

## **MANAGING NABLUS WASTE WATER SYSTEM BY ESTABLISHING ENVIRONMENTAL CONTROL UNIT (ECU) - NABLUS MUNICIPALITY CASE STUDY (THE 2017 CURRENT STATE)**

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### **ABSTRACT**

Nablus municipality provides services to 200,000 citizen including Nablus city and 4 refugee camps. These services include water supply, waste water disposal, electricity, solid waste management....etc. In waste water services 96% of the city premises connected to the waste water network ,and 4% of the premises connected to septic tanks. In 2013, the waste water treatment plant (WWTP) has been started its work , it is planned to serve 50% of Nablus city and five villages located nearby. Currently the five villages are not connected until now .waiting to finish the construction of wastewater collection system. The WWTP uses biological treatment to treat the domestic waste water. The industrial wastewater and the sludge evacuated from the septic tank from the villages are discharging to the open area resulting in environmental disaster to the whole area. In 2018 it is expected to operate the Eastern waste water treatment plant to serve the remaining part of the city and the nearby 6 villages.In order to manage the waste water system in the service area of NM (Nablus city and 11 villages) to overcome the above mentioned environmental problem and to protect its assets (now WWTP west and WWTP east in the future), Nablus Municipality established Environmental Control Unit (ECU). The overall objective of the ECU is to guarantee sustainable improvement of the Sanitation Sector in Nablus through: 1) Support the industrial sector to make pretreatment for their waste water before connecting to WWTP according to environmental and hygienic criteria, 2) Monitor the usage of treated waster and sludge to assure using it in a safe way, 3) Evacuating of septic tanks in a correct way, and 4) Control the waste water collecting system inside the city. In this paper more details about ECU objectives, legal ,technical and institutional frameworks will be emphasized. In addition to the work procedures and the activities planned to raise the awareness of citizens and factories owners to discharge their wastewater in a certain way to be environmentally and healthy acceptable

**keywords:** wastewater treatment plant, industrial pre-treatment, awareness, ECU, septic tank.

### **1 INTRODUCTION**

#### **1.1 General background about Nablus city :**

Geographically, Nablus extends on Mount Ebal and Mount Gerizim. The city is known by its delicious sweet (kenafa) and it has many industries such as soap industry and stone industry, the served Population is about 200,000 inhabitants.

#### **1.2 Nablus Municipality**

Nablus municipality is a semi- governmental foundation and it considered as one of the oldest municipalities in the level of Palestine and the Arab world . It established in 1869 . Currently NM is one of the biggest Palestinian foundations . The most important services provided by the municipality: water, electricity and solid waste, permits buildings, and paving the opening of streets and sidewalks. Nablus Municipality vision includes : Improving energy and water efficiency, Promoting sustainable development in all services provided, engaging and inspiring the community and Adapting and managing the effects of climate change and disaster risks. In the city , we face many challenges such

as : Israeli control of water resources , financial deficit , lack of water sources , lack of awareness , and electricity supply is from Israel company which is not reliable. The following table (Table 1) shows some facts about the city:

**Table 1: Facts about the city**

<b>Item</b>	<b>value</b>
Water supply coverage	100%
Waste water coverage	97%
Water consumption per capita per day	80 L
Cost of 1 m <sup>3</sup> of water	1.6 US\$
Average tariff	1.65 US\$/ m3
Electricity coverage	95 %
Average Electricity tariff	0.2 0 US\$/ kwh
Purchase Electricity cost	0.11 US\$/ kwh
Annual consumption of different energy sources	705 GW (35% electricity source)
Palestine GHG emissions per capita	1,0 t CO <sub>2</sub> eq /year

## 2 ENVIRONMENT CONTROL UNIT

### 2.1 Introduction

Nablus Municipality has carried out a project to establish wastewater treatment plant in the western region of the city of Nablus (treat 50% of wastewater produced), and currently being worked on a project to establish a wastewater treatment plant in the eastern region of the city (Table 2). The main objective of these projects is the establishment of an integrated sewerage system (collection, transport, treatment), including protecting the environment from pollution and provides treated water usable in many areas. The establishment cost of the waste water treatment plant was very high, and it is the responsibility of Nablus municipality to protect these WWTPs as property of high value. These WWTPs have high probability to be affected by the pollutants contained in waste water emerging from industrial plants (Table 3), and due to this important issue, Nablus municipality has established a unit called "The environmental Control Unit – ECU" to protect these WWTPs and protect the environment.

