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Establishing an Online Monitoring System for Bulk Water Supply and Distribution in the West Bank

Progress Report

Reporting Period	1 November 2022 to 31 December 2023
Donor	Netherlands
Country	occupied Palestinian territory (oPt)
Project Title	Establishing an Online Monitoring System for Bulk Water Supply and Distribution in the West Bank
Project ID (Award ID) Outputs	Netherlands: Project 4000006156 UNDP-PAL 0110308 00147361 1. An affordable and sustainable solution for online monitoring of bulk water supply and distribution is developed, piloted and operationalized in prioritized locations across the West Bank. 2. Groundwater well is constructed and ready to be equipped for water supply in As Samoua south of Hebron. 3. Improved capacities of PWA/WBWD for maintained and improved water service in identified water wells in the West Bank
Implementing Partner(s)	Palestinian Water Authority PWA
Project Start Date	1 November 2022
Project End Date	31 December 2024
Total resources required.	USD 4,710,020
Revenue received	Netherlands' funding USD 3,869,796.14
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I. Executive summary

This report summarizes the progress made from 1 November 2022 until 31 December 2023. The project started with an inception phase where a preliminary assessment of selected monitoring stations on water trunk pipelines in the West Bank was carried out. The aim was to identify the interventions needed for deploying a remote monitoring system to monitor water flow and track water supply and leakages. Another assessment for the available digital solutions (commercial) and possible customized solutions was also carried out by a consultant from Birzeit University. The recommendation was to implement customised solutions to allow for selecting the needed functions and break down the cost assuming that will reduce the operational cost. PWA together with UNDP team selected 100 sites for the pilot phase located in the north and central of West Bank. Specifications and BOQ were prepared for a customized digital solution (including 'supply and install 100 smart water meters and a data management system). Tendering was done on 6 September 2023 and only two offers were received. The evaluation committee decided that no supplier is qualified because the bidders' offers substantially exceeded the allocated budget for the project. The customized solutions were expensive, and the recommendation was to consider commercial solutions instead since they are cheaper and easier to replace. Tendering for new Request for Proposal (RFP) was initiated on 16/11/2023 for readymade commercial solution and three offers were received. The evaluation started and it is expected to have a technical supplier on board by end of February 2024. The aim is to supply and install 100 smart mechanical water meters (water meter and Electronic Data Capture (EDC) module) as well as 100 pressure sensors and install a data management system at a server at PWA office.

The capacity assessment of the West Bank Water Department (WBWD) which was supposed to be implemented during the inception phase was cancelled since there is an on-going assessment by EU consulting firm under an EU funded project that may overlap with the scope of assessment under the on-line monitoring project. Consequently, and as discussed in the project steering committee dated 26 October 2023, it was recommended by PWA that the project shall focus on training and building the capacity of WBWD team related to the project output to avoid any inconsistency with the ongoing assessment.

The construction of As Samoua Groundwater well south of Hebron is on-going. A verification report was prepared and discussed with PWA. Tendering was done and drilling contract was awarded in August 2023. Site preparation and mobilization of equipment completed. Drilling started in September 2023 and expected to be completed by June 2024. Until the end of December, 164 m were drilled. A delay was encountered due to high restrictions on movements because of escalation in security incidents in the West Bank. Casing material was approved, purchased, and expected to arrive to the site in April 2024. A 10 meter 28-inch conductor was installed. Work progress percentage is around 20%. However, progress is expected to be impacted by the ongoing incursions in the West Bank.

Regarding improving capacities of PWA/WBWD for maintaining and improving water service in identified water wells in the West Bank", electro-mechanical and hydrological assessment funded by UNDP track recourses was carried out, as part of the inception phase, for 23 ground water wells owned and operated by WBWD. While 20 of these wells are currently operational, 5 wells are not well functioning and need rehabilitation. These 5 wells are Al 'Eizariya No.1A, Al 'Eizariya No.2A, East Herodion 2, Qabatiya and Arrabah wells. Based on the assessment,

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and during the inception phase, the scope of work and the budget of the on-line monitoring project was increased to allow for the rehabilitation of the five wells. The project budget was initially 2,210,020. This amount was increased by USD 2,500,000. Consequently, the final revised project budget is USD 4,710,020.

