Design of Wastewater Collection System For Bait kahil Village

By

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Design of Wastewater Collection System For Bait kahil Village

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accordance with the recommendations of the project supervisor, and the acceptance of all examining committee members, this project has been submitted to the Department of Civil and Architectural Engineering in the College of Engineering and Technology in partial fulfillment of the requirements of the department for the degree of Bachelor of Civil Engineering.

Project Supervisor **Department Chairman**

الإهداء

. إهدائي هذا لمن رَكض معي نحو أحلامي، لِمن سعى أن يُنير لي طريقي المظلم، لِمَن حَمَل على كفّتيه تعب سنين وأيام لراحتي

إلى (عائلتي أولًا).

إلى من يستحق أن يُذكر اسمه اول مشروع تخرجي، إليك يا من خُتِمَ إسمي بإسمك

(أبي)

الى من التفتُّ خلفي فكانت ورائي، وحين احتجت للإستناد كانت حائطي، وحين مُلت كانت حائطي، إلى من أعطتنا قبل نفسها، إلى من أعطتنا حياتُها،أدامكِ الله سندًا يا (أُمي).

إلى من كانت دمائي من دمائهم، إلى من كانو لي سندًا وعونًا، إلى مَن إشتدت يدي بيدهم وقت التعب وضغط الدراسة، إليكم يآ

(أخي وأختي)

إلى من وقفوا وتعبوا وعانوا وسهروا الليالي حتى نكون إسمًا لامعا من النجاح في هذا الوطن إليكم يا

(أساتذتي).

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Work team

Abstract

Design of Wastewater Collection System For Bait kahil Village

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Shatha Shahateet **Eyas Atawneh**

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The aim of this study is to design a wastewater collection system for Bait kahil village, this area are suffered from shortage of existing Infrastructure, such as wastewater collection system. Therefore; the dispose wastewater without any treatment, will cause danger to human health, unacceptable damage to the natural environment, and water resources (surface and underground water).

After THIS project we expect to design a wastewater collection system , that provide a good sanitary environmental condition of Bait kahil protecting public health ,dispose the human excrete to a safe place by a safe and protective means , to dispose of all liquid waste from community to a proper place for preventing a favorable condition of mosquito breeding ,fly developing or bacteria growing , to transport liquid to wastewater treatment plant so as not danger or land to get of polluted where it is disposed off .

Thus, it protects the receiving environment from degradation or contamination. We use the GIS, AutoCAD, Sewer CAD to achieve our goal which is to design an efficient and economical wastewater collection system.

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Chapter One

Introduction

1.1 General

1.2 Problem Definition

1.3 Objectives of the Project

1.4 Methodology

1.5 Phases of the Project

- **1.5.1 First Phase: - Data Collection and Survey**
- **1.5.2 Second Phase: - Preparing Layout for The Network and Calculate the Amount of Wastewater**
- **1.5.3 Third Phase: - Design of Wastewater Collection Systems**
- **1.5.4 Fourth Phase: - Writing the Report and Other Needed Jobs**

1.6 Organization of the Project

General

In most of the cities, wastewater is let out partially treated or untreated and it either percolates into the ground and in turn contaminates the ground water or it is discharged into the natural drainage system causing pollution in downstream water bodies.

In the past disposal of waste from water closets was carried out manually and wastewater generated from kitchen and bathrooms was allowed to flow along the open drains. This primitive method was modified and replace by a system, in which these wastes are mixed with sufficient quantity of water. This waste is carried through closed conduits under the conditions of gravity flow. This mixture of water and waste products is known as sewage.

So the aim of this study is to design a wastewater collection system for Bait kahil village, this area are suffered from shortage of existing Infrastructure, such as wastewater collection system. Therefore; the dispose wastewater without any treatment, will cause danger to human health, unacceptable damage to the natural environment, and water resources (surface and underground water).

1.2 Problem Definition

The daily activities of human beings produce both liquid and solid wastes. The liquid portion of the wastewater is necessarily the water supplied by the authority or through private water sources, after it has fouled by variety of uses. The sources of wastewater generation can be defined as a combination of the liquid or water-carried wastes removed from residences, institutions, and commercial and industrial establishments, together with groundwater, surface water, and storm water as may be present.

If the untreated wastewater is allowed to accumulate, it will lead to highly unhygienic conditions. The organic matter present in the wastewater will undergo decomposition with production of large quantities of malodorous gases. In view of these bad conditions, and since there is no sewage networks exist, along with fast increasing of the environmental and health problem. The design of wastewater collection system study becomes a pressing necessity so as to solve all problems that mentioned above. This study will consider the annual growth of the people and their water consumption for the coming 25 years, which will be the design period.

IN THIS project we expect to design a wastewater collection system , that provide a good sanitary environmental condition of Bait kahil protecting public health ,dispose the human

excrete to a safe place by a safe and protective means , to dispose of all liquid waste from community to a proper place for preventing a favorable condition of mosquito breeding ,fly developing or bacteria growing , to transport liquid to wastewater treatment plant so as not danger or land to get of polluted where it is disposed off.

1.3 Objectives of the Project

The main objectives of this project are: -

1. Estimation of population and their densities for the design period for each catchment area.

2. Determination of the water consumption and consequently the wastewater production from the different sources for each catchment area.

3. Evaluation of the collected data, propose collection system of the region and design of the main trunks of the network.

4. Showing the proposed wastewater network its parts on different maps for different purposes.

5. Preparation of Bill of Quantities for the main trunks.

6. Preparation the profiles of pipes.

1.4 Methodology

The way to do our project to design Wastewater Collection:

1. Collecting of topographical maps for all the area.

2. Collecting of meteorological and hydrological data (temperature, wind, speed, rainfall…etc.) from different sources.

3. Draw the layout of the network and compare it with the real situation in Bait kahil Village then make adjustment and last draw the final layout, this task is the most important.

4. Evaluation of the contour maps and matching it with actual ground levels in the region.

5. Determination of the wastewater quantities.

6. Determination of the wastewater quantities and projection of the wastewater production in year 2045.

7. Finalizing of the project that will contain the report and the needed maps and drawings.

1.5 Phases of the Project

Table (1.1):The project will consist of the four phases as shown in

Title	Duration								
	09/15	10/15	11/15	12/15	01/15	02/15	03/15	04/15	05/15
Data collection and survey.									
Preparing layout for wastewater collection system and calculate the amount of wastewater.									
Design of wastewater collection system.									
Writing the report and preparing maps.									

1.5.1 First Phase: - Data Collection and Survey

In this phase, available data and information were collected from different sources. Moreover, many site visits to both the region and the municipality were done. This phase includes the following tasks.

1. Collecting of topographical maps for all the area.

2. Collecting of meteorological and hydrological data (temperature, wind, speed, rainfall, evaporation…etc.) from different sources.

3. Evaluation of population densities in each zone of the region with their water consumption and predicting their numbers, densities and their water consumption in year 2045.

1.5.2 Second Phase: - Preparing Layout for the Network and Calculate the Amount of Wastewater.

In this phase layout will prepared and put in its final shape and then quantities of wastewater were determined. This phase includes the following tasks:

1. Draw the layout of the network and compare it with the real situation in Bait kahil village then make adjustment and last draw the final layout, this task is the most important.

2. Evaluation of the contour maps and matching it with actual ground levels in the region.

3. Determination of the wastewater quantities.

4. Determination of the wastewater quantities and projection of the wastewater production in year 2045.

1.5.3 Third Phase: - Design of Wastewater Collection Systems

In this phase the necessary hydraulic calculation needed for the design of the main trunks were carried out. This phase includes the following tasks:

2. Establish the catchments and sub-catchments areas and routes of the sewers.

3. Establish the design criteria and conducting the needed sewer diameter hydraulic calculations.

4. Preparing needed different drawings for the designed sewers.

1.5.4 Fourth Phase: - Writing the Report and Other Needed Jobs

After finishing the design calculation of the main trunks, the project team prepared the specifications drawing, bill of quantities and preliminary maps. Final report of the project was prepared and submitted to the Department of civil and Architectural Engineering at Palestine Polytechnic University.

1.6 Organization of the Project

The study report has been prepared in accordance with the objectives and scope of work. The report consists of five chapters.

The first chapter entitled "Introduction" outlines the problem, project objectives, and phases of the project.

Chapter two entitled "Characteristic of the Project Area" presents basic background data and information on the project area, water supply, wastewater disposal.

Chapter three entitled "Design Criteria" deals with municipal sewage system, types of wastewater collection systems, sewer appurtenances, flow in sewers, design of sewer system, and sewer construction and maintenance.

Chapter four entitled "Analysis and Design" presents the design calculations and maps of the system.

Chapter five Bill of quantities deals with the quantities of pipes manhole excavation, backfilling and…etc.

Chapter six entitled "Conclusions" discusses the conclusions of the study.

Chapter Two

Characteristics of the project area

2.1 General

2.2 Project Area

2.3 Population

- **2.3.2 Geometrical Increase Method**
- **2.3.1 Arithmetical Increase Method**
- **2.3.3 Incremental Increase Method**
- **2.3.4 Graphical Method**
- **2.3.5 Comparative Graphical Method**
- **2.3.6 Master Plan Method**
- **2.3.7 Logistic Curve Method**

2.4 Population Density

2.5 Water Consumption

2.6 Wastewater Quantity

2.7 Land Use

2.8 Meteorological Data

- **2.8.1 Temperature**
- **2.8.2 Relative Humidity**
- **2.8.3 Wind**
- **2.8.4 Rainfall**

2.1 General

In this chapter, the basic data of Bait kahil Village will be briefly discussed. The topography, population water consumption, wastewater production, Land Use, and Meteorological Data will be briefly presented.

2.2 Project Area

Bait Kahil village is located in the west north of the Hebron city, on the local line north side 108.61 m. and eventual local line from the east 156.86 m, it elevates 955m above sea level and keeps away 4 Km from Hebron city. The total land area of the village is about 600 hectares. It is surrounding by Hebron city, Bait Aula, Halhoul, and Tarqumia Town. As shown in the figure (2.1).

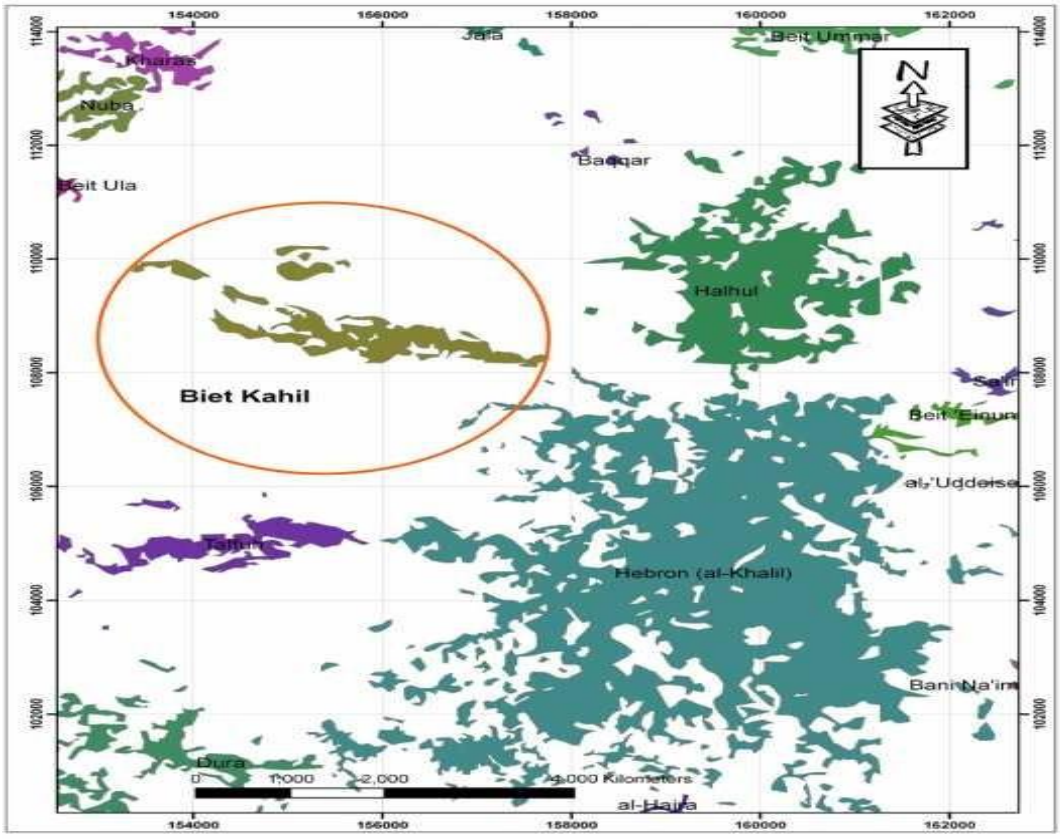


Fig.2.1 -Location Map of Bait Kahil village

2.3 Population

Methods to calculate Population:

2.3.1 Arithmetical Increase Method

This method is suitable for large and old city with considerable development. If it is used for small, average or comparatively new cities, it will give low result than actual value.

2.3.2 Geometrical Increase Method

In this method the percentage increase in population from decade to decade is assumed to remain

Constant. Geometric mean increase is used to find out the future increment in population.

2.3.3 Incremental Increase Method

This method is modification of arithmetical increase method and it is suitable for an average size town under normal condition where the growth rate is found to be in increasing order.

2.3.4 Graphical Method

In this method, the populations of last few decades are correctly plotted to a suitable scale on graph. The population curve is smoothly extended for getting future population.

2.3.5 Comparative Graphical Method

In this method the census populations of cities already developed under similar conditions are plotted. The curve of past population of the city under consideration is plotted on the same graph. The curve is extended carefully by comparing with the population curve of some similar cities having the similar condition of growth.

2.3.6 Master Plan Method

The big and metropolitan cities are generally not developed in haphazard manner, but are planned and regulated by local bodies according to master plan. The master plan is prepared for next 25 to 30 years for the city.

2.3.7 Logistic Curve Method

This method is used when the growth rate of population due to births, deaths and migrations takes place under normal situation and it is not subjected to any extraordinary changes. if the population of city is plotted with respect to time, the curve so obtained under normal condition is look like S-shaped curve and is known as logistic curve

The ideal approach for population forecasting is by the study and use of previous census records, which cover along period. The longer the period, and the more comprehensive the census data, the more accurate will be the results, which will be obtained. In the analysis of these data, demographical, economical and political factors should be considered in order to develop a method of forecasting which will predict the expected growth rate, future population and its distribution in the different zones of the area under consideration.

In Bait Kahil village, there is great uncertainty in the political and economical future. Additionally, there were no accurate population data since the occupation of the West Bank in 1967, until 2020 when the Palestinian Central Bureau of Statistic (PCBS) conducted comprehensive census covering the West Bank and Gaza Strip. The final results of this census show that the total population of Bait Kahil is 9521 inhabitants.

Due to the unstable condition of the area during the last 50 years, it would be very difficult to develop a statistical interpretation to extrapolate future population. Some reasonable assumptions have, therefore, been made to project the future population of Bait Kahil over the next 25years.

Prediction of the future population of Bait Kahil is very difficult due to the lack of reliable historic data, and the political uncertainties, which will greatly influence future social and economic development. At the same time, the available data on past population growth do not constitute a reliable basis for projecting the future population growth in Bait Kahil.

The base for the forecast is the 2020 population for Bait Kahil obtained from PCBS of 9521 inhabitants. The annual growth rates for the next twenty years are also obtained from the PCPS and they are presented in Table 2.1.

To calculate the population at the end of the design period (year 2045),

a geometric increase is assumed, represented by the following equation:

$$P = P_0 * (1+r)^n \qquad (2.1)$$

Where, P is the future population, P_0 is the present population, r is the annual population growth

rate, and n is the period of projection.

Using the above assumption and equation, Table 2.1 presents the population projection up to the design horizon of 2045. The data show that the population of Bait Kahil is estimated to be 17652 in year 2045.

Table2.1: Population Forecasts for Bait kahil village

Year	2020	2025	2030	2035	2040	2045
Population	9521	10772	12188	13789	15601	17652

2.4 Population Density

When determining the density of population, it is either related to the total municipal area (gross density) or to the built–up area only (net density). The gross density related to the municipal area includes large industrial areas, agricultural areas, un-built areas, public parks, large water surfaces, forests …etc. The net density is related to the built-up urban area, but it includes small-scale industries, schools, public and commercial buildings, small parks for local use and roads. Figure 2.2 show Bait Kahil density by municipality

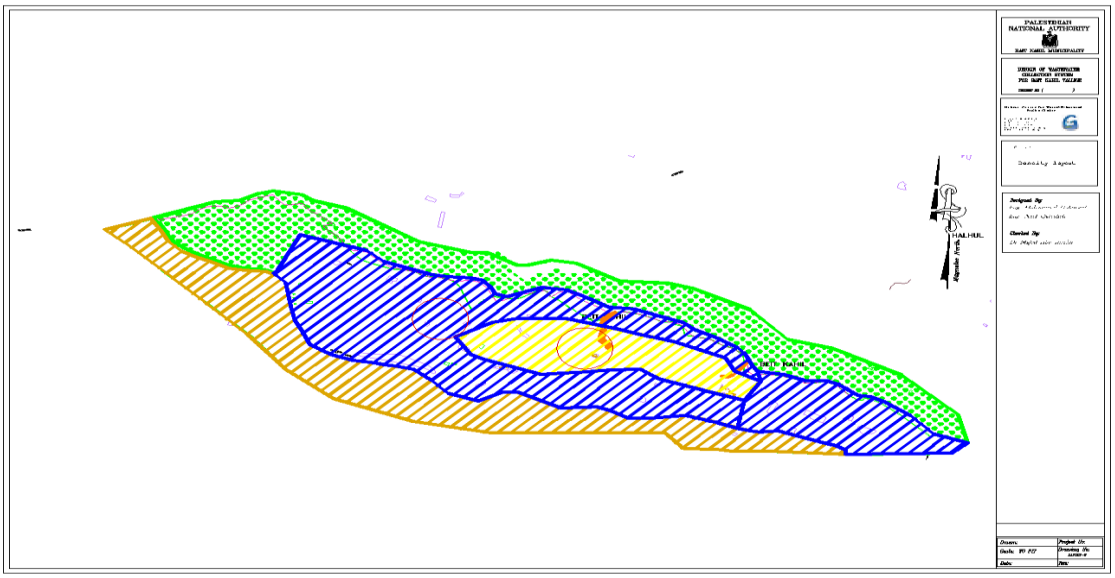


Figure 2.2 : Bait Kahil density by municipality

2.5 Water Consumption

According to the water consumption data obtained from the previous studies, the current water consumption was 100 liters per capita per day, and the future water consumption is 150 liters per capita per day.

2.6 Wastewater Quantity

In general, the amount of domestic wastewater produced per capita per day is usually (70-80%) of water consumption.

2.7 Land Use

As mentioned earlier, the land area of Bait kahil is approximately 650 ha .There is no
Clear town plan defining land use in the various zones of Bait kahil. The land use can be distributed as follows:-

1. Residential areas, food stories, workshop building, public buildings.
2. Agricultural Areas.
3. Artificial Surfaces

4. Forest and Semi-Natural Area.

Figure (2.3) show The land use of Bait kahil
Figure (2.4) show.The Soil type of Bait kahil

Figure (2.3).The land use of Bait kahil

Figure (2.4).The Soil type of Bait kahil

2.8 Meteorological Data

The hydrology of the region depends primarily on its climate, and secondarily on its topography. Climate is largely dependent on geographical position of the earth surface humidity, temperature, and wind. These factors affect are affecting evaporation and transpiration. So this study will include needed data about these factors, since they play big role in the determination of water demand. The climate of Bait kahil Village tends to be cold in winter with good amount of rain, and warm in summer with relative humid.

2.8.1 Temperature

Based on information obtained from Bethlehem municipality, the temperature is characterized by considerable variation between summer and winter times. The mean temperature values at Bait kahil are given in below.

The Mean maximum temperature: 29 ˚C

The Mean minimum temperature: 12˚C

The Mean Maximum temperature record: 25.2 ˚C

The Mean Minimum temperature record: 14.9 ˚C

2.8.2 Relative Humidity

The relative humidity in Bait kahil village from 20-80 % .

2.8.3 Wind

The directions and velocities of wind vary depending on the season of the year. In winter, the wind blows in the morning from the southwest a rounds noon from southwest and west, and at night from west and northwest. In summer, northeasterly wind blows all day long. According to data obtained from Meteorological Station, average wind in winter is about 15 km/h and in summer 5.6km/h.

2.8.4 Rainfall

Based on information obtained from Bait kahilmunicipality, the average annual rainfall in Bait kahil for the last five year is approximately 550 mm.

2.9 Topography

The topography of Bait Kahil village divided into three parts

1- Northern slope.
2- Mountain crests.
3- Southern slope.

The city is about 955 m. above mean sea level (AMSL). The area of city center is located in elevation ranges on average between (955m -760 m) AMSL. Figure (2.5) show Bait Kahil Topography

Figure (2.5) Bait Kahil Topography

Chapter Three

Design Criteria

3.1 Type of Sewerage System
3.2 Municipal Sewerage System

- **3.2.1 Types of Sewer**
- **3.2.2 Sewer Materials**
    - **3.2.2.1 Asbestos Cement Sewers**
    - **3.2.2.2 Plain Cement Concrete or Reinforced Cement Concrete**
    - **3.2.2.3 Vitrified Clay or Stoneware Sewers**
    - **3.2.2.4 Brick Sewers**
    - **3.2.2.5 Cast Iron Sewers**
    - **3.2.2.6 Steel Pipes**
    - **3.2.2.7 Ductile Iron Pipes**
    - **3.2.2.8 Plastic sewers (PVC pipes)**

3.3 Types of Wastewater Collection Systems

- **3.3.1 Gravity Sewer System**
- **3.3.2 Pressure Type System**
- **3.3.3 Vacuum Type System**

3.4 Sewer Appurtenances

- **3.4.1 Manholes**
- **3.4.2 Drop Manholes**
- **3.4.3 House Connections**
- **3.4.4 Inverted Siphons**
- **3.4.5 Pumping of Sewer**

3.5 Design Parameters

- **3.5.1 Flow Rate Projections**
- **3.5.2 The peak coefficient**
- **3.5.3 Hydraulic Design**
- **3.5.4 Design and Planning Assumptions**

3.1 Type of Sewerage System

The sewerage system can be of following three types

.

1) Combined system: In combined system along with domestic sewage, the run-off resulting from a storm is carried through the same sewers of sewerage system. In countries like India where actual rainy days are very few; this system will face the problem of maintaining self cleansing velocity in the sewers during dry season, as the sewage discharge may be far lower as compared to the design discharge after including storm water.

2) Separate System: In separate system, separate conduits are used; one carrying sewage and other carrying storm water run-off. The storm water collected can be directly discharged into the water body since the run-off is not as foul as sewage and no treatment is generally Provided. Whereas, the sewage collected from the city is treated adequately before it is discharged into the water body or used for irrigation to meet desired standards. Separate system is advantageous and economical for big towns.

3) Partially separate system: In this system part of the storm water especially collected from roofs and paved courtyards of the buildings is admitted in the same drain along with sewage from residences and institutions, etc. The storm water from the other places is collected separately using separate conduits.

3.2 Municipal Sewerage System

3.2.1 Types of Sewer

The types and sizes of sewers used in municipal collection system will vary with size of the collection system and the location of the wastewater treatment facilities. The municipal or the community sewerage system consists of (a) building sewers (also called house connections), (b) laterals or branch sewers, (c) main and sub main sewers, (d) trunk sewers. House sewers connect the building plumbing to the laterals or to any other sewer lines mentioned above. Laterals or branch sewers convey the wastewater to the main sewers. Several main sewers connect to the trunk sewers that convey the wastewater to large intercepting sewers or the treatment plant.

The diameter of a sewer line is generally determined from the peak flow that the line must carry and the local sewer regulations, concerning the minimum sizes of the laterals and house connections. The minimum size recommended for gravity sewer is 200 mm (8 in).

3.2 .2 Sewer Materials

3.2.2.1 Asbestos Cement Sewers

• These are manufactured from a mixture of asbestos fibers, silica and cement. Asbestos fibers are thoroughly mixed with cement to act as reinforcement.
• These pipes are available in size 10 to 100 cm internal diameter and length up to 4.0 m.
• These pipes can be easily assembled without skilled labor with the help of special Coupling, called 'Ring Tie Coupling' or Simplex joint.
• The pipe and joints are resistant to corrosion and the joints are flexible to permit 120 deflection for curved laying.
• These pipes are used for vertical transport of water. For example, transport of rainwater from roofs in multistoried buildings, for transport of sewage to grounds, and for transport of less foul collage i.e., wastewater from kitchen and bathroom.

3.2.2.2 Plain Cement Concrete or Reinforced Cement Concrete

Plain cement concrete (1: 1.5: 3) pipes are available up to 0.45 m diameter and reinforcement cement pipes are available up to 1.8 m diameter. These pipes can be cast in situ or precast pipes.Precast pipes are better in quality than the cast in situ pipes. The reinforcement in these pipes can be different such as single cage reinforced pipes, used for internal pressure less than 0.8 m; double cage reinforced pipes used for both internal and external pressure greater than 0.8m; elliptical cage reinforced pipes used for larger diameter sewers subjected to external pressure ;and hume pipes with steel shells coated with concrete from inside and outside. Nominal longitudinal reinforcement of 0.25% is provided in these pipes.

3.2.2.3 Vitrified Clay or Stoneware Sewers

These pipes are used for house connections as well as lateral sewers. The size of the pipe available is 5 cm to 30 cm internal diameter with length 0.9 to 1.2 m. These pipes are rarely manufactured for diameter greater than 90 cm. These are joined by bell and spigot flexible compression joints.

3.2.2.4 Brick Sewers

This material is used for construction of large size combined sewer or particularly for storm water drains. The pipes are plastered from outside to avoid entry of tree roots and ground water

through brick joints. These are lined from inside with stone ware or ceramic block to make them smooth and hydraulically efficient. Lining also make the pipe resistant to corrosion.

3.2.2.5 Cast Iron Sewers

These pipes are stronger and capable to withstand greater tensile, compressive, as well as bending stresses. However, these are costly. Cast iron pipes are used for outfall sewers, rising mains of pumping stations, and inverted siphons, where pipes are running under pressure. These are also suitable for sewers under heavy traffic load, such as sewers below railways and highways. They are used for carried over piers in case of low lying areas. They form 100% leak proof sewer line to avoid ground water contamination. They are less resistant to corrosion; hence, generally lined from inside with cement concrete, coal tar paint, epoxy, etc.

3.2.2.6 Steel Pipes

These are used under the situations such as pressure main sewers, under water crossing, bridge crossing, necessary connections for pumping stations, laying pipes over self supporting spans, railway crossings, etc. They can withstand internal pressure, impact load and vibrations much better than CI pipes. They are more ductile and can withstand water hammer pressure better. These pipes cannot withstand high external load and these pipes may collapse when negative pressure is developed in pipes. They are susceptible to corrosion and are not generally used for partially flowing sewers. They are protected internally and externally against the action of corrosion.

3.2.2.7 Ductile Iron Pipes

Ductile iron pipes can also be used for conveying the sewers. They demonstrate higher capacity to withstand water hammer. The specification for DI pipes is provided in IS: 12288-1987. The predominant wall material is ductile iron, a spheroid zed graphite cast iron. Internally these pipes are coated with cement mortar lining or any other polyethylene or poly wrap or plastic bagging/ sieving lining to inhibit corrosion from the wastewater being conveyed, and various types of external coating are used to inhibit corrosion from the environment. Ductile iron has proven to be a better pipe material than cast iron but they are costly. Ductile iron is still believed to be stronger and more fracture resistant material; like most ferrous materials, it is susceptible to corrosion. A typical life expectancy of thicker walled pipe could be up to 75 years, however with the current thinner walled ductile pipe the life could be about 20 years in highly corrosive soils without a corrosion control program like catholic protection.

3.2.2.8 Plastic sewers (PVC pipes)

Plastic is recent material used for sewer pipes. These are used for internal drainage works in house. These are available in sizes 75 to 315 mm external diameter and used in drainage works. They offer smooth internal surface. The additional advantages they offer are resistant to corrosion, light weight of pipe, economical in laying, jointing and maintenance, the pipe is tough and rigid, and eases in fabrication and transport of these pipes.

3.3 Types of Wastewater Collection Systems

3.3.1 Gravity Sewer System

Collecting both wastewater and storm water in one conduit (combined system) or in separate conduits (separate system). In this system, the sewers are partially filled. A typical characteristic is that the gradients of the sewers must be sufficient to create self-cleansing velocities for the transportation of sediment. These velocities are 0.6 to 0.7 m/s minimum when sewers are flowing full or half-full. Manholes are provided at regular intervals for the cleaning of sewers.

3.3.2 Pressure Type System

Collecting wastewater only. The system, which is entirely kept under pressure, can be compared with a water distribution system. Sewage from an individual house connection, which is collected in manhole on the site of the premises, is pumped into the pressure system. There are no requirements with regard to the gradients of the sewers.

3.3.3 Vacuum Type System

Collecting wastewater only in an airtight system. A vacuum of 5-7 m is maintained in the system for the collection and transportation of the wastewater. There is no special requirement for the gradients of the sewers.

Pressure and vacuum–types systems require a comparatively high degree of mechanization, automation and skilled manpower. They are often more economical than gravity system, when applied in low population density and unstable soil conditions. Piping with flexible joints has to be used in areas with expansive soils.

3.4 Sewer Appurtenances

3.4.1 Manholes

The general shapes of the manholes are square, rectangular or circular in plan, the latter is common. Manholes for small sewers are generally 1.0-1.2 m in diameter. For larger sewers larger manhole bases are provided. The maximum spacing of manholes is 40-60 m depending on the size of sewer and available size of sewer cleaning equipment.

Standard manholes consist of base, risers, top, frame and cover, manhole benching, and step iron. The construction materials of the manholes are usually precast concrete sections, cast in place concrete or brick. Frame and cover usually made of cast iron and they should have adequate strength and weight.

3.4.2 Drop Manholes:

A drop manhole is used where an incoming sewer, generally a lateral, enters the manhole at a point more than about 0.6 m above the outgoing sewer. The drop pipe permits workmen to enter the manhole without fear of being wetted avoid the splashing of sewage and corrosion of manhole bottom.

3.4.3 House Connections:

The house sewers are generally 10-15 cm in diameter and constructed on a slope of 2% m/m. house connections are also called, service laterals, or service connections. Service connections are generally provided in the municipal sewers during construction. While the sewer line is under construction, the connections are conveniently located in the form of wyes or tees, and plugged tightly until service connections are made. In deep sewers, a vertical pipe encased in concrete is provided for house connections.

3.4.4 Inverted Siphons:

An inverted siphon is a section of sewer, which is dropped below the hydraulic grade line in order to avoid an obstacle such as a railway or highway cut, a subway, or a stream. Such sewers will flow full and will be under some pressure; hence they must be designed to resist low internal pressures as well as external loads. It is also important that the velocity be kept relatively high (at least 0.9 m/s) to prevent deposition of solids in locations, which would be very difficult or impossible to clean.

Since sewage flow is subject to large variation, a single pipe will not serve adequately in this application. If it is small enough to maintain a velocity of 0.9 m/s at minimum flow, the velocity

at peak flow will produce very high head losses and may actually damage the pipe. Inverted siphons normally include multiple pipes and an entrance structure designed to divide the flow among them so that the velocity in those pipes in use will be adequate to prevent deposition of solids.

3.4.5 Pumping of Sewer:

There are many communities in which it is possible to convey all the sewage to a central treatment location or point of discharge in only a gravity system. In other areas with flat terrain, more than one drainage area, low-lying sections, or similar complications, pumping may be required. Pumping may also be required at or within sewage treatment plants, in the basements of buildings which are below the grade of the sewer, and to discharge treated wastewater to streams which are above the elevation of the treatment plan.

Pumping of untreated sanitary sewage requires special designs, since sewage often contains large solids. Nonclog pumps have impellers, which are usually closed and have, at most, two or three vanes. The clearance between the vanes is sufficiently large that anything, which will clear the pump suction, will pass through the pump. A bladeless impeller, sometimes used as a fish pump, has also been applied to this service. For a specified capacity, bladeless impellers are larger and less efficient than vaned designs.

3.5 Design Parameters

3.5.1 Flow Rate Projections

The total wastewater flow in sanitary sewers for industrial area is made up of two components:

(1) Domestic

(2) Infiltration

Sanitary sewers are designed for peak flows from domestic, and peak infiltration allowance for the entire service area. The flow rate projections are necessary to determine the required capacities of sanitary sewers.

3.5.2 The peak coefficient

In general, this coefficient increases when the average flow decrease, it will be determined from the practice and experience of the designer. The following relation has been used commonly by the designer and gives satisfactory results:

$Pf = 1.5 + 2.5 / \sqrt{q}$ (3.1)

Where, q (in L/s) is the daily average flow rate of the network branch under consideration and Pf is the peak factor.

3.5.3 Hydraulic Design

As mentioned earlier and according to usual practice, the sewers will be designed for gravity flow using Manning's formula:

$V = (1/n) R^{2/3} S^{1/2}$ (3.2)

Where n is the Manning coefficient Depending on pipe materials, the typical values of n are:
- Reinforced Concrete (RC) n = 0.013
- Polyvinyl Chloride (PVC) n = 0.01
- Ductile Iron: n = 0.013
- Asbestos Cement: n = 0.012

R is the hydraulic radius = area /wetted perimeter (circular pipe flowing full, R= D/4).

1. **Minimum and Maximum** Velocities To prevent the settlement of solid matter in the sewer, the literature suggested that the minimum velocity at half or full depth – during the peak flow period – should not be less than 0.6 m/s, Usually, maximum sewer velocities are limited to about 3 m/s in order to limit abrasion and avoid damages which may occur to the sewers and manholes due to high velocities.

2. **Pipes and Sewers**
   Experience indicates a minimum diameter of 200 mm (8 in) for sewer pipes. For house connections. Pipe Materials: Different pipe materials may be recommended for the sewers. Polyvinyl chloride, vitrified clay or polyethylene material for small size pipes (approximately up to the size 400 mm in diameter). Centrifugal cast reinforced concrete pipes may be used for larger diameter.

3. **Manholes and Covers**
   Manholes should be located at changes in size, slope direction or junction with secondary sewer. Manholes spacing generally does not exceed 60 m.

4. Sewer Slope

For a circular sewer pipe, the slope must be between the minimum and maximum slope, the minimum and maximum slope is determined from minimum and maximum velocity. Generally the natural ground slope is used because it is the technical and economic solution, the solution is therefore recommended.

5. Depth of Sewer Pipe

The depth of sewers is generally 1.5 m below the ground surface. Depth should be enough to receive the sewage by gravity, avoid excessive traffic loads, and avoid the freezing of the sewer. It is recommended that the top of sewer should not be less than 1.5 m below basement floor.

3.5.4 Design and Planning Assumptions

The design and planning assumptions used in this project are as follow:

1-Design period 25 year (from 2020-2045).
2. Present (2020) population of municipality of Bait kahil village is 9521 capita.
3. The growth rate will be 2.5% .
4. The existing per capita water consumption has been assessed 100 L/c.d.
5. Total administrative area of municipality of Bait kahil village town 6500 dounm.
6. Future 2045 population of Bait Kahil village 17652 capita.
7. Formula to be used in design of sewers:
   (Manning formula) $V=(1/n)* R^{2/3} *S^{1/2}$ (3.2)
8. Minimum velocity 0.6 m/sec.
9. Maximum velocity 3.0 m/sec.
10. d/D =70% .
11. Maximum manhole spacing 50 m for main trunk.
12. Minimum diameter 200 mm
13. Maximum diameter 1000 mm
14. Minimum cover 1 m
15. Maximum cover 5 m

After the preliminary sewer layout plan is prepared, the design computations are accomplished. Design computations for sewers are repetitious and therefore, are best performed in a tabular format. Tables (A.2, A.3,A.4,… ,A.19) in Appendix A is typical of the way in which data can be calculated flow per Manhole.

Chapter four

Design and analysis wastewater collection

4.1 General

4.2 Layout of the System

4.3 Quantity of Waste Water

4.4 The Proposed Waste Water Collection System

4.5 Sewer CAD Program Works

4.6 Profiles of Waste Water Pipes

4.1 General

In this project, design of waste water collection system for Bait Kahil Village is made, and develop a future plans for construction of the collection system, corresponding to the vision of Bait Kahil Village municipality about their future plan zone, in order to reduce the problem causes by missing this important part.

In this section, the layout of the system established is presented, and the computation procedures and tables are given along the drawings of layout and profiles for all the lines designed.

4.2 Layout of the System

The first step in designing a sewerage system is to establish an overall system layout that includes a plan of the area to be sewered, showing roads, streets, buildings, other utilities, topography, and the lowest floor elevation or all buildings to be drained.

In establishing the layout of waste water collection system for Bait Kahil Village, the following basic steps were followed:

1- Obtain a topographic map of the area to be served.
2- Visit the location.
3- Locate the drainage outlet. This is usually near the lowest point in the area and is often along a stream or drainage way. In Bait Kahil Village, the lowest points are in the West part and North West of the zone.
4- Sketch in preliminary pipe system to serve all the contributors.
5- Pipes are located so that all the users or future users can readily tap on. They are also located so as to provide access for maintenance and thus are ordinarily placed in streets or other rights-of-way.
6- Sewers layout is followed natural drainage ways so as to minimize excavation and pumping requirements. Large trunk sewers are located in low-lying areas closely paralleling streams or channels.
7- Revise the layout so as to optimize flow-carrying capacity at minimum cost. Pipe lengths and sizes are kept as small as possible, pipe slopes are minimized, and followed the ground surface slope to minimize the depth of excavation, and the numbers of appurtenances are kept as small as possible
8- The pumping is avoided across drainage boundaries. Pumping stations are costly and add maintenance problems.

Figure (4.1) show The final layout of Wastewater collection system for Bait Kahil village with flow direction and contour is illustrated

Figure (4.2) shows catchment area divided , Figure (4.3) showes lines pipes names , Figure (4.4) shows pipe distribution and Figure (4.5) shows pipes distribution by road

Figure (4.1) The final layout of Wastewater collection system for Bait Kahil village with flow direction and contour is illustrated

Figure (4.2) : catchment area divided

Figure (4.3) : lines pipes names

Figure (4.4) : pipe distribution

Figure (4.5) : pipes distribution by road

4.3 Quantity of Wastewater

The detailed design of sanitary sewers involves the selection of appropriate pipe sizes and slopes to transport the quantity of waste water expected from the surroundings and upstream areas to the next pipe in series, subject to the appropriate design constrains. The design computations in the example given below. After preparing the layout of the waste water collection system the quality of waste water that the system must carry it will be calculated using the data collected about the area.

Design example: Design a gravity flow sanitary sewer

Example: Design a gravity flow sanitary sewer for the area to outfall (line AL-QUF valley) in Appendix A. The following data will collect and analyzed:-

1.For current water consumption uses 100 L/C.day

2.For future population: using the equation (2.1)

3.For current population.

4.For Population growth rate 2.5%.

5.For design period 25 year.

6.For infiltration allowance use 10% of the domestic sewerage flow.

7.Peaking factor depending on the formula :

$$Pf = 1.5 + (2.5/\sqrt{\ }) \quad (3.1)$$

Where q = Average industrial sewage flow

8. For the hydraulic design equation use the Manning equation with an n value of 0.01. To simplify the computations, we use the tables.

9. Minimum pipe size: The building code specifies 200 mm (8 in) as the smallest pipe size Permissible for this situation.

10. Minimum velocity: To prevent the deposition of solids at low wastewater flows, use Minimum velocity of 0.6 m/s during the peak flow conditions.

