AMMAN-MADABA SCOPING SESSION

1 LIST OF PARTICIPANTS AT AMMAN SCOPING SESSION

Table 1: List of participants at Amman scoping session

No.	Name	Institution
1	Jawdat Yaghmour	Associated Consulting Engineers (ACE)
2	Ahmad Qasem	Amman Chamber of Commerce
3	Ms Rose Smadi	Amman Chamber of Industry
4	Hussein Abu Dalbouh	Amman Municipality
5	Mr. Ayman Kamal Sabri	Arab International Company for Agricultural Development
6	Sharif Aljbour	Birdlife International
7	Mr. Ibrahim Khader	Birdlife International
8	Mohammed Yasien AL-Sobake	Civil Defence Directorate
9	Abdulah Alusairat	Department of Land and Survey
10	Dr. Andreas Kuck	German Technical Cooperation (GTZ)
11	Dr. Ali El-Naqa	Hashemite University
12	Eng. Ismael Hashem	Hydrotech International
13	Ms Hala Mesmar	Integrated Management and Information (IMI)
14	Ms Rabha Saafadi	Jordanian Forum for Business and Professional Women (JFBP)
15	Dr.Naill Momani	Jordan Environment Society
16	Eng. Shireen Abu -Dahoud	Jordan Environment Society (Amman)
17	Eng. Ahmad Kofahi	Jordan Environment Society (Amman)
18	Mr. Mahmoud Atwah Salem Al-Hrout	Jordan Environment Society (Madaba)
19	Dr. Mona Hindyeh	Jordan University of Science and Technology (JUST)
20	Falah Ibrahem Salah	Ministry of Agriculture
21	Eng. Ahmad Saeed	Ministry of Environment
22	Eng. Ahmad Al-Qatarneh	Ministry of Environment
23	Mr. Bassam Al-Natsheh	Ministry of Health (Department of Environmental Health)
24	Eng. Sahar Al-Soruri	Ministry of Interior / Amman Governorate
25	Eng. Yvon Sahawnh	Ministry of Planning (MOP)
26	Eng. Wafaa Haddadin	Ministry of Public Works and Housing (MOPWH)
27	Eng. Mahmoud Khleifat	Ministry of Public Works and Housing (MOPWH)
28	Eng. Lamia Al-Zoubi	Ministry of Rural Affairs
29	Mohammad Ibrahim	Ministry of Social Development
30	Dr. Ahmad Zyoud	Ministry of Water and Irrigation
31	Eng. Nazir Abu Arquob	Ministry of Water and Irrigation
32	Eng. Fayez Bataineh	Ministry of Water and Irrigation
33	Eng. Edward Qanqar	Ministry of Water and Irrigation
34	Eng. Mohammad Najjar	Ministry of Water and Irrigation
35	Eng. Sultan Mashakbeh	Ministry of Water and Irrigation/BOT
36	Hasan Abdel-Hameed	National Electric Power Company
37	Khaled Shawabkheh	Natural Resources Authority (NRA)
38	Eng. Bolous Kefaya	Previous employee of Ministry of Planning
39	Eng. Adnan Al-Zobair	Public Security Department
40	Mr. Ahmad Al-A'ajlouni	Public Security Department / Criminal Laboratories
41	Eng. Fida'a Jibril	Royal Scientific Society
42	Laith M. El-Moghrabi	Royal Society for Conservation of Nature (RSCN)
43	Ms Lina A. Qasem	University of Jordan
44	Dr. Amal Hijazi	United Stated Agency for International Development (USAID)
45	Ms Majd Nafez Al-A'atar	University of Jordan (UJ)
46	Eng. Zoulina Sawajneh	University of Jordan (UJ)
47	Eng. Rawand Fawzi	University of Jordan (UJ)

Table 1: List of participants at Amman scoping session (contd.)

No.	Name	Institution
48	Eng. Moataz A'lawi	University of Jordan (UJ)
49	Eng. Mohammad Edaily	Water Authority of Jordan (WAJ)/ As-Samra Wastewater Treatment Plant
50	Dr. Aiman Banihani	Water Authority of Jordan (WAJ)/University of Jordan (JU)
51	Dr. Nawal Sunna	Water Authority of Jordan (WAJ)
52	Eng. Zakaria Tarawneh	Water Authority of Jordan (WAJ)
53	Eng. Saleh Malkawi	Water Authority of Jordan (WAJ)
54	Dr. Sawsan Himmo	Consolidated Consultants
55	Dr. Omar Rimawi	Consolidated Consultants
56	Naser Al Manaseer	Consolidated Consultants
57	Dr. Adnan Al-Salihi	Consolidated Consultants
58	Dr. Raoul Nasr	Consolidated Consultants
59	Ahmad Abu Hijleh	Consolidated Consultants
60	Eng. AbdRahman Jabr	Consolidated Consultants
61	Rola Quba'a	Consolidated Consultants
62	Eng. Ruba Khoury	Consolidated Consultants
63	Ms Soheir Al-Khateeb	Consolidated Consultants
64	Eng. Khaled Murad	Consolidated Consultants
65	Mr. Abdul Karim Bourini	Consolidated Consultants
66	Mr. Mahmoud Hishmeh	Consolidated Consultants

2 FOCUS GROUPS AT AMMAN SCOPING SESSION

2.1 Focus Group 1: Water Resources

2.1.1 Group Members

The names of the members of the water Focus Group are shown in **Table 2**.

Table 2: The members of the water resources focus group

No.	Name	Institution
1.	Eng. Fayez Bataineh	Ministry of Water and Irrigation
2.	Eng. Edward Qanqar	Ministry of Water and Irrigation
3.	Eng. Nazeer Abu Arqoub	Ministry of Water and Irrigation
4.	Dr. Ahmad Al-Zyoud	Ministry of Water and Irrigation
5.	Dr. Nawal Al-Sunna’	Ministry of Water and Irrigation
6.	Eng. Ismail Hashem	Hydrotech International
7.	Mr. Hasan Abdel-Hameed	National Electric Power Company
8.	Dr. Adnan Al-Salihi	Consolidated Consultants
9.	Dr. Omar Rimawi	Consolidated Consultants
10.	Eng. Naser Al-Manaseer	Consolidated Consultants
11.	Eng. Ruba Khoury	Consolidated Consultants

2.1.2 Discussions within Focus Group

At the beginning of the meeting, Dr. Adnan Al-Salihi and Dr. Omar Rimawi, representing the consultant, introduced a brief summary about surface and ground water and relations to the Disi watershed.