Based on the new budget, UNDP initiated the tendering for the rehabilitation of these 5 wells on 7 December 2023. It is expected to have a contract signed mid-March 2024

Finally, the first steering committee meeting for the project was conducted on 26 October 2023 and attended by NRO, PWA and UNDP, where the progress and the workplan were presented and a six-month free cost extension was discussed. The Committee agreed to undertake the following actions:

1. UNDP to organize a follow up meeting with all stakeholders to discuss further progress and priorities related to the results of the assessment.
2. PWA to allocate funds for SIM cards' subscription for the following 3 years for the pilot phase stations.
3. UNDP to organize a site visit to Assamou once the situation is improved.
4. PWA to provide a final list (coordinates) of the intended sites where the digital solutions will be installed.
5. The training of the team of WBWD related to the digital solutions will be provided by the company who will install the digital solutions. Any training needs that will be highlighted by the assessment that is on-going through EU and related to the on-line monitoring will be considered.
6. *UNDP to submit a request for six-month no cost extension for Netherland's approval during the first quarter of 2024.*

II. Background

Ensuring a reliable and safe water supply service is crucial for meeting the urgent humanitarian needs of Palestinian communities, promoting economic development, and supporting sustainable livelihoods in the West Bank. However, due to the occupation's control over water resources and the rapid population growth and urbanization, the gap between water supply and demand is significant and expected to widen. This has led to numerous challenges in the bulk water supply and distribution system, including water shortages, inadequate infrastructure, high rates of unaccounted for water, and limited access to sufficient, safe, and affordable water for Palestinians.
Moreover, the restrictions on the movement of people and goods imposed by the occupation have hindered the development of water infrastructure and access to water resources for Palestinian communities. In response to these challenges, UNDP, in partnership with the Palestinian Water Authority, aims to improve the management of bulk water distribution in the West Bank, facilitate reducing non-revenue water, maintain existing groundwater wells, and explore additional water resources.

The project will establish an effective online monitoring system for bulk water supply, develop the necessary institutional setup and capacities to ensure accurate real-time monitoring of

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water flow to facilitate prompt response to any water leakage that may emerge. It will also support rehabilitating critically identified existing water wells and drilling a new groundwater

well to address the critical shortage of water supply in the vulnerable communities. Ultimately the project will contribute to the national efforts towards improving the effectiveness and efficiency of WBWD and increase highly vulnerable communities' access to water.

Currently, the WBWD has more than 700 measuring points (meters) with different diameters and pressure rates distributed all over the West Bank. A total of 500 meters are invoiced meters that measure the water supply quantities for around 280 service providers. The remaining meters measure the flows at local sources (wells) and/or the inlet/outlet of regional reservoirs. With regards to the current water supply monitoring system, at the beginning of each month WBWD's operators are sent out to read the 700 meters across the West Bank, and then enter manually these readings to the billing system. Subsequently, a big team from WBWD starts to work in data validation, estimate the missing readings (damaged meters), enter the Mekorot invoice and eventually generate the final invoices. This whole process – which is time-consuming and requiring significant human resources and costs - takes almost one month, before the final invoices are ready and sent to the service providers.

In addition, the project will support development of a new water well in As Samoua. Works include drilling well up to 700 m below ground water level, casing and conducting pumping tests to confirm water well yield, and water quality. This is urgently needed and will complement the work funded by the World Bank to enhance water service in the target area. The project also aims to support WBWD in undertaking comprehensive water wells electromechanical and hydrological assessment for 23 water wells currently operated by the WBWD, development of operation and maintenance plan, and most importantly providing WBWD with the needed equipment and material to ensure effective operation of 5 ground water wells that were identified as top priority to avoid putting around 147,150 people under the threat of not being served of water services for domestic purpose.

This project will support gender mainstreaming opportunities during the project implementation in close collaboration with PWA and WBWD with the aim of including specific initiatives in the implementation and exit phase. The gender focal point from PWA will be among the PWA team who will be consulted during the project lifetime on gender mainstreaming aspects.

Expected Results

This project intends to achieve the following outputs, with a view to contribute to the longer-term and higher-level results of improved and equitable access to quality water services to people ensured:

1. An affordable and sustainable solution for online monitoring of bulk water supply and distribution is developed and operationalized in prioritized locations across the West Bank.
2. Groundwater well, constructed, and ready to be equipped for water supply in As Samoua South of Hebron
3. Improved capacities of PWA/WBWD for maintained and improved water service in identified water wells in the West Bank.

