Strategy Paper for

Establishment of Offshore Wind Energy Projects

1.0 Background:

Government of India notified National Offshore Wind Energy Policy-2015 on 6 October 2015 for the development of offshore wind power in the country. The policy provides for offshore wind power development up to a seaward distance of 200 nautical miles from the baseline, i.e., up to the country's Exclusive Economic Zone (EEZ). Ministry of New & Renewable Energy (MNRE) is the Nodal Ministry, and the National Institute of Wind Energy (NIWE) is the Nodal Agency for the development of Offshore Wind Energy in India.

Preliminary studies carried out by NIWE across the coastline of India indicate good potential both off the Southern tip of the country and the West coast for offshore wind farm development in India. The offshore wind potential was assessed by the FOWIND (Facilitating Offshore Wind in India) consortium with NIWE as a knowledge partner. Based on a multi-criteria approach involving assessment of various parameters such as wind resource, bathymetry etc., eight zones each off the coast of Gujarat and Tamil Nadu were identified as potential offshore wind energy zones. The identified eight zones off the coast of Tamil Nadu & Gujarat and their locations are shown in Figure 1 and Figure 2 respectively.

Keeping in view the requirement of the holistic development of offshore wind farms in the country and to fast-track the process, the following three models are proposed: -

Model-1	This approach will be followed for demarcated offshore wind zones for which MNRE/NIWE has carried out detailed studies/surveys. Presently, identified Zone B3 (365 Sq.km) off the coast of Gujarat shall be considered in phase-1 of this model.
Model-2	This approach will be followed for identified offshore wind sites by NIWE for which detailed studies/surveys have not been carried out. Offshore wind developers may select a wind site within the identified zone and carry out required studies/surveys with the approval of MNRE subject to the clearances from various ministries/departments.
2(A)	MNRE through its implementing agencies will come up with bids for procurement of 2 GW of offshore wind power capacities tentatively in the FY 2024-25. Those developers who have carried out the studies and survey will be allowed to participate in the bidding for the development of such projects. Necessary central financial assistance in the form of Viability Gap Funding (VGF) for initial projects would be available to achieve a predetermined power tariff for these 2 GW of offshore wind power capacity.

2(B)	Developers who have carried out studies and surveys may also decide to develop offshore wind power projects by themselves for sale of power on a merchant basis or under bilateral agreements with consumers under the open access mechanism or for captive consumption. For such projects the benefits of provision of power evacuation infrastructure from the off shore pooling delivery point, waiver of transmission charges, Renewable Energy Credits with Multipliers, Carbon Credit benefits etc. as determined by GoI/ State Govts from time to time shall be applicable.
Model- 3	In this model, NIWE shall identify from time to time large offshore wind zones within the EEZ but not covered either under Model 1 or Model 2. Proposed offshore wind sites demarcated within these zones would be allocated for a fixed period on a lease basis through single-stage two envelope bidding. Project development shall be carried out by the prospective developer in this zone. The power generated from such projects shall be either used for captive consumption under open access mechanism or sold to any entity through a bilateral power purchase agreement or sold through Power Exchanges. Benefits like provision of power evacuation infrastructure from the off shore pooling delivery point, waiver of transmission charges, Renewable Energy Credits with Multipliers, Carbon Credit benefits etc. as determined by GoI/ State Govt's from time to time shall be applicable.

