

Appendix-1
Result of the Site Survey

Appendix 1 Results of the Site Survey

1. The location of the Whole Candidate Substation

According to the the hearing with MoE and the PSS/E analysis, the study team extract the 400 kV Substations which are required in order to improve the overload as shown following table and figure.

Table 1.1.1 The list of the Candidate Substation

	Governorate	Substation Name
1	Ninawa	Ninawa
2	Baghdad	Al-Radwaniyah
3	Baghdad	Al-Madaain
4	Anbar	Anbar
5	Diyala	New Diyala
6	Thi Qar	Thi Qar
7	Missan	Missan
8	Basra	Al-Fayha'

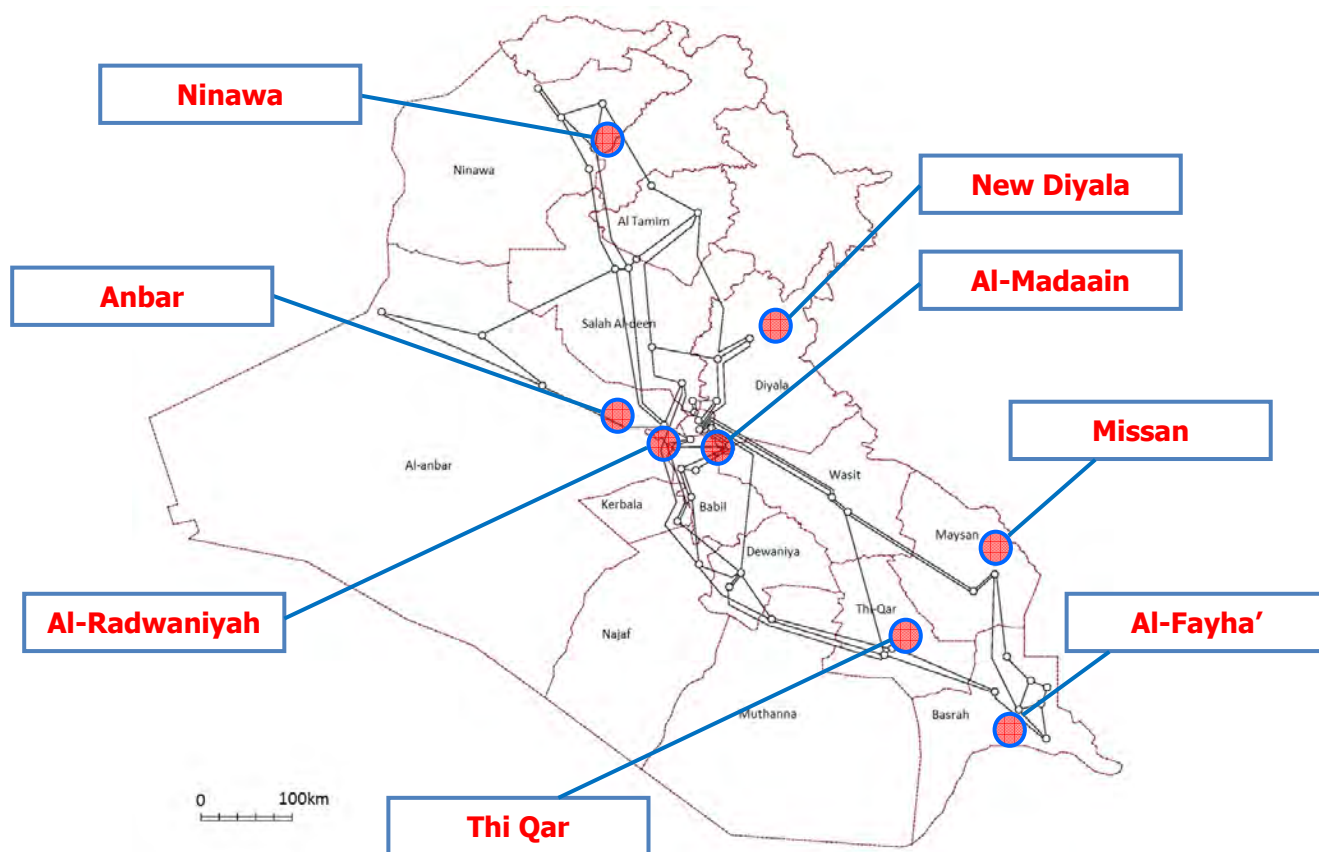


Figure 1.1.1 The location of the Whole Candidate Substation

2. Result of the Site Survey

2.1 Ninawa

2.1.1 The location of the candidate site

The site is in Mosul, Khether,, where is outside rural area of Mosul city, in southern east. The GPS coordinate of the main point on the site is 36°7'42.36"N, 43°24'19.19"E.



Figure 2.1.1 The location of the Candidate site

2.1.2 Outline of the candidate site

Outline of the candidate site is as follows.

- (1) The site is to the south and southwest of the dirt road.
- (2) It is an agricultural land planted with rain fed wheat.
- (3) The site is owned by the government (Ministry of Agriculture) and leased to farming families (number unknown at this point).
- (4) There is a single 132kV TL nearly 12 km west of the site, and a double 400 kV TL at 25 km west of the site.
- (5) There is a very mild slope across the site towards the southwest
- (6) The site is right on the main road and has a dirt access road that branches from the main road and serves the entire site road can be seen from the site.

2.1.3 Result of the Site Survey

Table 2.1.1 The Results of the Site Survey

1	Substation Name	Mosul 400 kV SS
2	Name of the Governorate, city	Mosul, Khether
3	Date of the survey	Wednesday April 3, 2013 at 10:00 am
4	Surveyed by	MoE: Saleh Mohammed Saleh Local Consultant: Tarek Tarawneh, Hussein Bairdawood
5	Site Survey Results	—
5.1	Area Identification	Agricultural area
5.2	Land Acquisition	Owned by the Ministry of Agriculture and leased to farming families.
5.3	Residential houses inside	No
5.4	Water appearance	None, the site is currently planted with wheat and is rain fed.
5.5	Access road condition	The average traffic flow on the main road to the site is 800 vehicles per hour in both directions on a 2-lane facility. The capacity of such facilities is estimated at 2,800 vehicles per hour, so less than 30% of the road capacity is currently utilized. The traffic was a mix of passenger cars and heavy vehicles.
5.6	Any obstructions	No apparent obstructions in the site area
5.7	Any facilities such as school, hospital, etc	The nearest population gathering is at least 1 kilometers from the site
5.8	Topographical Survey at site Horizontal coordinates (4corners and existing roads)	The exact corners of the site have not been located yet. It is recommended that the site be located either as close as possible to the dirt road where the team stopped.
	Horizontal Dimensions (Including existing roads)	—
	Vertical Coordinates, (Maximum difference in sideand between roads and the site)	The difference in elevation between the dirt road where the team stopped and the vehicles were parked, and the extreme edge of the site is not more than 1 to 1.5 meters over a distance of about 1500 meters.

The recommended site layout for 400kV Substation is as shown below.

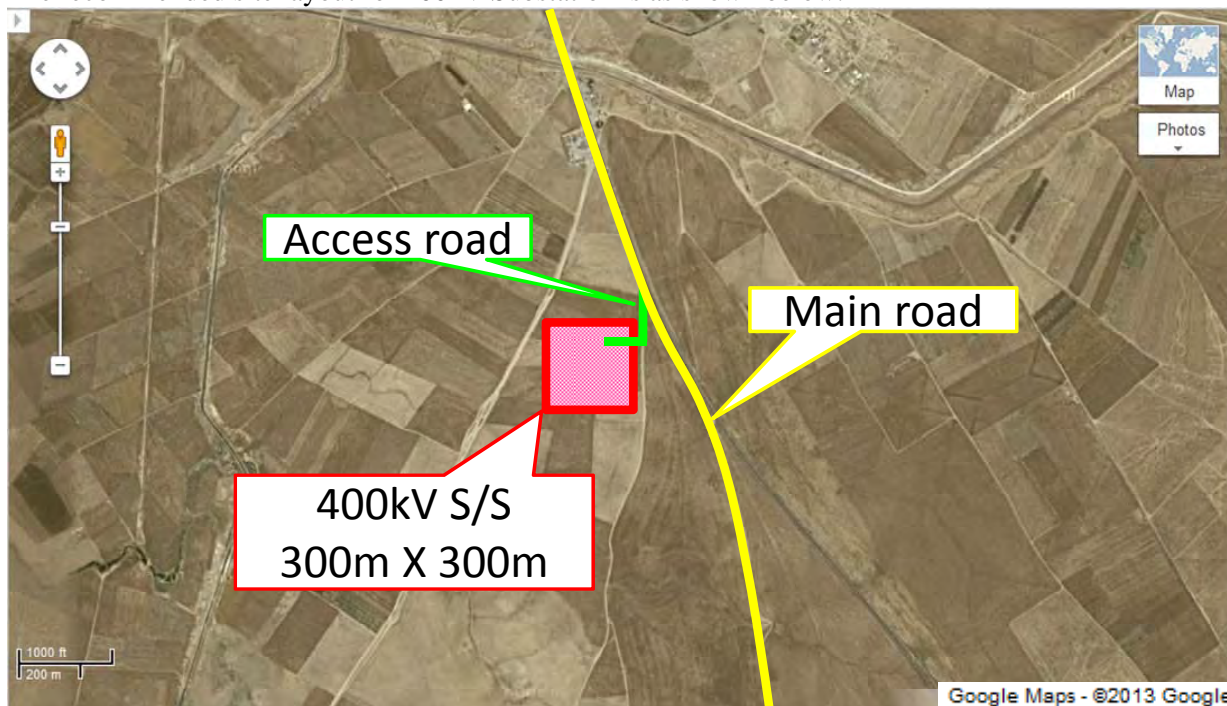


Figure 2.1.2 The Recommended Site Layout (Reference)

Land required for 400kV Substation construction is an area of Approx.300m×300m including the storage, temporary facilities and future expansion spaces.

Access road from the gate of the substation to the existing main road will be created along the existing public dirt road as shown above.

2.1.4 Photograph near the Site



Figure 2.1.3 Orientation of Photo Shot from the site


	<p>Photo No.1</p>
	<p>Photo No.2</p>
	<p>Photo No.3</p>

	Photo No.4
	Photo No.5
	Photo No.6

	<p>Photo No.7</p>
	<p>Photo No.8</p>
	<p>Photo No.9</p>

2.2 Al-Radwaniyah

2.2.1 The location of the candidate site

The site is in Baghdad, Radwaniyah, where is outside rural area of Baghdad city, in west. The GPS coordinate of the main point on the site is 33°14'43.58"N, 44°7'30.66"E.

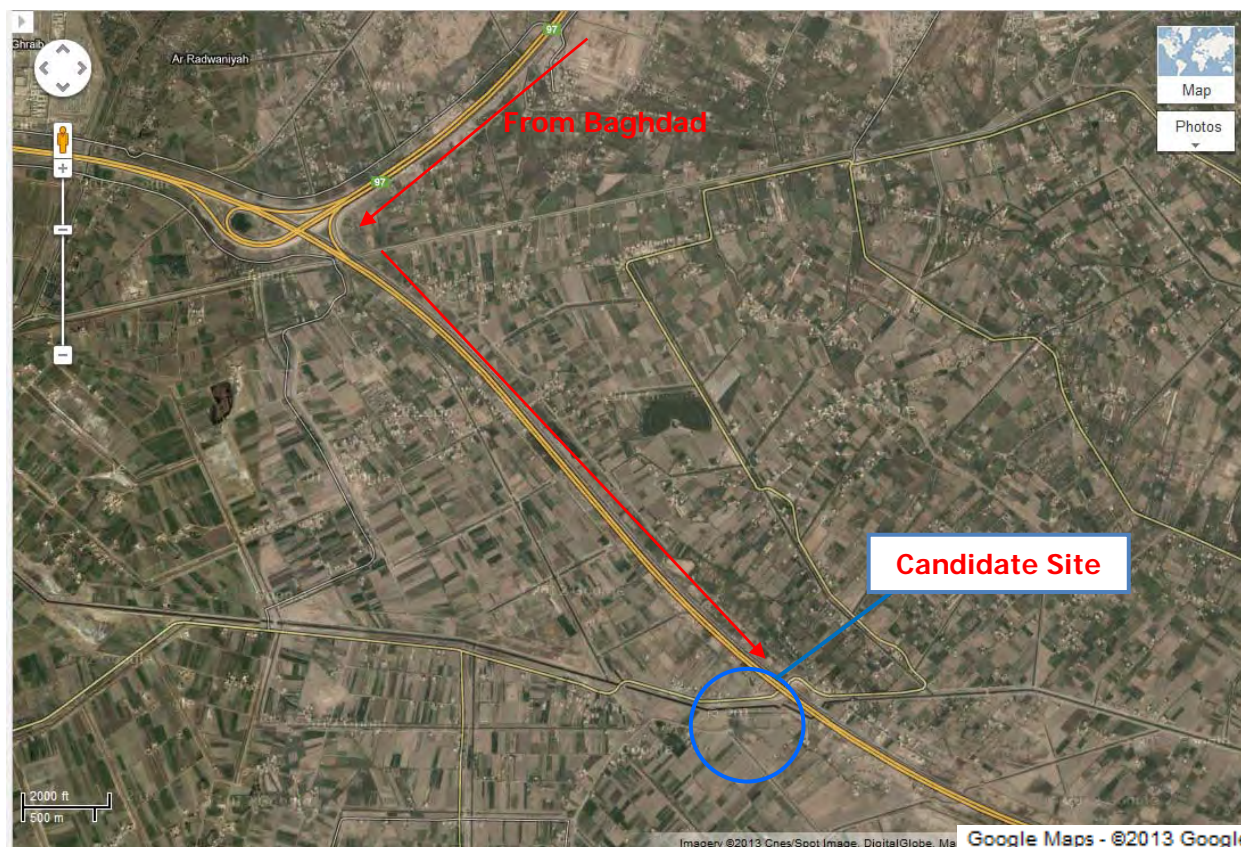


Figure 2.2.1 The location of the Candidate site

2.2.2 Outline of the candidate site

Outline of the candidate site is as follows.

- (1) The site is to the north of the dirt road where the team stopped. The dirt road is elevated and nearly 2meters higher than the site. This is because there is an irrigation canal on the southern side of the dirt road (no water was flowing at the time of the visit and it seemed to have not been used in quite sometime).
- (2) It is an agricultural land and was already ploughed at the time of the visit.
- (3) The site is owned by the Ministry of Agriculture but seems to be planted by some families that live in the area.
- (4) There is a 400kV TL running nearly 2 kilometers to the southwest of the site (West Baghdad-Al-Rasheed Line).
- (5) There is a significant drop from the dirt road to the site, but then the site is pretty flat.
- (6) Conversations with one of the local residents indicated that there is an oil pipe that runs through the site. He did not know whether it is currently used or not.
- (7) There are a few houses on the northern edge of the site and a few houses on the southern edge. Thenorthern edge is also delineated by an active 15-m wide irrigation canal.

2.2.3 Result of the Site Survey

Table 2.2.1 The Results of the Site Survey

1	Substation Name	Baghdad-Radwaniyah 400 kV SS
2	Name of the Governorate, city	Baghdad- Radwaniyah
3	Date of the survey	Sunday April 9, 2013 at 10:00 am
4	Surveyed by	MoE: Local Consultant: Tarek Tarawneh, Dheyaa Hassan, Khajak Vartanian
5	Site Survey Results	
5.1	Area Identification	Agricultural area
5.2	Land Acquisition	Owned by the Ministry of Agriculture.
5.3	Residential houses inside	No
5.4	Water appearance	There is a 15-m wide irrigation canal on the northern edge of the site, and a 0.5 meter irrigating canal on the southern end (not used)
5.5	Access road condition	N/A; access is through a dirt road
5.6	Any obstructions	No apparent obstructions in the site area but there are some houses scattered on the northern and southern edge of the site
5.7	Any facilities such as school, hospital, etc	No such facilities nearby nut some houses
5.8	Topographical Survey at site	
	a. Horizontal coordinates (4corners and existing roads)	The exact corners of the site have not been located yet. In any case, the site requires a temporary road to be constructed for access during construction and during operation.
	b. Horizontal Dimensions (Including existing roads)	—
	c. Vertical Coordinates, (Maximum difference in sideand between roads and the site)	The site is generally flat.

The recommended site layout for 400kV Substation is as shown below.

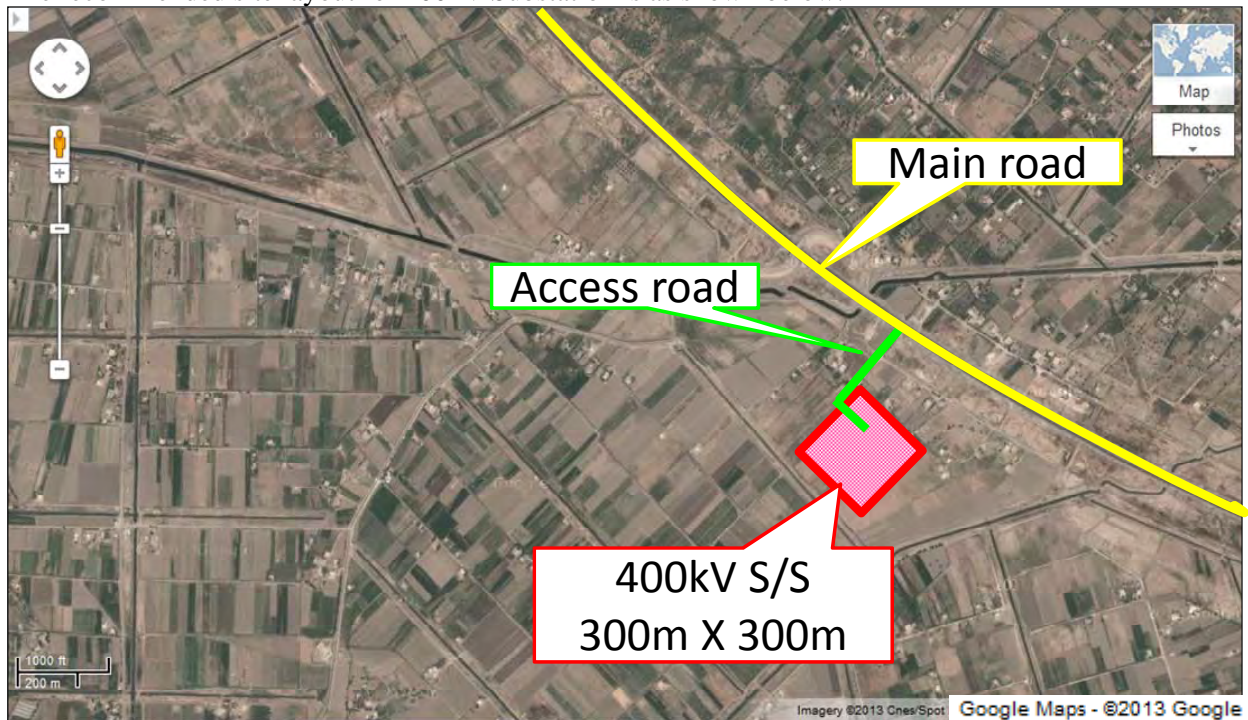


Figure 2.2.2 The Recommended Site Layout (Reference)

Land required for 400kV Substation construction is an area of Approx.300m×300m including the storage, temporary facilities and future expansion spaces.


Access road from the gate of the substation to the existing main road will be created along the existing public dirt road as shown above.

2.2.4 Photograph near the Site



Figure 2.2.3 Orientation of Photo Shot from the site

	Photo No.1
	Photo No.2
	Photo No.3

	Photo No.4
	Photo No.5
	Photo No.6



2.3 Al-Madaain

2.3.1 The location of the candidate site

The site is in Baghdad, Madaain, where is outside rural area of Baghdad city, in southern east. The GPS coordinate of the main point on the site is 33°11'6.70"N, 44°30'19.65"E.



Figure 2.3.1 The location of the Candidate site

2.3.2 Outline of the candidate site

Outline of the candidate site is as follows.

- (1) The site is to the northeast from the nearest paved road which runs alongside Tigris river.
- (2) It is an agricultural land with plenty of shrubs and ground cover including trees.
- (3) The site is owned by the Ministry of Agriculture and used to be an area used for aqua farms and fish pond.
- (4) There is a 132kV TL running across the western edge of the site
- (5) There is a very mild slope across the site
- (6) The main road cannot, however, the MoE engineers indicated that access to the site would be better from the Nuclear Engineering Department premises which is about 2 kilometers northeast of the site and has better access to paved roads.

2.3.3 Result of the Site Survey

Table 2.3.1 The Results of the Site Survey

1	Substation Name	Baghdad-Madaain 400 kV SS
2	Name of the Governorate, city	Baghdad-Madaain
3	Date of the survey	Sunday April 7, 2013 at 11:00 am
4	Surveyed by	MoE: Local Consultant: Tarek Tarawneh, Dheyaa Hassan, Khajak Vartanian
5	Site Survey Results	—
5.1	Area Identification	Agricultural area
5.2	Land Acquisition	Owned by the Ministry of Agriculture.
5.3	Residential houses inside	No
5.4	Water appearance	There is surface water on the eastern side of the site, the source is believed to be from the River Tigris, however, the team could not locate a channel that conveys this water. The area to the east is more of a wetlands (marshes) type of an area. Therefore, it is recommended to push the site further west or northeast to avoid this area. According to MoE staff, this area was previously used for aqua culture farming. The GW levels are also reported to be high.
5.5	Access road condition	N/A; access is through a dirt road
5.6	Any obstructions	No apparent obstructions in the site area
5.7	Any facilities such as school, hospital, etc	The nearest population gathering is at least 3 kilometers from the site
5.8	Topographical Survey at site a. Horizontal coordinates (4corners and existing roads)	The exact corners of the site have not been located yet. It is recommended that the site be located to the northwest of where the team stopped to avoid the wetlands. This would also give reasonable access to the TL. In any case, the site requires a temporary road to be constructed for access during construction and during operation.
	b. Horizontal Dimensions (Including existing roads)	—
	c. Vertical Coordinates, (Maximum difference in side and between roads and the site)	The site is generally flat.

The recommended site layout for 400kV Substation is as shown below.

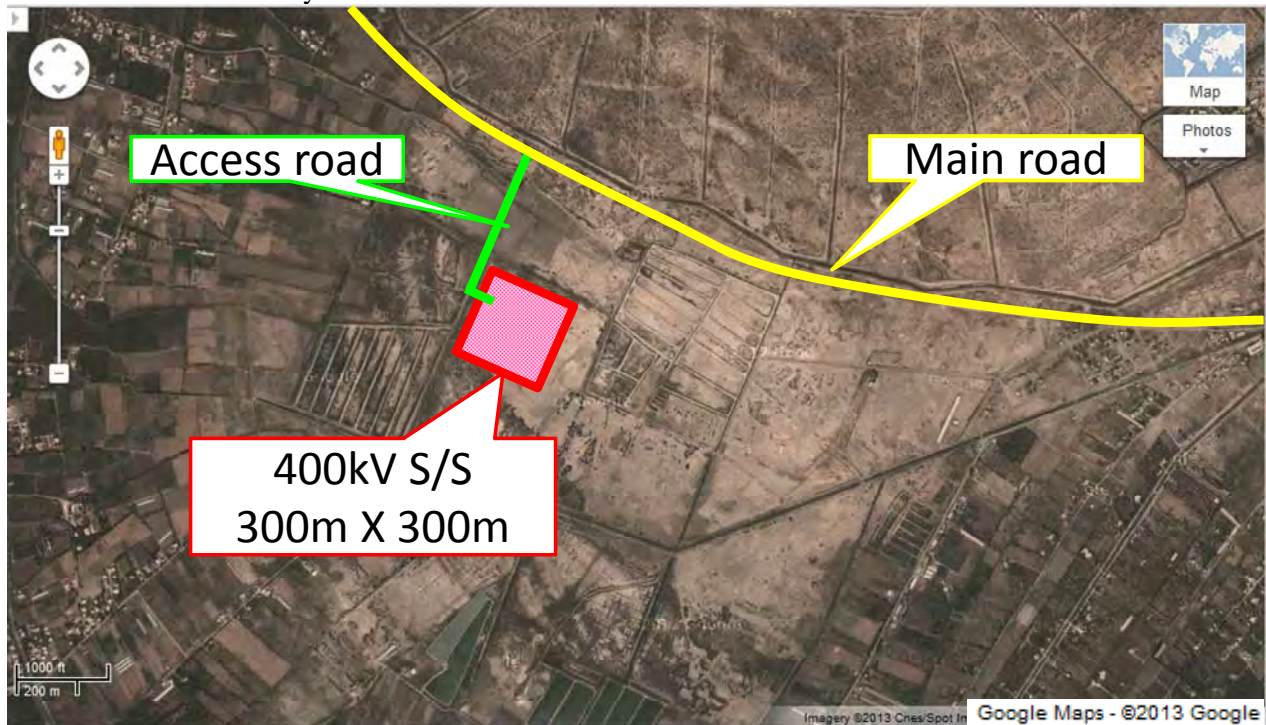


Figure 2.3.2 The Recommended Site Layout (Reference)




Land required for 400kV Substation construction is an area of Approx.300m×300m including the storage, temporary facilities and future expansion spaces.

Access road from the gate of the substation to the existing main road will be created along the existing public dirt road as shown above.

2.3.4 Photograph near the Site







Figure 2.3.3 Orientation of Photo Shot from the site

	Photo No.1
	Photo No.2
	Photo No.3

	<p>Photo No.4</p>
	<p>Photo No.5</p>
	<p>Photo No.6</p>

		Photo No.7
		Photo No.8

		<p>Additional Photo No.1</p> <p>The situation of the surface water on eastern side.</p>
		<p>Additional Photo No.2</p> <p>The situation of the surface water on eastern side.</p>
		<p>Additional Photo No.3</p> <p>The situation of the surface water on eastern side.</p>
		<p>Additional Photo No.4</p> <p>The situation of the surface water on eastern side.</p>

2.4 Al-Anbar

2.4.1 The location of the candidate site

The site is in Anbar, Ramadi, where is outside unexploited area of Ramadi city, in northern east. The GPS coordinate of the main point on the site is 33°29'57.84"N, 43°23'7.35"E.



Figure 2.4.1 The location of the Candidate site

2.4.2 Outline of the candidate site

Outline of the candidate site is as follows.

- (1) Access to this site is from a dirt-unpaved road that links the site to the main international highway, which links major cities like Baghdad, Fallujah Ramadi, and Heet. There are no new roads planned in the area at the time of this study.
- (2) The site is an unexploited area, generally with level terrain.
- (3) There is no evidence or history of significant flooding on the site. There are no rivers or streams in the area, neither surface water or groundwater bodies.
- (4) The site has good connectivity to the existing 400KV, 132KV, and 33KV towers that provide good electrical connectivity node. It consists of the following lines:
 - a) 132KV tower (No. 127), with a linking line coming from (Eastern Fallujah–Ramadi Station); GPS Coordinates: Lat. 33°29'36.3"N, Long. 43°23'0.63"E,
 - b) 132KV tower (No. 20), with a linking line coming from (Het -Eastern Ramadi- new Ramadi Station); GPS Coordinates: Lat. 33°29'36.8"N, Long. 43°22'57"E,
 - c) 400KV tower (No. 153), with a linking line coming from (Haditha-Baghdad Station); GPS Coordinates: Lat. 33°29'45.5"N, Long. 43°23'07.7"E, and
 - d) 33KV transmission line

2.4.3 Result of the Site Survey

Table 2.4.1 The Results of the Site Survey

1	Substation Name	Ramadi 400 kV SS
2	Name of the Governorate, city	Anbar, Ramadi
3	Date of the survey	April 14, 2013 at 2.00 pm
4	Surveyed by	GDFEET/ Highest Euphrates: Eng. Omar Abd Al Baqe (+964 781 191-6717) Local Consultant: Oday Asaad
5	Site Survey Results	
5.1	Area Identification	Unexploited area
5.2	Land Acquisition	Uncertain, probably owned by the Ministry of Finance
5.3	Residential houses inside	No residential houses observed
5.4	Water appearance	There are no apparent surface water resources in the area
5.5	Access road condition	The average traffic flow on the 4-lane international main road, which links the site to the dirt road, is 1200 vehicles per hour in both directions. Traffic density and speed vary from time to time on the main road. The facility is an international route connecting Iraq and its neighboring countries, as well as linking major cities in Iraq like Baghdad, Ramadi, Fallujah, and Heet. Therefore, traffic density and speed are high on the main road. The traffic was a mix of passenger cars and heavy vehicles.
5.6	Any obstructions	No apparent obstructions in the site area
5.7	Any facilities such as school, hospital, etc	The nearest population gathering is at least 4 kilometers from the site
5.8	Topographical Survey at site Horizontal coordinates (4corners and existing roads)	The total land required for the site is about 20 Iraqi acres (80,937 m ²). That includes access road and 20 service houses. The suitable location of the proposed SS is around 1.50 km south of the international highway linking Iraq, Jordan, and Syria. According to the GDFEET/ Highest Euphrates team, the proposed site offers large land area with suitable topography to host the SS. The site location, far from any populated areas and close to the existing 132KV and 400KV power transmission lines, further supports its suitability. Therefore, it is the recommendation of this report to consider site No. 2 for the proposed 400KV substation in Anbar Governorate.
	Horizontal Dimensions (Including existing roads)	
	Vertical Coordinates, (Maximum difference in sideand between roads and the site)	
		The land is fairly leveled, but it might require some cut and fill

The recommended site layout for 400kV Substation is as shown below.