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III. Achievements Review

The following sections presents detailed overview of the progress made during the reporting period:

Output 1: An affordable and sustainable solution for online monitoring of bulk water supply and distribution is developed, piloted, and operationalized in prioritized locations across the West Bank

Progress Status: On-going

1. Assessment of available commercial solutions and possibility for customizing the solution completed. The assessment results were either to have a customized solution that is suitable for each distinct station or to have a readymade commercial solution. The recommendations were discussed with PWA, and the decision was to select customized solutions assuming that will reduce both the investment and operational costs.
2. Assessment of potential pilot flowmeters where the solution will be installed (100 locations were selected for the pilot) completed. Sites were assessed for their readiness for installation of the new digital solution (smart mechanical water meter and water sensors), availability of space, power, GSM/3G/radio signal coverage and site accessibility. The selection of the sites was concluded by WBWD.
3. Specifications and BOQ was prepared for a customized solution and tendering was done on 6 September 2023. Two bids were received but ended with no qualification for any supplier. Contrary to the expectations, the bidders' offers substantially exceeded the allocated budget for the project. After discussion with PWA team, studying the available commercial solutions and review the availability of such solutions in the worldwide, a new RFP was initiated on 16/11/2023 for commercial solution. Three offers were received. It is expected that a contractor will be on board by end of February 2024.

The main challenge faced during the implementation of the above activities was the lack of local experience in the digital solutions. UNDP hired a consultant to review the available solutions and shared the specifications with an expert from the Netherlands through support from the NRO focal point.

Output 2: Groundwater well, constructed, and ready to be equipped for water supply in As Samoua south of Hebron.

A delay was encountered due to high restrictions on movements because of the War on Gaza and the restriction on movement in the West Bank.

Progress Status: On-going

1. A consultant was hired to review the available assessment received from PWA and validate the design. The verification report was completed and discussed with PWA team. According to the assessment, the expected yield is 120 M3/hr.
2. Final design including tender document prepared and published.
3. Drilling contract signed in August 2023

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4. Site preparation and mobilization of equipment completed including supply and installation site's offices, site's meeting room, and welfare area, supplied and installed project signs, supplied and installed temporary fence with a lockable gate surrounding the whole land allocated for the well, supplied spread, level, water, and compact 25cm of base course in the working area.

5. Drilling 10 m deep hole with a 34-inch diameter and installing 28-inch conductor was completed.
6. Casing material was approved, purchased, and expected to arrive to the site in April 2024.
7. Drilling of a 12-1/4-inch pilot hole up to 164 m deep was completed.

It is expected that six-months delays will be encountered due to complicated political situation. Work progress percentage is around 20%. Expected completion date is June 2024.

Output 3: Improved capacities of PWA/WBWD for maintained and improved water service in identified water wells in the West Bank

Progress Status: On-going

To ensure quality of water service for the communities in the West Bank is being provided, UNDP completed the support to the WBWD in undertaking comprehensive electromechanical and hydrological assessment for the 23 water wells operated by the WBWD. The assessment along with a costed maintenance and operational plan is expected to be completed by end of 2023. The assessment also investigated the possibility of mainstreaming solar energy and energy efficiency measures, when possible, to ensure operational sustainability of these wells while mitigating climate change impacts.

Electro-mechanical and hydrological assessment was carried out for 23 ground water wells owned and operated by WBWD. While 20 of these wells are currently operational, 5 wells are not well functioning and need rehabilitation. These 5 wells are Al 'Eizariya No.1A, Al 'Eizariya No.2A, East Herodion 2, Qabatiya and Arrabah wells. Assessment included the following:

1. Work needed and action plan.
2. Tender documents for rehabilitation and upgrade work.
3. Cost estimate for rehabilitation work.
4. Operation, monitoring, and maintenance plans for the wells' utilities.
5. Geo-database and map for the wells.
6. Solar photovoltaic pre-feasibility analysis and conceptual design.