The following are the main subjects that were laid for discussion:

1- Water resources of Jordan in terms of both, quality and quantity.
2- The Jordanian water sector and its ultimate relation to Disi.
3- Disi Aquifer with respect to:
    a. Quality and quantity,
    b. Present and Future consumption, and
    c. Water budget.
4- Justification of Disi water conveyance to:
    a. Amman,
    b. Southern region, and
    c. Along the conveyor route.
5- Implications of effluent enhancement on the Jordan Valley.
6- "Do nothing" impacts on the water sector.
7- Quality impacts on Disi Aquifer.
8- Northern Aquifers quality and quantity improvements.
9- Limited water usage for recreation along the route.
10- Electrical consumption impact and air pollution.
11- Mixing of Disi water with other sources.
12- Work safety and effect on electrical poles and high-tension lines.

2.1.3 Conclusions of the Focus Group

The following points and issues were mainly arrived at during the focus group discussions:

1- The shown numbers in the brief should be clearly identified and the graphs should be referenced; future and present values should be marked or separated in different tables.
2- The Disi-Mudawarra Conveyor is a necessity for the following reasons:
    a. The project is an important part of Jordan's water vision. The project is part of the Kingdom's strategy and policy for the water sector.
    b. The conveyor will reduce groundwater abstraction and reduce water deficit in aquifers especially the ones supplying Amman. Those could be proposed for enhancing both the quality and quantity of Amman-Zarqa Basin, Azraq Basin, and Mujib Basin.
    c. The conveyor is needed to ensure a reliable source and good quality of conveyed water.
    d. Disi is considered an important part of Jordan's integrated water management system but it should be known that it is not an ultimate solution for Jordan's water shortage.
    e. The Disi project will add to the use of non-conventional sources such as desalination of brackish water as it is cheaper than the desalination of seawater. Both options require conveyance but the Disi water does not require treatment.
    f. The project will be considered as the national water conveyor in Jordan where it will convey from the southern regions of Jordan to the northern region.
3- Issues of concern include:
    a. Time scale for Disi abstraction has been postponed for more than 30 years.

b. The Disi Basin is a shared basin with Suadia Arabia, which has been using the Disi water for a long time, and its well field is coming near to Jordan's border.
c. It is a World Bank study and must be implemented as soon as possible.
d. No other alternative exists for solving the shortage problems in drinking water for the time being.
e. The project is a solution for protecting the ground water basins.

4- Disi water is to be conveyed to:
   a. South: limited to local settlements with domestic priority.
   b. Along the conveyor Route: Five outlets for emergency and for domestic usage only; industrial improvements are not priority in this project.
   c. Amman City.
5- Adverse quality impacts are limited since recharge is minimum and negligible (low penetration of water into soil, low infiltration, and high evaporation).
6- Quality of water at Disi Basin will not be affected and will stay homogeneous because there is no connection with salty water as is the case for al-Khraeem.
7- Abstraction and quality problem is minimum and needs verification by modelling.
8- Watershed boundaries for protection may be used if needed.
9- Effluent quality to the Jordan Valley will be enhanced.
10- Possibility of mixing Disi water with other sources for optimization such as: Disi with Zai, quality with respect to quantity needs management to optimize quality for largest Amman area.
11- Water usage for recreation along the route is not acceptable.

2.2 Focus Group 2: Agricultural Resources

2.2.1 Group Members

The names of the members of the Agricultural Resources Focus Group and the stakeholders they represent are shown in **Table 3**.

Table 3: The members of the agricultural resources focus group

No.	Name	Institution
1.	Eng. Mohammad Najjar	Ministry of Water and Irrigation
2.	Eng. Saleh Milkawi	Water Authority of Jordan
3.	Eng. Mohammad Al-Adily	Water Authority of Jordan
4.	Eng. Falah A'wamleh	Ministry of Agriculture
5.	Dr. Ayman Bani Hani	University of Jordan
6.	Eng. Zoulina Sawajneh	University of Jordan
7.	Dr. Andreas Kuck	German Technical Cooperation (GTZ)
8.	Eng, Bolous Kefaya	Previous Employee of the Ministry of Planning
9.	Mr. Ayman Kamal Sabri	Arab International for Agricultural Development
10.	Dr. Raoul Nasr	Consolidated Consultants
11.	Eng. AbdlRahman Jabr	Consolidated Consultants

2.3 Focus Group Conclusions

The focus group worked on outlining the potential environmental impacts associated with agricultural resources and determining the groups that are expected to be impacted, along with mitigation and follow up requirements. These conclusions are presented in **Table 4**.

Table 4: Focus group results concerning the agricultural resources issues

	Stage	Impact	Mitigation	Follow up
Disi Companies	2002-2008	-----	-----	Contractor
	2008-2011	-----	-----	Contractor
	2011→ Renew Contracts	According to contract	According to contract	According to contract
	2011→ No Renew	-----	-----	-----
Local People in Disi area	2002-2008	Limited Employment	-----	-----
	2008-2011	Limited Employment	-----	-----
	2011----	Limited Employment	-----	-----
Desert Path	2002-2008	Animal Production	Provide access	Contractor
	2008-2011			
	2011----			
Jiza to Amman	During Construction	Dust	Sprinkling water	Contractor
		Cut trees	Compensation	
	Post Construction	Reduce soil fertility due to new imported Soil	Minimize importing soil in Construction Area	Contractor

2.4 Focus Group 3: Archaeological and Cultural Heritage

2.4.1 Group Members

The names of the members of the Archaeological and Cultural Heritage Focus Group and the stakeholders they represent are shown in **Table 5**.

