

Project: **APSEZ Utilities & Infrastructure Crossing.**
Location: **Mundra Forest Land**; Area: **40448 sq.mt / 9.99 Acres**

Projects Brief:

Adani Port & SEZ Ltd, having total land with an area admeasuring approx. 8481 Ha has been notified as Multi Product SEZ in various villages of Mundra Taluka included approx. 1840 Ha diverted forest land for Special Economic Zone development. The total is spread up and adjoining in the coastal region of Gulf of Kutch where majorly Port activity has been planned and executed/functional. Therefore the notified SEZ area is defined as PORTS BASED SEZ development, where the Berths, port backup area, storages, godowns, exist as well as many export oriented industrial processing units are on back of ports facilities are existing including Power generation and their distribution, CETP etc., housing facilities.

The entire port based SEZ area are well connected with the regional road and rail networks as is its uniqueness of the APSEZ SEZ with the proper planned internal traffic and transportation movement with the utilities/facilities provisions. Presently the entire SEZ regions are occupied/developed almost 50% area and the balance 50% area development is expected in the coming years. Similarly some of the major Start of Art facilities execution are under progress include SOLAR manufacturing Parks & LNG & LPG Terminals and expected new major initiatives in Industrial Manufacturing/processing setup with the expansion of business potentials for existing PORTS in the SEZ area.

Envisaging the expected development in the region in the upcoming years, required augmentations of existing facilities and infrastructure with the additional new infrastructure, facilities, new establishment of connectivity in terms of Roads & Rails, utility corridors, pipeline corridors etc. within the SEZ area to facilitate the new sustainable Industrial development.

Requirements of Land for Project

Considering the existing transportation and utilities networks limitation for expansion, explored new avenues/path/route for establishment of planned connectivity and accordingly planning necessity of various new connectivity for transportation and utility networks with their suitability and available land profile within SEZ area, in which required identified additional adjoining forest land area for establishing the connectivity between the APSEZ land parcels bifurcated through existing creek and the balance non allotted forest land.

The dedicated 20.0mt width pipeline corridor will be proposed for laying 36inch dia pipe – 4 nos.(initial & later phases) for LNG & LPG transmission from the LNG & LPG Terminal at Southern location (South port) and connect to the main Gas Grid/pipeline networks in the nearby region in a phasing manner.

Similarly, the dedicated corridor of 18 meters width for EHV Power Network will be used for laying 66 KV Multi-circuit Transmission Line for feeding power to LNG terminal and also used to complete 66 KV Ring Network for various existing and other upcoming facilities in SEZ area at Mundra. The Ring Network will improve power reliability as well as availability and thereby increase productivity.

The dedicated road and rail corridor of 35 mt widths is proposed elevated transportation corridor connectivity between the SEZ areas, which is proposed for 2 nos. railway tracks and 2 + 2 lane road with other required road components. The balance corridor width of 27 mt is proposed for other utilities transfer viz Water mains, cold energy transfer, power connectivity, conveyor for bulk transfer etc in reference to establish the connectivity between port basin /port back up area with the other hinterland processing activity area with storage facilities.

The required land area is composition of 100m wide corridor included reserved corridor for Road, Rail, utilities incl Power transmission, water mains transmission, crude oil transmission, LPG & LNG gas transmission etc. as conceptually planned and described below which may further rearrange, if required while doing the detailed engineering and site suitability studies. All the proposed components within corridor, partly or entirely contents may transfer through underground or at grade with the required supports will be finalized subject to detailed engineering and site suitability studies.

Sl.no	Particulars	Approx. Width in Mt.
1	Gas Pipeline (LNG/LPG etc)	20 mt
2	66KV/220Kv HT line with Pylons	18 mt
3	Road Rail corridor	35 mt
4	Other utilities may include water mains/bulk transfer conveyor/electrical lines, COLD energy transfer etc	27 mt
5	Total	100 mt

