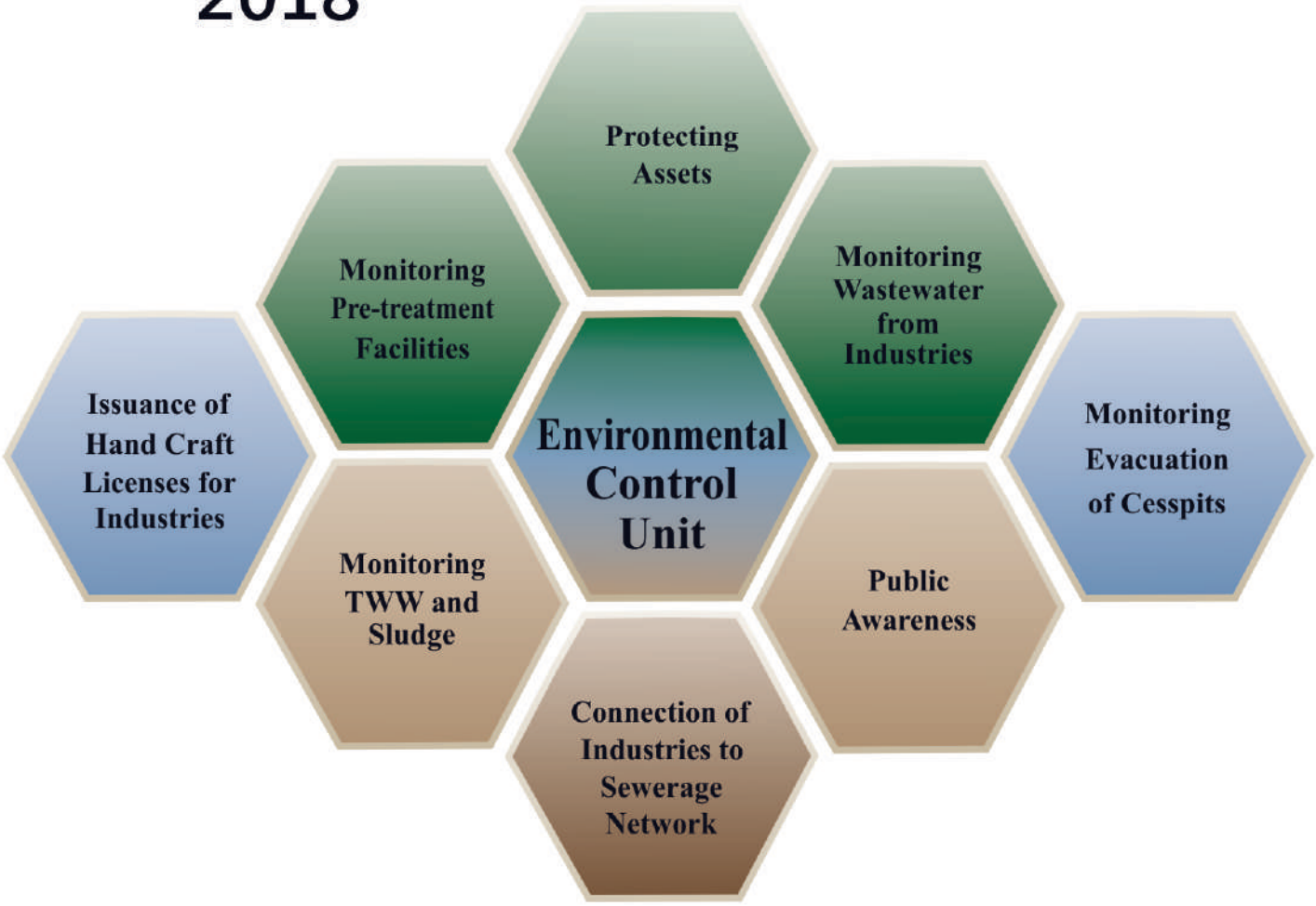
Annual Report 2018



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Environmental Control Unit

Annual Report 2018

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ABBREVIATIONS

µs/cm: Micro Siemens per centimeter
Al: Aluminum element
AT: Aeration tank
B: Boron element
BDL: Below detection limit
BOD: Biological oxygen demand
Ca: Calcium element
Cd: Cadmium element
cfu: colony fecal unit
CH_4: Methane
Cl: Chloride
Cn: Cyanide element
C^o: Carbon monoxide
C^o: Celsius degree
CO_2: Carbon Dioxide
COD: Chemical oxygen demand
Cr: Chrome element
Cu: Cupper element
ECU: The Environmental Control Unit
FC: Fecal coliform
Fe: Ferric element
GIS: Geographic information systems
GSHC: General Safety and Health Committee
Hg: Mercury element
kfW: Kreditanstalt für Wiederaufbau
LGU: Local Governments Units
m^3: Cubic meter
MBAS: Methylene blue active substance
Mg: Magnesium element
Mn: Manganese element
Na: Sodium element
NAPCO: The National Company of Aluminum production of profiles
NH_4-N: Ammonium as nitrogen
Ni: Nickel element
NM Nablus Municipality
NO_3-N: Nitrate as nitrogen
Pb: Lead element
PO_4-P: Phosphate as phosphorous
PS: Palestinian Specifications
SAR: Sodium adsorption ration
Se: Selenium element
SO_4: Sulphate compound
TDS: Total dissolved solids
TN: Total nitrogen
TSS: Total suspended solids
TWW: Treated wastewater
USAID: The United States Agency for International Development
UV: Ultra violet
WSSD: Water supply and sanitation department
WWTP: Wastewater treatment plant
Zn: Zink element
LTD: Liable to the debt

1. Introduction

1.1 Environmental Control Unit

The Environmental Control Unit (ECU) of Nablus Municipality (NM) was established in 2015 through the German Palestinian Financial Cooperation Program, with fund from KfW. However, the unit was launched in February 2016. The ECU mainly aims at:

- Sustainable operations of WWTPs in Nablus West
- Protecting assets owned by NM from damaging action due to uncontrolled industrial discharged pollution
- Ensuring that the public health will be improved as much as possible in the service area
- Ensuring quality of treated wastewater (TWW) and sludge to be within the required standards

1.2 Consultancy Services by ICON