Table 5: The members of the archaeological and cultural heritage focus group

No.	Name	Institution
1.	Dr. Mona Hindyeh	Royal Scientific Society
2.	Eng. Lamya Al-Zoubi	Ministry of Rural & Municipal Affairs
3.	Eng. Yvon Sahawnh	Ministry of Planning (MOP)
4.	Ms Wafaa Hadadine	Ministry of Public Works and Housing (MOPWH)
5.	Eng. Sahar Al-Soruri	Ministry of Interior / Amman Governorate
6.	Ms Rabha Safadi	Jordan Forum of Business and Professional Women (JFBP)
7.	Ms Majd Nafez Al-A'atar	University of Jordan
8.	Eng. Lina Qasem	University of Jordan
9.	Dr. Mohammad Waheeb	Consolidated Consultants

2.4.2 Discussions within Focus Group

The focus group discussions started with a brief explanation from Dr. Mohammad Waheeb, representing the Consultant, about the project in terms of the methodology used and the preliminary assessment results.

The Ministry of Water and Irrigation (MWI) has begun the implementation of proposed Disi-Mudawara project. The project aims to supply Amman with sweet water.

2.4.2.1 Methodology

The methodology adopted for the assessment of Cultural Resources Impact Assessment is based on the following:

1- Literature study.
2- Field investigations.

The preparation process included the following steps:

1- JADIS Searching.
2- Literature Review DAJ/ACOR/BCRL...etc.
3- Field Investigation and Documentation.
4- Data Analysis.

The field investigations included detailed study conducted along the pipe alignment, registration, mapping, definition of the mitigation measures. Providing cost estimate and developing suitable implementation framework for the management of the cultural resources located within the Project.

2.4.2.2 Preliminary Assessment

35 archaeological sites were identified in the projected area as follow:

- Zone A- North 6 sites
- Zone B- South 26 sites
- Zone C- Middle 3 sites

The discovered archaeological sites fall under the following categories:

- Sacred sites, such as the Cave of Seven Sleepers.
- Agricultural sites such as Al Qastal.
- Settlement sites such as Al- Jizza.
- Defensive sites such as Al- Qatraneh.

The field activities included brief description of each site such as site number, name, location, coordinates, detailed assessment and description, and recommendations based on the field investigation findings.

In addition to that policy and legal implementation framework was discussed in details showing some weakness in the existed antiquities law, for this reason and other concerns the Cultural Resources Management Procedure was adopted to overcome the difficulties and to establish the following:

1- Preventive planning
2- Planning coordination for the DAJ with Go and NGO agencies.
3- Public awareness and cultural education.

Investigated in the following phases:

1- Project definition stage.
2- Preliminary design phase.
3- Tender bidding phase.

4- Construction phase.
5- Monitoring phase.
6- Remediation phase.

2.4.2.3 Expected Questions

- The discovered Archaeological sites, threatened or not.
- Mitigation plans / budget estimate
- Preservation or preventive protection.
- Types of impacts.
- Methodology of the study.
    - Literature
    - Field
- The role of DAJ in the project.

2.4.2.4 Site No. 1

Site name: Al- Jiza Pool.
PG coordinates: 240409E 1123500N

- Site description:
  On the right side of the airport highway toward south, a large water pool situated near the police station. The pool represents one of the important elements of the water system in Al- Jiza village during the past and recent days.

  The municipality of Al- Jiza conducted a restoration project in the pool so as to reuse and develop the remains for daily usage.

  The restoration project succeeded in building fence and enforcing the walls and maintain the channels and water aqueducts which drains the rain water toward the pool.

  According to previous exploration the pool dated to Roman Period, while some scholars said that the pool dated back to Islamic Period (Umayyad).

- Site Assessment: Low significance.
- Recommendations:
  The site is not directly threatened by pipeline constructions, while digging activities should be kept under control, so as to avoid the vibration which will be result from the movements of the Vehicles and heavy lorries during construction.

  The anticipated threat to the pool is coming from the expected cracks in body of the pool. The contractor should avoid the area of the pool.

2.4.2.5 Site No. 2

Site name: The Byzantine Church
Site location: l- Jiza village / under modern houses
PG coordinates: 40619E 1123315N

- Site description:
  The Byzantine remains located on the left side of Al- Jiza highway not far away from the Large pool, and just opposite the police station.

  The area is well known for the local people as one of the promising locations for antiquities.

  The existed remains are under control of the Department of Antiquities of Jordan. According to the owner of the land where the remains located.

  The discovered remains consist of medium cylindrical pillars and well cut limestone ashlars and mosaic pavement. The extension of the site still undetermined but may be extended under the modern highway toward the large pool.

  Depending on the available material the site dated back to the Byzantine period, and may represent a church.

  The local people reported some information about a robbed cemetery to the east of the site.

- Site Assessment: Low significance

- Recommendation:
  The site is not threatened by the pipe construction but the dept. of Antiquities representative should control the digging operation area the site coordinate with the contractor for chance find procedure. The existed remains may extend to the western side under the new highway, this possibility encouraged the team to ensure the DAJ representative to coordinate with the contractor to avoid any delay for construction activities and to find the appropriate procedure to protect the heritage from threats of destruction.

2.4.2.6 Site No.3

Site name: Al- Qatraneh Castle
Site Location: Al-Qatraneh Village
PG Coordinates:

- Site description:
  One of the famous castles on the right side of the main highway toward Aqaba City.

  Some scholar reported limited information regarding the earliest known historical occupation on the site.

The existed remains consist of a squared fortes of two stories, the gate opened toward south direction, while the large pool located to the east of the castle and very close to the modern highway.

Depending on the previous explorations the building was built during the Turkish rule, while other scholars dated the structure earlier to the Ayubbi-Mamluk era, and developed during the Ottoman and Turkish rule.

The castle was restored and protected by a joint project between of Antiquities of Jordan and the Ministry of Culture in Turkey, so the standing structure still represent of several Pilgrim station on the Pilgrims route from Damascus to Arabia.

- Site Assessment: Low significance

- Recommendation:
  The castle is not threatened by the pipe construction. The DAJ representative should control the area of the castle and coordinate with contractor regarding the dumping area, borrow area, camping area, and other locations may effected directly or indirectly by construction activities.

2.4.3 Focus Group Conclusions

2.4.3.1 Archaeological and Cultural Impact Assessment

Segment A:
- 26 Archaeological Sites
- All sites were outside of the project corridor
- Non-threatened sites

Segment B:
- 3 Archaeological sites.
- Non-threatened sites.

