/m^3</td></tr>
<tr><td>NOx</td><td>Not to Exceed (Annual Average)</td><td>40 µg /m^3</td></tr>
<tr><td></td><td>Not to Exceed (24 hours)</td><td>80 µg /m^3</td></tr>
<tr><td>PM_{10}</td><td>Not to Exceed (Annual Average)</td><td>50 µg/m^3</td></tr>
<tr><td></td><td>Not to Exceed (24 hours)</td><td>100 µg /m^3</td></tr>
<tr><td>$PM_{2.5}$</td><td>Not to Exceed (Annual Average)</td><td>40 µg /m^3</td></tr>
<tr><td></td><td>Not to Exceed (24 hours)</td><td>60 µg /m^3</td></tr>
</table>
All other parameters should meet the standards specified in NAAQS Notification dated 16th November, 2009 for the relevant industry.</td><td>where there is possibility of particulate emissions.
• Locking grab fitted on to Quay Ship Unloaders (prevention of spillage and wind dispersal)
• Surge hoppers and feed conveyors (prevention of spillage and wind dispersal)
• Storage stockpiles covered with Tarpaulin, continuously, without any break. The cargo is handled under water sprinkling.</td><td></td></tr>
<tr><td>(x)</td><td>The units shall carry out Ambient Air Quality Monitoring once every month from a laboratory recognised by MOEF under the Environment Protection Act, 1986 and the report should be submitted to the Board by 15th of subsequent months until the Continuous Ambient Air Quality Monitoring is installed.</td><td>AAQ monitoring is carried out by M/s Akanksha Analytical and Research Lab, Pune (recognised by the MoEFCC, Govt. of India under EP Act, 1986 (GR No. S,O. 1680 (€), Sr. 63)). The results are submitted to the Board on a monthly frequency.

A CAAQMS of Environment Assey, Austria has been installed over the Canteen building in the terminal since 12th march, 2016. The CAAQMS monitors the following parameters on a continuous basis.
a. PM10
b. PM2.5
c. SO_2
d. NOx
e. CO

The CAAQMS gives real-time parameter value on a display on the instrument panel and records the data internally which can be accessed through a software on the computer.</td><td></td></tr>
<tr><td>(xi)</td><td>The applicant shall maintain wind breaking walls/barriers</td><td>Wind barrier walls constructed of MS structural with geotextile cladding has been installed around the coal stock yard on the eastern side of the Terminal premises to contain wind blown dusts, if any.</td><td></td></tr>
</table>

Annex III

Details of the Status of Compliance of Consent to Operate (No. 5/2580/04-PCB/C1-3090)

(xii)	The applicant shall maintain dust containment cum suppression system.	SWPL has installed pressurized mist formation aqua-dyne system at every transfer points from discharge operation to loading operations and water sprinkling system at plots while stacking / reclaiming. This ensures dust entrapment while operation is being carried out.
(xiii)	The applicant shall maintain metalled road within the premises.	Complied. All the internal roads of the Terminal are either RCC or made up of interlocking paver blocks.
(xiv)	The applicant shall carry out regular cleaning and wetting of roads within the plot to suppress dust pollution.	There is no road transportation of cargo. The internal roads of the facility are sprinkled with water using water bowser and swept using mechanical rotary sweeping cum suction machines of Dulevo, Italy as an when required to suppress vehicle tyre associated dusts.
(xv)	The applicant shall construct garland drains along the periphery of the unit to avoid siltation of dust into seasonal streams/agricultural lands, etc.	Complied. Garland drains have been provided around the material storage area connected to a siltation pond. There are no seasonal streams running through the Terminal. There are no agricultural lands beside the Terminal.
(xvi)	The applicant shall plant fast growing trees along the periphery/compound wall of the plot to arrest the dust pollution.	About 700 trees and tall shrubs have been planted over 1400 m^2 around the Terminal premises and alongside the compound wall.
(xvii)	The applicant shall take all the necessary steps to maintain the good and healthy ambient air quality in and around the **P**lot	Adequate and effective steps have been taken, as described above to prevent air pollution from Terminal operations.
(xviii)	The applicant shall not use any agricultural land	Complied. The Terminal is inside a designated Industrial Area of the MPT. No agricultural land is present around the Terminal.
(xix)	The applicant shall be minimum 500 m away from the residential area schools/collages, historical monuments, religious places, ecological sensitive areas as well as forests area.	Complied. The Terminal is the farthest operation from the nearest residential are of Vasco, inside the designated Industrial Area of the MPT. The Terminal is more than 500 meters away from the residential area, schools/collages, historical monuments, religious places, ecological sensitive area, and any forest area.