ICON Consultant has been awarded a consultancy tender to establish the ECU. The consultancy tasks of ICON have included the following:

1. Training of ECU staff
2. Establishment of working procedures for monitoring system of ECU
3. Prepare proposal for cesspit evacuation
4. Establish Communication plan with industries
5. Establish sanction mechanism
6. Procurement of equipment to ECU

1.3 Objectives of the ECU

1. Monitoring the wastewater from industries through collecting samples periodically as well as following up pretreatment facilities.
2. Monitoring evacuation of cesspits in the areas that do not have sewerage networks.
3. Issue permissions to connect industries to sewerage network (permanent, temporary, not allowed) based on samples collected from relevant industrial wastewater compared to concerned bylaws.
4. Raising awareness of Industrial facilities on risk of uncontrolled dumping of untreated industrial wastewater into sewerage network or to nearby wadi.
5. Monitoring the effluent quality of TWW and sludge from Nablus WWTPs.
6. Monitoring reuse of sludge in agriculture especially plantation of tobacco and fodder crops.
7. in issuance of hand craft licenses for industries and commercial premises.

1.4 Legal framework

Establishing ECU was based on Palestinian Ministers Cabinet Resolution Number (16) for the year of 2013, "By law on the House and Facilities" Connection System to the Public Sewerage Networks CR (16/13) and on PS, 227-2010 concerning disposal of industrial wastewater to Wadi.

1.5 Relation of ECU with local and national institutions

1. The ECU works together with General Safety and Health Committee (GSHC) in order to follow up all industrial relevant issues in cooperation with ministries and Local Governments Units (LGU) in the Governorate of Nablus.
2. Singing agreements with the Western Villages. Such agreements were signed with the villages of Beit Eba, Zawata, Deir Sharaf, Beit Wazan and Qusin. These agreements were considered as the legal framework for ECU to work outside Nablus municipal boundary to monitor industries with GSHC coordination.

2. Industries and Commercial Facilities

Total number of industries and commercial premises (restaurants, sweet shops, chicken shops) are about 231 as per Table 1.