11. Minimum cover (minimum depth of cover over the top of sewer). The minimum depth of cover is 1.0 m

Solution:

1- Lay out the sewer. Draw a line to represent the proposed sewer(Figure (4.1) show all line drawn).
2- Locate and number the manholes. Locate manholes at (1) change in direction, (2) change in slope, (3) pipe junctions, (4) upper ends of sewers, and (5) intervals from 35 to 50 m or less. Identify each manhole with a number.
3- Prepare a sewer design computation table. Based on the experience of numerous engineers, it has been found that the best approach for carrying out sewer computations is to use a computation table.
4- The entries in column 1, column 2 and column 3 are used to identify the line(pipe) numbers and start –end Manhole.
5- The entries in column 4 and column 5 are used to identify the sewer manholes, their spacing between each two manholes and area between Manholes.
6- The entries in column 6 used to identify unit sewage. Unit sewage = 80% multiplied by the current consumption density divided area in dounm.
7- The entries in column 7 and 8 are used tributary area, column 7 used incremental area, column 8 used total area in dounm.
8- To calculate municipal maximum flow rates columns 9, 10, are used. Column9 is municipal average sewage flow (unit sewage *total area), the peak factor column 10 is calculated using equation (4.1)

   As: Pf = 1.5 + 2. 5 √ (4.1)

   Where q = Average industrial sewage flow (Column 9) .
9- Column 11 used to calculate the Q max , the value of it comes from multiply column 10* column 9. Column 12 calculate the infiltration which equal to 10% of Q average (10% * column 9). Column 13 and column 15 used to show the maximum flow design which is come from column 11+ column 12.
10- Column 13 and column 15 used to show the maximum flow design which is come from column 11+ column 12.

The calculation and design tables for the wastewater collection system of Bait Kahil village are shown in table (A2, A3 , … ,A19) in Appendix A.

To making design for all pipes a software program (Sewer CAD) was used to calculate the pipe size, slope, velocity and cover of the pipe in Appendix B is showing the basics of working on Sewer CAD program.

4.4 The Proposed Waste Water Collection System

In the proposed study for the Waste Water Collection System for Bait Kahil village, the trial is made to design the main trunks of the collection system. This section deals with the results of the wastewater collection system.

Manholes number, pipes lengths, water consumption, areas, wastewater quantities are found doing the calculations given in the previous section and are given in tables (A2 TO A19) in Appendix. The appropriate pipe diameters, lengths and slopes, and location of the manholes are found doing the calculations on the Sewer CAD software program. During and once the sewer design computations have been completed, alternative alignments have be examined, and the most cost and energy effective alignment has Collection System for the area, slopes ,lengths of the pipes ,the calculated velocities and flow rates are given in profiles in Appendix C.

4.5 Sewer CAD Program Works

There are several steps to design wastewater Network using sewer CAD:

1. Open Sewer CAD Program Great New Hydraulic Model

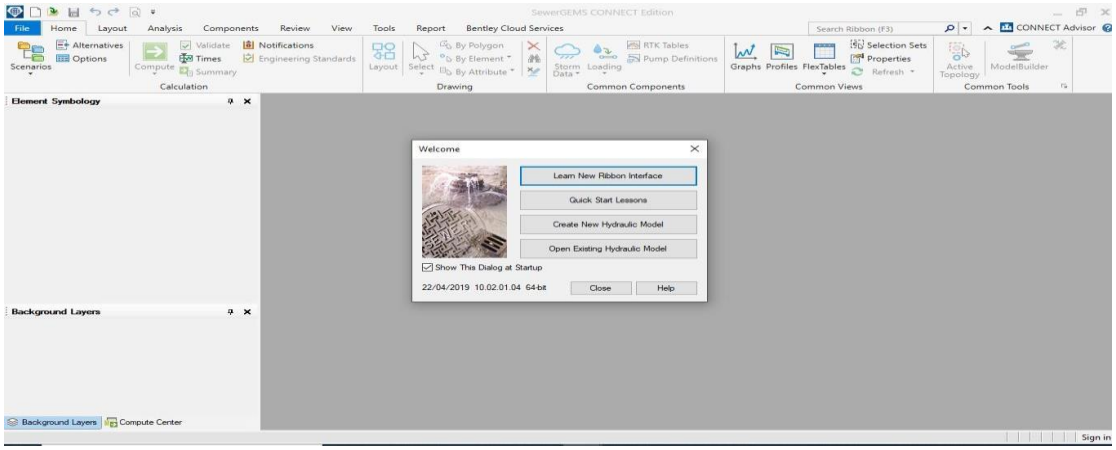


Figure (4.6) : Open Sewer Cad program

2. From Review list << select Units Result Defaults (SI).

3. From Review list << select Model Builder << import DXFCAD. Fig (4.7) shows create model builders

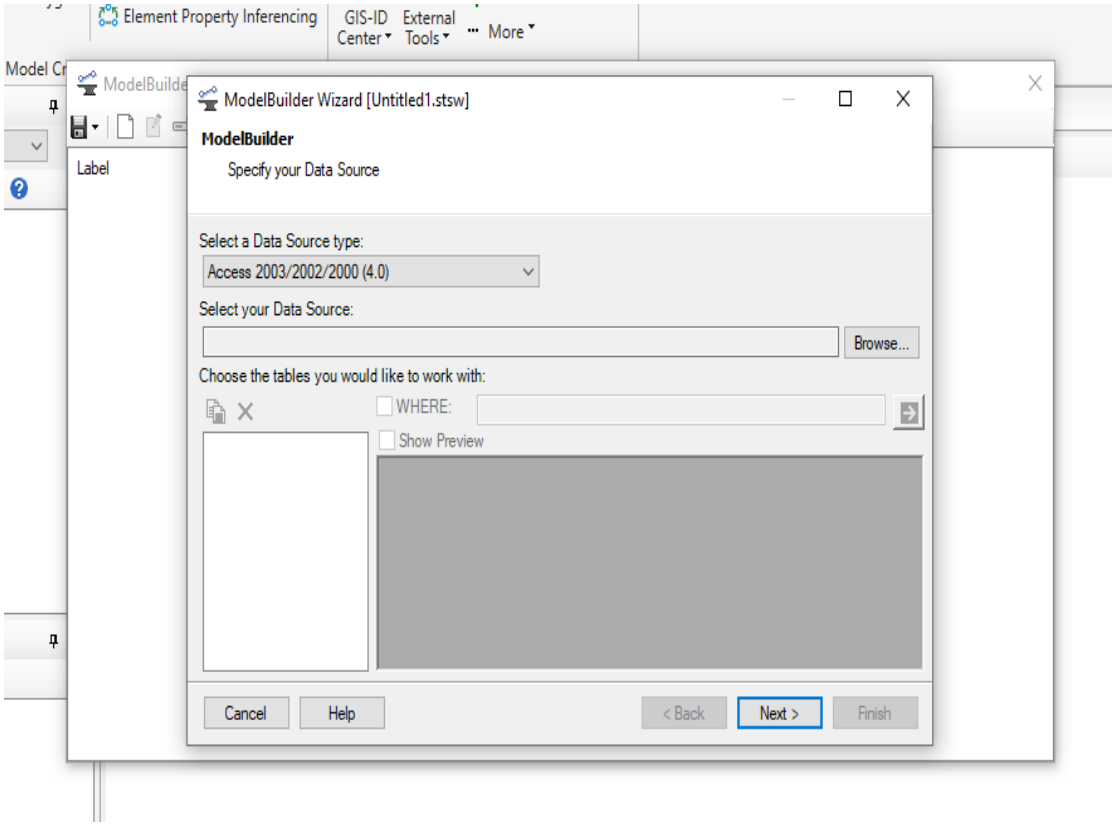


Figure 4.7 : create model builder

4. Rename conduit and Manhole.

5. Enter information about Manhole:
   From Components list << catalog << Conduit catalog << Import from library < < Material (PVC) << Shape (circler).
   From Components list << Conduit << Type (Conduit catalog) << Conduit class (Circle PVC). From Components list << Loading << inflow control Center << inilalize fixed load for all element << (Enter load in unit (L/sec)).

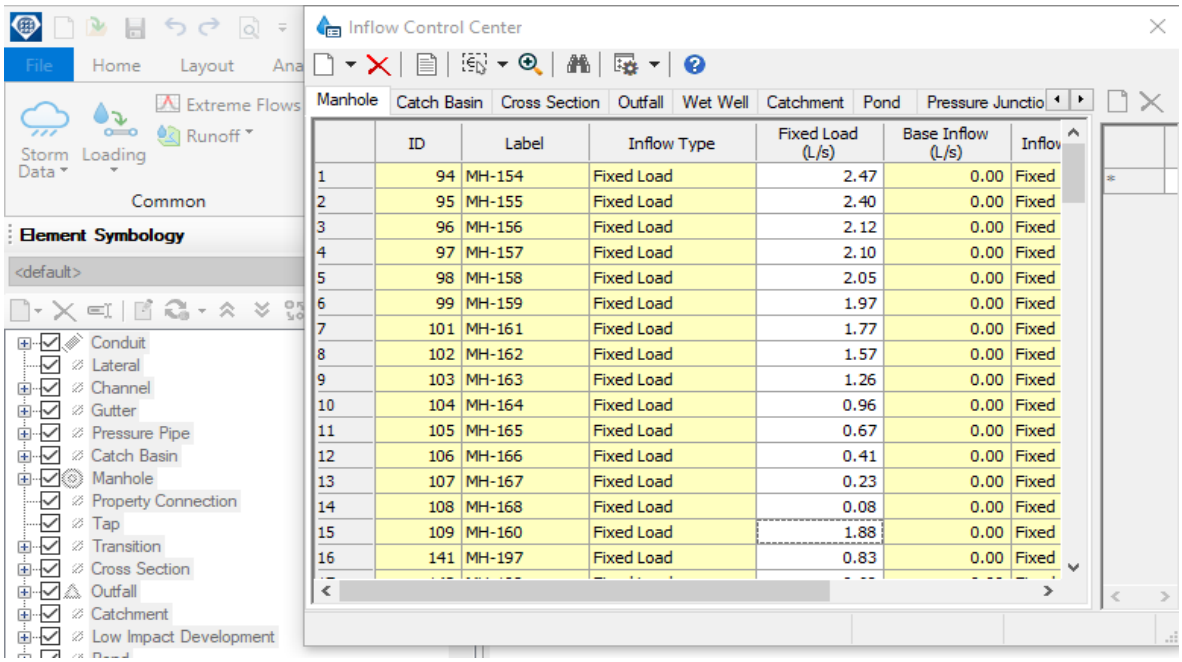


Figure (4.8) : Input inflow Control Center

6. Enter Design Criteria:

From Analyses list << Design Constrain << Velocity << Min =0.6 (m/sec) << Max = 3 (m/sec). From Analyses list << Options <<Calculation options << Base design.

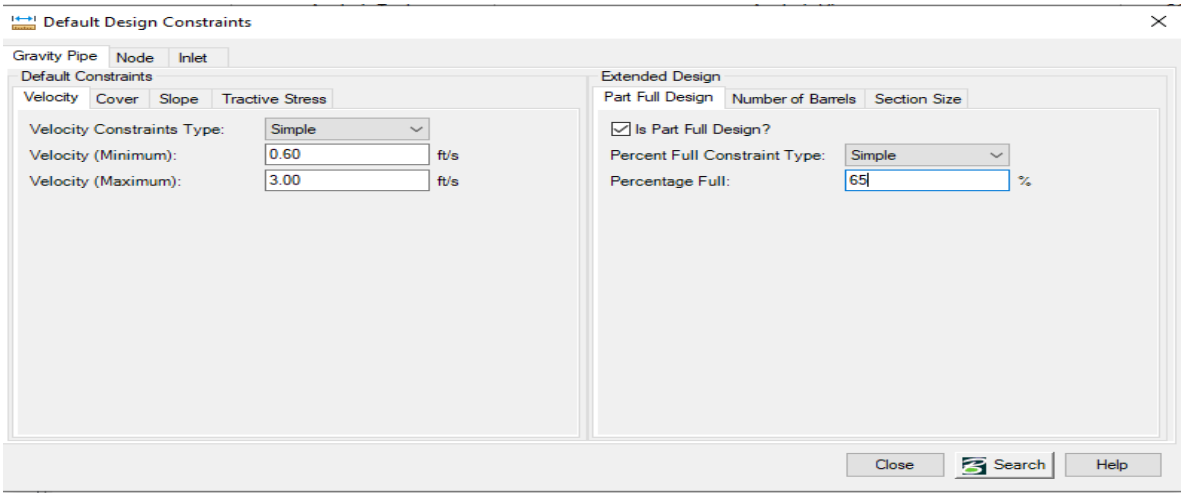


Figure (4.9) : Input Design Criteria (Velocity)

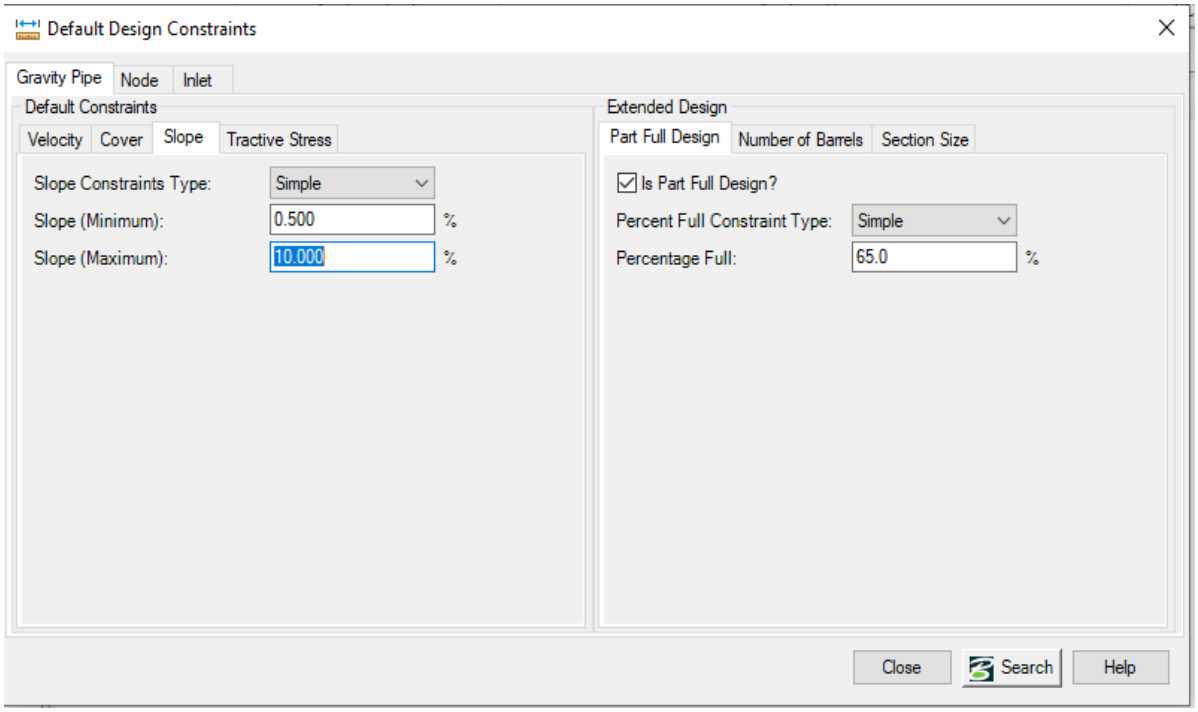


Figure (4.10): Input Design Criteria (Slop pipe)

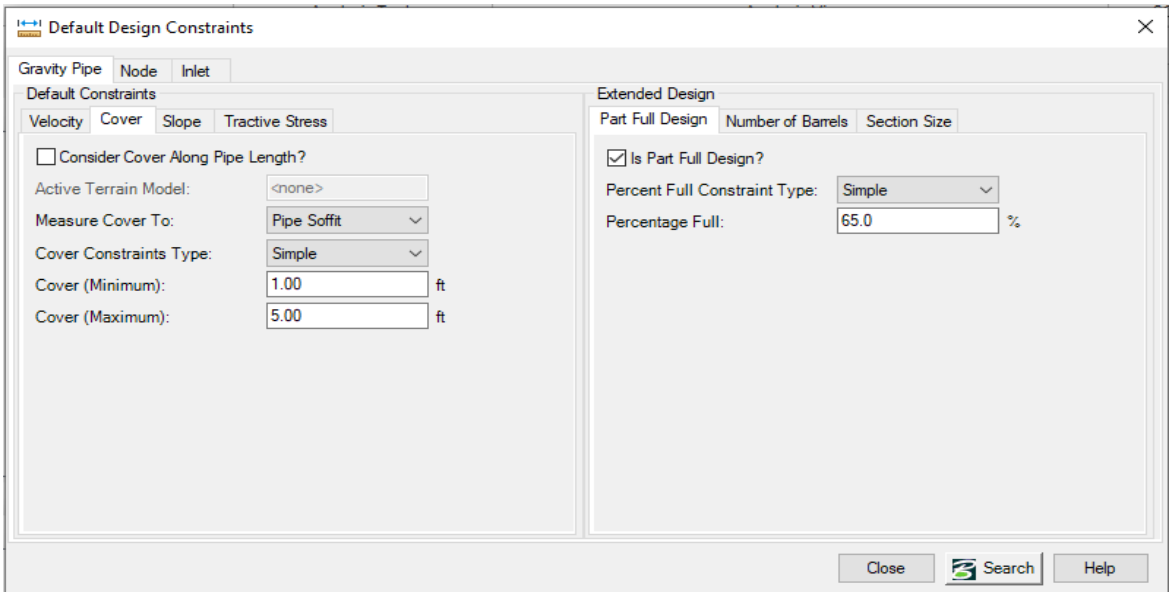


Figure (4.11) : Input Design Criteria (Cover)

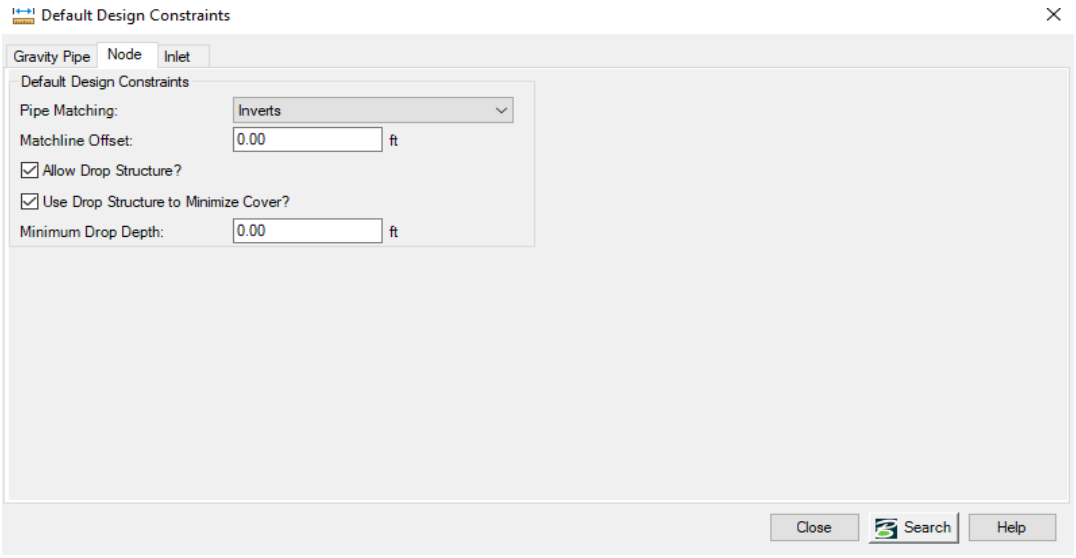


Figure (4.12) : Input Design Criteria (Drop Manhole)

7. Run the program :
   From Analyses list << Compute.
8. Output the Results :
   From Report list << Flex table <<
   Condit table From Report list <<
   Flex table << Manhole table

	ID	Label	Start Node	Set Invert to Start?	Invert (Start) (m)	Stop Node	Set Invert to Stop?	Invert (Stop) (m)	Has User Defined Length?	Length (User Defined) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Section Type	Diameter (mm)	Manning's n
284: pipe-252	284	pipe-252	MH-241		608.21	MH-242		608.16			9.2	0.500	Circle	750.0	0.010
285: pipe-223	285	pipe-223	MH-249		636.13	MH-250		636.08			10.0	0.500	Circle	450.0	0.010
288: pipe-38	288	pipe-38	MH-251		761.59	MH-212		762.54			10.0	9.447	Circle	200.0	0.010
290: pipe-27	290	pipe-27	MH-17		725.41	MH-216		725.61			10.0	2.079	Circle	200.0	0.010
291: pipe-37	291	pipe-37	MH-211		760.65	MH-251		761.59			10.0	9.429	Circle	200.0	0.010
292: pipe-209	292	pipe-209	MH-10		769.90	MH-11		768.90			10.0	10.000	Circle	200.0	0.010
293: pipe-213	293	pipe-213	MH-14		744.85	MH-15		743.85			10.0	10.000	Circle	200.0	0.010
295: pipe-240	295	pipe-240	MH-37		630.52	MH-38		629.52			10.0	10.000	Circle	750.0	0.010
296: pipe-236	296	pipe-236	MH-34		633.88	MH-252		633.80			15.0	0.500	Circle	600.0	0.010
298: pipe-157	298	pipe-157	MH-89		638.85	MH-90		638.93			15.0	0.500	Circle	200.0	0.010
300: pipe-212	300	pipe-212	MH-13		747.67	MH-14		746.17			15.0	10.000	Circle	200.0	0.010
301: pipe-225	301	pipe-225	MH-24		635.83	MH-253		635.75			15.0	0.500	Circle	600.0	0.010
303: pipe-221	303	pipe-221	MH-22		636.30	MH-23		636.23			15.0	0.500	Circle	450.0	0.010
305: pipe-72	305	pipe-72	MH-154		634.55	MH-155		634.62			15.0	0.500	Circle	200.0	0.010
315: pipe-76	315	pipe-76	MH-158		635.15	MH-159		635.22			15.0	0.500	Circle	200.0	0.010
316: pipe-77	316	pipe-77	MH-159		635.22	MH-160		635.32			20.0	0.500	Circle	200.0	0.010
319: pipe-39	319	pipe-39	MH-212		762.54	MH-213		764.54			20.0	10.000	Circle	200.0	0.010
322: pipe-78	322	pipe-78	MH-160		635.32	MH-161		635.42			20.0	0.500	Circle	200.0	0.010
323: pipe-253	323	pipe-253	MH-242		606.76	O-1		606.66			20.0	0.500	Circle	900.0	0.010
325: pipe-160	325	pipe-160	MH-92		639.43	MH-93		639.58			20.0	0.772	Circle	200.0	0.010
329: pipe-147	329	pipe-147	MH-19		636.90	MH-80		637.00			20.0	0.500	Circle	250.0	0.010
330: pipe-222	330	pipe-222	MH-23		636.23	MH-249		636.13			20.0	0.500	Circle	450.0	0.010
331: pipe-17	331	pipe-17	MH-77		641.41	MH-196		643.41			20.0	10.000	Circle	200.0	0.010
336: pipe-242	336	pipe-242	MH-39		621.92	MH-40		620.44			20.0	7.394	Circle	750.0	0.010
337: pipe-231	337	pipe-231	MH-29		634.80	MH-30		634.70			20.0	0.500	Circle	600.0	0.010
342: pipe-79	342	pipe-79	MH-161		635.42	MH-162		635.55			25.0	0.500	Circle	200.0	0.010
344: pipe-226	344	pipe-226	MH-253		635.75	MH-25		635.63			25.0	0.500	Circle	600.0	0.010
345: pipe-19	345	pipe-19	MH-197		652.98	MH-198		653.93			25.0	3.777	Circle	200.0	0.010
346: pipe-227	346	pipe-227	MH-25		635.63	MH-26		635.50			25.0	0.500	Circle	600.0	0.010
347: pipe-232	347	pipe-232	MH-30		634.70	MH-31		634.58			25.0	0.500	Circle	600.0	0.010
351: pipe-20	351	pipe-20	MH-198		653.93	MH-199		654.54			25.0	2.464	Circle	200.0	0.010

Figure (4.13) : Result of conduit

9. Draw profile :
   From View list << Profile.

10. Output the Result to AutoCAD.

4.6 Profiles of Waste Water Pipes

The profiles of sewer area assist in the design and are used as the basis of construction drawings. The profile is usually prepared for pipe sewer line at a horizontal and vertical scale. The profile shows the ground or street surface, inlets locations, elevation of street surface, pipe surface and pipe basement.

After all the calculation is completed and all the maps of the proposed waste water collection system are prepared, detailed profile for sewer pipe line is drawn. The profile of sewer pipe line is shown in Drawing in Appendix C. This profile has shown the ground elevation, the proposed sewer pipe line.

Chapter five

Bill of Quantity

5.1Bill of Quantity Collection System

No.	EXCAVATION	UNIT	QTY	UNIT PRICE		TOTAL PRICE	
				$	C	$	C
A1	Excavation of pipes trench in all kind of soil for one pipe diameter 200mm depth and disposing of the debris and the top soil unsuitable for backfill outside the site	LM	20827				
A2	Excavation of pipes trench in all kind of soil for one pipe diameter 250mm depth and disposing of the debris and the top soil unsuitable for backfill outside the site	LM	1836.9				
A3	Excavation of pipes trench in all kind of soil for one pipe diameter 300mm depth and disposing of the debris and the top soil unsuitable for backfill outside the site	LM	1034.5				
A4	Excavation of pipes trench in all kind of soil for one pipe diameter 375mm depth and disposing of the debris and the top soil unsuitable for backfill outside the site	LM	622				
Sub-Total							
B	PIPE WORK						

B1	Supplying, storing and installing of PVC	LM	24320.4				
Sub-Total							
C	PIPE BEDDING AND BACKFILLING Dimension and material	LM	24320.4				
C1	Supplying and embedment of sand for one pipe diameter 200mm , depth up to 1 meter and disposing of the debris and the top soil unsuitable for backfill outside the site.	LM	20827				
C2	Supplying and embedment of sand for one pipe diameter 250mm , depth up to 1 meter and disposing of the debris and the top soil unsuitable for backfill outside the site.	LM	1836.9				
C3	Supplying and embedment of sand for one pipe diameter 300mm , depth up to 1 meter and disposing of the debris and the top soil unsuitable for backfill outside the site.	LM	1034.5				

C4	Supplying and embedment of sand for one pipe diameter 375mm , depth up to 1 meter and disposing of the debris and the top soil unsuitable for backfill outside the site.	LM	622				
D	MANHOLES, Details according to the drawing						
D1	Supplying and installing of precasted manhole including excavation pipe connection, epoxytar coating, 25-ton cast iron cover and backfill, size 1000mm, depth up to 1 m.	NR	258				
D2	Supplying and installing of precasted manhole including excavation pipe connection, epoxytar coating, 25-ton cast iron cover and backfill, size 914.4 mm, depth up to 5.8m.	NR	317				
Sub-Total							
F	Air And Water Leakage Test						

F1	Air leakage test for sewer pipe lines and 15 inch according to specifications, including for all temporary works.	LM	24320.4				
F2	Water leakage tests for manholes, depth up to 1 meter according to specifications.	NR	258				
F3	Water leakage test for manholes , depth up to 5.8 meter according to specification	NR	317				
	Sub-Total						
G	Survey work						
G1	Topographical survey required for shop drawings and as built DWGS using absolute Elev. And coordinate system	LM	24320.4				

Chapter six

Conclusions and Recommendation

6.1 Conclusions

In this project, the trial is made to design waste water collection system for Bait Kahil village considering the annual growth of the people and their water consumption for the coming 25 years, the water runoff, and catchment area. The result brought out many important conclusions. The main conclusions drawn from the present study are summarized below:

1. Bait Kahil has no sewage facility. The people are using laterains cesspits and septic tanks. The waste water has been seeping into the ground through the over flow of the deteriorated cesspits and laterains, causing series environmental and health problem also storm water collect in law areas and flood streets and walk ways, rapid growth has decreased the open areas available for percolation of the rainwater and has greatly increased the runoff to low lying areas.
2. The present population of Bait Kahil village is 17652 person prediction of the future population of Bait Kahil village is estimated depending on 2.5 % growth rate.
3. The present water consumption of Bait Kahil is 100 L/c.day.
4. The slopes of sewer in the proposed waste water, collection system is followed the slope of the ground to decrease the cost of construction.
5. For the Wastewater collection system it is found that there are 4 main catchments in the area and each main catchments consists of many 11 sub-main and 9 lateral streets.

6.2 Recommendation

1. When the Bait Kahil municipality implements the sewage network , it takes our design model to implement it on the ground .
2. Implement the design of the sewage network for the area as soon as possible in order to reduce the risks and damages of resulting from the absence of a network of time now.
3. We suggest setting up two treatment plants, to treat wastewater from the network that we designed, as there are two points for collecting wastewater, taking into account all the conditions that restrict the connection of Bait Kahil network to other networks.
4. Pay more attention to the infrastructure of the town

Appendix Calculation and Design Table

Appendix A: Tables of Calculation for Wastewater Network.

Introduction

The amount of wastewater for the main lines is calculated and displayed on the tables in this Appendix A. We have 4 main streets, 11 sub-main streets and 9 Lateral street . Where in this appendix we divided each street with a special table in it to show the amount of flow that comes out from each street, and this amount that takes in the design of the sewage network, and it will entered into the Sewer CAD design program at finial project . The criteria were taken as a 2.5% population growth rate, as well as water consumption 100 L/c/d. The current population density is 1462 C/km2 .

A1 Table of Calculation Report For main (خط واد القف)

	Current density of population (C/km^2)			1462				(d/D) Assume	0.7		Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years			P_f	$Q_{max\ (p)}$ (m^3/s)	Q_{des} (m^3/s)	$Q_{per\ Manhole}$ (m^3/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative					
خط حسكا				542682.3415	794	1473	1473	0.002045833	0.002045833		3.69	0.007539402	0.007743986	0.007743986
P-254	MH-531	MH-249	50	42547.6892	63	117	1590	0.00016250	0.00220833		3.66	0.008084963	0.008305796	0.000561811
P-255	MH-249	MH-3	50	21439.4016	32	60	1650	0.00008333	0.00229167		3.65	0.008362855	0.008592021	0.000286225
P-256	MH-3	MH-4	45	13049.4109	20	38	1688	0.00005278	0.00234444		3.64	0.008538216	0.00877266	0.000180639
P-257	MH-4	MH-199	45	12745.3521	19	36	1724	0.00005000	0.00239444		3.64	0.008703902	0.008943346	0.000170686
P-258	MH-199	MH-135	14.7	500	1	2	1726	0.00000278	0.00239722		3.63	0.008713094	0.008952816	9.47001E-06
المجنونه				133289.1782	195	362	2088	0.00050278	0.00290000		3.57	0.010356394	0.010646394	0.001693577
P-259	MH-135	MH-460	50	16885.7788	25	47	2135	0.00006528	0.00296528		3.56	0.010566934	0.010863461	0.000217068
P-260	MH-460	MH-461	50	5229.4964	8	15	2150	0.00002083	0.00298611		3.56	0.010633999	0.01093261	6.91485E-05
P-261	MH-461	MH-482	50	12555.93	19	36	2186	0.00005000	0.00303611		3.56	0.010794705	0.011098316	0.000165706
P-262	MH-482	MH-275	50	10395.1475	16	30	2216	0.00004167	0.00307778		3.55	0.01092836	0.011236138	0.000137821
P-263	MH-275	MH-276	50	9398.8846	14	26	2242	0.00003611	0.00311389		3.55	0.011044	0.011355389	0.000119251
P-264	MH-276	MH-442	50	9472.8289	14	26	2268	0.00003611	0.00315000		3.54	0.011159462	0.011474462	0.000119073
P-265	MH-442	MH-7	50	10556.9741	16	30	2298	0.00004167	0.00319167		3.54	0.011292467	0.011611634	0.000137173
P-266	MH-7	MH-8	46.3	12493.3805	19	36	2334	0.00005000	0.00324167		3.53	0.011451768	0.011775935	0.0001643
P-267	MH-8	MH-153	14	500	1	2	2336	0.00000278	0.00324444		3.53	0.011460608	0.011785053	9.11808E-06
P-268	MH-153	MH-154	33.4	24746.6642	37	69	2405	0.00009583	0.00334028		3.52	0.01176498	0.012099008	0.000313955
P-269	MH-154	MH-428	50	4925.0745	8	15	2420	0.00002083	0.00336111		3.52	0.01183099	0.012167101	6.80936E-05
P-270	MH-428	MH-429	50	33085.8756	49	91	2511	0.00012639	0.00348750		3.51	0.012230272	0.012579022	0.00041192
P-271	MH-429	MH-390	50	19847.9777	30	56	2567	0.00007778	0.00356528		3.50	0.012474994	0.012831522	0.0002525
P-272	MH-390	MH-290	50	9502.7169	14	26	2593	0.00003611	0.00360139		3.50	0.012588364	0.012948503	0.000116981
P-273	MH-290	MH-291	50	42029.2496	62	115	2708	0.00015972	0.00376111		3.48	0.013087942	0.013464053	0.000515549
P-274	MH-291	MH-435	50	10463.6188	16	30	2738	0.00004167	0.00380278		3.48	0.013217774	0.013598052	0.000133999
P-275	MH-435	MH-436	50	60838.8064	89	166	2904	0.00023056	0.00403333		3.45	0.013932624	0.014335957	0.000737905
P-276	MH-436	MH-296	50	9222.101	14	26	2930	0.00003611	0.00406944		3.45	0.014044054	0.014450999	0.000115042
P-277	MH-296	MH-297	50	7187.524	11	21	2951	0.00002917	0.00409861		3.45	0.014133953	0.014543814	9.28154E-05
P-278	MH-297	MH-348	50	69738.7895	102	190	3141	0.00026389	0.00436250		3.43	0.014943229	0.015379479	0.000835665
P-279	MH-348	MH-349	50	15537.9908	23	43	3184	0.00005972	0.00442222		3.42	0.015125383	0.015567605	0.000188126
P-280	MH-349	MH-392	50	34150.4177	50	93	3277	0.00012917	0.00455139		3.41	0.015518122	0.015973261	0.000405656
P-281	MH-392	MH-391	50	4920.8622	8	15	3292	0.00002083	0.00457222		3.41	0.015581313	0.016038535	6.52741E-05
P-282	MH-391	MH-149	50	4619.4429	7	13	3305	0.00001806	0.00459028		3.41	0.015636044	0.016095071	5.65366E-05
P-283	MH-149	MH-150	31.3	47644.687	70	130	3435	0.00018056	0.00477083		3.39	0.016181629	0.016658712	0.00056364

P-284	MH-150	MH-197	48.5	12423.0538	19	36	3471	0.00005000	0.00482083	3.39	0.016332168	0.016814251	0.000155539
P-285	MH-197	MH-207	50	500	1	2	3473	0.00000278	0.00482361	3.39	0.016340524	0.016822885	8.63422E-06
P-286	MH-207	MH-469	53.4	25806.9208	38	71	3544	0.00009861	0.00492222	3.38	0.016636716	0.017128938	0.000306053
P-287	MH-469	MH-162	50	500	1	2	3546	0.00000278	0.00492500	3.38	0.016645046	0.017137546	8.60827E-06
P-288	MH-162	MH-163	39.6	29827.3378	44	82	3628	0.00011389	0.00503889	3.37	0.016985995	0.017489883	0.000352337
P-289	MH-163	MH-265	50	500	1	2	3630	0.00000278	0.00504167	3.37	0.016994296	0.017498462	8.57901E-06
P-290	MH-265	MH-295	50	500	1	2	3632	0.00000278	0.00504444	3.37	0.017002596	0.017507041	8.57832E-06
P-291	MH-295	MH-320	50	26436.6585	39	73	3705	0.00010139	0.00514583	3.36	0.017305098	0.017819681	0.00031264
P-292	MH-320	MH-321	50	500	1	2	3707	0.00000278	0.00514861	3.36	0.017313373	0.017828234	8.55273E-06
P-293	MH-321	MH-532	50	18628.6358	28	52	3759	0.00007222	0.00522083	3.36	0.017528285	0.018050368	0.000222135
P-294	MH-532	MH-454	50	500	1	2	3761	0.00000278	0.00522361	3.36	0.017536542	0.018058903	8.53459E-06
P-295	MH-454	MH-160	50	500	1	2	3763	0.00000278	0.00522639	3.36	0.017544798	0.018067437	8.53393E-06
P-538	MH-160	MH-161	38.2	41638.5437	61	114	3877	0.00015833	0.00538472	3.35	0.018014306	0.018552778	0.000485342
P-539	MH-161	MH-106	47.8	500	1	2	3879	0.00000278	0.00538750	3.35	0.018022524	0.018561274	8.49578E-06
P-540	MH-106	MH-105	27.6	500	1	2	3881	0.00000278	0.00539028	3.35	0.018030741	0.018569769	8.49513E-06
P-296	MH-105	MH-11	26.8	23559.8405	35	65	3946	0.00009028	0.00548056	3.34	0.018297455	0.01884551	0.000275741
P-297	MH-11	MH-12	11.7	500	1	2	3948	0.00000278	0.00548333	3.34	0.01830565	0.018853984	8.47359E-06
P-298	MH-12	MH-393	50	500	1	2	3950	0.00000278	0.00548611	3.34	0.018313846	0.018862457	8.47295E-06
P-299	MH-393	MH-521	50	24267.7512	36	67	4017	0.00009306	0.00557917	3.33	0.018588017	0.019145934	0.000283477
P-300	MH-521	MH-21	50	12727.269	19	36	4053	0.00005000	0.00562917	3.33	0.018735042	0.019297959	0.000152025
شعب الشحده				344216.5956	504	935	4988	0.00129861	0.00692778	3.25	0.022487368	0.023180146	0.003882188
P-301	MH-21	MH-354	50	3977.2395	6	12	5000	0.00001667	0.00694444	3.25	0.022534753	0.023229197	4.9051E-05
P-302	MH-354	MH-355	50	691.8405	2	4	5004	0.00000556	0.00695000	3.24	0.022550543	0.023245543	1.63462E-05
P-303	MH-355	MH-472	50	4662.5944	7	13	5017	0.00001806	0.00696806	3.24	0.022601849	0.023298655	5.31112E-05
P-304	MH-472	MH-513	50	500	1	2	5019	0.00000278	0.00697083	3.24	0.02260974	0.023306824	8.16905E-06
P-305	MH-513	MH-368	50	5056.6632	8	15	5034	0.00002083	0.00699167	3.24	0.022668909	0.023368075	6.12517E-05
P-369	MH-368	MH-369	50	500	1	2	5036	0.00000278	0.00699444	3.24	0.022676796	0.02337624	8.16473E-06
P-307	MH-369	MH-229	50	7799.194	12	23	5059	0.00003194	0.00702639	3.24	0.022767459	0.023470098	9.3858E-05
P-308	MH-229	MH-230	50	500	1	2	5061	0.00000278	0.00702917	3.24	0.02277534	0.023478257	8.15841E-06
P-309	MH-230	MH-536	50	8297.3272	13	25	5086	0.00003472	0.00706389	3.24	0.022873805	0.023580194	0.000101938
P-310	MH-536	MH-539	50	10162.4788	15	28	5114	0.00003889	0.00710278	3.24	0.022983993	0.023694271	0.000114077
P-311	MH-539	MH-315	50	500	1	2	5116	0.00000278	0.00710556	3.24	0.02299186	0.023702416	8.1446E-06
P-312	MH-315	MH-316	50	18078.3862	27	51	5167	0.00007083	0.00717639	3.23	0.023192296	0.023909935	0.000207519
P-313	MH-316	MH-399	50	500	1	2	5169	0.00000278	0.00717917	3.23	0.02320015	0.023918066	8.13143E-06
P-314	MH-399	MH-400	50	500	1	2	5171	0.00000278	0.00718194	3.23	0.023208003	0.023926197	8.13094E-06
P-315	MH-400	MH-453	50	30559.703	45	84	5255	0.00011667	0.00729861	3.22	0.023537392	0.024267253	0.000341055
P-316	MH-453	MH-525	50	500	1	2	5257	0.00000278	0.00730139	3.22	0.023545224	0.024275362	8.10985E-06
P-317	MH-525	MH-486	50	500	1	2	5259	0.00000278	0.00730417	3.22	0.023553055	0.024283472	8.10937E-06
P-318	MH-486	MH-298	50	34833.6434	51	95	5354	0.00013194	0.00743611	3.22	0.023924499	0.02466811	0.000384638
P-319	MH-298	MH-107	50	500	1	2	5356	0.00000278	0.00743889	3.22	0.023932307	0.024676196	8.08599E-06