**Table 2: Wastewater projects funded by KfW**

<b>Project</b>	<b>Year Start</b>	<b>Year End</b>	<b>Budget (EUR)</b>
Water loss reduction 1+2	2000	Ongoing	20,000,000
Nablus –west WWTP+ Restoration measures + sewerage network for villages +CHP Unit (cogeneration heat and power)	2002	Ongoing	48,000,000
Nablus -east sewerage and sewerage network for villages + Reuse	2014	Ongoing	40,000,000
Accompanying Measures ECU	2014	2016	350,000

## 2.2 Scope and Mission

The Environmental Control Unit (ECU) is a separate unit within the municipality of Nablus and reports directly to the Mayor. It contains three sections: 1) Planning and permissions, 2) Research and studies, 3) Monitoring and enforcement. In addition to that the unit is supported by other Nablus Municipality departments (legal, public relation.....). The Mission of ECU is to manage the wastewater system in the Municipality of Nablus and adjacent Local Governmental Units by

- (i) Issuing permits to industries,
- (ii) Monitoring the entire system, i.e. the wastewater system managed by the Water Supply Sanitation Department (WSSD), the safe evacuation of faecal sludge, and waste water discharge of industries, and
- (iii) Enforcement.

**Table 3: list of industries in Nablus service area**

<b>Factories</b>	<b>Unit number</b>	<b>Main pollutant</b>
Stone cutting	61	Suspend solid
Chemicals	10	No pollutant
Olive mills	10	High organic compounds, phenol ,low Ph.Total scolds
Tahina	16	Salt
Dairy	1	
Slaughter houses	1	Solid
Soap	3	No pollutant
Tannery	1	Chrome
Aluminium	1	Chrome
Other	25	

## 2.3 Main Tasks

The following main tasks are distinguished:

1. Permitting: verification of applications for new connections, additional investigations, risk assessment, issuance of permits, annual renewal of permits;
2. Monitoring: Three subsystems, i.e. the WSSD wastewater system, evacuation of sewerage sludge and industries. These systems will be monitored in a graduated manner; the first will be the industries, the second will be the WSSD, and the third will be the FS
3. Enforcement: This task comprised of two main activities:
  - (i) Incentives, i.e. information and awareness raising, guidance during the application, technical advice, guidance during monitoring and
  - (ii) Sanctions, i.e. temporary permits, warnings, disconnection and legal actions (by the Legal Department – other authorities and ministries through the advisory committee).
4. Database Management: capture, validation, and processing of data, scheduling (analyses, inspections, remedial actions, etc.), regular or special reporting, queries, QA, and updating; N.B. IT tasks are outsourced to the IT Department of the Municipality, i.e. system administration, security, maintenance, and development
5. Relations and Awareness: manages the communication between the ECU and the various target groups: mass media, events, workshops, and hearings, public awareness, new media
6. Legal: coordination with Legal Department, regulatory framework, legal aspects of permitting and enforcement
7. Administrative Support: secretarial and logistic support, documentation

## 2.4 The legal framework for ECU

Based on the Palestinians bylaw (16) “ connecting industrial and commercial facilities to public sewerage system” which shows the procedures to connect and which one need pretreatment ,and the quality of waste water that can enter the public sewer from relevant industries.

## 2.5 Institutional framework for ECU

Forming an advisory committee (AC), including the following Nablus Municipality, Ministry of Local Government, Ministry of National Economy, Environment Quality Authority, Ministry of Agriculture, Water Authority and Ministry of Health. The main task for this AC is discuss any violation from industries and take action by each one according to his authority.