Annex III

Details of the Status of Compliance of Consent to Operate (No. 5/2580/04-PCB/C1-3090)

(xx)	The applicant shall provide paved approach with adequate traffic carrying capacity	Complied. The Terminal does not transport any cargo through the road route. Internal roads of 9 m width have been provided which are adequate to cater to the administrative vehicular traffic within the Terminal, as well as for Tractor trailers for movement of steel products inside the Terminal.
(xxi)	Continuous water sprinkling shall be carried out on the top of the heap at regular intervals to prevent dusting, fire and smoke. During loading/unloading, fixed pipe with sufficient water storage and pump shall be installed.	Complied. The bulk cargo stockpiles are covered with geotextile except for the portion which are being worked up (stacked or reclaimed using mechanised means). Sprinkling of water is carried out on the part of exposed stockpile at the time of working, and as and when required. Sprinkling is carried out with static/fixed sprinklers fed with pressurised water from a 40 HP, four stage pump (one plus one standby) fitted on a 700 kl reservoir.
(xxii)	The applicant shall ensure that all trucks before leaving the storage yard shall be covered with tarpaulin and also that trucks are not over loaded as well as there is no spillage during transportation.	No cargo transportation by road is carried out by the Terminal. The Terminal moves all its inbound and outbound cargo through the railways. Wagon loading in the Terminal is carried out with flexible chutes at the bottom of the Silo. The wagons thereafter are immediately covered from top with custom cut and stringed tarpaulin sheets and secured with ropes from the top margins, thus not leaving any possibility of in-travel spillage or dusting.
(xxiii)	The applicant shall insure regular sweeping of coal from internal and main road and also ensure that there is space for free movement of vehicles at the surrounded area.	There is no road transportation of cargo. The roads are sprinkled with water using water bowser and swept using mechanical rotary sweeping cum suction machines of Dulevo, Italy as an when required to suppress vehicle tyre associated dusts.
(xxiv)	Fixed pipeline should be installed for sprinkling of water to ensure that total plot area is covered with adequate water tank of compatible storage.	Fixed pipeline network connected with water sprinkling, water hose taps and firefighting system are installed in the terminal, connected to water storage tank capacity of 700 kl.
(xxv)	The applicant shall provide adequate firefighting measures to avoid any fire	The Terminal is provided with an annular yard hydrant system which is pressurised

Annex III

Details of the Status of Compliance of Consent to Operate (No. 5/2580/04-PCB/C1-3090)

	and shall insure that there is no explosive or chemical reaction in storage yard.	with the 40 HP, four stage pump provided with 700 kl of water reservoir. In addition, the Terminal has a truck mounted fire monitor with two 7.5 HP pumps which run on PTO and an on-board diesel engine auxiliary power unit. The support of MPT's fire and rescue tenders is also available to the Terminal on call basis in case of emergency.
(xxvii)	Proper drainage system shall be provided in all coal storage areas so that water drained from sprinkling is collected at a common tank and can be reused after screening through the coal silt.	Sprinkling is carried out in a controlled manner. The water is entrained in the cargo at the surface and does not form any king of leachate or runoff requiring settling.

Annexure 5 Colly

SOUTH WEST PORT LTD.
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CIN : U45203GA1997PLC002369
Phone : 0832 252 3000
Fax : 0832 252 3006
Website : www.jsw.in

SWPL/EHS/24-25/75

Date: 06/02/2025

To,
The Member Secretary
Goa State Pollution Control Board,
Opp. Saligao Seminary
Saligao, Bardez Goa.

Sub: Submission of CAAQMS data for SWPL Berth 5A & 6A in the Month of Jan 2025

GSPCB Ref: CtO Letter No. 12/2023-PCB/1911605/R00013548 dtd. 15.04.2024.