Segment C:
- 6 Archaeological sites
- Main site: Cave of Seven Sleepers mitigation
- Plan: shifting the pipeline
- Main site Khirbet Es-Suq Mausoleum, mitigation
- Plan: building protection wall

Anticipated impacts during construction phase:
1- Destruction during digging
2- Vibration
3- Pollution
4- Movement of Vehicles
5- Camping Areas
6- Solid waste material

7- Borrowing Areas

Anticipated impacts during operation phase:

- Pipe explosion / seepage
- Vehicles Movements
- Pollution

Anticipated impacts / remediation phases:

- Destruction caused by digging
- Vehicles movement
- Cavities

Mitigation measures:

- Salvage Excavations by DAJ + Contractor
- Fence the Sites by DAJ + Contractor
- Shifting the pipeline by MWI
- Building shelter for the sites by DAJ

The positive impacts of the project on the archaeological sites are illustrated in **Table 6**.

Table 6: The positive impacts of the project on the archaeological sites

With Project	Without Project
Positive Impacts on Archaeological sites	
Sites will be fenced	Not fenced
Sites will be restored	Not restored
Sites will be protected	Not protected
Improvements of the surrounding zone	No improvements
Increase public awareness	No development
Developing the sites for touristic purposes	Sites will not be effected such as site No. 5 in zone A

Table 7: Anticipated Affected Archaeological Sites and proposed mitigation and monitoring measures during both construction and operation phases of the project

Anticipated Impact	Anticipated Affected Archaeological Sites	Impact Type (Temporary, Direct, Indirect, Accumulative, and Magnitude)	Proposed Mitigation Measure	Monitoring Indicator	Monitoring Methodology	Responsible
Construction Phase						
Destruction & vibration	Zone A; S. no.2	Direct	Shifting the pipe route	Representative of DAJ	Daily visit to site	DAJ + MWI
Destruction & vibration	Zone A; S. no.5	Indirect	Building a protection wall	Representative of DAJ	Daily visit to site	DAJ + Contractor
Pollution & camping	Zone B; S. no. 3	Indirect	Propose a butter zone for the site not less than 150 m	Representative of DAJ	Daily visit to site	DAJ + Contractor
Chance find destruction	Zone B; S. no. 2	Indirect	Coordination with DAJ & the contractor	Representative of DAJ	Daily visit to site	DAJ + Contractor
Borrowing Area	Zone A; S. no. 6	Indirect	Ensure the contractor to avoid the area of the site	Representative of DAJ	Daily visit to site	DAJ + Contractor
Operation Phase						
Pipe explosion or seepage	Zone A; S. no. 5	Indirect	Salvage dig			
Destruction + vibration	Zone A; S. no. 5	Indirect	Salvage dig	Representative of DAJ	Daily visit to site	DAJ
Camping	Zone B; S. no.3	Indirect	Establish better zone	MWI Representative	Daily visit to site	DAJ + Contractor

2.5 Focus Group 4: A-biotic Environment

2.5.1 Group Members

The names of the members of the A-biotic Environment Focus Group and the stakeholders they represent are shown in **Table 8**.

Table 8: The members of the a-biotic focus group

No.	Name	Institution
1.	Eng. Rawand Fawzi Masoud Al-Nashwati	University of Jordan
2.	Ahmad Abdul Qader Qassem	Amman Chamber of Commerce
3.	Eng. Mahmoud Hashem Khleifat	Ministry of Public Works and Housing
4.	Eng. Sultan Mashakbeh	Ministry of Water and Irrigation
5.	Eng. Jamal Kawasmeh	Ministry of Water and Irrigation
6.	Ahmad Al-Koufehi	Jordan Environment Society
7.	Eng, Ahmad Mahmoud Saeed	Ministry of Environment
8.	Eng. Moutaz A'alawi	University of Jordan
9.	Ahmad Abu Hijleh	Consolidated Consultants
10.	Rola Quba'a	Consolidated Consultants

2.5.2 Discussions within Focus Group

The focus group discussions started with a brief explanation by Mr. Ahmad Abu Hijleh, representing the Consultant. Mr. Abu Hijleh started by explaining that the a-biotic environment refers to the physical environment of the project area.

It was explained that the project area is divided into three segments as follows:

- Segment A which extends from the Well Field to Joruf Al Drawish - Qatraneh Junction (Desert Highway);
- Segment B which extends from Joruf Al Drawish-Qatraneh Junction to the beginning of Al Jiza Area; and
- Segment C which extends from Al Jiza to Dabook and Abu Alanda Reservoirs.

A handout on the potential environmental issues during the construction and operation phases that the group leader wishes to get feedback on was distributed to the participants. This handout indicated the following:

- The physical (a-biotic) environment task, covers the following environmental issues during the construction and operation phases of the project:
    - The increase in noise level
    - The increase in dust level
    - The change of local geomorphology and natural landscape along the proposed project corridor
    - The public safety of the locals and project employees
    - Traffic disruption
    - Solid waste
    - Fluid waste (i.e., oil, grease, etc.)

Site visits to the proposed project corridor indicated that segment C will be impacted by the following environmental issues:

1- The increase in noise level;
2- The increase in dust level; and
3- The public safety of the locals and project employees.

Segment B will be impacted by the following environmental issues:

1- Changing the local geomorphology and natural landscape;
2- Increase in noise and dust levels in the residential parts;
3- Public safety of the locals and project employees; and
4- Traffic disruption, when crossing any of the local/National road system.

As for Segment A, it will be impacted by the following environmental issues:

1- Changing the local geomorphology and natural landscape;
2- Public safety of the locals and project employees; and
3- Traffic disruption, when crossing any of the local/national road system.

It was explained that Segment A is all sandstone hills and flint is in many places. It is a low vegetation area with a high drainage system. The population gathering is only in Disi villages and in the farms.

It was also pointed out there will be no explosives sued during the construction phase.

2.6 Focus Group Conclusions

The focus group worked on outlining the potential environmental impacts associated with the a-biotic component and determining the level of significance of these potential issues across the three segments of the project during the construction, operation and decommissioning phases. They discussed those potential impacts with reference the corridor of the project area and not the whole area.

