

7.2 SOCIO- ECONOMIC CHARACTERISTICS

7.2.1 SOCIO- ECONOMIC CHARACTERISTICS OF TAM IEP COMMUNE.

a. Population

According to statistics, the commune has population of 7557 inhabitants living in 1654 households. The natural area is about 316 ha. The commune has 3 villages: Huynh cung, Yen Nguu, Tuu Liet. The communal office is in Huynh Cung commune. Telephone number is 048.615463

The population distribution is as follow:

Name of village	Number of household	Population (people)
Huynh Cung	844	3699
Tuu Liet	232	1075
Yen Nguu	578	2783

Residential area is far from the transfer station. The nearest is 500m away

b. Infrastructure

Within Tam Hiep commune, there are many State and local factories and enterprises in the Van Dien industrial zone which is by the Road No70 from Van Dien to Ha Dong

The commune has 01 basic secondary school (level II) with 572 pupils, 02 primary schools (level I) with 765 pupils and 03 kindergartens with 304 pupils. There is a hospital under Ministry of Transportation (Hospital G with only a part in operation). In addition, there is a clinic with 06 beds.

The roads in the commune is almost concrete and asphalt road. 100% of population have access to electricity. Main sources of domestic water are ground water and rainwater. According to statistic, the whole commune has 1403 dug wells, 3m deep on average and 512 drilled wells well (30m deep on arrearage). As much as 60% of the household use rain water tank with mean volume of 6m³ . 26.36% of the population use toilet with septic tank, 9.24% use two compartments latrine and 64.40% use others

c. Main occupation

Farming and working in factories or enterprises within the commune are major occupation of local people. A small portion involve in commercial activities. Mean income of local people is 140.400VND/capital/month.

7.2.2 SOCIO-ECONOMIC CHARACTERISTICS OF THE TRANSFER STATION AND ITS VICINITY.

a. In the transfer station.

The whole transfer station is covered by trees, there isn't any solid structure but small house of family of Mr Nguyen Huu Chi- the only household living within the site. There are 3 people in the family.

b. In the vicinity.

In the vicinity of the site is paddy field and fish pond. In the NE are military camp and 03 households living in the area leased from the Cooperative.

When the transfer station is built, relocation must be carried out for 4 households residing within the site and on the access road to the site. Compensation will be low for the area is under the Cooperative.

7.2.3 RESULT OF ENVIRONMENTAL SURVEY IN THE AREA INTENDED FOR THE TRANSFER STATION

During the survey, we have cooperated with communal People's committee to collect information on land use status and socioeconomic condition of the locality. We have interviewed 33 households living in Huynh Cung, Tuu Liet, Yen Nguu villages (Tam Hiep communes) and Vinh Linh village (Vinh Quynh commune).

The result of surveys and interviews show that:

+ As regards the surrounding environment :

- Severely polluted: 72.2 %,
- Not severely polluted: 21.3 %
- Not polluted: 6.1 %

+ Evaluation of the interviewees on the degree of pollution (in %):

Degree Aspect	Severely polluted	Not severely polluted	Not polluted
Waste	15.2%	76.6%	9.1%
Water resource	18.2 %	45.4 %	36.4 %
Odor	36.4 %	57.5 %	6.1%
Gas, dust	51.7 %	42.4 %	6.1 %
Noise	39.4 %	21.2 %	39.4 %
Vibration	0 %	33.1 %	66.7 %

+ As regards the degree of pollution caused by the surrounding solid wastes:

9.1 % - Polluted, 84.4 % - Not very clean, 6.1%: Clean

+ Point of view of the population about the construction of the transfer station:

- 9.1% of them agree with the construction of the transfer station
- 90.9 % not agree

7.3 ACCESSIBILITY OF THE INTENDED TRANSFER STATION

7.3.1 DISTANCE OF WASTES TRANSPORTATION

The distance and time of truck travel from the transfer station, to Nam Son landfill are 59.2 km and 1.30- 1.40 hour respectively.

The distance and time of truck travel from URENCO office to the transfer station are 12.2 km and 20- 25 minutes respectively.

7.3.2 NUMBER OF VEHICLES IN ROAD NO70.

Waste trucks to Nam Son landfill must follow 2.1km section of Road No70 and cross a railway barrier at Van Dien T-junction. This is a big disadvantage, cause of traffic jam. On the other hand, waste transportation route from Tam Hiep to Nam Son must turn back by Kim Giang road or pass through Ha Dong town, raising the cost, affecting the environment and esthetics of the City as well as many households living along the street. We have counted the number of vehicles passing this 2.1km road section with the result show that:

The average number of vehicles per hour is 172 trips of which:

Kinds of vehicles	Number of vehicles	Ratio (%)
Small struck (under 4.5 tones)	62	36.04
Big struck (over 4.5 tones)	17	9.88
Small car under 16 seats	58	33.72
Passenger car over 24 seats	17	9.77
Minitrucks	18	10.47

The number of trains is 22-25 in the day time and 17-20 at night, of which 13 trips are passenger trains of all kinds

7.3.3 ACCESS ROAD TO THE TRANSFER STATION

* Description of the existing access road to the site

The proposed site used to be the dump site of the City and is now under municipal management. On the access road to the site, there is a temporary house at the bend leading to the transfer station (this house is often unoccupied) and 3 households of

- Nguyen Thi Hanh (household size is 4)
- Tran Van Son (household size is 3)
- Nguyen huu Chi (household size is 3)

The Tam Hiep transfer station is 480m away from Road No70. Access road to the proposed site is divided into 2 sections

Section 1: From Road No70 passing a military camp to the bend leading to the transfer station