Dear Madam,

Further to the above cited subject matter and in terms of condition no. 4-(ix) of the above referred CtO, please find attached SWPL CAAQMS daily average report for the month of Jan 2025.

This is for your kind information.

Thanking you.

for South West Port Ltd.

SOUTH WEST PORT LTD. Mormugao Harbour GOA

Authorized Signatory

Encl: As above

South West Port Limited, Goa

AIR MONITORING Report

Doc No: F-EHS-11	Revision : 00	Issued : Jan 2018	Page No. : 1/1

Goa State Pollution Control Board

Site Name: South West Port Ltd

From Date: 2025/01/01 To Date: 2025/01/31

Report Name: Custom Report

Report Created by SWPLV on 2025-02-01 15:15:54

Sl No.	Time	CAAQMS-SO2 - (ug/m3) Raw	CAAQMS-NOx - (ug/m3) Raw	CAAQMS-CO - (ug/m3) Raw	CAAQMS-PM10 - (ug/m3) Raw	CAAQMS-PM2.5 - (ug/m3) Raw
1	2025-01-01	2.20	5.16	0.68	46.84	23.55
2	2025-01-02	2.94	5.2	0.69	51.08	26.21
3	2025-01-03	2.57	5.21	0.65	47.70	26.38
4	2025-01-04	2.00	5.21	0.59	42.81	22.90
5	2025-01-05	2.06	5.12	0.52	47.22	24.94
6	2025-01-06	2.67	5.06	0.50	48.98	26.69
7	2025-01-07	2.83	5.20	0.51	47.39	24.10
8	2025-01-08	3.03	5.17	0.62	47.78	25.48
9	2025-01-09	2.49	5.21	0.65	49.26	26.57
10	2025-01-10	1.88	5.17	0.64	49.09	26.99
11	2025-01-11	2.34	5.17	0.53	50.02	24.86
12	2025-01-12	1.80	5.18	0.56	51.20	28.41
13	2025-01-13	1.90	5.17	0.59	56.47	30.05
14	2025-01-14	2.22	5.16	0.68	47.54	27.20
15	2025-01-15	3.77	5.21	0.53	49.40	24.44
16	2025-01-16	4.49	5.21	0.62	52.51	26.94
17	2025-01-17	4.43	5.19	0.63	57.99	27.76
18	2025-01-18	4.42	5.08	0.59	65.22	30.11
19	2025-01-19	3.90	4.91	0.62	63.00	30.05
20	2025-01-20	3.55	5.00	0.64	47.74	27.80
21	2025-01-21	3.76	4.90	0.60	51.44	28.99
22	2025-01-22	4.34	4.98	0.61	39.75	32.09
23	2025-01-23	3.79	4.99	0.55	42.81	30.83
24	2025-01-24	3.44	5.17	0.54	39.83	28.98
25	2025-01-25	5.33	5.17	0.51	42.05	27.10
26	2025-01-26	9.01	5.02	0.72	47.38	32.35
27	2025-01-27	10.28	5.15	0.43	54.19	33.92
28	2025-01-28	9.18	4.85	0.68	48.61	35.76
29	2025-01-29	7.78	5.52	0.72	53.93	29.02
30	2025-01-30	10.5	7.69	0.46	53.81	29.74
31	2025-01-31	2.61	9.57	1.00	56.82	37.75

SOUTH WEST PORT LTD.
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Website : www.jsw.in

SWPL/EHS/24-25/80

Date: 04/03/2025

To,
The Member Secretary
Goa State Pollution Control Board,
Opp. Saligao Seminary
Saligao, Bardez Goa.

Sub: Submission of CAAQMS data for SWPL Berth 5A & 6A in the Month of Feb 2025

GSPCB Ref: CtO Letter No. 12/2023-PCB/1911605/R00013548 dtd. 15.04.2024.

Dear Madam,

Further to the above cited subject matter and in terms of condition no. 4-(ix) of the above referred CtO, please find attached SWPL CAAQMS daily average report for the month of Feb 2025.

This is for your kind information.

Thanking you.

for South West Port Ltd.