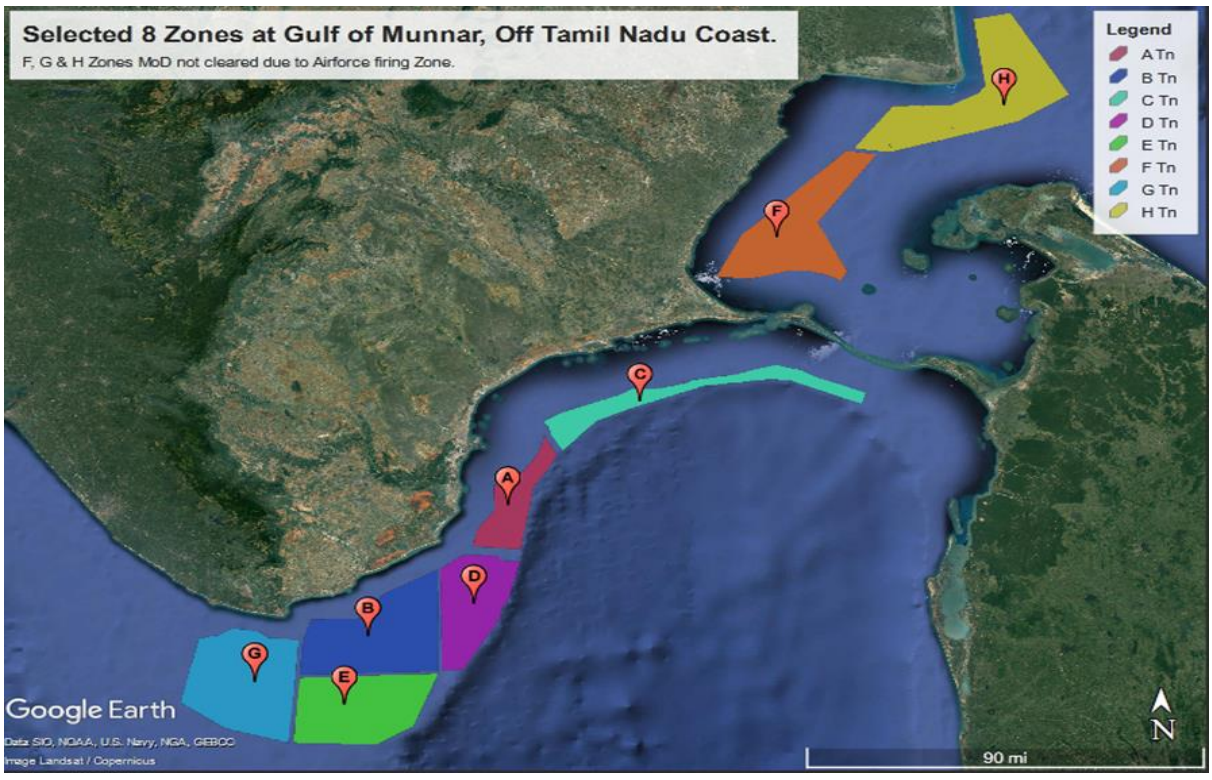


Fig. 1: Demarcated Offshore Wind Energy Zones at Tamil Nadu

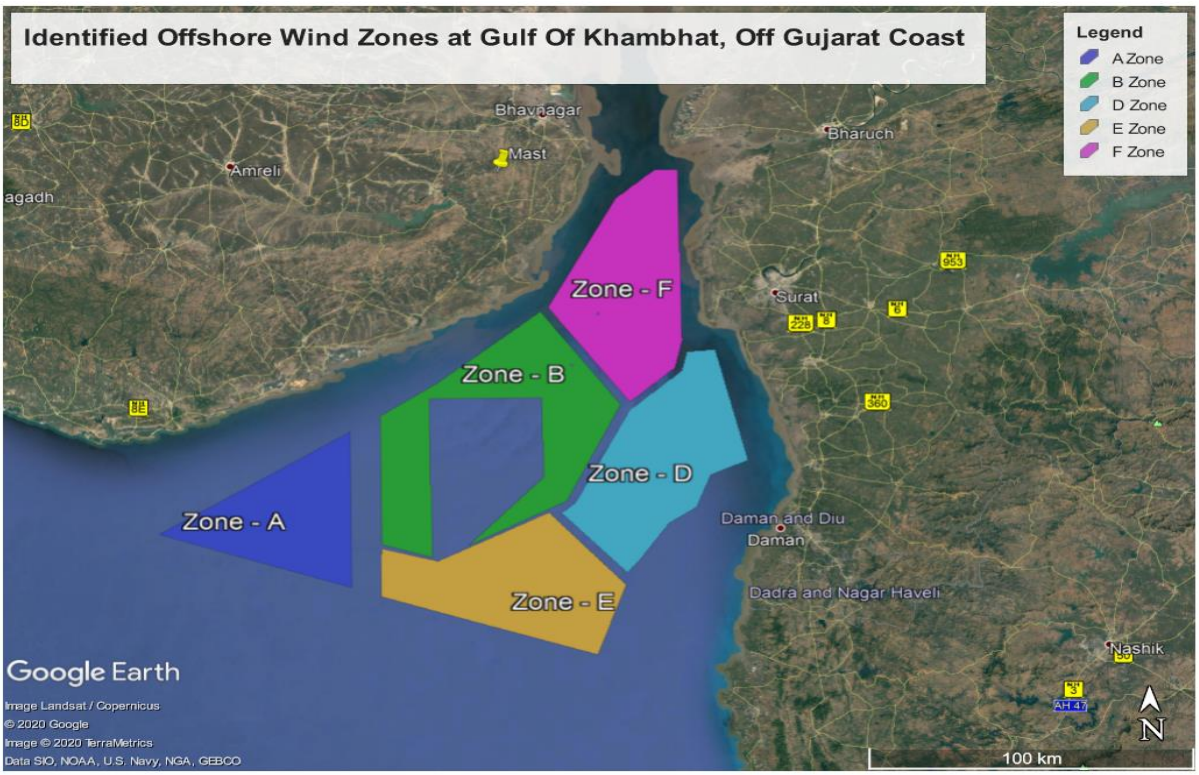


Fig. 2: Demarcated Offshore Wind Energy Zones at Gujarat Off Coast

For the initial offshore wind power projects under Model 1 & Model 2(A), it is envisaged that VGF (viability gap funding) or any other financial incentive as decided by GoI may be made available to bridge the gap between the actual tariff determined through the competitive bidding process and power purchase tariff by the designated entity.

Considering the above three models of development and to fast track the process to achieve the offshore wind energy target, an indicative auction trajectory is indicated in Table 1.

Table 1: *Indicative auction trajectory for offshore wind*

Year	Total Auction Trajectory (in GW)	Auction Capacity under Model 1 (in GW)	Auction Capacity under Model 2 (A) (in GW)	Auction Capacity under Model 3 (in GW)
2022-23	4	-	-	4
2023-24	4	1	-	3
2024-25	4	-	2	2
2025-26	5	-	4	1

2026-27	5	-	4	1
2027-28	5		4	1
2028-29	5	-	5	-
2029-30	5	-	5	-
Total	**37**	1	24	12

The detailed approach for the three models are elaborated below:-

2.0 Model-1 (Demarcated offshore zones for which MNRE/NIWE has carried out studies/surveys. Gujarat Zone B3 (365 Sq.km).

- This model of offshore wind project development shall be applicable to the offshore wind zones for which MNRE/NIWE have already carried out sufficient studies/ surveys that will enable developers to bid and commence the development of offshore wind projects.
- For the development of this project a single bid two stage process followed by an e-Reverse Auction (e-RA) will be adopted. The bidding will be carried out by SECI. The e-RA will be based either on the tariff or the VGF amount required for making the project viable with a pre-determined tariff.

NIWE has carried out the following investigations for a 365 Sq.km seabed area (which is sufficient for a 1.0 GW project capacity) of Zone B3, Gulf of Khambhat, off the coast of Gujarat:

1. Lidar-based offshore wind resource assessment for two years and data published on the NIWE website.
2. Geophysical investigation and Geotechnical investigation for 3nos of representative boreholes up to 60m soil depth#.
3. Rapid EIA study#
4. Oceanographic (Wave, Tide & current) for one month #.

#-Data will be shared after the concurrence of MOD (Ministry of Defence)

This model can be further extended to other zones where NIWE or other developers who have relinquished the capacity, have carried out the necessary studies & surveys and data is available for sharing subject to project viability and availability of required CFA.

2.1 Offshore wind development process under Model-I.

MNRE/designated agency will float a bid for 1GW in the demarcated 365 Sq.km area wherein the stage-1 clearances have already been accorded. The proposed site (365 sq.km) boundary coordinates are given in **Annexure-1**.

i. MNRE or its designated agency will enter into the 'Lease Agreement' for 30 years with the successful bidders (Offshore Wind Power Developer (OWPD)) in accordance with 'lease rules' to be notified. The OWPD shall be required to pay the annual floor lease fee of Rs 1.0 lakhs/Sq.km/year for the entire lease period.
ii. The successful bidders shall file the relevant information necessary for obtaining the Stage II clearances, subsequent to which Stage II clearances for the installation and commissioning of the offshore wind farm and transmission infrastructure shall be undertaken.
iii. MNRE or its designated agency shall enter into the Offshore Wind project 'Concessionaire Agreement' with the OWPD.
iv. The OWPD shall commission the project within four years from the date of the "Concessionaire agreement". (A period of four years is considered sufficient for the OWPD to establish an offshore wind farm once the Stage II Clearances are obtained for the site, subject to any of extenuating circumstances like non-availability of evacuation arrangements, etc., that are beyond the control of the developer, in which case this could be extended but in any case the project must be set up within 5 years)
v. The sale of power shall be through Solar Energy Corporation of India Ltd. (SECI) / Implementing agency. A back-to-back Power Sale Agreement will be signed with the State DISCOM of Gujarat / Any other State DISCOM for procuring the power from this particular project.
vi. Eligible OWPDs shall be able to avail suitable financial incentives such as VGF or any other financial mechanism as decided by MNRE from time to time.