This road section is low, 350m long, 6m wide on average and constructed by graded stones. The road is now in bad condition, with many pot holes,

making it hard for traveling. Currently, traffic density in this road is low, only 6-8 vehicles per hour

Section 2: From the bend at the end of section 1 to the transfer station

This road section is 130m long, 6m wide and heavily damaged. This section is also low, only 0.33-0.4m above the water level of the lake. Some parts are subsided as low as the water level making it inaccessible by vehicles with low chassis or vehicles of over 4 tons capacity

*** Upgrade of existing road**

In case the proposed transfer station is selected, a 500m long road must be improved at the price of 917 million VND for road of level III, 7.8m wide

*** Anticipated traffic flow in case the transfer station is selected**

If the proposed site is selected for construction, 400 trips is estimated to increase in Road No70. If waste trucks operate 12 hours a day, 34 trips will be added per hour, which is an increase of about 19.77% over the current traffic flow in the road. Given the current traffic density, together with the train barrier and funeral procession, the road will be vulnerable to traffic jam.

7.3.4 CURRENT STATUS OF THE PROPOSED TRANSFER STATION

The site is now under City's management. Therefore, only few households are cultivating here without paying tax. According to survey, these households are aware of the fact that when the State take over this land, they have no right to ask for compensation.

Currently, there is only one small house within the site with the total area of 200m². This land is leased from the cooperative for animals breeding not for dwelling.

Trees planted at the site are mainly vegetable and short-term trees such as bananas, squash, spinach, sweet potato and margoses. A small part of the site is covered by margoses

- Bananas: Bananas are planted around the site in an area of about 20% of the site. With suitable conditions, these kind of tree grows well, a part is being harvested
- Vegetables and sweet potato are planted at the center of the site which cover 22% of the area of the site. Sweet potatoes are mainly planted in the low-lying south-eastern part of the site near the lake. This kind of tree has medium growth except dry spinach which is still growing well
- Margoses are planted in a small area in South-West of the site (about 10% of the site) and currently growing well. The mean height and diameter of the trees is 4.5m and 6-8cm respectively

A large area of the site is still uncultivated because the relief is too low and the waste are dumped high. Moreover, the newly-dumped waste hasn't decomposed yet

The analysis result of soil samples are presented bellowed:

Table 7.4: Soil analysis result at Tam Hiep transfer station

No	Indicator	Sample mark	
		THD1	THD2
1	Hg (mg/kg dry soil)	0.000062	0.000035
2	As (mg/kg dry soil)	0.000095	0.000082
3	Pb (mg/kg dry soil)	0.0024	0.0033
4	Cu (mg/kg dry soil)	0.023	0.022
5	Fe (mg/kg dry soil)	3.9	4.05
6	Al (mg/kg dry soil)	8.64	6.75
7	CaO (mg/kg dry soil)	0.70	0.86
8	MgO (mg/kg dry soil)	1.50	1.30
9	Mn (mg/kg dry soil)	0.056	0.05
10	Clo (mg/kg dry soil)	0.0071	0.0071
11	pH value	6.7	6.8

7.3.5 ISSUES TO BE NOTED

- ◆ The proposed transfer station is on the ground of the old waste dump site which was closed in 1993. Waste is dumped to the height of 4.5m on average and still in decomposition period. Therefore, construction will be difficult.
- ◆ This is a low-lying area with poor drainage so it's not favorable for construction of a sanitary project
- ◆ Currently, a great many of factories and enterprises focus on Van Dien particularly around Van Dien cemetery. Therefore, this area is very sensitive and attracts great public concern. If the transfer station is built here, psychological aspects must be taken into consideration

7.4 COMMENTS OF THE STUDY TEAM

- *Area: The area of the proposed site is small (covering just 3ha) not meeting the requirement*
- *Distance of waste transportation: The proposed transfer station is far from waste-generating area and landfill site (12.2km from the City center, 59.2 km from Nam Son landfill) so cost for waste transportation is high. The waste transportation route to Nam Son must pass through the City centre affecting the esthetics of the City and mind of residents living along the road*
- *Access road: The access road is available. However, it is very narrow and traffic density is very high (172 trips/hour). Moreover, the access road run across the rail road so it is easy to create traffic jam. Therefore, if the transfer station is constructed, investment should be made to construct and upgrade 500m long access road*
- *Topography: The proposed site is unfavorable for construction because*

- it's on the ground of the old waste dump site with waste height of 4.5m and various elevation, so the foundation must be leveled and previous waste layer must be removed*
- *Geological setting: The foundation is firm. There is no faults or slides in the proposed transfer station*
 - *Surface water: The proposed site is unfavorable because it, is located in low-lying area and easy to be submerged in rainy season especially when there is heavy rain*
 - *Ground water: At the proposed site, the clay layer is almost thinned out (only 0.7-1.7m thick). The layer below is sand, silty fine grain sand. Therefore, the proposed transfer station may badly affect groundwater*
 - *Environment: According to survey results and collected documents, there are signs of pollution of surface water, shallow ground water as well as air environment*
 - *Land use condition: There is no building within the proposed site. The site is under direct management of City People's Committee so site clearance will be easy and there is no need for land compensation*
 - *Distance to residential: The site is 500m away from the nearest residential area*
 - *Public opinion: According to results of household survey, 91% of respondents oppose to the construction of the transfer station*

II.8 LAI HOANG TRANSFER STATION

8.1 NATURAL GEOGRAPHICAL CHARACTERISTICS AND ENVIRONMENTAL STATUS

8.1.1 LOCATION

The study area is located in Yen Thuong commune, Gia Lam district, suburb of Ha Noi. The proposed site is on the access road to Lai Hoang village, 2.4 km to the North of National road No3 and 16 km to the North-East of Ha Noi.