It is worth mentioning that the total cost of the rehabilitation of the wells (Hydrological, mechanical, and electrical work) is USD 9.9 million while the cost of installing solar panels for 15 wells (the suitable sites) is about USD 1.8 million

Results of the assessment and key findings are presented in Annex I

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PROGRESS TOWARDS PROJECT OUTPUTS

EXPECTED OUTPUTS	OUTPUT INDICATORS	DATA SOURCE	BASELINE		TARGETS (by frequency of data collection)			DATA COLLECTION METHODS & RISKS	Status by December 2023
			Value	Year	2023	2024	FINAL		
Output 1 *An affordable and sustainable solution for online monitoring of bulk water supply and distribution is developed, and operationalized in prioritized locations across the West Bank*	***1.1*** *Online water monitoring solution developed and operationalized at PWA (Binary: Yes / No)*	UNDP project monitoring	No	2022	No	Yes	Yes	Report of comparative assessment of potential solutions.	No Only, tendering process was completed
	1.2 *Number of locations where the online monitoring solution is installed and functional.*	UNDP project monitoring; WBWD records	0	2022	0	100	100 locations across 4 governorates in the West Bank	Maps of targeted locations.	0 Planned to start in March 2024
	1.3 *Number of staff in WBWD received training to manage and maintain the online monitoring system (disaggregated by gender and age)*	UNDP project monitoring; WBWD records	0	2022	0	TBD	TBD	Records of participants in training.	0 Planned to start in July 2024
	1.4 *Percentage of female consultant hired to develop the online monitoring system*	UNDP project monitoring; WBWD records	0	2022	30% of the team are females	30% of the team are females	30% of the team are females	Action plan arrived from the capacity assessment report	0%

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Output 2 *Groundwater well constructed, and ready to be equipped for water supply in As Samou south of Hebron.*	***2.1*** *Drilling of well completed (Binary: Yes / No)*	UNDP project monitoring; drilling company report	No	2022	No	Yes	Yes	Drilling Company's progress report; field visits	No On-going and will be completed in June 2024
	2.2. *pumping test at a rate of 120 m3/hr successfully performed*	UNDP project monitoring	0	2022	0	July 2024	September 2024	water development completion report	0 Planned
Output 3: *Improved capacities of PWA/WBWD for maintained and improved water service in identified water wells in the West Bank*	***3.1*** *Number of PWA/WBWD technicians/personnel with increased technical capacity and equipment for effective water management services.*	PWA/WBWD	0	2022	0	12	12	Records of participants in developing operation sustainability plan	0 Planned in July 2024
	3.2 *Number of water wells rehabilitated and equipped to maintain and improve water service*	UNDP project monitoring; WBWD records	0	2023	0	5	5	Project site report and WBWD records	0 Tendering started in December 2023
	3.3 *Quantity of ground water pumped by the rehabilitated*	UNDP project monitoring; WBWD records	0	2023	0	12,602	12,602	WBWD water wells records	0 Planned in Q2 2025

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	water wells (measured in cubic meter/day)								

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IV. Project Risks and Issues

1. Issue: immature Customized Solution in the local market
   Following the unsuccessful tendering (ITB) for a customized solution, a consultation process was carried out with PWA team who consulted some local experts and reviewed the available commercial solutions. A decision was made by UNDP and PWA to revise the specifications and allow for procurement of commercial readymade solution. This decision ensures a more expedited process, less costly, easily replaced and leveraging readily available technologies and suppliers in the market. It was also decided to use the request for proposal modality to allow for better scoring that takes all technical issues into consideration when setting the criteria.

   Action: Initiated New RFP for Commercial Solution
   The new Request for Proposal (RFP) initiated on 16/11/2023 for a commercial solution aims to attract qualified suppliers and streamline the procurement process.

2. Issue: Expected Delay in As Samoua Well drilling
   Recognizing the challenges faced due to the deteriorating security situation and the proximity of the drilling site to settlements, a proactive approach was taken to address the expected delay. A no-cost extension of 6 months was discussed with the contractor to accommodate the additional time required to complete the drilling and pumping test of the As Samoua well, works are expected to be completed in June 2024

   Action: Requested a No-Cost Extension for the drilling contract

3. Risk: High potential that there is misalignment in the drilling of the deep well in As-Samoua. This is an initial diagnosis done by the site engineer. It may happen when the selected drilling method is not the most appropriate, there are fractures and caves or due to high variation in rock layers.

   Action: In case misalignment is assured by the UNDP team, the contractor will implement the correction measures. Consequently, a delay will be encountered.

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V. Conclusions and Way Forward

The project has encountered challenges, particularly in the procurement of digital water flowmeters (smart solutions) and the online monitoring platform. Based on consultation with the PWA, discussion with local experts and reviewing the available digital solution, the project strategy has been changed from adopting customized smart solutions to commercial solutions. It was concluded that the commercial solutions are less costly and easier for operation and maintenance. The tendering process will be completed early January and it is expected that the contractor will be on board by March 2024.