3.0 Model-2 (Demarcated offshore zones for which no studies/surveys have been carried out)

This model will be followed for identified wind sites/zones by NIWE within the Exclusive Economic Zone (EEZ) of the country for which studies/surveys are yet to be commenced. The process followed for offshore wind power project development under this model shall be as follows:

Model 2(A):

a. NIWE will facilitate as a single-window (one-stop-shop) and will coordinate with different authorities for stage – 1 and stage – 2 clearances.
b. NIWE will issue guidelines along with application format for offshore study/ survey including wind resource assessment, the geophysical, geotechnical oceanography, environment impact assessment, etc.
c. OWPD may select any site/sites for investigations. There will be a minimum gap of one km between the mast location/ LIDAR site & bore holes of one developer and the mast location/site & bore holes of another developer. The OWPD will give information to NIWE about the sites where they propose to carry out the survey/investigation, and they

will commence the survey/investigation only after permission is received from NIWE. The sites will be allocated to developers on the basis of a first come first serve basis.

d. OWPD may approach NIWE for stage – 1 and stage – 2 clearances for carrying out study/ survey in the identified area.
e. Based on the stage – 1 and stage – 2 clearances from various authorities, NIWE will issue an in-principle approval and consent letter respectively.
f. After a period of two years (say e.g., during FY 2024-25), SECI/Implementing Agency will issue a bid for procurement of 2 GW power from offshore wind power projects along with necessary financial support from the Ministry.
g. The process of competitive bidding and further project development by the bid winners will be as per the process detailed under Model-1.

Model 2(B):

h. OWPDs may elect to submit proposals for project development under open access within a period of 5 years from the date of the consent letter. Post expiry of 5 year period, Ministry may grant extensions from case to case after examination of the request. Post expiry of the 6-year period, all clearances to the relevant company shall be withdrawn and they will need to deposit the data they have collected.
i. In case of project development under open access regime, the OWPD may submit the proposal along with DPR to NIWE. NIWE will issue guidelines for scrutiny of DPR and facilitate for necessary clearances. The OWPD has to enter into concessionaire and lease agreement. Lease rent as per specified in the lease agreement will be payable by the developer.
j. The OWPD shall commission the project within four years from the date of the "Concessionaire agreement". (A period of four years is considered sufficient for the OWPD to establish an offshore wind farm once the Stage II Clearances are obtained for the site, subject to any of extenuating circumstances like non-availability of evacuation arrangements, etc., that are beyond the control of the OWPD, in which case this could be extended but in any case the project must be set up within 5 years)
k. OWPD shall not share the study/ survey data with any third party other than its own affiliates, subsidiaries, or holding/parent company.

The potential identified zones that can be offered under model-2 are given in **Annexure-2.**

4.0. Model-3 (Allocation of offshore wind sites under a lease with site exclusivity rights for a fixed period)

This model envisages offshore project development for sale of power under open access/captive/third party sale without any VGF assistance from Govt. of India.

- Ministry of New and Renewable Energy / Nodal Agency through a competitive process shall allocate identified offshore wind energy blocks to prospective OWPDs under an exclusive lease for a stipulated period for the development of offshore Wind Energy projects. The development of offshore wind energy projects shall be taken up by the selected OWPD within the stipulated period and the power offtake will be the responsibility of the OWPD. The allocation of sea beds shall be through a bidding carried out under a single stage two envelop process; a technical bid to assess bidders' techno-financial capability and a financial bid for the lease fee for the bided offshore sea blocks.

4.1 Bidding Process for allocation of sub-blocks

- Potential sites will be identified for allocation through a bidding process under this model. Ministry in consultation with NIWE will identify offshore sea blocks to cater to the project capacities as per the set trajectory given above. These offshore sea blocks will be opened up for allocation from time to time.
- Each offshore sea block will be assigned with a minimum offshore installable wind power capacity that must be established by the selected developer. However, the selected OWPD is free to establish any additional capacity over and above the assigned capacity within the allocated block to optimize the offshore wind site utilization.
- The bids would comprise of a technical qualification criteria to evaluate the techno-commercial capability of the bidders.
- The bidder has to submit the technical bid as well as the commercial bid quoting the lease fee they wish to offer for interested offshore wind sea blocks.
- The financial bids of technically qualified bidders will only be opened and analyzed. This analysis will be held for every sea block independently.
- The offshore wind energy sea blocks will be allocated to the bidder offering the highest lease fee for a specific block.
- The blocks shall be provisionally allocated to the successful bidders for a period of five years, which can be further extended by 2 years subject to the progress of study/survey and project development.
- MNRE or its designated agency would issue the 'Letter of Consent' to the selected OWPD for carrying out the offshore wind measurements and other surveys after obtaining requisite clearances from concerned Ministries/Departments as per the National Offshore Wind Energy policy.
- The OWPD shall pay quoted lease fee during the period of 'Agreement to Lease', i.e. duration of study/survey, or till the period they would like to retain the exclusivity rights (which is a maximum of 5 years extendable to 7 years). The lease fee would be non-refundable.
- OWPD need to submit DPR and enter into concessionaire agreement and lease agreement (for a period of 30 years) for project development and sale of power under open access regime within a period of 5 years (extendable up to 7 years) from the date of 'Letter of Consent'.
- The OWPD shall commission the project within four years from the date of the "Concessionaire agreement". (A period of four years is considered sufficient for the OWPD to establish an offshore wind farm once the Stage II Clearances are obtained for the site, subject to any of extenuating circumstances like non-availability of evacuation arrangements, etc., that are beyond the control of the OWPD , in which case this could be extended but in any case the project must be set up within 5 years)
- The OWPD will have to pay the quoted Lease fee for the period starting from the date of commencement of 'Agreement to Lease' till COD of the project. Thereafter the OWPD would continue to pay the lease fee as per the floor price (prescribed in the to be notified lease rules)till the end of Lease Agreement.