The project area has following coordinate:

21°06'16" - 21°06'30" North latitude

105°54'10" - 105°54'20" East longitude

- In the North: it's bounded with paddy field of Xuan Duc village, Yen Thuong commune, Gia Lam district
- In the East: it's bounded with irrigation canals which supply water for paddy field in the area
- In the South: it's bounded with railway to Viet Tri, Yen Bai, Con Minh provinces
- In the West is paddy field and old brick kilns of Nghia Vu village, Duc Tu commune, Dong Anh district

(see the outline and photographs)

8.1.2 TOPOGRAPHY

The proposed transfer station is in paddy field of Xuan Duc village, Yen Thuong commune Gia Lam district. The project area has quadrilateral shape, side in the South-West, North-West, North-East and South-East is 158m, 319m, 190m and 313m long respectively.

The area of the site is 5 ha and the terrain is quite flat with maximum elevation of 1.0-1.4m. The site is divided into three parts: Duc Thoi, Phan Duong, To Phu (as called by local people).

- Duc Thoi: located West of the site covering 25% of the area of the site. This part is low, maximum elevation being 5.2m and covered by paddy
- Phan Duong: in the centre of the site covering 35% of the area of the site. This part is 0.3-0.4m higher than the others
- To Phu: in the East of the site covering 40% of the area of the site with elevation of 5.2-5.4m

Main drainage is in North-West direction

8.1.3 AIR ENVIRONMENT

The result of survey and measurement at 4 typical points around the site on 5-6 August show that the air environment is clean with no sign of pollution. Almost all indicators are many times below the permissible level. The

results of air analysis are presented on table below:

Table 8.1: Result of air analysis in Lai Hoang transfer station

No	indicator	Sample marks				TCVN 5937 - 1995
		LH1	LH2	LH3	LH4	
1	NO _x (mg/m ³)	0.16	0.01	0.015	0.15	0.4
2	NH ₃ (mg/m ³)	<0.01	0.02	0.01	0.02	-
3	CH ₄ (mg/m ³)	0.30	0.20	0.30	0.25	-
4	CO (mg/m ³)	0.15	0.10	0.17	0.14	40
5	CO ₂ (mg/m ³)	88	88	90	90	-
6	SO ₂ (mg/m ³)	0.011	0.01	0.012	0.01	0.5
7	H ₂ S (mg/m ³)	<0.01	<0.01	<0.01	<0.01	0.008 *
8	Dust (mg/m ³)	0.07	0.08	0.10	0.09	0.3
9	Noise (dB)	46 - 49	46 - 48	45 - 50	45 - 50	70 **
10	RH (%)	70	70	70	70	-
11	Temperature (°C)	33	34	37	35	-
12	P (mmHg)	720	715	715	715	-
13	Wind direction	ĐN	ĐN	ĐN	ĐN	-
14	Wind velocity (m/s)	0.5 - 0.8	0.5 - 0.7	0.5 - 1.0	0,5 - 0,8	-

* Taken from Vietnamese Standard TCVN 5938 -1995

** Taken from Vietnamese Standard TCVN 5949-1995

8.1.4 HYDROLOGY

The project area is located in a low - lying area, surrounded by many lakes, and swamps of Duc Tu commune, Dong Anh district (Nghia Vu swamp). Within the project area, there are many drainage canals and irrigation channels. Surface water drains in north and North-West direction, to Ngu Huyen Khe river.

Ngu Huyen Khe river flows in SW - NE direction. Water in this river is muddy and polluted due to discharge of domestic water and waste of some factories in the area.

The quality of surface water in the area is generally good , analyzed indicators are below the standard limits in TCVN 5942-1995 (see table 8.2)

8.1.5 HYDROGEOLOGY

The hydrogeological characteristics of the proposed site is similar to that in

Noi Du transfer station

Residents in the study area mainly exploit groundwater for domestic uses. Drilled wells in the region has average depth of 36 - 38m. Water quality is quite good. However, water in some wells has high iron content . The results of water analysis are shown in table 8.2 below:

Table 8.2: Results of water analysis in Lai Hoang transfer station

No	Indicator	Sample Mark					TCVN 5944 - 1995
		LH01	LH02	LH03	LH04	LH05	
1	COD (mg/l)	16.0	12.0	15.2	4.8	4.2	-
2	BOD ₅ (mg/l)	6.4	4.2	4.6	1.6	1.2	-
3	Phenol (mg/l)	0.001	0.001	0.003	0.003	<0.001	0.001
4	Cyanua (mg/l)	0.001	0.001	0.005	0.005	0.005	0.01
5	As (mg/l)	0.0008	0.0010 1	0.0008 7	0.00029	0.00053	0.05
6	Pb (mg/l)	0.0108	0.0039	0.005	0.0014	0.0022	0.05
7	Cu (mg/l)	0.0015	<0.000 1	0.0007	<0.0001	0.0011	1.0
8	Zn (mg/l)	0.003	0.0021	0.0016	0.001	0.0074	5.0
9	Cd (mg/l)	0.0004	0.0005	0.0005	0.0003	<0.0001	0.01
10	Hg (mg/l)	0.00037	0.0006 4	0.0009 6	0.00029	0.0011	0.001
11	Mn (mg/l)	0.15	0.035	0.08	<0.01	0.88	0.1 - 0.5
12	Ni (mg/l)	<0.01	<0.01	<0.01	<0.01	0.035	-
13	Cr (VI) (mg/l)	0.004	0.04	0.0045	0.0035	0.004	0.05
14	F ⁻ (mg/l)	0.51	0.84	0.44	0.25	<0.01	1.0
15	Ca (mg/l)	30.0	26.0	28.0	37.0	42.0	-
16	Mg (mg/l)	7.8	9.0	7.2	18.0	10.8	-
17	Coliform (MPN/100ml)	0	36	52	0	200	3
18	Sulphat (mg/l)	3.0	3.0	4.0	8.0	0.0	200-400
19	pH	7.0	7.0	7.0	7.0	7.2	6.5 - 8.0
20	Fe (mg/l)	3.77	0.70	2.1	0.30	3.7	1 - 5
21	NO ₂ (mg/l)	0.01	0.0	0.0	0.05	0.0	-
22	NH ₄ ⁺ (mg/l)	0.20	0.10	0.20	0.0	1.20	-
23	NO ₃ ⁻ (mg/l)	2.06	2.0	1.72	8.26	1.38	45
24	Clorua (mg/l)	14.618	12.41	15.95	46.09	15.95	200-600