Table (1): Industrial and Commercial Premises

Industry/ premises	Nablus East	Nablus West	Total	Monitoring
Stone Cutting factories	21	51	72	Disposal of Slurry cake to identified location
Olive Mills	3	4	7	Transport Zeibar to be treated in the anaerobic Digester of the WWTP
Tahini	9	8	17	Monitoring the operation of pealing units, collecting samples
Jeans	2	3	5	Monitoring SS, TDS, COD detergents
Slaughter shops	-	5	5	Organic loads to estimate additional pollution cost
Municipal Slaughter House	1	-	-	Organic loads
Aluminum	-	1	1	Periodic samples, heavy metals
Tannery	-	1	1	Heavy metals (closed)
Detergents	2	-	2	Periodic Samples, SS, TDS, COD, TOC, effective material
Paints	1	-	1	Periodic samples, SS, TDS, COD , TOC
Led factory	1	-	1	Periodic samples, SS, TDS, COD , TOC,
Diary	1	-	1	Periodic samples after installation of the balancing tank, organic loads
Medicine	1	1	2	Monitoring pretreatment facilities
Restaurant & Sweet Shops	2	48	50	Monitoring installation of grease trap
Chicken shops	7	57	64	Installation of screens
Total			**231**	

3. Achievements of ECU

3.1 Regular Monitoring Visits

The ECU staff has conducted the following site visits:

3.1.1 Public awareness visits to industrial facilities inside and outside municipal boundaries.

The purpose of such visits is to introduce the importance of ECU and about the negative impact of disposing the untreated wastewater to sewerage system and WWTPs.

3.1.2 Monitoring industries

Conducting visits to factories and identifying the characteristic of industrial wastewater effluents, materials used in production process, collecting samples that are tested in certified laboratories. Accordingly, the lab results compared to By-Law no. 16 and PS 227 .

3.1.3 Suntex Company for Investment for insecticides

Tests results showed that effluent industrial characteristics of relevant wastewater were in line with standards. Therefore it was agreed to release a connection license for this factory to the public sewerage network. Temporary license connection was granted to Suntex after signing an agreement between NM and said factory.

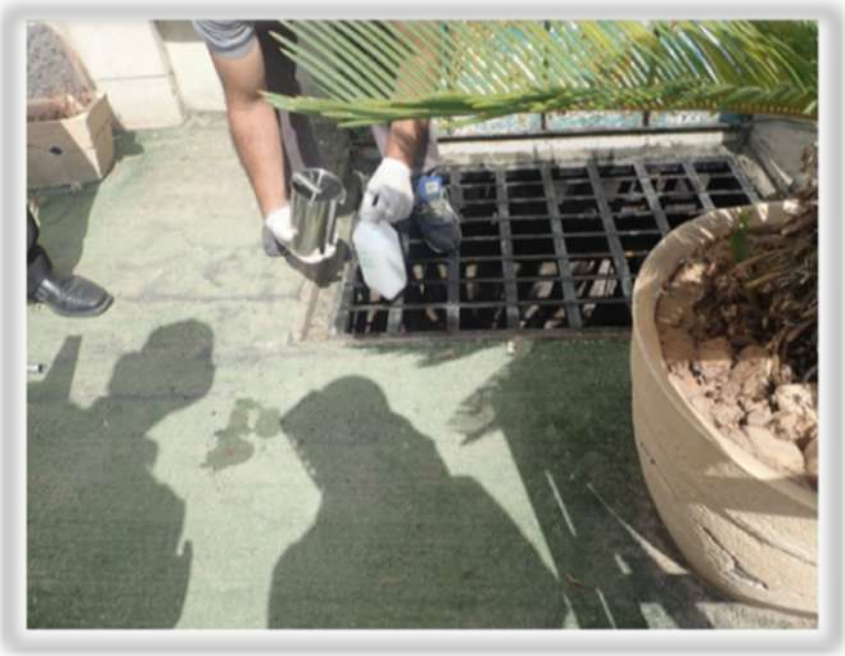

Figure 1: Sampling of Suntex industrial discharge

3.1.2.1 Arab Paints Company

Samples have been collected from the cesspit of the factory where industrial wastewater disposed of. The sample results show minor increase in COD, TDS than the standards. Additional pollution fees to be imposed later on as per new bylaw. Therefor temporary licensing connection where granted to the factory. An agreement was signed between NM and the factory for regular monitoring of their industrial wastewater.