Authorized Signatory

Encl: As above

South West Port Limited, Goa

AIR MONITORING Report

Doc No: F-EHS-11	Revision : 00	Issued :Jan 2018	Page No. : 1/1

Goa State Pollution Control Board

Site Name: South West Port Ltd

From Date: 2025/02/01 To Date: 2025/02/28

Report Name: Custom Report

Report Created by SWPLV on 2025-03-01 17:48:36

Sl No.	Time	CAAQMS-SO2 - (ug/m3) Raw	CAAQMS-NOx - (ug/m3) Raw	CAAQMS-CO - (ug/m3) Raw	CAAQMS-PM10 - (ug/m3) Raw	CAAQMS-PM2.5 - (ug/m3) Raw
1	2025-02-01	5.41	8.27	1.17	50.91	34.78
2	2025-02-02	6.33	7.36	0.59	49.56	36.56
3	2025-02-03	5.56	6.70	1.73	48.87	29.21
4	2025-02-04	7.26	7.07	0.51	44.8	31.94
5	2025-02-05	8.13	6.78	0.67	44.56	33.87
6	2025-02-06	7.76	5.75	0.72	36.11	24.51
7	2025-02-07	6.63	5.22	0.45	39.06	28.37
8	2025-02-08	9.27	5.22	0.53	37.79	33.30
9	2025-02-09	9.65	5.14	0.56	45.59	36.63
10	2025-02-10	6.84	5.00	0.56	50.27	35.33
11	2025-02-11	7.63	5.06	0.61	44.76	27.99
12	2025-02-12	9.22	4.96	0.43	48.13	32.62
13	2025-02-13	8.86	5.14	0.5	55.1	35.49
14	2025-02-14	9.47	5.14	0.85	43.2	25.94
15	2025-02-15	4.95	5.6	0.54	49.95	11.90
16	2025-02-16	8.49	6.07	0.56	52.41	18.34
17	2025-02-17	6.75	5.98	0.66	54.53	19.57
18	2025-02-18	6.98	5.89	0.59	47.48	18.25
19	2025-02-19	8.27	6.04	0.53	48.6	17.10
20	2025-02-20	7.64	5.93	0.56	50.69	18.29
21	2025-02-21	7.89	6.04	0.57	56.53	22.02
22	2025-02-22	7.38	6.00	0.55	52.23	20.04
23	2025-02-23	7.97	6.05	0.57	51.69	17.37
24	2025-02-24	7.8	6.00	0.66	57.45	16.37
25	2025-02-25	8.03	6.03	0.53	50.09	16.44
26	2025-02-26	8.12	5.97	0.66	48.76	15.92
27	2025-02-27	7.46	5.85	0.57	51.04	16.25
28	2025-02-28	8.85	5.98	0.54	55.6	18.32

SOUTH WEST PORT LTD.
Regd. Off: Site Office Building,
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Website : www.jsw.in

SWPL/EHS/24-25/87

Date: 03/04/2025

To,
The Member Secretary
Goa State Pollution Control Board,
Opp. Saligao Seminary
Saligao, Bardez Goa.

Sub: Submission of CAAQMS data for SWPL Berth 5A & 6A in the Month of Mar 2025

GSPCB Ref: CtO Letter No. 12/2023-PCB/1911605/R00013548 dtd. 15.04.2024.

Dear Madam,

Further to the above cited subject matter and in terms of condition no. 4-(ix) of the above referred CtO, please find attached SWPL CAAQMS daily average report for the month of Mar 2025.

This is for your kind information.

Thanking you.

for South West Port Ltd.