- LH01 : Taken from irrigation canal in the South-East of the site
- LH02 : Taken from fish-breeding swamp in the North-west of the

The proposed access road to the transfer station traverse a residential area so when the planned access road is built, 24 households residing along the access road in Dong Dau village need to be relocated and another 41 households need to be compensated for land.

8.2.3 RESULT OF HOUSEHOLD SURVEY ON ENVIRONMENTAL CONDITION

During the survey, we have cooperated with communal People's committee and Xuan Duc commune to collect information on land use status and socio-economic condition of the commune. We have interviewed 35 households living in Dong Dau, Xuan Duc, Lai Hoang (most of them live near the site and have cultivation land within the site) and those living along the access road to the site

The results of the surveys and interviews show that:

+ *As regards the surrounding environment :*

- Severely polluted: 2,9 %,
- Not severely polluted: 25.7 %
- Not polluted: 74.1 %

+ *Evaluation of the interviewees on the degree of pollution (in %):*

Aspect	Degree Severely polluted	Not severely polluted	Not polluted
Waste	0%	11.4%	88.6
Water resource	0 %	8.6 %	91.4 %
Odor	2.9 %	20 %	77.1 %
Gas, dust	0 %	2.9 %	97.1 %
Noise	2.9 %	22.8 %	74.3 %
Vibration	2.9 %	0 %	97.1 %

+ *As regards the degree of pollution caused by the surrounding solid wastes:*

0 % - Polluted, 28.6 % - Not very clean, 71.4%: Clean

+ *Point of view of the population about the construction of the transfer station:*

- 65.7% of them agree with the construction of the transfer station
- 34.3 % not agree .

8.3 ACCESSIBILITY OF THE PROPOSED TRANSFER STATION

8.3.1 DISTANCE OF WASTES TRANSPORTATION

Center for Consultation on Environmental Technology
Address: 51 - Quangtrung street - Hanoi; Tel: 04-9.430028

The distance and time of truck travel from the transfer station to Nam Son landfill are 34.6 km and 50-60 minutes respectively.

The distance and time of truck travel from URENCO office to the transfer station are 16.0 km and 40 minutes respectively.

8.3.2 TRAFFIC FLOW IN THE MAIN ROAD

The average number of vehicles in National road No3 is 256 trips per hour of which:

Kinds of vehicles	Number of vehicles	Ratio (%)
Small truck (under 4.5 tones)	80	31.25
Big truck (over 4.5 tones)	80	31.25
Small car under 16 seats	50	19.53
Passenger car over 24 seats	110	42.97
Ministruck	16	6.25

Very few vehicles passing the access road to the site. As the access road run across the rail way, waste trucks have to pass the rail road to enter the transfer station. Everyday, there are about 50 trains passing this railway, 16 of which are passenger trains and 34 cargo trains.

8.3.3 ACCESS ROAD TO THE TRANSFER STATION

1. Dong Dau road.

The proposed access road to the transfer station is the same road leading to Dong Dau village (called as Dong Dau road). This road is divided into 2 sections:

Section 1: This section starts from National road N°3 leading to Dong Dau village and acrosses the railway. This is an earthen road, 1.8km long, 4-6m wide, and now in bad condition with a lot of pot holes. The road is 1.0-1.5m above the paddy field. It is crossed by a railway at the end. Results of measurement show that this railway is 3.8-4.0m above the paddy field and cause of traffic jam in this road

Along this road section, there are 65 households (of Dong Dau village, Duc Tu commune, Dong Anh district) of which one-third has flat-roofed house, two-storey house and the remaining owns house of level IV

This road section is narrow and not sufficient for travel of big capacity trucks. Therefore, the roadway need to be enlarged, resettlement and compensation of land and houses must be carried out

Section 2: This road section from the railway to the transfer station isn't available so new road section must be constructed. The proposed new access road is 600m long and goes through a complex topography including:

- 150m long swamp with depth of 0.4-0.6m
- 250m long lake with depth of 0.8-1.0m
- 200m long paddy field of Duc Tu village, Dong Anh district

In short, if the proposed transfer station is selected, 1,8km long access road need to be upgraded and another new 600m long access road must be constructed. To ensure travel of 30 tons capacity waste trucks, the access road must be expanded and constructed to 8m wide. Furthermore, a fly over need to be built to ensure safety of trains and waste trucks. Given the above-mentioned characteristics, compensation of land, houses and construction will be very costly

Apart from the above proposed access road, the transfer station can be accessed by another two roads namely Li Nhan and Doc Van road

2. Ly Nhan road:

This road is connected with National road No3, 200m from Loc Ha bridge. This road is divided into 3 sections with total length of 3.6km

- Section from National road No3 to Duc Tu communal People's Committee: this road section goes through Li Nhan village, paddy field and across railway which lead to Thai Nguyen province. It's asphalt road, 2.5m long and 4m wide with weak foundation
- Section from Ngu Huyen Khe river to the railway: this is earthen road 3m wide, 500 long and in bad condition
- Section from railway to the transfer station: this road section is described above.