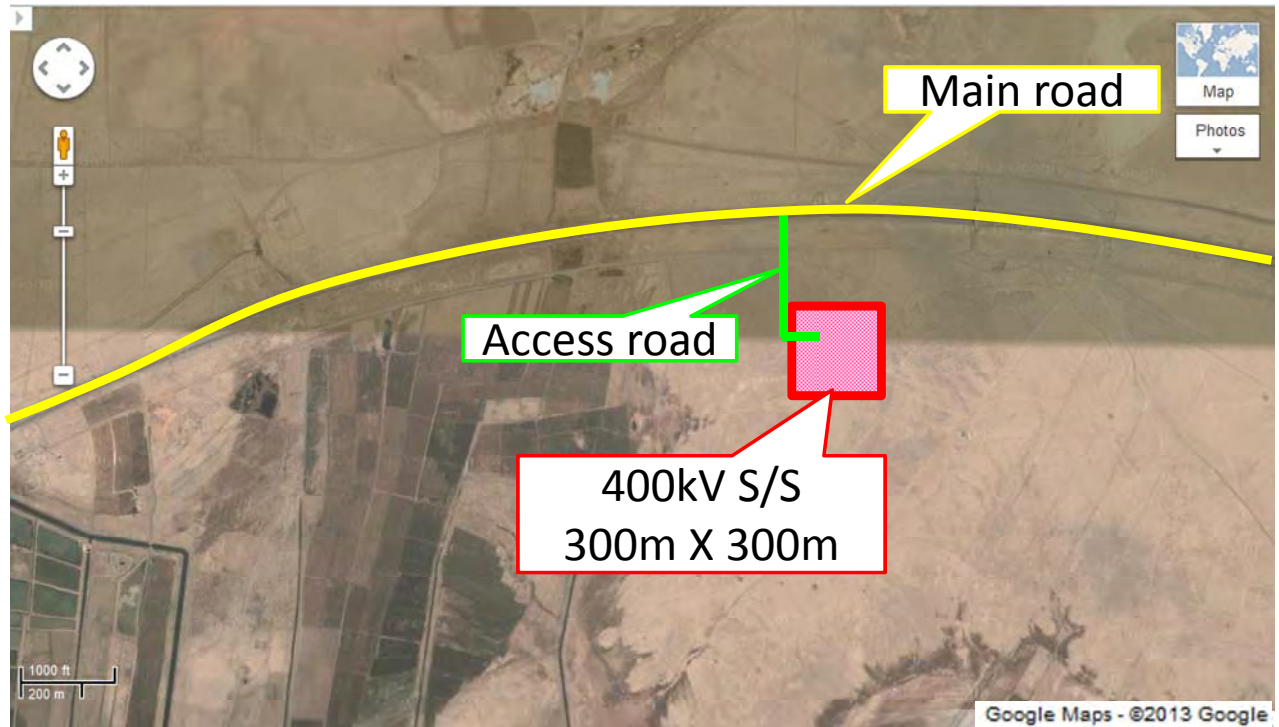


Figure 2.4.2 The Recommended Site Layout (Reference)

Land required for 400kV Substation construction is an area of Approx.300m×300m including the storage, temporary facilities and future expansion spaces.
Access road from the gate of the substation to the existing main road will be created along the existing public dirt road as shown above.

2.4.4 Photograph of the Site

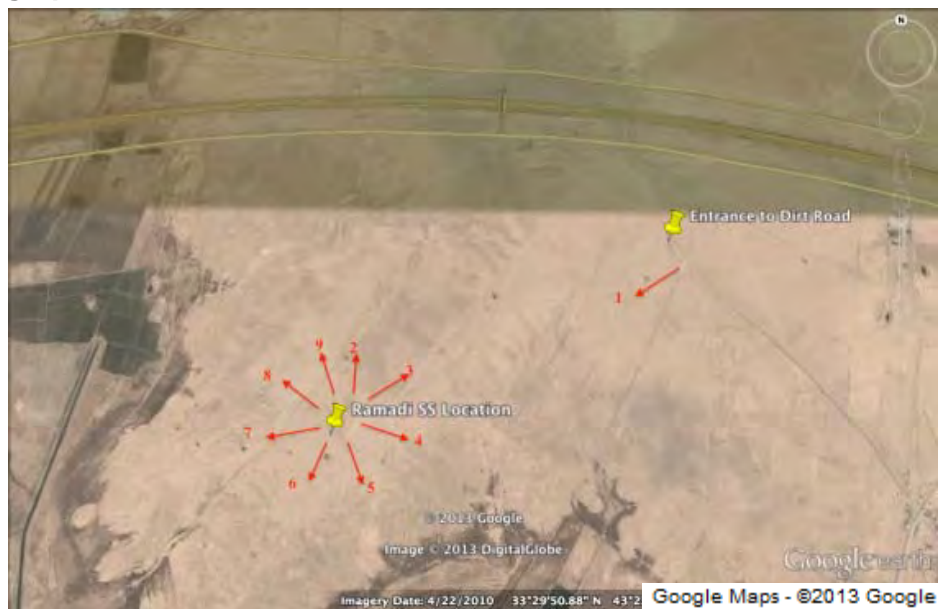





Figure 2.4.3 Orientation of Photo Shot from the site

		Photo No.1
		Photo No.2
		Photo No.3




		Photo No.4
		Photo No.5
		Photo No.6

		Photo No.7
		Photo No.8
		Photo No.9

Under the guidance of the local MoE staff, the following site of Anbar governorate was also carried out the survey. However, through the discussion with MoE, this site was decided as the *reference site*. For reference, the results of the site survey are as follows.

2.4.5 The location of the *reference site*

The site is in Anbar, Habbaniyah, where is outside unexploited area of Habbaniyah city, in southern east. The GPS coordinate of the main point on the site is 33°21'48.57"N, 43°36'21.78"E.



Figure 2.4.4 The location of the Reference site

2.4.6 Outline of the *reference site*

Outline of the candidate site is as follows.

- (1) Access to this site is from a dirt-unpaved road that links the site to the paved road (Old Bridge main road, which links Fallujah and Ramadi City). This is a divided highway with a median in the middle separating two lanes on each side (each side is 8 meters wide). Although there are no railways currently operating in the site area, access to the site is not easy and passes over an obsolete railway track. There are no new roads planned in the area at the time of this study.
- (2) The site is a bumpy deserted area at the time of visit, bounded by hills, valleys, and a military zone.
- (3) There is no evidence or history of significant flooding on the site. There are no rivers or streams in the area, neither surface water or groundwater bodies.
- (4) The electricity infrastructure consists of 33KV transmission line that is currently not working. According to General Directorate for Electrical Energy Transmission (GDFEET / Highest Euphrates) team, the proposed site is located far from the existing 400KV and 132KV lines that service the area.

2.4.7 Result of the Site Survey (*Reference site*)

Table 2.4.2 The Results of the Site Survey (Reference Site)

1	Substation Name	Habbaniah 400 kV SS
2	Name of the Governorate, city	Anbar, Habbaniah
3	Date of the survey	April 14, 2013 at 12.00 pm
4	Surveyed by	GDFEET/ Highest Euphrates: Eng. Omar Abd Al Baqe (+964 781 191-6717) Local Consultant: Oday Asaad
5	Site Survey Results	
5.1	Area Identification	It is an unexploited deserted bumpy area, generally used as a quarry
5.2	Land Acquisition	Uncertain, probably owned by the Ministry of Finance
5.3	Residential houses inside	No residential houses observed
5.4	Water appearance	There are no apparent surface water resources in the area
5.5	Access road condition	The average traffic flow on the 4-lane main road, which links the site to the dirt road, is 900 vehicles per hour in both directions. Traffic density and speed vary from time to time on the main road. Yet, given the highway location connecting the two large cities of Fallujah and Ramadi, traffic volume and speed could increase during early morning and afternoon, with a high composition of large and heavy vehicles using the road. Other cities like Saqlawiyah and Habbaniah, as well as many small villages are also connected to the road.
5.6	Any obstructions	No apparent obstructions in the site area
5.7	Any facilities such as school, hospital, etc	A nearby military zone is located at around 830 m south of the site
5.8	Topographical Survey at site Horizontal coordinates (4corners and existing roads)	The exact corners of the site have not been located yet. However, the proposed site is not suitable to host a 400 KV station. Given the site uneven topography, its closeness to a military zone, and its proximity to Habbaniah Airport to the south, this will make the construction of the SS quite unpractical and costly. Additionally, the remoteness of the existing 400 KV and 132 KV towers from the proposed site makes it difficult to connect the proposed SS to the existing network.
	Horizontal Dimensions (Including existing roads)	
	Vertical Coordinates, (Maximum difference in sideand between roads and the site)	The difference in elevation between the entrance point on the main road and the extreme edge of the site is around 10 meters over a distance of about 700 meters.

The recommended site layout for 400kV Substation is as shown below.

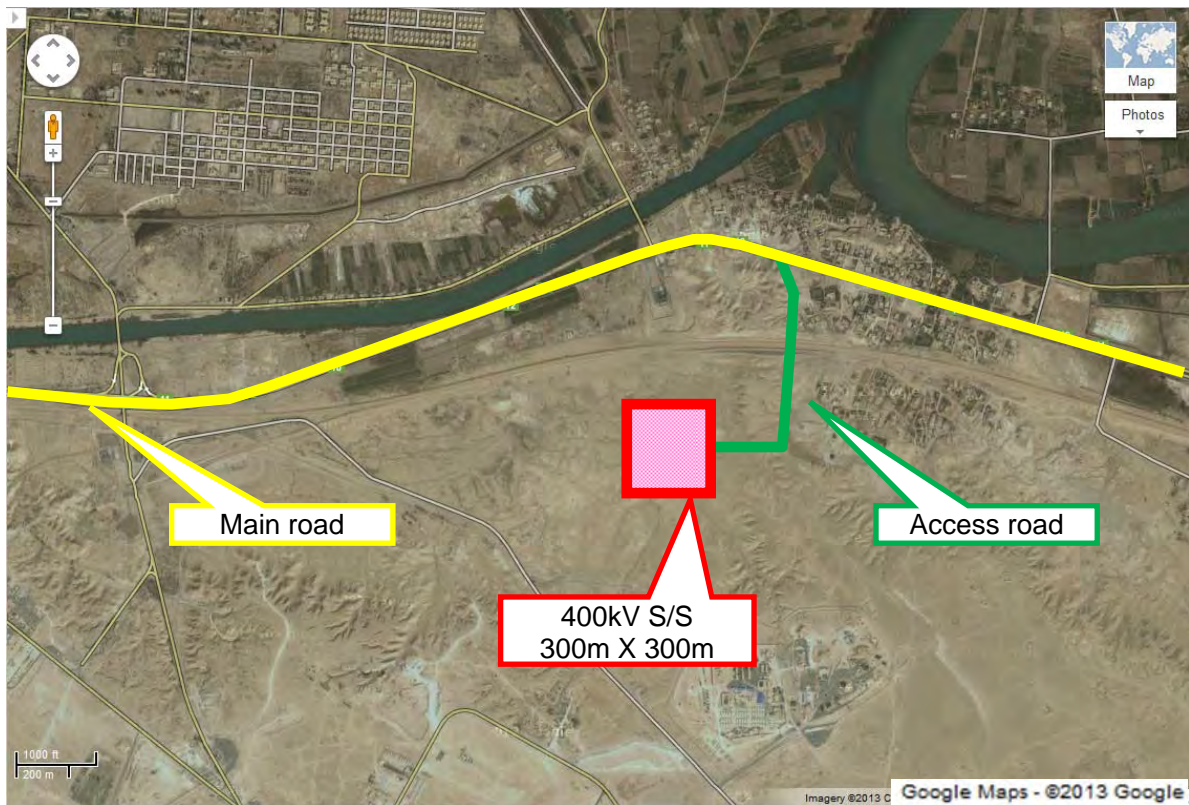


Figure 2.4.5 The Recommended Site Layout (Reference)

Land required for 400kV Substation construction is an area of Approx.300m×300m including the storage, temporary facilities and future expansion spaces. Access road from the gate of the substation to the existing main road will be created along the existing public dirt road as shown above.

2.4.8 Photograph of the Site (Reference site)



Figure 2.4.6 Orientation of Photo Shot from the site




		Photo No.1
		Photo No.2
		Photo No.3

		Photo No.4
		Photo No.5
		Photo No.6

		Photo No.7
		Photo No.8
		Photo No.9

2.5 New Diyara

2.5.1 The location of the candidate site

The site is in Diyala, Failaq, where is desert area of Diyara governorate.

The GPS coordinate of the main point on the site is 34°1'53.00"N, 45°1'23.04"E

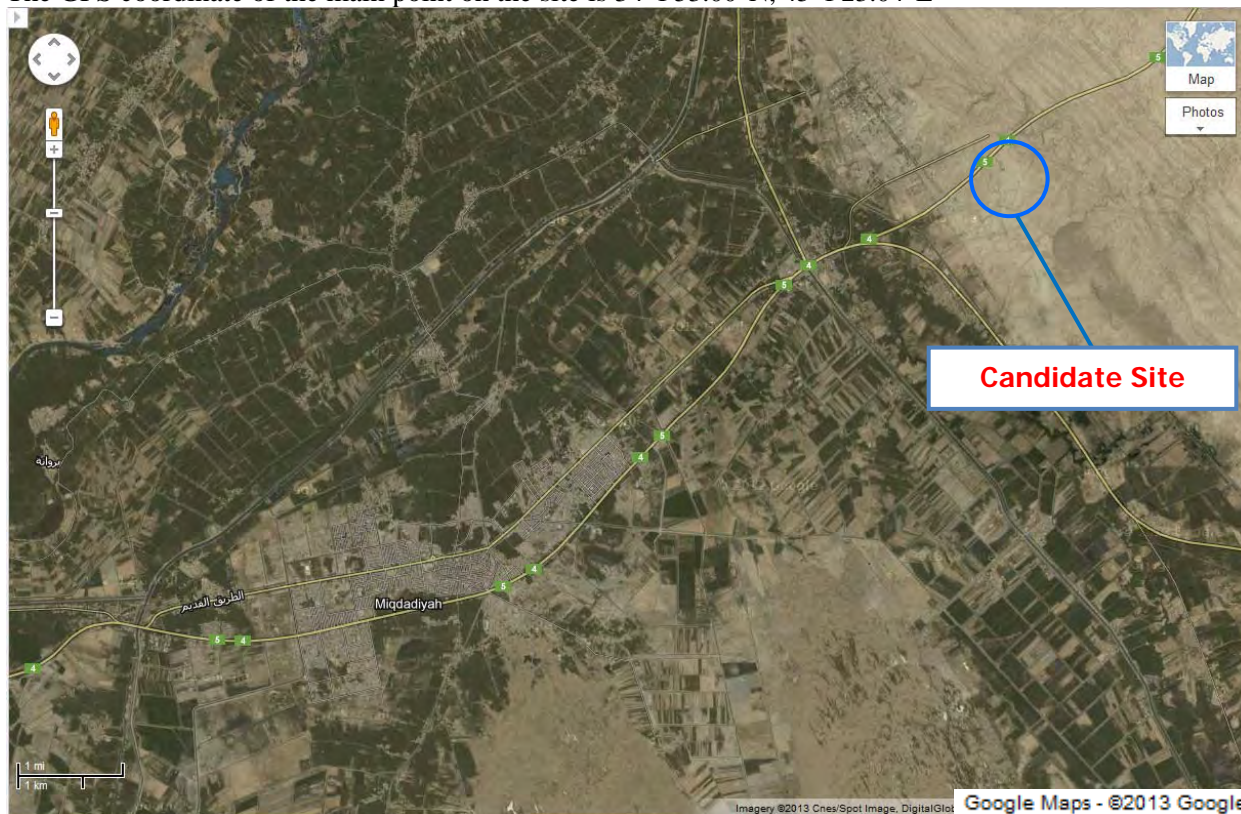


Figure 2.5.1 The location of the Candidate site

2.5.2 Outline of the candidate site

Outline of the candidate site is as follows.

- (1) The site is to the south of a two lane highway (7-meters) wide street.
- (2) It is an open area that is not planted and does not have any type of ground cover.
- (3) There is a 132 KV transmission line that runs along the highway where the team stopped. There is a generation plant to the northwest of the site at Himreen dam that is nearly 10 kilometers to the northwest.
- (4) There are no houses or any other land use at the site vicinity.
- (5) There is some high terrain nearly 100 meters into the site. Judging from the nature of the soil of the area, cut and grading operations should be done fairly easy.
- (6) The GPS coordinates of the point on the local road where we stopped is (GPS Coordinates 34.03134, 45.02226). The site is to the south of this point and all the photos were taken from this point.

2.5.3 Result of the Site Survey

Table 2.5.1 The Results of the Site Survey

1	Substation Name	New Diyala 400 kV SS
2	Name of the Governorate, city	Diyala, Failaq Area
3	Date of the survey	Monday April 8, 2013 at 12:00 pm
4	Surveyed by	Local Consultant: Tarek Tarawneh, Dheyaa Hassan, Khajak Vartanian
5	Site Survey Results	
5.1	Area Identification	Desert area not planted
5.2	Land Acquisition	Owned by the Government (Ministry of Finance)
5.3	Residential houses inside	None; site is completely empty
5.4	Water appearance	None. There is no apparent surface water resources in the area
5.5	Access road condition	The site is located on a 2-lane major highway with an estimated traffic volume of 1,200 vehicles per hour. The capacity of such facility is estimated at 2,800 vph, therefore, the traffic operating conditions are acceptable
5.6	Any obstructions	No apparent obstructions in the site area
5.7	Any facilities such as school, hospital, etc	The site is outside city limits with no visible land uses in its vicinity
5.8	Topographical Survey at site a. Horizontal coordinates (4corners and existing roads)	The exact corners of the site have not been located yet. The total available area is estimated at 20,000 square meters. The site is right on a highway, however, if the site is to be used then the SS would have to be offset to the south of the highway. In that case, there would be a need for an access road.
	b. Horizontal Dimensions (Including existing roads)	—
	c. Vertical Coordinates, (Maximum difference in side and between roads and the site)	The difference in elevation between the road where the team stopped and the vehicles were parked, and the highest area in the site is nearly 8 meters edge of the site is not more than 1 meters over a distance of about 250 meters.

The recommended site layout for 400kV Substation is as shown below.

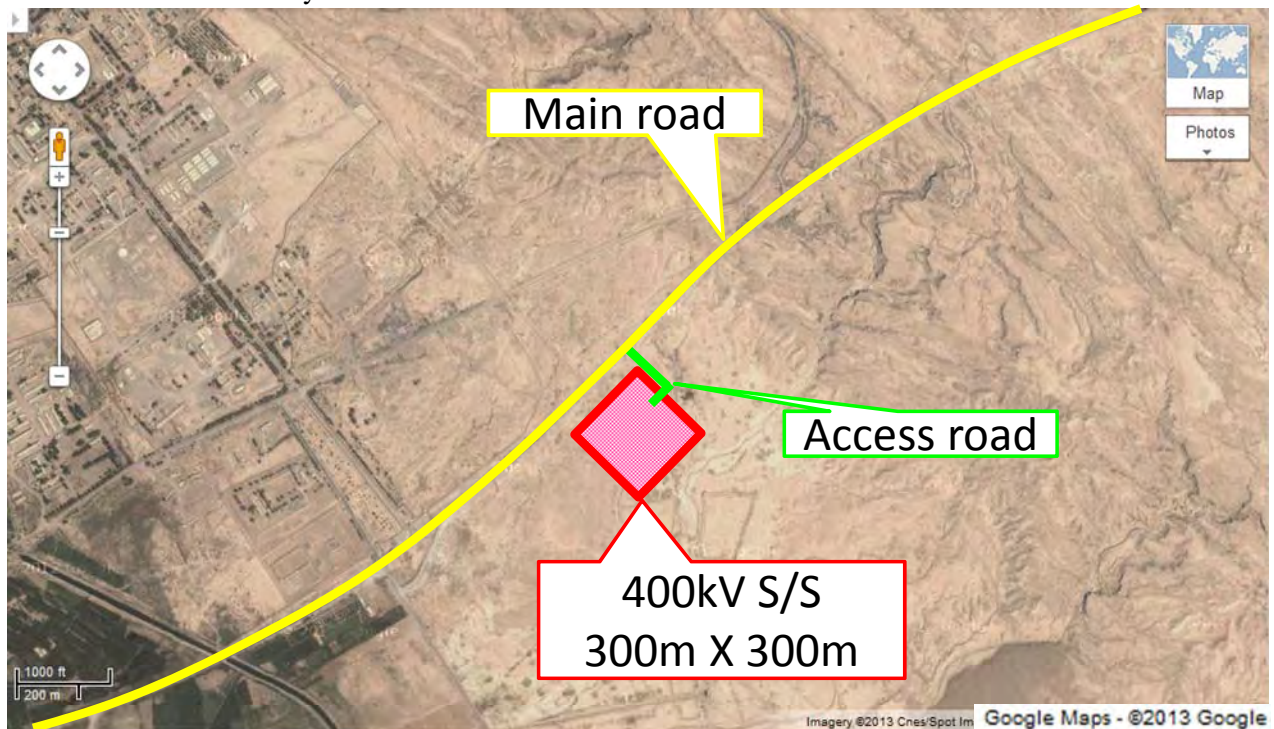


Figure 2.5.2 The Recommended Site Layout (Reference)




Land required for 400kV Substation construction is an area of Approx.300m×300m including the storage, temporary facilities and future expansion spaces.




Access road from the gate of the substation to the existing main road will be created along the existing public dirt road as shown above.

2.5.4 Photograph of the Site



Figure 2.5.3 Orientation of Photo Shot from the point

	Photo No.1
	Photo No.2
	Photo No.3

	Photo No.4
	Photo No.5
	Photo No.6



Under the guidance of the local MoE staff, the following site of Diyala governorate was also carried out the survey. However, through the discussion with MoE, this site was decided as the reference site. For reference, the results of the site survey are as follows.

2.5.5 The location of the reference site

The site is in Diyala, Al-Ja'ar, where is privately owned agricultural area of Diyara governorate. The GPS coordinate of the main point on the site is 33°57'41.44"N, 44°55'51.19"E.



Figure 2.5.4 The location of the Reference site

2.5.6 Outline of the reference site

Outline of the candidate site is as follows.

- (1) The site is to the west of a two lane local street (6-meters) wide street that serves the village of wherethe study team stopped. It has the following characteristics.
- (2) It is an agricultural land but not excessively planted, except for some palm trees through the site. We chatted with one of the private owners who indicated that the land is privately owned by a group of people who inherited the land from their father.
- (3) There are no visible transmission lines in the vicinity of the site. The MoE team accompanying our team indicated that the nearest TL to connect to is nearly 10 kilometers (point to point distance) towards the northeast from the site.
- (4) There are a few houses on both sides of the site (around 6 houses on the southern edge of the site and 1 large property on the northern edge of the site)
- (5) There is a very mild slope across the site towards the southeast
- (6) The GPS coordinates of the point on the local road where we stopped is (GPS Coordinates 33.96550,44.93478). The site is to the west of this point and all the photos were taken from this point.

2.5.7 Result of the Site Survey (Reference site)

Table 2.5.2 The Results of the Site Survey (Reference Site)

1	Substation Name	New Diyala 400 kV SS
2	Name of the Governorate, city	Diyala, Al-Ja'ar
3	Date of the survey	Monday April 8, 2013 at 11:00 am
4	Surveyed by	Local Consultant: Tarek Tarawneh, Dheyaa Hassan, Khajak Vartanian
5	Site Survey Results	
5.1	Area Identification	Agricultural area but not planted with crops; has palm trees
5.2	Land Acquisition	Privately owned
5.3	Residential houses inside	Not on the site itself but on both the southern and western borders of the site
5.4	Water appearance	None. There is no apparent surface water resources in the area
5.5	Access road condition	The average traffic flow on the main road to the site is 80-90 vehicles per hour in both directions on a 2-lane facility. The capacity of such facilities is estimated at 1000 vehicles per hour, so less than 10% of the road capacity is currently utilized. It must be noted that this is a local street serving a small community and travel speeds are quite low. The traffic was a mainly passenger cars. If this site is selected, there is a need to open an access road from this local street to serve the facility.
5.6	Any obstructions	No apparent obstructions in the site area
5.7	Any facilities such as school, hospital, etc	The site is in the middle of a small community
5.8	Topographical Survey at site	The site is quite level and nearly 50 centimeters lower than the street serving it
	a. Horizontal coordinates (4corners and existing roads)	The exact corners of the site have not been located yet. The total available area is estimated at 5,000 to 6,000. The site is right on a local paved road, however, if the site is to be used then the SS would have to be offset to the west of this local road. In that case, there would be a need for an access road. There currently is a dirt access road, but would have to be upgraded in order to improve access both during construction and operation.
	b. Horizontal Dimensions (Including existing roads)	—
	c. Vertical Coordinates, (Maximum difference in side and between roads and the site)	The difference in elevation between the road where the team stopped and the vehicles were parked, and the extreme edge of the site is not more than 1 meters over a distance of about 250 meters.

The recommended site layout for 400kV Substation is as shown below.

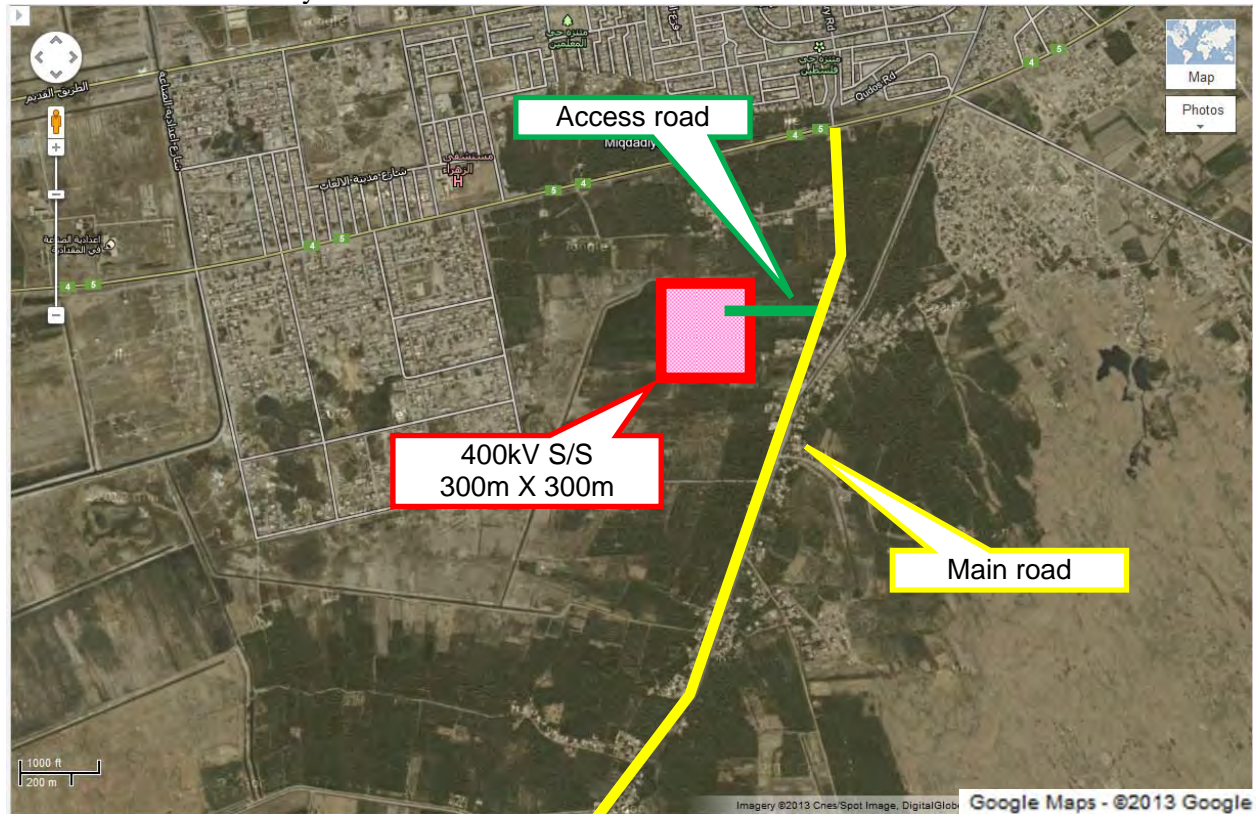


Figure 2.5.5 The Recommended Site Layout (Reference)

Land required for 400kV Substation construction is an area of Approx.300m×300m including the storage, temporary facilities and future expansion spaces. Access road from the gate of the substation to the existing main road will be created along the existing public dirt road as shown above.

2.5.8 Photograph of the Site (Reference site)



Figure 2.5.6 Orientation of Photo Shot from the point

	Photo No.1
	Photo No.2
	Photo No.3

	Photo No.4
	Photo No.5
	Photo No.6

	Photo No.7
	Photo No.8
	Photo No.9

2.6 Thi Qar

2.6.1 The location of the candidate site

The site is in Thi Qar, Nasiriya, where is agricultural area of Thi Qar governorate.

The GPS coordinate of the main point on the site is 31°25'57.16"N, 46° 9'17.85"E.



Figure 2.6.1 The location of the Candidate site

2.6.2 Outline of the candidate site

Outline of the candidate site is as follows.

- (1) Access to the site is from a dirt road linking the site to the paved road ((7th Street, which links Baghdad to Nasiriya City). This is a divided highway with a median in the middle separating two lanes on each side (each side is 7 meters wide). There are no new roads planned in the area at the time of this study. There are no railways in this substation study area.
- (2) It is an agricultural land at the time of visit, generally covered by plants and bound by a few houses.
- (3) The site is owned by the Ministry of Finance, (according to the Head of Shatrah Council) and it is possible to have this site area for the proposed project.
- (4) The electricity infrastructure consists of 132kV and 400kV transmission lines. There are smaller, lower voltage lines servicing houses and farms in the area, and the proposed site area is about 1.5 km north of an existing 132kV SS(Al-Shatrah-Al-aubaidy substation)
- (5) Some parts of the site are covered by water. There are two canals near the site area, one of them is the Sweet Water Canal used for the conveyance and delivery of sweet water to Basra Governorate, while the second one is Al-Abowda Canal to collect the drainage water from the surrounding area.
- (6) The main road can be seen from the site.