Post expiry of the 5-year period, Ministry may grant extension on case to case basis after examination of the request from the developer. Post expiry of the 7 year period, all clearances issued to the relevant OWPD shall be withdrawn and the OWPD will be required to relinquish the lease and deposit the data acquired during the study/survey.

The initial potential zones for 08 GW equivalent offshore wind capacity that can be considered for offering under Model-3 are given in **Annexure-3** which may be leased out during the next two financial years (04 GW every year).

5.0 Institutional mechanism for implementation of the projects

Sl. No	Activity	Institution
1	Application submission for Letter of Consent	NIWE
2	Stage-I clearance	NIWE
3	Power off-take	SECI/State DISCOM/Central Utility /Bilateral Agreement/ Power Exchange
4	Grid connectivity	Central Transmission Utility (CTU)
5	Lease agreement	MNRE or its designated agency
6	Single window clearances for NoCs as required in accordance with the notified national offshore wind energy policy	NIWE will facilitate all clearances as a single-window facilitator.
7	Grid connection permission	CTU
8	Project implementation agreement	SECI or other implementing agencies
9	Project monitoring	NIWE/ Implementing agencies
10	Grievance Redressal Authority	Secretary, MNRE

6.0. Proposed timelines:

Sl. no	Description of activity	Proposed schedule
1	Guidelines along with application format for offshore study/survey	July, 2022
2	Commencement of 1st Bid for leasing out 4 GW equivalent offshore wind capacity sites (Tamil Nadu)	Sept, 2022

Sl. no	Description of activity	Proposed schedule
2	Commencement of 1st Bidding process for purchase of power from 1.0 GW offshore wind project (Gujarat)	Dec, 2022
3	Commissioning of the 1.0 GW offshore wind projects	December, 2026 (Estimated)
4	Commencement of 1st Bidding process for purchase of power for 2.0 GW offshore wind project. (anywhere but highly probable that these projects will come up off Tamil Nadu coast)	June, 2024
5	Declaration and issuance of bidding documents for the subsequent projects as per pipeline. The bidding cycle will continue until the targets are achieved.	As indicated in Table 1

7.0 Connectivity with the Grid

Evacuation of power from the offshore pooling delivery point to the onshore meeting/interconnection point shall be the responsibility of PGCIL for all the above models. The developer shall set up the offshore wind project(s), including the offshore pooling station at the voltage level of 220 kV. Metering for the purpose of energy accounting shall be done at e respective onshore pooling station.

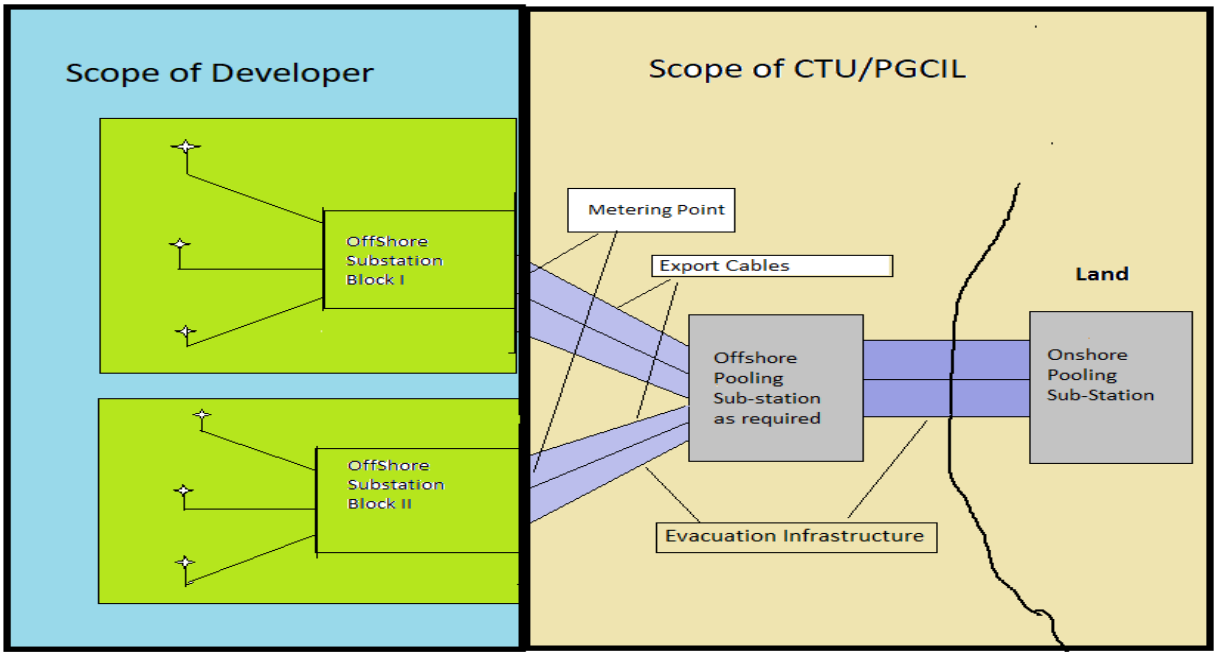


Fig 3: Evacuation Infrastructure Network

Annexure-1

Proposed 1 GW of Offshore Wind Farm at Zone B3 Coordinates under Model-1

Boundary Point	Latitude	Longitude
1	20 35' 23.4724" N	71 39' 36.0604" E
2	20 35' 40.3142" N	71 42' 48.9256" E
3	20 37' 8.6836" N	71 46' 32.2712" E
4	20 38' 33.8318" N	71 48' 27.8889" E
5	20 44' 35.4573" N	71 48' 27.0911" E
6	20 50' 2.6047" N	71 48' 26.4892" E
7	20 50' 2.4566" N	71 51' 34.0013" E
8	20 51' 38.8328" N	71 50' 51.3695" E
9	20 53' 11.1231" N	71 49' 52.7061" E
10	20 51' 17.5642" N	71 46' 54.6909" E
11	20 49' 9.3229" N	71 43' 30.8629" E
12	20 46' 42.3267" N	71 39' 35.7641" E
13	20 43' 16.9636" N	71 39' 35.0917" E
14	20 38' 36.9260" N	71 39' 36.6028" E