3. Doc Van road

This road starts from Van slope (by National road No3), goes through Xuan Duc village, paddy field and run across railway to the transfer station with length of 2.2km.

- Section from Van slope to Xuan Duc village is asphalt road 350m long, 4-5m wide and in bad condition. This section borders with residential area of Mai Lam commune on both side
- Section from xuan Duc village to paddy field: this section is 450m long, 3.5m wide and borders with crowed residential area on both sides
- Section from paddy field to the transfer station is high earthen road, 1400m long, 2.5-3.0m wide and 1.5m above the paddy field. It borders with concrete irrigation canal on one side and lake, cemetery and paddy field on the other. This section is in very bad condition with a lot of pot holes making it difficult for travel. It's crossed by railway to Thai Nguyen, Viet Tri province

If Doc Van road is selected as the access road to the transfer station, waste trucks must run pass through crowed residential area, creating dust, odor and noise. This is a disadvantage with this road.

In short, access road to the transfer station is difficult, running across the railway and not favorable for travel. All of the three access roads to the transfer

station must go across the railway so a flyover must be built to ensure safety for trains and waste trucks. This will be very costly.

On account of economic efficiency and environmental impacts, the Dong Dau road is more favorable than the other two.

8.3.4 CURRENT STATUS OF THE TRANSFER STATION

Within the site, there isn't any solid structures.

60m to the North-West of the site, there is an old brick kiln and dug graveyard of Nghia Vu village, Duc Tu commune, Dong Anh district with total of 40-50 graves.

The proposed site is paddy field of Xuan Duc commune. According to result of interviews, cultivation land in the area is of level II which is now cultivating in both two crops with mean yield of 140-150 kg/360m²/crop.

The proposed site is divided into 25 land plots (see the outline). In the South and the East, there is an high earthen road, 0.5-1.0m higher than the paddy field.

Analysis results of soluble compositions of soil samples are presented in the table below:

Table 8.3: Analysis results of soil sample in Lai Hoang transfer station

No	Indicator	Sample mark	
		LH01	LH02
1	Hg (mg/kg dry soil)	0.000029	0.000012
2	As (mg/kg dry soil)	0.000195	0.00021
3	Pb (mg/kg dry soil)	0.0095	0,010
4	Cu (mg/kg dry soil)	0.048	0.057
5	Fe (mg/kg dry soil)	2.85	2.90
6	Al (mg/kg dry soil)	6.75	7.43
7	CaO (mg/kg dry soil)	1.0	1.86
8	MgO (mg/kg dry soil)	1,1	1.20
9	Mn (mg/kg dry soil)	0.24	0.03
10	Clo (mg/kg dry soil)	0.0046	0.0089
11	pH	7.3	7.8

Sample: LH01 taken from South Eastern boundary of the transfer station

LH02 taken from paddy field near drainage canal.

8.4 COMMENTS OF THE SURVEY TEAM

- **Area:** The proposed site cover 5 ha which is wide enough for construction
- **Distance of waste transportation:** The proposed transfer station is located far from waste-generating area and landfill site (16km from the city center, 34.6 km from Nam Son landfill). This will raise the cost for waste transportation. Waste transportation route from City center to the transfer station must pass over Chuong Duong and Duong bridge, raising the traffic density and affecting the esthetics
- **Access road:** The site is located far from main road. Access road and exit road is not favorable (passing across railway and through residential area) The existing access road doesn't ensure travel of waste trucks so the cost for construction and upgrade of road is high. Therefore, this site is not favorable.
- **Topography:** The topography of the site is low and drainage capability is poor. Therefore, it's unfavorable for construction of a sanitary project
- **Geological setting:** The site foundation is quite firm. There is no faults or slide at the proposed transfer station.
- **Surface water:** The proposed site is unfavorable because it is located in low-lying area with poor drainage capability and easy to be submerged.
- **Ground water:** At the proposed site, the clay layer is discontinuous. When constructing the transfer station, attention should be paid to avoid percolation of waste water into aquifer.
- **Environment:** Environment in the proposed site is clean and there is no sign of pollution.
- **Land use :** Favorable because the proposed site is paddy field and there is not any solid building within the site, the site is not in the area intended for development of the city.
- **Distance to residential area:** The site is 600 away from the nearest residential area. Therefore, it's quite favorable for construction.
- **Public opinion:** 65.7% agree, 34.3 disagree.
- **Land compensation:** The site intended for construction is occupied by paddy field. This paddy field has been distributed to local people on long term basic so land acquisition and compensation of crops will be difficult and costly.

II.9 DONG NGAC II TRANSFER STATION

9.1 NATURAL GEOGRAPHIC CHARACTERISTICS AND ENVIRONMENTAL STATUS

9.1.1 LOCATION

The Dong Ngac II transfer station is located in the Dong Ngac commune, Tu Liem district, Hanoi city, at the coordinates 21° 04.815' North latitude and 105° 46.750' East longitude.

It is bounded in the North with Red river, in the South with Xuan Dinh commune, in the East with Phu Thuong ward, in the West with Thuy Phuong and Co Nhue communes.

The surveyed site is mainly in the paddy field of Hamlet 7, Dong Ngac village.

- In the North, it is bounded with paddy fields of Dong Ngac commune, 150 m away from the flood detaining dike and 1,000 m from the Red river.
- In the South it is bounded with paddy fields of Xuan Dinh commune.
- In the East it is bounded with paddy fields of Xuan Dinh commune and 600 m away from Thang Long - Noi Bai expressway.
- In the West it is bounded with paddy fields and graveyard of Dong Ngac commune, 190 m away from Co Nhue - Chem road.