## 2.6 What have been done up to now

- The implementation phase of the project started at 1-2-2016,with the staff (Head of unit Environment engineer, Two chemical engineer , Technician , and administration officer)
- Since that ECU have done a lot of tasks, the following summarize the main activities carried out :
  1. Conducting case study :
    - The main aim of conducting case studies are :
      - a) Testing standard operating procedures (SOP's)
      - b) Familiarity with the process inside the factory
      - c) Familiarity with the raw material used in the process
      - d) The waste water quality produced during the industrial process
      - e) The quality of waste water effluent from the factories
      - f) Studying the effect of the WW effluent on the sewage system (network& WWTP)
    - Since February 2016 eight case studies were conducted by the staff and completed which are : WWTP, Aluminum , Sesame paste (Tahina) , jeans , chemicals , Adham Olive Mill, Stone cutting factory , Deir sherif slaughter shop)
    - For the case studies which have been completed, we have already done the following :
      1. Preparing protocol for each case study that includes 3 stages : preparation ,introduce visit , sampling , final visit
      2. Understanding process
      3. Taking sample
      4. Analysis result and compare the result with standard
      5. Risk assessment and drawing flow chart
      6. Writing final report
    - WWTP : understanding the process, testing SOP's, drawing flowchart , familiar with the test done in the laboratory
    - Aluminum : The industrial waste water that comes from factory contain high concentration in both of sodium & chloride due to use NaOH & HCL
    - Tahina : The industrial waste water that come from factory contain high concentration of TDS and high value in electrical conductivity due to use high amount of salt in the manufacturing process
    - Jeans : The factory use large amount of water so all chemicals used in washing process are diluted but we must frequently monitoring
    - Chemicals (al-Rajeh ) : the only waste water that effluent from this factory is domestic water
    - Olive mille : according to bylaws it's impossible connect to the public network ,the waste water from this factory contain organic compound and phenol, now we must supervision to make sure that the O.M dispose the waste water in proper way
    - Stone cutting : The industrial waste water that produces from these factories contains soul (water & powder ) ,so it's impossible in the existing case to connect to the public network
    - Slaughterhouse : high concentration of COD&BOD that produced from slaughterhouse that may increases the operational cost for WWTP

2. Filed tours for the factories up to now more than 70 factories were visited , the main aim of this visit are :
  - a) Introduce the ECU to the owner of each factory ,and what the main tasks of the unit regard supervision and controlling the effluent in the industry
  - b) Talking about the pre-treatment project that fund by KFW ,two factories (Tahina & stone cutting ) have done the pre-treatment
  - c) Making sure how the factory discharges the waste water
3. Data base program : The team collect information about the industries in the NM western and eastern area including general information ,water consumption from different sources (water department ,NEDCO, ministry of health, and the data base program under testing (reporting ,work order..)
4. Preparing Permission connection form , conditions and procedures
5. Setting performance indicator( KPI's ) for the sewage system to monitoring and evaluating
6. Environmental Control Unit Icon on the Municipality Website : Adding of icon for ECU on Nablus Municipality Website which includes introduction about the Unit , its tasks , various activities and the team achievements We publish the team field visits ( introducing and final visits ) for local factories
7. participation in training courses about environment governance that include these important topic : environmental legislation ,international environmental principles ,and environmental crisis management
8. Conducting several studies about cesspits evacuation, zibar disposal, and possibility of using stone cutting cake for industrial stone

## 2.7 Conclusion

- ECU start working with industries through case studies and field visits. The way for success in achieving the ECU goals is to work together with all parties
- Solving any Environmental problems needs: 1)feasible solutions for the industries, 2) Education and awareness, 3) implementing the regulations and laws.
- Unique Success story to be repeat in the other municipalities

## 3 FUTURE PLAN

- Sign agreements with other stakeholders (LGU)
- Awareness campaigns and learning education programs (owner of industries, public, students, LGU, ....)
- Design and implement business model for fecal sludge evacuation
- Enhancing the monitoring system and issue permission connection for industries

## REFERENCE

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**PHOTOS**

**Photo 1: Olive Mill industries**



**Photo 2: Industrial waste water discharged in open area (wadi)**