The determined potential environmental impacts associated with the a-biotic component are as follows:

1- Potential impact of noise on nearby local communities and workers at the project construction site.
2- Potential impact of increased dust levels in the area on:
    a. Public safety for workers and local communities;
    b. Nearby farms in the project and nearby areas.
3- Changing the geomorphological system of the area to a large extent.
4- Fluid and Solid wastes resulting from the project, including:
    a. Cutting and demolition wastes;
    b. Construction material wastes;
    c. Oil and grease residues; and
    d. Human wastes of the workers.
5- Tectonic activity in the area and its impact on the project.
6- Increase in traffic due to vehicles related to the project especially heavy vehicles and the traffic problems associated with them.
7- Opening temporary access roads haphazardly in order to reach to the construction sites.
8- Potential impact on soil stability.
9- Potential impact on air quality.
10- Public safety for the workers and the local communities.

The focus group agreed that changing the geomorphological system of the area to a large extent and public safety are the most significant issues related to the project. They also pointed out that, at Segment A, tectonic activity should be considered during the design stage.

As for the level of significance of these potential issues across the three segments of the project during the construction, operation and decommissioning phases, these are presented in **Table 9**.

Table 9: The level of significance of the potential a-biotic environmental issues

Project Phase	Construction Phase			Operation Phase			Decommissioning Phase		
Project Segment / A-biotic Environmental Issues	A	B	C	A	B	C	A	B	C
1- Potential impact of noise	L	M	H	M[1]	L	M[1]	L	M	H
2- Potential impact of increased dust levels	H	H	H	Nil[2]	Nil	Nil	H	H	H
3- Changing the geomorphological system	H	L	L	Nil	Nil	Nil	Nil	Nil	Nil
4- Fluid and Solid wastes	H	H	H	L	L	L	M	M	M
5- Tectonic activity	H	L	L	H	L	L	-	-	-
6- Increase in traffic	H	H	H	Nil	Nil	Nil	H	H	H
7- Temporary access roads	H	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
8- Potential impact on soil stability	L	L	H	Nil	Nil	Nil			
9- Potential impact on air quality	H	H	H	Nil	Nil	Nil	H	H	H
10- Safety of the workers and the local communities	H	H	H	L	Nil	L	H	H	H

[1] Potential impact of noise related to the workers who have to check and maintain the pumps.
[2] Nil implies that no impact is expected at all.

2.7 Focus Group 5: Biotic Environment

2.7.1 Group Members

The names of the members of the Biotic Environment Focus Group and the stakeholders they represent are shown in **Table 10**.

Table 10: The members of the biotic focus group

No.	Name	Institution
1.	Mr Layth Al-Moghrabi	Royal Society for Conservation of Nature
2.	Mr. Sharif Al-A'badi	Birdlife International - Middle East Division
3.	Dr. Ibrahim Khader	Birdlife International - Middle East Division
4.	Mr. Mohammad Atweh Al-Hrout	Jordan Environment Society (JES)
5.	Ms Rose Smadi	Amman Chamber of Commerce
6.	Eng. Zakariya Al-Tarawneh	Water Authority of Jordan
7.	Mr Khaled Al-Shawabekh	Head of Syndicate of Geologists
8.	Dr. Nael Al-Momany	Jordan Environment Society (JES)
9.	Eng. Fida Jebreil	Royal Scientific Society
10.	Mr. Rami Salameh	Hashemite University
11.	Ms. Hala Mismar	Hashemite University
12.	Majdi Salameh	Consolidated Consultants

2.7.2 Discussions within the Focus Group

The focus group discussion began with a description of project segmentation similar to that presented in the previous focus group. Mr. Majdi Salameh, representing the Consultant, presented to the participants the purpose of conducting the biological environment assessment for the proposed project. These objectives are:

- To document existing biological environment conditions along the proposed conveyor route and the well field.

- To assess anticipated impacts on biological environment including habitats and species due to the project activities.
- To suggest proper mitigation measures and monitoring activities to be conducted during the course of the project implementation.

After that, the participants were briefed on the findings of the existing biological environment within each segment of the project area including habitats, hot spots and species diversity and on the identified issues of concern to the biological environment.

The discussions started with discussing the participants' issues of concern as per their interest and/or their experience.

2.7.3 Focus Group Conclusions

The focus group discussion concluded the following concerns:

- **Issues of Concern at the Species Level**
    - Destruction of vegetative cover: Acacia at Batn Al-Ghoul
    - Increased collection (Buffer zone of 1 km)
    - Impact on desert inhabitants
    - Waste Accumulation
    - Disturbance
    - Accessibility

- **Issues of Concern at the Ecosystem Level**
    - Habitat fragmentation (Buffer Zone)
        - Hammada
        - Sand dune
    - Disturbance
    - Alteration and damage to natural water flow
    - Air pollution and dusting
    - Important Bird Areas and Hotspots

2.8 Group 6: Social Assessment

2.8.1 Group Members

The names of the members of the Social Assessment Focus Group and the stakeholders they represent are shown in **Table 11**.

Table 11: The members of the social assessment focus group

No.	Name	Institution
1.	Orabi Ibraheem	Ministry of Social Development
2.	Ahmed Al Ajlouni	Public Security / Criminal Laboratory Management
3.	Bassam Al Natsheh	Ministry of Health
4.	Eng. Hussein Abu Dalbouh	Municipality of Grater Amman
5.	Eng. Adnan Al Zubaidy	Public Security / Buildings Management
6.	Mohammed Al Subaihy	Civil Defense
7.	Abdullah Al Nsairat	Land & Surveying Department
8.	Eng. Sheereen Abu Dawoud	Jordan Environment Society
9.	Abdul Kareem Al Bourini	Consolidated Consultants
10.	Eng. Suhair Al Khateeb	Consolidated Consultants
11.	Mahmoud Hishmah	Consolidated Consultants

2.8.2 Discussions within Focus Group

The arguments which were presented for the focus group are as follows:

1- First Argument: Population

The present population census and the projected numbers for the years 2010 and 2020 were introduced. The present and future numbers of people in the governorates which the project will pass through and the number of residents living directly alongside the pipeline were also presented.

2- Second Argument: Use of Labour Force

It was recognized that project will need the use of a number of technical and non-technical labour to establish that pipeline. It is expected that the priority will be given to the local residents in the Disi and other areas alongside the pipeline.