Authorized Signatory

Encl: As above

South West Port Limited, Goa

AIR MONITORING Report

Doc No: F-EHS-11	Revision : 00	Issued : Jan 2018	Page No. : 1/1

Goa State Pollution Control Board

Site Name: South West Port Ltd

From Date: 2025/03/01 To Date: 2025/03/31

Report Name: Custom Report

Report Created by SWPLV on 2025-04-01 17:59:46

Sl No.	Time	CAAQMS-SO2 - (ug/m3) Raw	CAAQMS-NOx - (ug/m3) Raw	CAAQMS-CO - (ug/m3) Raw	CAAQMS-PM10 - (ug/m3) Raw	CAAQMS-PM2.5 - (ug/m3) Raw
1	2025-03-01	8.16	5.96	0.63	55.75	18.63
2	2025-03-02	7.95	5.88	0.58	52.77	17.72
3	2025-03-03	7.46	5.94	0.56	49.19	17.7
4	2025-03-04	7.22	6.02	0.69	61.19	19.36
5	2025-03-05	7.78	5.94	0.55	55.21	20.92
6	2025-03-06	7.73	5.93	0.52	54.75	17.45
7	2025-03-07	7.78	6.02	0.62	59.2	20.74
8	2025-03-08	7.76	5.96	0.53	50.78	17.05
9	2025-03-09	7.35	6.03	1	51.02	18.01
10	2025-03-10	7.26	5.93	0.57	51.74	19.94
11	2025-03-11	7.7	5.98	0.54	51.08	14.46
12	2025-03-12	7.15	5.97	0.63	58.77	17.56
13	2025-03-13	6.89	6.01	0.49	39.41	12.44
14	2025-03-14	6.91	5.84	0.66	44.96	13.51
15	2025-03-15	7.8	5.91	0.56	44.93	15.43
16	2025-03-16	7.59	5.94	0.63	41.94	12.54
17	2025-03-17	8.43	6.02	0.46	45.83	14.38
18	2025-03-18	7.42	5.96	0.6	49.04	16.94
19	2025-03-19	7.31	6.03	0.57	40.15	12.12
20	2025-03-20	7.44	5.99	0.5	50.78	16.96
21	2025-03-21	6.54	5.98	0.67	47.17	13.26
22	2025-03-22	7.31	5.99	0.59	44.78	12.08
23	2025-03-23	7.38	5.95	0.67	42.82	12.89
24	2025-03-24	7.53	5.98	0.63	40.77	11.34
25	2025-03-25	7.31	6.09	0.58	40.2	11.94
26	2025-03-26	7.24	5.93	0.63	33.31	8.83
27	2025-03-27	6.98	5.91	0.58	37.55	9.62
28	2025-03-28	7.06	5.81	0.57	32.46	8.17
29	2025-03-29	7.51	5.96	0.64	59.92	19.74
30	2025-03-30	7.2	5.9	0.59	50.92	16.13
31	2025-03-31	7.47	5.92	0.63	49.99	14.98

SOUTH WEST PORT LTD.
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Phone : 0832 252 3000
Fax : 0832 252 3006
Website : www.jsw.in

SWPL/EHS/25-26/05

Date: 03/05/2025

To,
The Member Secretary
Goa State Pollution Control Board,
Opp. Saligao Seminary
Saligao, Bardez Goa.

Sub: Submission of CAAQMS data for SWPL Berth 5A & 6A in the Month of April 2025

GSPCB Ref: CtO Letter No. 12/2023-PCB/1911605/R00013548 dtd. 15.04.2024.

Dear Madam,

Further to the above cited subject matter and in terms of condition no. 4-(ix) of the above referred CtO, please find attached SWPL CAAQMS daily average report for the month of April 2025.

This is for your kind information.

Thanking you.

for South West Port Ltd.