The drilling of the As Samoua Groundwater Well is on-going despite the many obstacles at the beginning such as limitations on access to the site due to security situation after the war on Gaza. The UNDP security team in cooperation with PWA, has coordinated with Civil Administration and established a mechanism to ensure safe access. Three months delays are expected.

Based on the assessment of ground water wells in the West Bank, a tendering process to rehabilitate five wells is on-going. It is expected that contracts will be signed by March 2024. Based on previous experience, the manufacturing of pumps that are the most important items in the rehabilitation programme takes nine months while the installation and testing takes six months which is beyond the completion date of the project. UNDP flagged the need for six months project extension in the steering committee meeting held in October 2023.

A salary survey was conducted by UNDP at regional level where salaries of UNDP staff has increased by 24% and this has an impact on the PIU project budget line. The increase includes most of UN agencies. This needs discussion and follow up with the NRO.

During the coming year, the digital solutions will be installed in 100 locations in the north and middle of the West Bank and the software will be functioning. It is planned to have this activity completed by November 2024. Training will also be conducted for the WBWD during November.

The drilling of As Samoua' well will be completed and pumping tests will be conducted by end of June 2024.

The rehabilitation programme for five wells (Ezzariya 1, Ezzariyah 2, and Est Herodeon, Arraba and Qabatya Wells) will start by April 2024. It is expected that this activity will be finalized by June 2025.

The maintenance and operation plan for the five well will also be ready by December 2025.

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VI. Financial Status report from 1 November 2022 up to 31 December 2023

Item	Description	Unit	#of units	Unit Rate (US$)	Revised Budget	Total expenses from 1 Nov 22 to 31 Dec 23	Budget Balance	% (Expenses/Budget)
1. Project implementation unit and operations								
Project Manager NPSA 8- 0% first 3 months, 100% next 24 months	salary	Per Month	24	5,164	123,944	68,941	55,002	55.62%
Project coordinator (100%)-NPSA 7- 18 months (smart water solution)	salary	Per Month	18	4,609	82,969	18,613	64,355	22.43%
Site Engineer 1 (100%)-NPSA 7- 12 months) smart water solution	salary	Per Month	12	4,609	55,312	4,352	50,961	7.87%
Site Engineer 1 (100%)-NPSA 7- 12 months water wells development and rehabilitation (consultant)	salary	Per Month	12	4,609	55,312	0	55,312	0.00%
DPC- BSSC- 15%/ 24 months	Salary	Per Month	24	2,057	49,367	7,380	41,987	14.95%
DPC- / (HR +Fin+ Proc. (Procu & electrical and mechanical engineer to prepare the tender document for wells rehabilitation programme, participate in bidders selection process and perform technical quality assurance on supply of equipment)..etc) ISS- Implementation Support Services	Centralized Finance, HR, and Procurement Services	lumpsum/Year	24	644	15,462	3,713	11,749	24.01%

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GOE 4 team members (GOE+email+UNDSS security+ LMS+ Office and utilities expenses including general operating expenses at site offices)	GOE (GOE+email+ UNDSS - security+ LMS+ Office utilities expenses including general operating expenses at site offices)	Lumpsum	24	718	17,237	6,268	10,969	36.36%
DPC- Communication		Lumpsum	2	1,500	3,000	1,000	2,000	33.33%
PIU- Services to project implementation & Vehicle Fuel, Maintenance, and insurance. Etc)	Transportation	Per Month	24	705	16,926	9,649	7,277	57.01%
Subtotal Project Implementation Unit & Operation					419,529	119,916	299,613	28.58%
2. Output # 1: An affordable and sustainable solution for online monitoring of bulk water supply and distribution is developed, and operationalized in prioritized locations across the West Bank								
Setting up adaptation solutions and training	Contractual services companies	Lumpsum	1	480,000	480,000	0	480,000	0.00%
Setting up the database management system including integration with billing, and GIS	Contractual services companies	Lumpsum	1	50,000	50,000	0	50,000	0.00%
Technical backstopping	Contractual services Companies	Unit	1	20,000	20,000	5,016	14,984	25.08%
Sub-total output # 1					550,000	5,016	544,984	0.91%
3. Output # 2 Groundwater well constructed and ready to be equipped for water supply in As Samou south of Hebron								