3- Third Argument: General Health

The importance of the project relating to health was presented, especially with the existence of many illnesses connected to pollution of water sources. This project will decrease these dangers and the expected incidences of the diseases resulting from water pollution, because it will provide good water quality, decrease soiled leakage through water networks, decrease disrupted pumping of water and increase individual's daily water share.

4- Fourth Argument: The Native Population and Their Re-Settling

The five criteria put forward by the World Bank in defining the native population were presented.

5- Fifth Argument: Land Acquisition and Population Re-settlement

It was pointed out that the final designs for the project took into consideration not to have the pipeline pass through agricultural lands or owned agricultural lands in order to avoid increasing the cost of the project due to the need of owning these lands or compensating its owners. It was pointed out as well that most of the pipeline passes through lands owned by the state, including it passage through the desert road. The lands of Abu Alanda area, which will have the water tank, were possessed previously

by the Water Authority. Therefore, no new land acquisitions will be required for the project.

6- Sixth Argument: An Explanation from the Field Study

It was pointed out that the local communities in the area of Disi Basin alongside the pipeline from Disi to Amman, have expressed their opinion about having their share of Disi water because of its high quality and in order to enhance their drinking water quality. They also requested to have the priority of hiring their working force during the building of the project.

2.8.2.1 Negative Effects

The participants have pointed out some opinions toward the project especially concerning expected negative effects resulting from the project. These can be summarized as follow:

1- The problems of diggings alongside the pipeline during the building of the project:

The participants believe these diggings may lead to some problems such as blocking traffic and negatively affecting the services available alongside the pipeline such as electricity, water, and telephone lines. In addition, increase in dust and noise levels may affect people especially in the populated areas.

2- Expected losses for commercial activities:

The participants think that the diggings and construction activities during the project may lead to financial losses to the owners of commercial shops as a result of the difficulty for people to get to these shops because of diggings and dust.

3- Water price increase:

The participants fear that the high cost of the project and the good quality of the water may lead to an increase in water prices. This is considered to be a real problem for the people of Jordan because of their economic condition which does not afford this increase in water prices.

2.8.3 Focus Group Conclusions

The participants agreed on several recommendations as solutions for the expected negative effects for the project. These are:

1- Specifying a percentage of required labour for the local residents alongside the pipeline and in Disi.
2- Taking into consideration the rules for public safety during digging and construction by coordinating efforts with the Ministry of Public Works and Housing, the Municipality of Greater Amman, and the Department of Traffic.
3- Launching public awareness campaign explaining the benefits of the project before and during work.
4- Taking into account the affected commercial shops owners alongside the pipeline as a result of the project, by compensating their expected financial losses.

5- Studying the available services and obstacles at the path of the pipeline before offering tender for the project.
6- Keeping away from cross-roads as much as possible.
7- Coordinating with the various service establishments.

3 QUESTIONNAIRE RESULTS OF AMMAN SCOPING SESSION

Sex	Frequency	Percentage
Males	38	74.5
Females	13	25.5
Total	**51**	**100**

Occupation	Frequency	Percentage
Engineer	21	41.2
University Professor	6	11.8
Student	5	9.8
Syndicates	1	2
Economist	1	2
Administrative	15	29.4
Military	2	3.9
Total	**51**	**100**

Institution	Frequency	Percentage
Governmental Agency	15	29.4
Private Sector	17	33.3
Non-Governmental Organizations	4	7.8
Universities	10	19.6
Syndicates	1	2
Greater Amman Municipality	1	2
Public Security	3	5.9
Total	**51**	**100**

Place of Residency	Frequency	Percentage
Amman	41	80.4
Irbid	4	7.8
Madaba	1	2
Jarash	1	2
Zarqa	2	3.9
Salt	2	3.9
Total	**51**	**100**

1- Do you think that Jordan suffers from lack in water supplies?	Frequency	Percentage
Yes	50	98
No	1	2
Do not know	0	0
Total	**51**	**100**

2- What is the source of water supply at your house?	Frequency	Percentage
Main water supply network	51	100
Buying water from water tanks	0	0
Collection well or a spring	0	0
Poor Quality	0	0
Do not know	0	0
Total	**51**	**100**

3- Do you think that the water quality in your neighborhood is:	Frequency	Percentage
Very Good Quality	4	7.8
Good Quality	24	47.1
Medium Quality	20	39.2
Poor Quality	3	5.9
Do not know	0	0
Total	**51**	**100**

4- If the water quality in your neighborhood is of medium quality, what is the source of drinking water used at your house?	Frequency	Percentage
Water supplied from the Water Authority	5	9.8
Household Treatment and Filtration Devices	8	15.7
Buying drinking water bottles	7	13.7
Other	31	60.8
Total	**51**	**100**

5- If the water quality in your neighborhood is less than medium quality, what is the source of drinking water used at your house?	Frequency	Percentage
Water supplied from the Water Authority	1	2
Household Treatment and Filtration Devices	0	0
Buying drinking water bottles	2	3.9
Other	48	94.1
Total	**51**	**100**

6- Did you have any idea about the Disi-Mudawarra Water Conveyance System before attending this workshop?	Frequency	Percentage
Yes	42	82.4
No	9	17.6
Total	**51**	**100**

7- If the answer to question (6) is yes, what is the source of such information?	Frequency	Percentage
Official Reports and Leaflets	14	27.5
Newspapers and magazines	16	31.4
Television	3	5.9
Other Sources	9	17.6
Total	**42**	**82.4**

8- Is the water supplied to your place of residence sufficient?	Frequency	Percentage
Yes	21	41.2
No	30	58.8
Total	**51**	**100**

9- Do you think that the current water tariff is:	Frequency	Percentage
High	12	23.5
Acceptable to everyone	35	68.6
Low	4	7.8
Total	**51**	**100**

10- Amman City suffers from a severe shortage in drinking water. Do you think that implementing this project in spite of its very high cost is important for solving the water shortage problem?	Frequency	Percentage
Yes	38	74.5
No	7	13.7
Do not know	6	11.8
Total	**51**	**100**

11- Do you think that the current water quality is among the reasons behind the diseases affecting family members?	Frequency	Percentage
Yes	26	51
No	23	45.1
Do not know	2	3.9
Total	**51**	**100**

12- Do you notice that there are sediments or suspended material resulting from the source of water at your house?	Frequency	Percentage
Yes	37	72.5
No	12	23.5
Do not know	2	3.9
Total	**51**	**100**