2.6.3 Result of the Site Survey

Table 2.6.1 The Results of the Site Survey

1	Substation Name	Shatrah 400 kV SS
2	Name of the Governorate, city	Thi Qar, Nasiriya
3	Date of the survey	Tuesday March 31, 2013 at 12:00 am
4	Surveyed by	GDFEET/South: Eng. Farrid Awaid (+964 780 139-1234) GDFEET/Southwest Eng. Loay Abd Al-Hassan (+964 780 142-3913) Local Consultant: Eng. Dheyaa A. Hasan and Eng. Humam Hassan
5	Site Survey Results	
5.1	Area Identification	It is a deserted agricultural land, generally covered by some plants
5.2	Land Acquisition	Owned by the Ministry of Finance.
5.3	Residential houses inside	No
5.4	Water appearance	There are two canals, one of them is the Sweet Water Canal used for the conveyance and delivery of sweet water to Basra Governorate while the second one is Al-Abowda Canal to collect the drainage water from the surrounding area.
5.5	Access road condition	The average traffic flow on the main road the 7th street (Baghdad / Nasiriya) to the site is about 2000 vehicles per hour in both directions on a dual paved carriageway road. The traffic was a mix of passenger vehicles and heavy vehicles.
5.6	Any obstructions	No apparent obstructions in the site area
5.7	Any facilities such as school, hospital, etc	The nearest population gathering is at least 2 kilometers from the site
5.8	Topographical Survey at site a. Horizontal coordinates (4corners and existing roads)	The exact corners of the site have not been located yet. In any case, the City Council Members indicated that they do not mind if the facility is located on this land or any other land. Discussions with the GDFEET / southwest and Shatrah District Council indicated that the land is available and There are no planning permission applications outstanding or pending on the lands.
	b. Horizontal Dimensions (Including existing roads)	The total Land required for the site is 20 Iraqi donum.
	c. Vertical Coordinates, (Maximum difference in sideand between roads and the site)	The difference in elevation between the dirt road where the team stopped and the vehicles were parked and the extreme edge of the site is more than 3 to 3.5 meters due to the existence of two small aqueducts.

The recommended site layout for 400kV Substation is as shown below.

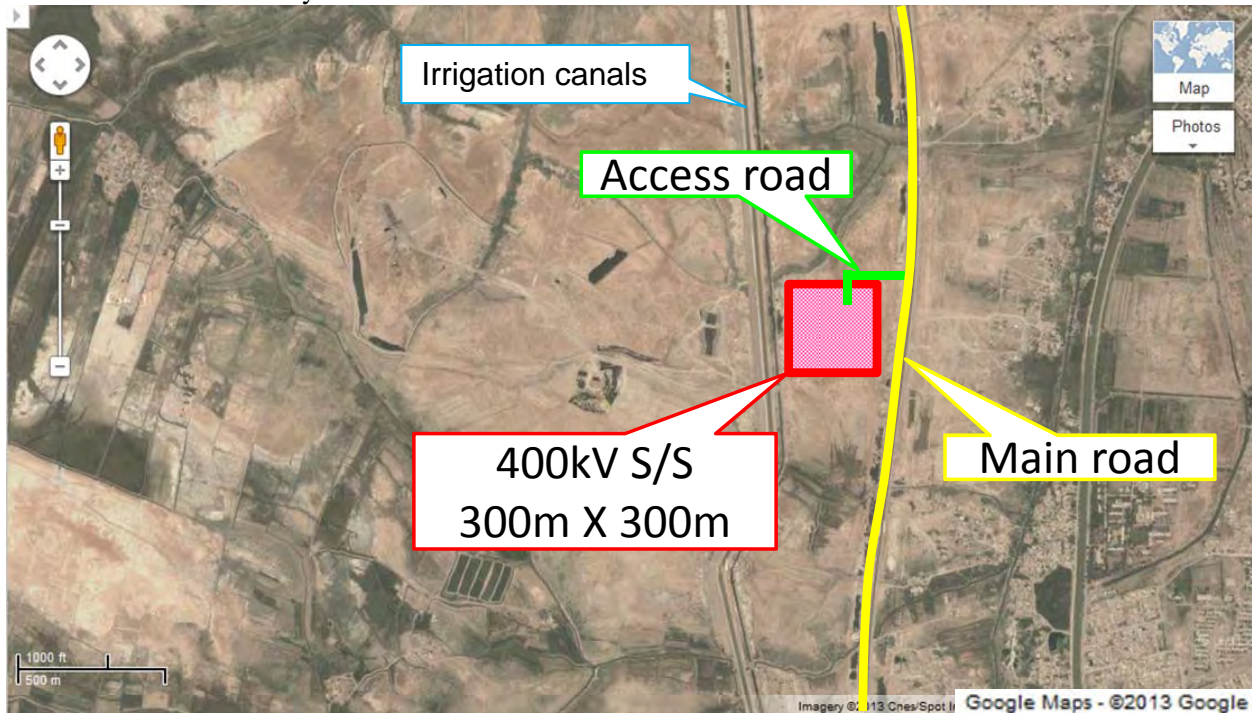


Figure 2.6.2 The Recommended Site Layout (Reference)

Land required for 400kV Substation construction is an area of Approx.300m×300m including the storage, temporary facilities and future expansion spaces.


Access road from the gate of the substation to the existing main road will be created along the existing public dirt road as shown above.




2.6.4 Photograph of the Site



Figure 2.6.3 Orientation of Photo Shot from the point

	Photo No.1
	Photo No.2
	Photo No.3

	Photo No.4
	Photo No.5
	Photo No.6

	Photo No.7
	Photo No.8
	Photo No.9

Under the guidance of the local MoE staff, the following site of Thi Qar governorate was also carried out the survey. However, through the discussion with MoE, this site was decided as the reference site.

For reference, the results of the site survey are as follows.

2.6.5 The location of the reference site

The site is in Thi Qar, Nasiriya, where is agricultural area of Thi Qar governorate.

The GPS coordinate of the main point on the site is 31°20'29.03"N, 46°10'51.84"E.

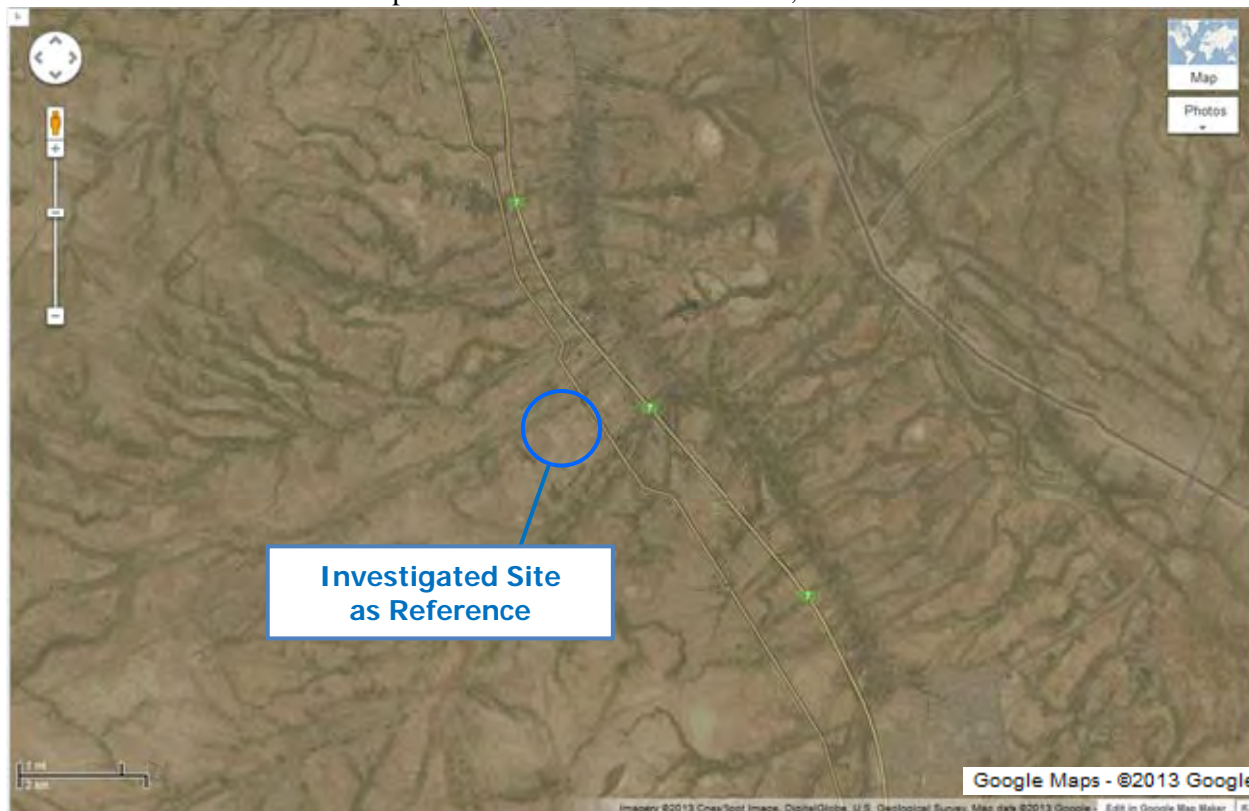


Figure 2.6.4 The location of the Reference site

2.6.6 Outline of the reference site

Outline of the candidate site is as follows.

- (1) Access to the site is from a dirt unpaved road that links the site to the paved road (7th Street, which links Baghdad to Nasiriya City). This is a divided highway with a median in the middle separating two lanes on each side (each side is 7 meters wide). There are no new roads planned in the area at the time of this study. There are no railways in the study area.
- (2) It is a deserted land at the time of the visit, and generally used for extracting building materials.
- (3) The site is owned by the Ministry of Finance (according to the Head of Shatrah Council), and it is possible to have this site area for the proposed substation.
- (4) The electricity infrastructure consists of 33kV and 400kV transmission lines, and there are smaller lower voltage lines servicing houses and farms in the area. The proposed site area is about 10 km away from an existing 132kV SS (Al-Shatrah - Al Aubaidy substation)
- (5) There is no evidence or history of significant flooding on the site. There are two canals; one of them is the Sweet Water Canal used for the conveyance and delivery of sweet water to Basra Governorate, while the second one is Al-Abowda Canal which collects the drainage water from the surrounding area.
- (6) The main road can be seen from the site.

2.6.7 Result of the Site Survey (*reference site*)

Table 2.6.2 The Results of the Site Survey (Reference Site)

1	Substation Name	Shatrah 400 kV SS
2	Name of the Governorate, city	Thi Qar, Nasiriya
3	Date of the survey	Tuesday March 31, 2013 at 12:00 am
4	Surveyed by	GDFEET/South: Eng. Farrid Awaid (+964 780 139-1234) GDFEET/Southwest Eng. Loay Abd Al-Hassan (+964 780 142-3913) Local Consultant: Eng. Dheyaa A. Hasan and Eng. Humam Hassan
5	Site Survey Results	
5.1	Area Identification	It used to be a quarry, generally used for extracting building materials
5.2	Land Acquisition	Owned by the Ministry of Finance.
5.3	Residential houses inside	No
5.4	Water appearance	There is no evidence or history of significant flooding on the site. There are two canals, one of them is the Sweet Water Canal used for the conveyance and delivery of sweet water to Basra Governorate, while the second one is Al-Abowda Canal used to collect the drainage water from the surrounding area.
5.5	Access road condition	The average traffic flow on the main road the 7th street (Baghdad / Nasiriya) to the site is About 2100 vehicles per hour in both directions on a dual paved carriageway road. Each side about 7 meters wide and has two lanes. Discussions indicated that the road could be significantly busier in the morning due to traffic traveling to Nasiriya, and returning in the afternoon. The traffic was a mix of passenger vehicles and heavy vehicles.
5.6	Any obstructions	No apparent obstructions in the site area.
5.7	Any facilities such as school, hospital, etc	The nearest population gathering is at least 3 kilometers from the site
5.8	Topographical Survey at site a. Horizontal coordinates (4corners and existing roads)	The exact corners of the site have not been located yet. In any case, the City Council Members indicated that they do not mind if the facility is located on this land or any other land. Discussions with the GDFEET/southwest and Shatrah District Council indicated that the land is available for the substation.
	b. Horizontal Dimensions (Including existing roads)	The total land area of the site is 20 Iraqi donum (i.e., 50,000 square meters)
	c. Vertical Coordinates, (Maximum difference in side and between roads and the site)	The difference in elevation between the dirt road where the team stopped and the vehicles were parked and the extreme edge of the site is vary between 0.5 to 1.5 meters over a distance of about 2000 meters.

The recommended site layout for 400kV Substation is as shown below.

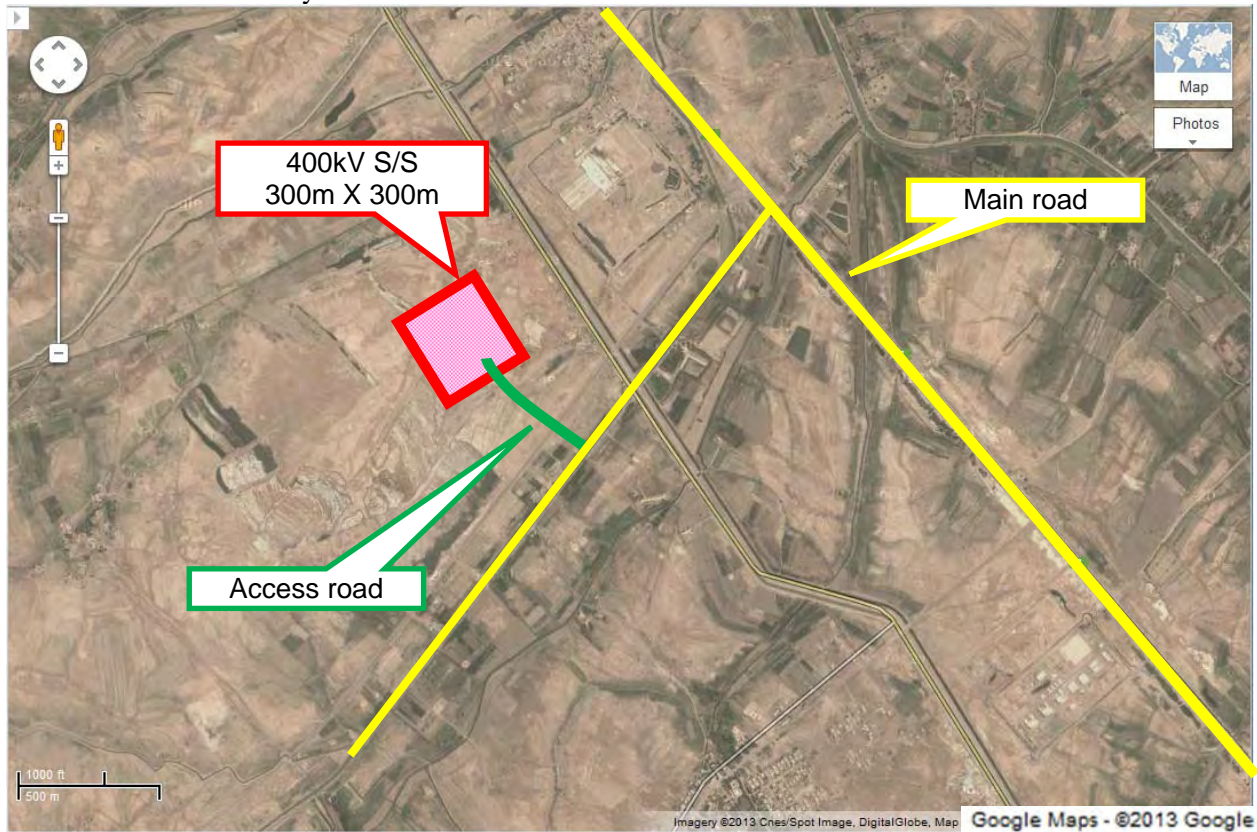


Figure 2.6.5 The Recommended Site Layout (Reference)

Land required for 400kV Substation construction is an area of Approx.300m×300m including the storage, temporary facilities and future expansion spaces. Access road from the gate of the substation to the existing main road will be created along the existing public dirt road as shown above.

2.6.8 Photograph of the Site *(reference site)*



Figure 2.6.6 Orientation of Photo Shot from the point

	Photo No.1
	Photo No.2
	Photo No.3

	Photo No.4
	Photo No.5
	Photo No.6

	<p>Photo No.7</p>
	<p>Photo No.8</p>
	<p>Photo No.9</p>



2.7 Missan

2.7.1 The location of the candidate site

The site is in Missan, Amarah, where is agricultural area of Missan governorate. The GPS coordinate of the main point on the site is 31°54'31.35"N, 46°57'52.08"E.



Figure 2.7.1 The location of the Candidate site

2.7.2 Outline of the candidate site

Outline of the candidate site is as follows.

- (1) Access to the site No.2 is through an unpaved road linking the site to the paved road (Baghdad/Amarah road or the 6th Street) that links Baghdad to Amarah City. Traffic travelling in opposite directions is separated by a road median, with each side being about 8 meter wide and has two lanes. There were no new roads planned in the area at the time of this study. There are no railways in this substation study area.
- (2) It is an agricultural land at the time of visit, generally coverage by shrubs.
- (3) The site is owned by the Ministry of Finance.
- (4) The electricity infrastructure consists of 132kV and 400kV transmission line and other smaller lower voltage lines servicing houses and farms in the area and two other 132 kV SS under construction (Ali Al-Garby SS and Kumayt SS)
- (5) Generally the site is covered by water, and there is a canal used for agriculture irrigation that separates the site from the main road.
- (6) The main road can be seen from the site.

2.7.3 Result of the Site Survey

Table 2.7.1 The Results of the Site Survey

1	Substation Name	Amarah 400 kV SS
2	Name of the Governorate, city	Missan, Amarah
3	Date of the survey	Tuesday April 01, 2013 at 13:00
4	Surveyed by	GDFEET / South: Eng. Farrid Awaid (+964 780 139-1234) GDFEET / Southwest: Eng. Mosaa Mtasher (+964 780 102 6741) Local Consultant: Eng. Dheyaa A. Hasan and Eng. Humam Hassan
5	Site Survey Results	
5.1	Area Identification	It is deserted agricultural land, generally covered by some plants
5.2	Land Acquisition	Owned by the Ministry of Finance.
5.3	Residential houses inside	No
5.4	Water appearance	The surface covered by water and there is water canal used for agriculture irrigation.
5.5	Access road condition	The average traffic flow on the main road the 6th street (Baghdad / Amarah) to the site is about 1200 vehicles per hour in both directions on dual paved carriageway road, each side is about 8 meter wide and has two lanes. Discussions indicated that the road could be significantly busier in the morning and afternoon due to people travel from Baghdad and Kut to Amarah and vice versa. The traffic was a mix of passenger vehicles and heavy vehicles. In order to access the site, there is need to construct an access road and bridge to the site area to cross the water canal.
5.6	Any obstructions	No apparent obstructions in the site area.
5.7	Any facilities such as school, hospital, etc.	The nearest population gathering is at least 5 kilometers from the site
5.8	Topographical Survey at site	
	a. Horizontal coordinates (4corners and existing roads)	The exact corners of the site have not been located yet. It is recommended that the site be located as close as possible to the dirt road where the team stopped. It requires a bridge to be constructed to cross the canal during construction and during operation. Discussions with GDFEET / Southeast staff indicated that the Ministry of Finance would agree on build 400 KV substation on this land.
	b. Horizontal Dimensions (Including existing roads)	The total Land required for the site is 20 Iraqi acres to include access road and 20 service houses
	c. Vertical Coordinates, (Maximum difference in sideand between roads and the site)	The difference in elevation between the dirt road where the vehicles were parked and the extreme edge of the site is not more than 1 meter, while the earth shoulder of the canal is about 3 meters higher than the land area.

The recommended site layout for 400kV Substation is as shown below.

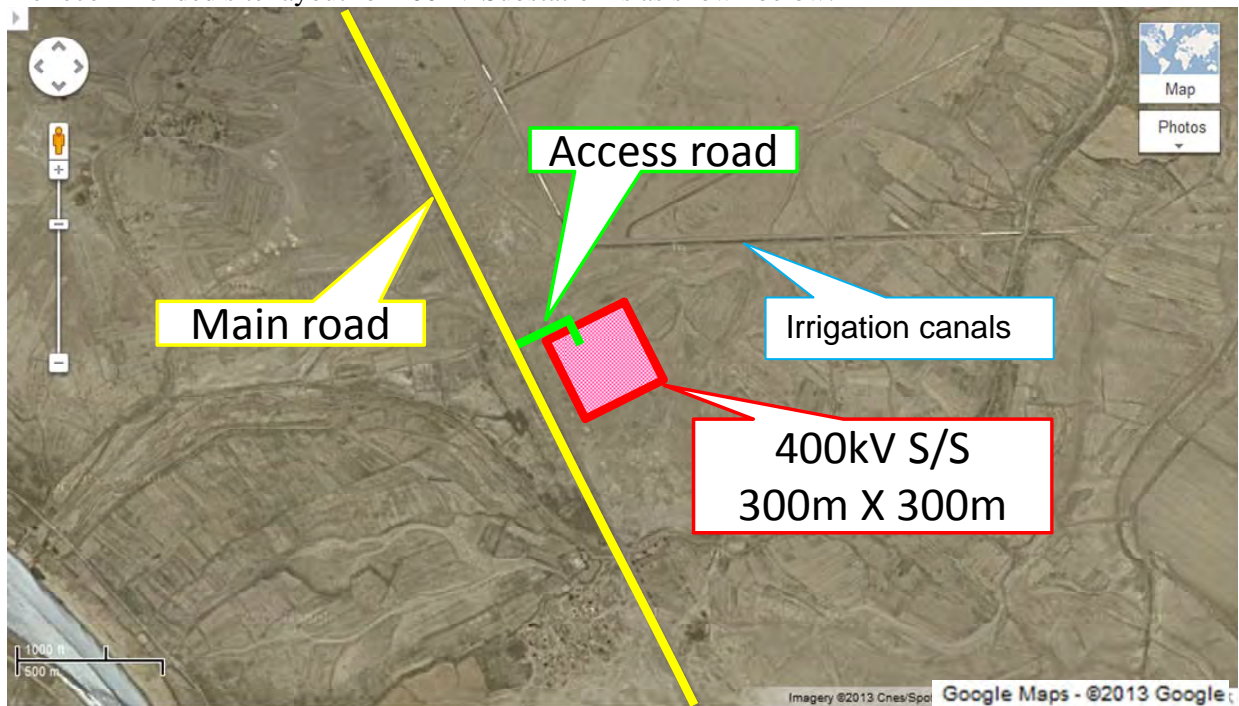


Figure 2.7.2 The Recommended Site Layout (Reference)

Land required for 400kV Substation construction is an area of Approx.300m×300m including the storage, temporary facilities and future expansion spaces.
 Access road from the gate of the substation to the existing main road will be created along the existing public dirt road as shown above.

2.7.4 Photograph of the Site

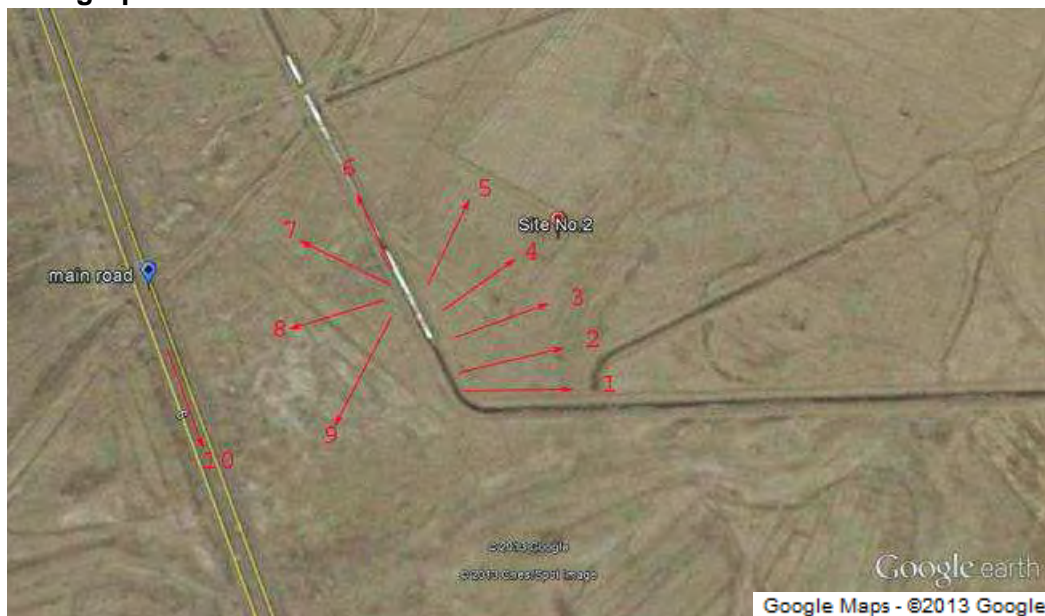


Figure 2.7.3 Orientation of Photo Shot from the point

	Photo No.1
	Photo No.2
	Photo No.3




	<p>Photo No.4</p>
	<p>Photo No.5</p>
	<p>Photo No.6</p>

	Photo No.7
	Photo No.8
	Photo No.9



Under the guidance of the local MoE staff, the following site of Missan governorate was also carried out the survey. However, through the discussion with MoE, this site was decided as the reference site. For reference, the results of the site survey are as follows.

2.7.5 The location of the reference site

The site is in Missan, Amarah, where is agricultural area of Missan governorate.

The GPS coordinate of the main point on the site is 31°53'24.80"N, 47°10'50.98"E.



Figure 2.7.4 The location of the Reference site

2.7.6 Outline of the reference site

Outline of the candidate site is as follows.

- (1) Access to the site is from an 8-meter bumpy paved road. There is no median available to separate opposing flows of traffic, and there are no new roads planned in the area at the time of this study. There are no railways in this substation study area.
- (2) It is a deserted agricultural land at the time of visit, generally covered by some shrubs.
- (3) The site is owned by the government (Ministry of Finance)
- (4) The electricity infrastructure consists of a 400kV transmission line and other smaller lower voltage lines servicing houses and farms in the area. The proposed site area is about 3 kilometers away from an existing 200 MW power plant (STX Korea Project) and North of Amarah 132 kV SS.
- (5) There is no evidence or history of significant flooding on the site.
- (6) The main road can be seen from the site.

2.7.7 Result of the Site Survey (*Reference site*)

Table 2.7.2 The Results of the Site Survey (Reference Site)

1	Substation Name	Amarah 400 kV SS
2	Name of the Governorate, city	Missan, Amarah
3	Date of the survey	Tuesday April 01, 2013 at 11:00 am
4	Surveyed by	GDFEET / South: Eng. Farrid Awaid (+964 780 139-1234) GDFEET / Southwest: Eng. Mosaa Mtasher (+964 780 102 6741) Local Consultant: Eng. Dheyaa A. Hasan and Eng. Humam Hassan
5	Site Survey Results	
5.1	Area Identification	It is deserted agricultural land , generally covered by some shrubs
5.2	Land Acquisition	Owned by the Ministry of Finance.
5.3	Residential houses inside	No
5.4	Water appearance	No surface water and there is no evidence or history of significant flooding on the site. There is evidence for high water level in the areas far away from the proposed site No.1.
5.5	Access road condition	The traffic flow on the main road is about 100 vehicles per hour in both directions on a single paved carriageway road, and the traffic was a mix of passenger vehicles and heavy vehicles.
5.6	Any obstructions	No apparent obstructions in the site area
5.7	Any facilities suchas school, hospital,etc	The nearest population gathering is about 2 kilometers from the site
5.8	Topographical Survey at site a. Horizontal coordinates (4corners and existing roads)	The exact corners of the site have not been located yet. It is recommended that the site be located as close as possible to the main road. Discussions with GDFEET / Southeast staff indicated that the land is available and Ministry of Finance would agree on build 400 KV substation on this land
	b. Horizontal Dimensions (Including existing roads)	The total Land required for the site is 20 Iraqi acres, including the access road and 20 service houses.
	c. Vertical Coordinates, (Maximum difference in sideand between roads and the site)	The difference in elevation between the dirt road where the team stopped and the vehicles were parked, and the extreme edge of the site varies between 0.5 to 1.5 meters over a distance of about 2000 meters.

The recommended site layout for 400kV Substation is as shown below.

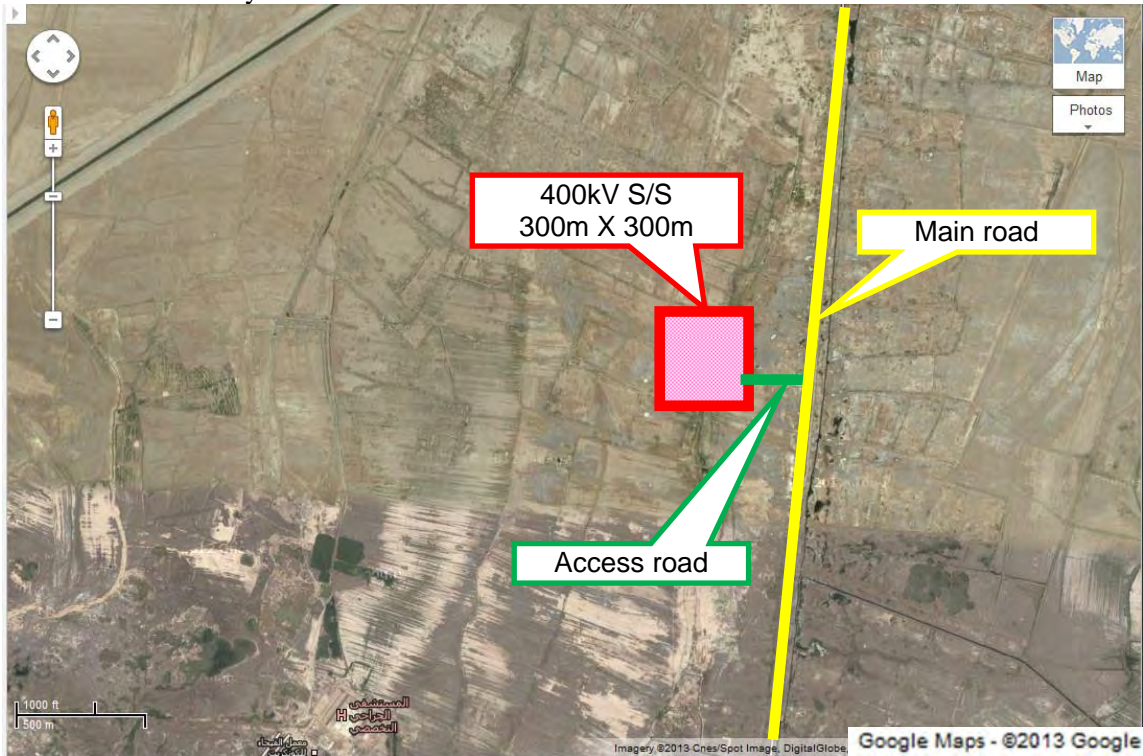


Figure 2.7.5 The Recommended Site Layout (Reference)

Land required for 400kV Substation construction is an area of Approx.300m×300m including the storage, temporary facilities and future expansion spaces.