P-541	MH-107	MH-17	29.5	500	1	2	5358	0.00000278	0.00744167	3.22	0.023940115	0.024684281	8.08551E-06
P-542	MH-17	MH-18	18.9	500	1	2	5360	0.00000278	0.00744444	3.22	0.023947922	0.024692366	8.08503E-06
P-320	MH-18	MH-492	50	31502.0403	47	88	5448	0.00012222	0.00756667	3.21	0.024290971	0.025047638	0.000355271
P-321	MH-492	MH-247	50	500	1	2	5450	0.00000278	0.00756944	3.21	0.024298757	0.025055701	8.06372E-06
P-322	MH-247	MH-248	50	500	1	2	5452	0.00000278	0.00757222	3.21	0.024306542	0.025063764	8.06325E-06
P-323	MH-248	MH-523	50	33505.0305	49	91	5543	0.00012639	0.00769861	3.20	0.024660287	0.025430148	0.000366384
P-324	MH-523	MH-498	50	500	1	2	5545	0.00000278	0.00770139	3.20	0.024668051	0.02543819	8.04159E-06
P-325	MH-498	MH-499	50	21165.6715	31	58	5603	0.00008056	0.00778194	3.20	0.024893001	0.025671196	0.000233006
P-326	MH-499	MH-512	50	500	1	2	5605	0.00000278	0.00778472	3.20	0.024900751	0.025679223	8.0278E-06
P-327	MH-512	MH-444	50	11927.0963	18	34	5639	0.00004722	0.00783194	3.20	0.025032432	0.025815626	0.000136403
P-328	MH-444	MH-102	50	5771.2394	9	17	5656	0.00002361	0.00785556	3.19	0.025098223	0.025883778	6.81521E-05
خله العطاونه				283575.0026	415	770	6426	0.00106944	0.00892500	3.14	0.028045252	0.028937752	0.003053974
P-329	MH-102	MH-251	50	4020.3948	6	12	6438	0.00001667	0.00894167	3.14	0.028090692	0.028984859	4.71064E-05
P-330	MH-251	MH-252	50	500	1	2	6440	0.00000278	0.00894444	3.14	0.028098264	0.028992708	7.84967E-06
P-331	MH-252	MH-158	50	3205.6078	5	10	6450	0.00001389	0.00895833	3.14	0.028136117	0.029031951	3.92424E-05
P-543	MH-158	MH-159	37.4	500	1	2	6452	0.00000278	0.00896111	3.14	0.028143687	0.029039798	7.84728E-06
P-544	MH-159	O-2	48.6	500	1	2	6454	0.00000278	0.00896389	3.14	0.028151256	0.029047645	7.84688E-06

A2 Table of Calculation Report For main (خط حبله الشيخ)

	Current density of population (C/km^2)			1462			(d/D) Assume	0.7		Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m³/s)	Q_{des} (m³/s)	$Q_{per\ Manhole}$ (m³/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
P-177	MH-286	MH-287	50	2922.5915	5	10	10	1.38889E-05	1.38889E-05	4.41	6.13144E-05	6.27033E-05	6.27033E-05
الجرن				30978.4376	46	86	96	0.00011944	0.00013333	4.25	0.000566451	0.000579784	0.000517081
P-178	MH-287	MH-537	50	20899.3546	31	58	154	0.00008056	0.00021389	4.19	0.000895618	0.000917006	0.000337222
P-179	MH-537	MH-471	50	500	1	2	156	0.00000278	0.00021667	4.19	0.00090685	0.000928517	1.15101E-05
P-180	MH-471	MH433	50	500	1	2	158	0.00000278	0.00021944	4.18	0.000918075	0.000940019	1.15029E-05
P-181	MH433	MH-419	50	25647.9356	38	71	229	0.00009861	0.00031806	4.13	0.001312303	0.001344109	0.000404089
P-182	MH-419	MH-324	50	500	1	2	231	0.00000278	0.00032083	4.12	0.001323298	0.001355381	1.12722E-05
P-183	MH-324	MH-325	50	17802.6193	27	51	282	0.00007083	0.00039167	4.09	0.001601839	0.001641005	0.000285624
P-184	MH-325	MH-479	50	500	1	2	284	0.00000278	0.00039444	4.09	0.001612694	0.001652138	1.11329E-05
P-185	MH-479	MH-480	50	500	1	2	286	0.00000278	0.00039722	4.09	0.001623544	0.001663266	1.1128E-05
P-186	MH-480	MH-233	50	500	1	2	288	0.00000278	0.00040000	4.09	0.001634389	0.001674389	1.11231E-05
P-187	MH-233	MH-234	50	500	1	2	290	0.00000278	0.00040278	4.08	0.00164523	0.001685508	1.11183E-05
P-188	MH-234	MH-408	50	30817.6498	46	86	376	0.00011944	0.00052222	4.03	0.00210705	0.002159273	0.000473765
P-189	MH-408	MH-409	50	500	1	2	378	0.00000278	0.00052500	4.03	0.002117696	0.002170196	1.09232E-05
P-190	MH-409	MH-491	50	16746.0234	25	47	425	0.00006528	0.00059028	4.01	0.002366725	0.002425752	0.000255557
P-191	MH-491	MH-344	50	500	1	2	427	0.00000278	0.00059306	4.01	0.002377274	0.00243658	1.08277E-05
P-192	MH-344	MH-345	50	500	1	2	429	0.00000278	0.00059583	4.01	0.002387821	0.002447404	1.08239E-05
P-193	MH-345	MH-484	50	500	1	2	431	0.00000278	0.00059861	4.01	0.002398363	0.002458224	1.08202E-05
P-194	MH-484	MH-485	50	22385.0942	33	62	493	0.00008611	0.00068472	3.98	0.002723392	0.002791864	0.00033364
P-195	MH-485	MH-237	50	500	1	2	495	0.00000278	0.00068750	3.98	0.002733821	0.002802571	1.07068E-05
P-196	MH-237	MH-238	50	500	1	2	497	0.00000278	0.00069028	3.98	0.002744247	0.002813275	1.07035E-05
P-197	MH-238	MH-490	50	18207.7352	27	51	548	0.00007083	0.00076111	3.95	0.00300899	0.003085102	0.000271827
P-198	MH-490	MH-338	50	500	1	2	550	0.00000278	0.00076389	3.95	0.00301933	0.003095719	1.06173E-05
P-199	MH-338	MH-339	50	500	1	2	552	0.00000278	0.00076667	3.95	0.003029666	0.003106333	1.06142E-05
P-200	MH-339	MH-334	50	500	1	2	554	0.00000278	0.00076944	3.95	0.00304	0.003116944	1.06111E-05
P-201	MH-334	MH-335	50	32528.7861	48	89	643	0.00012361	0.00089306	3.92	0.003496785	0.003586091	0.000469146
P-202	MH-335	MH-543	50	500	1	2	645	0.00000278	0.00089583	3.91	0.003506984	0.003596567	1.04766E-05
P-203	MH-543	MH-302	50	17912.2634	27	51	696	0.00007083	0.00096667	3.90	0.003766126	0.003862793	0.000266226
P-204	MH-302	MH-303	50	500	1	2	698	0.00000278	0.00096944	3.90	0.003776253	0.003873198	1.04045E-05
P-205	MH-303	MH-406	50	17441.3677	26	49	747	0.00006806	0.00103750	3.88	0.004023546	0.004127296	0.000254099
P-206	MH-406	MH-279	50	500	1	2	749	0.00000278	0.00104028	3.88	0.004033607	0.004137635	1.03388E-05
P-207	MH-279	MH-280	50	20647.8678	31	58	807	0.00008056	0.00112083	3.86	0.004324305	0.004436388	0.000298753
P-208	MH-280	MH-319	50	500	1	2	809	0.00000278	0.00112361	3.86	0.004334293	0.004446654	1.02656E-05

P-209	MH-319	MH-462	50	20582.7379	31	58	867	0.00008056	0.00120417	3.84	0.004622924	0.004743341	0.000296687
P-210	MH-462	MH-376	50	500	1	2	869	0.00000278	0.00120694	3.84	0.004632843	0.004753537	1.01963E-05
P-211	MH-376	MH-260	50	25095.2847	37	69	938	0.00009583	0.00130278	3.82	0.004973679	0.005103957	0.00035042
P-212	MH-260	MH-261	50	500	1	2	940	0.00000278	0.00130556	3.82	0.00498352	0.005114076	1.01187E-05
P-213	MH-261	MH-501	50	500	1	2	942	0.00000278	0.00130833	3.82	0.004993359	0.005124192	1.01166E-05
P-214	MH-501	MH-502	50	500	1	2	944	0.00000278	0.00131111	3.82	0.005003196	0.005134307	1.01145E-05
P-215	MH-502	MH-505	50	49105.4933	72	134	1078	0.00018611	0.00149722	3.78	0.005657603	0.005807325	0.000673018
P-216	MH-505	MH-497	50	500	1	2	1080	0.00000278	0.00150000	3.78	0.005667303	0.005817303	9.97798E-06
P-217	MH-497	MH-466	50	21971.8316	33	62	1142	0.00008611	0.00158611	3.76	0.005967077	0.006125688	0.000308385
P-218	MH-466	MH-110	50	500	1	2	1144	0.00000278	0.00158889	3.76	0.005976717	0.006135606	9.91828E-06
P-219	MH-110	MH-111	30	14733.6455	22	41	1185	0.00005694	0.00164583	3.75	0.006173949	0.006338533	0.000202926
P-220	MH-111	MH-143	30	500	1	2	1187	0.00000278	0.00164861	3.75	0.006183551	0.006348412	9.87961E-06
P-221	MH-143	MH-86	50	500	1	2	1189	0.00000278	0.00165139	3.75	0.006193151	0.00635829	9.87783E-06
P-222	MH-86	MH-37	25	16651.8968	25	47	1236	0.00006528	0.00171667	3.74	0.006418248	0.006589915	0.000231625
P-223	MH-37	MH-23	20	500	1	2	1238	0.00000278	0.00171944	3.74	0.006427805	0.00659975	9.83513E-06
P-224	MH-23	MH-24	20	500	1	2	1240	0.00000278	0.00172222	3.74	0.006437361	0.006609583	9.83342E-06
P-225	MH-24	MH-19	20	500	1	2	1242	0.00000278	0.00172500	3.74	0.006446915	0.006619415	9.8317E-06
P-226	MH-19	MH-20	20	500	1	2	1244	0.00000278	0.00172778	3.74	0.006456467	0.006629245	9.82999E-06
P-227	MH-20	MH-29	20	500	1	2	1246	0.00000278	0.00173056	3.74	0.006466018	0.006639073	9.82829E-06
P-228	MH-29	MH-34	20	500	1	2	1248	0.00000278	0.00173333	3.74	0.006475566	0.0066489	9.82658E-06
خله العين				448209.5966	656	1217	2465	0.00169028	0.00342361	3.51	0.012028689	0.01237105	0.00572215
P-229	MH-34	MH-256	50	13874.9348	21	39	2504	0.00005417	0.00347778	3.51	0.012199629	0.012547406	0.000176357
P-230	MH-256	MH-257	50	500	1	2	2506	0.00000278	0.00348056	3.51	0.012208385	0.012556441	9.03406E-06
P-233	MH-257	MH-195	50	500	1	2	2508	0.00000278	0.00348333	3.51	0.01221714	0.012565474	9.0331E-06
P-234	MH-195	MH-49	48	500	1	2	2510	0.00000278	0.00348611	3.51	0.012225895	0.012574506	9.03215E-06
P-235	MH-49	MH48	20	500	1	2	2512	0.00000278	0.00348889	3.51	0.012234648	0.012583537	9.03119E-06

A3 Table of Calculation Report For main (خط واد الفوار)

	Current density of population (C/km^2)			1462			(d/D) Assume	0.7		Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m^2)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m^3/s)	Q_{des} (m^3/s)	$Q_{per\ Manhole}$ (m^3/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
شعب السود				203543.0933	298	553	553	0.000768056	0.000768056	3.95	0.003034833	0.003111639	0.003111639
راس الواد				214380.0573	314	583	1136	0.00080972	0.00157778	3.76	0.005938144	0.006095922	0.002984283
P-46	MH-142	MH-455	50	11913.3818	18	34	1170	0.00004722	0.00162500	3.76	0.006101879	0.006264379	0.000168457
P-47	MH-455	MH-456	50	29250.7978	43	80	1250	0.00011111	0.00173611	3.74	0.006485113	0.006658725	0.000394346
P-48	MH-456	MH-506	50	19494.6415	29	54	1304	0.00007500	0.00181111	3.72	0.006742249	0.00692336	0.000264635
P-49	MH-506	MH-381	50	21721.9844	32	60	1364	0.00008333	0.00189444	3.71	0.007026549	0.007215993	0.000292633
P-50	MH-381	MH-330	50	25850.6675	38	71	1435	0.00009861	0.00199306	3.69	0.007361127	0.007560432	0.000344439
P-51	MH-330	MH-331	50	32738.0252	48	89	1524	0.00012361	0.00211667	3.67	0.007777821	0.007989487	0.000429055
P-52	MH-331	MH-332	50	37030.7887	55	102	1626	0.00014167	0.00225833	3.65	0.008251847	0.00847768	0.000488193
P-53	MH-332	MH-333	50	34617.6364	51	95	1721	0.00013194	0.00239028	3.64	0.008690111	0.008929139	0.000451458
P-54	MH-333	MH-494	50	39960.6289	59	110	1831	0.00015278	0.00254306	3.62	0.009193871	0.009448177	0.000519038
P-55	MH-494	MH-272	50	6031.8508	9	17	1848	0.00002361	0.00256667	3.61	0.009271383	0.009528049	7.98725E-05
العصقورة	0			100600.2485	148	275	2123	0.00038194	0.00294861	3.57	0.010513237	0.010808098	0.001280049
P-56	MH-272	MH-273	50	50130.6528	74	138	2261	0.00019167	0.00314028	3.54	0.011128393	0.011442421	0.000634323
P-57	MH-273	MH-167	50	24199.2959	36	67	2328	0.00009306	0.00323333	3.53	0.011425241	0.011748574	0.000306153
P-58	MH-167	MH-168	40	500	1	2	2330	0.00000278	0.00323611	3.53	0.011434084	0.011757695	9.12114E-06
P-59	MH-168	MH-16	49.4	17700.7792	26	49	2379	0.00006806	0.00330417	3.53	0.01165043	0.011980846	0.000223151
P-60	MH-16	MH-371	50.6	23186.2392	34	64	2443	0.00008889	0.00339306	3.52	0.011932098	0.012271404	0.000290557
P-61	MH-371	MH-473	50	32426.5083	48	89	2532	0.00012361	0.00351667	3.50	0.01232213	0.012673796	0.000402393
P-62	MH-473	MH-516	50	5169.2232	8	15	2547	0.00002083	0.00353750	3.50	0.012387679	0.012741429	6.76321E-05
P-63	MH-516	MH-397	50	5333.8352	8	15	2562	0.00002083	0.00355833	3.50	0.012453174	0.012809007	6.7579E-05
P-64	MH-397	MH-398	50	500	1	2	2564	0.00000278	0.00356111	3.50	0.012461903	0.012818014	9.00653E-06
P-65	MH-398	MH-402	50	71932.9596	106	197	2761	0.00027361	0.00383472	3.47	0.013317177	0.013700649	0.000882635
P-66	MH-402	MH-403	50	4836.5171	8	15	2776	0.00002083	0.00385556	3.47	0.013381942	0.013767498	6.68486E-05
P-67	MH-403	MH-379	31.4	57280.0888	84	156	2932	0.00021667	0.00407222	3.45	0.01405262	0.014459842	0.000692344
الجبالى	MH-379			294840.3782	432	801	3733	0.00111250	0.00518472	3.36	0.017420885	0.017939358	0.003479515
P-68	MH-379	MH-380	50	51692.0004	76	141	3874	0.00019583	0.00538056	3.35	0.018001978	0.018540033	0.000600676
P-69	MH-380	MH-515	50	500	1	2	3876	0.00000278	0.00538333	3.35	0.018010197	0.01854853	8.49676E-06
P-70	MH-515	MH-352	50	500	1	2	3878	0.00000278	0.00538611	3.35	0.018018415	0.018557026	8.49611E-06
P-71	MH-352	MH-353	50	5917.0394	9	17	3895	0.00002361	0.00540972	3.34	0.018088245	0.018629217	7.21908E-05
P-72	MH-353	MH-489	50	500	1	2	3897	0.00000278	0.00541250	3.34	0.018096457	0.018637707	8.48996E-06

P-73	MH-489	MH-342	50	77812.1002	114	212	4109	0.00029444	0.00570694	3.32	0.018963347	0.019534041	0.000896334
P-74	MH-342	MH-343	50	8222.5528	13	25	4134	0.00003472	0.00574167	3.32	0.019065112	0.019639279	0.000105238
P-75	MH-343	MH-383	50	500	1	2	4136	0.00000278	0.00574444	3.32	0.01907325	0.019647694	8.41491E-06
P-76	MH-383	MH-477	50	8291.7561	13	25	4161	0.00003472	0.00577917	3.32	0.019174912	0.019752829	0.000105135
P-77	MH-477	MH-488	50	500	1	2	4163	0.00000278	0.00578194	3.32	0.019183041	0.019761236	8.40669E-06
P-78	MH-488	MH-187	50	101620.4084	149	277	4440	0.00038472	0.00616667	3.29	0.020303147	0.020919814	0.001158578
P-79	MH-187	MH-188	40	16669.3354	25	47	4487	0.00006528	0.00623194	3.29	0.020492095	0.021115289	0.000195476
P-80	MH-188	MH-148	50	72464.5772	106	197	4684	0.00027361	0.00650556	3.27	0.021280703	0.021931259	0.000815969
P-537	MH-148	MH-147	31.3	1660.97	3	6	4690	0.00000833	0.00651389	3.27	0.021304638	0.021956027	2.47681E-05
P-536	MH-147	MH-204	50	500	1	2	4692	0.00000278	0.00651667	3.27	0.021312615	0.021964282	8.25493E-06
P-81	MH-204	MH-53	50	2915.6041	5	10	4702	0.00001389	0.00653056	3.27	0.021352493	0.022005548	4.12665E-05
P-433	MH-53	MH-52	25	80517.9541	118	219	4921	0.00030417	0.00683472	3.25	0.022222466	0.022905938	0.00090039
بئر البلد				66942.7238	98	182	5103	0.00025278	0.00708750	3.24	0.022940717	0.023649467	0.000743529
P-432	MH-52	MH-54	25	500	1	2	5105	0.00000278	0.00709028	3.24	0.022948586	0.023657614	8.14735E-06
P-82	MH-54	MH-55	25	500	1	2	5107	0.00000278	0.00709306	3.24	0.022956455	0.023665761	8.14685E-06
P-83	MH-55	MH-214	50	500	1	2	5109	0.00000278	0.00709583	3.24	0.022964324	0.023673907	8.14635E-06
P-84	MH-214	MH-218	50	45471.3396	67	125	5234	0.00017361	0.00726944	3.23	0.023455125	0.02418207	0.000508162
P-85	MH-218	MH-427	50	6907.1315	11	21	5255	0.00002917	0.00729861	3.22	0.023537392	0.024267253	8.51829E-05
P-86	MH-427	MH-377	50	500	1	2	5257	0.00000278	0.00730139	3.22	0.023545224	0.024275362	8.10985E-06
P-87	MH-377	MH-378	50	69447.5341	102	190	5447	0.00026389	0.00756528	3.21	0.024287078	0.025043605	0.000768243
P-88	MH-378	MH-495	50	80446.6275	118	219	5666	0.00030417	0.00786944	3.19	0.025136908	0.025923853	0.000880247
P-89	MH-495	MH-470	50	500	1	2	5668	0.00000278	0.00787222	3.19	0.025144644	0.025931866	8.01348E-06
P-90	MH-470	MH-270	50	34232.4768	51	95	5763	0.00013194	0.00800417	3.19	0.025511572	0.026311988	0.000380122
P-91	MH-270	MH-271	50	500	1	2	5765	0.00000278	0.00800694	3.19	0.025519286	0.02631998	7.99173E-06
P-92	MH-271	MH-451	50	500	1	2	5767	0.00000278	0.00800972	3.19	0.025526999	0.026327971	7.99129E-06
P-93	MH-451	MH-452	50	500	1	2	5769	0.00000278	0.00801250	3.19	0.025534712	0.026335962	7.99084E-06
P-94	MH-452	MH-317	50	73745.5632	108	201	5970	0.00027917	0.00829167	3.17	0.026307634	0.027136801	0.000800838
P-95	MH-317	MH-318	50	500	1	2	5972	0.00000278	0.00829444	3.17	0.026315303	0.027144747	7.94649E-06
P-96	MH-318	MH-384	50	96933.5468	142	264	6236	0.00036667	0.00866111	3.15	0.027323856	0.028189967	0.00104522
P-97	MH-384	MH-517	50	500	1	2	6238	0.00000278	0.00866389	3.15	0.027331469	0.028197857	7.89057E-06
P-98	MH-517	MH-227	50	65863.8434	97	180	6418	0.00025000	0.00891389	3.14	0.028014951	0.02890634	0.000708483
P-99	MH-227	MH-228	50	500	1	2	6420	0.00000278	0.00891667	3.14	0.028022527	0.028914194	7.85366E-06
P-100	MH-228	MH-459	50	500	1	2	6422	0.00000278	0.00891944	3.14	0.028030102	0.028922047	7.85326E-06
P-101	MH-459	MH-412	50	110846.578	163	303	6725	0.00042083	0.00934028	3.12	0.02917324	0.030107268	0.001185221
P-102	MH-412	MH-413	50	500	1	2	6727	0.00000278	0.00934306	3.12	0.029180756	0.030115062	7.79369E-06
P-103	MH-413	MH-530	50	500	1	2	6729	0.00000278	0.00934583	3.12	0.029188272	0.030122855	7.79331E-06
P-104	MH-530	MH-235	50	500	1	2	6731	0.00000278	0.00934861	3.12	0.029195787	0.030130648	7.79293E-06
P-105	MH-235	MH-236	50	112602.319	165	306	7037	0.00042500	0.00977361	3.10	0.030341177	0.031318538	0.00118789
P-106	MH-236	MH-496	50	500	1	2	7039	0.00000278	0.00977639	3.10	0.030348635	0.031326274	7.73549E-06
P-107	MH-496	MH-308	50	500	1	2	7041	0.00000278	0.00977917	3.10	0.030356092	0.031334009	7.73512E-06

P-108	MH-308	MH-309	50	500	1	2	7043	0.00000278	0.00978194	3.10	0.030363549	0.031341744	7.73476E-06
P-109	MH-309	MH-538	50	72601.9588	107	199	7242	0.00027639	0.01005833	3.09	0.031103713	0.032109547	0.000767803
P-110	MH-538	MH-425	50	500	1	2	7244	0.00000278	0.01006111	3.09	0.031111134	0.032117245	7.69864E-06
P-111	MH-425	MH-426	50	500	1	2	7246	0.00000278	0.01006389	3.09	0.031118555	0.032124944	7.69829E-06
P-112	MH-426	MH-231	50	500	1	2	7248	0.00000278	0.01006667	3.09	0.031125975	0.032132641	7.69793E-06
P-113	MH-231	MH-232	50	500	1	2	7250	0.00000278	0.01006944	3.09	0.031133395	0.032140339	7.69758E-06
P-114	MH-232	MH-440	50	168789.242	247	458	7708	0.00063611	0.01070556	3.07	0.0328234	0.033893955	0.001753616
P-115	MH-440	MH-288	50	500	1	2	7710	0.00000278	0.01070833	3.07	0.032830741	0.033901574	7.61867E-06
P-116	MH-288	MH-289	50	500	1	2	7712	0.00000278	0.01071111	3.07	0.032838081	0.033909192	7.61834E-06
P-117	MH-289	MH-463	50	500	1	2	7714	0.00000278	0.01071389	3.07	0.032845421	0.03391681	7.61801E-06
P-118	MH-463	MH-346	50	500	1	2	7716	0.00000278	0.01071667	3.07	0.032852761	0.033924428	7.61768E-06
P-119	MH-346	MH-347	50	16567.851	25	47	7763	0.00006528	0.01078194	3.06	0.033025153	0.034103348	0.00017892
P-120	MH-347	MH-526	50	500	1	2	7765	0.00000278	0.01078472	3.06	0.033032485	0.034110957	7.60956E-06
P-121	MH-526	MH-304	50	113146.167	166	308	8073	0.00042778	0.01121250	3.05	0.034157692	0.035278942	0.001167985
P-122	MH-304	MH-305	50	500	1	2	8075	0.00000278	0.01121528	3.05	0.034164974	0.035286501	7.55941E-06
P-123	MH-305	MH-446	50	500	1	2	8077	0.00000278	0.01121806	3.05	0.034172255	0.035294061	7.55909E-06
P-124	MH-446	MH-447	50	500	1	2	8079	0.00000278	0.01122083	3.05	0.034179536	0.035301619	7.55877E-06
P-125	MH-447	MH-511	50	500	1	2	8081	0.00000278	0.01122361	3.05	0.034186817	0.035309178	7.55846E-06
P-126	MH-511	MH-220	50	95958.6519	141	262	8343	0.00036389	0.01158750	3.03	0.035137876	0.036296626	0.000987448
P-127	MH-220	MH-221	50	500	1	2	8345	0.00000278	0.01159028	3.03	0.035145115	0.036304143	7.51731E-06
P-128	MH-221	MH-361	50	500	1	2	8347	0.00000278	0.01159306	3.03	0.035152354	0.03631166	7.517E-06
P-129	MH-361	MH-404	50	15233.948	23	43	8390	0.00005972	0.01165278	3.03	0.035307924	0.036473201	0.000161542
P-130	MH-404	MH-405	50	500	1	2	8392	0.00000278	0.01165556	3.03	0.035315156	0.036480712	7.51013E-06
P-131	MH-405	MH-364	50	148771.9991	218	405	8797	0.00056250	0.01221806	3.01	0.036773528	0.037995334	0.001514622
P-132	MH-364	MH-89	50	500	1	2	8799	0.00000278	0.01222083	3.01	0.0367807	0.038002784	7.4496E-06
P-231	MH-89	MH-48	25	500	1	2	8801	0.00000278	0.01222361	3.01	0.036787872	0.038010233	7.44931E-06
حبلة الشيخ				904163.1474	1322	2451	11252	0.00340417	0.01562778	2.90	0.045377164	0.046939942	0.008929709
P-232	MH-48	MH-62	25	5616.9696	9	17	11269	0.00002361	0.01565139	2.90	0.045435463	0.047000602	6.06605E-05
P-133	MH-62	MH-198	49.1	500	1	2	11271	0.00000278	0.01565417	2.90	0.045442321	0.047007738	7.13547E-06
P-134	MH-198	MH-200	49.4	500	1	2	11273	0.00000278	0.01565694	2.90	0.045449179	0.047014873	7.13525E-06
P-135	MH-200	MH-203	50	500	1	2	11275	0.00000278	0.01565972	2.90	0.045456036	0.047022008	7.13502E-06
P-136	MH-203	MH-210	50	500	1	2	11277	0.00000278	0.01566250	2.90	0.045462893	0.047029143	7.1348E-06
P-137	MH-210	MH-211	50	500	1	2	11279	0.00000278	0.01566528	2.90	0.04546975	0.047036277	7.13458E-06
P-138	MH-211	MH-189	50	500	1	2	11281	0.00000278	0.01566806	2.90	0.045476606	0.047043412	7.13435E-06
P-139	MH-189	MH-190	42	500	1	2	11283	0.00000278	0.01567083	2.90	0.045483463	0.047050546	7.13413E-06
P-140	MH-190	MH-382	50	500	1	2	11285	0.00000278	0.01567361	2.90	0.045490319	0.04705768	7.13391E-06
P-141	MH-382	MH-389	50	500	1	2	11287	0.00000278	0.01567639	2.90	0.045497175	0.047064813	7.13368E-06
P-142	MH-389	MH-416	50	500	1	2	11289	0.00000278	0.01567917	2.90	0.04550403	0.047071947	7.13346E-06
P-143	MH-416	MH-311	50	500	1	2	11291	0.00000278	0.01568194	2.90	0.045510886	0.04707908	7.13324E-06
P-144	MH-311	MH-312	50	500	1	2	11293	0.00000278	0.01568472	2.90	0.045517741	0.047086213	7.13302E-06

P-145	MH-312	MH-503	50	500	1	2	11295	0.00000278	0.01568750	2.90	0.045524596	0.047093346	7.13279E-06
P-146	MH-503	MH-118	50	500	1	2	11297	0.00000278	0.01569028	2.90	0.045531451	0.047100479	7.13257E-06
P-147	MH-118	O-1	30	500	1	2	11299	0.00000278	0.01569306	2.90	0.045538305	0.047107611	7.13235E-06

A4 Table of Calculation Report For main (خط خله الجبالي)

	Current density of population (C/km^2)				1462			(d/D) Assume	0.7	Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m³/s)	Q_{des} (m³/s)	$Q_{per\ Manhole}$ (m³/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
P-148	MH-301	MH-5	50	26395.2852	39	73	73	0.000101389	0.000101389	4.28	0.000433797	0.000443936	0.000443936
P-149	MH-5	MH-6	3.4	500	1	2	75	0.00000278	0.00010417	4.28	0.000445388	0.000455805	1.18689E-05
P-150	MH-6	MH-164	39.8	500	1	2	77	0.00000278	0.00010694	4.27	0.000456968	0.000467663	1.18577E-05
P-151	MH-164	MH-194	46.7	500	1	2	79	0.00000278	0.00010972	4.27	0.000468537	0.000479509	1.18467E-05
P-152	MH-194	MH-202	50	500	1	2	81	0.00000278	0.00011250	4.27	0.000480095	0.000491345	1.18359E-05
P-153	MH-202	MH-205	50	22520.6563	33	62	143	0.00008611	0.00019861	4.20	0.000833709	0.00085357	0.000362225
P-154	MH-205	MH-209	50	10935.6686	16	30	173	0.00004167	0.00024028	4.17	0.00100204	0.001026067	0.000172497
الكوريه				27457.4529	41	77	250	0.00010694	0.00034722	4.11	0.001427469	0.001462191	0.000436124
P-155	MH-209	MH-213	50	500	1	2	252	0.00000278	0.00035000	4.11	0.001438406	0.001473406	1.12148E-05
P-156	MH-213	MH-216	50	3187.9655	5	10	262	0.00001389	0.00036389	4.10	0.001493012	0.001529401	5.59947E-05
P-157	MH-216	MH-155	50	4397.3094	7	13	275	0.00001806	0.00038194	4.09	0.001563807	0.001602001	7.26002E-05
P-158	MH-155	MH-156	34.8	7371.3637	11	21	296	0.00002917	0.00041111	4.08	0.001677722	0.001718833	0.000116832
P-159	MH-156	MH-145	50	6253.5948	10	19	315	0.00002639	0.00043750	4.07	0.001780334	0.001824084	0.000105251
P-160	MH-145	MH-146	30.9	13105.2138	20	38	353	0.00005278	0.00049028	4.05	0.001984331	0.002033359	0.000209275
P-161	MH-146	MH-223	50	8885.202	13	25	378	0.00003472	0.00052500	4.03	0.002117696	0.002170196	0.000136837
P-162	MH-223	MH-122	50	500	1	2	380	0.00000278	0.00052778	4.03	0.002128337	0.002181115	1.09191E-05
لفه الطاقه				49573.5466	73	136	516	0.00018889	0.00071667	3.97	0.002843125	0.002914791	0.000733676
P-163	MH-122	MH-123	30	14720.5821	22	41	557	0.00005694	0.00077361	3.95	0.003055494	0.003132855	0.000218064
P-164	MH-123	MH-367	50	7504.0426	11	21	578	0.00002917	0.00080278	3.94	0.003163758	0.003244036	0.000111181
P-165	MH-367	MH-546	50	22261.5166	33	62	640	0.00008611	0.00088889	3.92	0.003481481	0.00357037	0.000326334
P-166	MH-546	MH-522	50	500	1	2	642	0.00000278	0.00089167	3.92	0.003491685	0.003580851	1.04808E-05
P-167	MH-522	MH-281	50	2836.8743	5	10	652	0.00001389	0.00090556	3.91	0.003542658	0.003633213	5.23623E-05
P-168	MH-281	MH-282	50	500	1	2	654	0.00000278	0.00090833	3.91	0.003552844	0.003643678	1.04641E-05
P-169	MH-282	MH-418	50	6385.3339	10	19	673	0.00002639	0.00093472	3.90	0.003649477	0.003742949	9.92717E-05
P-170	MH-418	MH-395	50	11778.7785	18	34	707	0.00004722	0.00098194	3.89	0.003821791	0.003919985	0.000177036
P-171	MH-395	MH-396	50	500	1	2	709	0.00000278	0.00098472	3.89	0.003831903	0.003930375	1.03901E-05
P-172	MH-396	MH-266	50	15169.2959	23	43	752	0.00005972	0.00104444	3.88	0.004048694	0.004153139	0.000222763
P-173	MH-266	MH-267	50	9570.702	14	26	778	0.00003611	0.00108056	3.87	0.004179213	0.004287268	0.00013413
P-174	MH-267	MH-285	50	7654.7708	12	23	801	0.00003194	0.00111250	3.86	0.004294327	0.004405577	0.000118309
P-175	MH-285	MH-151	50	7132.8886	11	21	822	0.00002917	0.00114167	3.85	0.004399156	0.004513322	0.000107745
P-176	MH-151	MH-152	33.1	5242.3341	8	15	837	0.00002083	0.00116250	3.85	0.004473875	0.004590125	7.68024E-05

A5 Table of Calculation Report For Sub-Main (خط حسكا)

	Current density of population (C/km^2)			1462			(d/D) Assume	0.7		Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m³/s)	Q_{des} (m³/s)	$Q_{per\ Manhole}$ (m³/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
الفلل				221910.6296	325	603	603	0.0008375	0.0008375	3.93	0.00329221	0.00337596	0.00337596
P-457	MH-508	MH-507	50	81315.3812	119	221	824	0.00030694	0.00114444	3.85	0.004409126	0.00452357	0.00114761
P-456	MH-507	MH-475	50	11239.8555	17	32	856	0.00004444	0.00118889	3.84	0.004568332	0.004687221	0.000163651
P-455	MH-475	MH-474	50	11096.2966	17	32	888	0.00004444	0.00123333	3.83	0.004726957	0.00485029	0.000163069
P-454	MH-474	MH-327	50	16403.2906	24	45	933	0.00006250	0.00129583	3.82	0.004949068	0.005078651	0.000228361
P-453	MH-327	MH-326	50	18226.5278	27	51	984	0.00007083	0.00136667	3.80	0.005199491	0.005336157	0.000257506
P-452	MH-326	MH-250	50	18141.6021	27	51	1035	0.00007083	0.00143750	3.79	0.005448582	0.005592332	0.000256175
P-451	MH-250	MH-193	50	18282.1259	27	51	1086	0.00007083	0.00150833	3.78	0.005696392	0.005847225	0.000254894
P-450	MH-193	MH-192	50	25988.3948	38	71	1157	0.00009861	0.00160694	3.76	0.006039336	0.006200031	0.000352805
P-449	MH-192	MH-457	50	21572.0612	32	60	1217	0.00008333	0.00169028	3.74	0.006327367	0.006496395	0.000296364
P-448	MH-457	MH-468	50	22852.9818	34	64	1281	0.00008889	0.00177917	3.73	0.006632877	0.006810794	0.000314399
P-447	MH-468	MH-478	50	25334.9031	38	71	1352	0.00009861	0.00187778	3.71	0.006969805	0.007157582	0.000346789
P-446(2)	MH-478	MH-551	22.5	7876.5516	12	23	1375	0.00003194	0.00190972	3.71	0.007078514	0.007269486	0.000111903
P-446(1)	MH-551	MH-531	40.1	42441.7397	63	117	1492	0.00016250	0.00207222	3.68	0.007628337	0.007835559	0.000566073

A6Table of Calculation Report For Sub-Main (خط خله العطاونه)

	Current density of population (C/km^2)				1462		(d/D) Assume	0.7		Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m^3/s)	Q_{des} (m^3/s)	$Q_{per\ Manhole}$ (m^3/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
P-535	MH-178	MH-74	40	35700.3539	53	99	99	0.0001375	0.0001375	4.24	0.000583655	0.000597405	0.000597405
P-534	MH-74	MH-73	25	8970.5718	14	26	125	0.00003611	0.00017361	4.22	0.000731903	0.000749265	0.000151859
P-533	MH-73	MH-370	50	500	1	2	127	0.00000278	0.00017639	4.21	0.000743247	0.000760886	1.16214E-05
P-532	MH-370	MH-91	50	21929.9679	33	62	189	0.00008611	0.00026250	4.16	0.001091184	0.001117434	0.000356548
P-531	MH-91	MH-90	25	500	1	2	191	0.00000278	0.00026528	4.16	0.001102298	0.001128826	1.13917E-05
P-530	MH-90	MH-241	50	500	1	2	193	0.00000278	0.00026806	4.15	0.001113406	0.001140211	1.13854E-05
P-529	MH-241	MH-323	50	23177.9086	34	64	257	0.00008889	0.00035694	4.11	0.001465725	0.00150142	0.000361209
P-528	MH-323	MH-322	50	500	1	2	259	0.00000278	0.00035972	4.10	0.001476644	0.001512616	1.11963E-05
P-527	MH-322	MH-476	50	500	1	2	261	0.00000278	0.00036250	4.10	0.001487557	0.001523807	1.11911E-05
P-526	MH-476	MH-439	50	47431.0456	70	130	391	0.00018056	0.00054306	4.03	0.002186793	0.002241098	0.000717291
P-525	MH-439	MH-438	50	26736.6612	40	75	466	0.00010417	0.00064722	3.99	0.002582265	0.002646987	0.000405889
P-524	MH-438	MH-465	50	500	1	2	468	0.00000278	0.00065000	3.99	0.00259274	0.00265774	1.07534E-05
P-523	MH-465	MH-450	50	500	1	2	470	0.00000278	0.00065278	3.99	0.002603212	0.00266849	1.07498E-05
P-522	MH-450	MH-363	50	500	1	2	472	0.00000278	0.00065556	3.99	0.002613681	0.002679236	1.07463E-05
P-364	MH-363	MH-362	50	15331.2345	23	43	515	0.00005972	0.00071528	3.97	0.002837928	0.002909456	0.000230219
P-363	MH-362	MH-407	50	500	1	2	517	0.00000278	0.00071806	3.97	0.00284832	0.002920126	1.06702E-05
P-362	MH-407	MH-524	50	500	1	2	519	0.00000278	0.00072083	3.97	0.00285871	0.002930793	1.0667E-05
P-361	MH-524	MH-293	50	500	1	2	521	0.00000278	0.00072361	3.96	0.002869096	0.002941457	1.06637E-05
P-360	MH-293	MH-292	50	14444.3543	22	41	562	0.00005694	0.00078056	3.95	0.003081302	0.003159357	0.000217901
P-359	MH-292	MH-493	50	500	1	2	564	0.00000278	0.00078333	3.95	0.00309162	0.003169953	1.05956E-05
P-358	MH-493	MH-375	50	11458.0386	17	32	596	0.00004444	0.00082778	3.93	0.003256291	0.003339068	0.000169116
P-357	MH-375	MH-329	50	500	1	2	598	0.00000278	0.00083056	3.93	0.003266557	0.003349613	1.05443E-05
P-356	MH-329	MH-328	50	500	1	2	600	0.00000278	0.00083333	3.93	0.003276821	0.003360154	1.05413E-05
P-355	MH-328	MH-242	50	500	1	2	602	0.00000278	0.00083611	3.93	0.003287081	0.003370692	1.05384E-05
P-354	MH-242	MH-129	50	500	1	2	604	0.00000278	0.00083889	3.93	0.003297339	0.003381228	1.05354E-05
P-353	MH-129	MH-128	30	500	1	2	606	0.00000278	0.00084167	3.93	0.003307594	0.00339176	1.05325E-05
P-352	MH-128	MH-421	50	500	1	2	608	0.00000278	0.00084444	3.93	0.003317845	0.00340229	1.05296E-05
P-351	MH-421	MH-420	50	500	1	2	610	0.00000278	0.00084722	3.93	0.003328094	0.003412816	1.05266E-05
P-350	MH-420	MH-88	50	500	1	2	612	0.00000278	0.00085000	3.93	0.00333834	0.00342334	1.05237E-05
P-349	MH-88	MH-87	25	500	1	2	614	0.00000278	0.00085278	3.93	0.003348583	0.003433861	1.05208E-05
P-348	MH-87	MH-139	30	500	1	2	616	0.00000278	0.00085556	3.93	0.003358823	0.003444379	1.05179E-05
P-347	MH-139	MH-26	50	500	1	2	618	0.00000278	0.00085833	3.93	0.003369061	0.003454894	1.0515E-05