13- Does the family clean the water storage tank at the house?	Frequency	Percentage
Yes, every sixth months	6	11.8
Yes, once every year	16	31.4
Yes, but not regularly	27	52.9
Never clean the water storage tank	2	3.9
Total	**51**	**100**

14- Do you think that water of better quality should be supplied for protecting the health of the community?	Frequency	Percentage
Yes	44	86.3
No	3	5.9
Do not know	4	7.8
Total	**51**	**100**

15- If the Water Authority supplied a better water quality that requires a higher cost, would you accept a raise on the current water tariff?	Frequency	Percentage
Yes	23	45.1
No	25	49
Do not know	3	5.9
Total	**51**	**100**

16- Do you think that the water resources management in Jordan is:	Frequency	Percentage
Very Good	4	7.8
Good	21	41.2
Acceptable	9	17.6
Should be improved	17	33.3
Total	**51**	**100**

17- If your answer to the Question (16) is that the management of water resources in Jordan should be improved, what solutions do you recommend:	Frequency	Percentage
Public awareness and encouragement of guidance	1	2
Secure proper planning regarding determination of water usage priorities	2	3.9
Rehabilitation of the damaged water supply networks	2	3.9
Finding new water sources, such as seawater desalination	0	0
All of the above	12	23.5
Water management in Jordan do not need improvement	34	66.7
Total	**51**	**100**

18- In the Disi area, are there any agricultural practices that depend upon using the Disi Basin groundwater?	Frequency	Percentage
Yes	42	82.4
No	7	13.7
Do not know	2	3.9
Total	**51**	**100**

19- If your answer to the Question (18) is yes, do you think that these agricultural practices are of economic importance to the national economy and that there are rare crops that assist in reducing the budget deficit?	Frequency	Percentage
Yes, of great importance	5	9.8
Yes, of medium importance	8	15.7
Yes, has an acceptable role	12	23.5
No, not important	17	33.3
There are no agricultural activities	9	17.6
Total	**51**	**100**

20- Do you think that the degree by which these agricultural activities will be affected is:	Frequency	Percentage
High	11	21.6
Medium	13	25.5
Limited	9	17.6
Will not be affected	9	17.6
There are no agricultural activities	9	17.6
Total	**51**	**100**

21- Do you think that the degree by which this project will reduce the water problems in Jordan is:	Frequency	Percentage
Excellent	7	13.7
Very Good	15	29.4
Good	20	39.2
Acceptable	7	13.7
Limited	2	3.9
Total	**51**	**100**

22- For whom do you think should be the priority of supplying water from the Disi Basin:	Frequency	Percentage
All the population of the Kingdom	23	45.1
Cities of the Kingdom that suffer from shortage in water supplies	25	49
No one is entitled to have a priority for water usage	2	3.9
Disi farms and the nearby industries	1	2
Only the people of Aqaba including the Disi area	0	0
Total	**51**	**100**

23- After getting acquainted with the alignment of the Disi conveyor, do you think that the construction of the conveyor will affect archaeological or cultural sites?	Frequency	Percentage
Yes	14	27.5
No	37	72.5
Total	**51**	**100**

24- If your answer to Question (23) is yes, please specify the sites that might be affected:	Frequency	Percentage
Cave of Seven Sleepers	3	5.9
Zizia Pool and Qatraneh Catsle	1	2
Khirbet Es-Suq mausoleum	2	3.9
Train Railway	1	2
Do not know / No such sites exist	44	86.3
Total	**51**	**100**

25- After getting acquainted with the alignment of the Disi conveyor, do you think that the construction of the conveyor will affect the natural habitat?	Frequency	Percentage
Yes	12	23.5
No	38	74.5
Do not know	1	2
Total	**51**	**100**

26- If your answer to Question (25) is yes, please specify the sites that might be affected:	Frequency	Percentage
Batn Al-Ghoul and Tarma	4	7.8
Do not know / No such sites exist	47	92.2
Total	**51**	**100**

27- After getting acquainted with the alignment of the Disi conveyor, do you think that the construction of the conveyor will affect the rangelands that the local community depends on?	Frequency	Percentage
Yes	15	29.4
No	36	70.6
Total	**51**	**100**

28- If your answer to Question (27) is yes, please specify the sites that might be affected:	Frequency	Percentage
Disi area	1	2
Southern regions	2	3.9
Batn Al-Ghoul and Jafr	2	3.9
Do not know / No such sites exist	46	90.2
Total	**51**	**100**

29- After getting acquainted with the alignment of the Disi conveyor, do you think that the construction of the conveyor will affect any plants, animals or birds that are rare or of special importance?	Frequency	Percentage
Yes	9	17.6
No	42	82.4
Total	**51**	**100**

30- If your answer to Question (29) is yes, please specify the sites and species that might be affected:	Frequency	Percentage
Total		

31- After getting acquainted with the alignment of the Disi conveyor, do you think that the construction of the conveyor will affect the quality of air in the areas that it will pass through?	Frequency	Percentage
Yes	13	25.5
No	38	74.5
Total	**51**	**100**

32- If your answer to Question (31) is yes, please specify the sites that might be affected:	Frequency	Percentage
All areas of the project	4	7.8
Do not know / No such areas exist	47	92.2
Total	**51**	**100**

33- After getting acquainted with the alignment of the Disi conveyor, do you think that the construction of the conveyor will affect the noise levels in the areas that it will pass through during the construction phase?	Frequency	Percentage
Yes	27	52.9
No	24	47.1
Total	**51**	**100**

34- If your answer to Question (33) is yes, please specify the sites that might be affected:	Frequency	Percentage
All project areas	9	17.6
Abu Alanda and Jiza	3	5.9
Do not know / No such areas exist	39	76.5
Total	**51**	**100**

35- After getting acquainted with the alignment of the Disi conveyor, do you think that the construction of the conveyor will affect the noise levels in the areas that it will pass through during the operation phase?	**Frequency**	**Percentage**
Yes	18	35.3
No	33	64.7
Total	**51**	**100**

36- If your answer to Question (35) is yes, please specify the sites that might be affected:	**Frequency**	**Percentage**
Road to Airport and Abu Alanda	1	2
Areas near to pumping stations	4	7.8
Along the conveyor route	1	2
Do not know / No such areas exist	45	88.2
Total	**51**	**100**

4 QUESTIONS AND COMMNETS AT AMMAN SCOPING SESSION

Q1. Was an environmental assessment study conducted during the economic feasibility study for the project in 1996?