Access road from the gate of the substation to the existing main road will be created along the existing public dirt road as shown above.

2.7.8 Photograph of the Site (Reference site)

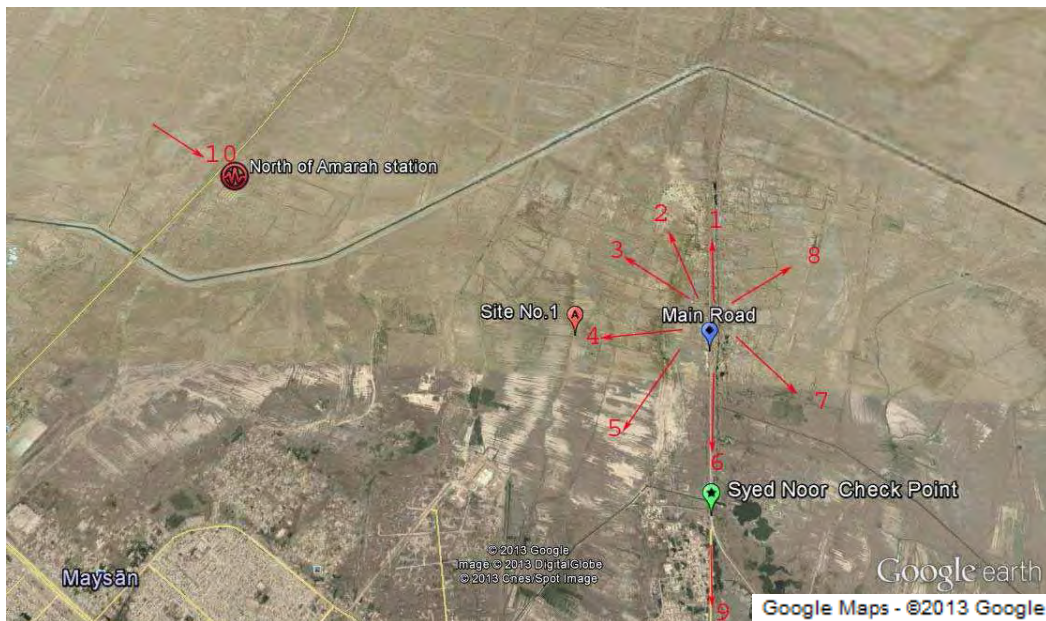






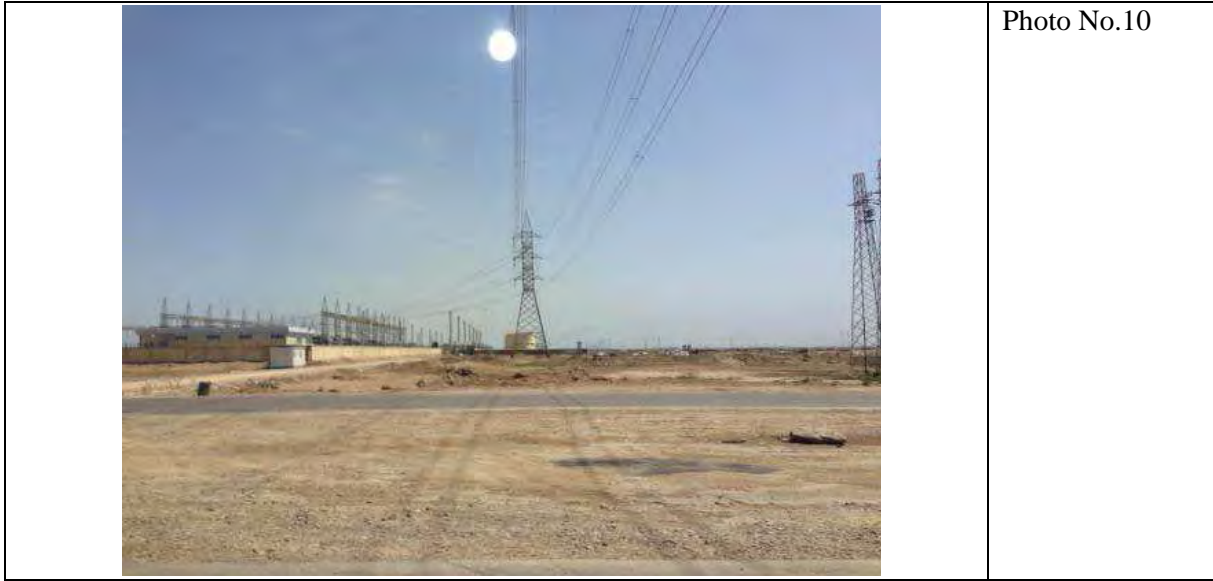


Figure 2.7.6 Orientation of Photo Shot from the point

	Photo No.1
	Photo No.2
	Photo No.3

	<p>Photo No.4</p>
	<p>Photo No.5</p>
	<p>Photo No.6</p>

	<p>Photo No.7</p>
	<p>Photo No.8</p>
	<p>Photo No.9</p>



2.8 Al-Fayha'

2.8.1 The location of the candidate site

The site is in Basra, Basra, where is deserted salty area of Basra governorate.

The GPS coordinate of the main point on the site is 30°25'22.47"N, 48°1'24.46"E.



Figure 2.8.1 The location of the Candidate site

2.8.2 Outline of the candidate site

Outline of the candidate site is as follows.

- (1) The Site is located in small town called Al-Awja, just south of local road (Hamdan Street) connect Basra city to the Faw City, GPS Coordinate (30°25'19.65"N, 48° 1'24.23"E).
- (2) Access to this site is from a paved rural road connected to a local single carriageway paved road about 8 meter wide without a median to separate opposing flows of traffic with one lane for each direction that links Basra City to the Faw City. Use of the main road would be confined to access to a small town from Basra City all the way to the Faw City. There are a number of regional roads and no railways in this proposed substation study area, and there were no new roads planned in the area at the time of this study.
- (3) It is a deserted salty land area at the time of visit, and it is fairly leveled and it does not require a lot of cut and fill.
- (4) There is no evidence or history of significant flooding on the site, the nearest rivers is Shat Al Arab river which is about 4km away from the site and Abo Floos river about 2Km.
- (5) The electricity infrastructure consists of 132kV Abo Floos Substation, GPS Coordinates (30°25'50.12"N, 48° 1'29.83"E) and a few 132kV and 32kV transmission line and there are smaller, lower voltage lines servicing houses and farms in the area.
- (6) The site has good connectivity to the existing transmission system and is well serviced by public roadways. The site is can be accessed by a paved rural road linking Basra City to small villages and towns all the way to the Faw City. The preferred location within the site is in a field to the south of this road about 0.9 km from 132kV Abo Floos SS.

2.8.3 Result of the Site Survey

Table 2.8.1 The Results of the Site Survey

1	Substation Name	Al-faihaa 400 kV SS
2	Name of the Governorate, city	Basra ,Basra
3	Date of the survey	March 28th 2013
4	Surveyed by	GDFEET (south): Engineer Farrid Awaid (+964 780 139-1234) Local Consultant: Dheyaa A. Hasan, Humam Hassan, Khajak Vartanian
5	Site Survey Results	The site is suitable for 400KV SS at this time according to GDFEET (South), it will solve the high demand problem which will serve a local domestic consumption + industrial and others demand.
5.1	Area Identification	Salty area
5.2	Land Acquisition	Government owned but not certain which ministry. It might be owned by the Ministry of Agriculture or Ministry of Finance and leased to farming families.
5.3	Residential houses inside	No houses
5.4	Water appearance	There is no apparent surface water resources in the area
5.5	Access road condition	Traffic density and speed are very high on the main road because it is a single carriageway. The traffic was a mix of passenger cars and heavy vehicles. It is about 1000 vehicles per hour in both direction at the time of the visit, which is nearly half the capacity of such roadway facilities.
5.6	Any obstructions	No apparent obstructions in the site area
5.7	Any facilities such as school, hospital, etc.	The nearest population gathering is at least 2 kilometers from the site
5.8	Topographical Survey at site	It's fairly leveled and it doesn't required a lot of cut and fill
	a. Horizontal coordinates (4corners and existing roads)	The exact corners of the site have not been located yet.
	b. Horizontal Dimensions (Including existing roads)	The total Land required for the site is 20 Iraqi acres, that include access road and 20 service houses
	c. Vertical Coordinates, (Maximum difference in sideand between roads and the site)	The land is fairly leveled but it' might require some cut and fill

The recommended site layout for 400kV Substation is as shown below.

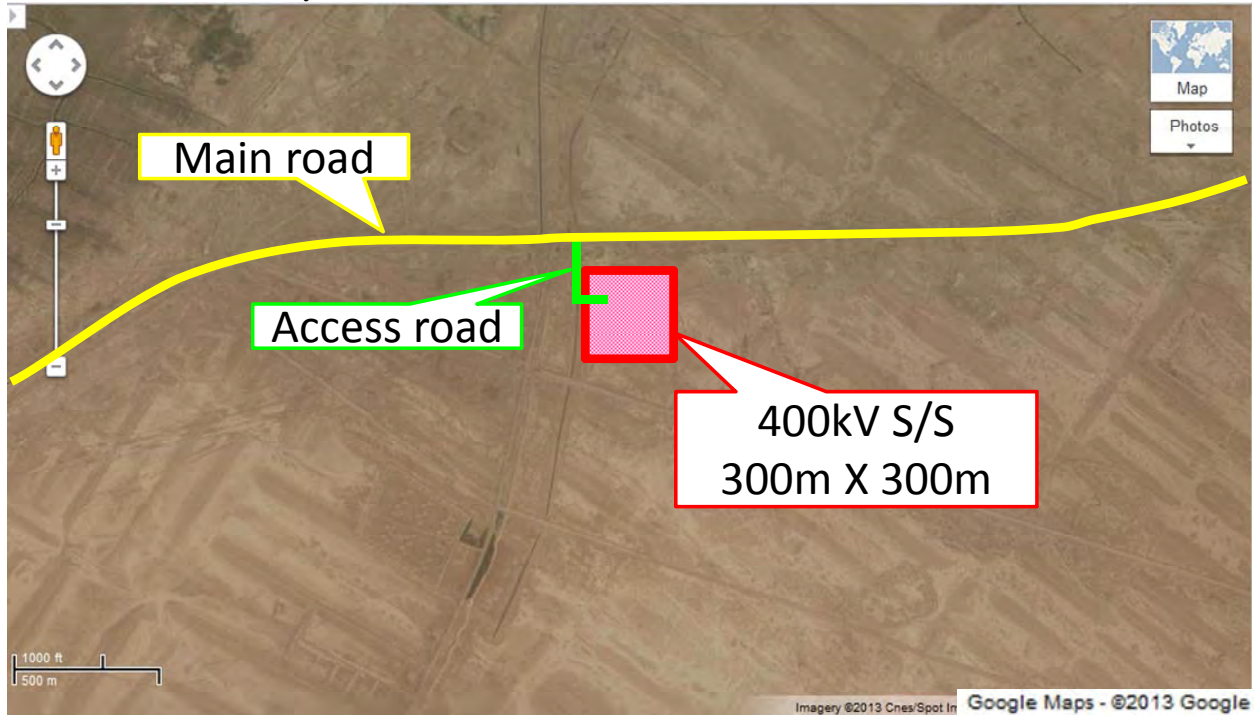


Figure 2.8.2 The Recommended Site Layout (Reference)

Land required for 400kV Substation construction is an area of Approx.300m×300m including the storage, temporary facilities and future expansion spaces. Access road from the gate of the substation to the existing main road will be created along the existing public dirt road as shown above.

2.8.4 Photograph of the Site

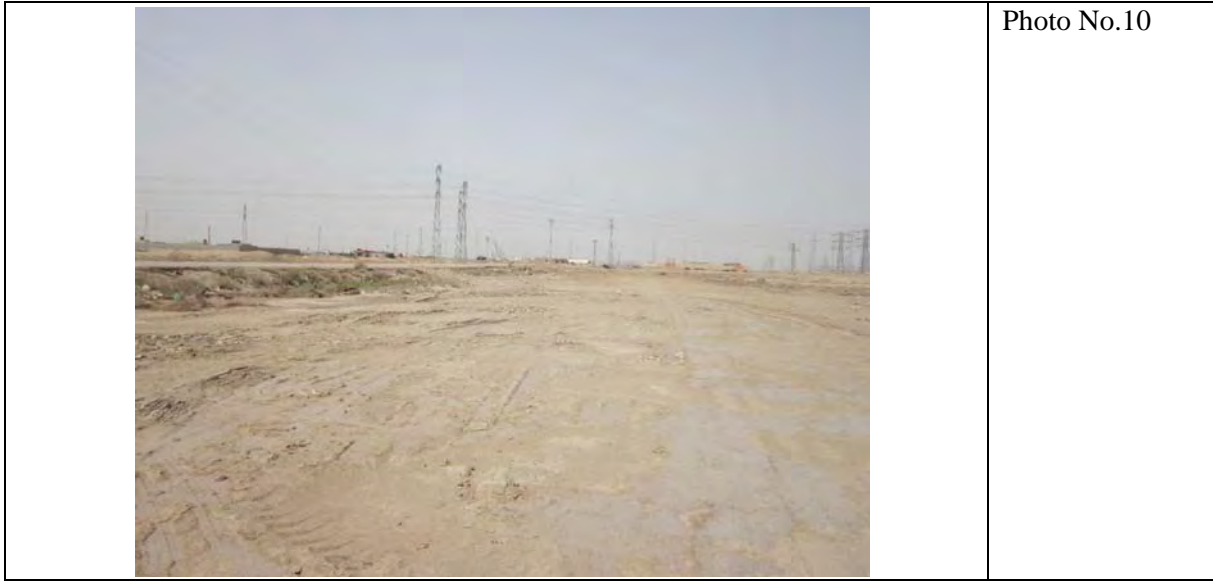


Figure 2.8.3 Orientation of Photo Shot from the point

	Photo No.1
	Photo No.2
	Photo No.3

	Photo No.4
	Photo No.5
	Photo No.6

	Photo No.7
	Photo No.8
	Photo No.9



Under the guidance of the local MoE staff, the following site of Basra governorate was also carried out the survey. However, through the discussion with MoE, this site was decided as the reference site.

For reference, the results of the site survey are as follows.

2.8.5 The location of the reference site

The site is in Basra, Basra, where is deserted salty area of Basra governorate.

The GPS coordinate of the main point on the site is 30°5'11.33"N, 47°48'5.20"E.



Figure 2.8.4 The location of the Reference site

2.8.6 Outline of the reference site

Outline of the candidate site is as follows.

- (1) The Site is located in a small village called Al-Mlihat, just south of the road coming from Safwan to Um Qasr), GPS Coordinate (30° 5'12.04"N , 47°48'4.84"E)
- (2) Access to this site is from a dual paved road that links Basra City and Safwan City to Um Qasr, traffic travelling in the two directions on this road is separated by a road median. Each side about 8 meter wide and has two lanes. Use of the road would be confined to access to Um Qasr City for large scale deliveries due to the presence of Um Qasr Port. There are a number of regional roads in this substation study area. There were no new roads planned in the area at the time of this study. There are no railways in this substation study area.
- (3) It is a deserted agricultural land at the time of visit, generally coverage by plants and bounded by a few houses and empty buildings.
- (4) There is no evidence or history of significant flooding on the site. There are no rivers or streams in the area.
- (5) The electricity infrastructure consists of 33KV transmission line and there are smaller, lower voltage lines servicing houses and farms in the area and the proposed site area is about 3.5 - 4 km away from an existing 132kV SS according to GDFEET / South.
- (6) The site has good connectivity to the existing transmission system and is well serviced by public roadways. The site can be accessed by a paved road linking the Basra and Safwan to Um Qasr. The preferred location within the site is in a field to the South of this road, and about 3.5 km southwest of SST 132KV SS and close to KAZ power station (according to GDFEET / South Staff Member)

2.8.7 Result of the Site Survey (*Reference site*)

Table 2.8.2 The Results of the Site Survey (Reference Site)

1	Substation Name	Al-Faihaa 400kV SS
2	Name of the Governorate, city	Basra, Safwan
3	Date of the survey	March 28, 2013 11:00
4	Surveyed by	GDFEET / South: Engineer Farrid Awaid (+964 780 139-1234) Local Consultant: Dheyaa A. Hasan, Humam Hassan, Khajak Vartanian
5	Site Survey Results	The site is not suitable for 400KV SS at this time because there is no suitable demand in this site and it will mostly serve industrial zone only in the future according to GDFEET / South, while they need to find a suitable location where high demand are available specially for the domestic consumption, so they suggested more sufficient site as mentioned in option 2 to solve the high demand problem which will serve a local domestic consumption + industrial and other demand.
5.1	Area Identification	Deserted agricultural area
5.2	Land Acquisition	Owned by the Ministry of Agriculture (governmental) and leased to farming families.
5.3	Residential houses inside	Five houses
5.4	Water appearance	There is no apparent surface water resources in the area
5.5	Access road condition	Traffic density and speed vary from time to time on the main road. It could be really busy in early morning and late afternoon due to deliveries of Heavy Commercial Vehicles that passing the road going to / coming from Um Qasr Port. It is about 500 to 800 vehicles per hour in both directions.
5.6	Any obstructions	No apparent obstructions in the site area
5.7	Any facilities such as school, hospital, etc.	The nearest population gathering is at least 4 to 5 kilometers from the site
5.8	Topographical Survey at site a. Horizontal coordinates (4corners and existing roads)	It is almost flat area. The exact corners of the site have not been located yet.
	b. Horizontal Dimensions (Including existing roads)	The total Land required for the site is 20 Iraqi acres. That include access road and 20 service houses
	c. Vertical Coordinates, (Maximum difference in sideand between roads and the site)	The difference in elevation between the unpaved road and the extreme edge of the site is not more than 1 to 1.5 meters over a distance of about 1500 meters.

The recommended site layout for 400kV Substation is as shown below.

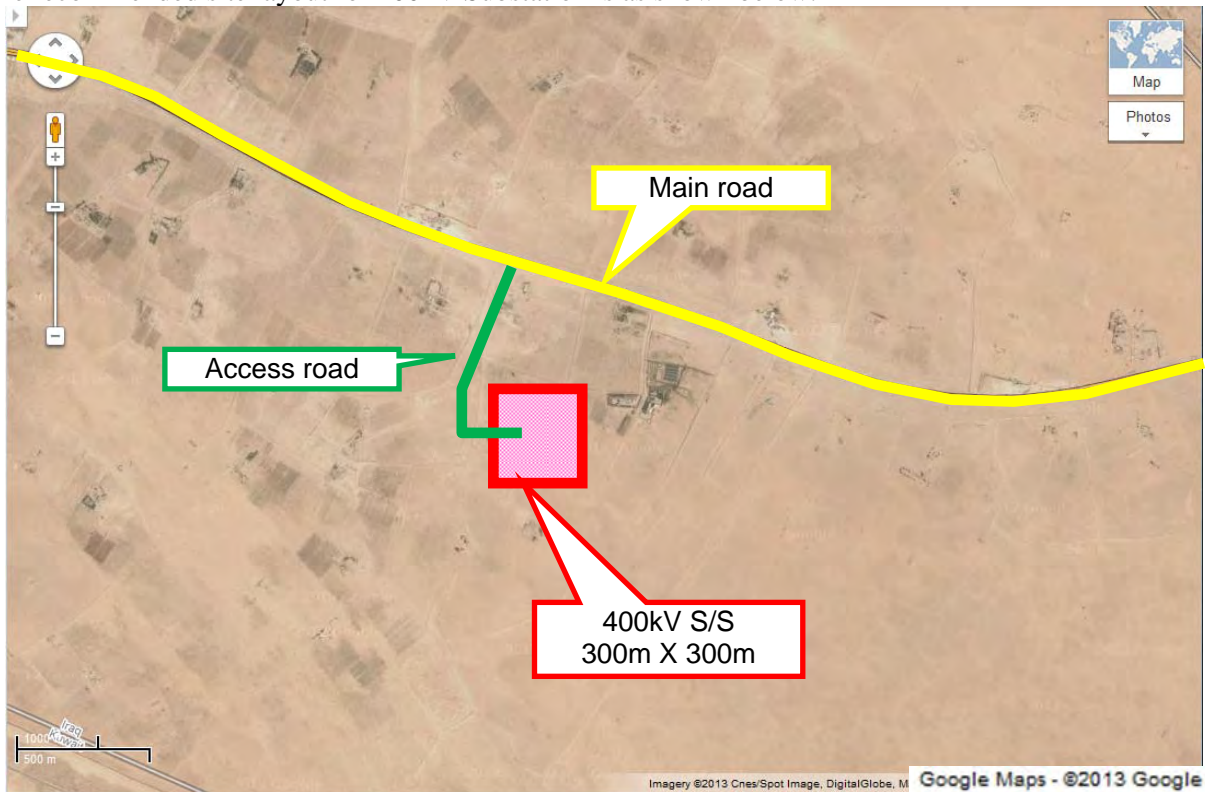


Figure 2.8.5 The Recommended Site Layout (Reference)

Land required for 400kV Substation construction is an area of Approx.300m×300m including the storage, temporary facilities and future expansion spaces.

Access road from the gate of the substation to the existing main road will be created along the existing public dirt road as shown above.



2.8.8 Photograph of the Site (Reference site)



Figure 2.8.6 Orientation of Photo Shot from the point

	<p>Photo No.1</p>
	<p>Photo No.2</p>
	<p>Photo No.3</p>

	Photo No.4
	Photo No.5
	Photo No.6

	Photo No.7
	Photo No.8
	Photo No.9

Appendix-2
Initial Environmental Examination

Appendix 2 Initial Environmental Examination

1. Ninawa Substation

Ninawa is a province in north of Iraq, with an area of 37,323 km². The capital is Mosul which lies near Tigris. 2,600,000 people live in the province. The name Ninawa is the Arabic name for Nineveh.

1.1 The Location of Candidate Nisawa Substation

Candidate Ninawa substation is in Al-Hamdaniya District of Ninawa Governorate.

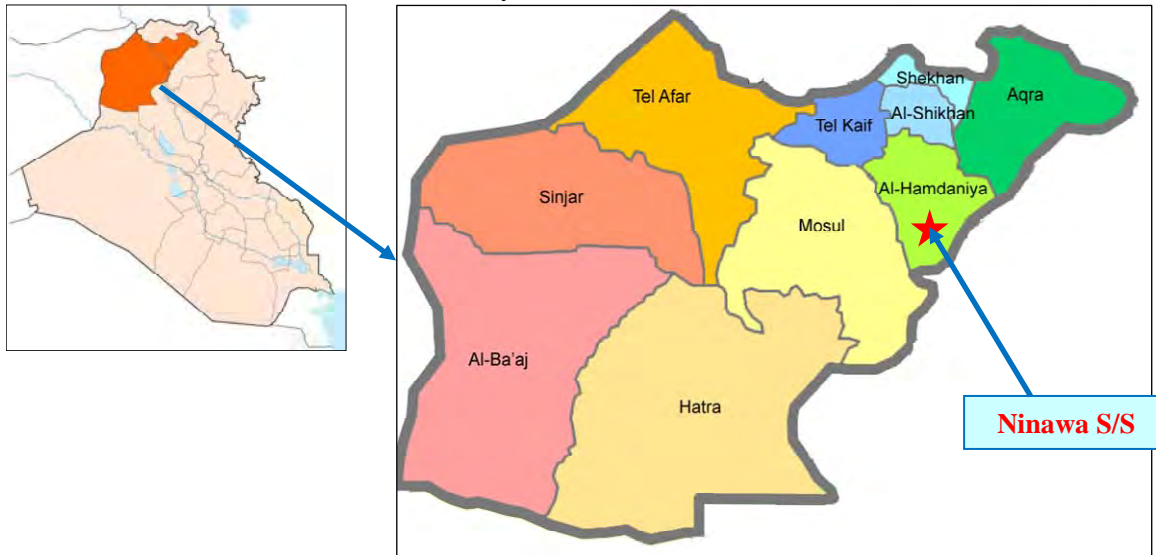


Figure A1. 1 Ninawa Governorate and Candidate Ninawa Site in Ninawa

Candidate site:

- Facing to route 80, which reaches to Mosul of 34 km away to northwest direction.
- Tigris River flows 9 km away to west direction.
- Zab River flows 10 km away to east direction.
- Ancient city of Bakhdida exists 16 km away to north direction.

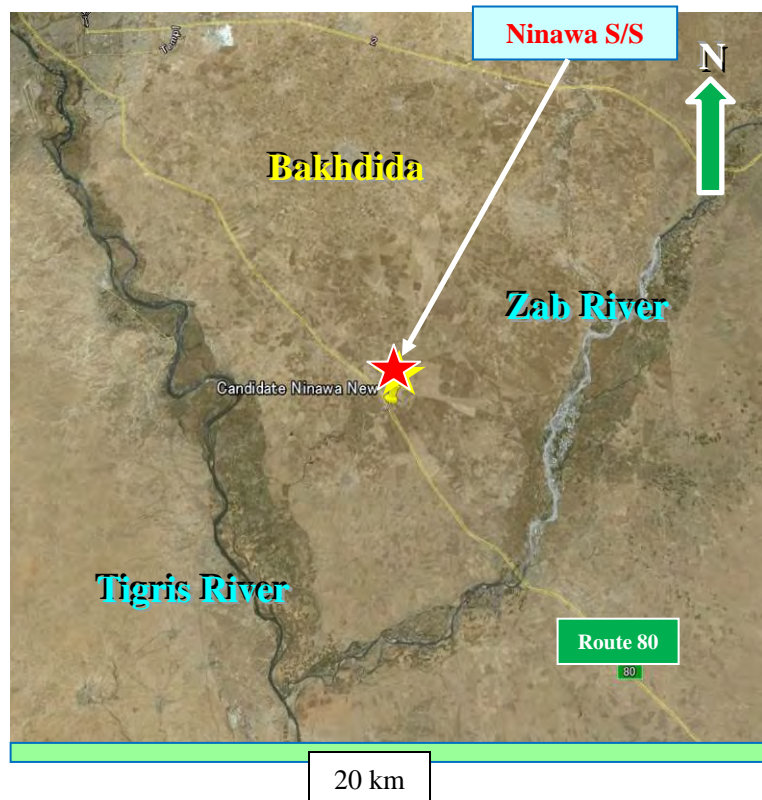


Figure A1. 2 (Ninawa) Location of Candidate Site in 20 × 20 km Area

1.2 Site Neighboring Area and Photo Taking Direction

Candidate site of Ninawa Substation is surrounded by agricultural area. The Sub-District named “Al Khidhir” is 1.3 km north of candidate site. There is the Monastery of Mar Behnam 1 km away from site to north.



Figure A1. 3 (Ninawa) Location of Candidate Site in 3×3 km Area

1.3 Photos from site



Figure A1. 4 (Ninawa) Vehicles on Route 80



Figure A1. 5 (Ninawa) Agricultural Land of Rain Fed Wheat



Figure A1. 6 (Ninawa) Route 80, Distribution Line



Figure A1. 7 (Ninawa) Distant Al Khidhir Sub-District over Route 80

1.4 Social Consideration

Site is located in agricultural area and owned by Ministry of Agriculture (MOA). And MOA lease the lands to farmers. It is necessary to negotiate with each farmers about re-allotment of land or compensation. Transition of land-ownership is necessary from MOA to MOE.

As the Sub-District named “Al Khidhir” is 1.3 km away, the installation of substation has no impact on the life of Sub-District people.

1.5 Historical Monastery (Monastery of Mar Behnam)¹

There is the Monastery of Mar Behnam 1 km away from site to north. Monastery of the Martyrs Saint Behnam and his Sister Sarah is a Syriac Catholic monastery in northern Iraq. The monastery was built in the 4th century AD. The monastery was renovated in 1986, and is visited by thousands of Christians and Muslims yearly. The installation of substation has no impact on this monastery.

¹ “Mar Behnam Monastery”, From Wikipedia, the free encyclopedia



Figure A1. 8 (Ninawa) Center of Al Khidhir Sub-District

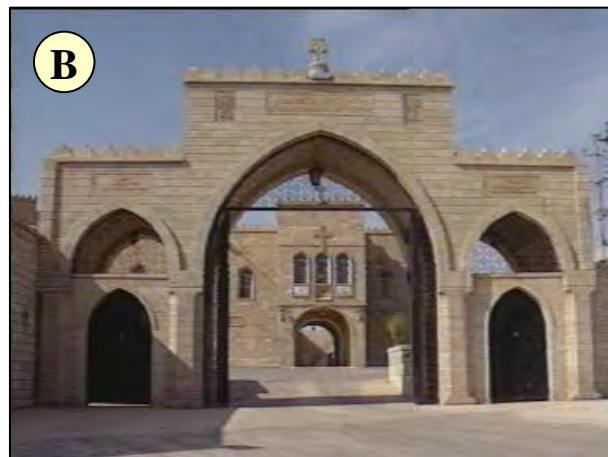


Figure A1. 9 (Ninawa) Monastery of Mar Behnam and his sister Sarah

1.6 Stakeholders in Ninawa Substation Project

Table A1. 1 Stakeholders in Ninawa Substation Project

Government and Local Government	Ministry of Environment (MOEN)	Ministry of Agriculture (MOA)
	Provincial Office of MOEN	Ministry of Electricity (MOE)
Non-Government	BPIE North of MOEN	
	Farmers plowing site	
	Representatives of Al-Khidhir Sub-District	

1.7 Ninawa Substation Environment Check List (Power transformation and transmission)

Table A1. 2 (Ninawa) Permits, approvals and explanations

Items	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) EIA & Environmental Permit	(a) Is the report of environment impact assessment and etc. is already created?	N	EIA is not necessary for "Class B" project. Instead IEE is necessary.
	(b) Does government approved EIA report?	N	IEE is not yet approved. In Iraq, Environmental Compliance Certificate is required.
	(c) Are there any collateral conditions to government approval? Could such collateral conditions be complied with?	Y	Environmental Regulation for Industrial, Agricultural and Service Project (No. 14 of 1990) stipulate concrete regulations.
	(d) Other than those above, did local competent authorities give environmental permit if required?	N	Provincial Office of MOEN and BPIE North of MOEN will check IEE report and submit to MOEN.
(2) Explanation to Local Stakeholders	(a) Are project contents and impacts including information disclosure explained properly to local stakeholders? And do they understand them?	N	To be conducted after selection as implementing site.
	(b) Are the comments of residents reflected to project?	N	Ditto
(3) Study of Alternatives	(a) Are multiple project alternatives studied? (Including environmental and social consideration)	Y	Various sites are studied. And this site is selected as giving the least impact on environment and society.