Figure 2 : Sampling of Arab Paints Company

3.1.2.2 Al – Aqqad for Jeans Washing Factory

It was noticed that industrial wastewater of Al-Aqqad Jeans factory can be connected to sewerage network. Relevant temporary license connection has been granted. An agreement has been signed to have regular monitoring of their industrial wastewater effluent.

Figure 3 : Sampling of Al-Aqqad for Jeans Washing Factory

3.1.2.3 Sadiq Qamhia Tahine Factory:

The sampling results of this factory in terms of COD, TSS tests have showed that the implementation of the pre-treatment unit (Mechanical sesame peeling unit) can reduce the concentration of chloride in their industrial wastewater. This allows Tahini factory to be connected the public sewerage network after pretreatment.

Figure 4 : Sampling of Sadiq Qamhia Tahine Factory

3.1.2.4 Cleanco company for washing carpets:

Samples have been taken from the discharged effluent of the washing process. It has been recognized that the tests results were under the allowable limits of Palestinian regulations. No danger to connect the industrial wastewater to the public sewerage network. The owner of the company has been granted a temporary permission to connect to the public sewerage network.

Figure 5 : Sampling of Cleanco Company for washing carpets

Table (2): Test results of the industrial wastewater effluents who asked for connection permission

Items	T.P mg/l	T.N mg/l	SO4 mg/l	Na mg/l	Cl mg/l	TOC mg/l	TDS mg/l	TSS mg/l	COD mg/l	BOD mg/l	Cond. µs/cm	pH unit	MBAS mg/l
*			1000	500	500		1200	600	2000			9.5-5	40
**			400	200	250		1200	600	1000	500	950	9.5-5	1
***	15	80	300		350	55		60	150			-06 Sep	15
Sun Tex Factory	1.4	40				465	659	40.2	1411	590	1029	7.09	
Qamhiyeh Tahini							1200	6330	11720		1457	7.7	
Al-Aqqad for washing jeans			233	595	475		1216	212	684	365	1786	6.95	130
Paints Fac.	2.6	91				876	1242	500	2640	1755	1630	6.96	
Cleanco Company			34.2	44	100		501	187	417	219	783	7.87	0.7

* By law No. 16 for the year 2013
**Agreed values for domestic wastewater
***PS 227 for industrial discharge to Wadi

3.1.2.5 Al Tal Al-Akhdar

This company is located in the industrial zone of Deir Sharaf where no sewerage networks exist. The company has been visited by ECU to investigate solid waste and wastewater disposal. The factory is collecting solid waste to be dumped in Zahrat Al Fenjan landfill site. However, the wastewater is used for irrigation after anaerobic treatment in septic storage tank within the boundaries of the company.

Figure 6: Picture from Al-Tal Al-Akhdar Company.

3.1.2.6 Al-Shunnar Factory for food products:

The factory is located in the village of Beit Eba. The materials and production lines inside the factory were (powder production line, oil filling line, liquid production line). The factory also has a sterilization unit, sodium hydroxide, phosphoric acid. A sample of the industrial wastewater from the factory will be taken to perform the necessary tests at the request of the factory to connect to public sewerage network.

Figure 7 : Al- Shunnar factory for food production

4. Joint field visits with the GHSC:

In order to improve and monitor the environmental situation, joint visits were conducted with the GHSC targeting the following factories:

4.1 Hazem Al-Harbawi Tannery Company

This plant is located at the industrial area of Deir Sharaf village. The factory has been inspected by the GHSC. The factory works in unsanitary and improper environmental conditions and not complying with the general health and safety conditions. A meeting was held with the owner of the factory at the Nablus Governorate. A commitment was signed to obligate the owner of the factory not to operate the tannery until he improve the environmental conditions and implement pretreatment facility for the industrial wastewater which contains high concentrations of chrome, COD, TSS, and TDS. Also the factory shall obtain all the necessary licenses/permissions from all relevant ministries. The teams of the ECU were visiting the plant regularly. The factory now is not working anymore.