- Yes, such a study was conducted.

Q2. At present, is it the Hidan or Mujib water that is pumped to Amman?

- At present, the Hidan water is pumped to Amman and in the future the Mujib water will be also pumped to Amman.

Q3. Does Disi Aquifer need water shed protection?

- At present there is no need since there is a study for the Kingdom aiming at protecting the water basins.

Q4. Impact on the expansion and upgrading of the new As-Samra wastewater treatment or/and if a new wastewater treatment plant for Zarqa is needed or upgrading of Hashimiya Pumping Station (East Zarqa pumping station) and of west Zarqa pumping station.

- It will have a positive impact as a better quality wastewater will reach the plant. Regarding the quality, the expansion already considers future additional flow regardless of the source of this flow. The As-Samra wastewater treatment plant is currently under expansion. In the future, the Hashimiya wastewater treatment plant will be expanded and upgraded or will be replaced by a new wastewater treatment plant.

Q5. AHL AL KAHF (The Cave of Seven Sleepers) site: relocation of the pipeline in this area since there shall be an improvement of this site.

- The Consultant already inspected the site and found that a new road has been constructed just couple of hundred meters away from the site and provided that new alignment to the Ministry of Water and Irrigation to consider this alignment.

Q6. Will the study consider the water quantities supplied from the Wehdah Dam or other dams with those pumped from the Disi Basin in order to determine the total water quantity available and if this will impact the farm companies in the south?

- Yes, it is considered under the total water budget for the Kingdom. The farm companies have contracts with the Ministry of Water and Irrigation till the year 2011. After that, action will be considered.

Q7. Since the Disi-Mudawarra water conveyance system would not completely resolve the water shortage problem in Jordan:
What is the current estimate of supplied water and what is the water deficit that Jordan is facing?
What is the substitute in case Jordan has a very large water deficit?

- The current water deficit in Jordan is around 400 MCM.
- Other projects being considered to alleviate the water shortage problem include desalination and the Red-Dead sea project.

Q8. Will the water from Disi be mixed with other water source or will it remain separated for drinking purposes and what is the impact of mixing on the quality of Disi water?
Is the Disi-Mudawarra water conveyance system a solution to the water shortage problem or is it just a temporary action?

- The Disi water will be mixed with the water at Dabook and Abu Alanda.
- The Disi-Mudawarra water conveyance system is for reducing the water shortage problem.

Q9. What mechanism is followed for coordinating with the current water company and what is the coordination considered regarding collecting tariffs from the people given that there are two different involved entities, LEMA and the project contractor?

- There is no relation between LEMA and the project contractor.

Q10. What is the size of the labour force estimated for the project?
Who will be responsible for monitoring the implementation of the project?

- It is difficult to determine now the size of the labour force.
- Monitoring of project implementation will be from various entities.

Q11. What are the impacts of dust resulting from drilling activities on traffic movement and accidents and the mitigation measures adopted?

- This is already in the technical specification of the construction contract and the contractors to submit the required mitigation measure.

Q12. Comment: All the social and environmental impacts mentioned during the presentations of the focus groups are exaggerated and does not match up to the level of importance of the project. The population along the project route from Disi till Amman is scattered and the soil is not fertile for agriculture. Also, all noise levels from the project are not significant as compared to other sources of noise in the area and human waste is no problem compared with animal wastes in the areas of the project.

Q13. Was the movement of sand dunes in Disi area and its impact on the project studied?

- This movement is limited.

Q14. Is there a possibility to plant the roadsides using a small portion of the water in the conveyance system passing along the highway especially that this is considered to be a precious opportunity in the presence of workers and equipment required for the process?

- No, it would be a waste of water given the great water shortage that Jordan is facing.

Q15. Have you taken into consideration the risk of high voltage lines and towers bases from Aqaba to Amman?

- Yes and detouring of the conveyor will take place to avoid these lines.

Q16. Comment: the biotic and a-biotic groups did not specify the effect as during construction and long-term.

- Those issues would be clarified more in the environmental and social assessment (ESA) report.

Q17. What are the procedures for compensation for damage during construction?
What are the procedures for compensation for land acquisition?

- There will be no compensations as land acquisition took place during the construction of the Desert Highway. As for interference with local commercial activities, these cannot be compensated as only civil laws are applicable in that case and it goes through normal court procedures.

Q18. There are no trees that would be cut or affected by the project. Also, what do they mean by livestock production as there is no impact on it?
The impacts of this project would not match the magnitude of the negative environmental impacts associated with the expansion of the desert highway.

- True, there are no trees affected and no relation to livestock production. Of course, the impacts are less than those related to the Construction of the Desert Highway.

Q19. The water conveyance system will pass through wadis. Were the frequency and return periods for the 50 and 100 years periods for the water floods studied to identify precautionary measures against destruction of the conveyor?

- Yes, this has been considered in the original design by Harza when designing the crossing structures if any. The conveyor along the whole alignment will be buried and thus will not be exposed to natural disasters.

Q20. A representative from the train railway should attend in order to give information on the degree of impact of this project on the train railway.

- The Ministry of Transport were invited and they confirmed that the Secretary General would attend. The Consultant has no idea why he was not represented.

Q21. Jordan's water resources are scarce and the Disi-Mudawarra project is not enough to cover the water shortage. Therefore, the responsible authorities should also look into implementing the Wehdah Dam and the Red-Dead sea projects along with this project.
So, will other projects be executed along with the Disi project in order to supply water for the Kingdom areas and all the sectors of water use?
If the Disi basin is considered as a groundwater source replenished by rainwater, why have the time period of 100 years been given to the depletion of this water source in spite the fact that it could be recharged by rainwater?

- There is a complete integrated development of water resources in Jordan which incorporate the above-mentioned projects in addition to the Disi water conveyance project.
- Yes, other projects will be implemented and Al-Wehdeh Dam has been awarded to a contractor and the construction will start very soon.
- 100 years were considered not more as the rate of recharge is much lower than extracted water based in calculation carried out for the specific characteristics of the aquifer.