Table A1. 3 (Ninawa) Anti-pollution measures

Items	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Water Quality	(a) Is there any water pollution by soil in peripheral river basin, which flow from exposed surface by banking and cutting of soil? Are any countermeasures prepared in case of water pollution?	N	Tigris river is 9 km away from site. Soil by banking and cutting never pollute river basin.

Table A.I. 4 (Ninawa) Natural Environment

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Protected Area	(a) Is the project site located in protected areas specified by domestic legislation or international treaty, etc.? Does project cause adverse effect on the protected areas?	N	
	(a) Does project site encompass primary forests, natural forests in tropical areas, habitats with important ecological value (coral reefs, mangrove wetlands, tidal flats, etc.)?	N	
	(b) Does project site encompass habitats of rare species that require protection under domestic legislation, international treaties, etc.?	N	
	(c) When serious adverse effects on ecosystem are expected, are any countermeasures taken to mitigate them?	N	
(2) Ecological System	(d) Are measures taken for blocking the migration pathway of wild and domestic animals and setting apart habitats?	N	
	(e) Does project implementation cause deforestation, poaching, desertification and dried moor? Do alien species or pest, which do not inhabit in the past induce, leading to disrupting ecosystem? Are any countermeasures prepared?	N	
	(f) Does the construction in undeveloped region harm natural environment?	N	
	(a) Is there any geologically faulty location on the routes of transmission and distribution lines, which induces soil collapse or land slide? Does proper construction method of treatment applied to faulty location?	N	Transmission lines will cross agricultural region and Tigris River. Proper construction method could be applied
(3) Geography and Geology	(b) Does civil work like banking or cutting soil cause the soil collapse or landslide? Does proper countermeasure applied to prevent the soil collapse or landslide?	N	As large scale banking or cutting soil is not necessary, there is no potential of soil collapse or landslide.
	(c) Does soil flow out from the sites of banking, cutting and dumping? Does proper countermeasure applied to prevent the soil flowage?	N	Soil from site should be utilized as temporary road construction.

Table A1. 5 (Ninawa) Social Environment

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Resettlement of Residents	(a) Does project cause involuntary resettlement of residents? Is the effort to minimize the resettlement effect made when resettlement is required?	N	As the site and transmission line is agricultural area, project does not cause involuntary resettlement of residents. However, this site is owned by Ministry of Agriculture (MOA), it is necessary to transfer the ownership from MOA to MOE. Farmers lease agricultural land from MOA, it is necessary to provide alternative site. If farmers are not agree to alternative site, some compensation is required.
	(b) Is the proper explanation given to resettling residents regarding to the measures of compensation and life restoration before resettlement?	N	
	(c) Is the resettlement plan including the compensation by reacquisition price and restoration of livelihood drawn based on survey of resident resettlement?	N	
	(d) Is compensation money paid before resettlement?	N	
	(e) Is the compensation policy written in the form of documents?	N	
	(f) Is the proper consideration taken into the resettling plan for gender, children, elderly people, poverty group, ethnic minority and indigenous people among resettling residents?	N	
	(g) Does resettling residents agree before resettlement?	N	
	(h) Is proper structural plan established, implementing resettlement of residents? Are sufficient capacity building and budget prepared?	N	
	(i) Is monitoring plan of resettlement established?	N	
	(j) Is complaint processing system established?	N	
(2) Life and Livelihood	(a) Does the project cause adverse effect on resident life? Is measure to mitigate effect considered if necessary?	N	As the residential area of Sub-District "Al Khidhir" is 1 km north of site, project does not cause adverse effect on resident life.
	(b) Is there any danger of disease contraction (infection such as HIV) by the population flux? Is the consideration to public health made if necessary?	N	There is no population flux during construction and operation.
	(c) Do iron tower etc. cause radio disturbance? Does proper measure considered when serious radio disturbance is expected?	N	Farmers working in agricultural fields could keep necessary distance to avoid the effect of radio disturbance by designing the height of iron tower and transmission lines.
	(d) Is the compensation etc. under transmission lines implemented law by the construction of such lines based on domestic?	N	

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(3) Cultural Heritage	(a) Is there any damage to archaeological, historical, cultural and religious precious heritage by project implementation? Are the measures, specified in domestic law of host country, considered?	N	There is the Monastery of Mar Behnam 1 km away from site to north. Project does not damage to it.
(4) Landscape	(a) Does project cause adverse effect on the landscape, which requires extra consideration? If adverse effect is expected, are necessary measures taken?	N	
(5) Ethnic Minority and Indigenous People	(a) Are consideration taken to mitigate effect on culture and life style of ethnic minority and indigenous people?	N	There is no ethnic minority.
	(b) Are the various rights regarding to land and resources possessed by ethnic minority and indigenous people respected?	N	
(6) Labor Environment	(a) Are the law and regulation of host country regarding to labor environment complied?	Y	
	(b) Are safety considerations to related personnel of project taken including the installation of safety facilities for preventing occupational accidents and management of harmful substances?	Y	
	(c) Are software aspects planned and implemented such as drawing of safety and health plan, implementing safety education to employees (including traffic safety and public health)?	Y	To be prepared before implementation
	(d) Are proper security measures taken not to impinge the safety of project related personnel and local residents?	Y	

Table A1. 6 (Ninawa) Others

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Impact during Construction	(a) Is mitigation plan prepared for the pollution during construction? (Noise, vibration, murky water, dust, waste gas and wastes etc.)	Y	To be prepared before implementation
	(b) Does construction work give adverse effect on natural environment (ecosystem)? Are mitigating measures of adverse effect prepared?	N	
	(c) Does construction work cause an adverse effect on social environment? Are mitigating measures of adverse effect prepared?	N	
(2) Monitoring	(a) Do project proponents plan and implement the monitoring of affected items among above environmental items?	Y	To be prepared before implementation
	(b) Are the items, methodologies and frequency of above mentioned plan judged as appropriate?	Y	
	(c) Is the monitoring framework of project proponents established such as organization, manpower, equipment and continuity of these items?	N	To be prepared before implementation
	(d) Is the reporting method and frequency from project proponents to the governing authority specified?	Y	

Table A1. 7 (Ninawa) Note

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
Referring other environment checklist	(a) If necessary, add and evaluate related items of road checklist.	N	
Instruction for the use of environment checklist	(a) If necessary, confirm the environmental impact of border crossing global scale. (Border crossing of waste, acid rain, destruction of ozone layer and global warming)	N	

2. Al-Anbar Substation

Al Anbar Governorate is the largest governorate in Iraq geographically. Encompassing much of the country's western territory, it shares borders with Syria, Jordan, and Saudi Arabia. The provincial capital is Ramadi, other important cities include Fallujah and Haditha.

2.1 The Location of Candidate Al-Anbar Substation

Candidate Al-Anbar substation is in Ramadi District of Al-Anbar Governorate.

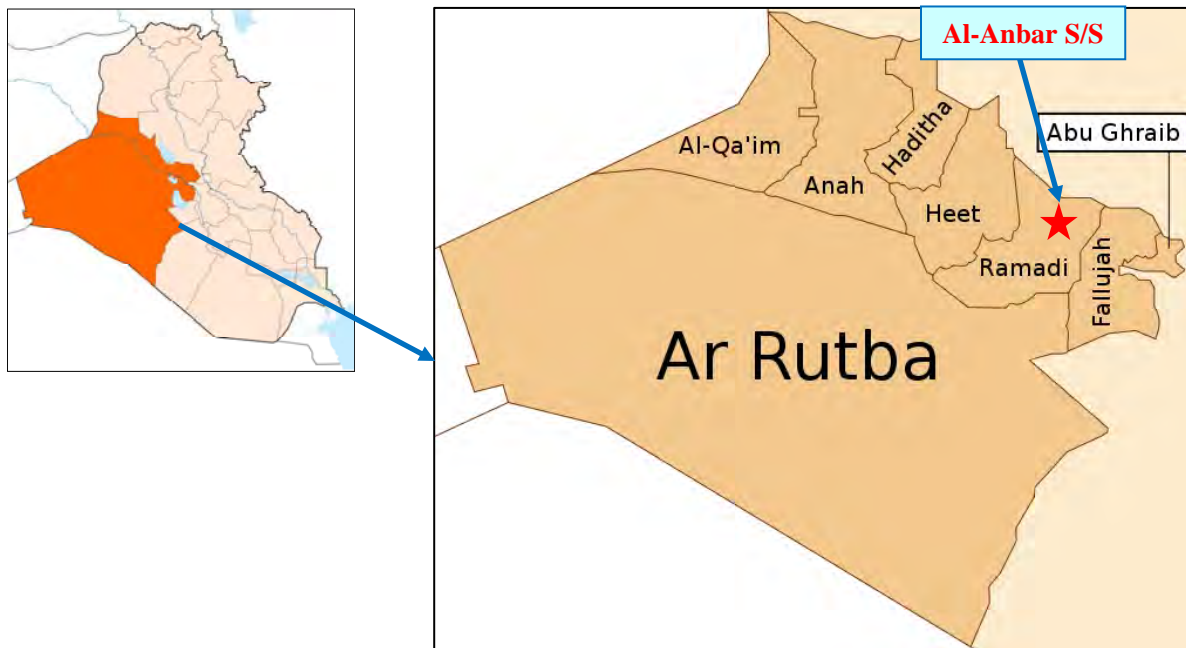


Figure A2. 1 Al-Anbar Governorate and Candidate Site in Al-Anbar

Candidate site:

- Facing to route 23 (Highway).
- Euphrates River flows 4 km away to south direction.
- The provincial capital Ramadi exists 9 km away to southeast.

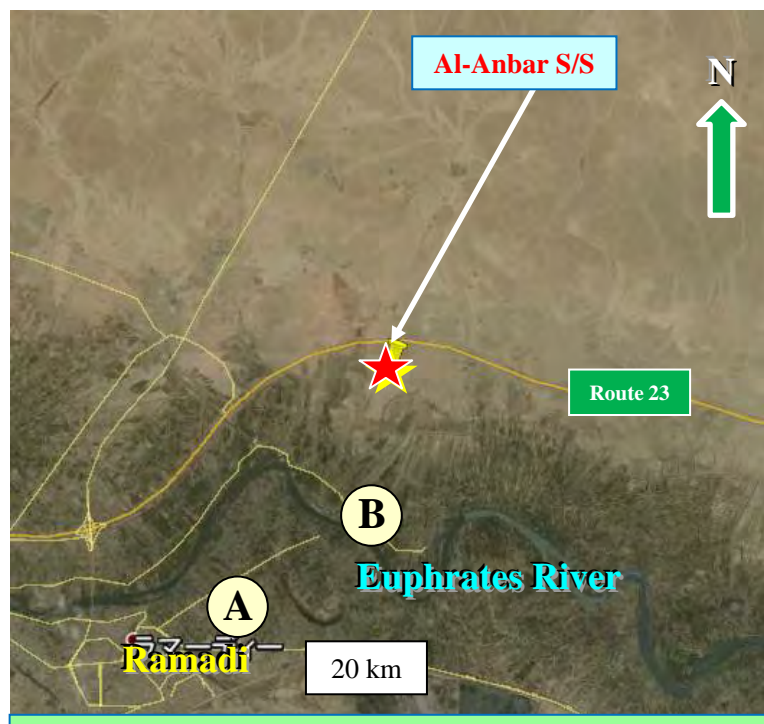


Figure A2. 2 (Al-Anbar) Location of Candidate Site in 20×20 km Area

2.2 Site Neighboring Area and Photo Taking Direction

Although there exist agriculture area in west and south sides, candidate site in unexploited area. It is also near to existing 400 kV and 132 kV transmission lines. Route 23 (Highway) runs 1 km north. It is quite convenient site for connecting existing transmission lines.

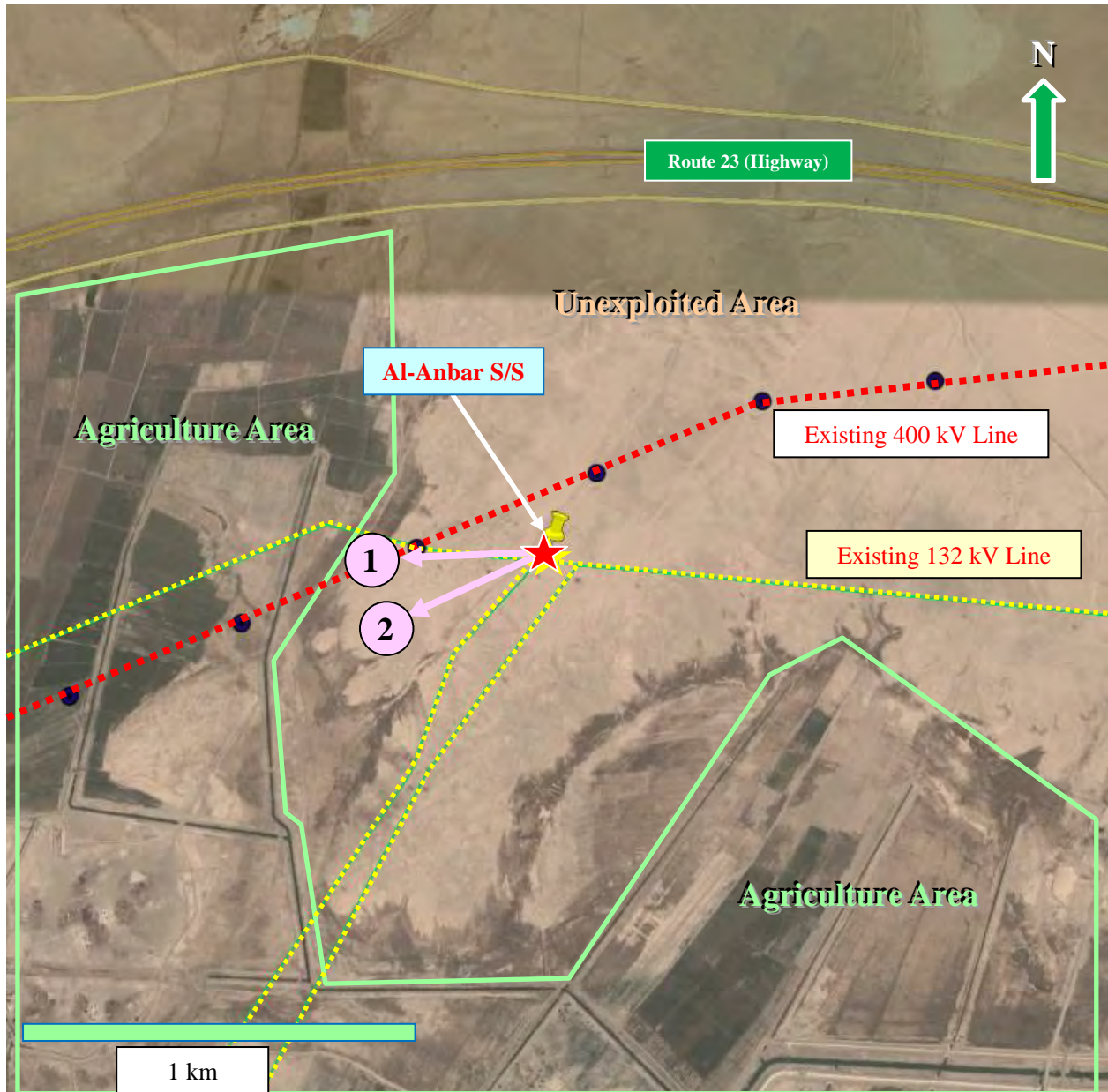


Figure A2. 3 (Al-Anbar) Location of Candidate Site in 3×3 km Area

2.3 Photos from site



Figure A2. 4 (Al-Anbar) 400kV Transmission Line



Figure A2. 5 (Al-Anbar) 400kV & 132KV Transmission Line

2.4 Social Consideration

Ramadi, which is located 4 km south of site, is a city in central Iraq, about 110 km west of Baghdad. It is the capital of Al Anbar Governorate. The city extends more than 60 kilometers along the Euphrates and is the largest city in Al-Anbar. Ramadi's population has been stated as 500,000 according to UN data from 2003 and 483,209 according to UN from 2004.



Figure A2. 6 (Al-Anbar) Ramadi Mosque in June 2004

2.5 Natural Resource Consideration

The Euphrates is the longest and one of the most historically important rivers of Western Asia. Together with the Tigris, it is one of the two defining rivers of Mesopotamia. Originating in eastern Turkey, the Euphrates flows through Syria and Iraq to join the Tigris in the Shatt al-Arab, which empties into the Persian Gulf.

The construction of the dams and irrigation schemes on the Euphrates has had a significant impact on the environment and society of each riparian country. Apart from the changes in the discharge regime of the river, the numerous dams and irrigation projects have also had other effects on the environment. The creation of reservoirs with large surfaces in countries with high average temperatures has led to

increased evaporation; thereby reducing the total amount of water that is available for human use. Annual evaporation from reservoirs has been estimated at 2 cubic kilometers (0.48 cu mi) in Turkey, 1 cubic kilometer (0.24 cu mi) in Syria and 5 cubic kilometers (1.2 cu mi) in Iraq. Water quality in the Iraqi Euphrates is low because irrigation water tapped in Turkey and Syria flows back into the river, together with dissolved fertilizer chemicals used on the fields. The salinity of Euphrates water in Iraq has increased as a result of upstream dam construction, leading to lower suitability as drinking water. The many dams and irrigation schemes, and the associated large-scale water abstraction, have also had a detrimental effect on the ecologically already fragile Mesopotamian Marshes and on freshwater fish habitats in Iraq.

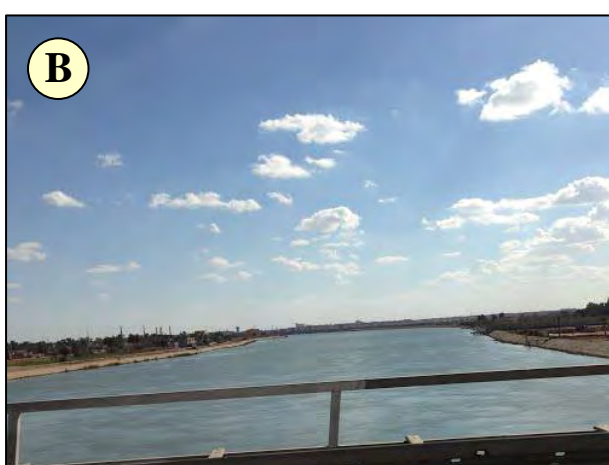


Figure A2. 7 (Al-Anbar) Euphrates



Figure A2. 8 (Al-Anbar) Map of the combined Tigris–Euphrates drainage basin (in yellow)

2.6 Stakeholders in Al-Anbar Substation Project

Table A2. 1 Stakeholders in Al-Anbar Substation Project

Government and Local Government	Ministry of Environment (MOEN) Provincial Office of MOEN	BPIE Middle Euphrates of MOEN Ministry of Electricity (MOE)
Non-Government	Representatives of Ramadi City	

2.7 Al-Anbar Substation Environment Check List (Power transformation and transmission)

Table A2. 2 (Al-Anbar) Permits, approvals and explanations

Items	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) EIA & Environmental Permit	(a) Is the report of environment impact assessment and etc. is already created?	N	EIA is not necessary for "Class B" project. Instead IEE is necessary.
	(b) Does government approved EIA report?	N	IEE is not yet approved. In Iraq, Environmental Compliance Certificate is required.
	(c) Are there any collateral conditions to government approval? Could such collateral conditions be complied with?	Y	Environmental Regulation for Industrial, Agricultural and Service Project (No. 14 of 1990) stipulate concrete regulations.
	(d) Other than those above, did local competent authorities give environmental permit if required?	N	Provincial Office of MOEN and BPIE Central of MOEN will check IEE report and submit to MOEN.
(2) Explanation to Local Stakeholders	(a) Are project contents and impacts including information disclosure explained properly to local stakeholders? And do they understand them?	N	To be conducted after selection as implementing site.
(3) Study of Alternatives	(b) Are the comments of residents reflected to project?	N	Ditto
	(a) Are multiple project alternatives studied? (Including environmental and social consideration)	Y	Various sites are studied. And this site is selected as giving the least impact on environment and society.

Table A2. 3 (Al-Anbar) Anti-pollution measures

Items	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Water Quality	(a) Is there any water pollution by soil in peripheral river basin, which flow from exposed surface by banking and cutting of soil? Are any countermeasures prepared in case of water pollution?	N	Euphrates river is 4 km away from site. Soil by banking and cutting never pollute river basin.

Table A2. 4 (Al-Anbar) Natural Environment

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Protected Area	(a) Is the project site located in protected areas specified by domestic legislation or international treaty, etc.? Does project cause adverse effect on the protected areas?	N	
	(a) Does project site encompass primary forests, natural forests in tropical areas, habitats with important ecological value (coral reefs, mangrove wetlands, tidal flats, etc.)?	N	
	(b) Does project site encompass habitats of rare species that require protection under domestic legislation, international treaties, etc.?	N	
	(c) When serious adverse effects on ecosystem are expected, are any countermeasures taken to mitigate them?	N	
(2) Ecological System	(d) Are measures taken for blocking the migration pathway of wild and domestic animals and setting apart habitats?	N	
	(e) Does project implementation cause deforestation, poaching, desertification and dried moor? Do alien species or pest, which do not inhabit in the past induce, leading to disrupting ecosystem? Are any countermeasures prepared?	N	
	(f) Does the construction in undeveloped region harm natural environment?	N	
	(a) Is there any geologically faulty location on the routes of transmission and distribution lines, which induces soil collapse or land slide? Does proper construction method of treatment applied to faulty location?	N	Existing transmission lines (400 kV and 132 kV) exist at the nearby location.
(3) Geography and Geology	(b) Does civil work like banking or cutting soil cause the soil collapse or landslide? Does proper countermeasure applied to prevent the soil collapse or landslide?	N	As large scale banking or cutting soil is not necessary, there is no potential of soil collapse or landslide.
	(c) Does soil flow out from the sites of banking, cutting and dumping? Does proper countermeasure applied to prevent the soil flowage?	N	Soil from site should be utilized as temporary road construction.

Table A2. 5 (Al-Anbar) Social Environment

		Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Resettlement of Residents	(a)	Does project cause involuntary resettlement of residents? Is the effort to minimize the resettlement effect made when resettlement is required?	N	
	(b)	Is the proper explanation given to resettling residents regarding to the measures of compensation and life restoration before resettlement?	N	
	(c)	Is the resettlement plan including the compensation by reacquisition price and restoration of livelihood drawn based on survey of resident resettlement?	N	
	(d)	Is compensation money paid before resettlement?	N	
	(e)	Is the compensation policy written in the form of documents?	N	
	(f)	Is the proper consideration taken into the resettling plan for gender, children, elderly people, poverty group, ethnic minority and indigenous people among resettling residents?	N	
	(g)	Does resettling residents agree before resettlement?	N	
	(h)	Is proper structural plan established, implementing resettlement of residents? Are sufficient capacity building and budget prepared?	N	
	(i)	Is monitoring plan of resettlement established?	N	
	(j)	Is complaint processing system established?	N	
	(a)	Does the project cause adverse effect on resident life? Is measure to mitigate effect considered if necessary?	N	As the residential area of city "Ramadi" is 4 km south of site, project does not cause adverse effect on resident life.
	(2) Life and Livelihood	(b)	Is there any danger of disease contraction (infection such as HIV) by the population flux? Is the consideration to public health made if necessary?	N
(c)		Do iron tower etc. cause radio disturbance? Does proper measure considered when serious radio disturbance is expected?	N	
(d)		Is the compensation etc. under transmission lines implemented law by the construction of such lines based on domestic?	N	

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(3) Cultural Heritage	(a) Is there any damage to archaeological, historical, cultural and religious precious heritage by project implementation? Are the measures, specified in domestic law of host country, considered?	N	There is no cultural heritage nearby.
(4) Landscape	(a) Does project cause adverse effect on the landscape, which requires extra consideration? If adverse effect is expected, are necessary measures taken?	N	
(5) Ethnic Minority and Indigenous People	(a) Are consideration taken to mitigate effect on culture and life style of ethnic minority and indigenous people?	N	There is no ethnic minority.
	(b) Are the various rights regarding to land and resources possessed by ethnic minority and indigenous people respected?	N	
(6) Labor Environment	(a) Are the law and regulation of host country regarding to labor environment complied?	Y	
	(b) Are safety considerations to related personnel of project taken including the installation of safety facilities for preventing occupational accidents and management of harmful substances?	Y	
	(c) Are software aspects planned and implemented such as drawing of safety and health plan, implementing safety education to employees (including traffic safety and public health)?	Y	To be prepared before implementation
	(d) Are proper security measures taken not to impinge the safety of project related personnel and local residents?	Y	

Table A2. 6 (Al-Anbar) Others

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Impact during Construction	(a) Is mitigation plan prepared for the pollution during construction? (Noise, vibration, murky water, dust, waste gas and wastes etc.)	Y	To be prepared before implementation
	(b) Does construction work give adverse effect on natural environment (ecosystem)? Are mitigating measures of adverse effect prepared?	N	
	(c) Does construction work cause an adverse effect on social environment? Are mitigating measures of adverse effect prepared?	N	
(2) Monitoring	(a) Do project proponents plan and implement the monitoring of affected items among above environmental items?	Y	To be prepared before implementation
	(b) Are the items, methodologies and frequency of above mentioned plan judged as appropriate?	Y	
	(c) Is the monitoring framework of project proponents established such as organization, manpower, equipment and continuity of these items?	N	To be prepared before implementation
	(d) Is the reporting method and frequency from project proponents to the governing authority specified?	Y	

Table A2. 7 (Al-Anbar) Note

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
Referring other environment checklist	(a) If necessary, add and evaluate related items of road checklist.	N	
Instruction for the use of environment checklist	(a) If necessary, confirm the environmental impact of border crossing global scale. (Border crossing of waste, acid rain, destruction of ozone layer and global warming)	N	

3. Diyala Substation

3.1 The Location of Candidate Diyala Substation

Diyala Governorate is a province in eastern Iraq. Area: 17,685 km², Population (2003) Total: 1,224,000.

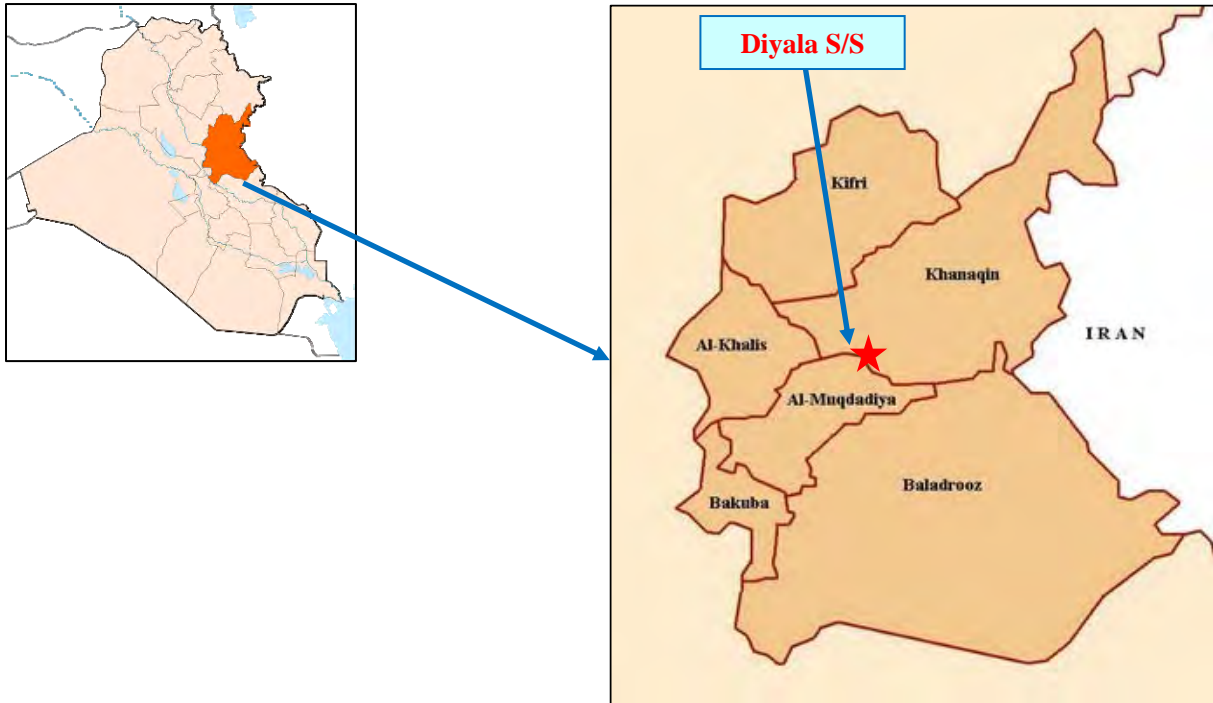


Figure A3. 1 Diyala Governorate and Candidate Site in Diyala Governorate

Candidate site:

- a) Facing to route 5
- b) Lake Dukan exists 9 km away north-east from site

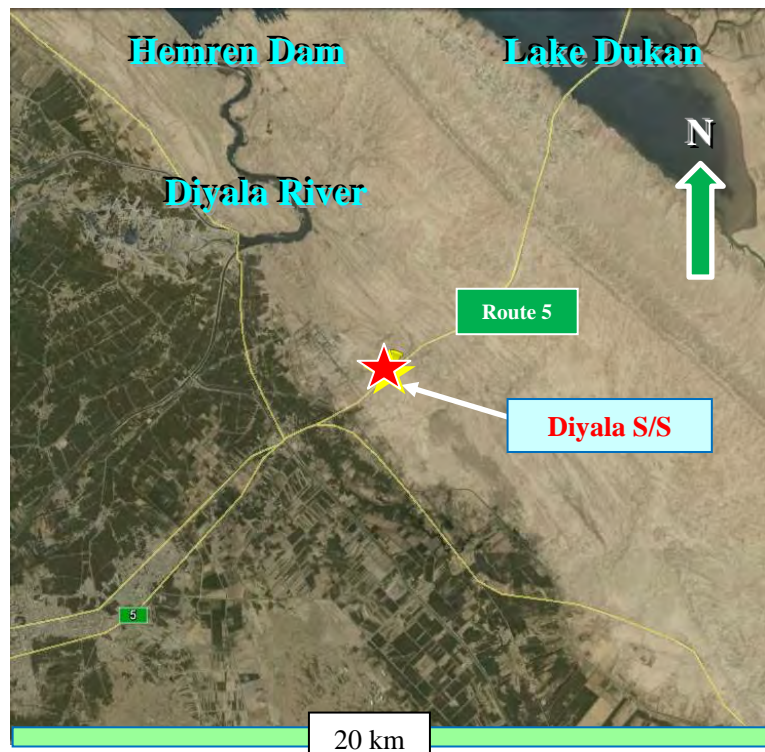


Figure A3. 2 (Diyala) Location of Candidate Site in 20×20 km Area

3.2 Site Neighboring Area and Photo Taking Direction

Although there exist agriculture area in west side, candidate site in unexploited area.