Figure 8: Al-Hazem Tannery factory

4.2 The National Company of Aluminum production of profiles- NAPCO:

Many visits have been conducted to NAPCO for investigating their wastewater characteristics. The company has changed their production process of aluminum. The company has sent official letter to the governorate announcing that they have changed their production process to chrome free production. The ECU unit has visited NAPCO several times. The consultant Dahlem has proposed to install 50 m^3 balancing reservoir to monitor the wastewater effluent. An agreement was submitted to NAPCO in this regard. ECU is in contact with GHSC in order to promote signing a monitoring agreement with NAPCO to connect the effluent wastewater to the public sewerage network.

Figure 9 : Process schematic Scheme of NAPCO company process

4.3 Deir Sharaf Butcher shops:

The shops were connected to the public sewerage system. The discharge wastewater from the butcher shops is containing high organic load which increase the operation cost of aerobic treatment in the WWTP. A meeting was arranged by General Safety and Health Committee was attended by the owners of the shops. An agreement was signed with Deir Sharaf local council, Ministry of Agriculture, the Veterinary Department and the Ministry of Health to pay additional fees to treat such additional organic load in the WWTP. Also it has been agreed to follow up the idea of constructing a sanitary slaughter house in the area.

Figure 10: Meeting of Deir Sharaf butcher shops

5. Follow up of the pretreatment facilities

5.1 Dana Factory for Veterinary:

Many visits were conducted to promote the importance of installation a pretreatment facility for the effluent wastewater. The German consultant Dahlem visited the factory and he has depicted the pretreatment process. The factory has followed up most of the recommendations of the consultant and he has established the pretreatment facility at his own cost. Monitoring procedure is followed up by the ECU staff.

Figure 11: Pre-Treatment Unit at Dana Veterinary Factory

5.2 The Lead Factory for Recycling Led:

Many sites visits were conducted to the factory to find out the latest progress regarding the implementation of the pretreatment unit (storage equalization tank and filter press) according to the recommendations of the consultant Dahlem. The regular visits showed a commitment with this factory to implement the pre-treatment unit at his own cost. The factory is still waiting for the chemicals to improve the pretreatment process of the wastewater.

Figure 12: Additional pretreatment unit

5.3 Grease Trap:

Many site visits were conducted to restaurants and sweets shops. Warnings regarding to installation of grease traps were distributed. Total number is 50; however 11 units were installed so far.

Figure 13: Grease Trap

5.4 Chicken Stores:

Site visits were conducted with the Health Department of NM to the 64 chicken stores. Warnings regarding installation strainers were distributed. Wefound that all the shops had installed strainers, ECU is monitoring them regularly.

5.5 Following up pre- treatment units with the consultant DAHLEM

The foreseen pretreatment units will be followed/ monitored by the ECU staff.

Table (3): Pre-treatment Facilities

With KfW contribution				**Without KfW contribution**	**Total of Pre-treatment Units**	**Notes**
Factories	**Total**	**Under Construction**	**Pilot Project**			
Stone Cutting Factories (Total)	72					
Big	12	5	1	1	7	Waiting for installing pre-treatment units
Medium	23	5			5	
Small	37					No clear strategy until now for slurry waste disposal
Tahina Factories	17	12	1	1	14	8 Tahina factories paid their full contributions 4 Tahina factories were followed up