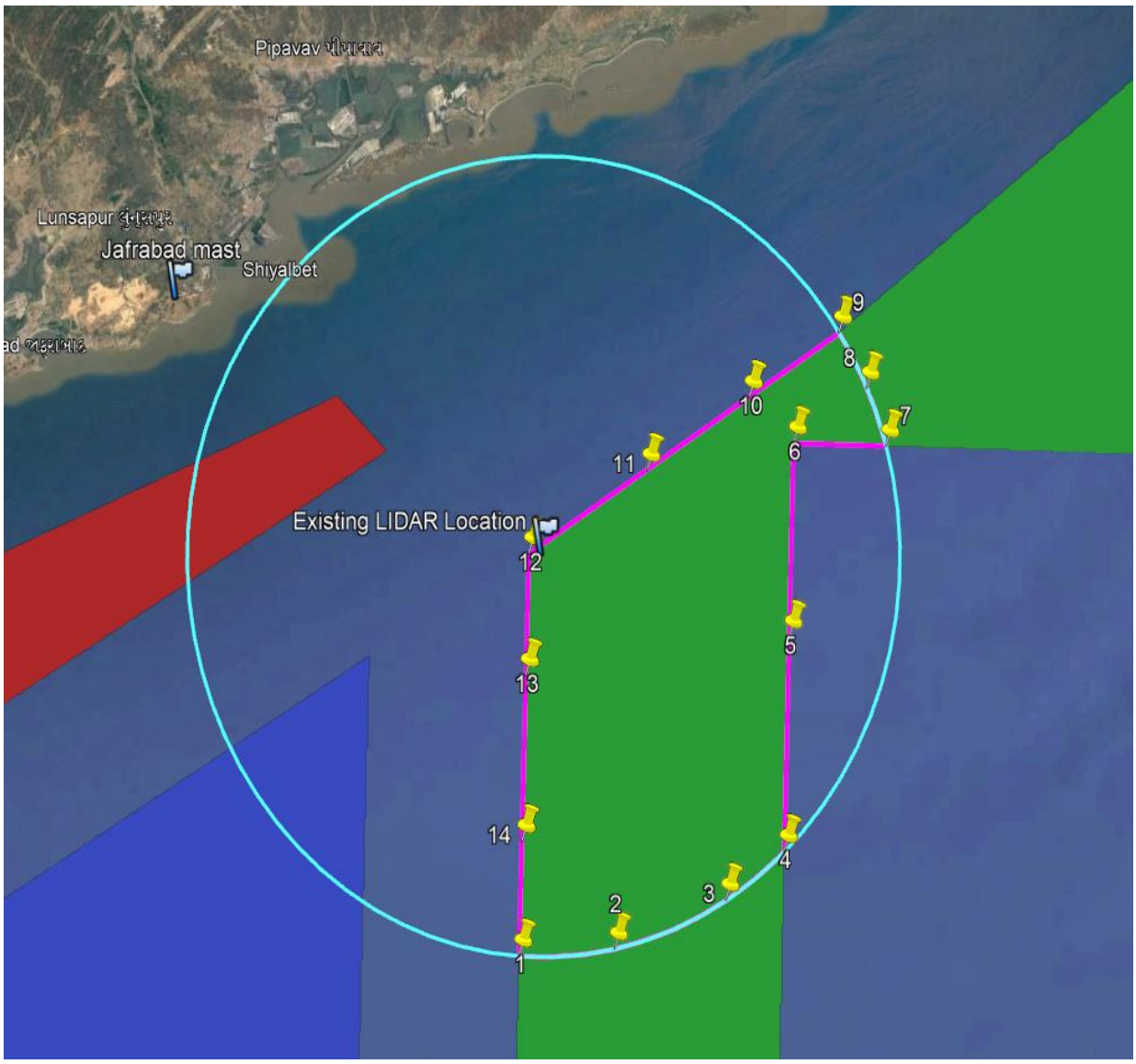


Fig 4: offshore Wind Farm off Gujarat Coast of 1 GW

Annexure-2

Proposed offshore wind sites/zones proposed to be opened up under model-2: without lease fee and without exclusivity rights for project development under power off-take guarantee through auctions

Potential	Subzone ID/State	Seabed area (sq.km)	Indicative Mean Wind speed range @150m height	Indicative water depth (m) range (as per GEBCO data)	Estimated Offshore potential (MW)			Min & Max Distance from Each Phase/Zone to Shore (km)
					Potential @ 4.5 MW/ Sq.km	Potential @ 5 MW/ Sq.km	Potential @ 6 MW/Sq.km	
6 – 8 GW	B7-TN	203	9-10 m/s	20-50 m	916	1017	1221	20 & 44
	D1-TN	184		20 – 35m	828	920	1104	
	D2-TN	131			591	657	789	
	D4-TN	173		30-50 m	780	867	1040	
	D5-TN	123			554	615	738	40 & 60
	E2-TN	286			1289	1432	1719	
	E3-TN	232			1043	1159	1391	