P-346	MH-26	MH-25	20	500	1	2	620	0.00000278	0.00086111	3.92	0.003379295	0.003465406	1.05121E-05
P-345	MH-25	MH-96	25	11851.2192	18	34	654	0.00004722	0.00090833	3.91	0.003552844	0.003643678	0.000178271
P-344	MH-96	MH-72	25	500	1	2	656	0.00000278	0.00091111	3.91	0.003563028	0.003654139	1.04613E-05
P-343	MH-72	MH-71	25	500	1	2	658	0.00000278	0.00091389	3.91	0.003573209	0.003664597	1.04586E-05
P-342	MH-71	MH-79	25	500	1	2	660	0.00000278	0.00091667	3.91	0.003583387	0.003675053	1.04558E-05
P-341	MH-79	MH-59	25	7783.9578	12	23	683	0.00003194	0.00094861	3.90	0.003700238	0.003795099	0.000120046
P-340	MH-59	MH-58	25	500	1	2	685	0.00000278	0.00095139	3.90	0.003710382	0.003805521	1.04218E-05
P-339	MH-58	MH-9	25	500	1	2	687	0.00000278	0.00095417	3.90	0.003720523	0.00381594	1.04192E-05
المناخ				30433.1074	45	84	771	0.00011667	0.00107083	3.87	0.004144114	0.004251197	0.000435258
P-338	MH-9	MH-63	25	1366.9794	2	4	775	0.00000556	0.00107639	3.87	0.004164174	0.004271813	2.06156E-05
P-337	MH-63	MH70	25	500	1	2	777	0.00000278	0.00107917	3.87	0.0041742	0.004282117	1.03041E-05
P-336	MH70	MH-69	25	500	1	2	779	0.00000278	0.00108194	3.87	0.004184224	0.004292419	1.03017E-05
P-335	MH-69	MH-527	50	7023.7381	11	21	800	0.00002917	0.00111111	3.86	0.004289329	0.00440044	0.000108021
P-334	MH-527	MH-65	50	500	1	2	802	0.00000278	0.00111389	3.86	0.004299325	0.004410714	1.02739E-05
P-333	MH-65	MH-64	25	3435.8643	6	12	814	0.00001667	0.00113056	3.86	0.004359252	0.004472307	6.15935E-05
P-332	MH-64	MH-102	25.1	500	1	2	816	0.00000278	0.00113333	3.86	0.004369231	0.004482565	1.02573E-05

A7 Table of Calculation Report For Sub-Main (خط شعب الشحده)

	Current density of population (C/km^2)			1462			(d/D) Assume	0.7		Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m^3/s)	Q_{des} (m^3/s)	$Q_{per\ Manhole}$ (m^3/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
البعارنه				106165.1358	156	290	290	0.000402778	0.000402778	4.08	0.00164523	0.001685508	0.001685508
P-490	MH-43	MH-42	20	10551.9783	16	30	320	0.00004167	0.00044444	4.07	0.001807268	0.001851712	0.000166205
P-489	MH-42	MH-45	40	500	1	2	322	0.00000278	0.00044722	4.07	0.001818033	0.001862755	1.10433E-05
P-488	MH-45	MH-44	20	500	1	2	324	0.00000278	0.00045000	4.06	0.001828794	0.001873794	1.10387E-05
P-487	MH-44	MH-114	50	13455.0368	20	38	362	0.00005278	0.00050278	4.04	0.002032418	0.002082695	0.000208901
P-486	MH-114	MH-113	30	15174.9262	23	43	405	0.00005972	0.00056250	4.02	0.002261018	0.002317268	0.000234572
P-485	MH-113	MH-133	30	500	1	2	407	0.00000278	0.00056528	4.02	0.002271605	0.002328133	1.08657E-05
P-484	MH-133	MH-504	50	5765.4561	9	17	424	0.00002361	0.00058889	4.01	0.002361448	0.002420337	9.22039E-05
P-483	MH-504	MH-350	50	500	1	2	426	0.00000278	0.00059167	4.01	0.002372	0.002431167	1.08295E-05
P-482	MH-350	MH-28	50	4247.1412	7	13	439	0.00001806	0.00060972	4.00	0.002440496	0.002501468	7.03013E-05
P-481	MH-28	MH-27	20	500	1	2	441	0.00000278	0.00061250	4.00	0.00245102	0.00251227	1.08018E-05
شعب عويص				42416.5229	63	117	558	0.00016250	0.00077500	3.95	0.003060657	0.003138157	0.000625887
P-476	MH-27	MH-126	30	17096.7725	25	47	605	0.00006528	0.00084028	3.93	0.003302467	0.003386494	0.000248337
P-475	MH-126	MH-127	30	500	1	2	607	0.00000278	0.00084306	3.93	0.00331272	0.003397025	1.0531E-05
P-474	MH-127	MH-101	50	500	1	2	609	0.00000278	0.00084583	3.93	0.00332297	0.003407554	1.05281E-05
P-473	MH-101	MH-100	25	500	1	2	611	0.00000278	0.00084861	3.93	0.003333218	0.003418079	1.05252E-05
P-472	MH-100	MH-109	30	500	1	2	613	0.00000278	0.00085139	3.93	0.003343462	0.003428601	1.05223E-05
P-471	MH-109	MH-77	30	500	1	2	615	0.00000278	0.00085417	3.93	0.003353704	0.00343912	1.05194E-05
عين العزب				69966.809	103	191	806	0.00026528	0.00111944	3.86	0.00431931	0.004431255	0.000992134
P-430	MH-77	MH-98	25	17602.1825	26	49	855	0.00006806	0.00118750	3.84	0.004563366	0.004682116	0.000250862
P-392	MH-98	MH-422	50	500	1	2	857	0.00000278	0.00119028	3.84	0.004573298	0.004692326	1.02098E-05
P-391	MH-422	MH-351	50	12543.54	19	36	893	0.00005000	0.00124028	3.83	0.00475169	0.004875718	0.000183392
P-390	MH-351	MH-31	50	6458.9761	10	19	912	0.00002639	0.00126667	3.83	0.004845553	0.004972219	9.65012E-05
P-389	MH-31	MH30	20	6343.8351	10	19	931	0.00002639	0.00129306	3.82	0.004939219	0.005068525	9.63055E-05
P-388	MH30	MH-394	50	500	1	2	933	0.00000278	0.00129583	3.82	0.004949068	0.005078651	1.01262E-05
P-387	MH-394	MH-22	50	5977.8619	9	17	950	0.00002361	0.00131944	3.81	0.005032693	0.005164638	8.59867E-05
P-386	MH-22	MH21	20	4450.4212	7	13	963	0.00001806	0.00133750	3.81	0.00509654	0.00523029	6.56519E-05

A 8 Table of Calculation Report For Sub-Main (خط الجرن)

Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m^3/s)	Q_{des} (m^3/s)	$Q_{per\ Manhole}$ (m^3/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
P-243	MH-117	MH-116	30	12125.8594	18	34	34	4.72222E-05	4.72222E-05	4.35	0.000205217	0.000209939	0.000209939
P-242	MH-116	MH-121	30	500	1	2	36	0.00000278	0.00005000	4.34	0.000217075	0.000217353	7.41369E-06
P-241	MH-121	MH-185	40	6551.9261	10	19	55	0.00002639	0.00007639	4.31	0.000328943	0.000331582	0.000114229
P-240	MH-185	MH-131	50	500	1	2	57	0.00000278	0.00007917	4.30	0.000340643	0.000340921	9.3395E-06
P-239	MH-131	MH-130	30	500	1	2	59	0.00000278	0.00008194	4.30	0.000352331	0.000352609	1.16875E-05
P-238	MH-130	MH-33	50	9800.6521	15	28	87	0.00003889	0.00012083	4.26	0.000514706	0.000518595	0.000165986
P-237	MH-33	MH-32	20	500	1	2	89	0.00000278	0.00012361	4.26	0.000526222	0.0005265	7.90521E-06
P-236	MH-32	MH-287	50	500	1	2	91	0.00000278	0.00012639	4.25	0.000537729	0.000538006	1.15062E-05

A9 Table of Calculation Report For Sub-Main (خط الكوربه)

	Current density of population (C/km^2)			1462			(d/D) Assume	0.7		Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m³/s)	Q_{des} (m³/s)	$Q_{per\ Manhole}$ (m³/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
P-253	MH-356	MH-243	50	11267.6411	17	32	32	4.44444E-05	4.44444E-05	4.35	0.000193341	0.000197786	0.000197786
P-252	MH-243	MH-217	50	2830.5635	5	10	42	0.00001389	0.00005833	4.33	0.000252549	0.000253938	5.61527E-05
P-251	MH-217	MH-212	50	7491.5914	11	21	63	0.00002917	0.00008750	4.29	0.000375668	0.000378584	0.000124646
P-250	MH-212	MH-209	50	5867.6569	9	17	80	0.00002361	0.00011111	4.27	0.000474317	0.000476679	9.80943E-05

A10 Table of Calculation Report For Sub-Main (خط بير البلد)

	Current density of population (C/km^2)			1462			(d/D) Assume	0.7		Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m³/s)	Q_{des} (m³/s)	$Q_{per\ Manhole}$ (m³/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
P-445	MH-547	MH-310	50	23466.6042	35	65	65	9.02778E-05	9.02778E-05	4.29	0.000387317	0.000396345	0.000396345
P-444	MH-310	MH-219	50	17950.7668	27	51	116	0.00007083	0.00016111	4.23	0.000680754	0.000687837	0.000291492
P-443	MH-219	MH-215	50	13513.6579	20	38	154	0.00005278	0.00021389	4.19	0.000895618	0.000900895	0.000213058
P-442	MH-215	MH-108	50	6893.6327	11	21	175	0.00002917	0.00024306	4.17	0.001013206	0.001016122	0.000115227
P-441	MH-108	MH-52	30	5118.0622	8	15	190	0.00002083	0.00026389	4.16	0.001096742	0.001098825	8.27028E-05

A11 Table of Calculation Report For Sub-Main (خط خلة العين)

	Current density of population (C/km^2)			1462				(d/D) Assume	0.7		Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years			P_f	$Q_{max\ (p)}$ (m^3/s)	Q_{des} (m^3/s)	$Q_{per\ Manhole}$ (m^3/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative					
خله شاور				148985.8932	218	405	405	0.0005625	0.0005625		4.02	0.002261018	0.002317268	0.002317268
P-422	MH-14	MH-13	15	45099.4858	66	123	528	0.00017083	0.00073333		3.96	0.002905421	0.002978754	0.000661487
P-421	MH-13	MH-115	30	500	1	2	530	0.00000278	0.00073611		3.96	0.002915792	0.002989403	1.06491E-05
P-420	MH-115	MH-483	50	500	1	2	532	0.00000278	0.00073889		3.96	0.00292616	0.003000049	1.06459E-05
P-419	MH-483	MH-401	50	500	1	2	534	0.00000278	0.00074167		3.96	0.002936525	0.003010692	1.06427E-05
P-418	MH-401	MH-307	50	37649.9839	56	104	638	0.00014444	0.00088611		3.92	0.003471276	0.003559887	0.000549195
P-417	MH-307	MH-306	50	500	1	2	640	0.00000278	0.00088889		3.92	0.003481481	0.00357037	1.04837E-05
P-416	MH-306	MH-544	50	38872.9441	57	106	746	0.00014722	0.00103611		3.88	0.004018515	0.004122126	0.000551756
P-415	MH-544	MH-467	50	500	1	2	748	0.00000278	0.00103889		3.88	0.004028577	0.004132466	1.03401E-05
P-414	MH-467	MH-415	50	44120.8596	65	121	869	0.00016806	0.00120694		3.84	0.004632843	0.004753537	0.000621071
P-413	MH-415	MH-366	50	500	1	2	871	0.00000278	0.00120972		3.84	0.004642759	0.004763731	1.0194E-05
P-412	MH-366	MH-365	50	500	1	2	873	0.00000278	0.00121250		3.84	0.004652673	0.004773923	1.01918E-05
P-411	MH-365	MH-414	50	47280.6334	70	130	1003	0.00018056	0.00139306		3.80	0.005292442	0.005431748	0.000657825
P-410	MH-414	MH-300	50	20772.8273	31	58	1061	0.00008056	0.00147361		3.78	0.005575074	0.005722435	0.000290687
P-409	MH-300	MH-299	50	19010.5317	28	52	1113	0.00007222	0.00154583		3.77	0.005827083	0.005981666	0.000259232
P-408	MH-299	MH-269	50	500	1	2	1115	0.00000278	0.00154861		3.77	0.00583675	0.005991611	9.945E-06
P-407	MH-269	MH-268	50	22759.4817	34	64	1179	0.00008889	0.00163750		3.75	0.006145133	0.006308883	0.000317272
P-406	MH-268	MH-181	50	500	1	2	1181	0.00000278	0.00164028		3.75	0.00615474	0.006318768	9.88494E-06
P-405	MH-181	MH-180	40	500	1	2	1183	0.00000278	0.00164306		3.75	0.006164346	0.006328651	9.88316E-06
P-404	MH-180	MH-225	50	18156.9559	27	51	1234	0.00007083	0.00171389		3.74	0.006408689	0.006580078	0.000251427
P-403	MH-225	MH-34	50	500	1	2	1236	0.00000278	0.00171667		3.74	0.006418248	0.006589915	9.83685E-06

A12 Table of Calculation Report For Sub-Main (خط لفة الطاقه)

	Current density of population (C/km^2)			1462			(d/D) Assume	0.7		Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m³/s)	Q_{des} (m³/s)	$Q_{per\ Manhole}$ (m³/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
P-249	MH-141	MH-140	30	15814.6885	24	45	45	0.0000625	0.0000625	4.32	0.000270233	0.000276483	0.000276483
P-248	MH-140	MH-184	40	500	1	2	47	0.00000278	0.00006528	4.32	0.000282004	0.000288532	1.20482E-05
P-247	MH-184	MH-41	50	13665.2745	20	38	85	0.00005278	0.00011806	4.26	0.00050318	0.000514985	0.000226454
P-246	MH-41	MH-40	20	500	1	2	87	0.00000278	0.00012083	4.26	0.000514706	0.000526789	1.18043E-05
P-245	MH-40	MH-481	50	12225.4333	18	34	121	0.00004722	0.00016806	4.22	0.000709191	0.000725997	0.000199208
P-244	MH-481	MH-122	50	6868.1503	11	21	142	0.00002917	0.00019722	4.20	0.00082807	0.000847792	0.000121795

A13 Table of Calculation Report For Sub-Main (خط العصفورة)

	Current density of population (C/km^2)		1462		(d/D) Assume	0.7				Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m³/s)	Q_{des} (m³/s)	$Q_{per\ Manhole}$ (m³/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
P-440	MH-255	MH-254	50	31805.9314	47	88	88	0.000122222	0.000122222	4.26	0.000520465	0.000532688	0.000532688
P-439	MH-254	MH-528	50	9411.9521	14	26	114	0.00003611	0.00015833	4.23	0.000669364	0.000685197	0.00015251
P-438	MH-528	MH-386	50	12290.3546	18	34	148	0.00004722	0.00020556	4.19	0.000861877	0.000882433	0.000197235
P-437	MH-386	MH-385	50	6413.1271	10	19	167	0.00002639	0.00023194	4.18	0.0009685	0.000991695	0.000109262
P-436	MH-385	MH-360	50	4904.1131	8	15	182	0.00002083	0.00025278	4.16	0.001052235	0.001077513	8.58179E-05
P-435	MH-360	MH-359	50	500	1	2	184	0.00000278	0.00025556	4.16	0.001063371	0.001088927	1.14142E-05
P-434	MH-359	MH-191	50	9068.2283	14	26	210	0.00003611	0.00029167	4.14	0.00120757	0.001236737	0.00014781
P-371	MH-191	MH-179	45	5942.3515	9	17	227	0.00002361	0.00031528	4.13	0.001301303	0.001332831	9.60943E-05
P-370	MH-179	MH-138	40	2882.4201	5	10	237	0.00001389	0.00032917	4.12	0.001356247	0.001389164	5.63331E-05
P-369	MH-138	MH-137	30	2018.5688	3	6	243	0.00000833	0.00033750	4.12	0.001389148	0.001422898	3.37334E-05
P-368	MH-137	MH-157	35	1020.3413	2	4	247	0.00000556	0.00034306	4.11	0.001411054	0.001445359	2.24617E-05
P-367	MH-157	MH-458	50	3114.279	5	10	257	0.00001389	0.00035694	4.11	0.001465725	0.00150142	5.60606E-05
P-366	MH-458	MH-337	50	10728.5812	16	30	287	0.00004167	0.00039861	4.09	0.001628967	0.001668828	0.000167408
P-365	MH-337	MH-272	50	500	1	2	289	0.00000278	0.00040139	4.09	0.00163981	0.001679949	1.11207E-05

A 14 Table of Calculation Report For Sub-Main (خط راس الواد)

	Current density of population (C/km^2)			1462		(d/D) Assume	0.7		Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m³/s)	Q_{des} (m³/s)	$Q_{per\ Manhole}$ (m³/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
P-385	MH-183	MH-182	40	66157.5091	97	180	180	0.00025	0.00025	4.16	0.001041092	0.001066092	0.001066092
P-384	MH-182	MH-246	50	11106.1813	17	32	212	0.00004444	0.00029444	4.14	0.001218619	0.001223064	0.000156972
P-383	MH-246	MH-358	50	5648.4472	9	17	229	0.00002361	0.00031806	4.13	0.001312303	0.001314664	9.16005E-05
P-382	MH-358	MH-357	50	1120.0509	2	4	233	0.00000556	0.00032361	4.12	0.001334287	0.001334842	2.01777E-05
P-381	MH-357	MH-208	50	5163.9917	8	15	248	0.00002083	0.00034444	4.11	0.001416527	0.00141861	8.3768E-05
P-380	MH-208	MH-201	50	12575.118	19	36	284	0.00005000	0.00039444	4.09	0.001612694	0.001617694	0.000199084
P-379	MH-201	MH-104	49.7	12800.496	19	36	320	0.00005000	0.00044444	4.07	0.001807268	0.001812268	0.000194574
P-378	MH-104	MH-103	25.3	18811.7655	28	52	372	0.00007222	0.00051667	4.04	0.002085747	0.00209297	0.000280702
P-377	MH-103	MH-274	50	6208.4727	10	19	391	0.00002639	0.00054306	4.03	0.002186793	0.002189432	9.64621E-05
P-376	MH-274	MH-341	50	15563.8077	23	43	434	0.00005972	0.00060278	4.01	0.00241417	0.002420142	0.00023071
P-375	MH-341	MH-340	50	16838.0657	25	47	481	0.00006528	0.00066806	3.98	0.002660746	0.002667274	0.000247132
P-374	MH-340	MH-518	50	21333.9958	32	60	541	0.00008333	0.00075139	3.96	0.002972777	0.002981111	0.000313836
P-373	MH-518	MH-253	50	11514.0047	17	32	573	0.00004444	0.00079583	3.94	0.003138012	0.003142456	0.000161346
P-372	MH-253	MH-142	50	9538.151	14	26	599	0.00003611	0.00083194	3.93	0.003271689	0.0032753	0.000132844

A 15 Table of Calculation Report For Sub-Main (خط شعب السود)

	Current density of population (C/km^2)				1462		(d/D) Assume	0.7		Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m^3/s)	Q_{des} (m^3/s)	$Q_{per\ Manhole}$ (m^3/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
P-1	MH-548	MH-1	50	5931.529	9	17	17	2.36111E-05	2.36111E-05	4.39	0.000103641	0.000106002	0.000106002
P-2	MH-1	MH-2	2.8	3639.2134	6	12	29	0.00001667	0.00004028	4.36	0.000175493	0.000179521	7.35187E-05
P-3	MH-2	MH-144	30.3	500	1	2	31	0.00000278	0.00004306	4.35	0.000187397	0.000191702	1.21809E-05
P-4	MH-144	MH-50	49	3534.6385	6	12	43	0.00001667	0.00005972	4.33	0.000258448	0.00026442	7.2718E-05
P-5	MH-50	MH-51	25	5599.7988	9	17	60	0.00002361	0.00008333	4.30	0.00035817	0.000366503	0.000102083
P-6	MH-51	MH-206	50	3939.1515	6	12	72	0.00001667	0.00010000	4.28	0.000427997	0.000437997	7.14942E-05
P-7	MH-206	MH-244	50	6782.7752	10	19	91	0.00002639	0.00012639	4.25	0.000537729	0.000550367	0.00011237
P-8	MH-244	MH-245	50	500	1	2	93	0.00000278	0.00012917	4.25	0.000549225	0.000562142	1.1774E-05
P-9	MH-245	MH-541	50	13741.1657	21	39	132	0.00005417	0.00018333	4.21	0.000771571	0.000789904	0.000227762
P-10	MH-541	MH-487	50	7273.0359	11	21	153	0.00002917	0.00021250	4.19	0.000889999	0.000911249	0.000121345
P-11	MH-487	MH-165	50	6904.8024	11	21	174	0.00002917	0.00024167	4.17	0.001007624	0.00103179	0.000120541
P-12	MH-165	MH-166	40	5896.1828	9	17	191	0.00002361	0.00026528	4.16	0.001102298	0.001128826	9.70357E-05
P-13	MH-166	MH-448	50	4418.9213	7	13	204	0.00001806	0.00028333	4.14	0.001174386	0.001202719	7.38934E-05
P-14	MH-448	MH-449	50	500	1	2	206	0.00000278	0.00028611	4.14	0.001185453	0.001214064	1.13452E-05
P-15	MH-449	MH-443	50	21136.3732	31	58	264	0.00008056	0.00036667	4.10	0.001503917	0.001540584	0.00032652
P-16	MH-443	MH-258	50	2824.368	5	10	274	0.00001389	0.00038056	4.09	0.001558368	0.001596424	5.58398E-05
P-17	MH-258	MH-259	50	16702.2747	25	47	321	0.00006528	0.00044583	4.07	0.001812651	0.001857234	0.00026081
P-18(1)	MH-259	MH-550	50	8388.366	13	25	346	0.00003472	0.00048056	4.05	0.001946872	0.001994927	0.000137693
P-18(2)	MH-550	MH-549	50.1	500	1	2	348	0.00000278	0.00048333	4.05	0.00195758	0.002005913	1.09859E-05
P-21(1)	MH-549	MH-552	50	6511.8941	10	19	367	0.00002639	0.00050972	4.04	0.002059095	0.002110068	0.000104154
P-21(2)	MH-552	MH-94	14.2	1560.7369	3	6	373	0.00000833	0.00051806	4.04	0.002091075	0.00214288	3.28126E-05
P-22	MH-94	MH-95	25	4673.3649	7	13	386	0.00001806	0.00053611	4.03	0.002160237	0.002213848	7.0968E-05
P-23	MH-95	MH-97	25	1938.7584	3	6	392	0.00000833	0.00054444	4.03	0.002192101	0.002246545	3.26972E-05
P-24	MH-97	MH-313	50	500	1	2	394	0.00000278	0.00054722	4.03	0.002202714	0.002257437	1.08911E-05
P-25	MH-313	MH-314	50	1543.036	3	6	400	0.00000833	0.00055556	4.02	0.002234531	0.002290086	3.26497E-05
P-26	MH-314	MH-432	50	2883.359	5	10	410	0.00001389	0.00056944	4.02	0.00228748	0.002344425	5.43383E-05
P-27	MH-432	MH514	50	3399.5092	5	10	420	0.00001389	0.00058333	4.01	0.002340333	0.002398667	5.42422E-05
P-28	MH514	MH-445	50	500	1	2	422	0.00000278	0.00058611	4.01	0.002350893	0.002409504	1.08371E-05
P-29	MH-445	MH-176	50	5621.8291	9	17	439	0.00002361	0.00060972	4.00	0.002440496	0.002501468	9.19641E-05
P-30	MH-176	MH-177	40	4744.9436	7	13	452	0.00001806	0.00062778	4.00	0.002508837	0.002571614	7.01464E-05
P-31	MH-177	MH-239	50	2812.7788	5	10	462	0.00001389	0.00064167	3.99	0.002561303	0.00262547	5.38553E-05

P-32	MH-239	MH-240	50	3155.5174	5	10	472	0.00001389	0.00065556	3.99	0.002613681	0.002679236	5.37668E-05
P-33	MH-240	MH-263	50	3382.3219	5	10	482	0.00001389	0.00066944	3.98	0.002665972	0.002732916	5.36796E-05
P-34	MH-263	MH-264	50	3339.5485	5	10	492	0.00001389	0.00068333	3.98	0.002718176	0.00278651	5.35937E-05
P-35	MH-264	MH-540	50	500	1	2	494	0.00000278	0.00068611	3.98	0.002728607	0.002797218	1.07085E-05
P-36	MH-540	MH-60	50	5774.201	9	17	511	0.00002361	0.00070972	3.97	0.002817133	0.002888105	9.08871E-05
P-37	MH-60	MH-61	25	3968.0266	6	12	523	0.00001667	0.00072639	3.96	0.002879478	0.002952117	6.40117E-05
P-38	MH-61	MH-84	50	1994.3774	3	6	529	0.00000833	0.00073472	3.96	0.002910607	0.002984079	3.19619E-05
P-39	MH-84	MH-85	25	4328.4852	7	13	542	0.00001806	0.00075278	3.96	0.002977953	0.003053231	6.91517E-05
P-40	MH-85	MH-120	40	2708.4025	4	8	550	0.00001111	0.00076389	3.95	0.00301933	0.003095719	4.24882E-05
P-41	MH-120	MH-38	30	4931.6197	8	15	565	0.00002083	0.00078472	3.95	0.003096777	0.00317525	7.95307E-05
P-42	MH-38	MH-39	20	12557.7867	19	36	601	0.00005000	0.00083472	3.93	0.003281951	0.003365424	0.000190174
P-43	MH-39	MH-56	25	500	1	2	603	0.00000278	0.00083750	3.93	0.00329221	0.00337596	1.05369E-05
P-44	MH-56	MH-57	25	500	1	2	605	0.00000278	0.00084028	3.93	0.003302467	0.003386494	1.05339E-05
P-45	MH-57	MH-142	30	500	1	2	607	0.00000278	0.00084306	3.93	0.00331272	0.003397025	1.0531E-05

A 16 Table of Calculation Report For Laterul (خط الفلاح)

	Current density of population (C/km^2)			1462			(d/D) Assume	0.7		Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m^3/s)	Q_{des} (m^3/s)	$Q_{per\ Manhole}$ (m^3/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
P-466	MH-93	MH-92	25	9475.0975	14	26	26	3.61111E-05	3.61111E-05	4.36	0.000157603	0.000161214	0.000161214
P-465	MH-92	MH-294	50	500	1	2	28	0.00000278	0.00003889	4.36	0.000169535	0.000173424	1.22099E-05
P-464	MH-294	MH-417	50	500	1	2	30	0.00000278	0.00004167	4.35	0.000181447	0.000185614	1.21904E-05
P-463	MH-417	MH-542	25	500	1	2	32	0.00000278	0.00004444	4.35	0.000193341	0.000197786	1.21716E-05

A17 Table of Calculation Report For Laterul (خط الفلل)

	Current density of population (C/km^2)			1462			(d/D) Assume	0.7		Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m^3/s)	Q_{des} (m^3/s)	$Q_{per\ Manhole}$ (m^3/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
P-470	MH-545	MH-533	50	27145.6693	40	75	75	0.000104167	0.000104167	4.28	0.000445388	0.000455805	0.000455805
P-469	MH-533	MH-388	50	51417.0927	76	141	216	0.00019583	0.00030000	4.14	0.0012407	0.0012707	0.000814896
P-468	MH-388	MH-387	50	38243.1585	56	104	320	0.00014444	0.00044444	4.07	0.001807268	0.001851712	0.000581012
P-467	MH-387	MH-542	50	32871.4757	49	91	411	0.00012639	0.00057083	4.02	0.00229277	0.002349853	0.000498141
الفلاح	الفلاح			12158.4647	18	34	445	0.00004722	0.00061806	4.00	0.002472057	0.002533862	0.000184009
P-463	MH-542	MH-535	25	2683.3672	4	8	453	0.00001111	0.00062917	4.00	0.002514087	0.002577004	4.31416E-05
P-462	MH-535	MH-441	50	1053.0665	2	4	457	0.00000556	0.00063472	3.99	0.002535081	0.002598553	2.15492E-05
P-461	MH-441	MH-411	50	3025.5133	5	10	467	0.00001389	0.00064861	3.99	0.002587503	0.002652364	5.38109E-05
P-460	MH-411	MH-410	50	9528.8118	14	26	493	0.00003611	0.00068472	3.98	0.002723392	0.002791864	0.0001395
P-459	MH-410	MH-519	50	26231.2846	39	73	566	0.00010139	0.00078611	3.95	0.003101934	0.003180545	0.000388681
P-458	MH-519	MH-508	50	17552.7253	26	49	615	0.00006806	0.00085417	3.93	0.003353704	0.00343912	0.000258575

A 18 Table of Calculation Report For Laterul (خط المناخ)

	Current density of population (C/km^2)			1462			(d/D) Assume	0.7		Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m^3/s)	Q_{des} (m^3/s)	$Q_{per\ Manhole}$ (m^3/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
P-397	MH-464	MH-437	50	11315.9453	17	32	32	4.44444E-05	4.44444E-05	4.35	0.000193341	0.000197786	0.000197786
P-399	MH-437	MH-423	50	500	1	2	34	0.00000278	0.00004722	4.35	0.000205217	0.000205495	7.70901E-06
P-399	MH-423	MH-424	50	6077.7188	9	17	51	0.00002361	0.00007083	4.31	0.000305501	0.000307862	0.000102368
P-400	MH-424	MH-434	50	8566.6154	13	25	76	0.00003472	0.00010556	4.27	0.00045118	0.000454652	0.000146789
P-401	MH-434	MH-10	50	1326.5657	2	4	80	0.00000556	0.00011111	4.27	0.000474317	0.000474873	2.02213E-05
P-402	MH-10	MH-9	10	2646.2622	4	8	88	0.00001111	0.00012222	4.26	0.000520465	0.000521577	4.67036E-05

A 19 Table of Calculation Report For Laterul (خط خربة البعارنه)

	Current density of population (C/km^2)			1462			(d/D) Assume	0.7		Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m³/s)	Q_{des} (m³/s)	$Q_{per\ Manhole}$ (m³/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
P-503	MH-112	MH-47	30	18006.6072	27	51	51	7.08333E-05	7.08333E-05	4.31	0.000305501	0.000312584	0.000312584
P-502	MH-47	MH-46	20	7496.9756	11	21	72	0.00002917	0.00010000	4.28	0.000427997	0.000437997	0.000125413
P-501	MH-46	MH-67	50	500	1	2	74	0.00000278	0.00010278	4.28	0.000439594	0.000449872	1.18745E-05
P-500	MH-67	MH-66	25	500	1	2	76	0.00000278	0.00010556	4.27	0.00045118	0.000461735	1.18633E-05
P-499	MH-66	MH-175	40	19923.1181	30	56	132	0.00007778	0.00018333	4.21	0.000771571	0.000789904	0.000328169
P-498	MH-175	MH-431	50	500	1	2	134	0.00000278	0.00018611	4.21	0.000782886	0.000801497	1.15932E-05
P-497	MH-431	MH-430	50	19080.9854	28	52	186	0.00007222	0.00025833	4.16	0.001074501	0.001100335	0.000298837
P-496	MH-430	MH-186	50	500	1	2	188	0.00000278	0.00026111	4.16	0.001085625	0.001111736	1.14013E-05
P-495	MH-186	MH-170	40	20999.2851	31	58	246	0.00008056	0.00034167	4.11	0.001405579	0.001439746	0.00032801
P-494	MH-170	MH-169	40	500	1	2	248	0.00000278	0.00034444	4.11	0.001416527	0.001450971	1.12255E-05
P-493	MH-169	MH-174	40	17158.1644	26	49	297	0.00006806	0.00041250	4.08	0.001683133	0.001724383	0.000273412
P-492	MH-174	MH-262	50	500	1	2	299	0.00000278	0.00041528	4.08	0.001693952	0.00173548	1.10966E-05
P-491	MH-262	MH-43	50	500	1	2	301	0.00000278	0.00041806	4.08	0.001704766	0.001746572	1.10919E-05

A 20 Table of Calculation Report For Laterul (خط شعب عويص)

	Current density of population (C/km^2)			1462			(d/D) Assume	0.7		Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m³/s)	Q_{des} (m³/s)	$Q_{per\ Manhole}$ (m³/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
P-480	MH-374	MH-373	50	18302.6405	27	51	51	7.08333E-05	7.08333E-05	4.31	0.000305501	0.000312584	0.000312584
P-479	MH-373	MH-222	50	8703.5715	13	25	76	0.00003472	0.00010556	4.27	0.00045118	0.000461735	0.000149151
P-478	MH-222	MH-134	50	14910.3109	22	41	117	0.00005694	0.00016250	4.22	0.000686446	0.000702696	0.000240961
P-477	MH-134	MH-27	30	500	1	2	119	0.00000278	0.00016528	4.22	0.000697823	0.000714351	1.16548E-05

A 21 Table of Calculation Report For Laterul (خط عين العزب)

	Current density of population (C/km^2)			1462			(d/D) Assume	0.7		Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m^3/s)	Q_{des} (m^3/s)	$Q_{per\ Manhole}$ (m^3/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
P-396	MH-125	MH-124	30	47431.0456	70	130	130	0.000180556	0.000180556	4.21	0.000760247	0.000778303	0.000778303
P-395	MH-124	MH-278	50	500	1	2	132	0.00000278	0.00018333	4.21	0.000771571	0.000789904	1.16012E-05
P-394	MH-278	MH-277	50	500	1	2	134	0.00000278	0.00018611	4.21	0.000782886	0.000801497	1.15932E-05
P-393	MH-277	MH-78	50	21035.7634	31	58	192	0.00008056	0.00026667	4.15	0.001107853	0.001134519	0.000333022
P-431	MH-78	MH-77	25	500	1	2	194	0.00000278	0.00026944	4.15	0.001118957	0.001145902	1.13822E-05

A 22 Table of Calculation Report For Laterul (خط نبعه المجنونه)

	Current density of population (C/km^2)			1462			(d/D) Assume	0.7		Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m^3/s)	Q_{des} (m^3/s)	$Q_{per\ Manhole}$ (m^3/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
P-521	MH-520	MH-226	50	13912.9421	21	39	39	5.41667E-05	5.41667E-05	4.34	0.00023483	0.000240247	0.000240247
P-520	MH-226	MH-36	50	500	1	2	41	0.00000278	0.00005694	4.33	0.000246647	0.000252341	1.20944E-05
P-519	MH-36	MH-35	20	6038.3742	9	17	58	0.00002361	0.00008056	4.30	0.000346489	0.000354544	0.000102203
P-518	MH-35	MH-68	25	500	1	2	60	0.00000278	0.00008333	4.30	0.00035817	0.000366503	1.19588E-05
P-517	MH-68	MH-99	25	500	1	2	62	0.00000278	0.00008611	4.29	0.000369838	0.000378449	1.19461E-05
P-516	MH-99	MH-171	40	500	1	2	64	0.00000278	0.00008889	4.29	0.000381494	0.000390383	1.19337E-05
P-515	MH-171	MH-500	50	8051.1161	12	23	87	0.00003194	0.00012083	4.26	0.000514706	0.000526789	0.000136406
P-514	MH-500	MH-132	50	500	1	2	89	0.00000278	0.00012361	4.26	0.000526222	0.000538583	1.17941E-05
P-513	MH-132	MH-76	30	26906.5239	40	75	164	0.00010417	0.00022778	4.18	0.000951708	0.000974485	0.000435902
P-512	MH-76	MH-75	25	500	1	2	166	0.00000278	0.00023056	4.18	0.000962905	0.00098596	1.14747E-05
P-511	MH-75	MH-81	25	18352.7737	27	51	217	0.00007083	0.00030139	4.13	0.001246217	0.001276356	0.000290396
P-510	MH-81	MH-80	25	7447.8584	11	21	238	0.00002917	0.00033056	4.12	0.001361734	0.00139479	0.000118434
P-509	MH-80	MH-83	25	27597.8457	41	77	315	0.00010694	0.00043750	4.07	0.001780334	0.001824084	0.000429294
P-508	MH-83	MH-82	25	7220.5376	11	21	336	0.00002917	0.00046667	4.06	0.001893266	0.001939933	0.000115849
P-507	MH-82	MH-336	50	6340.5506	10	19	355	0.00002639	0.00049306	4.05	0.001995025	0.00204433	0.000104397
P-506	MH-336	MH-224	50	500	1	2	357	0.00000278	0.00049583	4.05	0.002005714	0.002055297	1.09667E-05
P-505	MH-224	MH-136	50	5117.8123	8	15	372	0.00002083	0.00051667	4.04	0.002085747	0.002137414	8.21171E-05
P-504	MH-136	MH-135	30	2802.8436	5	10	382	0.00001389	0.00053056	4.03	0.002138975	0.00219203	5.46161E-05

A 23 Table of Calculation Report For Laterul (خط خله شاور)

	Current density of population (C/km^2)			1462			(d/D) Assume	0.7		Water Consumption (L/c/d) = 100 l/cap/day			
Pipe no.	Manholes		Length (m)	Area (m²)	Population			{.8 Qavg} (m3/s) after 25 years		P_f	$Q_{max\ (p)}$ (m³/s)	Q_{des} (m³/s)	$Q_{per\ Manhole}$ (m³/s)
	From	To			Now	After 25 years	Cumulative	Increment	Cumulative				
P-429	MH-534	MH-510	50	69938.6661	103	191	191	0.000265278	0.000265278	4.16	0.001102298	0.001128826	0.001128826
P-428	MH-510	MH-509	50	500	1	2	193	0.00000278	0.00026806	4.15	0.001113406	0.001140211	1.13854E-05
P-427	MH-509	MH-529	50	34819.9836	51	95	288	0.00013194	0.00040000	4.09	0.001634389	0.001674389	0.000534178
P-426	MH-529	MH-284	50	500	1	2	290	0.00000278	0.00040278	4.08	0.00164523	0.001685508	1.11183E-05
P-425	MH-284	MH-283	50	42227.2435	62	115	405	0.00015972	0.00056250	4.02	0.002261018	0.002317268	0.00063176
P-424	MH-283	MH-372	50	500	1	2	407	0.00000278	0.00056528	4.02	0.002271605	0.002328133	1.08657E-05
P-423	MH-372	MH-14	50	500	1	2	409	0.00000278	0.00056806	4.02	0.00228219	0.002338995	1.08618E-05

Appendix B: Tables of Sanitary Sewer Design for Wastewater Network.

Introduction

In this appendix B, the program design results are presented, where all the outputs are displayed, so you know the details of the two- way sewage network design. The pipes show their length, starting point and end point, as well as the inclination, flow velocity and pipe diameter, as well as the amount of drilling for them and the type of pipe. As for the manholes, they display information about the depth and openings of the manholes, as well as ground elevation, invert elevation, diameter , . x coordinate, y coordinate. We have clarified in this appendix all the information we mentioned about the manholes and pipes in the 4 main Street , 11 sub-main street and 9 lateral streets.