Authorized Signatory

Encl: As above

South West Port Limited, Goa

AIR MONITORING Report

Doc No: F-EHS-11	Revision : 00	Issued : Jan 2018	Page No. : 1/1

Goa State Pollution Control Board

Site Name: South West Port Ltd

From Date: 2025/04/01 To Date: 2025/04/30

Report Name: Custom Report

Report Created by SWPLV on 2025-05-02 18:22:51

Sl No.	Time	CAAQMS-SO2 - (ug/m3) Raw	CAAQMS-NOx - (ug/m3) Raw	CAAQMS-CO - (ug/m3) Raw	CAAQMS-PM10 - (ug/m3) Raw	CAAQMS-PM2.5 - (ug/m3) Raw
1	2025-04-01	7.9	5.91	0.56	50.73	15.69
2	2025-04-02	7.19	5.9	0.53	46.12	14.93
3	2025-04-03	7.72	5.96	0.56	38.23	10.98
4	2025-04-04	8.01	6.01	0.56	41.63	13.8
5	2025-04-05	NA	NA	NA	NA	NA
6	2025-04-06	NA	NA	NA	NA	NA
7	2025-04-07	NA	NA	NA	NA	NA
8	2025-04-08	NA	NA	NA	NA	NA
9	2025-04-09	6.87	6.25	0.93	35.35	13.02
10	2025-04-10	9.72	5.92	0.8	33.66	9.51
11	2025-04-11	5.33	3.65	0.72	36.08	14.1
12	2025-04-12	5.57	3.69	0.72	32.28	10.44
13	2025-04-13	5.44	3.71	0.7	36.79	12.82
14	2025-04-14	5.28	3.64	0.67	40.38	15.22
15	2025-04-15	5.11	3.64	0.72	38.68	13.78
16	2025-04-16	4.88	3.69	0.61	36.39	13.58
17	2025-04-17	5.31	3.63	0.64	33.9	13.09
18	2025-04-18	4.99	3.69	0.64	30.43	11.74
19	2025-04-19	5.06	3.65	0.7	30.44	12.02
20	2025-04-20	5.15	3.63	0.64	32.11	12.53
21	2025-04-21	5.63	3.71	0.64	51.24	18.31
22	2025-04-22	5.03	3.69	0.62	47.61	16.23
23	2025-04-23	3.99	3.47	0.66	53.83	20.13
24	2025-04-24	1.32	2.99	0.66	49.99	17.87
25	2025-04-25	1.32	2.99	0.66	49.99	17.87
26	2025-04-26	1.88	3.23	0.78	46.06	17.23
27	2025-04-27	5.13	3.67	0.63	37.31	14.38
28	2025-04-28	5.3	3.72	0.63	35.53	14.54
29	2025-04-29	5.59	3.66	0.75	41.28	14.07
30	2025-04-30	5.84	3.68	0.57	43.97	16.13

** CAAQMS PC hard disk got crashed hence four days our CAAQMS connectivity was down.

SOUTH WEST PORT LTD.
Regd. Off: Site Office Building,
Berth No. 5A & 6A, Mormugao Harbour,
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CIN : U45203GA1997PLC002369
Phone : 0832 252 3000
Fax : 0832 252 3006
Website : www.jsw.in

SWPL/EHS/25-26/11

Date: 03/06/2025

To,
The Member Secretary
Goa State Pollution Control Board,
Opp. Saligao Seminary
Saligao, Bardez Goa.

Sub: Submission of CAAQMS data for SWPL Berth 5A & 6A in the Month of May 2025

GSPCB Ref: CtO Letter No. 12/2023-PCB/1911605/R00013548 dtd. 15.04.2024.

Dear Madam,

Further to the above cited subject matter and in terms of condition no. 4-(ix) of the above referred CtO, please find attached SWPL CAAQMS daily average report for the month of May 2025.

This is for your kind information.

Thanking you.

for South West Port Ltd.