With KfW contribution				Without KfW contribution	Total of Pre-treatment Units	Notes
Factories	**Total**	**Under Construction**	**Pilot Project**			
Olive mills industries	7	2		5	7	5 olive mills have storage tank for a long time
Jeans wash	5	1		4	5	Balancing tanks will be monitored by the ECU and the consultant.
Dana Veterinary Drugs Factory	1			1	1	The factory has implemented of the pretreatment unit
Sama Pharmaceuticals Manufacturing Co - Salem village	1					The factory will be visited
Suntex factory	1			1	1	The factory have pretreatment unit
-Lead Factory for Recycling Lead	1			1	1	The treatment unit (storge) is implemented and treating the chemicals which required for treatment
National Aluminum and Profiles Company	1			1	1	The Factory has a treatment unit - the factory replaced the production method by using Cr-Free, The factory is required to install balancing tank for monitoring.
Dairy Factory	1	1			1	The organic load from the Factory was taken into consideration in design Nablus East Treatment plant
Hazem Harbawi for Tanning Company	1					Closed
National Paints Factoriey	1			1	1	The Factory had installed sedimentation tank
Chemicals (detergents)	2					No need for treatment
Slaughter Houses of Deir Sharaf Village	5					The Owners signed commitments regarding to not slaughter in the shops of the village of Deir Sharaf
Municipal slaughterhouse	1					The organic load from the Factory was taken into consideration in design Nablus East Treatment plant
Chickens Shops	64			64	64	Strainers for feather collection has been Installed
Restaurants and sweet shops	50			11	11	11 grease traps are installed until now
Total	**231**	**26**	**2**	**91**	**119**	

6. Renewal of the hand crafts and industries licenses

68 crafts and industries licenses were renewed/issued in cooperation with various departments of NM.

7. Follow-up connecting industrials establishments to the sewerage network

ECU has sent warning notes to the industrial factories inside the boundary of Nablus West and Beit Eba village which have a new sewerage network to clean upper Wadi Zeimer from the wastewater. The connection procedure was followed ECU staff in cooperation with the Water and Sanitation Department and the project implementation unit of NM. Several factories in Beit Eba submitted to the Beit Eba village council requests to connect to the public sewerage network. Connection requests were forwarded accordingly to NM ECU in order to identify the materials used, wastewater characteristics, production process of each individual industry, collecting samples, the factories were:

7.1 Palestinian Construction Products Ltd :

Through monitoring from ECU it's found that no industrial wastewater produced from the factory, it is just domestic wastewater. The factory has been granted temporary connection license after signing a connection and a monitoring agreement.

7.2 Metal casting Company:

Through monitoring from ECU it's found that no industrial wastewater produced from the factory, it is just domestic wastewater. The factory donated a temporary connection after signing a connection and monitoring agreement.

7.3 Near East Industries & Trade-Anabtawi Group:

Through monitoring from ECU it was found that no industrial wastewater produced from the factory, it is just domestic wastewater. The factory has been granted temporary connection after signing a connection and monitoring agreement

7.4 Al-Shunnar Factory for Foodstuffs:

ECU found that the factory produced industrial wastewaterECU will collect samples from industrial wastewater in order to perform needed lab tests . The decision of connection to the sewerage network will be considered after investigating lab results.

For the other factories in Beit Eba, they will be followed up by the village councils and the ECU has the right to oblige the factories to submit permission requests to be connected to the sewerage network.

8. Cesspits Data

The staff of ECU has collected the information and the coordinates of the cesspits in the following areas: Al-Amriya, New Nablus, Al-Junaid and the Zawata area, which are not served by the sewerage network. So far, the total number so far registered of the cesspits is 294. The coordinates and information were downloaded into GIS environment. The information of the remaining cesspits inside and outside Nablus is in progress.

Table (4): Locations of cesspits

Location	Number of cesspits
New Nablus	129
Al-Amreya	68
AL-Junaid	22
Zawata	75
Total	294