B.1 Table of Sanitary Sewer Design Report For main (واد القف)

B.1.1 Pipe Report									
Label	start node	stop node	length (user define) m	length (scaled) m	slope (calculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-254	MH-531	MH-249		50	7.579	1.8	200	1	PVC
P-255	MH-249	MH-3		50	6.976	1.76	200	1	PVC
P-256	MH-3	MH-4	45	38.7	4.291	1.49	200	1	PVC
P-257	MH-4	MH-199	45	46.8	4.261	1.5	200	1	PVC
P-258	MH-199	MH-135	14.7	19.2	0.5	0.69	200	1.21	PVC
P-259	MH-135	MH-460		50	8.814	2.08	200	1.45	PVC
P-260	MH-460	MH-461		50	10	2.18	200	1.24	PVC
P-261	MH-461	MH-482		50	10	2.18	200	2.13	PVC
P-262	MH-482	MH-275		50	10	2.19	200	1.75	PVC
P-263	MH-275	MH-276		50	10	2.2	200	1.6	PVC
P-264	MH-276	MH-442		50	9.316	2.15	200	1	PVC
P-265	MH-442	MH-7		50	7.326	1.98	200	1	PVC
P-266	MH-7	MH-8	46.3	47.7	6.439	1.9	200	1	PVC
P-267	MH-8	MH-153	14	12.7	8.938	2.14	200	1	PVC
P-268	MH-153	MH-154		33.4	10	2.24	200	1.76	PVC
P-269	MH-154	MH-428		50	10	2.24	200	1.73	PVC
P-270	MH-428	MH-429		50	0.5	0.76	200	2.04	PVC
P-271	MH-429	MH-390		50	3.926	1.63	200	2.04	PVC
P-272	MH-390	MH-290		50	9.195	2.21	200	2.23	PVC
P-273	MH-290	MH-291		50	10	2.31	200	2.23	PVC
P-274	MH-291	MH-435		50	0.5	0.77	200	2.19	PVC
P-275	MH-435	MH-436		50	0.5	0.78	200	3.06	PVC
P-276	MH-436	MH-296		50	6.657	2.04	200	1.94	PVC
P-277	MH-296	MH-297		50	10	2.36	200	1.07	PVC
P-278	MH-297	MH-348		50	9.08	2.31	200	1	PVC
P-279	MH-348	MH-349		50	9.178	2.33	200	1	PVC
P-280	MH-349	MH-392		50	4.767	1.85	200	1	PVC
P-281	MH-392	MH-391		50	1.343	1.17	200	1	PVC
P-282	MH-391	MH-149		50	7.622	2.2	200	1	PVC
P-283	MH-149	MH-150		31.3	10	2.45	200	3.39	PVC
P-284	MH-150	MH-197		48.5	10	2.46	200	1.94	PVC
P-285	MH-197	MH-207		50	2.795	1.55	200	1.88	PVC
P-286	MH-207	MH-469		53.4	10	2.47	200	1.88	PVC
P-287	MH-469	MH-162		50	10	2.47	200	2.3	PVC
P-288	MH-162	MH-163		39.6	1.943	1.37	200	1	PVC
P-289	MH-163	MH-265		50	5.057	1.94	200	1.15	PVC

P-290	MH-265	MH-295		50	10	2.48	200	1.15	PVC
P-291	MH-295	MH-320		50	4.63	1.89	200	1	PVC
P-292	MH-320	MH-321		50	7.197	2.21	200	1.74	PVC
P-293	MH-321	MH-532		50	10	2.5	200	1.74	PVC
P-294	MH-532	MH-454		50	9.002	2.41	200	1	PVC
P-295	MH-454	MH-160		50	3.832	1.77	200	1	PVC
P-296	MH-105	MH-11		26.8	0.5	0.84	250	1.31	PVC
P-297	MH-11	MH-12		11.7	0.5	0.84	250	1.39	PVC
P-298	MH-12	MH-393		50	1.835	1.35	250	1.08	PVC
P-299	MH-393	MH-521		50	4.3	1.84	250	1	PVC
P-300	MH-521	MH-21		50	3.4	1.69	250	1.61	PVC
P-301	MH-21	MH-354		50	10	2.68	250	1.61	PVC
P-302	MH-354	MH-355		50	5.266	2.13	250	1	PVC
P-303	MH-355	MH-472		50	4.159	1.96	250	1	PVC
P-304	MH-472	MH-513		50	4.088	1.95	250	1	PVC
P-305	MH-513	MH-368		50	1.892	1.47	250	1	PVC
P-306	MH-368	MH-369		50	5.587	2.18	250	1	PVC
P-307	MH-369	MH-229		50	4.266	1.98	250	1	PVC
P-308	MH-229	MH-230		50	1.067	1.2	250	1	PVC
P-309	MH-230	MH-536		50	6.005	2.24	250	1	PVC
P-310	MH-536	MH-539		50	2.075	1.53	250	1	PVC
P-311	MH-539	MH-315		50	1.158	1.24	250	1	PVC
P-312	MH-315	MH-316		50	6.164	2.27	250	1	PVC
P-313	MH-316	MH-399		50	5.014	2.11	250	1	PVC
P-314	MH-399	MH-400		50	5.651	2.2	250	1	PVC
P-315	MH-400	MH-453		50	4.946	2.1	250	1	PVC
P-316	MH-453	MH-525		50	4.189	1.98	250	1	PVC
P-317	MH-525	MH-486		50	2.878	1.73	250	1	PVC
P-318	MH-486	MH-298		50	2.551	1.66	250	1	PVC
P-319	MH-298	MH-107		50	5.895	2.25	250	1	PVC
P-320	MH-18	MH-492		50	4.831	2.1	250	1.05	PVC
P-321	MH-492	MH-247		50	4.979	2.13	250	1	PVC
P-322	MH-247	MH-248		50	0.5	0.91	250	1.12	PVC
P-323	MH-248	MH-523		50	3.451	1.87	250	1.12	PVC
P-324	MH-523	MH-498		50	8.383	2.57	250	1	PVC
P-325	MH-498	MH-499		50	6.721	2.38	250	1	PVC
P-326	MH-499	MH-512		50	6.344	2.33	250	1	PVC
P-327	MH-512	MH-444		50	7.943	2.53	250	1	PVC
P-328	MH-444	MH-102		50	3.422	1.87	250	1.01	PVC
P-329	MH-102	MH-251		50	3.234	1.92	250	1.01	PVC
P-330	MH-251	MH-252		50	6.503	2.46	250	1	PVC
P-331	MH-252	MH-158		50	3.597	1.99	250	1.03	PVC
P-538	MH-160	MH-161		38.2	3.227	1.68	200	1	PVC
P-539	MH-161	MH-106		47.8	6.233	2.13	200	1	PVC
P-540	MH-106	MH-105		27.6	4.037	1.82	200	1.03	PVC

P-541	MH-107	MH-17		29.5	2.636	1.68	250	1	PVC
P-542	MH-17	MH-18		18.9	0.5	0.91	250	1.05	PVC
P-543	MH-158	MH-159		37.4	0.5	0.96	300	3.4	PVC
P-544	MH-159	O-2		48.6	0.5	0.96	300	3.62	PVC

B1.2 Manhole Report

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-3	835.84	834.64	914.4	1.2	158,120.8	108,438.3
MH-4	833.91	832.71	914.4	1.2	158,086.9	108,457.0
MH-7	794.23	793.03	914.4	1.2	157,728.7	108,662.1
MH-8	791.25	790.05	914.4	1.2	157,683.5	108,677.2
MH-11	682.65	680.78	914.4	1.87	156,359.7	109,283.6
MH-12	682.13	680.72	914.4	1.41	156,348.5	109,287.0
MH-17	635	633.75	914.4	1.25	155,321.3	109,535.7
MH-18	635	633.66	914.4	1.34	155,302.9	109,540.2
MH-21	678.42	675.95	914.4	2.47	156,226.1	109,373.0
MH-102	611.63	610.37	914.4	1.26	154,925.3	109,764.6
MH-105	682.16	680.91	914.4	1.25	156,384.1	109,272.5
MH-106	683.23	682.03	914.4	1.2	156,410.4	109,264.1
MH-107	635.78	634.53	914.4	1.25	155,350.6	109,532.8
MH-135	832.34	830.72	914.4	1.63	158,028.4	108,487.5
MH-149	742.04	736.07	914.4	5.97	157,060.7	109,047.2
MH-150	734.14	731.06	914.4	3.08	157,039.2	109,070.0
MH-153	790	787.29	914.4	2.71	157,671.5	108,681.2
MH-154	785.15	782.48	914.4	2.67	157,641.0	108,694.9
MH-158	605	603.7	914.4	1.3	154,800.5	109,846.7
MH-159	609.62	603.51	914.4	6.11	154,776.8	109,875.6
MH-160	687.44	686.24	914.4	1.2	156,494.1	109,244.2
MH-161	686.21	685.01	914.4	1.2	156,456.4	109,251.1
MH-162	713.07	711.87	914.4	1.2	156,878.1	109,187.9
MH-163	712.3	711.1	914.4	1.2	156,840.2	109,199.4
MH-197	727.41	726.21	914.4	1.2	157,005.8	109,105.2
MH-199	831.99	830.79	914.4	1.2	158,045.6	108,479.0
MH-207	727.78	724.82	914.4	2.96	156,969.2	109,139.2
MH-229	659.57	658.32	914.4	1.25	155,895.1	109,404.4
MH-230	659.04	657.79	914.4	1.25	155,848.7	109,385.5
MH-247	630	628.75	914.4	1.25	155,208.8	109,573.3
MH-248	630	628.5	914.4	1.5	155,159.6	109,582.2
MH-249	839.33	838.13	914.4	1.2	158,160.7	108,408.2
MH-251	610	608.75	914.4	1.25	154,880.2	109,786.3
MH-252	606.75	605.5	914.4	1.25	154,839.9	109,815.9

MH-265	710.08	708.57	914.4	1.5	156,792.2	109,213.2
MH-275	808.76	806.35	914.4	2.41	157,865.4	108,601.9
MH-276	802.55	801.35	914.4	1.2	157,822.5	108,627.6
MH-290	774.32	770.67	914.4	3.65	157,445.3	108,733.2
MH-291	766.87	765.67	914.4	1.2	157,398.6	108,751.1
MH-295	704.77	703.57	914.4	1.2	156,742.5	109,219.2
MH-296	763.18	761.84	914.4	1.34	157,284.1	108,847.6
MH-297	758.04	756.84	914.4	1.2	157,247.7	108,881.9
MH-298	638.72	637.47	914.4	1.25	155,400.0	109,525.3
MH-315	654.42	653.17	914.4	1.25	155,700.7	109,402.4
MH-316	651.34	650.09	914.4	1.25	155,664.2	109,436.5
MH-320	702.46	701.26	914.4	1.2	156,692.7	109,223.3
MH-321	700.35	697.66	914.4	2.69	156,642.9	109,228.1
MH-348	753.5	752.3	914.4	1.2	157,207.4	108,911.5
MH-349	748.91	747.71	914.4	1.2	157,168.6	108,943.0
MH-354	672.2	670.95	914.4	1.25	156,177.2	109,383.7
MH-355	669.57	668.32	914.4	1.25	156,131.3	109,403.5
MH-368	664.5	663.25	914.4	1.25	155,988.8	109,437.3
MH-369	661.71	660.46	914.4	1.25	155,940.1	109,426.1
MH-390	776.47	775.27	914.4	1.2	157,494.0	108,722.1
MH-391	745.86	744.66	914.4	1.2	157,096.9	109,012.7
MH-392	746.53	745.33	914.4	1.2	157,132.7	108,977.8
MH-393	681.05	679.8	914.4	1.25	156,305.2	109,311.9
MH-399	648.83	647.58	914.4	1.25	155,635.2	109,477.3
MH-400	646.01	644.76	914.4	1.25	155,596.0	109,508.3
MH-428	778.68	777.48	914.4	1.2	157,592.4	108,706.6
MH-429	780.51	777.23	914.4	3.28	157,542.5	108,710.0
MH-435	768.99	765.42	914.4	3.58	157,363.0	108,786.2
MH-436	768.11	765.17	914.4	2.94	157,324.4	108,818.0
MH-442	797.9	796.7	914.4	1.2	157,776.2	108,646.5
MH-444	613.33	612.08	914.4	1.25	154,968.7	109,739.9
MH-453	643.53	642.28	914.4	1.25	155,546.2	109,503.7
MH-454	689.36	688.16	914.4	1.2	156,544.0	109,242.9
MH-460	827.99	826.31	914.4	1.68	157,985.4	108,512.9
MH-461	822.51	819.06	914.4	3.45	157,941.7	108,537.3
MH-469	720.67	716.87	914.4	3.8	156,923.3	109,166.5
MH-472	667.49	666.24	914.4	1.25	156,086.2	109,425.1
MH-482	815.26	812.56	914.4	2.7	157,904.0	108,570.1
MH-486	640	638.75	914.4	1.25	155,446.7	109,507.5
MH-492	632.49	631.24	914.4	1.25	155,257.0	109,560.1
MH-498	623.83	622.58	914.4	1.25	155,076.7	109,637.6
MH-499	620.47	619.22	914.4	1.25	155,047.4	109,678.1
MH-512	617.3	616.05	914.4	1.25	155,008.5	109,709.6
MH-513	665.45	664.2	914.4	1.25	156,038.7	109,440.6
MH-521	678.9	677.65	914.4	1.25	156,264.6	109,341.1

MH-523	628.02	626.77	914.4	1.25	155,115.9	109,606.6
MH-525	641.44	640.19	914.4	1.25	155,496.3	109,500.7
MH-531	843.12	841.92	914.4	1.2	158,195.8	108,372.6
MH-532	693.86	692.66	914.4	1.2	156,593.5	109,235.6
MH-536	656.04	654.79	914.4	1.25	155,800.0	109,396.7
MH-539	655	653.75	914.4	1.25	155,750.1	109,394.3

B.2 Table of Sanitary Sewer Design Report For main (حبلة الشيخ)

B.2.1 Pipe Report									
Label	start node	stop node	length (user define) m	length (scaled) m	slope (calculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-177	MH-286	MH-287		50	9.796	0.45	200	1.41	PVC
P-178	MH-287	MH-537		50	10	1.02	200	1.41	PVC
P-179	MH-537	MH-471		50	10	1.03	200	1.88	PVC
P-180	MH-471	MH-433		50	10	1.03	200	1.79	PVC
P-181	MH-433	MH-419		50	3.302	0.78	200	1	PVC
P-182	MH-419	MH-324		50	6.912	1.02	200	1	PVC
P-183	MH-324	MH-325		50	1.934	0.69	200	1	PVC
P-184	MH-325	MH-479		50	2.85	0.79	200	1	PVC
P-185	MH-479	MH-480		50	6.518	1.06	200	1	PVC
P-186	MH-480	MH-233		50	6.995	1.08	200	1	PVC
P-187	MH-233	MH-234		50	7.758	1.13	200	1	PVC
P-188	MH-234	MH-408		50	8.547	1.26	200	1	PVC
P-189	MH-408	MH-409		50	9.24	1.29	200	1	PVC
P-190	MH-409	MH-491		50	7.406	1.24	200	1	PVC
P-191	MH-491	MH-344		50	5.709	1.13	200	1	PVC
P-192	MH-344	MH-345		50	1.478	0.71	200	1	PVC
P-193	MH-345	MH-484		50	1.48	0.71	200	1	PVC
P-194	MH-484	MH-485		50	1.48	0.73	200	1	PVC
P-195	MH-485	MH-237		50	0.837	0.6	200	1.21	PVC
P-196	MH-237	MH-238		50	0.835	0.6	200	1.26	PVC
P-197	MH-238	MH-490		50	1.375	0.73	200	1.05	PVC
P-198	MH-490	MH-338		50	3.982	1.07	200	1	PVC
P-199	MH-338	MH-339		50	2.069	0.85	200	1	PVC
P-200	MH-339	MH-334		50	6.392	1.27	200	1	PVC
P-201	MH-334	MH-335		50	9.88	1.54	200	1	PVC
P-202	MH-335	MH-543		50	10	1.55	200	1.58	PVC
P-203	MH-543	MH-302		50	10	1.58	200	1.35	PVC
P-204	MH-302	MH-303		50	9.609	1.56	200	1	PVC
P-205	MH-303	MH-406		50	10	1.61	200	1.31	PVC
P-206	MH-406	MH-279		50	8.263	1.51	200	1	PVC
P-207	MH-279	MH-280		50	8.859	1.57	200	1.03	PVC
P-208	MH-280	MH-319		50	10	1.65	200	1.03	PVC
P-209	MH-319	MH-462		50	9.356	1.64	200	1.08	PVC
P-210	MH-462	MH-376		50	10	1.68	200	1.08	PVC
P-211	MH-376	MH-260		50	10	1.71	200	1.17	PVC

P-212	MH-260	MH-261		50	8.791	1.64	200	1	PVC
P-213	MH-261	MH-501		50	8.041	1.59	200	1	PVC
P-214	MH-501	MH-502		50	8.502	1.62	200	1.26	PVC
P-215	MH-502	MH-505		50	10	1.78	200	1.26	PVC
P-216	MH-505	MH-497		50	9.589	1.76	200	1	PVC
P-217	MH-497	MH-466		50	10	1.81	200	1.21	PVC
P-218	MH-466	MH-110		50	9.192	1.76	200	1	PVC
P-219	MH-110	MH-111		30	8.833	1.75	200	1	PVC
P-220	MH-111	MH-143		30	8.473	1.73	200	1	PVC
P-221	MH-143	MH-86		50	6.651	1.59	200	1	PVC
P-222(1)	MH-86	MH-553		14	10	1.85	200	2.77	PVC
P-222(2)	MH-553	MH-37		11	10	1.85	200	2	PVC
P-223(1)	MH-37	MH-554	10	10	10	1.85	200	2.44	PVC
P-223(2)	MH-554	MH-23	10	10	10	1.85	200	2.66	PVC
P-224	MH-23	MH-24		20	10	1.85	200	3.2	PVC
P-225(1)	MH-24	MH-555	10	10	10	1.85	200	2.66	PVC
P-225(2)	MH-555	MH-19	10	10	10	1.85	200	2.24	PVC
P-226(1)	MH-19	MH-556	10	10	10	1.85	200	2.69	PVC
P-226(2)	MH-556	MH-20	10	10	10	1.85	200	2.06	PVC
P-227(1)	MH-20	MH-557	10	10	10	1.85	200	2.37	PVC
P-227(2)	MH-557	MH-29	10	10	10	1.85	200	2.28	PVC
P-228(1)(1)	MH-29	MH-559	5	5	15	2.14	200	2.93	PVC
P-228(1)(2)	MH-559	MH-558	5	5	15	2.14	200	2.56	PVC
P-228(2)(1)	MH-558	MH-560	5	5.1	15	2.14	200	2.58	PVC
P-228(2)(2)	MH-560	MH-34	5	5	15	2.14	200	2.17	PVC
P-229	MH-34	MH-256		50	10	2.27	200	3.21	PVC
P-230	MH-256	MH-257		50	10	2.28	200	2.84	PVC
P-233	MH-257	MH-195		50	10	2.28	200	2.45	PVC
P-234	MH-195	MH-49		48	10	2.28	200	2.13	PVC
P-235	MH-48	MH-49		20	10	2.28	200	1.37	PVC

B2.2 Manhole Report for main (حبلة الشيخ)

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-19	655.3	650.73	914.4	4.57	154,327.8	109,473.5
MH-20	647.8	643.86	914.4	3.94	154,325.1	109,453.7
MH-23	669.5	663.9	914.4	5.6	154,333.1	109,513.1
MH-24	663.1	658.57	914.4	4.53	154,329.8	109,493.4
MH-29	640.5	635.43	914.4	5.07	154,323.8	109,433.7
MH-34	625	619.37	914.4	5.63	154,318.6	109,414.4
MH-37	677.7	673.61	914.4	4.09	154,335.9	109,533.0

MH-48	589.17	587.28	914.4	1.89	154,103.2	109,426.2
MH-49	591.91	589.97	914.4	1.94	154,122.6	109,431.3
MH-86	685.74	681.01	914.4	4.73	154,336.3	109,557.9
MH-110	694.26	693.06	914.4	1.2	154,384.0	109,599.1
MH-111	691.61	690.41	914.4	1.2	154,354.2	109,602.8
MH-143	689.07	687.87	914.4	1.2	154,324.5	109,606.5
MH-195	598.98	595.51	914.4	3.47	154,170.5	109,433.5
MH-233	811.82	810.62	914.4	1.2	155,703.5	108,750.8
MH-234	807.94	806.74	914.4	1.2	155,661.3	108,777.6
MH-237	790.27	788.65	914.4	1.62	155,366.5	109,042.1
MH-238	789.53	788.23	914.4	1.3	155,333.5	109,079.6
MH-256	615.57	610.68	914.4	4.89	154,269.7	109,424.7
MH-257	606.88	602.78	914.4	4.11	154,220.5	109,433.6
MH-260	726.73	725.53	914.4	1.2	154,704.7	109,477.9
MH-261	722.34	721.14	914.4	1.2	154,663.1	109,505.7
MH-279	751.17	749.97	914.4	1.2	154,925.8	109,362.8
MH-280	746.79	745.54	914.4	1.25	154,882.7	109,388.1
MH-286	849.31	848.11	914.4	1.2	156,162.1	108,613.6
MH-287	845.23	843.21	914.4	2.03	156,113.5	108,625.2
MH-302	765.72	764.52	914.4	1.2	155,035.8	109,260.9
MH-303	760.91	759.1	914.4	1.81	155,000.5	109,296.3
MH-319	741.74	740.54	914.4	1.2	154,839.3	109,413.0
MH-324	820.97	819.77	914.4	1.2	155,871.0	108,641.6
MH-325	820	818.8	914.4	1.2	155,828.9	108,668.6
MH-334	782.52	781.32	914.4	1.2	155,163.6	109,183.4
MH-335	777.58	775.22	914.4	2.36	155,118.4	109,204.8
MH-338	786.76	785.56	914.4	1.2	155,252.3	109,137.2
MH-339	785.72	784.52	914.4	1.2	155,207.6	109,159.7
MH-344	792.49	791.29	914.4	1.2	155,503.3	108,898.0
MH-345	791.75	790.55	914.4	1.2	155,473.6	108,938.2
MH-376	732.06	730.53	914.4	1.53	154,746.7	109,450.9
MH-406	755.3	754.1	914.4	1.2	154,963.2	109,329.6
MH-408	803.67	802.47	914.4	1.2	155,617.9	108,802.5
MH-409	799.05	797.85	914.4	1.2	155,575.2	108,828.5
MH-419	824.42	823.22	914.4	1.2	155,919.3	108,628.6
MH-433	826.07	824.87	914.4	1.2	155,969.3	108,628.1
MH-462	737.23	735.86	914.4	1.36	154,793.0	109,432.0
MH-466	698.85	697.65	914.4	1.2	154,433.2	109,590.4
MH-471	832.66	829.87	914.4	2.78	156,018.2	108,638.4
MH-479	818.58	817.38	914.4	1.2	155,787.0	108,695.9
MH-480	815.32	814.12	914.4	1.2	155,745.0	108,722.9
MH-484	791.01	789.81	914.4	1.2	155,433.1	108,967.5
MH-485	790.27	789.07	914.4	1.2	155,400.3	109,005.2
MH-490	788.75	787.55	914.4	1.2	155,295.7	109,112.3
MH-491	795.34	794.14	914.4	1.2	155,538.4	108,862.3

MH-497	704.27	702.65	914.4	1.62	154,482.7	109,582.9
MH-501	718.32	717.12	914.4	1.2	154,622.2	109,534.4
MH-502	714.58	712.86	914.4	1.72	154,580.2	109,561.6
MH-505	709.06	707.86	914.4	1.2	154,532.0	109,574.9
MH-537	839.41	836.46	914.4	2.95	156,067.7	108,645.4
MH-543	771.42	769.52	914.4	1.91	155,075.7	109,230.7
MH-553	680.81	677.6	914.4	3.21	154,336.3	109,543.9
MH-554	673.81	669.3	914.4	4.51	154,334.3	109,523.1
MH-555	658.77	655.1	914.4	3.67	154,328.8	109,483.5
MH-556	650.93	647.6	914.4	3.33	154,326.4	109,463.7
MH-557	644.06	640.3	914.4	3.76	154,324.4	109,443.8
MH-558	632.01	627.64	914.4	4.36	154,321.4	109,424.1
MH-559	635.88	631.56	914.4	4.33	154,322.6	109,428.9
MH-560	628.09	624.55	914.4	3.54	154,320.0	109,419.2

B.3 Table of Sanitary Sewer Design Report For main (واد الفواره)

B.3.1 Pipe Report									
Label	start node	stop node	length (user define) m	length (scaled) m	slope (calculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-46	MH-142	MH-455		50	4.693	1.43	200	1	PVC
P-47	MH-455	MH-456		50	6.707	1.65	200	1	PVC
P-48	MH-456	MH-506		50	9.109	1.86	200	1.34	PVC
P-49	MH-506	MH-381		50	10	1.95	200	1.34	PVC
P-50	MH-381	MH-330		50	9.022	1.89	200	1	PVC
P-51	MH-330	MH-331		50	4.996	1.56	200	1	PVC
P-52	MH-331	MH-332		50	8.385	1.91	200	1	PVC
P-53	MH-332	MH-333		50	6.958	1.81	200	1	PVC
P-54	MH-333	MH-494		50	7.591	1.9	200	1	PVC
P-55	MH-494	MH-272		50	5.803	1.72	200	1.29	PVC
P-56	MH-272	MH-273		50	4.507	1.68	200	1.38	PVC
P-57	MH-273	MH-167		50	10	2.24	200	1.09	PVC
P-58	MH-167	MH-168		40	9.055	2.16	200	1	PVC
P-59	MH-168	MH-16		49.4	4.248	1.66	200	1	PVC
P-60	MH-16	MH-371		50.6	8.775	2.16	200	1	PVC
P-61	MH-371	MH-473		50	4.513	1.72	200	1	PVC
P-62	MH-473	MH-516		50	3.983	1.65	200	1	PVC
P-63	MH-516	MH-397		50	9.552	2.26	200	1	PVC
P-64	MH-397	MH-398		50	8.22	2.14	200	1	PVC
P-65	MH-398	MH-402		50	7.146	2.07	200	1	PVC
P-66	MH-402	MH-403		50	7.293	2.09	200	1	PVC
P-67	MH-152	MH-379	25	18.6	3.644	1.78	200	1.11	PVC
P-68	MH-379	MH-380		50	8.821	2.47	200	1.05	PVC
P-69	MH-380	MH-515		50	10	2.58	200	1.05	PVC
P-70	MH-515	MH-352		50	7.031	2.28	200	1	PVC
P-71	MH-352	MH-353		50	6.843	2.26	200	1	PVC
P-72	MH-353	MH-489		50	1.948	1.43	200	1	PVC
P-73	MH-489	MH-342		50	1.681	1.36	200	1	PVC
P-74	MH-342	MH-343		50	2.699	1.63	200	1	PVC
P-75	MH-343	MH-383		50	4.616	1.98	200	1	PVC
P-76	MH-383	MH-477		50	8.248	2.45	200	1.43	PVC
P-77	MH-477	MH-488		50	10	2.62	200	1.43	PVC
P-78	MH-488	MH-187		50	10	2.67	200	1.2	PVC
P-79	MH-187	MH-188		40	10	2.67	200	1.11	PVC
P-80	MH-188	MH-148		50	4.356	1.99	200	1	PVC

P-81	MH-204	MH-53		50	5.208	2.13	200	1	PVC
P-82	MH-54	MH-55		25	10	2.75	200	1.01	PVC
P-83	MH-55	MH-214		50	10	2.75	200	1.23	PVC
P-84	MH-214	MH-218		50	5.125	2.17	200	1	PVC
P-85	MH-218	MH-427		50	5.203	2.19	200	1	PVC
P-86	MH-427	MH-377		50	5.729	2.27	200	1.65	PVC
P-87	MH-377	MH-378		50	10	2.79	200	1.65	PVC
P-88	MH-378	MH-495		50	4.925	2.18	200	1	PVC
P-89	MH-495	MH-470		50	3.587	1.94	200	1	PVC
P-90	MH-470	MH-270		50	7.634	2.57	200	1	PVC
P-91	MH-270	MH-271		50	3.263	1.88	200	1	PVC
P-92	MH-271	MH-451		50	7.446	2.55	200	1	PVC
P-93	MH-451	MH-452		50	4.277	2.08	200	1	PVC
P-94	MH-452	MH-317		50	5.18	2.24	200	1	PVC
P-95	MH-317	MH-318		50	4.734	2.17	200	1	PVC
P-96	MH-318	MH-384		50	9.241	2.8	200	1	PVC
P-97	MH-384	MH-517		50	6.025	2.39	200	1	PVC
P-98	MH-517	MH-227		50	2.787	1.8	200	1	PVC
P-99	MH-227	MH-228		50	6.21	2.44	200	1	PVC
P-100	MH-228	MH-459		50	4.2	2.11	200	1	PVC
P-101	MH-459	MH-412		50	6.253	2.47	200	1	PVC
P-102	MH-412	MH-413		50	6.047	2.44	200	1	PVC
P-103	MH-413	MH-530		50	6.606	2.52	200	1	PVC
P-104	MH-530	MH-235		50	6.276	2.47	200	1	PVC
P-105	MH-235	MH-236		50	5.429	2.36	200	1	PVC
P-106	MH-236	MH-496		50	4.786	2.25	200	1	PVC
P-107	MH-496	MH-308		50	2.936	1.87	200	1	PVC
P-108	MH-308	MH-309		50	7.104	2.61	200	1	PVC
P-109	MH-309	MH-538		50	5.145	2.33	200	1	PVC
P-110	MH-538	MH-425		50	7.809	2.72	200	1	PVC
P-111	MH-425	MH-426		50	4.237	2.17	200	1	PVC
P-112	MH-426	MH-231		50	4.504	2.22	200	1	PVC
P-113	MH-231	MH-232		50	7.589	2.69	200	1	PVC
P-114	MH-232	MH-440		50	6.053	2.51	200	1	PVC
P-115	MH-440	MH-288		50	4.72	2.28	200	1.03	PVC
P-116	MH-288	MH-289		50	1.508	1.49	250	1.03	PVC
P-117	MH-289	MH-463		50	1.647	1.53	300	1.41	PVC
P-118	MH-463	MH-346		50	10	2.92	300	1.41	PVC
P-119	MH-346	MH-347		50	10	2.92	300	1.8	PVC
P-120	MH-347	MH-526		50	7.441	2.63	300	1	PVC
P-121	MH-526	MH-304		50	6.424	2.52	300	1	PVC
P-122	MH-304	MH-305		50	6.038	2.46	300	1	PVC
P-123	MH-305	MH-446		50	7.952	2.72	300	1.05	PVC
P-124	MH-446	MH-447		50	10	2.94	300	1.05	PVC
P-125	MH-447	MH-511		50	8.255	2.75	300	1	PVC

P-126	MH-511	MH-220		50	5.676	2.43	300	1	PVC
P-127	MH-220	MH-221		50	6.294	2.52	300	1	PVC
P-128	MH-221	MH-361		50	8.138	2.76	300	1.26	PVC
P-129	MH-361	MH-404		50	10	2.97	300	1.26	PVC
P-130	MH-404	MH-405		50	7.38	2.67	300	1	PVC
P-131	MH-405	MH-364		50	6	3.02	300	1.81	PVC
P-132	MH-364	MH-89		50	9.807	2.98	300	1	PVC
P-133	MH-62	MH-198		49.1	6	3.28	300	1.46	PVC
P-134	MH-198	MH-200		49.4	6.126	2.74	300	1.04	PVC
P-135	MH-200	MH-203		50	0.5	1.09	375	1.12	PVC
P-136	MH-203	MH-210		50	0.5	1.09	375	1.37	PVC
P-137	MH-210	MH-211		50	0.5	1.09	375	1.62	PVC
P-138	MH-211	MH-189		50	0.5	1.09	375	1.87	PVC
P-139	MH-189	MH-190		42	0.5	1.09	375	2.1	PVC
P-140	MH-190	MH-382		50	0.5	1.09	375	2.33	PVC
P-141	MH-382	MH-389		50	0.5	1.09	375	2.58	PVC
P-142	MH-389	MH-416		50	0.5	1.09	375	2.83	PVC
P-143	MH-416	MH-311		50	0.5	1.09	375	3.08	PVC
P-144	MH-311	MH-312		50	0.5	1.09	375	3.33	PVC
P-145	MH-312	MH-503		50	0.5	1.09	375	3.58	PVC
P-146	MH-503	MH-118		50	0.5	1.09	375	3.83	PVC
P-147	MH-118	O-1		30	0.5	1.09	375	4.03	PVC
P-231	MH-89	MH-48		25	7.72	2.74	300	1	PVC
P-232	MH-48	MH-62		25	6	3.28	300	1.25	PVC
P-432	MH-54	MH-52		25	4.169	2.01	200	1.01	PVC
P-433	MH-52	MH-53		25	5.83	2.24	200	1	PVC
P-536	MH-204	MH-147		50	4.429	2.01	200	1	PVC
P-537	MH-147	MH-148		31.3	8.307	2.52	200	1	PVC
P-545	MH-152	MH-403	25	31.4	8.319	2.68	200	1.11	PVC

B.3.2 Manhole Report for main (واد الفواره)

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-16	834.6	833.4	914.4	1.2	157,234.5	108,067.1
MH-48	589.17	587.28	914.4	1.89	154,103.2	109,426.2
MH-52	755.19	753.99	914.4	1.2	156,078.4	108,268.7
MH-53	756.65	755.45	914.4	1.2	156,103.4	108,269.4
MH-54	754.17	752.95	914.4	1.22	156,053.4	108,267.9
MH-55	751.65	749.98	914.4	1.66	156,029.1	108,273.8
MH-62	586.99	584.69	914.4	2.31	154,078.5	109,429.9
MH-89	591.1	589.8	914.4	1.3	154,128.0	109,422.5
MH-118	580	575.67	914.4	4.33	153,558.4	109,833.5

MH-142	884.21	883.01	914.4	1.2	157,875.4	107,861.5
MH-147	761.47	760.27	914.4	1.2	156,203.3	108,273.9
MH-148	764.07	762.87	914.4	1.2	156,234.6	108,275.0
MH-152	807.95	806.53	914.4	1.42	156,870.9	108,184.1
MH-167	840.32	839.12	914.4	1.2	157,323.0	108,063.5
MH-168	836.7	835.5	914.4	1.2	157,283.3	108,059.0
MH-187	770.47	769.05	914.4	1.42	156,322.0	108,262.8
MH-188	766.25	765.05	914.4	1.2	156,284.5	108,276.8
MH-189	580	577.63	914.4	2.37	153,803.3	109,540.5
MH-190	580	577.42	914.4	2.58	153,767.6	109,562.6
MH-198	582.95	581.65	914.4	1.3	154,030.0	109,437.4
MH-200	580	578.63	914.4	1.38	153,983.2	109,453.4
MH-203	580	578.38	914.4	1.62	153,938.5	109,475.7
MH-204	759.25	758.05	914.4	1.2	156,153.3	108,272.1
MH-210	580	578.13	914.4	1.87	153,893.8	109,498.1
MH-211	580	577.88	914.4	2.12	153,847.6	109,517.3
MH-214	746.18	744.98	914.4	1.2	155,985.6	108,298.4
MH-218	743.62	742.42	914.4	1.2	155,942.5	108,323.8
MH-220	616.69	615.39	914.4	1.3	154,374.1	109,292.8
MH-221	613.55	612.25	914.4	1.3	154,357.3	109,339.9
MH-227	703.61	702.41	914.4	1.2	155,306.3	108,445.5
MH-228	700.5	699.3	914.4	1.2	155,276.2	108,485.4
MH-231	664.84	663.64	914.4	1.2	154,680.8	108,707.6
MH-232	661.04	659.84	914.4	1.2	154,633.5	108,723.9
MH-235	685.81	684.61	914.4	1.2	155,068.0	108,611.9
MH-236	683.1	681.9	914.4	1.2	155,018.8	108,620.9
MH-270	725.08	723.88	914.4	1.2	155,665.7	108,384.2
MH-271	723.45	722.25	914.4	1.2	155,621.6	108,360.5
MH-272	848.15	846.38	914.4	1.77	157,422.2	108,064.2
MH-273	845.5	844.12	914.4	1.38	157,372.6	108,070.1
MH-288	655.7	654.45	914.4	1.25	154,552.3	108,781.8
MH-289	655	653.7	914.4	1.3	154,523.7	108,822.9
MH-304	635.65	634.35	914.4	1.3	154,413.3	109,045.9
MH-305	632.63	631.33	914.4	1.3	154,404.0	109,095.1
MH-308	679.24	678.04	914.4	1.2	154,920.2	108,637.8
MH-309	675.68	674.48	914.4	1.2	154,870.8	108,645.1
MH-311	580	576.42	914.4	3.58	153,625.2	109,699.3
MH-312	580	576.17	914.4	3.83	153,605.5	109,745.3
MH-317	715	713.8	914.4	1.2	155,477.5	108,345.3
MH-318	712.63	711.43	914.4	1.2	155,431.1	108,363.9
MH-330	864.44	863.24	914.4	1.2	157,656.8	107,977.6
MH-331	861.95	860.75	914.4	1.2	157,609.7	107,994.6
MH-332	857.75	856.55	914.4	1.2	157,563.1	108,012.7
MH-333	854.27	853.07	914.4	1.2	157,516.1	108,029.8
MH-342	788.66	787.46	914.4	1.2	156,554.9	108,177.1

MH-343	787.31	786.11	914.4	1.2	156,505.2	108,182.7
MH-346	649.18	646.29	914.4	2.89	154,475.0	108,910.2
MH-347	642.59	641.29	914.4	1.3	154,450.7	108,953.9
MH-352	793.89	792.69	914.4	1.2	156,704.0	108,193.8
MH-353	790.47	789.27	914.4	1.2	156,654.3	108,187.6
MH-361	610	608.18	914.4	1.82	154,319.9	109,373.1
MH-364	596	594.7	914.4	1.3	154,177.5	109,415.7
MH-371	830.16	828.96	914.4	1.2	157,186.1	108,081.7
MH-377	739.46	736.96	914.4	2.5	155,855.8	108,373.7
MH-378	733.16	731.96	914.4	1.2	155,811.1	108,395.9
MH-379	806.82	805.62	914.4	1.2	156,853.1	108,189.4
MH-380	802.52	801.21	914.4	1.31	156,803.8	108,197.4
MH-381	868.95	867.75	914.4	1.2	157,703.9	107,960.9
MH-382	580	577.17	914.4	2.83	153,725.6	109,589.6
MH-383	785	783.8	914.4	1.2	156,458.7	108,201.1
MH-384	708.01	706.81	914.4	1.2	155,385.7	108,384.9
MH-389	580	576.92	914.4	3.08	153,686.5	109,620.9
MH-397	821.14	819.94	914.4	1.2	157,043.5	108,128.3
MH-398	817.03	815.83	914.4	1.2	156,996.1	108,144.2
MH-402	813.46	812.26	914.4	1.2	156,948.5	108,159.4
MH-403	809.81	808.61	914.4	1.2	156,901.1	108,175.2
MH-404	604.48	603.18	914.4	1.3	154,274.6	109,394.2
MH-405	600.79	597.79	914.4	3	154,227.2	109,410.0
MH-412	695.27	694.07	914.4	1.2	155,207.1	108,557.4
MH-413	692.25	691.05	914.4	1.2	155,163.1	108,581.1
MH-416	580	576.67	914.4	3.33	153,652.5	109,657.4
MH-425	669.21	668.01	914.4	1.2	154,775.5	108,675.5
MH-426	667.09	665.89	914.4	1.2	154,727.9	108,690.7
MH-427	741.02	739.82	914.4	1.2	155,898.9	108,348.3
MH-440	658.01	656.81	914.4	1.2	154,591.1	108,750.3
MH-446	628.76	627.36	914.4	1.4	154,397.0	109,144.6
MH-447	623.66	622.36	914.4	1.3	154,390.0	109,194.1
MH-451	719.73	718.53	914.4	1.2	155,576.0	108,340.2
MH-452	717.59	716.39	914.4	1.2	155,526.3	108,334.4
MH-455	881.86	880.66	914.4	1.2	157,837.0	107,893.5
MH-456	878.51	877.31	914.4	1.2	157,796.0	107,922.1
MH-459	698.4	697.2	914.4	1.2	155,244.2	108,523.9
MH-463	655	652.88	914.4	2.12	154,499.3	108,866.5
MH-470	728.9	727.7	914.4	1.2	155,712.4	108,401.9
MH-473	827.91	826.71	914.4	1.2	157,138.3	108,096.5
MH-477	781.74	779.68	914.4	2.06	156,412.9	108,221.1
MH-488	775.88	774.27	914.4	1.61	156,367.5	108,242.0
MH-489	789.5	788.3	914.4	1.2	156,604.7	108,181.6
MH-494	850.48	849.28	914.4	1.2	157,469.3	108,047.2
MH-495	730.69	729.49	914.4	1.2	155,762.2	108,406.6