9.1.2 TOPOGRAPHY

The project site is located in the North of Tu Liem district, suburb of Hanoi city. The land surface is rather flat. The mean elevation is 7.1 - 7.4 m. This area is occupied mainly by wet paddy field, with very little dry crop area and rather large area of lakes.

Along the flood detaining dike in the North, there are various ponds with the depth of 1.0 - 1.5 m.

9.1.3 AIR ENVIRONMENT

The project site is located in the Northern urban area of Hanoi, so it bears the general climatic characteristics of Hanoi area, which is of hot and humid tropical monsoon climate.

The air environment in the survey area is little polluted, mainly by fertilizers used for crops by the farmers. Besides, the air environment in the area is polluted by traffics. Every day, there are hundreds of vehicles by - passing the Co Nhue - Chem road and flood detaining dike. For results of air analysis, see the table 9.1:

Bảng 9.1: Result of air analysis in Dongngac transfer station

N ^o	Indicator	Sample marks				TCVN 5937 - 1995
		ĐN01	ĐN02	ĐN03	ĐN04	
1	NO _x (mg/m ³)	0.016	0.02	0.036	0.025	0.4
2	NH ₃ (mg/m ³)	0.1	<0.01	<0.01	<0.01	-
3	CH ₄ (mg/m ³)	0.45	0.38	0.4	0.4	-
4	CO (mg/m ³)	0.23	0.25	0.2	0.27	40
5	CO ₂ (mg/m ³)	280	110	96.8	120	-
6	SO ₂ (mg/m ³)	0.028	0.02	0.025	0.025	0.5
7	H ₂ S (mg/m ³)	0.03	0.01	<0.01	<0.01	0.008 *
8	Dust (mg/m ³)	0.36	0.25	0.21	0.25	0.3
9	Noise (dB)	58-64	55-60	60-65	55-60	70 **
10	RH (%)	60	55	50	55	-
11	Temperature (°C)	30	30	32	30	-
12	P (mmHg)	705	705	715	705	-
13	Wind direction	ES	ES	ES	ES	-
14	Wind velocity (m/s)	0.4-0.6	0.3-0.6	0.5-1.0	0.3-0.6	-

Sample DN01 is measured in the flood detaining dike

Sample DN02 is measured in Hamlet No7 Dong Ngac commune

Sample DN03 is measured in the residential area by Co Nhue-Chem road

Sample DN04 is measured in the paddy field within the transfer station

Remarks: All of the indicators are below the standard limits . This show that the environment is clean.

9.1.4 HYDROLOGY

The study area is 600 m West of Nhue river and 1km South of Red river. There isn't any water course or body in the proposed transfer station

For environmental survey of the site we collected 02 surface water samples. The results of sample analysis are presented in table 9.2.

Bảng 9.2: Results of surface water analysis in Dongngac transfer station

No	Indicator	Sample marks		TCVN 5942 - 1995 (column B)
		ĐN02	ĐN03	
1	COD (mg/l)	11.2	16.0	< 35
2	BOD ₅ (mg/l)	4.2	5.6	< 25
3	Phenol (mg/l)	0.003	0.001	0.02

REPORT ON THE RESULTS OF SURVEYS AND STUDIES ON ENVIRONMENTAL, SOCIAL CONDITIONS
AND ACCESSIBILITY OF THE CANDIDATE TRANSFER STATIONS FOR HANOI

No	Indicator	Sample marks		TCVN 5942 - 1995 (column B)
		ĐN02	ĐN03	
4	Cyanua (mg/l)	0.005	0.005	0.05
5	As (mg/l)	0.0011	0.00094	0.1
6	Pb (mg/l)	0.0081	0.0034	0.1
7	Cu (mg/l)	0.0092	0.0045	1
8	Zn (mg/l)	0.0238	0.0015	1
9	Cd (mg/l)	0.0004	0.0002	0.02
10	Hg (mg/l)	0.00024	0.00055	0.002
11	Mn (mg/l)	0.08	0.055	0.8
12	Ni (mg/l)	<0.01	<0.01	1.0
13	Cr (VI) (mg/l)	0.009	0.0065	0.05
14	F ⁻ (mg/l)	0.28	0.38	1.5
15	Ca (mg/l)	32	20	-
16	Mg (mg/l)	6.0	4.3	-
17	Coliform (MPN/100ml)	42	60	10000
18	Sulphat (mg/l)	6.0	0.5	-
19	pH	7.0	7.0	5.5 - 9.0
20	Fe (mg/l)	1.39	2.1	-
21	NO ₂ (mg/l)	0.04	0.0	0.05
22	NH ₄ ⁺ (mg/l)	2.8	0.2	1
23	NO ₃ ⁻ (mg/l)	1.38	3.1	15
24	Clorua (mg/l)	10.64	7.09	-

Sample DN02 is taken from irrigation canal within the transfer station

Sample DN03 is taken from a pond within the transfer station

Remark: The analysis result show that no indicator exceed the permissible level.
The water environment fulfill environmental standard limits.