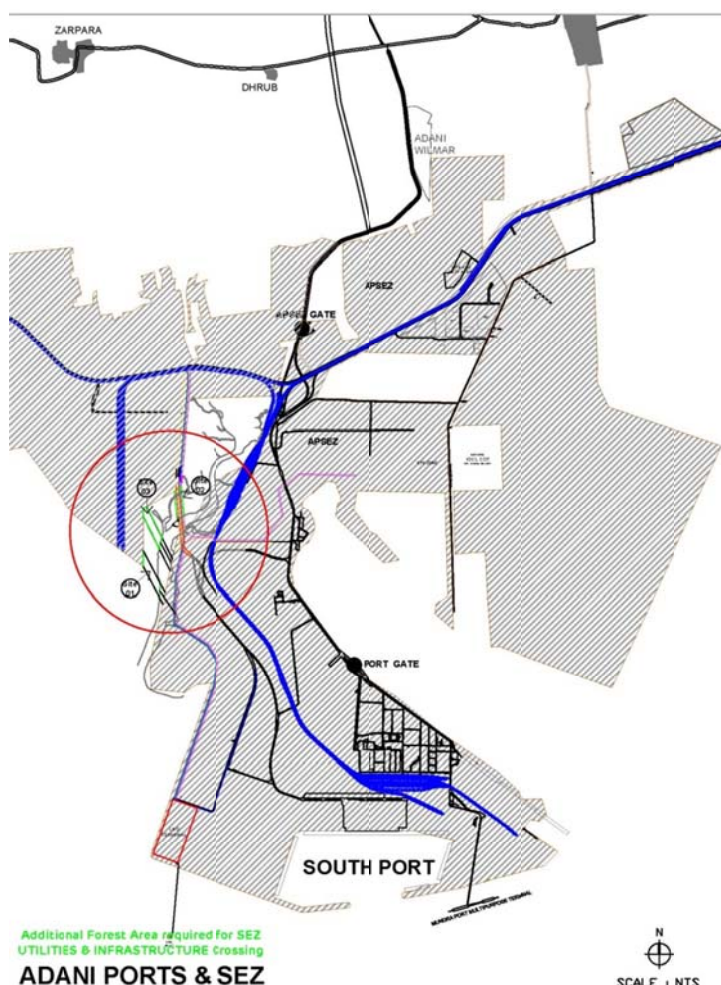
Identified and Selection of Land for Project

Based on the above requirements and the land availability constraints in the land with us, identified location OPTIONS (3 nos.), as shown in the map to analyze the cost benefits comparison accordingly select the OPTIONS for further consideration.

Site - 01: Proposed extreme southern edge of the SEZ area, connecting two bifurcated APSEZ land parcel by existing creek and non-allotted forest land through proposed corridor.

Site - 02: Proposed northern edge junction at starting of SEZ area, connecting two bifurcated APSEZ land parcel by existing creek and non-allotted forest land through proposed corridor.

Site - 03: Proposed above site -01, middle of SEZ area, connecting two bifurcated APSEZ land parcel by existing creek and non-allotted forest land through proposed corridor.



Criteria for selection

The identified required land options is proposed for APSEZ utilities and Infrastructure crossing in a linear way from one land parcel to another land parcel, which bifurcated due to existing creek and non-allotted forest land.

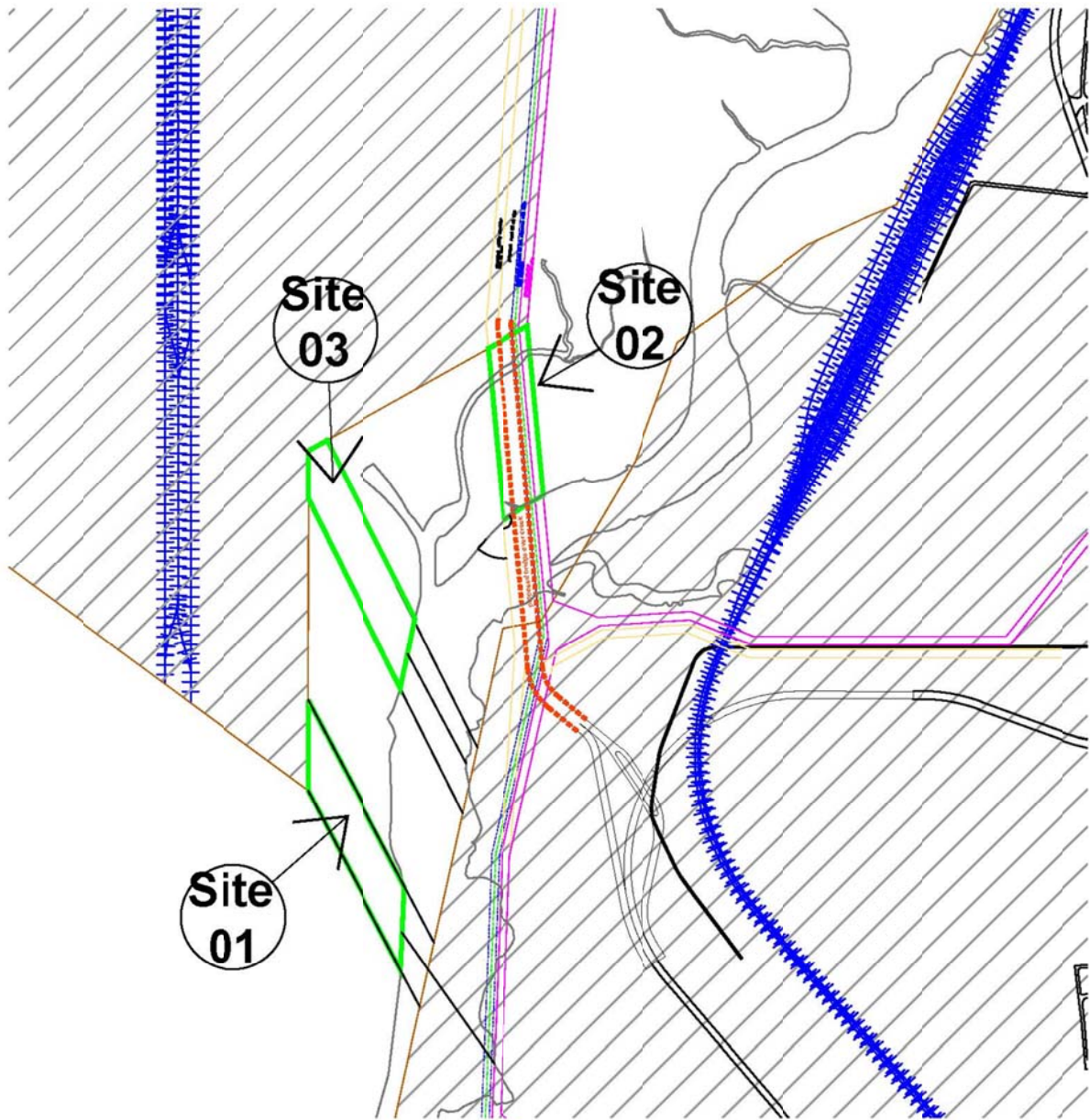
The major criteria considered while evaluating the identified proposed site location are as follow