MH-496	680.7	679.5	914.4	1.2	154,969.4	108,628.9
MH-503	580	575.92	914.4	4.08	153,583.5	109,790.2
MH-506	874.64	872.75	914.4	1.88	157,750.5	107,942.8
MH-511	619.53	618.23	914.4	1.3	154,382.2	109,243.5
MH-515	797.41	796.21	914.4	1.2	156,753.8	108,198.0
MH-516	825.92	824.72	914.4	1.2	157,091.0	108,112.5
MH-517	705	703.8	914.4	1.2	155,344.7	108,413.4
MH-526	638.87	637.57	914.4	1.3	154,426.8	108,997.8
MH-530	688.95	687.75	914.4	1.2	155,115.7	108,596.9
MH-538	673.11	671.91	914.4	1.2	154,822.9	108,659.5

B.4 Table of Sanitary Sewer Design Report For main (خلة الجبالي)

B.4.1 Pipe Report									
Label	start node	stop node	length (user define) m	length (scaled) m	slope (calculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-148	MH-301	MH-5		50	6.246	0.69	200	1	PVC
P-149	MH-5	MH-6		3.4	5.893	0.69	200	1.02	PVC
P-150	MH-6	MH-164		39.8	10	0.83	200	1.02	PVC
P-151	MH-164	MH-194		46.7	10	0.84	200	1.13	PVC
P-152	MH-194	MH-202		50	10	0.84	200	1.35	PVC
P-153	MH-202	MH-205		50	9.661	0.98	200	1	PVC
P-154	MH-205	MH-209		50	9.631	1.04	200	1	PVC
P-155	MH-209	MH-213		50	10	1.19	200	1.72	PVC
P-156	MH-213	MH-216		50	10	1.2	200	1.09	PVC
P-157	MH-216	MH-155		50	9.182	1.18	200	1	PVC
P-158	MH-155	MH-156		34.8	10	1.24	200	1.23	PVC
P-159	MH-156	MH-145		50	9.818	1.25	200	1	PVC
P-160	MH-145	MH-146		30.9	10	1.31	200	1.91	PVC
P-161	MH-146	MH-223		50	10	1.33	200	1.84	PVC
P-162	MH-223	MH-122		50	10	1.33	200	2.81	PVC
P-163	MH-122	MH-123		30	10	1.5	200	1.59	PVC
P-164	MH-123	MH-367		50	6.563	1.31	200	1	PVC
P-165	MH-367	MH-546		50	0.667	0.6	200	1.59	PVC
P-166	MH-546	MH-522		50	0.665	0.6	200	2.56	PVC
P-167	MH-522	MH-281		50	0.658	0.6	200	2.57	PVC
P-168	MH-281	MH-282		50	1.766	0.85	200	1.6	PVC
P-169	MH-282	MH-418		50	2.22	0.93	200	1	PVC
P-170	MH-418	MH-395		50	2.338	0.96	200	1	PVC
P-171	MH-395	MH-396		50	0.62	0.6	200	1.01	PVC
P-172	MH-396	MH-266		50	0.592	0.6	200	1.04	PVC
P-173	MH-266	MH-267		50	0.577	0.6	200	1.05	PVC
P-174	MH-267	MH-285		50	0.569	0.6	200	1.06	PVC
P-175	MH-285	MH-151		50	0.558	0.6	200	1.06	PVC
P-176	MH-151	MH-152		33.1	0.55	0.6	200	1.14	PVC

B.4.2Manhole Report for main (خلة الجبالي)

label	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-5	890.74	889.54	914.4	1.2	156,931.9	108,517.3
MH-6	890.57	889.34	914.4	1.23	156,928.7	108,518.5
MH-122	820.99	818.61	914.4	2.38	156,427.0	108,473.4
MH-123	816.81	815.61	914.4	1.2	156,403.3	108,455.1
MH-145	841.2	838.18	914.4	3.02	156,518.3	108,542.6
MH-146	836.29	833.41	914.4	2.88	156,517.3	108,511.7
MH-151	807.97	806.71	914.4	1.26	156,870.6	108,217.2
MH-152	807.95	806.53	914.4	1.42	156,870.9	108,184.1
MH-155	850.05	848.38	914.4	1.67	156,554.4	108,595.7
MH-156	846.11	844.91	914.4	1.2	156,519.8	108,592.6
MH-164	886.56	885.1	914.4	1.46	156,891.6	108,532.9
MH-194	881.62	879.71	914.4	1.91	156,849.1	108,552.5
MH-202	875.92	874.72	914.4	1.2	156,802.8	108,571.2
MH-205	871.09	869.89	914.4	1.2	156,753.1	108,576.8
MH-209	866.27	863.63	914.4	2.65	156,703.4	108,582.2
MH-213	859.83	858.44	914.4	1.38	156,654.3	108,591.8
MH-216	854.64	853.44	914.4	1.2	156,604.4	108,594.2
MH-223	829.61	824.79	914.4	4.82	156,468.4	108,501.5
MH-266	808.81	807.56	914.4	1.25	156,722.9	108,240.9
MH-267	808.53	807.28	914.4	1.25	156,772.7	108,237.3
MH-281	813.74	811.33	914.4	2.41	156,485.9	108,293.4
MH-282	811.65	810.45	914.4	1.2	156,526.3	108,264.0
MH-285	808.25	806.99	914.4	1.26	156,822.1	108,229.5
MH-301	893.86	892.66	914.4	1.2	156,976.6	108,494.9
MH-367	813.53	812.33	914.4	1.2	156,393.0	108,406.1
MH-395	809.37	808.17	914.4	1.2	156,623.5	108,242.0
MH-396	809.09	807.86	914.4	1.23	156,673.1	108,235.7
MH-418	810.54	809.34	914.4	1.2	156,574.1	108,249.2
MH-522	814.8	811.66	914.4	3.14	156,445.9	108,323.4
MH-546	814.38	811.99	914.4	2.39	156,411.4	108,359.6

B.5 Table of Sanitary Sewer Design Report For Sub Main (خط حسكا)

B.5.1 Pipe Report

Label	start node	stop node	length (user define) m	length (scaled) m	slope (calculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-446(1)	MH-531	MH-551	40	30.9	6.916	1.71	200	1	PVC
P-446(2)	MH-551	MH-478	22.5	31.6	10	1.9	200	2.73	PVC
P-447	MH-478	MH-468		50	10	1.89	200	2.11	PVC
P-448	MH-468	MH-457		50	8.248	1.74	200	1	PVC
P-449	MH-457	MH-192		50	5.386	1.48	200	1	PVC
P-450	MH-192	MH-193		45	7.166	1.61	200	1	PVC
P-451	MH-193	MH-250		50	6.166	1.5	200	1	PVC
P-452	MH-250	MH-326		50	6.127	1.48	200	1	PVC
P-453	MH-326	MH-327		50	10	1.73	200	1.29	PVC
P-454	MH-327	MH-474		50	6.209	1.45	200	1.29	PVC
P-455	MH-474	MH-475		50	5.816	1.39	200	1	PVC
P-456	MH-475	MH-507		50	9.706	1.65	200	1	PVC
P-457	MH-507	MH-508		50	9.423	1.61	200	1	PVC

B.5.2 Manhole Report for Sub Main (حسكا)

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-192	865.62	864.42	914.4	1.2	158,340.9	108,217.6
MH-193	868.85	867.65	914.4	1.2	158,376.0	108,189.4
MH-250	871.93	870.73	914.4	1.2	158,417.4	108,161.5
MH-326	874.99	873.79	914.4	1.2	158,463.8	108,142.9
MH-327	880.58	878.79	914.4	1.79	158,506.5	108,116.8
MH-457	862.93	861.73	914.4	1.2	158,304.6	108,252.1
MH-468	858.8	855.39	914.4	3.42	158,268.8	108,286.9
MH-474	883.1	881.9	914.4	1.2	158,554.8	108,104.0
MH-475	886.01	884.81	914.4	1.2	158,604.3	108,096.7
MH-478	851.59	846.93	914.4	4.66	158,236.0	108,324.7
MH-507	890.86	889.66	914.4	1.2	158,652.5	108,083.3
MH-508	895.57	894.37	914.4	1.2	158,700.2	108,068.4
MH-531	843.12	841.92	914.4	1.2	158,195.8	108,372.6
MH-551	845.88	844.68	914.4	1.2	158,215.6	108,348.8

B.6 Table of Sanitary Sewer Design Report For Sub Main (خلة العطاونة)

B.6.1 Pipe Report									
Label	start node	stop node	length (user define) m	length (scaled) m	slope (calculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-332	MH-102	MH-64		25.1	0.568	0.6	200	1.03	PVC
P-333	MH-64	MH-65		25	10	1.66	200	2.65	PVC
P-334	MH-65	MH-527		50	10	1.65	200	1.4	PVC
P-335	MH-527	MH-69		50	10	1.65	200	2.34	PVC
P-336	MH-69	MH-70		25	10	1.64	200	1.71	PVC
P-337	MH-70	MH-63		25	10	1.64	200	2.93	PVC
P-338(1)	MH-63	MH-564	12.5	12.5	10	1.64	200	2.6	PVC
P-338(2)	MH-564	MH-9	12.5	12.5	10	1.64	200	2.61	PVC
P-339(1)	MH-9	MH-563	12.5	12.5	10	1.57	200	2.8	PVC
P-339(2)	MH-563	MH-58	12.5	12.5	10	1.57	200	2.86	PVC
P-340(1)	MH-58	MH-562	12.5	12.5	10	1.57	200	3.44	PVC
P-340(2)	MH-562	MH-59	12.5	12.5	15	1.81	200	3.27	PVC
P-341(1)	MH-59	MH-561	12.5	12.5	10	1.57	200	2.62	PVC
P-341(2)	MH-561	MH-79	12.5	12.5	10	1.57	200	2.43	PVC
P-342	MH-79	MH-71		25	10	1.55	200	1.89	PVC
P-343	MH-71	MH-72		25	10	1.55	200	1.46	PVC
P-344	MH-72	MH-96		25	10	1.55	200	1.78	PVC
P-345	MH-96	MH-25		25	10	1.55	200	2.13	PVC
P-346	MH-25	MH-26		20	10	1.53	200	1.64	PVC
P-347	MH-26	MH-139		50	9.244	1.48	200	1.64	PVC
P-348	MH-139	MH-87		30	2.018	0.87	200	1	PVC
P-349	MH-87	MH-88		25	1.488	0.78	200	1	PVC
P-350	MH-88	MH-420		50	4.841	1.18	200	1	PVC
P-351	MH-420	MH-421		50	0.793	0.62	200	1	PVC
P-352	MH-421	MH-128		50	2.875	0.98	200	1	PVC
P-353	MH-128	MH-129		30	3.152	1.01	200	1	PVC
P-354	MH-129	MH-242		50	8.293	1.42	200	1	PVC
P-355	MH-242	MH-328		50	8.31	1.42	200	1	PVC
P-356	MH-328	MH-329		50	7.19	1.35	200	1	PVC
P-357	MH-329	MH-375		50	7.2	1.35	200	1	PVC
P-358	MH-375	MH-493		50	8.02	1.4	200	1	PVC
P-359	MH-493	MH-292		50	8.017	1.38	200	1	PVC
P-360	MH-292	MH-293		50	8.446	1.4	200	1	PVC
P-361	MH-293	MH-524		50	8.749	1.38	200	1	PVC
P-362	MH-524	MH-407		50	9.189	1.41	200	1	PVC

P-363	MH-407	MH-362		50	9.115	1.4	200	1	PVC
P-364	MH-362	MH-363		50	8.489	1.37	200	1	PVC
P-522	MH-363	MH-450		50	4.857	1.1	200	1	PVC
P-523	MH-450	MH-465		50	9.5	1.38	200	1.22	PVC
P-524	MH-465	MH-438		50	0.88	0.6	200	1.22	PVC
P-525	MH-438	MH-439		50	7.8	1.29	200	1	PVC
P-526	MH-439	MH-476		50	7.8	1.23	200	1	PVC
P-527	MH-476	MH-322		50	7.8	1.09	200	1	PVC
P-528	MH-322	MH-323		50	7.8	1.09	200	1	PVC
P-529	MH-323	MH-241		50	7.8	1.09	200	1	PVC
P-530	MH-241	MH-90		50	7.8	1.01	200	1	PVC
P-531	MH-90	MH-91		25	10	1.08	200	1.7	PVC
P-532	MH-91	MH-370		50	7.8	0.99	200	1	PVC
P-533	MH-370	MH-73		50	7.8	0.88	200	1	PVC
P-534	MH-73	MH-74		25	10	0.96	200	1.7	PVC
P-535	MH-74	MH-178		40	10	0.89	200	1.18	PVC

B.6.2 Manhole Report for Sub Main (خله العطاونة)

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-9	650.19	645.77	914.4	4.42	154,716.6	109,784.4
MH-25	697.69	694.23	914.4	3.46	154,583.8	109,684.9
MH-26	700.98	698.49	914.4	2.49	154,597.4	109,670.2
MH-58	660.01	655.1	914.4	4.92	154,691.8	109,781.6
MH-59	672.56	666.82	914.4	5.74	154,667.8	109,774.4
MH-63	641.27	636.21	914.4	5.06	154,741.6	109,784.8
MH-64	611.71	610.51	914.4	1.2	154,906.6	109,747.7
MH-65	617.51	613.01	914.4	4.5	154,883.0	109,739.6
MH-69	631	627.11	914.4	3.89	154,791.1	109,778.9
MH-70	634.91	632.3	914.4	2.61	154,766.6	109,783.9
MH-71	685.45	682.47	914.4	2.98	154,627.0	109,746.0
MH-72	688.87	686.75	914.4	2.12	154,610.8	109,727.0
MH-73	798.72	797.52	914.4	1.2	155,752.6	109,029.4
MH-74	802.62	800.02	914.4	2.6	155,772.6	109,014.5
MH-79	681.17	677.1	914.4	4.07	154,645.9	109,762.4
MH-87	704.92	703.72	914.4	1.2	154,677.3	109,672.9
MH-88	705.29	704.09	914.4	1.2	154,701.9	109,668.5
MH-90	787.02	785.82	914.4	1.2	155,638.9	109,068.6
MH-91	790.92	788.32	914.4	2.6	155,658.5	109,053.0
MH-96	692.93	690.17	914.4	2.76	154,596.9	109,706.2
MH-102	611.63	610.37	914.4	1.26	154,925.3	109,764.6

MH-128	709.55	708.35	914.4	1.2	154,839.2	109,608.8
MH-129	710.49	709.29	914.4	1.2	154,865.7	109,594.7
MH-139	704.32	703.12	914.4	1.2	154,647.4	109,670.5
MH-178	806.98	805.42	914.4	1.56	155,778.9	108,975.0
MH-241	783.12	781.92	914.4	1.2	155,615.3	109,112.7
MH-242	714.64	713.44	914.4	1.2	154,897.8	109,556.4
MH-292	734.01	732.81	914.4	1.2	155,071.0	109,383.5
MH-293	738.23	737.03	914.4	1.2	155,117.3	109,364.7
MH-322	775.32	774.12	914.4	1.2	155,564.7	109,198.9
MH-323	779.22	778.02	914.4	1.2	155,588.8	109,155.1
MH-328	718.79	717.59	914.4	1.2	154,921.0	109,512.1
MH-329	722.39	721.19	914.4	1.2	154,952.3	109,473.2
MH-362	751.76	750.56	914.4	1.2	155,263.9	109,336.1
MH-363	756	754.8	914.4	1.2	155,311.7	109,321.4
MH-370	794.82	793.62	914.4	1.2	155,708.5	109,053.0
MH-375	725.99	724.79	914.4	1.2	154,986.3	109,436.5
MH-407	747.2	746	914.4	1.2	155,214.7	109,344.5
MH-420	707.71	706.51	914.4	1.2	154,745.8	109,644.5
MH-421	708.11	706.91	914.4	1.2	154,792.6	109,626.9
MH-438	763.62	762.42	914.4	1.2	155,448.0	109,268.6
MH-439	767.52	766.32	914.4	1.2	155,498.0	109,267.5
MH-450	758.43	757.23	914.4	1.2	155,352.7	109,292.7
MH-465	763.61	761.98	914.4	1.63	155,398.1	109,271.8
MH-476	771.42	770.22	914.4	1.2	155,541.7	109,243.3
MH-493	730	728.8	914.4	1.2	155,027.6	109,408.2
MH-524	742.61	741.41	914.4	1.2	155,164.9	109,349.2
MH-527	623.31	621.31	914.4	2	154,837.5	109,760.4
MH-561	677.05	672.61	914.4	4.44	154,656.9	109,768.4
MH-562	666.14	660.06	914.4	6.08	154,679.8	109,778.0
MH-563	655.05	650.24	914.4	4.81	154,704.2	109,783.1
MH-564	645.72	641.32	914.4	4.4	154,729.1	109,784.5

B.7 Table of Sanitary Sewer Design Report For Sub Main (شعب الشحده)

B.7.1 Pipe Report									
Label	start node	stop node	length (user define) m	length (scaled) m	slope (calculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-386	MH-21	MH-22		20	10	1.75	200	3.08	PVC
P-387	MH-22	MH-394		50	10	1.75	200	2.75	PVC
P-388	MH-394	MH-30		50	10	1.74	200	2.75	PVC
P-389(1)	MH-30	MH-574	10	10	10	1.74	200	2.61	PVC
P-389(2)	MH-574	MH-31	10	10	10	1.74	200	2.64	PVC
P-390	MH-31	MH-351		50	10	1.73	200	2.75	PVC
P-391(1)	MH-351	MH-573		25	10	1.72	200	3.21	PVC
P-391(2)	MH-573	MH-422		25	10	1.72	200	3.2	PVC
P-392(1)	MH-422	MH-572	25	25	10	1.7	200	2.89	PVC
P-392(2)	MH-572	MH-98	25	25	10	1.7	200	2.86	PVC
P-430	MH-98	MH-77		25	4.187	1.25	200	3.03	PVC
P-471	MH-77	MH-109		30	10	1.54	200	3.15	PVC
P-472	MH-109	MH-100		30	10	1.54	200	3.35	PVC
P-473	MH-100	MH-101		25	10	1.54	200	3.25	PVC
P-474(1)	MH-101	MH-571	25	25	10	1.54	200	2.74	PVC
P-474(2)	MH-571	MH-127	25	25	10	1.54	200	2.76	PVC
P-475	MH-127	MH-126		30	10	1.54	200	3.25	PVC
P-476(1)	MH-126	MH-570		15	10	1.54	200	2.36	PVC
P-476(2)	MH-570	MH-27		15	10	1.54	200	2.39	PVC
P-481	MH-27	MH-28		20	10	1.39	200	1.79	PVC
P-482	MH-28	MH-350		50	4.96	1.09	200	1.79	PVC
P-483	MH-350	MH-504		50	1.54	0.72	200	1	PVC
P-484	MH-504	MH-133		50	1.5	0.71	200	1	PVC
P-485	MH-133	MH-113		30	1.667	0.73	200	1	PVC
P-486	MH-113	MH-114		30	1.667	0.73	200	1	PVC
P-487	MH-114	MH-44		50	1.54	0.69	200	1	PVC
P-488	MH-44	MH-45		20	1.198	0.61	200	1.05	PVC
P-489	MH-45	MH-42		40	1.155	0.6	200	1.16	PVC
P-490	MH-42	MH-43		20	1.16	0.6	200	1.28	PVC

B.7.2 Manhole Report for Sub Main (شعب الشحده)

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-21	678.42	675.95	914.4	2.47	156,226.1	109,373.0
MH-22	684.58	679.22	914.4	5.36	156,226.4	109,353.0
MH-27	800	796.03	914.4	3.97	156,090.2	109,155.0
MH-28	803.58	800.8	914.4	2.78	156,104.6	109,141.2
MH-30	701.58	696.88	914.4	4.7	156,145.3	109,312.2
MH-31	710.08	705.6	914.4	4.48	156,125.3	109,311.6
MH-42	808.7	807.27	914.4	1.43	156,368.5	108,963.4
MH-43	809.04	807.5	914.4	1.54	156,388.5	108,964.5
MH-44	807.77	806.57	914.4	1.2	156,314.5	108,989.3
MH-45	808.1	806.81	914.4	1.29	156,333.2	108,982.2
MH-77	750	744.75	914.4	5.25	155,954.7	109,281.0
MH-98	744.9	739.97	914.4	4.93	155,977.3	109,291.5
MH-100	765	759.1	914.4	5.9	156,005.0	109,259.7
MH-101	772	766.3	914.4	5.7	156,021.7	109,241.0
MH-109	757.3	751.8	914.4	5.5	155,975.1	109,259.0
MH-113	806.5	805.3	914.4	1.2	156,250.3	109,035.6
MH-114	807	805.8	914.4	1.2	156,270.8	109,013.7
MH-126	791.5	785.8	914.4	5.7	156,070.5	109,177.6
MH-127	784	779.28	914.4	4.72	156,052.8	109,201.9
MH-133	806	804.8	914.4	1.2	156,227.1	109,054.6
MH-350	804.48	803.28	914.4	1.2	156,146.2	109,113.4
MH-351	718.58	713.88	914.4	4.7	156,075.4	109,308.8
MH-394	693.08	688.38	914.4	4.7	156,195.3	109,313.9
MH-422	732.4	726.79	914.4	5.61	156,025.5	109,304.9
MH-504	805.25	804.05	914.4	1.2	156,186.9	109,084.3
MH-570	795.72	791.8	914.4	3.93	156,080.3	109,166.4
MH-571	777.98	773.3	914.4	4.68	156,037.3	109,221.4
MH-572	738.67	733.7	914.4	4.97	156,001.4	109,298.3
MH-573	725.49	719.88	914.4	5.61	156,050.5	109,306.8
MH-574	705.8	701.38	914.4	4.42	156,135.3	109,311.9

B.8 Table of Sanitary Sewer Design Report For sub main (الجرن)

B.8.1 Pipe Report

Label	start node	stop node	lenghth (user define) m	lenghth (scaled) m	slope (culculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-236	MH-287	MH-32		50	8.309	0.81	200	1.95	PVC
P-237	MH-32	MH-33		20	3.59	0.6	200	1.91	PVC
P-238	MH-33	MH-130		50	3.637	0.6	200	1.83	PVC
P-239	MH-130	MH-131		30	5.012	0.6	200	2.17	PVC
P-240	MH-131	MH-185		50	5.2	0.6	200	2.12	PVC
P-241	MH-185	MH-121		40	5.253	0.61	200	1.77	PVC
P-242	MH-121	MH-116		30	7.723	0.6	200	1.56	PVC
P-243	MH-116	MH-117		30	7.992	0.6	200	1.2	PVC

B.8.2 Manhole Report for Sub Main (الجرن)

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-32	849.64	847.36	914.4	2.28	156,148.4	108,661.0
MH-33	850.02	848.08	914.4	1.94	156,165.9	108,670.7
MH-116	860.02	858.42	914.4	1.6	156,314.7	108,768.1
MH-117	862.02	860.82	914.4	1.2	156,344.1	108,762.2
MH-121	858.02	856.11	914.4	1.91	156,285.3	108,762.0
MH-130	852.02	849.9	914.4	2.12	156,215.8	108,667.8
MH-131	854.02	851.4	914.4	2.62	156,241.2	108,683.7
MH-185	856.02	854	914.4	2.02	156,263.4	108,728.6
MH-287	845.23	843.21	914.4	2.03	156,113.5	108,625.2

B.9 Table of Sanitary Sewer Design Report For sub main (الكوربه)

B.9.1 Pipe Report Material

Label	start node	stop node	lenghth (user define) m	lenghth (scaled) m	slope (culculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-250	MH-212	MH-209		50	5.93	0.7	200	3.64	PVC
P-251	MH-217	MH-212		50	4.722	0.6	200	4.65	PVC
P-252	MH-243	MH-217		50	6.756	0.6	200	3.78	PVC
P-253	MH-356	MH-243		50	8.293	0.61	200	2.04	PVC

B.9.2 Manhole Report for Sub Main (الكوربه)

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-209	866.27	863.63	914.4	2.65	156,703.4	108,582.2
MH-212	871.62	866.59	914.4	5.02	156,716.9	108,630.4
MH-217	873.62	868.95	914.4	4.67	156,724.7	108,679.7
MH-243	875.62	872.33	914.4	3.29	156,686.5	108,711.9
MH-356	877.68	876.48	914.4	1.2	156,650.7	108,746.8

B.10 Table of Sanitary Sewer Design Report For sub main (بئر البلد)

B.10.1 Pipe Report

Label	start node	stop node	lenghth (user define) m	lenghth (scaled) m	slope (culculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-441	MH-52	MH-108		30	3.38	0.74	200	1	PVC
P-442	MH-108	MH-215		50	10	1.05	200	1.07	PVC
P-443	MH-215	MH-219		50	10	1.01	200	2.21	PVC
P-444	MH-219	MH-310		50	10	0.93	200	3.18	PVC
P-445	MH-310	MH-547		50	10	0.79	200	3.37	PVC

B.10.2 Manhole Report for Sub Main (بئر البلد)

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-52	755.19	753.99	914.4	1.2	156,078.4	108,268.7
MH-108	756.21	755.01	914.4	1.2	156,098.8	108,290.7
MH-215	761.34	760.01	914.4	1.33	156,147.5	108,302.0
MH-219	768.77	765.14	914.4	3.63	156,195.7	108,315.0
MH-310	778.13	772.57	914.4	5.56	156,235.5	108,345.4
MH-547	787.87	781.93	914.4	5.94	156,261.8	108,387.9

B.11 Table of Sanitary Sewer Design Report For Sub Main (خله العين)

B.11.1 Pipe Report

Label	start node	stop node	lenghth (user define) m	lenghth (scaled) m	slope (culculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-403	MH-34	MH-225		50	10	1.85	200	1.22	PVC
P-404	MH-225	MH-180		50	10	1.85	200	2.64	PVC
P-405	MH-180	MH-181		40	10	1.83	200	1.35	PVC
P-406	MH-181	MH-268		50	10	1.83	200	1.82	PVC
P-407	MH-268	MH-269		50	10	1.83	200	1.78	PVC
P-408	MH-269	MH-299		50	10	1.8	200	1.1	PVC
P-409	MH-299	MH-300		50	9.333	1.76	200	1.1	PVC
P-410	MH-300	MH-414		50	3.264	1.2	200	1	PVC
P-411	MH-414	MH-365		50	10	1.75	200	1.45	PVC
P-412	MH-365	MH-366		50	10	1.68	200	2.09	PVC
P-413	MH-366	MH-415		50	10	1.68	200	1.87	PVC
P-414	MH-415	MH-467		50	10	1.68	200	1.04	PVC
P-415	MH-467	MH-544		50	10	1.61	200	2.22	PVC
P-416	MH-544	MH-306		50	10	1.61	200	2.93	PVC
P-417	MH-306	MH-307		50	8.26	1.44	200	1	PVC
P-418	MH-307	MH-401		50	10	1.54	200	2.43	PVC
P-419	MH-401	MH-483		50	9.619	1.44	200	1	PVC
P-420	MH-483	MH-115		50	9.306	1.43	200	1	PVC
P-421	MH-115	MH-13		30	10	1.46	200	2.03	PVC
P-422	MH-13	MH-14		15	10	1.46	200	1.44	PVC

B.11.2 Manhole Report for Sub Main (خلة العين)

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-13	735.6	732.35	914.4	3.25	154,989.2	108,855.2
MH-14	737.98	735.9	914.4	2.07	154,983.5	108,841.3
MH-34	625	619.37	914.4	5.63	154,318.6	109,414.4
MH-115	730.55	729.35	914.4	1.2	154,988.0	108,885.1
MH-180	638.71	634.23	914.4	4.47	154,416.7	109,395.1
MH-181	643.41	641.51	914.4	1.9	154,439.0	109,361.9
MH-225	630.43	628.8	914.4	1.63	154,367.2	109,402.5
MH-268	650.04	647.21	914.4	2.83	154,454.8	109,314.5

MH-269	656.61	653.84	914.4	2.77	154,476.6	109,269.5
MH-299	661.81	660.41	914.4	1.41	154,513.2	109,235.4
MH-300	666.27	665.07	914.4	1.2	154,547.6	109,199.1
MH-306	709.11	704.05	914.4	5.06	154,838.6	109,009.5
MH-307	713.24	712.04	914.4	1.2	154,882.5	108,985.5
MH-365	673.81	671.71	914.4	2.1	154,623.2	109,133.9
MH-366	680.98	677.61	914.4	3.38	154,664.9	109,106.2
MH-401	721.09	717.04	914.4	4.05	154,926.9	108,962.5
MH-414	667.91	666.71	914.4	1.2	154,583.5	109,164.3
MH-415	687.73	684.78	914.4	2.94	154,709.2	109,083.2
MH-467	692.81	691.53	914.4	1.28	154,754.6	109,062.3
MH-483	725.9	724.7	914.4	1.2	154,964.0	108,929.0
MH-544	700.25	696.61	914.4	3.64	154,800.0	109,041.2

B.12 Table of Sanitary Sewer Design Report For Sub Main (لفة الطاقة)

B.12.1 Pipe Report

Label	start node	stop node	lenghth (user define) m	lenghth (scaled) m	slope (culculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-244	MH-481	MH-122		50	8.63	0.94	200	1.59	PVC
P-245	MH-40	MH-481		50	10	0.95	200	2.61	PVC
P-246	MH-41	MH-40		20	10	0.86	200	1.57	PVC
P-247	MH-184	MH-41		50	10	0.86	200	1.66	PVC
P-248	MH-140	MH-184		40	10	0.72	200	2.16	PVC
P-249	MH-141	MH-140		30	10	0.71	200	1.89	PVC

B.12.2 Manhole Report for Sub Main (لفة الطاقة)

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-40	832.33	827.92	914.4	4.41	156,361.0	108,530.9
MH-41	835.46	833.13	914.4	2.33	156,341.3	108,534.7
MH-122	820.99	818.61	914.4	2.38	156,427.0	108,473.4
MH-140	848.1	844.58	914.4	3.52	156,274.6	108,584.7
MH-141	852.88	849.9	914.4	2.99	156,266.0	108,613.4
MH-184	841.78	839.26	914.4	2.52	156,313.7	108,576.4
MH-481	824.12	822.92	914.4	1.2	156,409.9	108,520.4

B.13 Table of Sanitary Sewer Design Report For Sub Main (العصفورة)

B.13.1 Pipe Report

Label	start node	stop node	lenghth (user define) m	lenghth (scaled) m	slope (culculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-365	MH-272	MH-337		50	1.306	0.6	200	1.29	PVC
P-366	MH-337	MH-458		50	1.8	0.67	200	1	PVC
P-367	MH-458	MH-157		50	1.8	0.65	200	1	PVC
P-368	MH-157	MH-137		35	2.571	0.73	200	1	PVC
P-369	MH-137	MH-138		30	1.871	0.65	200	1.17	PVC
P-370	MH-138	MH-179		40	1.517	0.6	200	1.49	PVC
P-371	MH-179	MH-191		45	1.569	0.6	200	1.73	PVC
P-434	MH-191	MH-359		50	1.685	0.6	200	1.85	PVC
P-435	MH-359	MH-360		50	1.879	0.6	200	1.86	PVC
P-436	MH-360	MH-385		50	1.896	0.6	200	1.82	PVC
P-437	MH-385	MH-386		50	2.035	0.6	200	1.74	PVC
P-438	MH-386	MH-528		50	2.211	0.6	200	1.58	PVC
P-439	MH-528	MH-254		50	2.746	0.6	200	1.24	PVC
P-440	MH-254	MH-255		50	6.661	0.75	200	1	PVC

B.13.2 Manhole Report for Sub Main (العصفورة)

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-137	850.93	849.73	914.4	1.2	157,258.3	108,147.4
MH-138	851.83	850.29	914.4	1.54	157,246.4	108,175.0
MH-157	850.03	848.83	914.4	1.2	157,286.7	108,127.0
MH-179	852.73	850.9	914.4	1.83	157,206.6	108,178.4
MH-191	853.63	851.6	914.4	2.03	157,162.7	108,188.3
MH-254	859.03	857.83	914.4	1.2	156,888.9	108,307.3
MH-255	862.36	861.16	914.4	1.2	156,846.4	108,333.6
MH-272	848.15	846.38	914.4	1.77	157,422.2	108,064.2
MH-337	848.23	847.03	914.4	1.2	157,378.0	108,087.5
MH-359	854.53	852.45	914.4	2.08	157,115.4	108,204.7
MH-360	855.43	853.39	914.4	2.04	157,071.9	108,229.3
MH-385	856.33	854.33	914.4	2	157,029.0	108,255.0
MH-386	857.23	855.35	914.4	1.88	156,981.1	108,269.4
MH-458	849.13	847.93	914.4	1.2	157,334.3	108,111.8
MH-528	858.13	856.46	914.4	1.67	156,933.5	108,284.6

B.14 Table of Sanitary Sewer Design Report For Sub Main (راس الواد)

B.14.1 Pipe Report

Label	start node	stop node	lenghth (user define) m	lenghth (scaled) m	slope (culculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-372	MH-142	MH-253		50	8.362	1.41	200	1	PVC
P-373	MH-253	MH-518		50	5.95	1.24	200	1	PVC
P-374	MH-518	MH-340		50	5.723	1.2	200	1	PVC
P-375	MH-340	MH-341		50	8.142	1.31	200	1	PVC
P-376	MH-341	MH-274		50	7.33	1.23	200	1	PVC
P-377	MH-274	MH-103		50	8.77	1.27	200	1	PVC
P-378	MH-103	MH-104		25.3	7.39	1.18	200	1	PVC
P-379	MH-104	MH-201		49.7	10	1.25	200	1.59	PVC
P-380	MH-201	MH-208		50	10	1.21	200	1.42	PVC
P-381	MH-208	MH-357		50	10	1.17	200	2.74	PVC
P-382	MH-357	MH-358		50	10	1.15	200	1.52	PVC
P-383	MH-358	MH-246		50	10	1.15	200	2.43	PVC
P-384	MH-246	MH-182		50	10	1.11	200	1.04	PVC
P-385	MH-182	MH-183		40	10	1.06	200	2.61	PVC

B.14.2 Manhole Report for Sub Main (راس الواد)

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-103	906.35	905.15	914.4	1.2	158,109.7	107,674.8
MH-104	908.22	907.02	914.4	1.2	158,130.0	107,659.7
MH-142	884.21	883.01	914.4	1.2	157,875.4	107,861.5
MH-182	947.69	946.4	914.4	1.29	158,413.9	107,586.8
MH-183	954.9	950.49	914.4	4.41	158,446.8	107,609.6
MH-201	914.37	911.99	914.4	2.38	158,172.0	107,633.2
MH-208	920.21	918.17	914.4	2.04	158,215.7	107,608.8
MH-246	942.6	938.53	914.4	4.06	158,363.9	107,588.1
MH-253	888.39	887.19	914.4	1.2	157,912.4	107,827.8
MH-274	901.96	900.76	914.4	1.2	158,067.9	107,702.2
MH-340	894.23	893.03	914.4	1.2	157,988.9	107,763.4
MH-341	898.3	897.1	914.4	1.2	158,028.4	107,732.8
MH-357	928.69	924.01	914.4	4.67	158,264.3	107,597.1
MH-358	934.73	932.49	914.4	2.25	158,314.1	107,592.0
MH-518	891.37	890.17	914.4	1.2	157,951.6	107,796.8

B.15 Table of Sanitary Sewer Design Report For Sub Main (شعب السود)

B.15.1 Pipe Report									
Label	start node	stop node	lenghth (user define) m	lenghth (scaled) m	slope (culculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-1	MH-548	MH-1		50	4.018	0.38	200	1	PVC
P-2	MH-1	MH-2		2.8	9.406	0.6	200	1.08	PVC
P-3	MH-2	MH-144		30.3	8.234	0.6	200	1.9	PVC
P-4	MH-144	MH-50		49	6.194	0.6	200	1.95	PVC
P-5	MH-50	MH-51		25	4.851	0.6	200	1.64	PVC
P-6	MH-51	MH-206		50	4.375	0.61	200	1.5	PVC
P-7	MH-206	MH-244		50	4.592	0.66	200	1	PVC
P-8	MH-244	MH-245		50	9.527	0.86	200	1	PVC
P-9	MH-245	MH-541		50	10	0.97	200	1.44	PVC
P-10	MH-541	MH-487		50	6.779	0.88	200	1	PVC
P-11	MH-487	MH-165		50	7.626	0.96	200	1	PVC
P-12	MH-165	MH-166		40	3.99	0.79	200	1	PVC
P-13	MH-166	MH-448		50	1.726	0.6	200	1.12	PVC
P-14	MH-448	MH-449		50	1.712	0.6	200	1.59	PVC
P-15	MH-449	MH-443		50	1.393	0.6	200	1.87	PVC
P-16	MH-443	MH-258		50	1.344	0.6	200	1.69	PVC
P-17	MH-258	MH-259		50	1.19	0.6	200	1.47	PVC
P-18(1)	MH-259	MH-550	50	50.4	1.12	0.6	200	1.18	PVC
P-18(2)	MH-550	MH-549	50	49.7	1.652	0.69	200	1.02	PVC
P-21(1)	MH-549	MH-552	50	49.7	1.72	0.71	200	1	PVC
P-21(2)	MH-552	MH-94	14.2	14.5	6.056	1.11	200	1	PVC
P-22	MH-94	MH-95		25	3.44	0.92	200	1	PVC
P-23	MH-95	MH-97		25	3.44	0.92	200	1	PVC
P-24	MH-97	MH-313		50	1.72	0.72	200	1	PVC
P-25	MH-313	MH-314		50	1.72	0.73	200	1	PVC
P-26	MH-314	MH-432		50	1.72	0.73	200	1	PVC
P-27	MH-432	MH-514		50	1.72	0.74	200	1	PVC
P-28	MH-514	MH-445		50	1.72	0.74	200	1	PVC
P-29	MH-445	MH-176		50	1.72	0.75	200	1	PVC
P-30	MH-176	MH-177		40	2.15	0.81	200	1	PVC
P-31	MH-177	MH-239		50	1.72	0.76	200	1	PVC
P-32	MH-239	MH-240		50	1.72	0.76	200	1	PVC
P-33	MH-240	MH-263		50	1.72	0.77	200	1	PVC
P-34	MH-263	MH-264		50	1.72	0.77	200	1	PVC
P-35	MH-264	MH-540		50	1.72	0.77	200	1	PVC

P-36	MH-540	MH-60		50	1.72	0.78	200	1	PVC
P-37	MH-60	MH-61		25	3.44	1	200	1	PVC
P-38	MH-61	MH-84		50	1.72	0.79	200	1	PVC
P-39	MH-84	MH-85		25	3.44	1.01	200	1	PVC
P-40	MH-85	MH-120		40	2.15	0.86	200	1	PVC
P-41(1)	MH-120	MH-565		15	5.715	1.22	200	1	PVC
P-41(2)	MH-565	MH-38		15	5.752	1.22	200	1	PVC
P-42(1)	MH-38	MH-566		10	8.608	1.44	200	1	PVC
P-42(2)	MH-566	MH-39		10	8.592	1.44	200	1	PVC
P-43(1)	MH-39	MH-567		12.5	6.875	1.33	200	1	PVC
P-43(2)	MH-567	MH-56		12.5	6.884	1.33	200	1	PVC
P-44(1)	MH-56	MH-568		12.5	6.887	1.33	200	1	PVC
P-44(2)	MH-568	MH-57		12.5	6.873	1.33	200	1	PVC
P-45(1)	MH-57	MH-569		15	5.716	1.25	200	1	PVC
P-45(2)	MH-569	MH-142		15	5.751	1.25	200	1	PVC

B.15.2 Manhole Report for Sub Main (شعب السود)