9.1.5 HYDROGEOLOGY.

Hydrogeological characteristics of the proposed Dong Ngac II transfer station is similar to that of Co Nhue transfer station (described in II.1)

Results of ground water analysis are shown in the table below:

Table 9. 3: Result of groundwater analysis in Dong Ngac transfer station

No	Indicator	Sample marks			TCVN 5944 - 1995
		ĐN 01	ĐN04	ĐN05	
1	COD (mg/l)	3.2	12.0	8.0	-
2	BOD ₅ (mg/l)	1.2	4.4	3.0	-
3	Phenol (mg/l)	0.002	0.001	0.001	0.001
4	Cyanua (mg/l)	0.01	0.003	0.003	0,01
5	As (mg/l)	0.00473	0.00155	0.00175	0.05
6	Pb (mg/l)	0.0021	0.0015	0.012	0.05
7	Cu (mg/l)	0.004	0.0024	0.014	1.0
8	Zn (mg/l)	0.131	0.0172	0.029	5.0
9	Cd (mg/l)	0.0005	0.0007	0.001	0.01
10	Hg (mg/l)	0.0002	0.00044	0.00045	0.001
11	Mn (mg/l)	0.05	0.045	0.025	0.1 - 0.5
12	Ni (mg/l)	<0.01	0.025	<0.01	-
13	Cr (VI) (mg/l)	0.003	0.0015	0.001	0.05
14	F ⁻ (mg/l)	0.12	0.12	0.09	1.0
15	Ca (mg/l)	4.0	19	2.0	-
16	Mg (mg/l)	7.8	33	3.6	-
17	Coliform (MPN/100ml)	6	Negative	Negative	3
18	Sulphat (mg/l)	12	12.0	0.0	200-400
19	pH	6.0	7.0	6.2	6.5 - 8.0
20	Fe (mg/l)	0.7	2.1	0.14	1 - 5
21	NO ₂ (mg/l)	0.3	0.0	0.0	-
22	NH ₄ ⁺ (mg/l)	0.0	0.0	0.0	-
23	NO ₃ ⁻ (mg/l)	9.63	1.38	4.47	45
24	Clorua (mg/l)	15.95	72.68	8.86	200-600

Sample DN01 is taken from drilled well in household in Hamlet No7 of Dong Ngac commune which by the Chem-Co Nhue road, West of the transfer station

Sample DN04 is taken from drilled well in the flood detaining dike in the North of the transfer station

Sample DN05 is taken from drilledwell of household in the south of the transfer station

Remark: The analysis results show that content of analyzed indicators is below the standard limits except for Coliform in sample DN01 which is 2 times higher than the permissible level.

9.2 SOCIO-ECONOMIC CHARACTERISTICS

9.2.1 SOCIO-ECONOMIC CHARACTERISTICS OF DONG NGAC COMMUNE.

a. Population

The study area is located in Dong Ngac commune, has an area of 362.4 ha. The population of the commune is 17,286 inhabitants living in 3,890 households. The population growth rate is 1 %.

The commune has 3 villages: Nhat Tao, Dong Ngac and Lien Ngac villages.

Chairman: Hoang Van Quy

Tel: 8.362326

b. Infrastructure

There is a clinic with 8 beds. The commune has 1,300 dug wells, in average 18 m deep and 3 schools:

- 01 primary school with 1,300 pupils
- 01 basic secondary school with 1,100 pupils
- 01 secondary school with 300 pupils.

Besides, in the commune there are 5 universities, college and professional high schools namely University of Mining and Geology, University of Finance and Accountancy, Agro-forestry high school and transport economic management school.

The roads in the commune is mainly concrete and asphalt road. 100% of population have access to electricity. Main sources of domestic water are ground water and rainwater. According to statistics, the whole commune has 1,300 drilled wells, 18m deep . 15% of population use the toilets with septic tank, 84% use two compartments latrine and 1% use others.

c. Main occupation

Residents here live mainly on agriculture (rice and dry crop cultivation) . Besides, some households involve in some traditional handicrafts.

9.2.2 SOCIO-ECONOMIC CHARACTERISTICS OF THE TRANSFER STATION AND ITS VICINITY.

a. In the transfer station.

The whole transfer station is covered by paddy field, there isn't any solid structure and household.

b. In the vicinity.

Within distance of 200m from the site boundary, it's mainly paddy field. In the North, there are 30 households living with 150 people. In the West is cemetery of Dong Ngac commune.

When the transfer station is built, no house relocation is needed but for construction of the access road, 6 households need to be resettled.

9.2.3 RESULTS OF HOUSEHOLD SURVEY AND OPINION OF RESPONDENTS

During the surveys, we cooperated with communal People's committee, worked with communal leaders, statistical department and collected information on land use status around the project area, socio-economic conditions of the commune. We also interviewed 38 households in the area intended for the transfer station and the vicinity. The results of the survey and interview show that:

+ As regards the surrounding environment :

- Severely polluted: 0 %,
- Not severely polluted: 94.7 %
- Not polluted: 5.3 %

+ Evaluation of the interviewees on the degree of pollution (in %):

Aspect	Degree Severely polluted	Not severely polluted	Not polluted
Waste	0%	7.9%	92.1 %
Water resource	7.9%	28.9 %	63.1 %
Odor	5.3 %	63.1%	31.6 %
Gas, dust	5.3%	31.6%	63.1 %
Noise	2.6%	31.6%	65.6 %
Vibration	5.3 %	28.9 %	65.6 %

+ As regards the degree of pollution caused by the surrounding solid wastes:

- 5.36% - Polluted, 65.6 % - Not very clean, 28.9%: Clean

+ Point of view of the population about the construction of the transfer station:

- 47.4% of them agree with the construction of the transfer station
- 52.6 % not agree.

9.3 ACCESSIBILITY OF THE INTENDED TRANSFER STATION

9.3.1 DISTANCE OF WASTES TRANSPORTATION

The distance and time of truck travel from URENCO office to the transfer station are 12.7 km and 30 minutes respectively.

The distance and time of truck travel from the transfer station to Nam Son landfill are 36.6 km and 1 h respectively.

9.3.2 TRUCK TRAFFIC FLOW ON THE ACCESS ROAD TO THE TRANSFER STATION

- *Cò Nhue - Dong Ngac road: (from Thang Long-Noi Bai express way following North-Eastern direction to Red river dike and through Co Nhue commune)*

During peak hours: There are 16 trucks, 4 buses and 10 cars.

Beyond peak hours: There are 26 trucks, 4 buses and 2 cars.