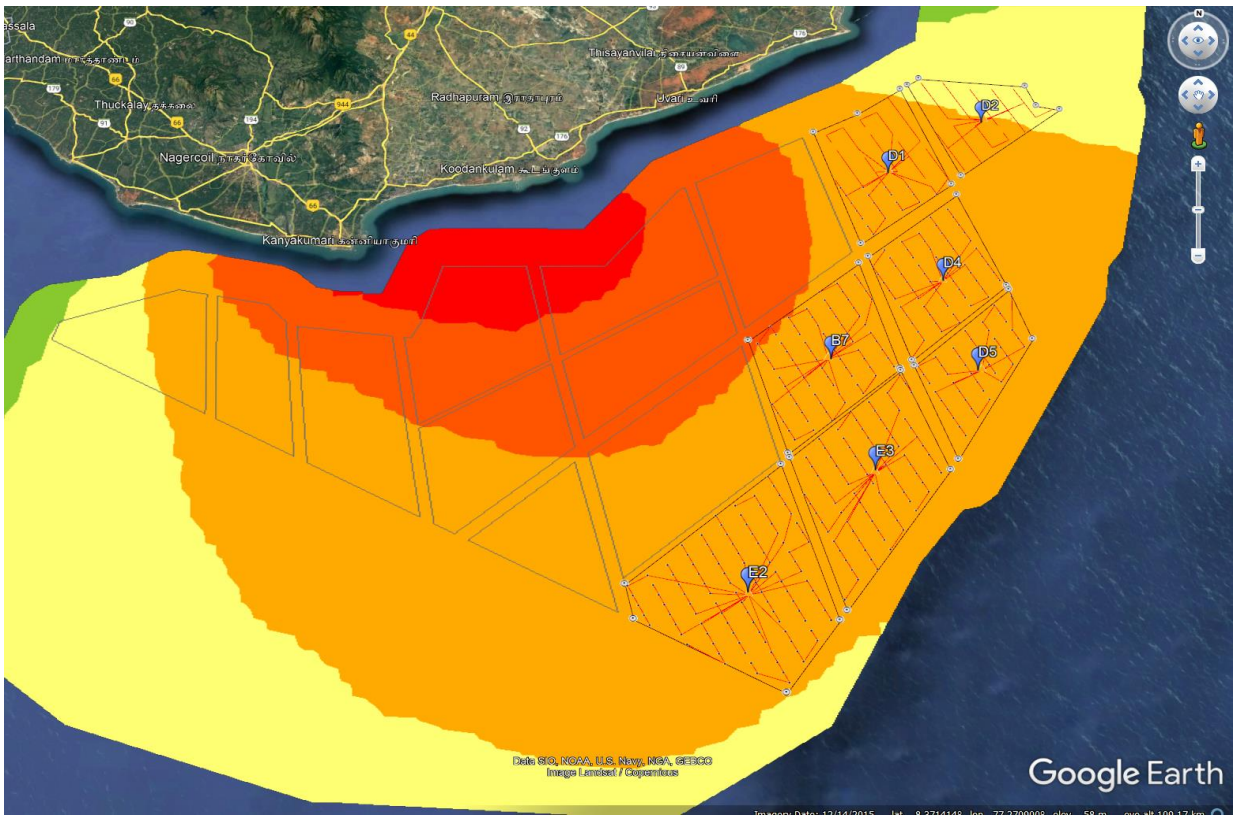
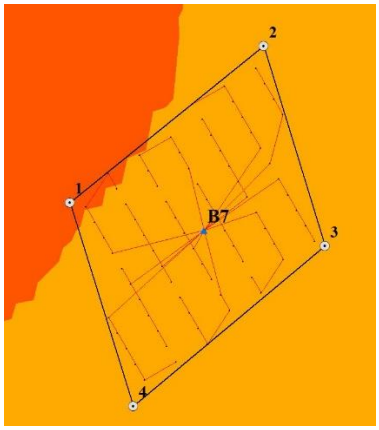
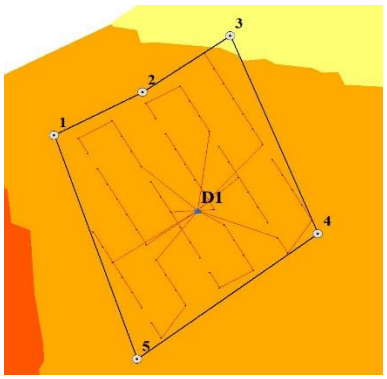


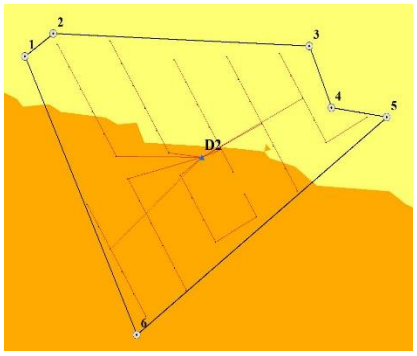
Fig 5: Proposed Subzones/Blocks for Offshore Wind Farm Projects (Model 2) at TN Coast



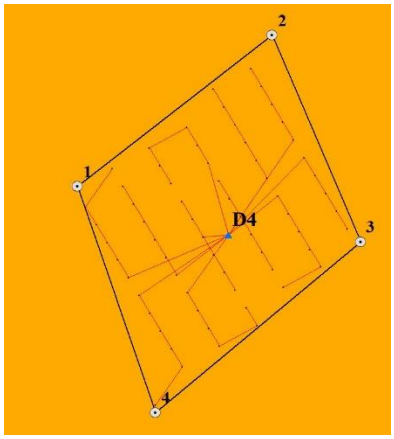
Subzone	Boundary ID	Latitude	Longitude
B7	1	7° 59' 20.011" N	77° 57' 8.330" E
	2	8° 4' 49.233" N	78° 3' 56.174" E
	3	7° 57' 48.615" N	78° 6' 5.273" E
	4	7° 52' 11.980" N	77° 59' 21.929" E



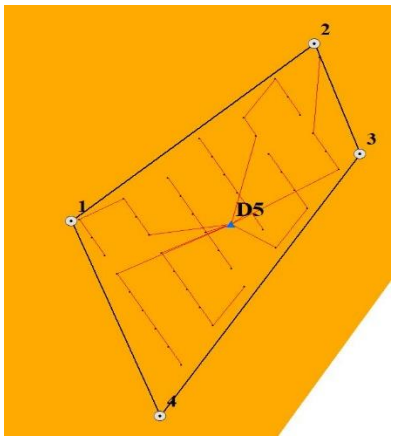
Subzone	Boundary ID	Latitude	Longitude
D1	1	8° 14' 13.783" N	78° 1' 25.681" E
	2	8° 15' 45.671" N	78° 4' 18.161" E
	3	8° 17' 47.150" N	78° 7' 8.666" E
	4	8° 10' 41.467" N	78° 9' 59.459" E
	5	8° 6' 11.637" N	78° 4' 7.394" E



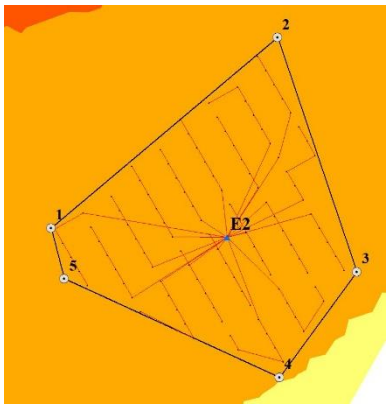
Subzone	Boundary ID	Latitude	Longitude
D2	1	8° 18' 7.773" N	78° 7' 37.612" E
	2	8° 18' 40.709" N	78° 8' 23.839" E
	3	8° 18' 22.428" N	78° 15' 18.116" E
	4	8° 16' 52.485" N	78° 15' 53.451" E
	5	8° 16' 38.565" N	78° 17' 23.395" E
	6	8° 11' 20.550" N	78° 10' 38.649" E