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-1	946.88	945.68	914.4	1.2	157,921.7	108,082.6
MH-2	946.79	945.42	914.4	1.37	157,919.2	108,083.9
MH-38	891.09	889.89	914.4	1.2	157,905.6	107,953.9
MH-39	889.37	888.17	914.4	1.2	157,906.2	107,933.9
MH-50	941.36	939.88	914.4	1.47	157,850.4	108,123.3
MH-51	940.87	938.67	914.4	2.2	157,828.4	108,135.2
MH-56	887.65	886.45	914.4	1.2	157,902.7	107,909.1
MH-57	885.93	884.73	914.4	1.2	157,891.5	107,886.8
MH-60	896.25	895.05	914.4	1.2	157,764.4	108,039.5
MH-61	895.39	894.19	914.4	1.2	157,787.2	108,029.3
MH-84	894.53	893.33	914.4	1.2	157,819.0	107,990.6
MH-85	893.67	892.47	914.4	1.2	157,839.2	107,976.1
MH-94	909.15	907.95	914.4	1.2	157,165.1	108,300.0
MH-95	908.29	907.09	914.4	1.2	157,163.8	108,275.0
MH-97	907.43	906.23	914.4	1.2	157,168.3	108,250.4
MH-120	892.81	891.61	914.4	1.2	157,877.1	107,963.1
MH-142	884.21	883.01	914.4	1.2	157,875.4	107,861.5
MH-144	945.74	942.92	914.4	2.82	157,892.2	108,097.7
MH-165	917.53	916.33	914.4	1.2	157,553.2	108,243.7
MH-166	915.94	914.74	914.4	1.2	157,519.5	108,265.1
MH-176	902.27	901.07	914.4	1.2	157,457.8	108,177.9
MH-177	901.41	900.21	914.4	1.2	157,496.9	108,169.8

MH-206	937.68	936.48	914.4	1.2	157,779.8	108,147.1
MH-239	900.55	899.35	914.4	1.2	157,535.0	108,137.4
MH-240	899.69	898.49	914.4	1.2	157,579.1	108,113.8
MH-244	935.39	934.19	914.4	1.2	157,730.8	108,156.8
MH-245	930.62	928.54	914.4	2.09	157,682.2	108,168.6
MH-258	913.45	911.65	914.4	1.8	157,328.0	108,322.5
MH-259	912.59	911.06	914.4	1.53	157,279.6	108,335.2
MH-263	898.83	897.63	914.4	1.2	157,624.2	108,092.3
MH-264	897.97	896.77	914.4	1.2	157,669.8	108,071.8
MH-313	906.57	905.37	914.4	1.2	157,216.5	108,237.4
MH-314	905.71	904.51	914.4	1.2	157,264.7	108,224.0
MH-432	904.85	903.65	914.4	1.2	157,309.9	108,202.7
MH-443	914.31	912.32	914.4	1.99	157,376.1	108,309.1
MH-445	903.13	901.93	914.4	1.2	157,408.2	108,184.4
MH-448	915.31	913.88	914.4	1.43	157,471.7	108,280.0
MH-449	915.17	913.02	914.4	2.15	157,423.5	108,293.0
MH-487	921.35	920.15	914.4	1.2	157,593.4	108,214.0
MH-514	903.99	902.79	914.4	1.2	157,358.8	108,192.0
MH-540	897.11	895.91	914.4	1.2	157,717.8	108,057.6
MH-541	924.74	923.54	914.4	1.2	157,635.9	108,187.6
MH-548	948.89	947.69	914.4	1.2	157,969.5	108,068.1
MH-549	910.87	909.67	914.4	1.2	157,183.0	108,361.6
MH-550	911.73	910.5	914.4	1.23	157,230.9	108,348.3
MH-552	910.01	908.81	914.4	1.2	157,169.0	108,313.9
MH-565	891.95	890.75	914.4	1.2	157,891.4	107,958.5
MH-566	890.23	889.03	914.4	1.2	157,905.9	107,943.9
MH-567	888.51	887.31	914.4	1.2	157,904.4	107,921.5
MH-568	886.79	885.59	914.4	1.2	157,897.0	107,898.0
MH-569	885.07	883.87	914.4	1.2	157,883.4	107,874.1

B.16 Table of Sanitary Sewer Design Report For Lateral (الفلاح)

B.16.1 Pipe Report

Label	start node	stop node	lenghth (user define) m	lenghth (scaled) m	slope (culculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-463	MH-542	MH-417		25	8.293	0.61	200	5.84	PVC
P-464	MH-417	MH-294		50	8.402	0.6	200	4.9	PVC
P-465	MH-294	MH-92		50	9.602	0.6	200	2.6	PVC
P-466	MH-93	MH-92		25	9.992	0.6	200	1.15	PVC

B.16.2 Manhole Report for Lateral (الفلاح)

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-92	932.99	931.49	914.4	1.5	158,333.1	108,012.3
MH-93	935.19	933.99	914.4	1.2	158,312.0	108,025.8
MH-294	930.79	926.69	914.4	4.1	158,380.8	107,997.3
MH-417	928.59	922.49	914.4	6.1	158,429.4	107,985.4
MH-542	926.39	920.42	914.4	5.97	158,453.4	107,978.7

B.17 Table of Sanitary Sewer Design Report For Lateral (الفلل)

B.17.1 Pipe Report

Label	start node	stop node	lenghth (user define) m	lenghth (scaled) m	slope (culculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-458	MH-508	MH-519		50	10	1.52	200	2.39	PVC
P-459	MH-519	MH-410		50	10	1.48	200	3.11	PVC
P-460	MH-410	MH-411		50	10	1.42	200	3.01	PVC
P-461	MH-411	MH-441		50	6.957	1.24	200	3.48	PVC
P-462	MH-441	MH-535		50	0.893	0.6	200	2.83	PVC
P-467	MH-542	MH-387		50	10	1.36	200	3.3	PVC
P-468	MH-387	MH-388		50	10	1.27	200	3.33	PVC
P-469	MH-388	MH-533		50	8.243	1.06	200	1	PVC
P-470	MH-533	MH-545		50	4.125	0.6	200	1	PVC
P-546	MH-542	MH-535		25	0.533	0.6	200	4.74	PVC

B.17.2 Manhole Report for Lateral (الفلل)

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-387	936	930.19	914.4	5.81	158,405.6	107,964.2
MH-388	945.66	939.8	914.4	5.86	158,362.4	107,939.0
MH-410	912.56	907.14	914.4	5.42	158,618.8	108,014.1
MH-411	921.57	916.36	914.4	5.21	158,576.0	107,988.3
MH-441	921.99	919.84	914.4	2.15	158,527.2	107,977.3
MH-508	895.57	894.37	914.4	1.2	158,700.2	108,068.4
MH-519	903.34	899.37	914.4	3.97	158,665.3	108,032.6
MH-533	949.78	948.58	914.4	1.2	158,327.4	107,903.3
MH-535	924.19	920.28	914.4	3.91	158,477.5	107,971.9
MH-542	926.39	920.42	914.4	5.97	158,453.4	107,978.7
MH-545	951.84	950.64	914.4	1.2	158,295.1	107,865.2

B.18 Table of Sanitary Sewer Design Report For Lateral (المناخ)

B.18.1 Pipe Report

Label	start node	stop node	lenghth (user define) m	lenghth (scaled) m	slope (culculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-397	MH-464	MH-437		50	8.293	0.61	200	3.35	PVC
P-398	MH-437	MH-423		50	8.166	0.6	200	4.84	PVC
P-399	MH-423	MH-424		50	5.623	0.6	200	3.24	PVC
P-400	MH-424	MH-434		50	4.061	0.6	200	1.89	PVC
P-401	MH-434	MH-10		50	9.919	0.83	200	1.14	PVC
P-402	MH-9	MH-10		10	10	0.86	200	3.13	PVC

B.18.2 Manhole Report for Lateral (المناخ)

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-9	650.19	645.77	914.4	4.42	154,716.6	109,784.4
MH-10	655.44	649.99	914.4	5.46	154,719.3	109,774.8
MH-423	668.22	664.05	914.4	4.17	154,842.5	109,689.2
MH-424	663.93	661.23	914.4	2.7	154,801.1	109,717.3
MH-434	660.68	659.2	914.4	1.48	154,760.0	109,745.8
MH-437	674.03	668.13	914.4	5.9	154,882.4	109,659.1
MH-464	673.47	672.27	914.4	1.2	154,923.1	109,630.1

B.19 Table of Sanitary Sewer Design Report For Lateral (خربة البعارنه)

B.19.1 Pipe Report

Label	start node	stop node	lenghth (user define) m	lenghth (scaled) m	slope (culculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-491	MH-43	MH-262		50	1.253	0.6	200	1.17	PVC
P-492	MH-262	MH-174		50	10	1.24	200	1.65	PVC
P-493	MH-174	MH-169		40	10	1.24	200	2.15	PVC
P-494	MH-169	MH-170		40	10	1.18	200	2.15	PVC
P-495	MH-170	MH-186		40	10	1.18	200	2.15	PVC
P-496	MH-186	MH-430		50	10	1.08	200	1.65	PVC
P-497	MH-430	MH-431		50	9.496	1.05	200	1	PVC
P-498	MH-431	MH-175		50	10	0.97	200	1.42	PVC
P-499	MH-175	MH-66		40	5.354	0.78	200	1.42	PVC
P-500	MH-66	MH-67		25	8	0.77	200	1	PVC
P-501	MH-67	MH-46		50	6	0.69	200	1	PVC
P-502	MH-46	MH-47		20	10	0.82	200	1.5	PVC
P-503	MH-47	MH-112		30	10	0.73	200	1	PVC

B.19.2 Manhole Report for Lateral (خربة البعارنه)

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-43	809.04	807.5	914.4	1.54	156,388.5	108,964.5
MH-46	857.72	856.52	914.4	1.2	156,798.9	108,871.5
MH-47	860.72	858.52	914.4	2.2	156,788.8	108,854.2
MH-66	852.72	851.52	914.4	1.2	156,764.7	108,936.6
MH-67	854.72	853.52	914.4	1.2	156,781.9	108,918.5
MH-112	863.72	862.52	914.4	1.2	156,800.6	108,826.6
MH-169	821.93	818.43	914.4	3.5	156,513.1	109,025.3
MH-170	828.23	824.73	914.4	3.5	156,553.0	109,022.8
MH-174	815.63	813.13	914.4	2.5	156,474.7	109,014.2
MH-175	851.41	849.38	914.4	2.03	156,729.5	108,955.7
MH-186	834.53	831.03	914.4	3.5	156,589.7	109,006.9
MH-262	809.33	808.13	914.4	1.2	156,429.2	108,993.5
MH-430	840.83	838.33	914.4	2.5	156,633.0	108,981.8
MH-431	845.58	844.38	914.4	1.2	156,681.5	108,969.5

B.20 Table of Sanitary Sewer Design Report For Lateral (شعب عويص)

B.20.1 Pipe Report									
Label	start node	stop node	lenghth (user define) m	lenghth (scaled) m	slope (culculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-477	MH-27	MH-134		30	10	0.94	200	2	PVC
P-478	MH-134	MH-222		50	10	0.94	200	3.33	PVC
P-479	MH-222	MH-373		50	10	0.82	200	1.45	PVC
P-480	MH-373	MH-374		50	10	0.73	200	3.47	PVC

B.20.2 Manhole Report for Lateral (شعب عويص)						
lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-27	800	796.03	914.4	3.97	156,090.2	109,155.0
MH-134	805	801.8	914.4	3.2	156,088.8	109,125.1
MH-222	814.66	808.8	914.4	5.86	156,099.9	109,076.3
MH-373	820.57	818.46	914.4	2.11	156,096.6	109,026.4
MH-374	830.5	824.37	914.4	6.13	156,091.9	108,976.6

B.21 Table of Sanitary Sewer Design Report For Lateral (عين العزب)

B.21.1 Pipe Report

Label	start node	stop node	lenghth (user define) m	lenghth (scaled) m	slope (culculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-393	MH-78	MH-277	50	50	1.814	0.6	200	4.3	PVC
P-394	MH-277	MH-278	50	50	2.435	0.6	200	3.34	PVC
P-395	MH-278	MH-124	50	50	2.463	0.6	200	2.21	PVC
P-396	MH-124	MH-125	30	30	2.492	0.6	200	1.32	PVC
P-431	MH-77	MH-78	25	25	1.799	0.6	200	4.88	PVC

B.21.2 Manhole Report for Lateral (عين العزب)

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-77	750	744.75	914.4	5.25	155,954.7	109,281.0
MH-78	750.1	745.2	914.4	4.9	155,940.3	109,260.6
MH-124	750.4	748.55	914.4	1.85	155,809.0	109,211.7
MH-125	750.5	749.3	914.4	1.2	155,780.3	109,203.1
MH-277	750.2	746.1	914.4	4.1	155,908.3	109,222.2
MH-278	750.3	747.32	914.4	2.98	155,858.3	109,219.5

B.22 Table of Sanitary Sewer Design Report For Lateral (نبعة المجنونه)

B.22.1 Pipe Report

Label	start node	stop node	lenghth (user define) m	lenghth (scaled) m	slope (culculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-504(1)	MH-135	MH-580		15	10	1.33	200	2.56	PVC
P-504(2)	MH-580	MH-136		15	10	1.33	200	2.51	PVC
P-505	MH-136	MH-224		50	6.498	1.13	200	1	PVC
P-506	MH-224	MH-336		50	7.354	1.17	200	1	PVC
P-507	MH-336	MH-82		50	10	1.3	200	1.36	PVC
P-508(1)	MH-82	MH-579		12.5	10	1.29	200	2.89	PVC
P-508(2)	MH-579	MH-83		12.5	10	1.29	200	2.83	PVC
P-509(1)	MH-83	MH-578		12.5	10	1.25	200	2.97	PVC
P-509(2)	MH-578	MH-80		12.5	10	1.25	200	2.91	PVC
P-510(1)	MH-80	MH-577		12.5	10	1.17	200	3.26	PVC
P-510(2)	MH-577	MH-81		12.5	10	1.17	200	3.25	PVC
P-511(1)	MH-81	MH-576		12.5	10	1.12	200	3.43	PVC
P-511(2)	MH-576	MH-75		12.5	10	1.12	200	3.37	PVC
P-512(1)	MH-75	MH-575		12.5	10	1.04	200	3.34	PVC
P-512(2)	MH-575	MH-76		12.5	10	1.04	200	3.28	PVC
P-513	MH-76	MH-132		30	10	1.03	200	1.17	PVC
P-514	MH-132	MH-500		50	10	0.87	200	1.18	PVC
P-515	MH-500	MH-171		50	9.833	0.86	200	1	PVC
P-516	MH-171	MH-99		40	10	0.79	200	1.21	PVC
P-517	MH-99	MH-68		25	10	0.78	200	3.28	PVC
P-518	MH-68	MH-35		25	10	0.78	200	2.42	PVC
P-519	MH-35	MH-36		20	4.988	0.6	200	1.89	PVC
P-520	MH-36	MH-226		50	6.775	0.6	200	1.65	PVC
P-521	MH-226	MH-520		50	7.026	0.6	200	1.38	PVC

B.22.2 Manhole Report for Lateral (نبعة المجنونه)

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-35	940.1	936.05	914.4	4.05	157,903.9	108,262.4
MH-36	940.4	938.66	914.4	1.74	157,907.0	108,242.6
MH-68	934.75	929	914.4	5.75	157,904.6	108,287.4
MH-75	897.93	891.99	914.4	5.93	157,802.0	108,418.6

MH-76	909.66	903.91	914.4	5.75	157,791.3	108,395.9
MH-80	874.33	869.3	914.4	5.03	157,823.7	108,463.6
MH-81	885.84	880.15	914.4	5.69	157,813.1	108,441.0
MH-82	854.14	852.22	914.4	1.92	157,851.2	108,503.9
MH-83	864.07	859.21	914.4	4.86	157,833.0	108,486.8
MH-99	927.7	926.08	914.4	1.62	157,906.1	108,312.3
MH-132	913	911.46	914.4	1.54	157,778.4	108,368.9
MH-135	832.34	830.72	914.4	1.63	158,028.4	108,487.5
MH-136	841.49	837.27	914.4	4.22	157,999.3	108,480.1
MH-171	923.28	922.08	914.4	1.2	157,868.0	108,324.4
MH-224	844.74	843.54	914.4	1.2	157,950.2	108,489.6
MH-226	944	942.04	914.4	1.96	157,950.3	108,217.5
MH-336	848.42	847.22	914.4	1.2	157,900.6	108,496.1
MH-500	918.37	916.8	914.4	1.57	157,822.9	108,346.1
MH-520	946.76	945.56	914.4	1.2	157,993.0	108,191.6
MH-575	903.86	897.98	914.4	5.88	157,796.7	108,407.2
MH-576	891.94	885.89	914.4	6.05	157,807.6	108,429.8
MH-577	880.1	874.38	914.4	5.72	157,818.4	108,452.3
MH-578	869.25	864.12	914.4	5.13	157,828.3	108,475.2
MH-579	859.16	854.19	914.4	4.97	157,842.1	108,495.4
MH-580	836.98	832.65	914.4	4.33	158,013.8	108,483.8

B.23 Table of Sanitary Sewer Design Report For Lateral (خلة شاور)

B.23.1 Pipe Report

Label	start node	stop node	lenghth (user define) m	lenghth (scaled) m	slope (culculated) (%)	velocity (m/s)	Diameter	cover (average) (m)	Material
P-423	MH-14	MH-372		50	8.451	1.28	200	1.44	PVC
P-424	MH-372	MH-283		50	10	1.35	200	1.05	PVC
P-425	MH-283	MH-284		50	5.791	1.12	200	1.05	PVC
P-426	MH-284	MH-529		50	10	1.23	200	1.56	PVC
P-427	MH-529	MH-509		50	10	1.23	200	1.25	PVC
P-428	MH-509	MH-510		50	10	1.08	200	1.2	PVC
P-429	MH-510	MH-534		50	10	1.08	200	1.19	PVC

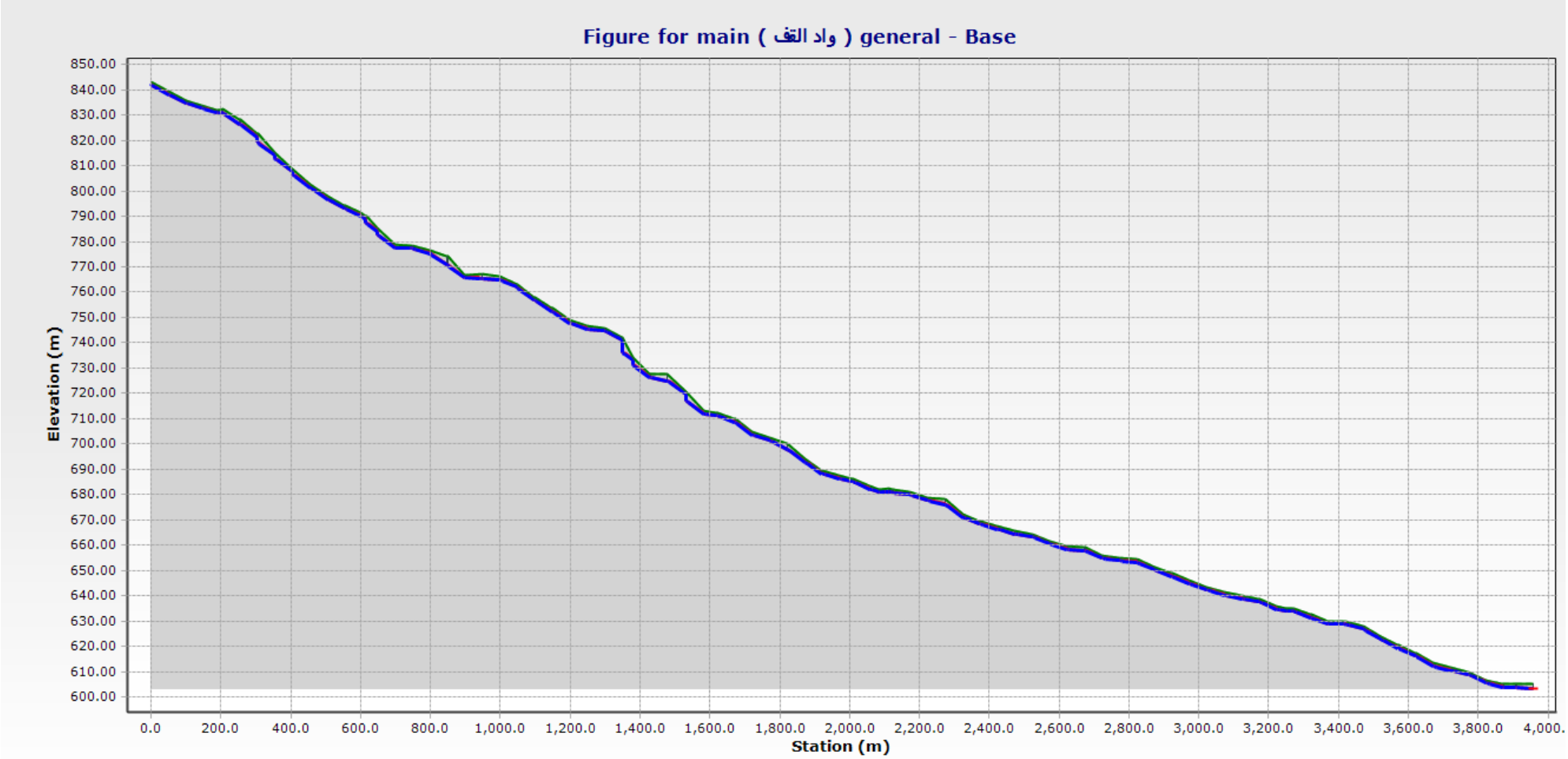
B.23.2 Manhole Report for Lateral (خلة شاور)

lable	ground elevation (m)	invert elevation (m)	diameter (m)	manhole Depth (m)	x coordinate (m)	y Coordinate (m)
MH-14	737.98	735.9	914.4	2.07	154,983.5	108,841.3
MH-283	746.43	745.13	914.4	1.3	155,071.2	108,793.8
MH-284	749.22	748.02	914.4	1.2	155,118.9	108,778.9
MH-372	741.33	740.13	914.4	1.2	155,025.5	108,814.0
MH-509	760.84	759.14	914.4	1.7	155,218.4	108,771.6
MH-510	766.24	764.64	914.4	1.6	155,268.2	108,776.3
MH-529	755.34	753.02	914.4	2.32	155,168.4	108,772.0
MH-534	771.62	770.04	914.4	1.58	155,317.8	108,782.5

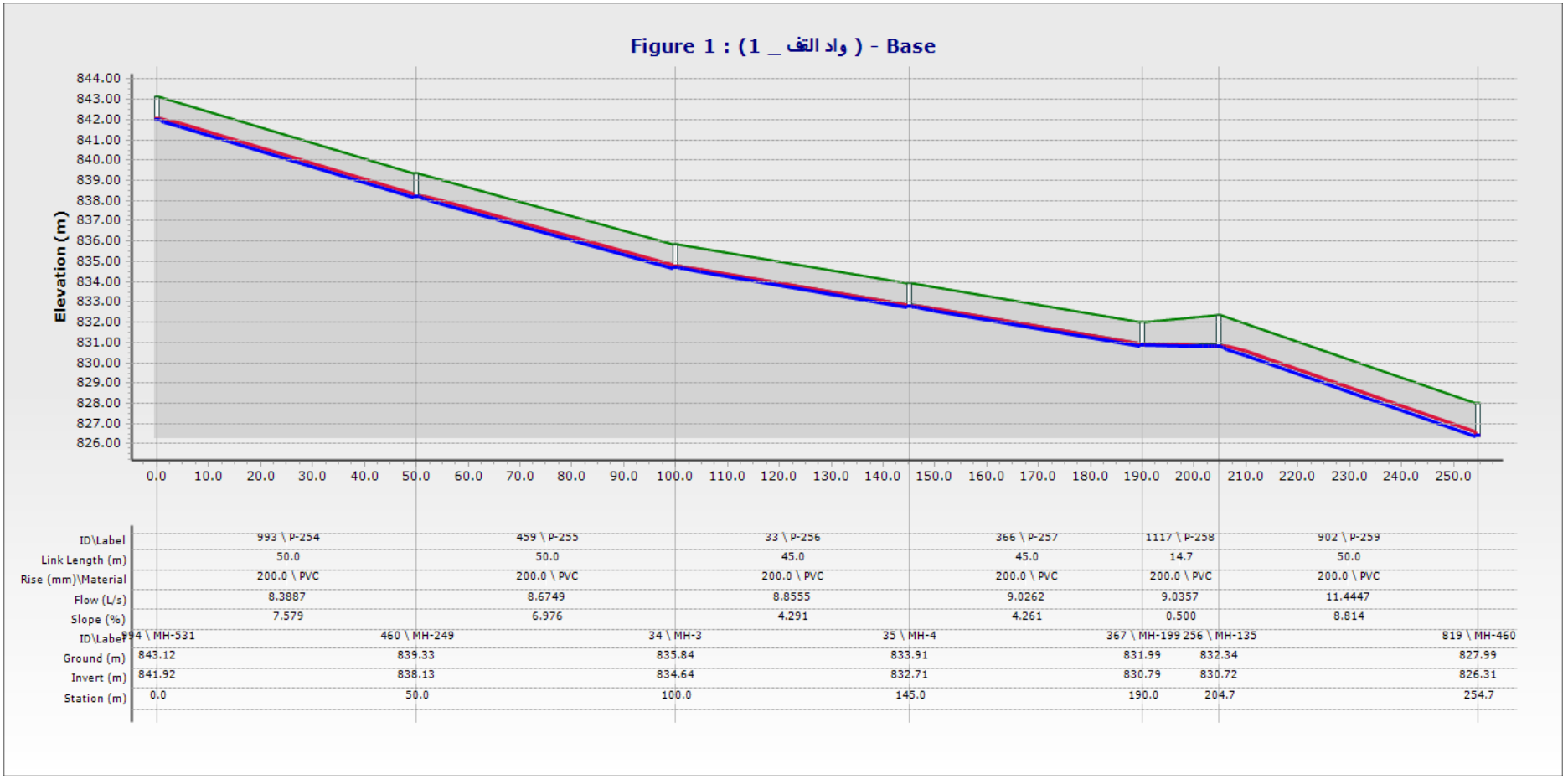
Appendix C: Profiles of Wastewater Network

Introduction

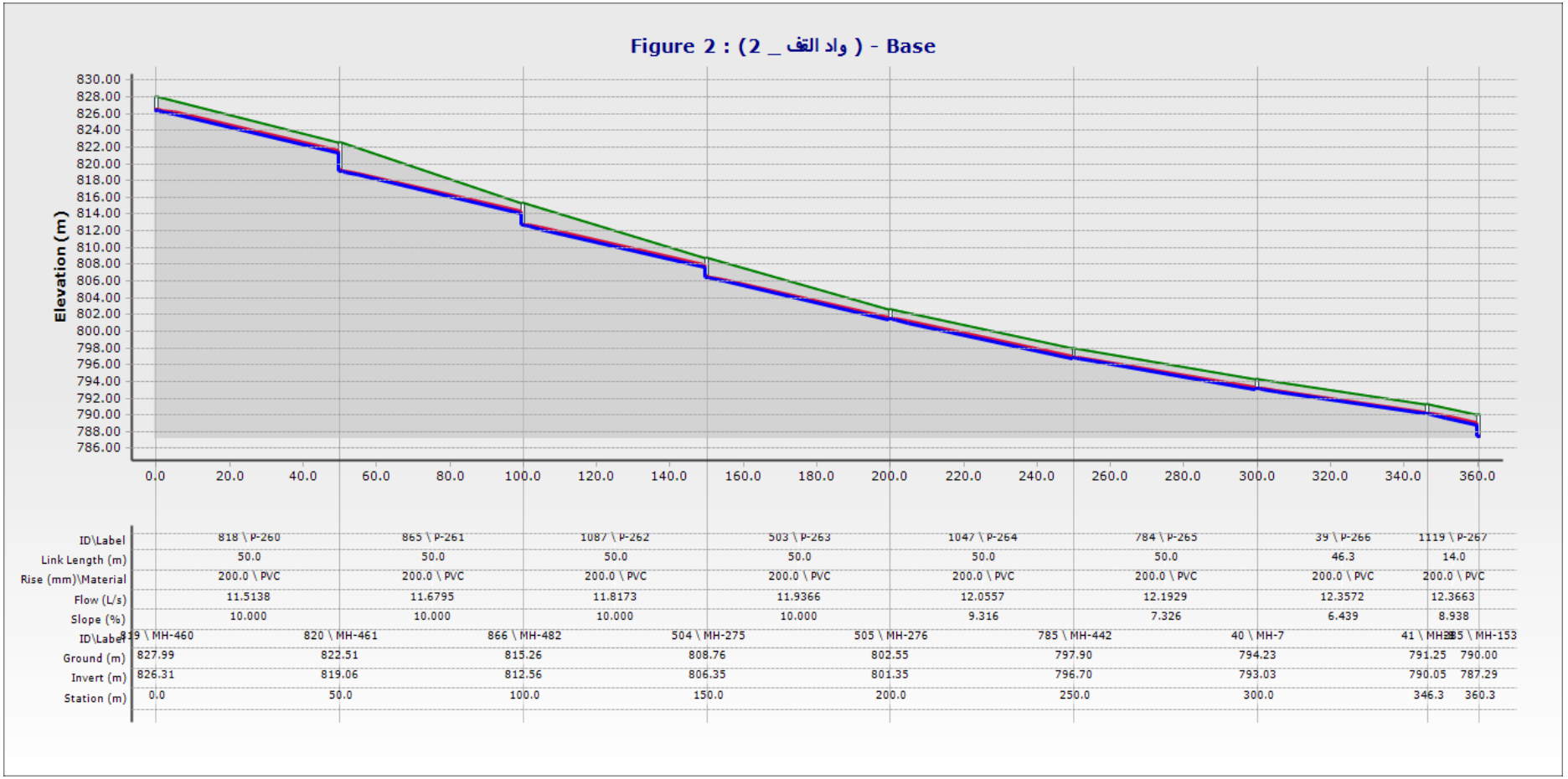
In this appendix "C", information about images and profiles displayed in the sewer CAD program, where these profiles show information about the length of the pipe, its diameter, type, and cumulative flow, in addition to the inclination of the earth, its ground elevation, invert elevation . which facilitates the process of reading the data.



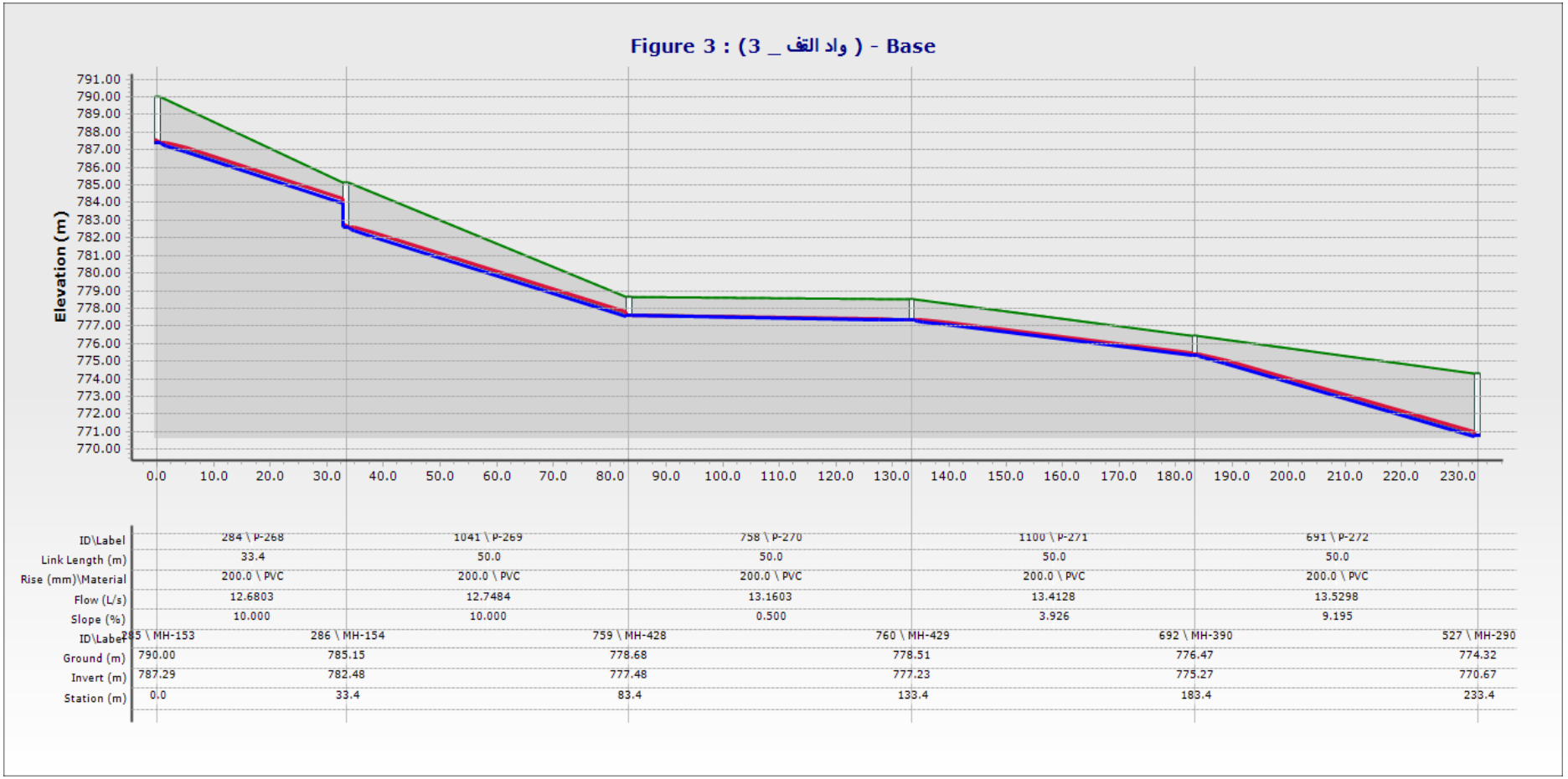
C.1 : Profile for main (واد القف) general



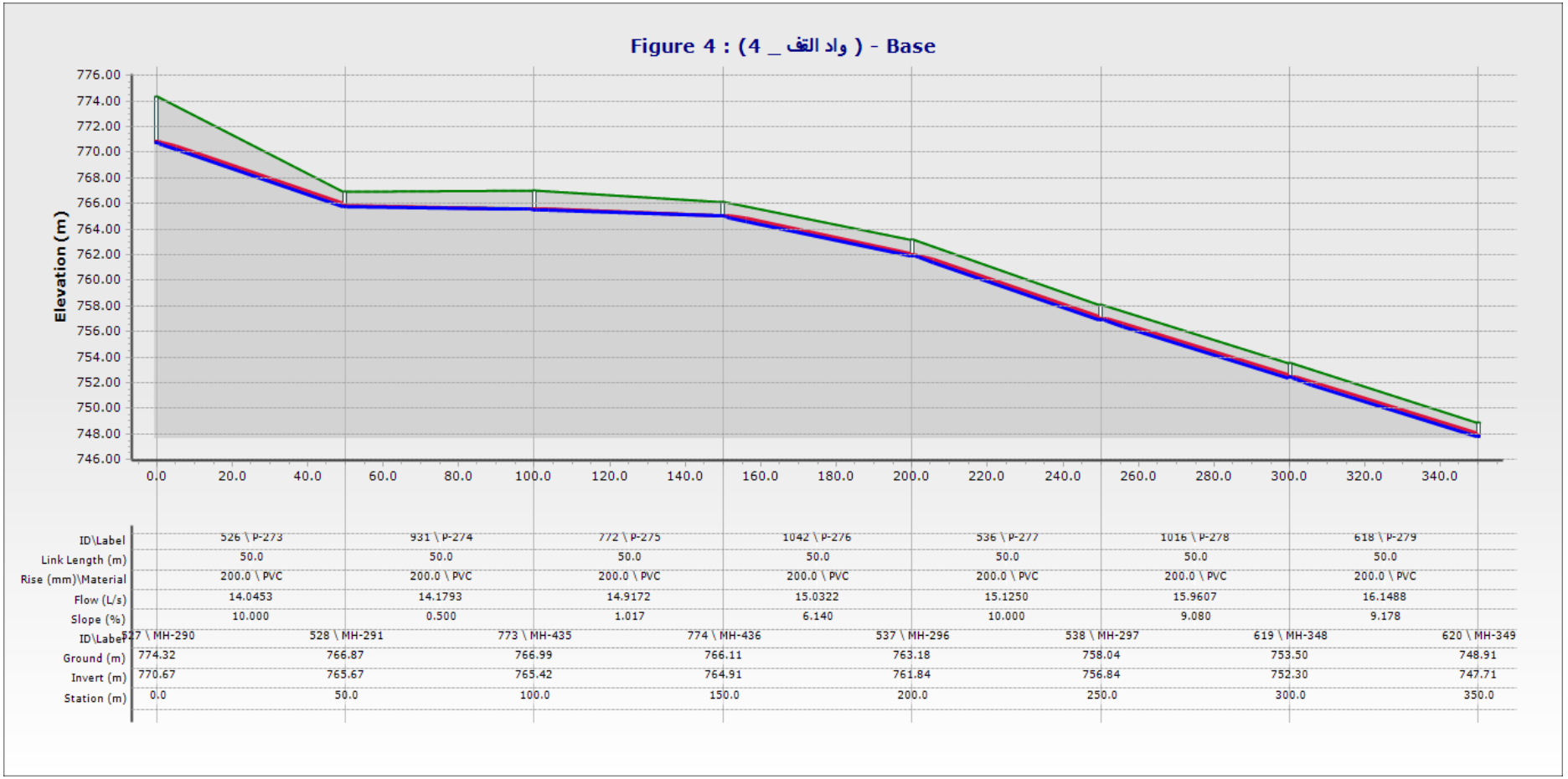
C.2 : Figure 1 : Profile for (1 _ واد القف)



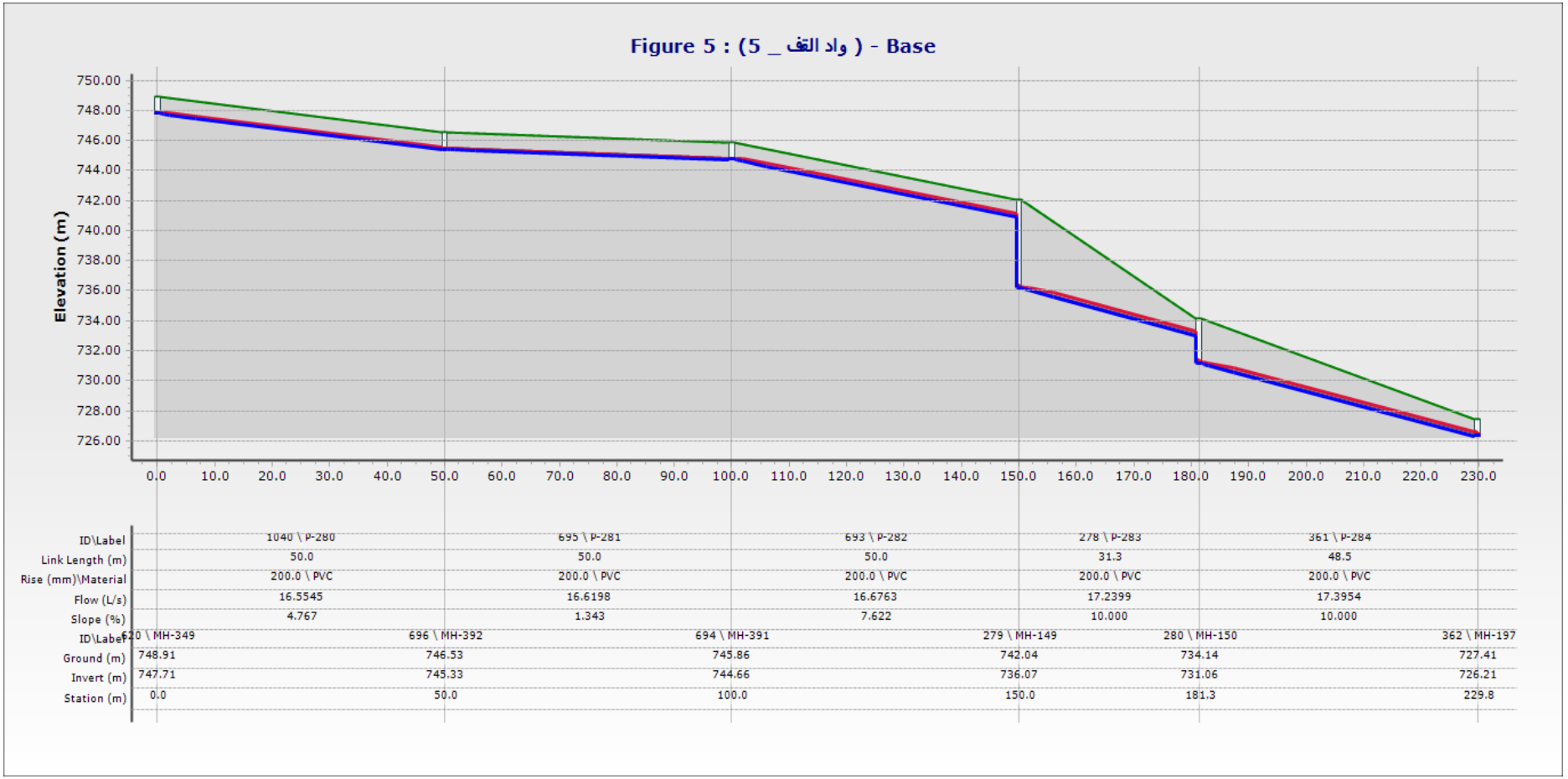
C.3 : Figure 2 : Profile for (2 _ واد القف)