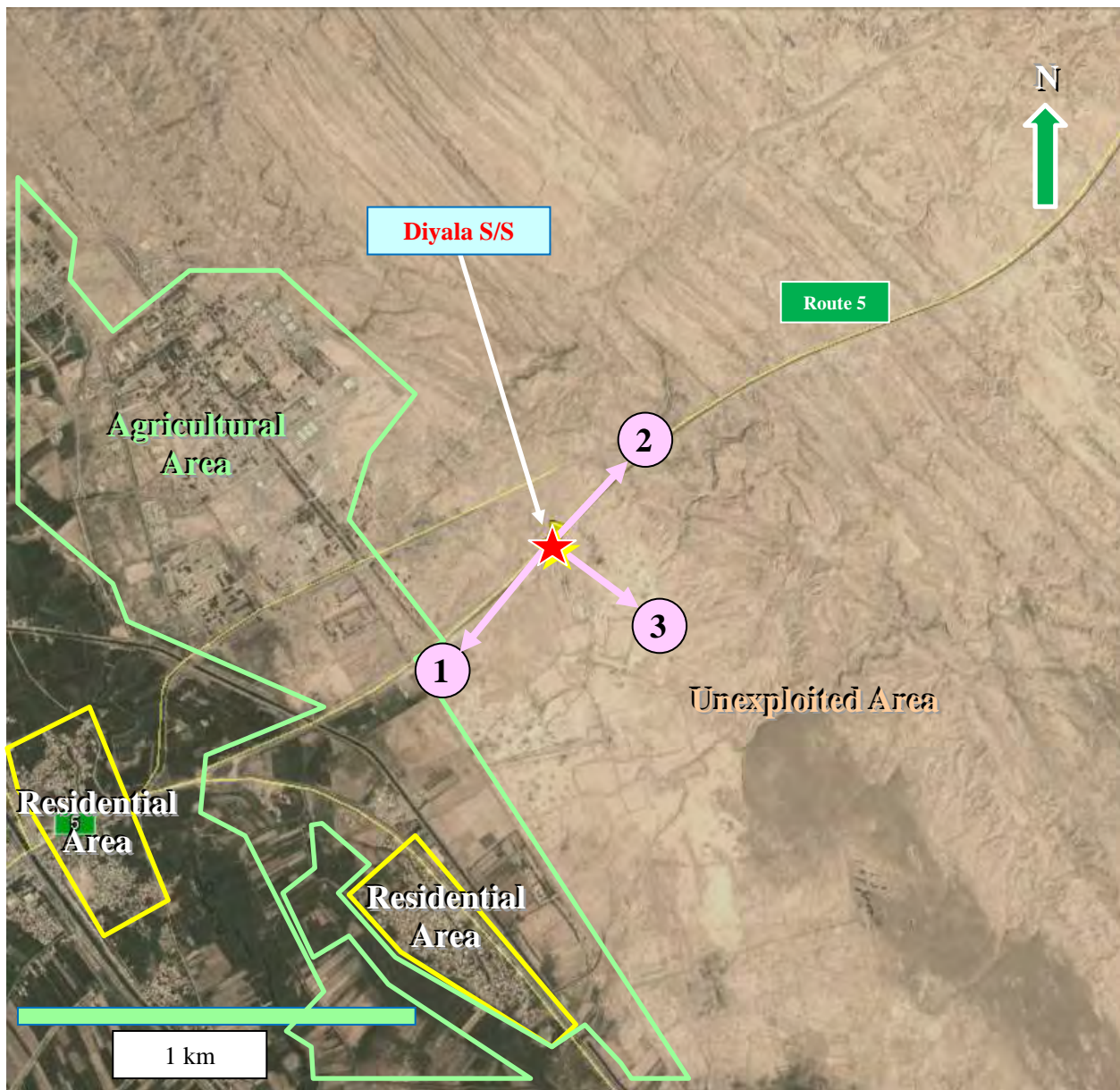


Figure A3. 3 (Diyala) Location of Candidate Site in 3×3 km Area

3.3 Photos from site

The site is surrounded by unexploited area.



Figure A3. 4 (Diyala) Transmission Line and Route 5



Figure A3. 5 (Diyala) Route 5 from Site



Figure A3. 6 (Diyala) Unexploited Area from Site

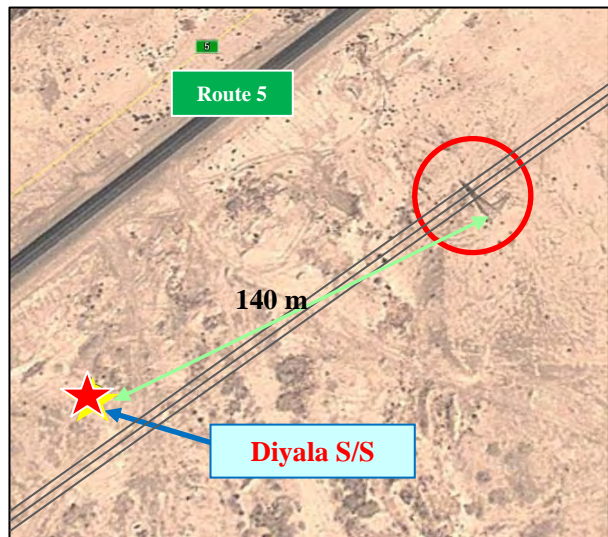


Figure A3. 7 (Diyala) Near TL Line and Iron Tower

3.4 Social Consideration

The city called “Muqdadiyah” exists 11 km away from site to southwest direction. Muqdadiyah is a city in the Diyala Governorate of Iraq. The city is located 80 km northeast of Baghdad and 30 km northeast of Baquba, the capital of Diyala. It has a population of about 298,000 inhabitants.

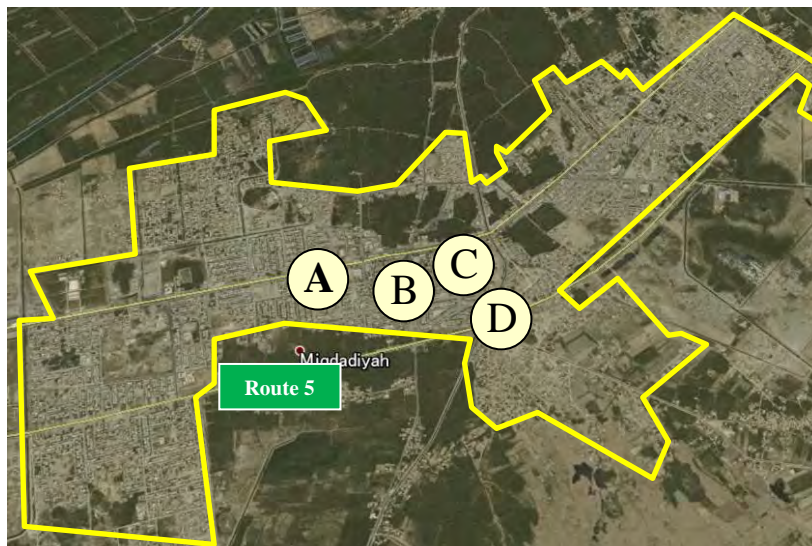


Figure A3. 8 (Diyala) Muqdadiyah City



Figure A3. 9 (Diyala) Private Generator



Figure A3. 10 (Diyala) Repair of Electricity

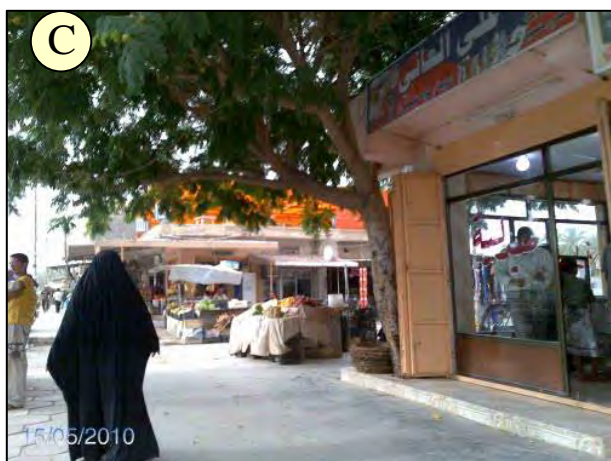


Figure A3. 11 (Diyala) Trendy Market



Figure A3. 12 (Diyala) Nazndh Khatun Mosque

As the city Muqdadiah is 11 km away, the installation of substation has no impact on the life of city people.

3.5 Natural Resource Environment Consideration Lake Dukan is the largest lake in Iraqi Kurdistan.

It is located close to the city of Ranya, and is a reservoir on the Little Zab created by the construction of the Dukan Dam. The Dukan Dam was built between 1954 and 1959 as a multi-purpose dam to provide water storage, irrigation and hydroelectricity. Prior to the flooding of Lake Dukan, the area has been subjected to archaeological research to investigate as many archaeological sites as possible. An archaeological survey in the Ranya Plain documented some 40 archaeological sites with evidence for occupation ranging from the sixth millennium BCE up to the present.

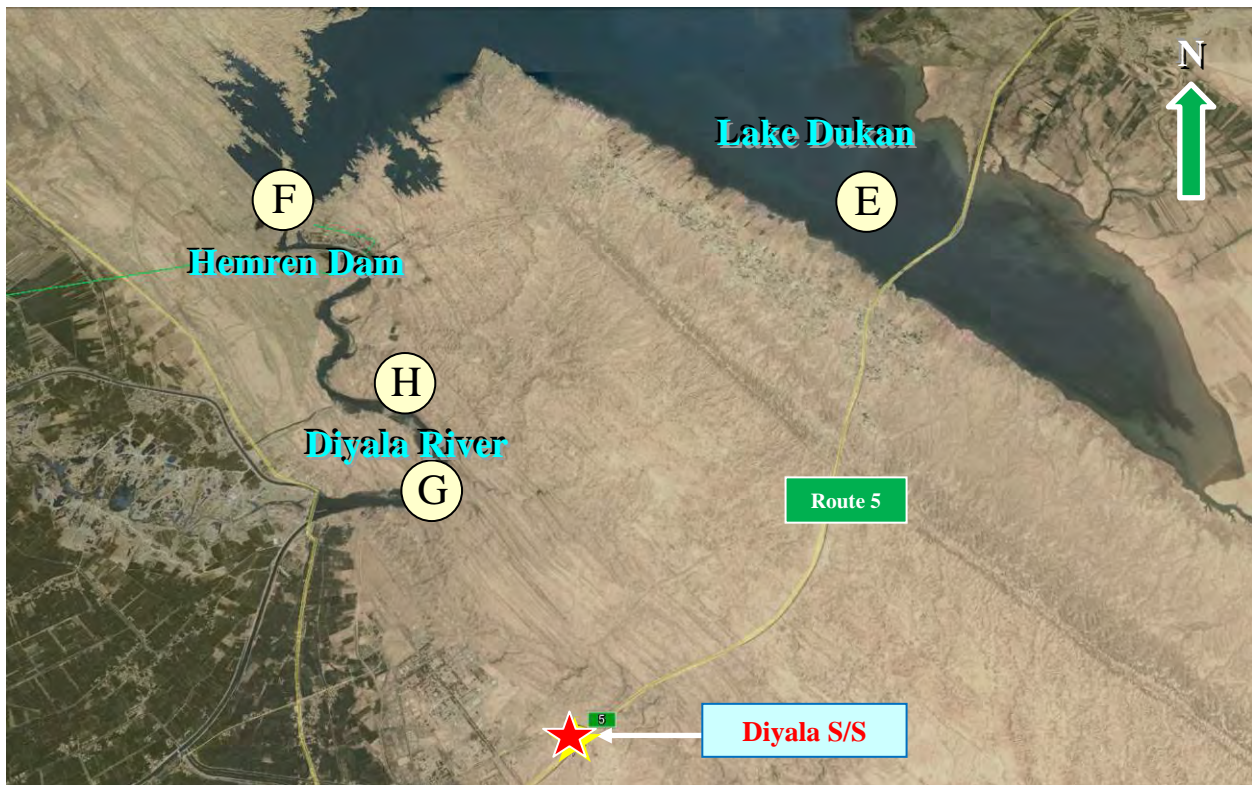


Figure A3. 13 (Diyala) Lake Dukan and Site Location



Figure A3. 14 (Diyala) Lake Dukan



Figure A3. 15 (Diyala) Hemren Dam 5 Gate

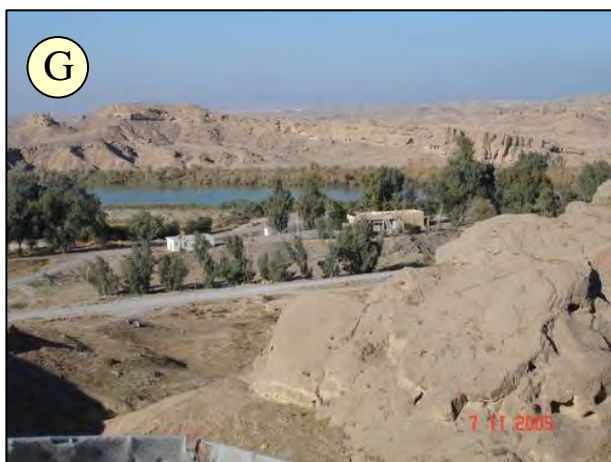


Figure A3. 16 (Diyala) Diyala River & Hamrin Mountains



Figure A3. 17 (Diyala) Spring in Hamrin

3.6 Stakeholders in Diyala Substation Project

Table A3. 1 Stakeholders in Diyala Substation Project

Government and Local Government	Ministry of Environment (MOEN) Provincial Office of MOEN	BPIE Middle of MOEN Ministry of Electricity (MOE)
Non-Government	Representatives of Muqdadiyah City	

3.7 Diyala Substation Environment Check List (Power transformation and transmission)

Table A3. 2 (Diyala) Permits, approvals and explanations

Items	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) EIA & Environmental Permit	(a) Is the report of environment impact assessment and etc. is already created?	N	EIA is not necessary for "Class B" project. Instead IEE is necessary.
	(b) Does government approved EIA report?	N	IEE is not yet approved. In Iraq, Environmental Compliance Certificate is required.
	(c) Are there any collateral conditions to government approval? Could such collateral conditions be complied with?	Y	Environmental Regulation for Industrial, Agricultural and Service Project (No. 14 of 1990) stipulate concrete regulations.
	(d) Other than those above, did local competent authorities give environmental permit if required?	N	Provincial Office of MOEN and BPIE Central of MOEN will check IEE report and submit to MOEN.
(2) Explanation to Local Stakeholders	(a) Are project contents and impacts including information disclosure explained properly to local stakeholders? And do they understand them?	N	To be conducted after selection as implementing site.
(3) Study of Alternatives	(b) Are the comments of residents reflected to project?	N	Ditto
	(a) Are multiple project alternatives studied? (Including environmental and social consideration)	Y	Various sites are studied. And this site is selected as giving the least impact on environment and society.

Table A3. 3 (Diyala) Anti-pollution measures

Items	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Water Quality	(a) Is there any water pollution by soil in peripheral river basin, which flow from exposed surface by banking and cutting of soil? Are any countermeasures prepared in case of water pollution?	N	Diyala river is 4 km away northeast from site. Soil by banking and cutting never pollute river basin.

Table A3. 4 (Diyala) Natural Environment

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Protected Area	(a) Is the project site located in protected areas specified by domestic legislation or international treaty, etc.? Does project cause adverse effect on the protected areas?	N	
	(a) Does project site encompass primary forests, natural forests in tropical areas, habitats with important ecological value (coral reefs, mangrove wetlands, tidal flats, etc.)?	N	
	(b) Does project site encompass habitats of rare species that require protection under domestic legislation, international treaties, etc.?	N	
	(c) When serious adverse effects on ecosystem are expected, are any countermeasures taken to mitigate them?	N	
(2) Ecological System	(d) Are measures taken for blocking the migration pathway of wild and domestic animals and setting apart habitats?	N	
	(e) Does project implementation cause deforestation, poaching, desertification and dried moor? Do alien species or pest, which do not inhabit in the past induce, leading to disrupting ecosystem? Are any countermeasures prepared?	N	
	(f) Does the construction in undeveloped region harm natural environment?	N	
	(a) Is there any geologically faulty location on the routes of transmission and distribution lines, which induces soil collapse or land slide? Does proper construction method of treatment applied to faulty location?	N	Existing transmission lines of 132 kV exist at the nearby location. As Ministry of Electricity (MOE) has plan of transmission line, MOE and JICA study team agreed that connecting transfer line is out of JICA work scope.
(3) Geography and Geology	(b) Does civil work like banking or cutting soil cause the soil collapse or landslide? Does proper countermeasure applied to prevent the soil collapse or landslide?	N	As large scale banking or cutting soil is not necessary, there is no potential of soil collapse or landslide.
	(c) Does soil flow out from the sites of banking, cutting and dumping? Does proper countermeasure applied to prevent the soil flowage?	N	Soil from site should be utilized as temporary road construction.

Table A3. 5 (Diyala) Social Environment

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Resettlement of Residents	(a) Does project cause involuntary resettlement of residents? Is the effort to minimize the resettlement effect made when resettlement is required?	N	
	(b) Is the proper explanation given to resettling residents regarding to the measures of compensation and life restoration before resettlement?	N	
	(c) Is the resettlement plan including the compensation by reacquisition price and restoration of livelihood drawn based on survey of resident resettlement?	N	
	(d) Is compensation money paid before resettlement?	N	
	(e) Is the compensation policy written in the form of documents?	N	
	(f) Is the proper consideration taken into the resettling plan for gender, children, elderly people, poverty group, ethnic minority and indigenous people among resettling residents?	N	
	(g) Does resettling residents agree before resettlement?	N	
	(h) Is proper structural plan established, implementing resettlement of residents? Are sufficient capacity building and budget prepared?	N	As the site is in unexploited area, project does not cause involuntary resettlement of residents.
	(i) Is monitoring plan of resettlement established?	N	
	(j) Is complaint processing system established?	N	
(2) Life and Livelihood	(a) Does the project cause adverse effect on resident life? Is measure to mitigate effect considered if necessary?	N	The city called "Muqdadayah" exists 11 km away from site to southwest direction. The project does not cause adverse effect on resident life.
	(b) Is there any danger of disease contraction (infection such as HIV) by the population flux? Is the consideration to public health made if necessary?	N	There is no population flux during construction and operation.
	(c) Do iron tower etc. cause radio disturbance? Does proper measure considered when serious radio disturbance is expected?	N	
	(d) Is the compensation etc. under transmission lines implemented law by the construction of such lines based on domestic?	N	

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(3) Cultural Heritage	(a) Is there any damage to archaeological, historical, cultural and religious precious heritage by project implementation? Are the measures, specified in domestic law of host country, considered?	N	There is no cultural heritage nearby.
(4) Landscape	(a) Does project cause adverse effect on the landscape, which requires extra consideration? If adverse effect is expected, are necessary measures taken?	N	
(5) Ethnic Minority and Indigenous People	(a) Are consideration taken to mitigate effect on culture and life style of ethnic minority and indigenous people?	N	There is no ethnic minority.
	(b) Are the various rights regarding to land and resources possessed by ethnic minority and indigenous people respected?	N	
(6) Labor Environment	(a) Are the law and regulation of host country regarding to labor environment complied?	Y	
	(b) Are safety considerations to related personnel of project taken including the installation of safety facilities for preventing occupational accidents and management of harmful substances?	Y	
	(c) Are software aspects planned and implemented such as drawing of safety and health plan, implementing safety education to employees (including traffic safety and public health)?	Y	To be prepared before implementation
	(d) Are proper security measures taken not to impinge the safety of project related personnel and local residents?	Y	

Table A3. 6 (Diyala) Others

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Impact during Construction	(a) Is mitigation plan prepared for the pollution during construction? (Noise, vibration, murky water, dust, waste gas and wastes etc.)	Y	To be prepared before implementation
	(b) Does construction work give adverse effect on natural environment (ecosystem)? Are mitigating measures of adverse effect prepared?	N	
	(c) Does construction work cause an adverse effect on social environment? Are mitigating measures of adverse effect prepared?	N	
(2) Monitoring	(a) Do project proponents plan and implement the monitoring of affected items among above environmental items?	Y	To be prepared before implementation
	(b) Are the items, methodologies and frequency of above mentioned plan judged as appropriate?	Y	
	(c) Is the monitoring framework of project proponents established such as organization, manpower, equipment and continuity of these items?	N	To be prepared before implementation
	(d) Is the reporting method and frequency from project proponents to the governing authority specified?	Y	

Table A3. 7 (Diyala) Note

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
Referring other environment checklist	(a) If necessary, add and evaluate related items of road checklist.	N	
Instruction for the use of environment checklist	(a) If necessary, confirm the environmental impact of border crossing global scale. (Border crossing of waste, acid rain, destruction of ozone layer and global warming)	N	

4. Thi Qar Substation

4.1 The Location of Thi Qar

Thi Qar is a governorate in southern Iraq. The provincial capital is Nasiriyah. Prior to 1976 the governorate was known as Muntafiq Governorate. Dhi Qar was the heartland of the ancient Iraqi civilization of Sumer and the ruins of Ur, Eridu, Lagash, Larsa, Girsu, Umma, and Bad-tibira are located here. Capital is “Nasiriyah. Total area is 12,900 km². Total population in 2011 is 1,836,200.



Figure A4. 1 Thi Qar Governorate

4.2 Site Neighboring Area and Photo Taking Direction



Figure A4. 2 (Thi Qar) Location of Candidate Site in 3×3 km Area

4.3 Photos from site



Figure A4. 3 (Thi Qar) Over Irrigation Cannel
(Left: Road & Right: Site)



Figure A4. 4 (Thi Qar) On Road (Left: Irrigation Cannel & Site, Right: 400 kV TL Line)



Figure A4. 5 (Thi Qar) Unexploited Area



Figure A4. 6 (Thi Qar) Unexploited Area and Pond

4.4 Connecting Transfer Line between Existing 400 kV Line and Candidate Site

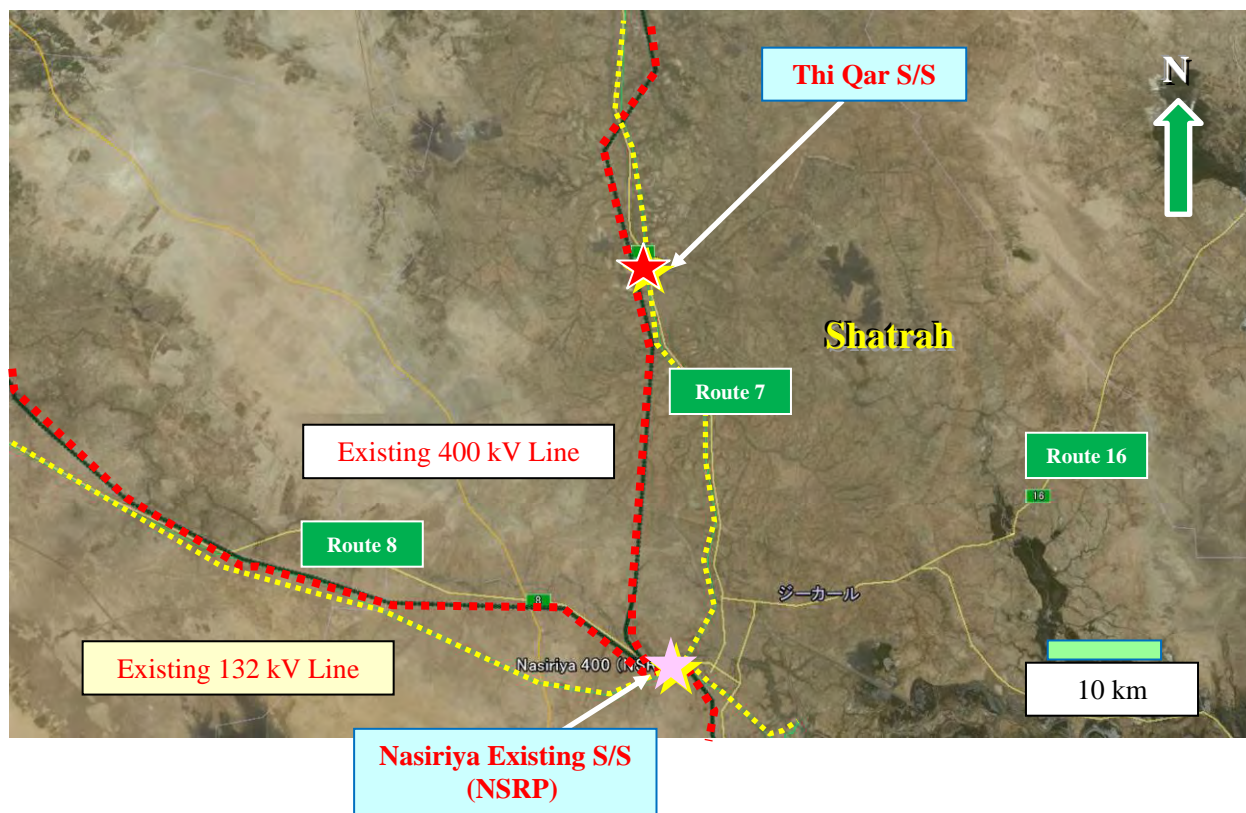


Figure A4. 7 (Thi Qar) Relative Location of Site and Existing Transfer Lines

4.5 Social Consideration

Shatrah is a Sub-District in the Thi Qar Governorate, Iraq, located on the Gharraf Canal at the intersection with Highway 7. It is 22.35 km west of the ancient city of Lagash. It has a 2009 population estimated between 65 and 90 thousand.



Figure A4. 8 (Thi Qar) Shatrah Sub-District



Figure A4. 9 (Thi Qar) Gharrf Channel in Shatrah

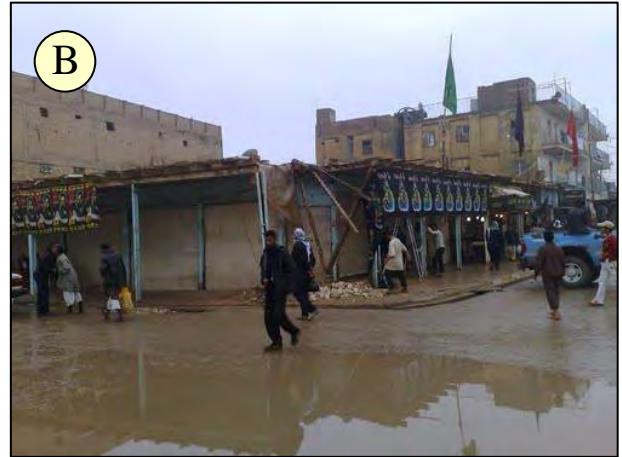


Figure A4. 10 (Thi Qar) Obaid cafe in Shatrah

The Gharraf Canal is an ancient canal that connects Tigris with Euphrates in Iraq.

4.6 Stakeholders in Thi Qar Substation Project

Table A4. 1 Stakeholders in Thi Qar Substation Project

Government and Local Government	Ministry of Environment (MOEN) Provincial Office of MOEN	BPIE South of MOEN Ministry of Electricity (MOE)
Non-Government	Representatives of Shatrah City	

4.7 Thi Qar Substation Environment Check List (Power transformation and transmission)

Table A4. 2 (Thi Qar) Permits, approvals and explanations

Items	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) EIA & Environmental Permit	(a) Is the report of environment impact assessment and etc. is already created?	N	EIA is not necessary for "Class B" project. Instead IEE is necessary.
	(b) Does government approved EIA report?	N	IEE is not yet approved. In Iraq, Environmental Compliance Certificate is required.
	(c) Are there any collateral conditions to government approval? Could such collateral conditions be complied with?	Y	Environmental Regulation for Industrial, Agricultural and Service Project (No. 14 of 1990) stipulate concrete regulations.
	(d) Other than those above, did local competent authorities give environmental permit if required?	N	Provincial Office of MOEN and BPIE South of MOEN will check IEE report and submit to MOEN.
(2) Explanation to Local Stakeholders	(a) Are project contents and impacts including information disclosure explained properly to local stakeholders? And do they understand them?	N	To be conducted after selection as implementing site.
	(b) Are the comments of residents reflected to project?	N	Ditto
(3) Study of Alternatives	(a) Are multiple project alternatives studied? (Including environmental and social consideration)	Y	Various sites are studied. And this site is selected as giving the least impact on environment and society.

Table A4. 3 (Thi Qar) Anti-pollution measures

Items	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Water Quality	(a) Is there any water pollution by soil in peripheral river basin, which flow from exposed surface by banking and cutting of soil? Are any countermeasures prepared in case of water pollution?	N	Gharraf Canal is 1 km away east from site. Soil by banking and cutting never pollute river basin.

Table A4. 4 (Thi Qar) Natural Environment

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Protected Area	(a) Is the project site located in protected areas specified by domestic legislation or international treaty, etc.? Does project cause adverse effect on the protected areas?	N	
	(a) Does project site encompass primary forests, natural forests in tropical areas, habitats with important ecological value (coral reefs, mangrove wetlands, tidal flats, etc.)?	N	
	(b) Does project site encompass habitats of rare species that require protection under domestic legislation, international treaties, etc.?	N	
	(c) When serious adverse effects on ecosystem are expected, are any countermeasures taken to mitigate them?	N	
(2) Ecological System	(d) Are measures taken for blocking the migration pathway of wild and domestic animals and setting apart habitats?	N	
	(e) Does project implementation cause deforestation, poaching, desertification and dried moor? Do alien species or pest, which do not inhabit in the past induce, leading to disrupting ecosystem? Are any countermeasures prepared?	N	
	(f) Does the construction in undeveloped region harm natural environment?	N	
	(a) Is there any geologically faulty location on the routes of transmission and distribution lines, which induces soil collapse or land slide? Does proper construction method of treatment applied to faulty location?	N	Existing transmission lines (400 kV and 132 kV) exist at the nearby location.
(3) Geography and Geology	(b) Does civil work like banking or cutting soil cause the soil collapse or landslide? Does proper countermeasure applied to prevent the soil collapse or landslide?	N	As large scale banking or cutting soil is not necessary, there is no potential of soil collapse or landslide.
	(c) Does soil flow out from the sites of banking, cutting and dumping? Does proper countermeasure applied to prevent the soil flowage?	N	Soil from site should be utilized as temporary road construction.