Authorized Signatory

Encl: As above

South West Port Limited, Goa

AIR MONITORING Report

Doc No: F-EHS-11	Revision : 00	Issued : Jan 2018	Page No. : 1/1

Goa State Pollution Control Board

Site Name: South West Port Ltd

From Date: 2025/05/01 To Date: 2025/05/31

Report Name: Custom Report

Report Created by SWPLV on 2025-06-01 10:55:49

Sl No.	Time	CAAQMS-SO2 - (ug/m3) Raw	CAAQMS-NOx - (ug/m3) Raw	CAAQMS-CO - (ug/m3) Raw	CAAQMS-PM10 - (ug/m3) Raw	CAAQMS-PM2.5 - (ug/m3) Raw
1	2025-05-01	5.23	3.74	0.69	37.07	13.33
2	2025-05-02	5.71	3.70	0.86	34.96	13.95
3	2025-05-03	5.41	3.65	0.51	32.44	12.47
4	2025-05-04	5.85	3.66	0.70	30.82	10.88
5	2025-05-05	5.77	3.68	0.59	35.01	13.86
6	2025-05-06	5.22	3.62	0.74	34.93	12.39
7	2025-05-07	5.90	3.67	0.57	34.62	12.54
8	2025-05-08	5.09	3.64	0.49	32.24	13.38
9	2025-05-09	5.64	3.69	0.82	29.59	10.46
10	2025-05-10	5.78	3.64	0.60	24.42	10.92
11	2025-05-11	4.85	3.68	1.11	24.64	8.10
12	2025-05-12	5.70	3.63	0.63	26.77	10.65
13	2025-05-13	4.96	3.71	0.62	25.37	9.22
14	2025-05-14	5.59	3.64	0.88	24.43	8.82
15	2025-05-15	5.53	3.67	0.53	29.86	11.82
16	2025-05-16	5.41	3.70	0.81	37.42	13.80
17	2025-05-17	5.76	3.72	0.78	29.06	10.47
18	2025-05-18	5.80	3.33	1.43	31.15	11.83
19	2025-05-19	5.89	3.71	0.66	27.92	12.29
20	2025-05-20	5.41	3.72	0.58	25.94	9.39
21	2025-05-21	6.03	3.65	0.66	18.44	7.45
22	2025-05-22	5.18	3.59	0.67	26.54	9.50
23	2025-05-23	5.49	3.36	0.59	24.11	8.47
24	2025-05-24	5.75	3.36	0.70	22.64	8.32
25	2025-05-25	5.63	3.39	0.77	26.01	9.16
26	2025-05-26	5.75	3.37	0.62	24.43	8.17
27	2025-05-27	5.44	3.40	0.59	25.68	9.27
28	2025-05-28	5.29	3.34	0.65	25.91	9.72
29	2025-05-29	4.65	3.36	0.65	27.12	10.41
30	2025-05-30	5.50	3.36	0.67	43.47	20.73
31	2025-05-31	5.67	3.39	0.55	38.66	17.20

SOUTH WEST PORT LTD.
Regd. Off: Site Office Building,
Berth No. 5A & 6A, Mormugao Harbour,
Goa – 403 803.
CIN : U45203GA1997PLC002369
Phone : 0832 252 3000
Fax : 0832 252 3006
Website : www.jsw.in

SWPL/EHS/25-26/17

Date: 03/07/2025

To,
The Member Secretary
Goa State Pollution Control Board,
Opp. Saligao Seminary
Saligao, Bardez Goa.

Sub: Submission of CAAQMS data for SWPL Berth 5A & 6A in the Month of June 2025

GSPCB Ref: CtO Letter No. 12/2023-PCB/1911605/R00013548 dtd. 15.04.2024.

Dear Madam,

Further to the above cited subject matter and in terms of condition no. 4-(ix) of the above referred CtO, please find attached SWPL CAAQMS daily average report for the month of June 2025.

This is for your kind information.

Thanking you.

for South West Port Ltd.

Authorized Signatory

Encl: As above

Goa State Pollution Control Board

Site Name: South West Port Ltd

From Date: 2025/06/01 To Date: 2025/06/30

Report Name: Custom Report

Report Created by SWPLV on 2025-07-01 14:59:40

Sl No.	Time	CAAQMS-SO2 - (ug/m3) Raw	CAAQMS-NOx - (ug/m3) Raw	CAAQMS-CO - (ug/m3) Raw	CAAQMS-PM10 - (ug/m3) Raw	CAAQMS-PM2.5 - (ug/m3) Raw
1	2025-06-01	4.94	3.35	0.73	30.78	11.97
2	2025-06-02	5.70	3.38	0.71	28.30	9.75
3	2025-06-03	4.52	3.34	0.92	30.47	12.24
4	2025-06-04	5.64	3.77	0.66	37.14	14.49
5	2025-06-05	5.82	4.56	0.61	39.42	15.05
6	2025-06-06	5.15	4.58	0.92	37.68	15.85
7	2025-06-07	5.02	4.57	0.65	33.86	12.19
8	2025-06-08	5.26	4.58	1.01	34.17	18.18
9	2025-06-09	5.35	4.57	0.82	35.30	11.69
10	2025-06-10	8.29	4.73	0.72	36.90	14.39
11	2025-06-11	6.45	5.62	0.84	29.18	11.16
12	2025-06-12	6.08	5.59	0.65	23.43	7.61
13	2025-06-13	5.82	5.51	1.27	24.25	9.78
14	2025-06-14	5.37	5.46	0.72	23.73	13.26
15	2025-06-15	6.21	5.47	0.71	28.29	29.79
16	2025-06-16	6.08	7.8	0.73	36.71	13.59
17	2025-06-17	5.89	9.71	0.75	41.32	16.69
18	2025-06-18	6.45	7.51	0.81	33.87	17.67
19	2025-06-19	6.54	7.54	0.76	33.31	13.95
20	2025-06-20	6.94	7.54	0.82	31.05	11.39
21	2025-06-21	6.84	7.51	0.78	30.03	13.99
22	2025-06-22	6.86	7.54	0.75	29.39	10.56
23	2025-06-23	6.49	7.51	0.76	29.55	9.81
24	2025-06-24	6.28	7.52	0.76	30.63	11.48
25	2025-06-25	6.74	7.53	0.72	30.96	9.47
26	2025-06-26	7.01	7.52	0.72	34.11	11.86
27	2025-06-27	6.57	7.5	0.73	31.21	12.25
28	2025-06-28	6.5	7.53	0.78	33.03	11.68
29	2025-06-29	6.65	7.51	0.67	32.56	12.98
30	2025-06-30	6.16	7.53	0.79	30.77	10.71