- 1) Minimum length of corridor proportionately impact on required area.
- 2) Minimum span of creek required to cross.
- 3) Perpendicular or near to perpendicular angle required to be form while crossing the creek.
- 4) Effective utilization of Developable land considering the starting/entering and end/exist point/location of proposed corridor.

Site analysis

The identified required land OPTIONS i.e Site-01, Site-02 & Site-03, for crossing the APSEZ utilities and infrastructures, has been analyzed considering the above mentioned criteria and finalized based on the merit and demerits on each site, which are as follow

Sl.no	Particulars	Site -01	Site-02	Site-03
1	Location	Proposed extreme southern edge of the SEZ area, connecting two bifurcated APSEZ land parcel by existing creek and non-allotted forest land through proposed corridor.	Proposed northern edge junction at starting of SEZ area, connecting two bifurcated APSEZ land parcel by existing creek and non-allotted forest land through proposed corridor.	Proposed above site -01, middle of SEZ area, connecting two bifurcated APSEZ land parcel by existing creek and non-allotted forest land through proposed corridor.
2	Length (Average)	487 mt	404 mt	525 mt
3	Width	100 mt	100 mt	100mt
4	Area (in HA/Acres)	4.87 Ha/ 12.03 Acres	4.04 Ha/ 9.99 Acres	5.25 Ha/ 12.97 Acres
5	Length over Creek/ Width of creek	380 mt	216 mt	317 mt
6	Corridor alignment ANGLE in reference to the Creek	30 deg	47 deg	38 deg
7	Land Effectiveness	Corridor enters in the concise land parcel between APSEZ land boundary and existing railway line.	Corridor enters in the edge of APSEZ land boundary i.e one side of the land parcels.	Corridor enters in the concise land parcel between APSEZ land boundary and existing railway line.



Location: Considering the land availability and constraints for provision of utilities and infrastructure within the APSEZ area in various developable zones, area has been identified with the different location OPTIONS to analyze the suitable and cost efficient, which is proposed between two different land parcels bifurcated through existing creek and non-allotted forest land. The different location options area close to each other due to limitation of adjoining area reservations as vegetation's are exists.

Average Length: The Average Length of required land for proposed corridor is varying from 400 mt to 500 mt in which **Site -02** having lowest length of required land proposed width of 100mt i.e 404 mt in compare to other site i.e site -01 is 487 mt and Site-03 is 525 mt. Similarly the length of the required land is lower impact the surrounding adjoining area; hence having lower length of SITE -02 is more suitable site.