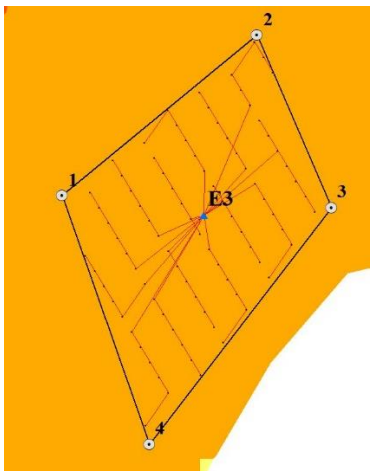
Subzone	Boundary ID	Latitude	Longitude
D4	1	8° 5' 17.954" N	78° 4' 31.754" E
	2	8° 9' 55.756" N	78° 10' 15.899" E
	3	8° 3' 36.359" N	78° 12' 52.074" E
	4	7° 58' 22.535" N	78° 6' 49.468" E



Subzone	Boundary ID	Latitude	Longitude
D5	1	7° 58' 0.973" N	78° 6' 56.616" E
	2	8° 3' 19.630" N	78° 12' 58.961" E
	3	8° 0' 1.785" N	78° 14' 7.879" E
	4	7° 52' 10.066" N	78° 9' 9.563" E



Subzone	Boundary ID	Latitude	Longitude
E2	1	7° 44' 10.065" N	77° 50' 12.867" E
	2	7° 51' 30.360" N	77° 58' 57.110" E
	3	7° 42' 28.481" N	78° 2' 1.234" E
	4	7° 38' 24.632" N	77° 59' 1.644" E
	5	7° 42' 12.506" N	77° 50' 44.147" E



Subzone	Boundary ID	Latitude	Longitude
E3	1	7° 51' 56.058" N	77° 59' 26.898" E
	2	7° 57' 40.414" N	78° 6' 7.790" E
	3	7° 51' 30.364" N	78° 8' 40.323" E
	4	7° 43' 2.112" N	78° 2' 26.004" E

Annexure-3

Proposed offshore wind sites/zones proposed to be opened up under model 3: with lease fee and with exclusivity rights for project development under open access without VGF.

Potential	Subzone ID/State	Sea bed area (sq.km)	Indicative Mean Wind speed range @150m height	Indicative water depth (m) range (as per GEBCO data)	Estimated Offshore potential (MW)			Min & Max Distance From Each Phase/Zone to Shore (km)
					Potential @ 4.5 MW/ Sq.km	Potential @ 5 MW/ Sq.km	Potential @ 6 MW/Sq.km	
3.9 – 5.2 GW (Phase-I)	B1 -TN	203	10 - 11 m/s	20 - 40m	912	1013	1216	10 & 39
	B2-TN	184			828	920	1104	
	B3-TN	157			705	783	939	
	B4 -TN	180		20 - 50m	809	899	1079	
	G1-TN	146			655	728	873	
4.2 – 5.6 GW (Phase-II)	G2-TN	123	10 - 11 m/s	20 - 50m	555	617	740	10 & 39
	G3_TN	195			878	975	1171	
	B6 -TN	252	9-10 m/s	20 - 35m	1132	1258	1510	20 & 44
	B5-TN	269		30-50 m	1209	1343	1612	40 & 60
	E1-TN	107			482	536	643	

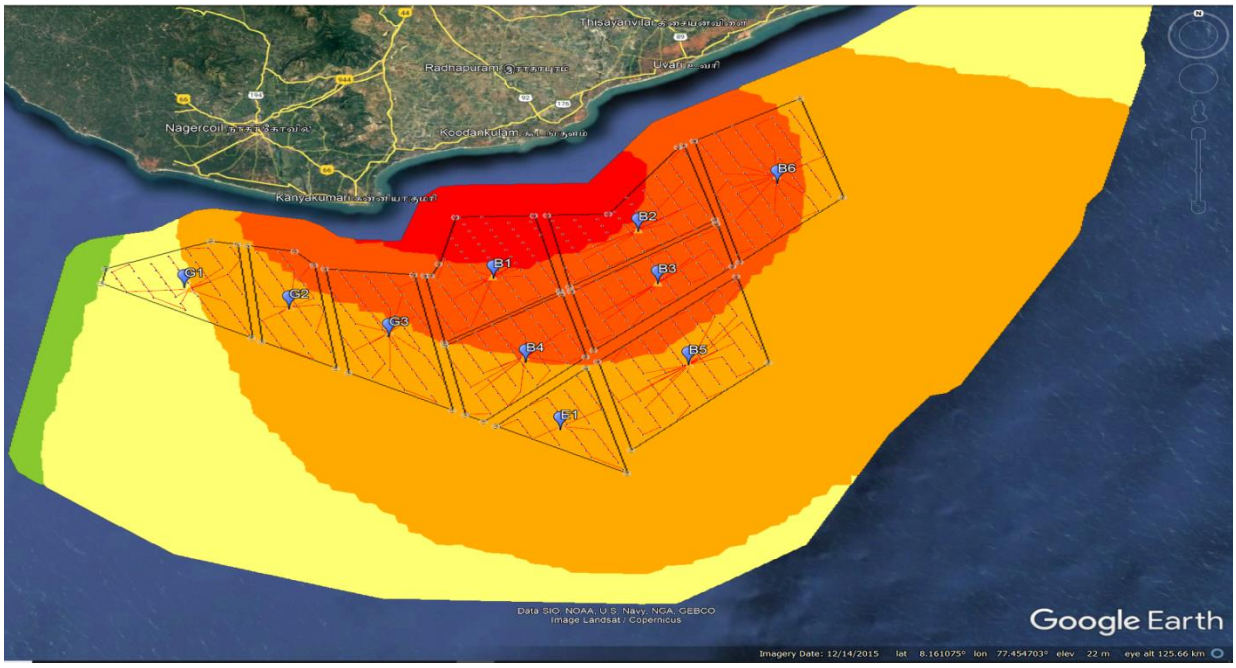
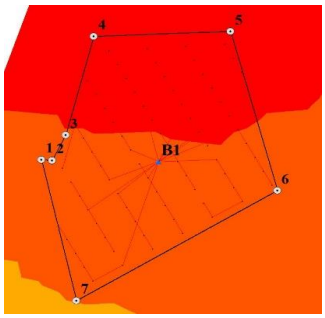
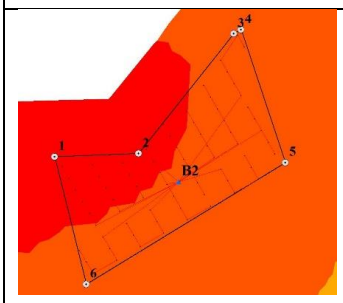
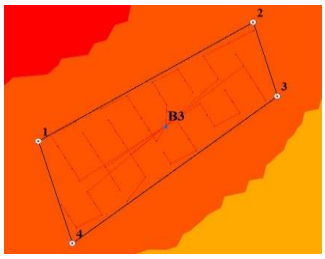
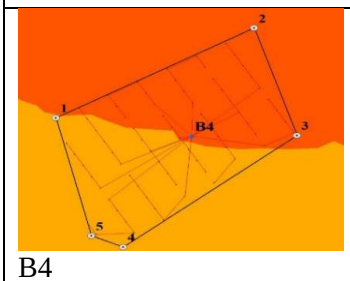