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Carry out assessment and hydrological analysis	Contractual services Companies	Lumpsum	1	20,000	20,000	9,027	10,973	45.13%
Drilling, casing, and pumping	Contractual services Companies	Lumpsum	1	1,000,000	1,000,000	111,743	888,257	11.17%
Sub-total output # 2					1,020,000	120,770	899,230	11.84%
4. Output # 3 Improved capacities of PWA/WBWD for maintained and improved water service in identified water wells in the West Bank								
Supply, install, and undertake commissioning of electro-mechanical equipment including development of the targeted 5 wells namely (Al-Eizariya wells 1 and 2, Bani Naim Well 2, Qabatiya Well, Arrabah Well)	Contractual services Companies	Lumpsum	1	2,210,000	2,210,000	0	2,210,000	0.00%
Review, update and finalize WBWD's operation and maintenance plan including cost recovery of the targeted water wells to ensure operational sustainability of these wells	Contractual services companies	Lumpsum	1	40,000	40,000	0	40,000	0.00%
Sub-total output # 3					2,250,000	0	2,250,000	0.00%
5. Visibility and QA								
Visibility	Professional Institutional Contract	Per Activity	1	12,000	12,000	0	12,000	0.00%
Quality Assurance & M& E	Quality Assurance including M&E	Per Month	24	2,768	66,421	12,000	54,421	18.07%
Sub-total Visibility and QA					78,421	12,000	66,421	15.30%
Sub-total activities					**4,317,950**	**257,703**	**4,060,247**	**5.97%**

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General Management Services (GMS) 8%	GMS				345,436	20,513	324,923	5.94%
Total budget without Levy				**Total Fund**	**4,663,386.14**	**278,215.47**	**4,385,171**	**5.97%**
Levy Coordination fees 1.0%					46,633.86	46,633.86	0	100.00%
Grand Total					**4,710,020**	**324,849.33**	**4,385,171**	**6.90%**

* US$ 50,000 UNDP contribution from UNDP resources

It is important to highlight that the financial figures in this report are temporary figures and may be corrected at a later stage due to exchange rate fluctuations, GMS collection, realized gain/loss or any other possible corrections.

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VII. Pictures

Drilling of As-Samoua' Deep Water Well - Monthly Progress Report – December 2023



Samoua Municipality for tendering



Pre-bid Meeting (01-May-2023)

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Meeting with the awarded bidder (Al Wael for General Contracting Company) and contract signing.

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Mobilization Works

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Drilling with a 12-1/4-inch pilot hole.

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Annex I

23 water wells assessment Key findings

Category	Findings
Well Pumps	Most of the wells need to have spare well pumps
Booster pumps	Most of the wells need to have spare booster pumps
Well pump Variable frequency drive (VFD)	Most of the wells need to have spare well pump VFD (One set for the southern well and one set for the northern wells)
Booster pump Variable frequency drive	Most of the wells need to have VFD for booster pumps to decrease the cost of pumping
Disinfection Units	Many wells don't have spare disinfection units.
Hydrological and Other Water-Related Data	Lack of available hydrological and other water-related data

23 Wells' Rehabilitation – Cost

- Hydrological works $1.2M
- Mechanical works $ 7.0M
- Electrical works $1.7M
- **Total wells rehabilitation cost** **$9.9M**

Phase 1 | Stage 1
Full well rehabilitation
2 Wells (Azz-1, East Herodion)
Partial Rehabilitation
3 Wells (Arraba, Qabatiya, Azz-2)

$2.2M

Phase 1 | Stage 2
Full well rehabilitation
4 Wells **(Azz-2, Qabatiya, Arraba, BN-2)**

$2.6M

Phase 2

$5.1M

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Renovation indirect Benefits

Improve the efficiency of a pump	Cost Saving Impact
Replace the existing well pump with a new pump	5-12% saving in electricity bills
Provide three VFDs for southern wells that need replacement (three wells)	3-8% saving in electricity bills
Operation and maintenance	2-3% saving in electricity bills

Mainstreaming PV solar

Only 15 wells out of 23 have the space to accommodate PV system with a capacity 100 to 120 KWp.

PV System Analysis and Cost Saving:

- Monthly generated power/well 18.1 MWH
- Avg. annual saving/well 120K NIS
- Annual savings for 15 wells 1.81M NIS ($477K)
- PV system anticipated cost $1000/KWp
- **Total PV system cost for 15 wells $1.8M**
- The average payback period is 45 months.

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