Corridor length over the creek: Based on the existing creek conditions between the APSEZ land parcels and connectivity establishment proposal through the identified locations, the proposed corridor site has to be cross over the creek and the width/span of the creek of creek is important to establish the supports in the edge of creeks. If span is less than no intermediate support is required which falls in the creek, in compare to larger span. In the proposed alternate sites, SITE - 02 are having lower span i.e 216 mt in comparison to other SITE-01 & SITE-03 i.e 380mt & 317 mt respectively, hence having lower SPAN of creek in SITE -02 is more suitable site.

Corridor alignment ANGLE: The proposed corridor OPTIONS are aligned in such a way to connect the two land parcels which bifurcated through existing creeks and the non-allotted forest land, the alignment angle in reference the creek is required cross perpendicularly or near to perpendicular impact the required area over the creek span and the cost of project execution. Therefore the shorter span is more recommendable as well as the SITE-02 are aligned with the angle of 47 degree, in comparison with the other sites, i.e SITE-01 & SITE-03 i.e 30 degree & 38 degree respectively, hence having lower SPAN of creek and the suitable angle of alignment in reference to the creek in SITE -02 is more recommendable.

Land Effectiveness: Effective land utilization is one of the important criteria while crossing the utilities and infrastructure through the proposed identified required site, while entering/exists, it will create effective use of the adjoining APSEZ land after passing the utilities and infrastructure means it can be falls within/in between the land parcels and has to be on either side of the land parcels. While analyzing the proposed Site OPTIONS, SITE-02 is aligned in such a way that it passes edge of the land parcels and create a single large land parcels in comparison to other site i.e SITE-01 & SITE-03 entering into the mid of the land parcels create bifurcation, hence SITE-02 is recommendable and most suitable option.

Conclusion/Recommendation

Based on above each site options analysis, in the initial conceptual stage found that SITE-02 is more suitable and recommendable OPTIONS considering the various criteria as lower in length with short span of creek impacting lesser impact in the adjoining area and the alignment angle in reference to the creek create more effective land utilization as its suitable to pass at the edge of the APSEZ land parcels.

The required identified forest land area **SITE -02** is composition of 100m wide corridor with average length of approx. 404 mt included reserved corridor for Road, Rail, utilities incl Power transmission, water mains transmission, crude oil transmission, LPG & LNG gas transmission etc. as conceptually planned and described below which may further rearrange, if required while doing the detailed engineering and site suitability studies. All the proposed components within corridor, partly or entirely contents may transfer through underground or at grade with the required supports will be finalized subject to detailed engineering and site suitability studies.

Sl.no	Particulars	Approx. Width in Mt.	Approx. length in Mt	Approx. Area in Sq.mt
1	Gas Pipeline (LNG/LPG etc)	20 mt	404 mt	8080 sq.mt
2	66KV/220Kv HT line with Pylons	18 mt	404 mt	7275 sq.mt
3	Road Rail corridor	35 mt	404 mt	14140 sq.mt
4	Other utilities may include water mains/bulk transfer conveyor/electrical lines, COLD energy transfer etc	27 mt	404 mt	10956 sq.mt
5	Total	100 mt	404 mt	40448 sq.mt (9.99 Acres)

Project Cost

As the required identified forest land area **SITE -02**, is proposed for crossing the utilities and infrastructures which consist of Roads, Rails and Pipelines, conveyor has been conceptualized based on the envisaged developments in the APSEZ land area and required to cross through identified land corridor. All such utilities are originated and ended or connected from the existing utilities and infrastructure which is passing through the existing APSEZ land as well as required land parcels, hence the overall cost of such proposed utilities and infrastructures distributed accordingly, accordingly present following the overall initial block cost of the projects and proportionality mentioned in the identified required forest land at **SITE -02**, which may change while detailing the project subject to site feasibility studies and the components of the proposed corridor which may change, rearrange, new components incorporation or deletion of proposed components based on the area development demands/requirements at the time of detailing the project.

Sl.no	Particulars	Initial Overall block Cost In Crore	Proportionally block cost sharing in the identified required forest land In Crore
1	LNG Pipeline (2 nos.) (assumed total length of pipeline is approx. 60km)	650 crore	4.5 crore
2	LPG pipeline (2nos.) (assumed total length of pipeline is approx. 90km)	900 crore	4 crore
3	66KVHT line with Pylons	8 crore	0.5 crore
4	Bridge for ROAD & Rail	228 crore	108 crore
5	Railway network	16 crore	1.9 crore
6	Water Mains (28 km)	34 crore	0.5 crore
7	Conveyor for bulk transfer Average 5.0km proposed	75 crore	6 crore
8	COLD energy recovery & transfer Pipeline (1 no.)	16 crore	1 crore
9	Electric line (power grid network for renewable projects – 33kv) approx. 45 km	45 crore	0.4 crore
10	Total COST	1922 crore	126.8 crore