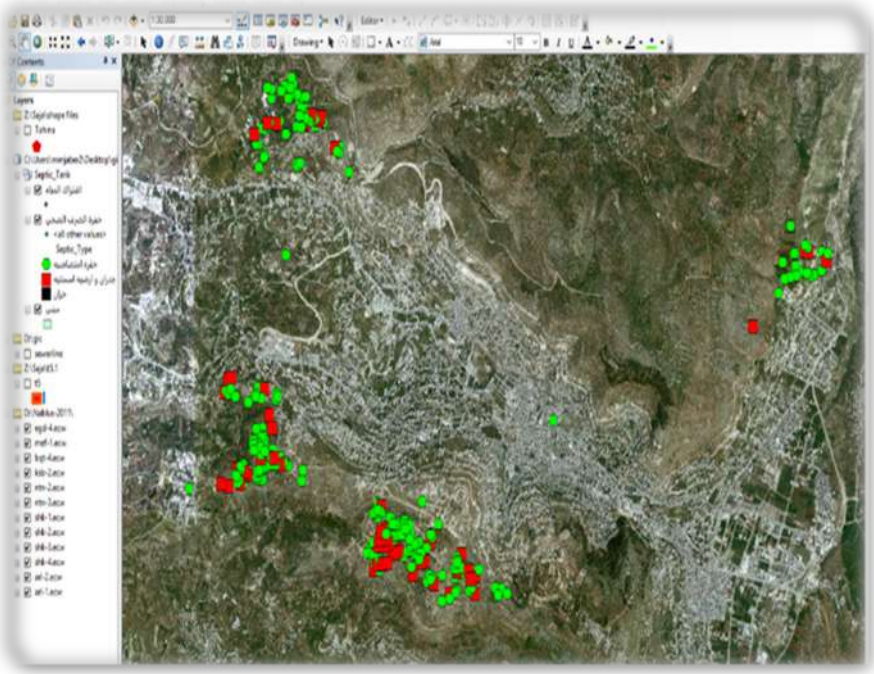

Figure 14: GIS plan of cesspits

9. Site visits to stone cutting factories:

The team of the ECU has conducted regular site visits to the large and medium stone cutting factories. The agreements were distributed to install filter presses, and to participate in the ongoing program.

10. Transport of Zibar to Nablus WWTP:

A coordination has been done with a contractor who has a suction truck to transport Zibar produced from the olive mills (Aladham from Nablus, Abu-Shadi Abu-laila from Qusin village, olive mills from Beit Leed) to be treated in the Anaerobic digester at the WWTP, About 390 m^3 have been transported.

11. Monitoring treated WASTEWATER and sludge of Nablus WWTP

11.1 Results of laboratory analysis of Nablus WWTP performance

Table (5): Average lab results for influent and effluent wastewater

Unit		pH	Cond. µs/cm	BOD mg/l	COD mg/l	TSS mg/l	TDS mg/l	NH4-N mg/l	NO3 mg/l	T.N mg/l	PO4 mg/l	T.P mg/l
July	IN	7.69	1625	-	943	417	-	61.2	-	86.5	-	21.2
	OUT	7.72	1444	-	37	8	814	1.4	-	7.4	-	3.8
Aug	IN	7.8	1671	-	1010	482	-	59.8	-	84	-	18.3
	OUT	7.87	1452	-	43	14	894	1.4	-	8	-	3.25
Sep	IN	7.9	1670	-	971	439	-	63	-	87	-	16
	OUT	8.56	1488	-	40	9	876	-	-	6	-	4
Oct	IN	7.86	1772	-	1075	495	-	62	-	95	-	-
	OUT	8.27	1491	-	38	9	806	1.5	5.8	10	-	-
Nov	IN	7.83	1783	-	975	461	-	73.7	-	100	-	21.8
	OUT	8.30	1463	-	36.3	9	804	1	8	21	-	3.3

The lab results showed that the efficiency of treatment reached 97.4% for suspended solids TSS, and 96.3% for COD during the months mentioned in Table (6).

Table (6): Treatment Efficiency in Nablus WWTP and Average Concentration of TDS

Month/2018	Test	Efficiency %	TDS mg/l
July	TSS	%98	814
	COD	%96	
August	TSS	%97	894
	COD	%97	
Sep.	TSS	%98	876
	COD	%96	
Oct.	TSS	%98	806
	COD	%96.4	
Nov.	TSS	%98	804
	COD	%96.2	

11.2 Lab results for treated wastewater after sand filtration and UV disinfection:

The lab results below show the effluent quality after tertiary treatment was Grade A category as per technical specification 34-2012 (Treated Waste Water for Agricultural Irrigation). Many crops inside the WWTP have been planted using tertiary treated waste water (olives, apples, pomegranate, almonds, apricot, walnut, citrus, peach, avocado, fodder crops, barley). However, the following crops have been planted in the outside reuse project through USAID (apples, almonds, fig, apricot, and olive).

On the other side, reuse of the treated sludge in pilot project for fodder crop and tobacco crops is under trial experimentation monitoring by ECU as well.