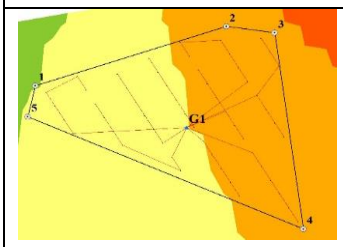
Fig 6: Proposed Blocks for Offshore Wind Projects in Phase-I & Phase-II (Model-3), TN coast

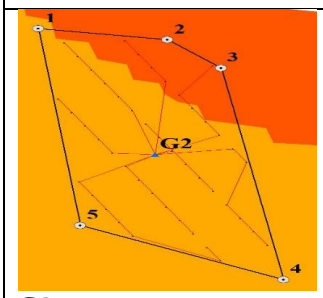
Subzone	Boundary ID	Latitude	Longitude
	1	7° 58' 54.388" N	77° 36' 47.167" E
	2	7° 58' 52.553" N	77° 37' 10.645" E
	3	7° 59' 51.953" N	77° 37' 40.661" E
	4	8° 3' 45.171" N	77° 38' 42.508" E
	5	8° 3' 56.248" N	77° 43' 43.811" E
	6	7° 57' 41.337" N	77° 45' 26.782" E
B1	7	7° 53' 22.047" N	77° 38' 4.212" E

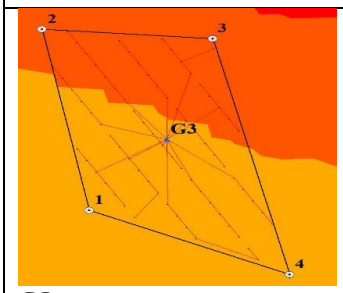
Subzone	Boundary ID	Latitude	Longitude
	1	8° 3' 58.094" N	77° 44' 34.028" E
	2	8° 4' 6.740" N	77° 48' 29.235" E
	3	8° 9' 41.505" N	77° 52' 54.989" E
	4	8° 9' 52.445" N	77° 53' 15.464" E
	5	8° 3' 41.902" N	77° 55' 19.875" E
B2	6	7° 58' 2.686" N	77° 46' 3.081" E

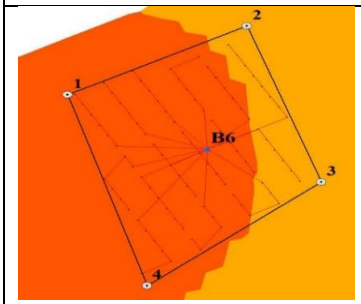
Subzone	Boundary ID	Latitude	Longitude
	1	7° 57' 40.785" N	77° 46' 9.651" E
	2	8° 3' 22.533" N	77° 55' 25.626" E
	3	7° 59' 50.352" N	77° 56' 28.635" E
B3	4	7° 52' 47.732" N	77° 47' 37.567" E

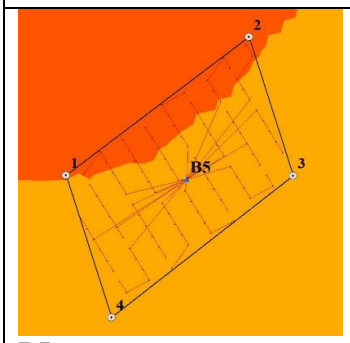
Subzone	Boundary ID	Latitude	Longitude
	1	7° 53' 6.477" N	77° 38' 7.821" E
	2	7° 57' 28.145" N	77° 45' 32.350" E
	3	7° 52' 15.332" N	77° 47' 7.840" E
	4	7° 46' 49.888" N	77° 40' 38.563" E
B4	5	7° 47' 22.398" N	77° 39' 27.587" E

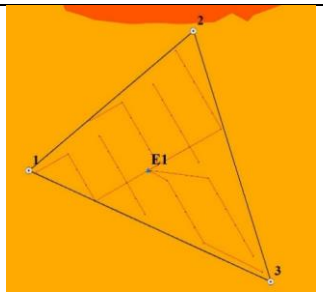
Sub zone	Boundary ID	Latitude	Longitude
	1	7° 59' 17.147" N	77° 16' 23.377" E
	2	8° 1' 37.474" N	77° 23' 5.669" E
	3	8° 1' 22.411" N	77° 24' 47.594" E
	4	7° 53' 37.782" N	77° 25' 48.045" E
G1	5	7° 58' 3.584" N	77° 16' 7.744" E

Subzone	Boundary ID	Latitude	Longitude
	1	8° 1' 16.762" N	77° 25' 25.818" E
	2	8° 0' 49.843" N	77° 28' 27.969" E
	3	7° 59' 41.815" N	77° 29' 42.883" E
	4	7° 51' 9.727" N	77° 31' 11.281" E
G2	5	7° 53' 20.724" N	77° 26' 25.286" E

Subzone	Boundary ID	Latitude	Longitude
	1	7° 50' 47.878" N	77° 31' 58.981" E
	2	7° 59' 24.296" N	77° 30' 24.499" E
	3	7° 58' 57.689" N	77° 36' 4.929" E
G3	4	7° 47' 44.760" N	77° 38' 38.766" E

Subzone	Boundary ID	Latitude	Longitude
	1	8° 10' 13.737" N	77° 53' 55.314" E
	2	8° 13' 50.611" N	78° 0' 42.185" E
	3	8° 5' 38.229" N	78° 3' 31.417" E
B6	4	8° 0' 11.862" N	77° 56' 55.665" E

Subzone	Boundary ID	Latitude	Longitude
 B5	1	7° 51' 52.622" N	77° 47' 54.100" E
	2	7° 59' 0.030" N	77° 56' 43.578" E
	3	7° 51' 51.079" N	77° 58' 50.957" E
	4	7° 44' 33.270" N	77° 50' 5.906" E

Subzone	Boundary ID	Latitude	Longitude
 E1	1	7° 46' 28.418" N	77° 41' 25.438" E
	2	7° 51' 20.081" N	77° 47' 9.553" E
	3	7° 42' 36.530" N	77° 49' 51.697" E