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SOUTH WEST PORT LIMITED

Regd. Off. : Site Office Building,
Berth No. 5A & 6A, Mormugao Harbour,
Goa - 403 803.
CIN : U45203GA1997PLC002369
Phone : 0832 - 252 3000
Fax : 0832 - 252 3006
Website : www.jsw.in

LETTER OF AUTHORITY

WHEREAS, South West Port Limited (CIN U45203GA1997PLC002369) having its Registered Office at 1st floor, Port Users Complex, Marmugao Harbour, Goa – 403803 and corporate office at JSW Centre, Bandra Kurla Complex, Bandra (East), Mumbai – 400051 (the '**Company**') *vide* a Board Resolution dated 28th October 2024 has conferred upon me certain powers / authorities and under such Board Resolution, the Company has vested me with authority to further delegate the powers / authorities in the manner therein mentioned.

In furtherance whereof, I Lalit Singhvi, Authorized Signatory, hereby nominate, constitute and appoint Ms. Breitkopf Siona, aged about 53 years, working in the capacity of Assistant General Manager, [Employee No: 4061009] as the duly Authorized Representative for and on behalf of the Company to initiate, institute, prosecute, defend, oppose, appear, appeal, refer to arbitration, compromise, submit to judgement, enforce judgement, execute, decree or order, in its and legal demands or proceedings (including civil writs, criminal, revenue, revisions, DGFT, Customs / Excise / Service tax / Port Authorities etc. generally or otherwise) and to declare, and affirm, modify all plaints, written statements, applications, petitions, affidavits, complaints, papers, writings and other documents and to appear before any Court in India, Judge, Magistrate or Tribunal, quasi-judicial authorities or Arbitrators including deposing and/or giving evidence on behalf of the Company, in its any legal demands or proceedings (including civil, criminal, revenue, revision etc. generally or otherwise) and to declare and affirm, modify all pleadings, all such documents and to appear before any Courts in Goa (including High Court), Judge, Magistrate or other Officer or authority empowered by law in respect of proceedings initiated by or against the Company and for this purpose to accept services of notice or processes and retain, employ and remunerate Advocates, Solicitors, Attorneys, Vakils and Pleaders and to sign and give warrants, Vakalatanamas and other necessary authorities. She is also authorized to file documents and applications for adjudication and matters relating to stamp duty ascertainment, refunds and payment. This letter of Authority shall be inoperative (a) the authorized representative/s ceases in the employment of the Company (b) the authority is revoked by the Company, whichever occurs earlier. Provided further that the said Representative shall at all-time act subject to supervision and instructions of the Company and keep the Company apprised and act within the ambit of applicable laws.

Given on this 23rd Day of July, 2025

In the presence of **For SOUTH WEST PORT LIMITED.**	Specimen Signature:
Lalit Singhvi **Authorized Signatory**	**Ms. Breitkopf Siona** **Assistant General Manager**

SOUTH WEST PORT LTD.

Corporate Office : JSW Centre,
Bandra Kurla Complex,
Bandra (East), Mumbai - 400 051

Phone : +91 22 4286 1000
Fax : +91 22 4286 3000