Table A4. 5 (Thi Qar) Social Environment

		Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Resettlement of Residents	(a)	Does project cause involuntary resettlement of residents? Is the effort to minimize the resettlement effect made when resettlement is required?	N	
	(b)	Is the proper explanation given to resettling residents regarding to the measures of compensation and life restoration before resettlement?	N	
	(c)	Is the resettlement plan including the compensation by reacquisition price and restoration of livelihood drawn based on survey of resident resettlement?	N	
	(d)	Is compensation money paid before resettlement?	N	
	(e)	Is the compensation policy written in the form of documents?	N	
	(f)	Is the proper consideration taken into the resettling plan for gender, children, elderly people, poverty group, ethnic minority and indigenous people among resettling residents?	N	
	(g)	Does resettling residents agree before resettlement?	N	
	(h)	Is proper structural plan established, implementing resettlement of residents? Are sufficient capacity building and budget prepared?	N	
	(i)	Is monitoring plan of resettlement established?	N	
	(j)	Is complaint processing system established?	N	
(2) Life and Livelihood	(a)	Does the project cause adverse effect on resident life? Is measure to mitigate effect considered if necessary?	N	The city called "Shatrah" exists 1 km away from site to southeast direction. The project does not cause adverse effect on resident life.
	(b)	Is there any danger of disease contraction (infection such as HIV) by the population flux? Is the consideration to public health made if necessary?	N	There is no population flux during construction and operation.
	(c)	Do iron tower etc. cause radio disturbance? Does proper measure considered when serious radio disturbance is expected?	N	
	(d)	Is the compensation etc. under transmission lines implemented law by the construction of such lines based on domestic?	N	

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(3) Cultural Heritage	(a) Is there any damage to archaeological, historical, cultural and religious precious heritage by project implementation? Are the measures, specified in domestic law of host country, considered?	N	There is no cultural heritage nearby.
(4) Landscape	(a) Does project cause adverse effect on the landscape, which requires extra consideration? If adverse effect is expected, are necessary measures taken?	N	
(5) Ethnic Minority and Indigenous People	(a) Are consideration taken to mitigate effect on culture and life style of ethnic minority and indigenous people?	N	There is no ethnic minority.
	(b) Are the various rights regarding to land and resources possessed by ethnic minority and indigenous people respected?	N	
(6) Labor Environment	(a) Are the law and regulation of host country regarding to labor environment complied?	Y	
	(b) Are safety considerations to related personnel of project taken including the installation of safety facilities for preventing occupational accidents and management of harmful substances?	Y	
	(c) Are software aspects planned and implemented such as drawing of safety and health plan, implementing safety education to employees (including traffic safety and public health)?	Y	To be prepared before implementation
	(d) Are proper security measures taken not to impinge the safety of project related personnel and local residents?	Y	

Table A4. 6 (Thi Qar) Others

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(2) Impact during Construction	(a) Is mitigation plan prepared for the pollution during construction? (Noise, vibration, murky water, dust, waste gas and wastes etc.)	Y	To be prepared before implementation
	(b) Does construction work give adverse effect on natural environment (ecosystem)? Are mitigating measures of adverse effect prepared?	N	
	(c) Does construction work cause an adverse effect on social environment? Are mitigating measures of adverse effect prepared?	N	
(2) Monitoring	(a) Do project proponents plan and implement the monitoring of affected items among above environmental items?	Y	To be prepared before implementation
	(b) Are the items, methodologies and frequency of above mentioned plan judged as appropriate?	Y	
	(c) Is the monitoring framework of project proponents established such as organization, manpower, equipment and continuity of these items?	N	To be prepared before implementation
	(d) Is the reporting method and frequency from project proponents to the governing authority specified?	Y	

Table A4. 7 (Thi Qar) Note

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
Referring other environment checklist	(a) If necessary, add and evaluate related items of road checklist.	N	
Instruction for the use of environment checklist	(a) If necessary, confirm the environmental impact of border crossing global scale. (Border crossing of waste, acid rain, destruction of ozone layer and global warming)	N	

5. Missan Substation

5.1 The Location of Missan

Missan Governorate is a province in southeastern Iraq, bordering Iran. The provincial capital, located beside the Tigris, is Amarah. The second settlement is Majar Al-Kabir. Prior to 1976 the province was known as Amara Province.



Figure A5. 1 Missan Governorate

5.2 Site Neighboring Area and Photo Taking Direction

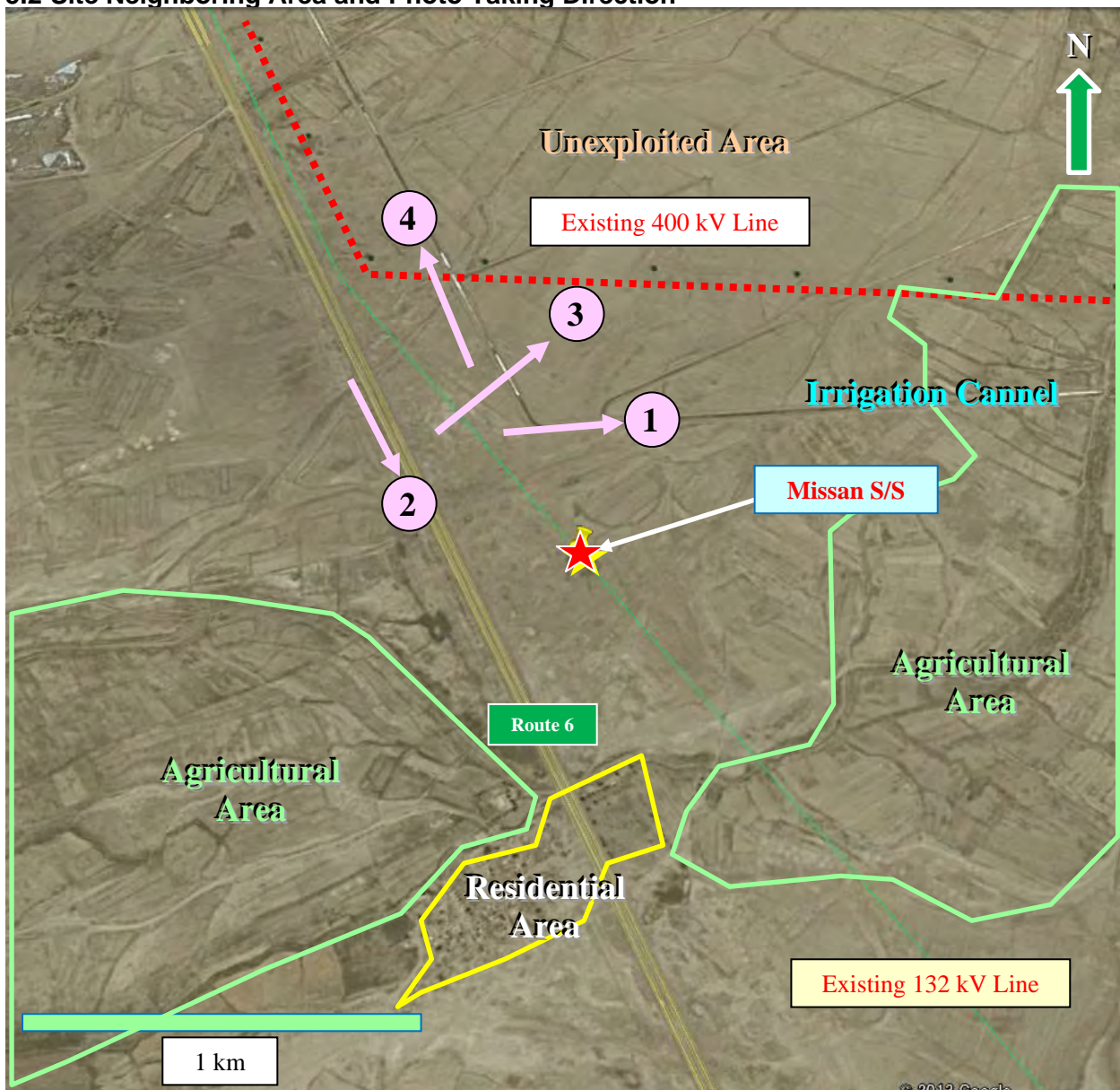


Figure A5. 2 (Missan) Location of Candidate Site in 3×3 km Area

5.3 Photos from site



Figure A5. 3 (Missan) 400 kV TL Line and Cannel



Figure A5. 4 (Missan) Route 6 and Site (Left Side)



Figure A5. 5 (Missan) Unexploited Area beyond 400 kV TL Line



Figure A5. 6 (Missan) Irrigation Cannel

5.4 Connecting Transfer Line between Existing 400 kV Line and Candidate Site

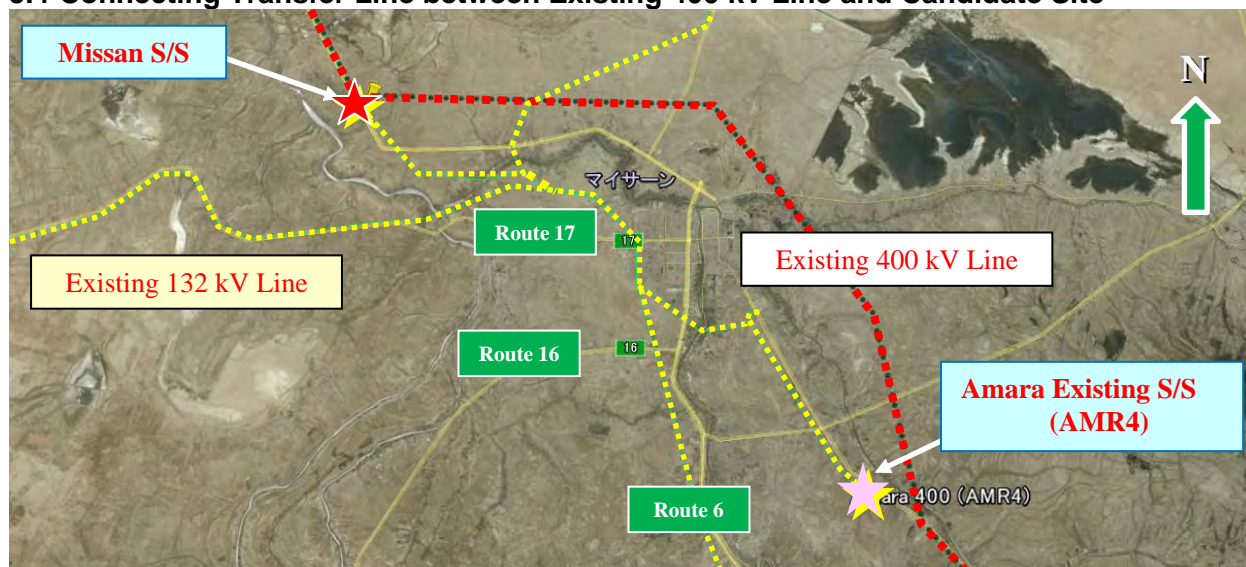


Figure A5. 7 (Missan) Relative Location of Site and Existing Transfer Lines

5.5 Social and Natural Resource Consideration

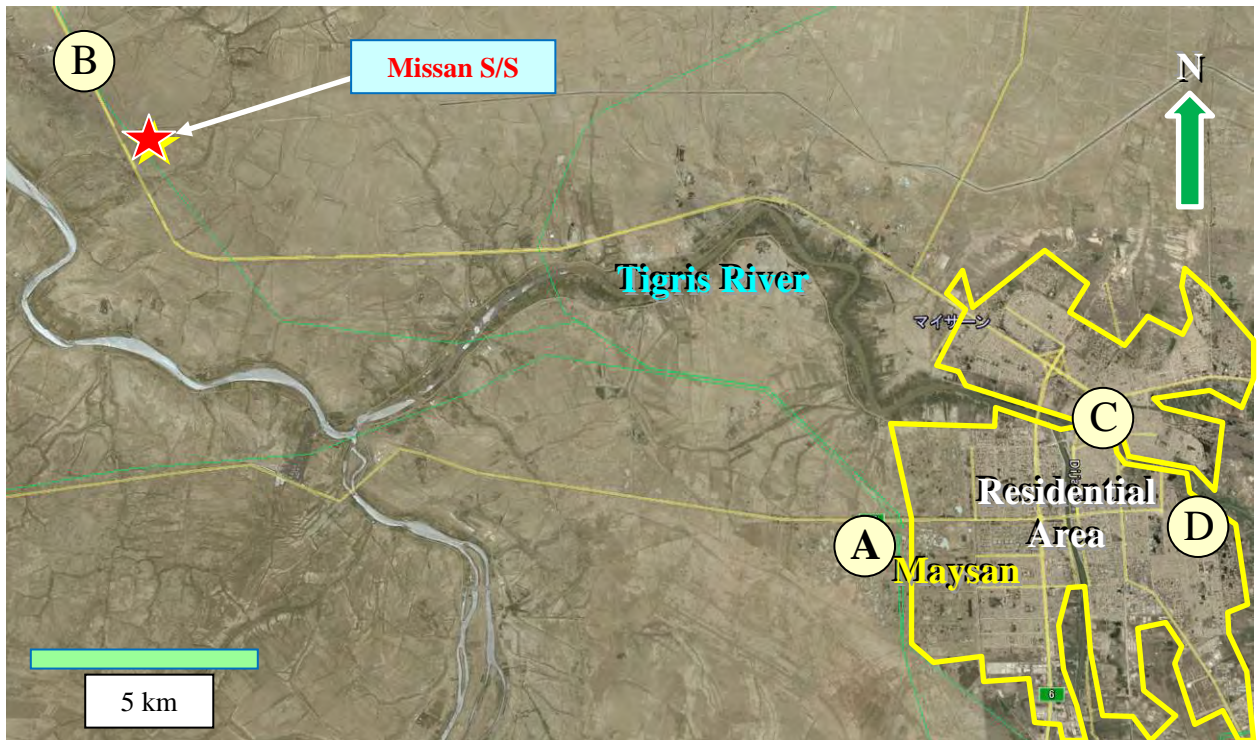


Figure A5. 8 (Missan) Tigris River and Maysan



Figure A5. 9 (Missan) Transformer



Figure A5. 10 (Missan) Kumayt Mobile Substation



Figure A5. 11 (Missan) Garden of Eden Resort



Figure A5. 12 (Missan) Maysan Bridge 2013

5.6 Stakeholders in Missan Substation Project

Table A5. 1 Stakeholders in Missan Substation Project

Government and Local Government	Ministry of Environment (MOEN) Provincial Office of MOEN	BPIE South of MOEN Ministry of Electricity (MOE)
Non-Government	Representatives of Maysan City	

5.7 Missan Substation Environment Check List (Power transformation and transmission)

Table A5. 2 (Missan) Permits, approvals and explanations

Items	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) EIA & Environmental Permit	(a) Is the report of environment impact assessment and etc. is already created?	N	EIA is not necessary for "Class B" project. Instead IEE is necessary.
	(b) Does government approved EIA report?	N	IEE is not yet approved. In Iraq, Environmental Compliance Certificate is required.
	(c) Are there any collateral conditions to government approval? Could such collateral conditions be complied with?	Y	Environmental Regulation for Industrial, Agricultural and Service Project (No. 14 of 1990) stipulate concrete regulations.
	(d) Other than those above, did local competent authorities give environmental permit if required?	N	Provincial Office of MOEN and BPIE South of MOEN will check IEE report and submit to MOEN.
(2) Explanation to Local Stakeholders	(a) Are project contents and impacts including information disclosure explained properly to local stakeholders? And do they understand them?	N	To be conducted after selection as implementing site.
(3) Study of Alternatives	(b) Are the comments of residents reflected to project?	N	Ditto
	(a) Are multiple project alternatives studied? (Including environmental and social consideration)	Y	Various sites are studied. And this site is selected as giving the least impact on environment and society.

Table A5. 3 (Missan) Anti-pollution measures

Items	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Water Quality	(a) Is there any water pollution by soil in peripheral river basin, which flow from exposed surface by banking and cutting of soil? Are any countermeasures prepared in case of water pollution?	N	Tigris River is 2 km away west from site. Soil by banking and cutting never pollute river basin.

Table A5. 4 (Missan) Natural Environment

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Protected Area	(a) Is the project site located in protected areas specified by domestic legislation or international treaty, etc.? Does project cause adverse effect on the protected areas?	N	
	(a) Does project site encompass primary forests, natural forests in tropical areas, habitats with important ecological value (coral reefs, mangrove wetlands, tidal flats, etc.)?	N	
	(b) Does project site encompass habitats of rare species that require protection under domestic legislation, international treaties, etc.?	N	
	(c) When serious adverse effects on ecosystem are expected, are any countermeasures taken to mitigate them?	N	
(2) Ecological System	(d) Are measures taken for blocking the migration pathway of wild and domestic animals and setting apart habitats?	N	
	(e) Does project implementation cause deforestation, poaching, desertification and dried moor? Do alien species or pest, which do not inhabit in the past induce, leading to disrupting ecosystem? Are any countermeasures prepared?	N	
	(f) Does the construction in undeveloped region harm natural environment?	N	
	(a) Is there any geologically faulty location on the routes of transmission and distribution lines, which induces soil collapse or land slide? Does proper construction method of treatment applied to faulty location?	N	Existing transmission lines (400 kV and 132 kV) exist at the nearby location.
(3) Geography and Geology	(b) Does civil work like banking or cutting soil cause the soil collapse or landslide? Does proper countermeasure applied to prevent the soil collapse or landslide?	N	As large scale banking or cutting soil is not necessary, there is no potential of soil collapse or landslide.
	(c) Does soil flow out from the sites of banking, cutting and dumping? Does proper countermeasure applied to prevent the soil flowage?	N	Soil from site should be utilized as temporary road construction.

Table A5. 5 (Missan) Social Environment

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Resettlement of Residents	(a) Does project cause involuntary resettlement of residents? Is the effort to minimize the resettlement effect made when resettlement is required?	N	
	(b) Is the proper explanation given to resettling residents regarding to the measures of compensation and life restoration before resettlement?	N	
	(c) Is the resettlement plan including the compensation by reacquisition price and restoration of livelihood drawn based on survey of resident resettlement?	N	
	(d) Is compensation money paid before resettlement?	N	
	(e) Is the compensation policy written in the form of documents?	N	
	(f) Is the proper consideration taken into the resettling plan for gender, children, elderly people, poverty group, ethnic minority and indigenous people among resettling residents?	N	
	(g) Does resettling residents agree before resettlement?	N	
	(h) Is proper structural plan established, implementing resettlement of residents? Are sufficient capacity building and budget prepared?	N	As the site is in unexploited area, project does not cause involuntary resettlement of residents.
	(i) Is monitoring plan of resettlement established?	N	
	(j) Is complaint processing system established?	N	
(2) Life and Livelihood	(a) Does the project cause adverse effect on resident life? Is measure to mitigate effect considered if necessary?	N	The city called "Shatrah" exists 1 km away from site to southeast direction. The project does not cause adverse effect on resident life.
	(b) Is there any danger of disease contraction (infection such as HIV) by the population flux? Is the consideration to public health made if necessary?	N	
	(c) Do iron tower etc. cause radio disturbance? Does proper measure considered when serious radio disturbance is expected?	N	There is no population flux during construction and operation.
	(d) Is the compensation etc. under transmission lines implemented law by the construction of such lines based on domestic?	N	

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(3) Cultural Heritage	(a) Is there any damage to archaeological, historical, cultural and religious precious heritage by project implementation? Are the measures, specified in domestic law of host country, considered?	N	There is no cultural heritage nearby.
(4) Landscape	(a) Does project cause adverse effect on the landscape, which requires extra consideration? If adverse effect is expected, are necessary measures taken?	N	
(5) Ethnic Minority and Indigenous People	(a) Are consideration taken to mitigate effect on culture and life style of ethnic minority and indigenous people?	N	There is no ethnic minority.
	(b) Are the various rights regarding to land and resources possessed by ethnic minority and indigenous people respected?	N	
(6) Labor Environment	(a) Are the law and regulation of host country regarding to labor environment complied?	Y	
	(b) Are safety considerations to related personnel of project taken including the installation of safety facilities for preventing occupational accidents and management of harmful substances?	Y	
	(c) Are software aspects planned and implemented such as drawing of safety and health plan, implementing safety education to employees (including traffic safety and public health)?	Y	To be prepared before implementation
	(d) Are proper security measures taken not to impinge the safety of project related personnel and local residents?	Y	

Table A5. 6 (Missan) Others

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Impact during Construction	(a) Is mitigation plan prepared for the pollution during construction? (Noise, vibration, murky water, dust, waste gas and wastes etc.)	Y	To be prepared before implementation
	(b) Does construction work give adverse effect on natural environment (ecosystem)? Are mitigating measures of adverse effect prepared?	N	
	(c) Does construction work cause an adverse effect on social environment? Are mitigating measures of adverse effect prepared?	N	
(2) Monitoring	(a) Do project proponents plan and implement the monitoring of affected items among above environmental items?	Y	To be prepared before implementation
	(b) Are the items, methodologies and frequency of above mentioned plan judged as appropriate?	Y	
	(c) Is the monitoring framework of project proponents established such as organization, manpower, equipment and continuity of these items?	N	To be prepared before implementation
	(d) Is the reporting method and frequency from project proponents to the governing authority specified?	Y	

Table A5. 7 (Missan) Note

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
Referring other environment checklist	(a) If necessary, add and evaluate related items of road checklist.	N	
Instruction for the use of environment checklist	(a) If necessary, confirm the environmental impact of border crossing global scale. (Border crossing of waste, acid rain, destruction of ozone layer and global warming)	N	

6. Basra Substation

6.1 The Location of Basra

Basra is a governorate in southern Iraq, bordering Kuwait to the south and Iran to the east. The capital is the city of Basra. Other districts of Basra include Al-Qurnah, Az Zubayr, Al Mudaynah, Shatt Al Arab, Abu Al Khaseeb and Al Faw located on the Persian Gulf.



Figure A6. 1 Basra Governorate

6.2 Site Neighboring Area and Photo Taking Direction



Figure A6. 2 (Basra) Location of Candidate Site in 3×3 km Area

6.3 Photos from Site



Figure A6. 3 (Basra) Unexploited Area



Figure A6. 4 (Basra) Unexploited Area



Figure A6. 5 (Basra) Unexploited Area



Figure A6. 6 (Basra) Unexploited Area

6.4 Connecting Transfer Line between Existing 400 kV Line and Candidate Site

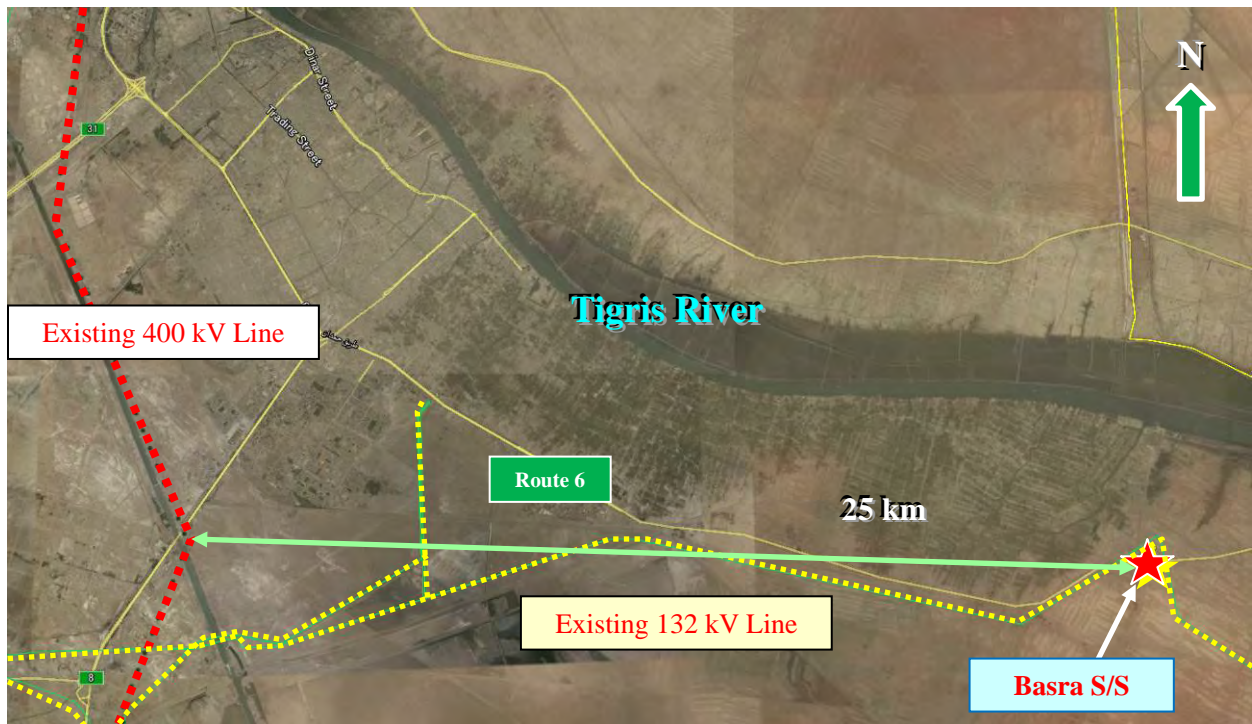


Figure A6. 7 (Basra) Relative Location of Site and Existing Transfer Lines

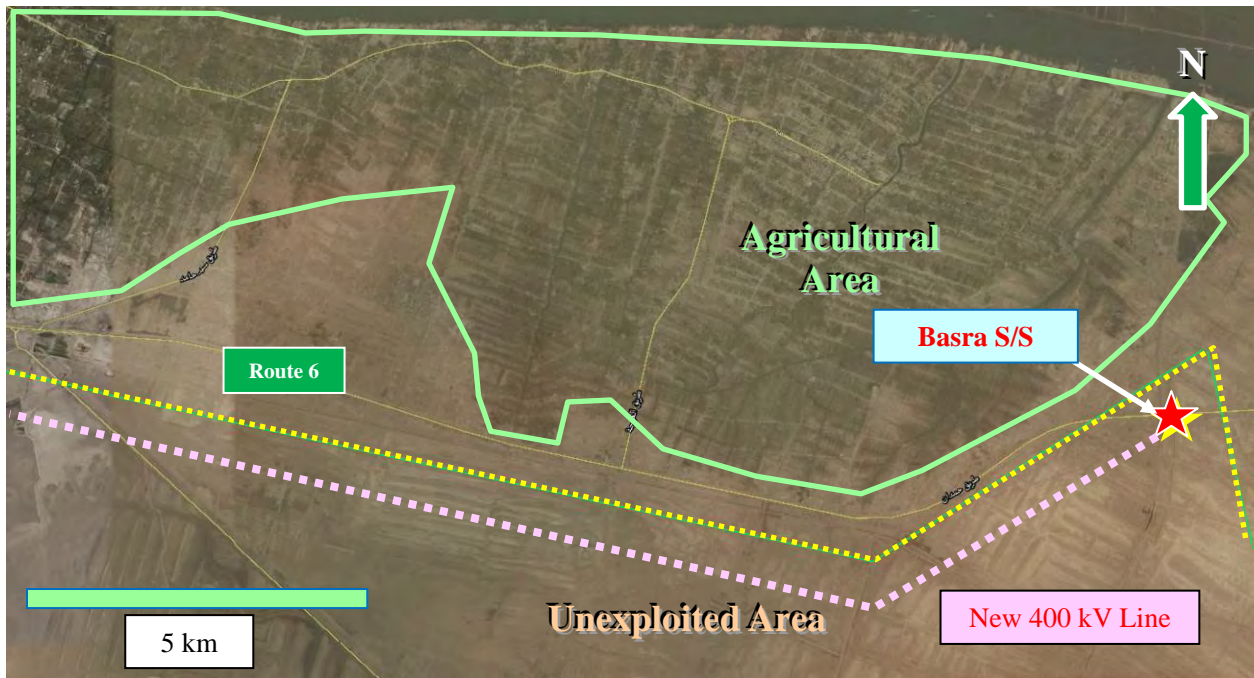


Figure A6. 8 (Basra) Site and New Transfer Lines (East Half)

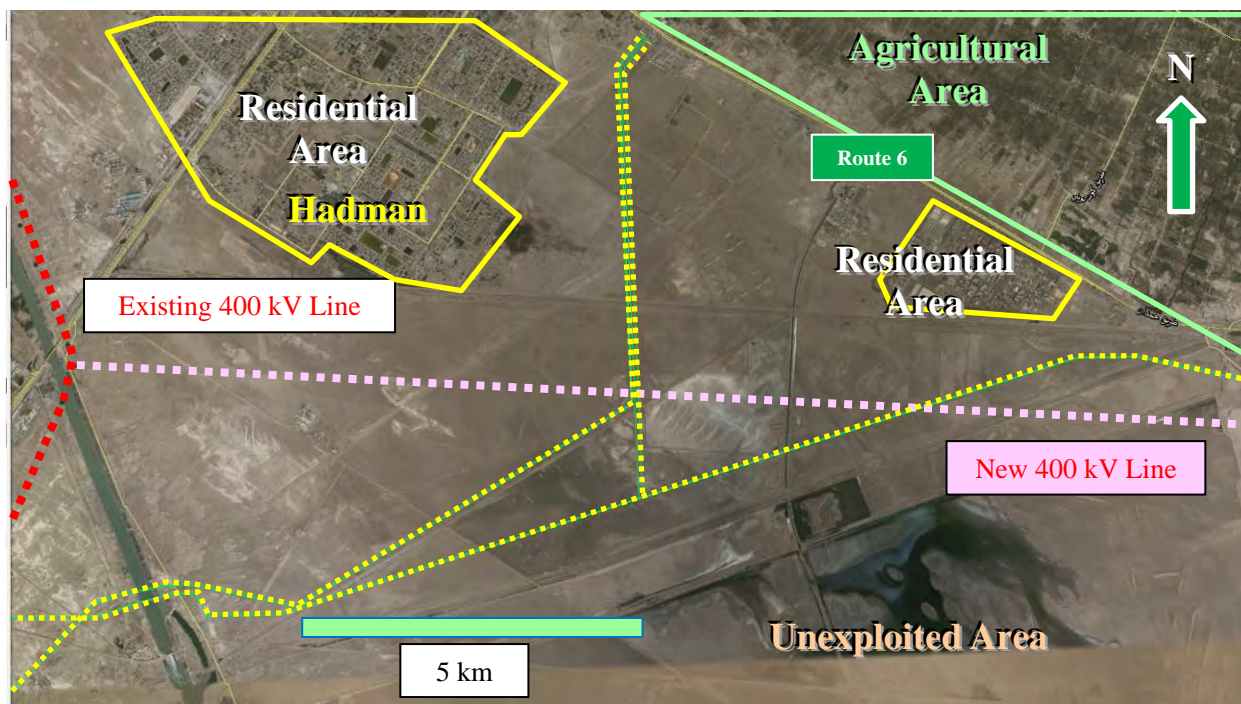


Figure A6. 9 (Basra) New Transfer Lines and Connecting Point at Existing Lines (West Half)

6.5 Social Consideration

Port of Abu Flus locates 4 km north from site. There are six cargo ports, plus two dedicated oil terminals in Iraq, all located in the riverine area of Shatt al Arab. These include: Umm Qasr; Az Zubair; Maqal (Basra); Abu Al Khazib; Abu Flus; and Al Faw.