Table (7) Lab results as conducted in Nablus WWTP Lab.

Test	Test result 17/7/2018	Test result 2018/8/15	Test result 2018/9/10	High quality A	Good quality B	Medium quality C	Low quality D
Total suspended solids (TSS) mg/l	0	2	0	30	30	50	90
(COD) mg/l	36	32	26	50	50	100	150
Total dissolved Solids (TDS) mg/l	-	-	-	1200	1500	1500	1500
pH	7.55	7.76	7.71	(6-9)	(6-9)	(6-9)	(6-9)
Cond. (µs/cm)	1570	1520	1469	-	-	-	-

Table (8): Lab results for tertiary treated waste water conducted in Birzeit University Labs

Test	Test result 2018/03/17	High quality A	Good quality B	Medium quality C	Low quality D
(BOD_5) mg/l	BDL	20	20	40	60
Total suspended solids (TSS) mg/l	BDL	30	30	50	90
FC (Colony/100ml)	Nill	200	1000	1000	1000
(COD) mg/l	BDL	50	50	100	150
Total dissolved Solids (TDS) mg/l	624	1200	1500	1500	1500
pH	7.81	(6-9)	(6-9)	(6-9)	(6-9)
Fat, Oil, & Grease mg/l	BDL	5	5	5	5
Phenol mg/l	BDL	0.002	0.002	0.002	0.002
MBAS	BDL	15	15	15	15
NO3-N mg/l	BDL	20	20	30	40
NH4-N mg/l	1.2	5	5	10	15
Total Nitrogen mg/l	31.2	30	30	45	60
CL mg/l	229.75	400	400	400	400
SO4 mg/l	84.24	300	300	300	300
Na mg/l	194.4	200	200	200	200

Mg mg/l	14.5	60	60	60	60
Ca mg/l	91.8	300	300	300	300
SAR	4.97	5.83	5.83	5.83	5.83
PO4-P mg/l	2.39	30	30	30	30
Al mg/l	0.038	5	5	5	5
Cu mg/l	0.009	0.2	0.2	0.2	0.2
Fe mg/l	0.072	5	5	5	5
Mn mg/l	0.04	0.2	0.2	0.2	0.2
Ni mg/l	Not det	0.2	0.2	0.2	0.2
Pb mg/l	Not det	0.2	0.2	0.2	0.2
Se mg/l	Not det	0.02	0.02	0.02	0.02
Cd mg/l	Not det	0.01	0.01	0.01	0.01
Zn mg/l	0.035	2	2	2	2
Cn mg/l	Not det	0.05	0.05	0.05	0.05
Cr mg/l	Not det	0.1	0.1	0.1	0.1
Hg mg/l	BDL	0.001	0.001	0.001	0.001
Co mg/l	Not det	0.05	0.05	0.05	0.05
B mg/l	Not det	0.7	0.7	0.7	0.7
E. coli (Colony/100ml)	Nill	1000	1000	1000	1000
Nematodes (eggs/L)	Absent	1≥	1≥	1≥	1≥

BDL: Below detection limit, Nill :Zero, Not det :Not detected

12. Training and capacity building:

The ECU staff had a training course in Jordan about (Integrated management of industrial wastewater and quality control) conducted by Jordanian Water Authority. Such training course aimed at:

- familiarize the ECU staff about different processes of pretreatment facilities for different industries
- introduced the local Jordanian standards about for effluents quality and quality control
- calculate industrial wastewater tariff (extra cost due to additional treatment),
- define allowable maximum limits for connection industrial wastewater to public sewerage network

Figure 15: pretreatment units for pharmaceutical factory in Jordan

13. ECU future improvements plan

- Following up activities for identifying cesspits locations in Nablus west area.
- Allocating a dumping site for solid /slurry from the stone cutting factory in cooperation with GHSC.
- Establish plans with the related village councils focusing on how to manage cesspits emptying in cooperation with WSSD of NM.
- Establish monitoring plan to industries in the year 2019.
- Creating data collection for the whole industries in Nablus Area with cooperation of IT department of NM.
- Imposing fine systems based on the principle which says “polluter shall pay”.

14. ECU organization chart