- *Road from Thang Long - Noi Bai expressway to Dong Ngac: (from Thang Long-Noi Bai express way following South-Western direction to Red river dike and through Dong Ngac commune)*

During peak hours: There are 19 trucks, 2 buses and 12 cars.

Beyond peak hours: There are 12 trucks, 2 buses and 4 cars.

9.3.3 ACCESS ROADS OF THE TRANSFER STATION.

The transfer station can be accessed by two roads:

* *Co Nhue-Chem road:*

This road is 5-6m wide, connected with Thang Long-Noi Bai express way in a distance of 2,3 km and crossed by Hanoi-Vinh Phuc railway . Along this road , there are 325 households, 2 offices, 1 pagoda and Co Nhue temple

* *Flood detaining dike*

This road has been asphalted, 5-6m wide and connected with Thang Long-Noi Bai express way in a distance of 1.3km. The road also go under railway bridge (Hanoi-Vinh Phuc railroute).There are 282 households living along the road.

Out of the two roads, the flood detaining dike is more favorable. However, it need to be upgraded if the transfer station is built.

It's would be best to build a new 0.6 km long access road from the transfer station to the Thang Long-Noi Bai express way, When constructing this road, site clearance should be carried out and location of the new access road should be properly selected so that the new access road can goes under railway bridge, excluding the possibility of constructing a flyover.

9.3.4 CURRENT STATUS OF THE TRANSFER STATION.

The study area is occupied by paddy fields of Dong Ngac commune. It has a rectangular shape, 155 m wide, 322 m long, with an area of 49,910 m², being cultivated by 35 households, with productivity of 120 - 150 kg/360 m². The rice cultivation is in 2 crops per year with a tax of 40 kg of paddy per crop.

Analysis result of soluble compositions of 02 soil samples (sample DN01 is taken from the paddy field within the transfer station, sample DN02 is taken in household adjacent to the transfer station) on August,17 1999 are shown in the table below:

Table 9.4: Result of soil analysis in Dong Ngac transfer station

N°	Indicator	Sample marks	
		ĐN01	ĐN02
1	Hg (mg/kg dry soil)	1.1×10^{-5}	2.5×10^{-5}
2	As (mg/kg dry soil)	2.15×10^{-4}	1.05×10^{-4}
3	Pb (mg/kg dry soil)	0.12	0.009
4	Cu (mg/kg dry soil)	0.0361	0.045
5	Fe (mg/kg dry soil)	2.9	2.75
6	Al (mg/kg dry soil)	6.78	7.43
7	CaO (mg/kg dry soil)	1.12	1.08
8	MgO (mg/kg dry soil)	1.3	1.4
9	Mn (mg/kg dry soil)	0.058	0.034
10	Clo (mg/kg dry soil)	0.0064	0.0078
11	PH value	7.4	7.4

Soil quality is generally good and suitable for industrial trees

9.3.5 ISSUES TO BE NOTED

- ◆ *The proposed transfer station is 200 North from Dong Ngac wellfield, the hydrogeological characteristics doesn't ensure construction of the transfer station. The area has open hydrogeological condition so if the transfer station is constructed, an absolutely good treatment plan is needed.*
- ◆ *The proposed site is also adjacent to cemetery of Dong Ngac commune so spiritual issues should be taken into consideration if the transfer station is selected*
- ◆ *If the transfer station is constructed, some agencies and universities in the area (University of Mining and Geology, University of Finance and Accountancy...) should be cooperated with when constructing new access road so as to win the support from related agencies.*
- ◆ *In the site, there isn't any household but within distance of 200m , there are 30 households. In the West is a cemetery of Dong Ngac commune.*

9.4 COMMENTS OF THE SURVEY TEAM.

- *As regards the area of the site: The area of the site is sufficient as compared with the requirements.*
- *As regards distance: The transfer station is located at a distance of 600 m from the Thang Long - Noi Bai expressway. This is the main waste transportation route so it's favorable. Distance of waste transport from City center to the transfer station and from the transfer station to Nam*

Son landfill is reasonable, economical and acceptable

- *Access road and exit road: The transfer station has two access roads; the flood detaining dike and Co Nhue - Chem road. These two roads are in bad condition, not sufficient for big capacity trucks to travel. Therefore, a new 600 m long and 8 m wide access road from the station to the expressway should be built with investment of 1.1 billion VND and compensation of 6,000 m² for road construction to Xuan Dinh commune. If this new access road is built, waste transport will be easier*
- *Topography of the site: The site intended for construction of the transfer station is paddy fields. The land surface is rather flat.*
- *Geological setting: The foundation of the site ensure good conditions for the construction of the transfer station. Phisico-machenical properties and indicators ensure good condition and suitable for project of this kind*
- *Surface water: The transfer station is located beyond the flood area. No water course or body is found affecting the transfer station*
- *Groundwater. The transfer station is located in the area with open hydrogeological condition (with hydrogeological window) so absolutely efficient measures should be taken against pollution*
- *Distance to residential area: The intended transfer station is located in 180 m South and 150 m North of the population area of Hamlet 7, Dong Ngac commune.*
- *Environment: The environment of the area is currently clean. There isn't any polluting factories or enterprises*
- *Public opinion: Local residents and authority don't support the construction (52.7% of the population in the study area do not support the construction of the transfer station)*
- *Site clearance: The site is located mainly in the paddy fields of Dong Ngac commune, the site clearance will be carried out easily.*
- *Others: The proposed site is 200 m North of Dong Ngac wellfield. This wellfield has been approved and going to be constructed. This is the greatest disadvantage with this site. Besides, the proposed transfer station is adjacent to cemetery of Dong Ngac commune so attention should be paid to sychological aspect.*

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