Figure A6. 10 (Basra) Port of Abu Flus



Figure A6. 11 (Basra) Loading Facilities of Port of Abu Flus



Figure A6. 12 (Basra) Ship Repair

6.6 Stakeholders in Basra Substation Project

Table A6. 1 Stakeholders in Basra Substation Project

Government and Local Government	Ministry of Environment (MOEN)	BPIE South of MOEN
	Provincial Office of MOEN	Ministry of Electricity (MOE)
Non-Government	Representatives of Abu Flus Sub-District	
	Representatives of Headman Sub-District	

6.7 Basra Substation Environment Check List (Power transformation and transmission)

Table A6. 2 (Basra) Permits, approvals and explanations

Items	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) EIA & Environmental Permit	(a) Is the report of environment impact assessment and etc. is already created?	N	EIA is not necessary for "Class B" project. Instead IEE is necessary.
	(b) Does government approved EIA report?	N	IEE is not yet approved. In Iraq, Environmental Compliance Certificate is required.
	(c) Are there any collateral conditions to government approval? Could such collateral conditions be complied with?	Y	Environmental Regulation for Industrial, Agricultural and Service Project (No. 14 of 1990) stipulate concrete regulations.
	(d) Other than those above, did local competent authorities give environmental permit if required?	N	Provincial Office of MOEN and BPIE South of MOEN will check IEE report and submit to MOEN.
(2) Explanation to Local Stakeholders	(a) Are project contents and impacts including information disclosure explained properly to local stakeholders? And do they understand them?	N	To be conducted after selection as implementing site.
(3) Study of Alternatives	(b) Are the comments of residents reflected to project?	N	Ditto
	(a) Are multiple project alternatives studied? (Including environmental and social consideration)	Y	Various sites are studied. And this site is selected as giving the least impact on environment and society.

Table A6. 3 (Basra) Anti-pollution measures

Items	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Water Quality	(a) Is there any water pollution by soil in peripheral river basin, which flow from exposed surface by banking and cutting of soil? Are any countermeasures prepared in case of water pollution?	N	Tigris River is 4 km away north from site. Soil by banking and cutting never pollute river basin.

Table A6. 4 (Basra) Natural Environment

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Protected Area	(a) Is the project site located in protected areas specified by domestic legislation or international treaty, etc.? Does project cause adverse effect on the protected areas?	N	
	(a) Does project site encompass primary forests, natural forests in tropical areas, habitats with important ecological value (coral reefs, mangrove wetlands, tidal flats, etc.)?	N	
	(b) Does project site encompass habitats of rare species that require protection under domestic legislation, international treaties, etc.?	N	
	(c) When serious adverse effects on ecosystem are expected, are any countermeasures taken to mitigate them?	N	
	(d) Are measures taken for blocking the migration pathway of wild and domestic animals and setting apart habitats?	N	
	(e) Does project implementation cause deforestation, poaching, desertification and dried moor? Do alien species or pest, which do not inhabit in the past induce, leading to disrupting ecosystem? Are any countermeasures prepared?	N	
	(f) Does the construction in undeveloped region harm natural environment?	N	
	(a) Is there any geologically faulty location on the routes of transmission and distribution lines, which induces soil collapse or land slide? Does proper construction method of treatment applied to faulty location?	N	Although existing transmission lines of 132 kV exist at the nearby location, 400 kV line is 25 km west from site. It is necessary to construct new 400 kV line. But these line goes through unexploited area.
	(b) Does civil work like banking or cutting soil cause the soil collapse or landslide? Does proper countermeasure applied to prevent the soil collapse or landslide?	N	As large scale banking or cutting soil is not necessary, there is no potential of soil collapse or landslide.
(3) Geography and Geology	(c) Does soil flow out from the sites of banking, cutting and dumping? Does proper countermeasure applied to prevent the soil flowage?	N	Soil from site should be utilized as temporary road construction.

Table A6. 5 (Basra) Social Environment

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Resettlement of Residents	(a) Does project cause involuntary resettlement of residents? Is the effort to minimize the resettlement effect made when resettlement is required?	N	
	(b) Is the proper explanation given to resettling residents regarding to the measures of compensation and life restoration before resettlement?	N	
	(c) Is the resettlement plan including the compensation by reacquisition price and restoration of livelihood drawn based on survey of resident resettlement?	N	
	(d) Is compensation money paid before resettlement?	N	
	(e) Is the compensation policy written in the form of documents?	N	
	(f) Is the proper consideration taken into the resettling plan for gender, children, elderly people, poverty group, ethnic minority and indigenous people among resettling residents?	N	
	(g) Does resettling residents agree before resettlement?	N	
	(h) Is proper structural plan established, implementing resettlement of residents? Are sufficient capacity building and budget prepared?	N	
	(i) Is monitoring plan of resettlement established?	N	
	(j) Is complaint processing system established?	N	
(2) Life and Livelihood	(a) Does the project cause adverse effect on resident life? Is measure to mitigate effect considered if necessary?	N	Port of Abu Flus locates 4 km north from site. And residential area exists 2 km north of site. The project does not cause adverse effect on resident life.
	(b) Is there any danger of disease contraction (infection such as HIV) by the population flux? Is the consideration to public health made if necessary?	N	
	(c) Do iron tower etc. cause radio disturbance? Does proper measure considered when serious radio disturbance is expected?	N	There is no population flux during construction and operation.
	(d) Is the compensation etc. under transmission lines implemented law by the construction of such lines based on domestic?	N	

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(3) Cultural Heritage	(a) Is there any damage to archaeological, historical, cultural and religious precious heritage by project implementation? Are the measures, specified in domestic law of host country, considered?	N	There is no cultural heritage nearby.
(4) Landscape	(a) Does project cause adverse effect on the landscape, which requires extra consideration? If adverse effect is expected, are necessary measures taken?	N	
(5) Ethnic Minority and Indigenous People	(a) Are consideration taken to mitigate effect on culture and life style of ethnic minority and indigenous people?	N	There is no ethnic minority.
	(b) Are the various rights regarding to land and resources possessed by ethnic minority and indigenous people respected?	N	
(6) Labor Environment	(a) Are the law and regulation of host country regarding to labor environment complied?	Y	
	(b) Are safety considerations to related personnel of project taken including the installation of safety facilities for preventing occupational accidents and management of harmful substances?	Y	
	(c) Are software aspects planned and implemented such as drawing of safety and health plan, implementing safety education to employees (including traffic safety and public health)?	Y	To be prepared before implementation
	(d) Are proper security measures taken not to impinge the safety of project related personnel and local residents?	Y	

Table A6. 6 (Basra) Others

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Impact during Construction	(a) Is mitigation plan prepared for the pollution during construction? (Noise, vibration, murky water, dust, waste gas and wastes etc.)	Y	To be prepared before implementation
	(b) Does construction work give adverse effect on natural environment (ecosystem)? Are mitigating measures of adverse effect prepared?	N	
	(c) Does construction work cause an adverse effect on social environment? Are mitigating measures of adverse effect prepared?	N	
(2) Monitoring	(a) Do project proponents plan and implement the monitoring of affected items among above environmental items?	Y	To be prepared before implementation
	(b) Are the items, methodologies and frequency of above mentioned plan judged as appropriate?	Y	
	(c) Is the monitoring framework of project proponents established such as organization, manpower, equipment and continuity of these items?	N	To be prepared before implementation
	(d) Is the reporting method and frequency from project proponents to the governing authority specified?	Y	

Table A6. 7 (Basra) Note

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
Referring other environment checklist	(a) If necessary, add and evaluate related items of road checklist.	N	
Instruction for the use of environment checklist	(b) If necessary, confirm the environmental impact of border crossing global scale. (Border crossing of waste, acid rain, destruction of ozone layer and global warming)	N	

7. Al-Radwaniyah Substation

7.1 Location of Al-Radwaniyah Substation (Including the Location of Al-Masaain Substation)



The location of Al-Radwaniyah Substation is in Rasheed District and west of Bagdad airport. On the other hand, the location of Al-Madaain Substation in Karadah District.



Figure A7. 1 The Location of Candidate Substations in Bagdad

7.2 Site Neighboring Area and Photo Taking Direction



Figure A7. 2 (Al-Radwaniyah) Location of Candidate Site in 3×3 km Area

7.3 Social Consideration

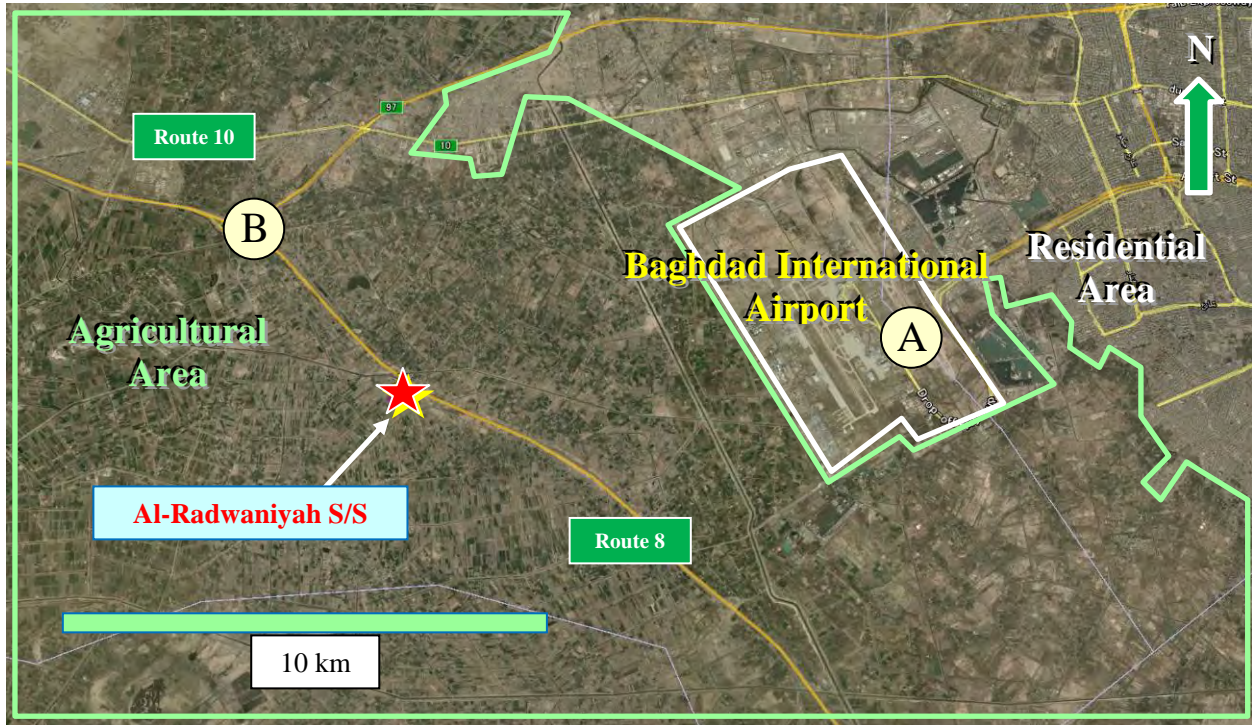


Figure A7. 3 (Al-Radwaniyah) Surrounding Area of Site

Baghdad International Airport, and also Saddam International Airport originally, is Iraq's largest airport, located in a suburb about 16 km (9.9 mi) west of downtown Baghdad in the Baghdad Governorate. It is the home base for Iraq's national airline, Iraqi Airways. It is often abbreviated BIAP although BIAP is not an official airport code.



Figure A7. 4 (Al-Radwaniyah) Baghdad International Airport



Figure A7. 5 (Al-Radwaniyah) Highway

7.4 Stakeholders in Al-Radwanayah Substation Project

Table A7. 1 Stakeholders in Al-Radwanayah Substation Project

Government and Local Government	Ministry of Environment (MOEN) Provincial Office of MOEN BPIE Middle of MOEN	Ministry of Agriculture (MOA) Ministry of Electricity (MOE)
Non-Government	Farmers Representatives of Abu Ghraih residents Representative of Rasheed District	

7.5 Al-Radwaniyah Substation Environment Check List (Power transformation and transmission)

Table A7. 2 (Al-Radwaniyah) Permits, approvals and explanations

Items	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) EIA & Environmental Permit	(a) Is the report of environment impact assessment and etc. is already created?	N	EIA is not necessary for "Class B" project. Instead IEE is necessary.
	(b) Does government approved EIA report?	N	IEE is not yet approved. In Iraq, Environmental Compliance Certificate is required.
	(c) Are there any collateral conditions to government approval? Could such collateral conditions be complied with?	Y	Environmental Regulation for Industrial, Agricultural and Service Project (No. 14 of 1990) stipulate concrete regulations.
	(d) Other than those above, did local competent authorities give environmental permit if required?	N	Provincial Office of MOEN and BPIE Middle of MOEN will check IEE report and submit to MOEN.
(2) Explanation to Local Stakeholders	(a) Are project contents and impacts including information disclosure explained properly to local stakeholders? And do they understand them?	N	To be conducted after selection as implementing site.
(3) Study of Alternatives	(b) Are the comments of residents reflected to project?	N	Ditto
	(a) Are multiple project alternatives studied? (Including environmental and social consideration)	Y	Various sites are studied. And this site is selected as giving the least impact on environment and society.

Table A7. 3 (Al-Radwaniyah) Anti-pollution measures

Items	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Water Quality	(a) Is there any water pollution by soil in peripheral river basin, which flow from exposed surface by banking and cutting of soil? Are any countermeasures prepared in case of water pollution?	N	Tigris River is 22 km away east from site. Soil by banking and cutting never pollute river basin.

Table A7. 4 (Al-Radwaniyah) Natural Environment

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Protected Area	(a) Is the project site located in protected areas specified by domestic legislation or international treaty, etc.? Does project cause adverse effect on the protected areas?	N	
(2) Ecological System	(a) Does project site encompass primary forests, natural forests in tropical areas, habitats with important ecological value (coral reefs, mangrove wetlands, tidal flats, etc.)?	N	
	(b) Does project site encompass habitats of rare species that require protection under domestic legislation, international treaties, etc.?	N	
	(c) When serious adverse effects on ecosystem are expected, are any countermeasures taken to mitigate them?	N	
	(d) Are measures taken for blocking the migration pathway of wild and domestic animals and setting apart habitats?	N	
	(e) Does project implementation cause deforestation, poaching, desertification and dried moor? Do alien species or pest, which do not inhabit in the past induce, leading to disrupting ecosystem? Are any countermeasures prepared?	N	
	(f) Does the construction in undeveloped region harm natural environment?	N	
(3) Geography and Geology	(a) Is there any geologically faulty location on the routes of transmission and distribution lines, which induces soil collapse or land slide? Does proper construction method of treatment applied to faulty location?	N	Existing transmission lines of 400 kV is 1.8-1.9 km southwest from site. It is necessary to construct new 400 kV line. These line goes through agricultural area.
	(b) Does civil work like banking or cutting soil cause the soil collapse or landslide? Does proper countermeasure applied to prevent the soil collapse or landslide?	N	As large scale banking or cutting soil is not necessary, there is no potential of soil collapse or landslide.
	(c) Does soil flow out from the sites of banking, cutting and dumping? Does proper countermeasure applied to prevent the soil flowage?	N	Soil from site should be utilized as temporary road construction.

Table A7. 5 (Al-Radwaniyah) Social Environment

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Resettlement of Residents	(a) Does project cause involuntary resettlement of residents? Is the effort to minimize the resettlement effect made when resettlement is required?	N	
	(b) Is the proper explanation given to resettling residents regarding to the measures of compensation and life restoration before resettlement?	N	
	(c) Is the resettlement plan including the compensation by reacquisition price and restoration of livelihood drawn based on survey of resident resettlement?	N	
	(d) Is compensation money paid before resettlement?	N	
	(e) Is the compensation policy written in the form of documents?	N	
	(f) Is the proper consideration taken into the resettling plan for gender, children, elderly people, poverty group, ethnic minority and indigenous people among resettling residents?	N	
	(g) Does resettling residents agree before resettlement?	N	
	(h) Is proper structural plan established, implementing resettlement of residents? Are sufficient capacity building and budget prepared?	N	
	(i) Is monitoring plan of resettlement established?	N	
	(j) Is complaint processing system established?	N	
(2) Life and Livelihood	(a) Does the project cause adverse effect on resident life? Is measure to mitigate effect considered if necessary?	N	Residential area locates 6 km north from site. The project does not cause adverse effect on resident life.
	(b) Is there any danger of disease contraction (infection such as HIV) by the population flux? Is the consideration to public health made if necessary?	N	There is no population flux during construction and operation.
	(c) Do iron tower etc. cause radio disturbance? Does proper measure considered when serious radio disturbance is expected?	N	
	(d) Is the compensation etc. under transmission lines implemented law by the construction of such lines based on domestic?	N	

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(3) Cultural Heritage	(a) Is there any damage to archaeological, historical, cultural and religious precious heritage by project implementation? Are the measures, specified in domestic law of host country, considered?	N	There is no cultural heritage nearby.
(4) Landscape	(a) Does project cause adverse effect on the landscape, which requires extra consideration? If adverse effect is expected, are necessary measures taken?	N	
(5) Ethnic Minority and Indigenous People	(a) Are consideration taken to mitigate effect on culture and life style of ethnic minority and indigenous people?	N	There is no ethnic minority.
	(b) Are the various rights regarding to land and resources possessed by ethnic minority and indigenous people respected?	N	
(6) Labor Environment	(a) Are the law and regulation of host country regarding to labor environment complied?	Y	
	(b) Are safety considerations to related personnel of project taken including the installation of safety facilities for preventing occupational accidents and management of harmful substances?	Y	
	(c) Are software aspects planned and implemented such as drawing of safety and health plan, implementing safety education to employees (including traffic safety and public health)?	Y	To be prepared before implementation
	(d) Are proper security measures taken not to impinge the safety of project related personnel and local residents?	Y	

Table A7. 6 (Al-Radwaniyah) Others

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Impact during Construction	(a) Is mitigation plan prepared for the pollution during construction? (Noise, vibration, murky water, dust, waste gas and wastes etc.)	Y	To be prepared before implementation
	(b) Does construction work give adverse effect on natural environment (ecosystem)? Are mitigating measures of adverse effect prepared?	N	
	(c) Does construction work cause an adverse effect on social environment? Are mitigating measures of adverse effect prepared?	N	
(2) Monitoring	(a) Do project proponents plan and implement the monitoring of affected items among above environmental items?	Y	To be prepared before implementation
	(b) Are the items, methodologies and frequency of above mentioned plan judged as appropriate?	Y	
	(c) Is the monitoring framework of project proponents established such as organization, manpower, equipment and continuity of these items?	N	To be prepared before implementation
	(d) Is the reporting method and frequency from project proponents to the governing authority specified?	Y	

Table A7. 7 (Al-Radwaniyah) Note

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
Referring other environment checklist	(a) If necessary, add and evaluate related items of road checklist.	N	
Instruction for the use of environment checklist	(a) If necessary, confirm the environmental impact of border crossing global scale. (Border crossing of waste, acid rain, destruction of ozone layer and global warming)	N	

8. Al-Madaain Substation

8.1 Site Neighboring Area and Photo Taking Direction



Figure A8. 1 (Al-Madaain) Location of Candidate Site in 3×3 km Area

8.2 Photos from site



Figure A8. 2 (Al-Madaain) Northeast of Site under 132 kV Line



Figure A8. 3 (Al-Madaain) Southeast of Site



Figure A8. 4 (Al-Madaain) Southwest of Site under 132 kV Line



Figure A8. 5 (Al-Madaain) Northwest of Site

8.3 Social Consideration



Figure A8. 6 (Al-Madaain) Surrounding Area of Site

Operation Opera, also known as Operation Babylon, was a surprise Israeli air strike carried out on 7 June 1981 that destroyed a nuclear reactor under construction 17 kilometers (10.5 miles) southeast of Baghdad, Iraq. This operation was after Iran's Operation Scorch Sword that damaged this nuclear facility months before.

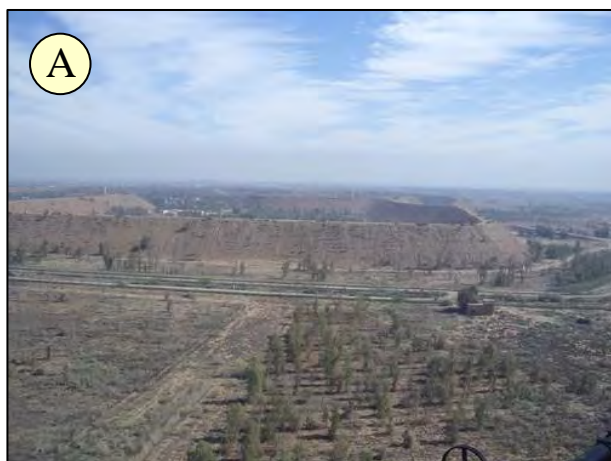


Figure A8. 7 (Al-Madaain) Ex-Nuclear Plant (Osirak Reactor)



Figure A8. 8 (Al-Madaain) Nuclear Plant under Construction

8.4 Stakeholders in Al-Radwanayah Substation Project

Table A8. 1 Stakeholders in Al-Madaain Substation Project

Government and Local Government	Ministry of Environment (MOEN) Provincial Office of MOEN BPIE Middle of MOEN	Ministry of Agriculture (MOA) Ministry of Electricity (MOE) Representative of Osirak Nuclear Station
Non-Government	Farmers Representative of Karadah District	

8.5 Al-Madaain Substation Environment Check List (Power transformation and transmission)

Table A8. 2 (Al-Madaain) Permits, approvals and explanations

Items	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) EIA & Environmental Permit	(a) Is the report of environment impact assessment and etc. is already created?	N	EIA is not necessary for "Class B" project. Instead IEE is necessary.
	(b) Does government approved EIA report?	N	IEE is not yet approved. In Iraq, Environmental Compliance Certificate is required.
	(c) Are there any collateral conditions to government approval? Could such collateral conditions be complied with?	Y	Environmental Regulation for Industrial, Agricultural and Service Project (No. 14 of 1990) stipulate concrete regulations.
	(d) Other than those above, did local competent authorities give environmental permit if required?	N	Provincial Office of MOEN and BPIE Middle of MOEN will check IEE report and submit to MOEN.
(2) Explanation to Local Stakeholders	(a) Are project contents and impacts including information disclosure explained properly to local stakeholders? And do they understand them?	N	To be conducted after selection as implementing site.
(3) Study of Alternatives	(b) Are the comments of residents reflected to project?	N	Ditto
	(a) Are multiple project alternatives studied? (Including environmental and social consideration)	Y	Various sites are studied. And this site is selected as giving the least impact on environment and society.

Table A8. 3 (Al-Madaain) Anti-pollution measures

Items	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Water Quality	(a) Is there any water pollution by soil in peripheral river basin, which flow from exposed surface by banking and cutting of soil? Are any countermeasures prepared in case of water pollution?	N	Tigris River is 2 km away west from site. Soil by banking and cutting never pollute river basin.

Table A8. 4 (Al-Madaain) Natural Environment

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Protected Area	(a) Is the project site located in protected areas specified by domestic legislation or international treaty, etc.? Does project cause adverse effect on the protected areas?	N	
(2) Ecological System	(a) Does project site encompass primary forests, natural forests in tropical areas, habitats with important ecological value (coral reefs, mangrove wetlands, tidal flats, etc.)?	N	
	(b) Does project site encompass habitats of rare species that require protection under domestic legislation, international treaties, etc.?	N	
	(c) When serious adverse effects on ecosystem are expected, are any countermeasures taken to mitigate them?	N	
	(d) Are measures taken for blocking the migration pathway of wild and domestic animals and setting apart habitats?	N	
	(e) Does project implementation cause deforestation, poaching, desertification and dried moor? Do alien species or pest, which do not inhabit in the past induce, leading to disrupting ecosystem? Are any countermeasures prepared?	N	
	(f) Does the construction in undeveloped region harm natural environment?	N	
(3) Geography and Geology	(a) Is there any geologically faulty location on the routes of transmission and distribution lines, which induces soil collapse or land slide? Does proper construction method of treatment applied to faulty location?	N	Existing transmission lines of 400 kV is 129 km southwest from site. It is necessary to construct new 400 kV line. These line goes through agricultural area.
	(b) Does civil work like banking or cutting soil cause the soil collapse or landslide? Does proper countermeasure applied to prevent the soil collapse or landslide?	N	As large scale banking or cutting soil is not necessary, there is no potential of soil collapse or landslide.
	(c) Does soil flow out from the sites of banking, cutting and dumping? Does proper countermeasure applied to prevent the soil flowage?	N	Soil from site should be utilized as temporary road construction.

Table A8. 5 (Al-Madaain) Social Environment

Main Checking Items		Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)	
(1) Resettlement of Residents	(a) Does project cause involuntary resettlement of residents? Is the effort to minimize the resettlement effect made when resettlement is required?	N	As the site is in agricultural area, project does not cause involuntary resettlement of residents. However, it is necessary to negotiate with farmers about alternative fields or compensation caused by this project.	
	(b) Is the proper explanation given to resettling residents regarding to the measures of compensation and life restoration before resettlement?	N		
	(c) Is the resettlement plan including the compensation by reacquisition price and restoration of livelihood drawn based on survey of resident resettlement?	N		
	(d) Is compensation money paid before resettlement?	N		
	(e) Is the compensation policy written in the form of documents?	N		
	(f) Is the proper consideration taken into the resettling plan for gender, children, elderly people, poverty group, ethnic minority and indigenous people among resettling residents?	N		
	(g) Does resettling residents agree before resettlement?	N		
	(h) Is proper structural plan established, implementing resettlement of residents? Are sufficient capacity building and budget prepared?	N		
	(i) Is monitoring plan of resettlement established?	N		
	(j) Is complaint processing system established?	N		
	(a) Does the project cause adverse effect on resident life? Is measure to mitigate effect considered if necessary?	N		Residential area locates 2 km east from site. The project does not cause adverse effect on resident life.
	(b) Is there any danger of disease contraction (infection such as HIV) by the population flux? Is the consideration to public health made if necessary?	N		There is no population flux during construction and operation.
(c) Do iron tower etc. cause radio disturbance? Does proper measure considered when serious radio disturbance is expected?	N			
(d) Is the compensation etc. under transmission lines implemented law by the construction of such lines based on domestic?	N			
(2) Life and Livelihood				

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(3) Cultural Heritage	(a) Is there any damage to archaeological, historical, cultural and religious precious heritage by project implementation? Are the measures, specified in domestic law of host country, considered?	N	There is no cultural heritage nearby.
(4) Landscape	(a) Does project cause adverse effect on the landscape, which requires extra consideration? If adverse effect is expected, are necessary measures taken?	N	
(5) Ethnic Minority and Indigenous People	(a) Are consideration taken to mitigate effect on culture and life style of ethnic minority and indigenous people?	N	There is no ethnic minority.
	(b) Are the various rights regarding to land and resources possessed by ethnic minority and indigenous people respected?	N	
(6) Labor Environment	(a) Are the law and regulation of host country regarding to labor environment complied?	Y	
	(b) Are safety considerations to related personnel of project taken including the installation of safety facilities for preventing occupational accidents and management of harmful substances?	Y	
	(c) Are software aspects planned and implemented such as drawing of safety and health plan, implementing safety education to employees (including traffic safety and public health)?	Y	To be prepared before implementation
	(d) Are proper security measures taken not to impinge the safety of project related personnel and local residents?	Y	

Table A8. 6 (Al-Madaain) Others

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
(1) Impact during Construction	(a) Is mitigation plan prepared for the pollution during construction? (Noise, vibration, murky water, dust, waste gas and wastes etc.)	Y	To be prepared before implementation
	(b) Does construction work give adverse effect on natural environment (ecosystem)? Are mitigating measures of adverse effect prepared?	N	
	(c) Does construction work cause an adverse effect on social environment? Are mitigating measures of adverse effect prepared?	N	
(2) Monitoring	(a) Do project proponents plan and implement the monitoring of affected items among above environmental items?	Y	To be prepared before implementation
	(b) Are the items, methodologies and frequency of above mentioned plan judged as appropriate?	Y	
	(c) Is the monitoring framework of project proponents established such as organization, manpower, equipment and continuity of these items?	N	To be prepared before implementation
	(d) Is the reporting method and frequency from project proponents to the governing authority specified?	Y	

Table A8. 7 (Al-Madaain) Note

	Main Checking Items	Yes: Y No: N	Concrete Environment and Social Consideration (Reason of Yes/No, ground and mitigation measures)
Referring other environment checklist	(a) If necessary, add and evaluate related items of road checklist.	N	
Instruction for the use of environment checklist	(a) If necessary, confirm the environmental impact of border crossing global scale. (Border crossing of waste, acid rain, destruction of ozone layer and global warming)	N	