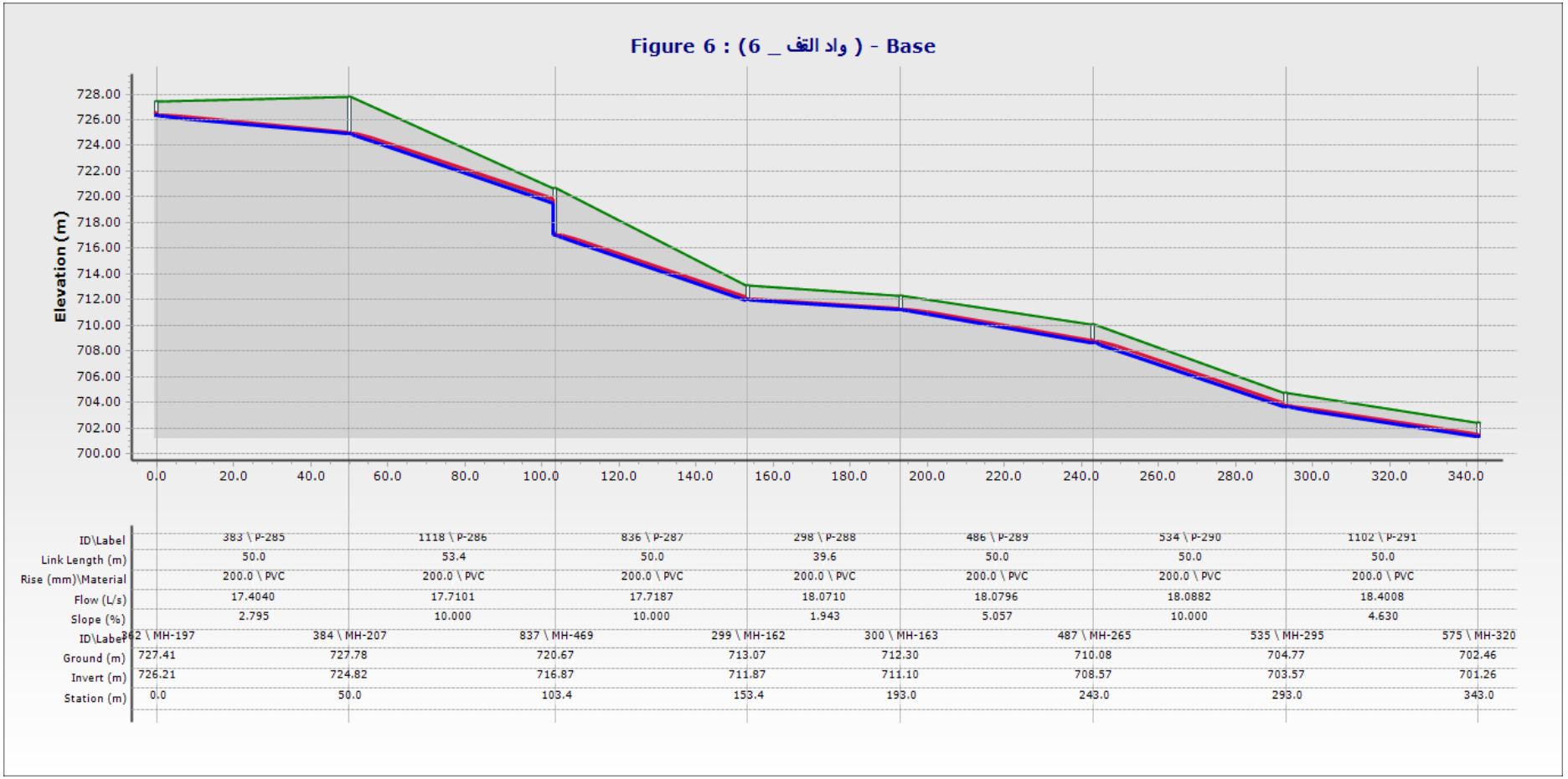
C.4 : Figure 3 : Profile for (3_ واد القف)



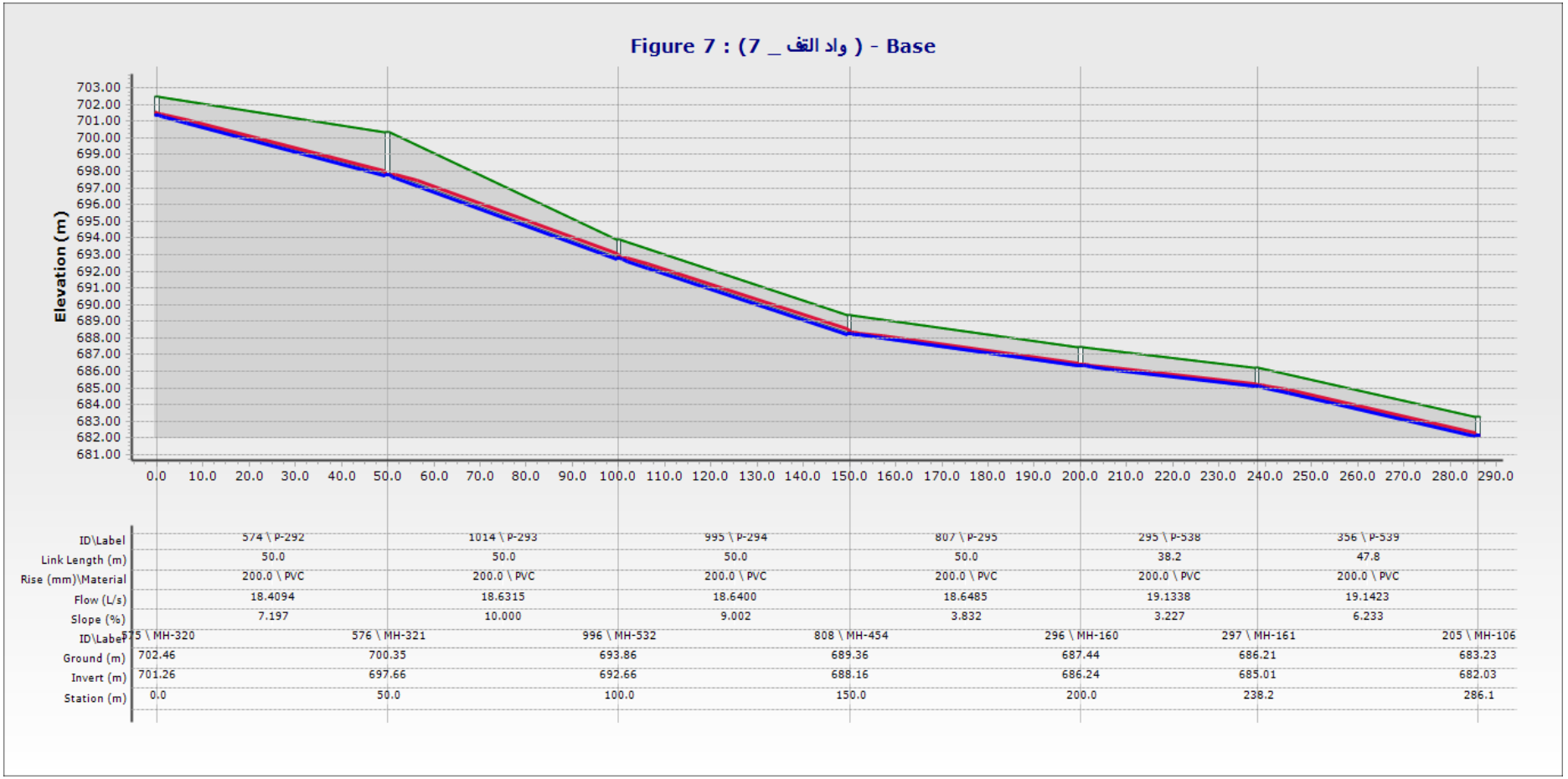
C.5 : Figure 4 : Profile for (4_ واد القف)



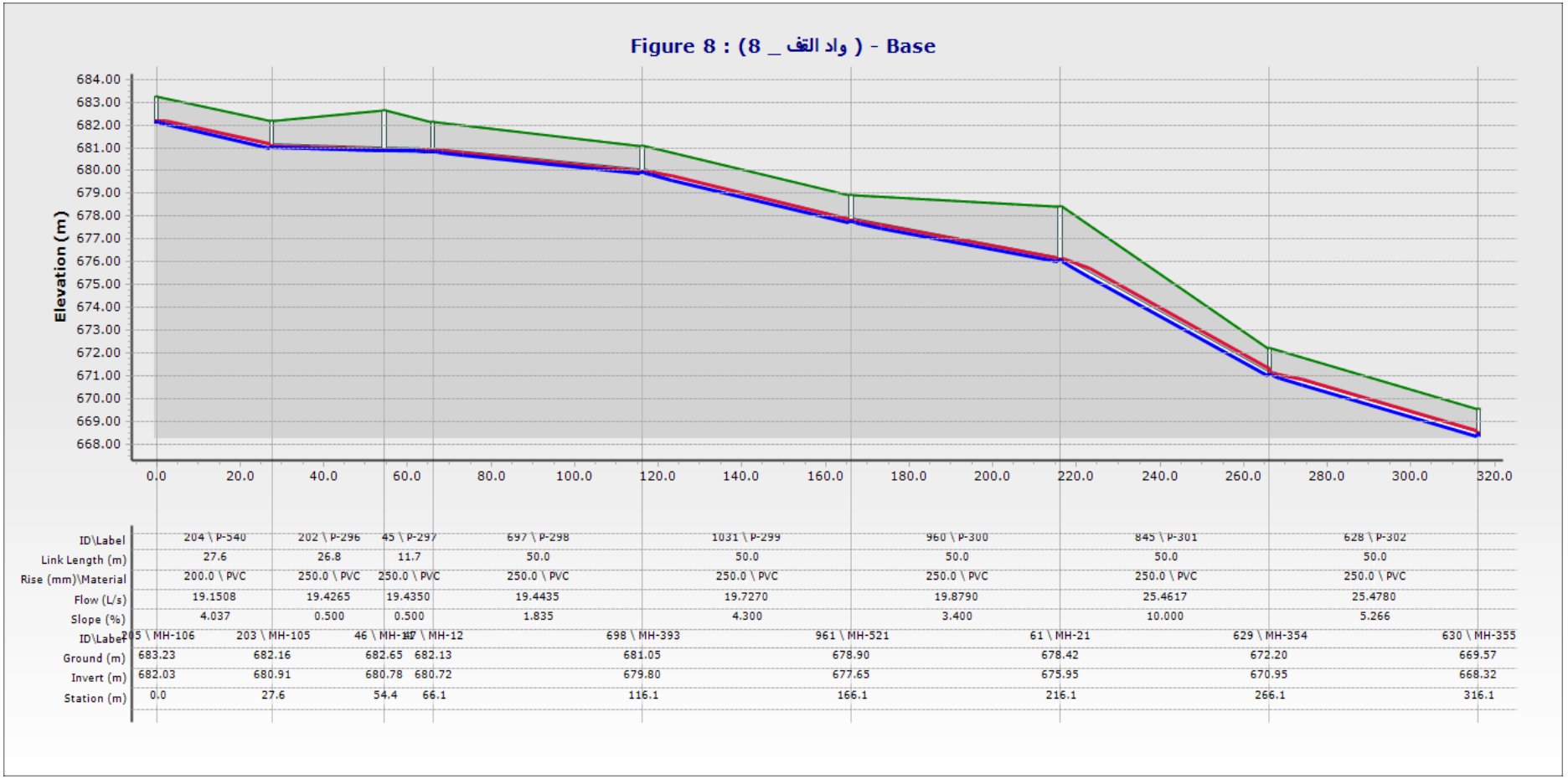
C.6 : Figure 5 : Profile for (5_ واد القف)



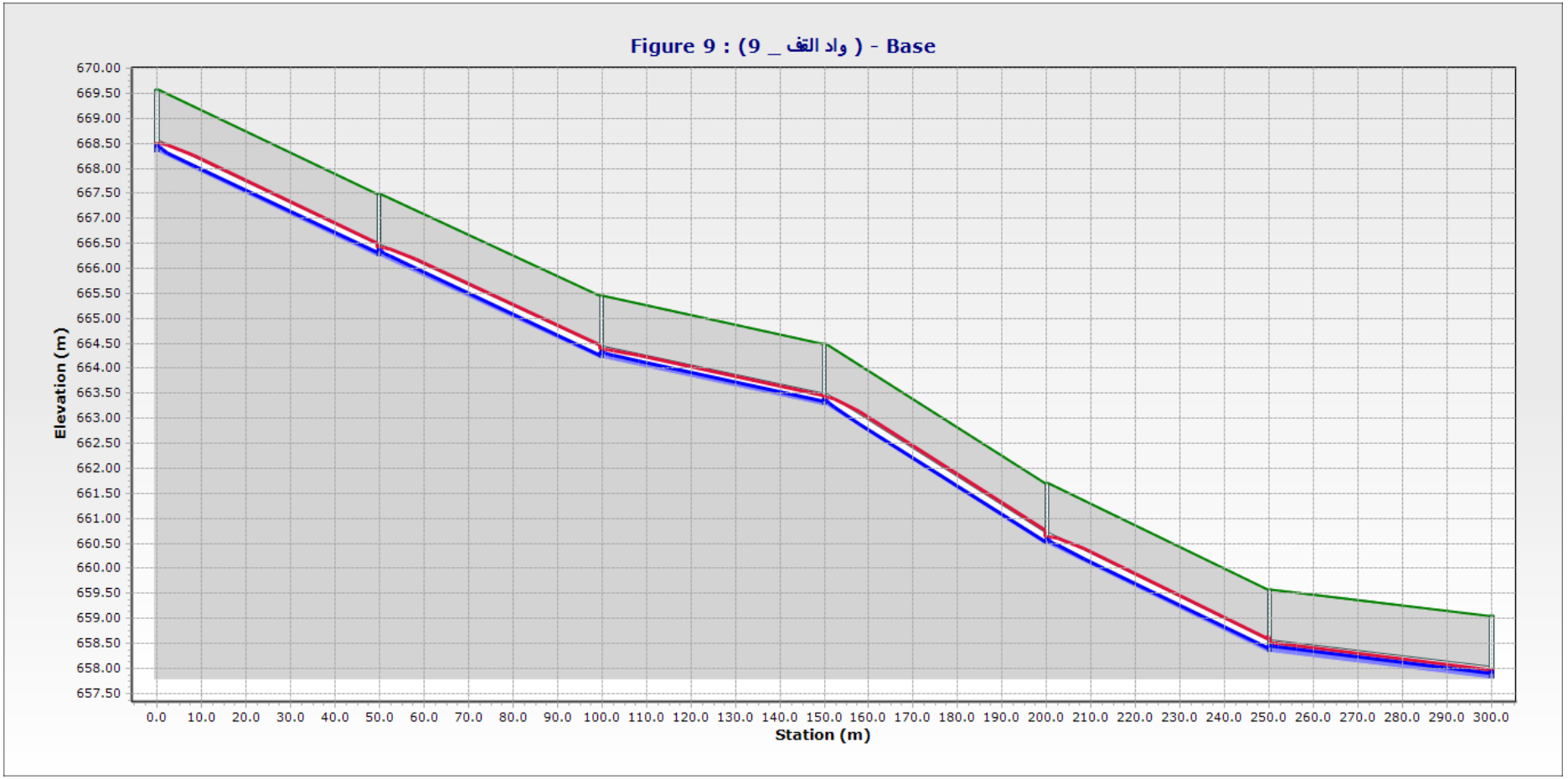
C.7 : Figure 6 : Profile for (6_ واد القف)



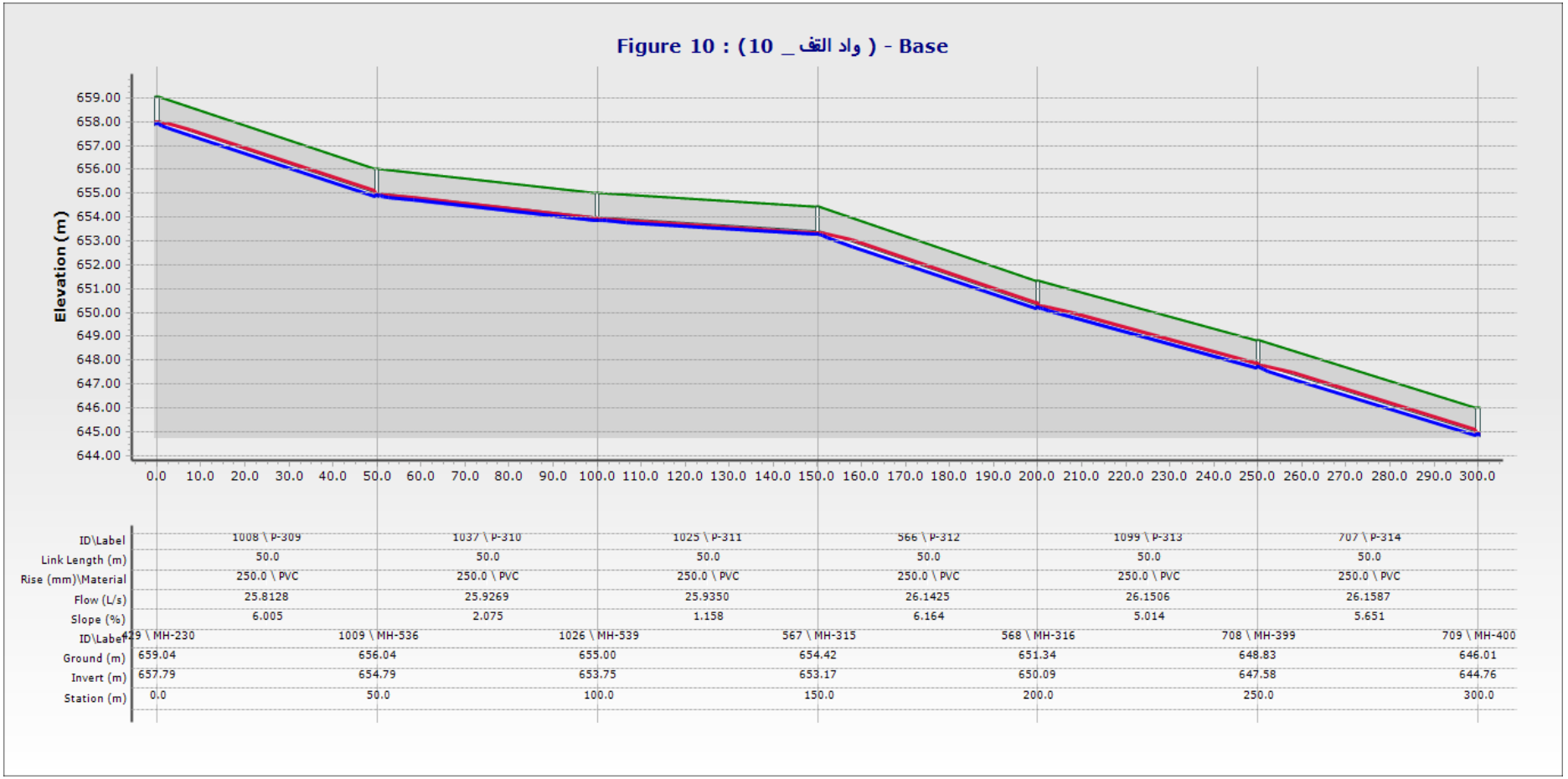
C.8 : Figure 7 : Profile for (7_ واد القف)



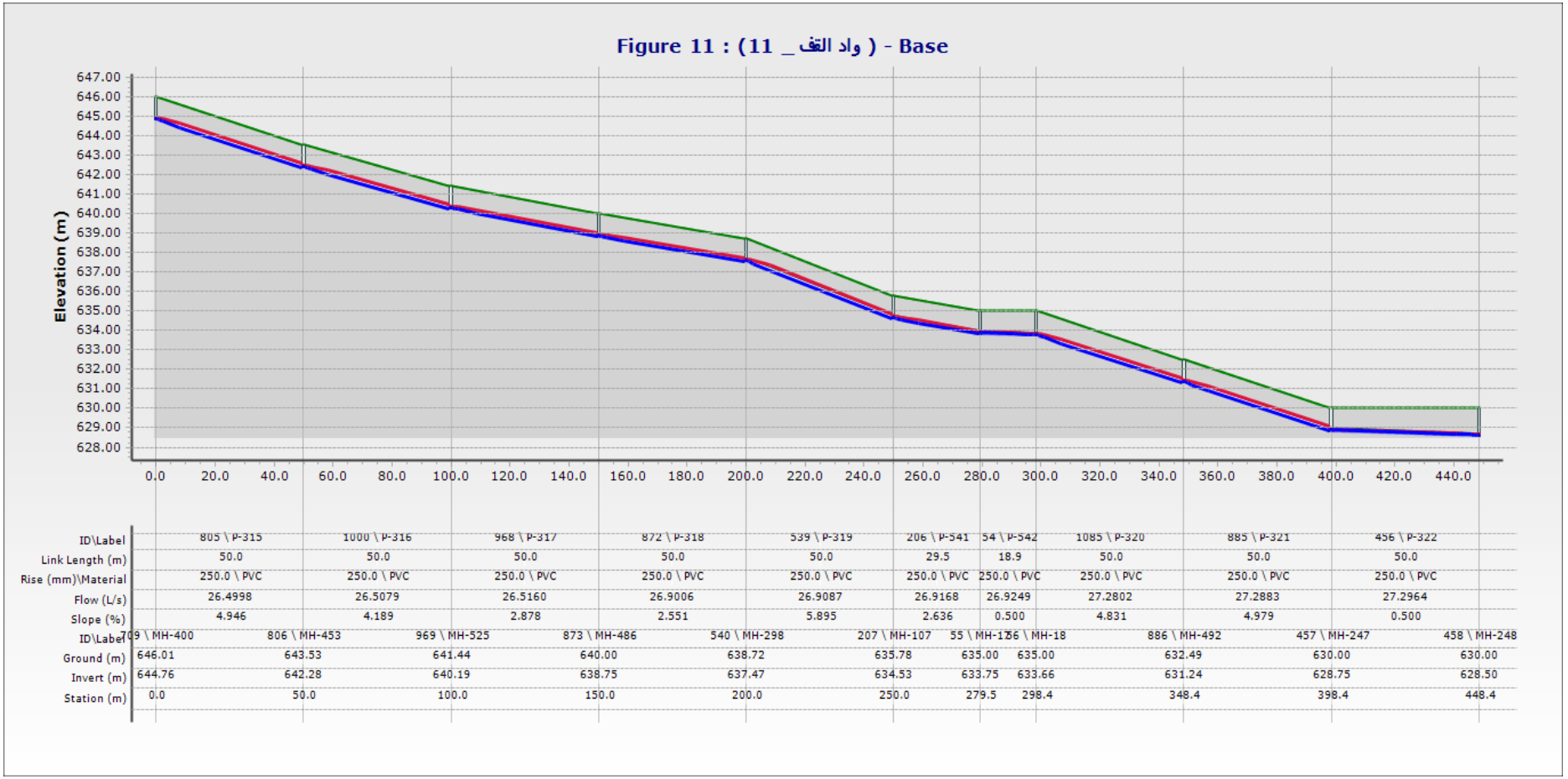
C.9 : Figure 8 : Profile for (8_ واد القف)



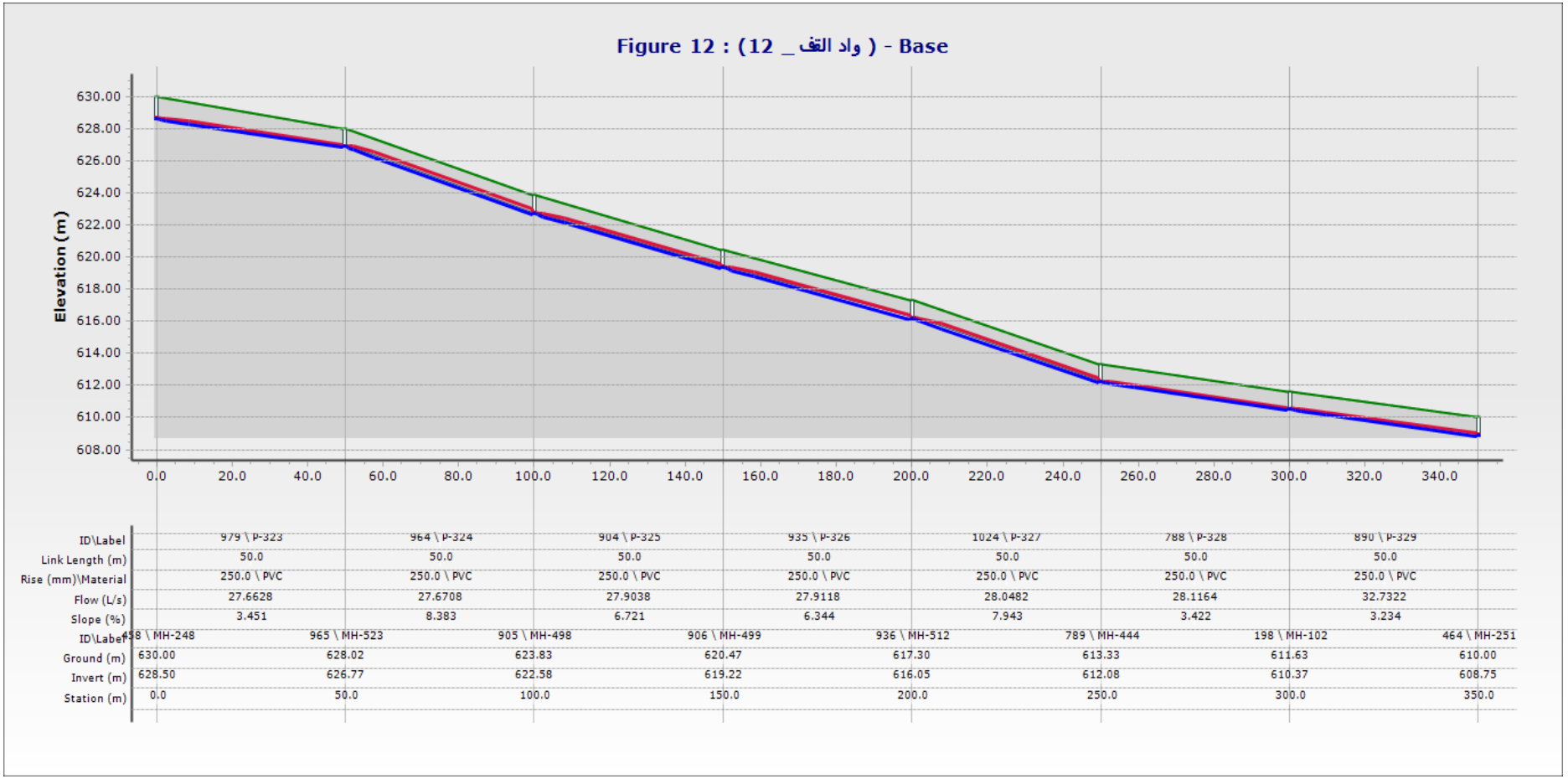
C.10 : Figure 9 : Profile for (9_ واد القف)



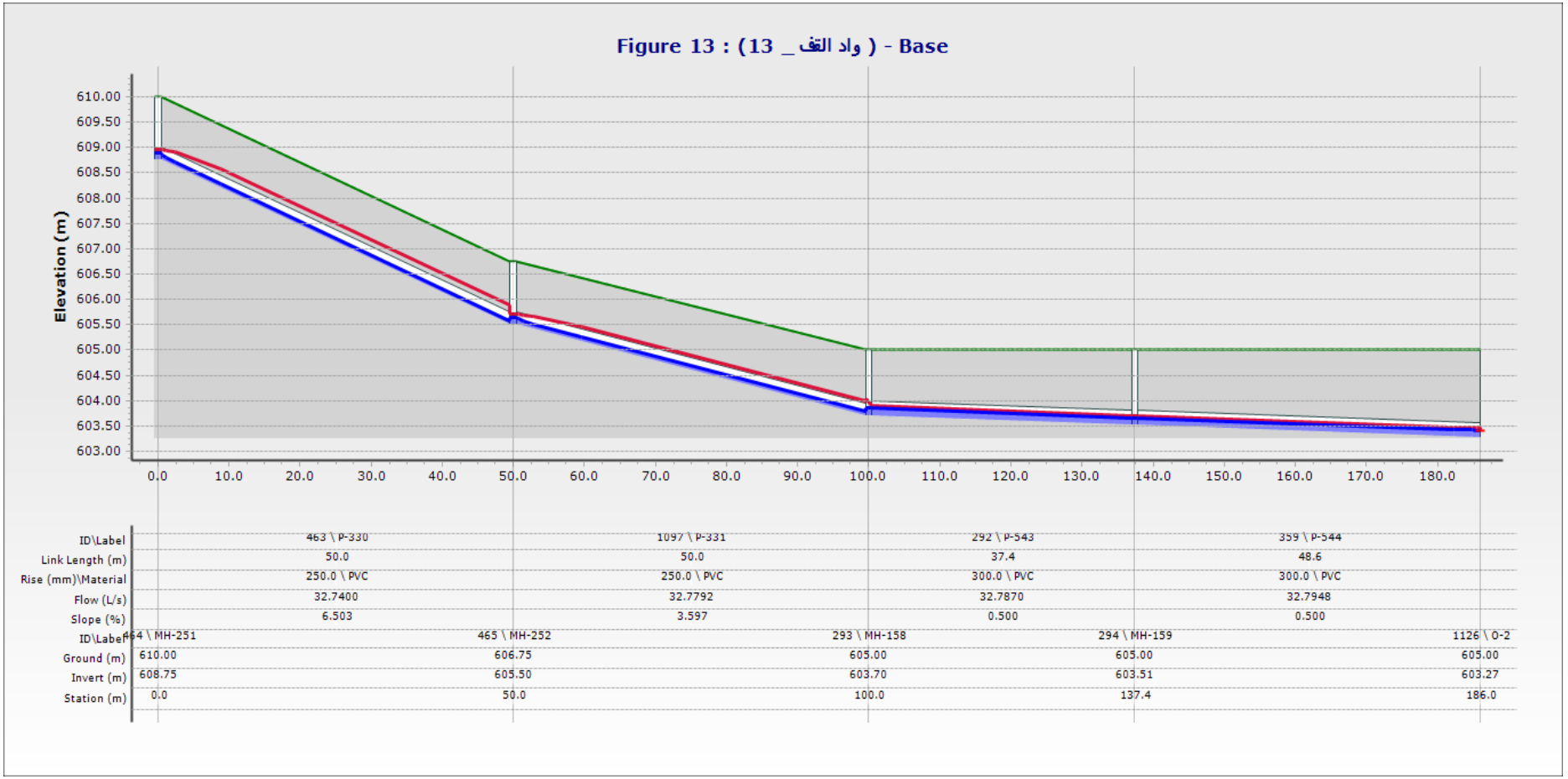
C.11 : Figure 10 : Profile for (10_ واد القف)



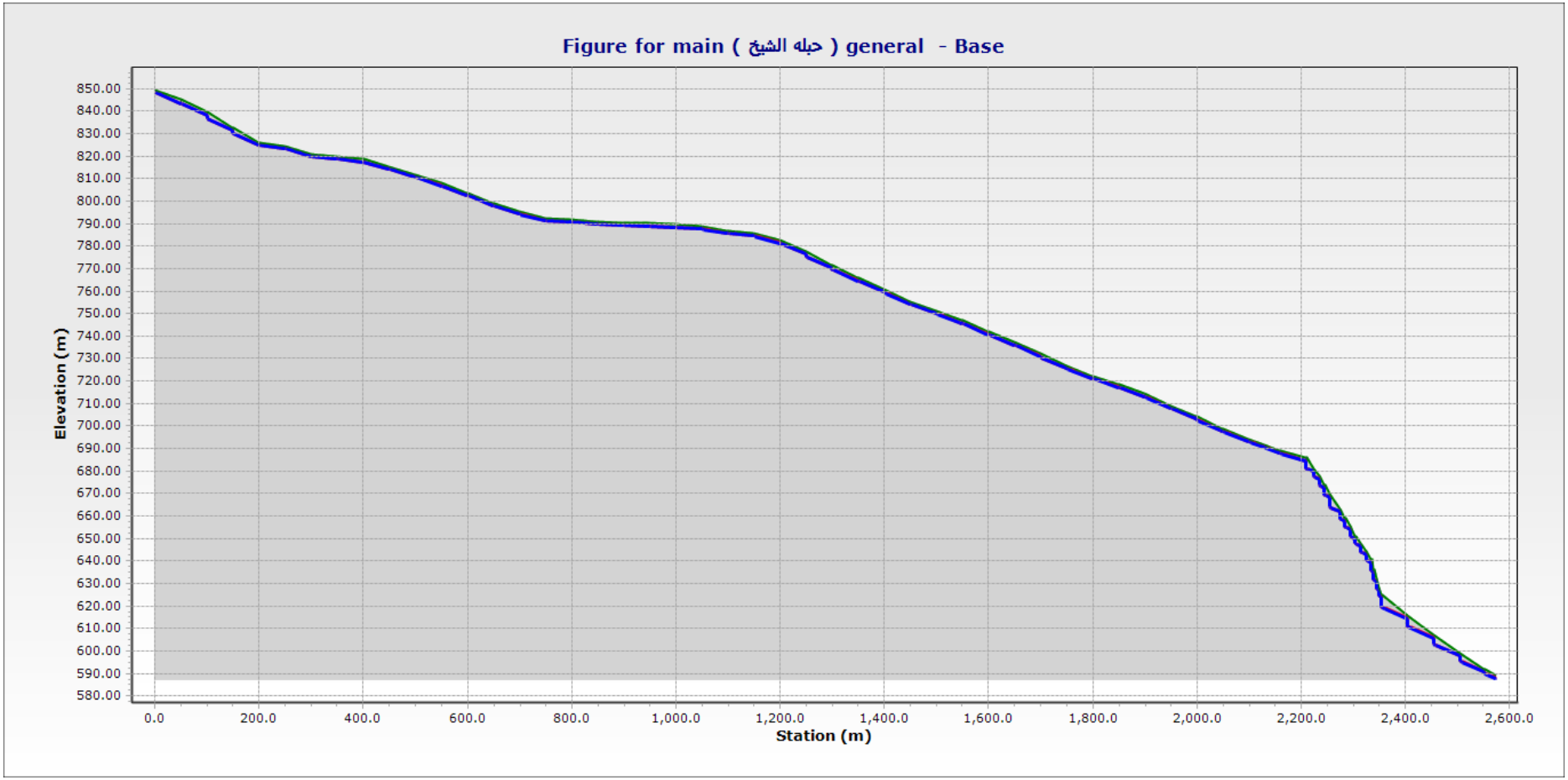
C.12 : Figure 11 : Profile for (11_ واد القف)



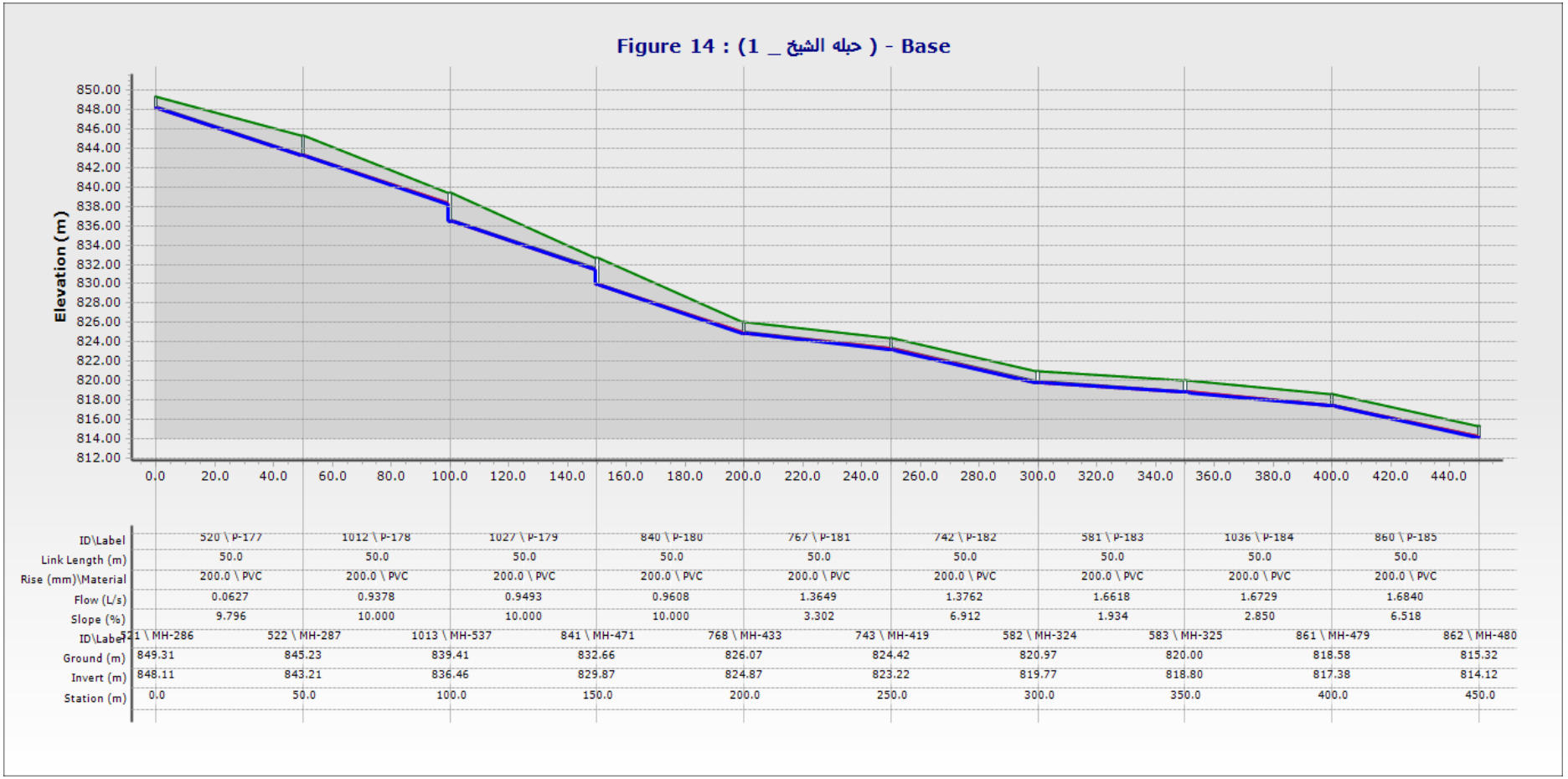
C.13 : Figure 12 : Profile for (12_ واد القف)



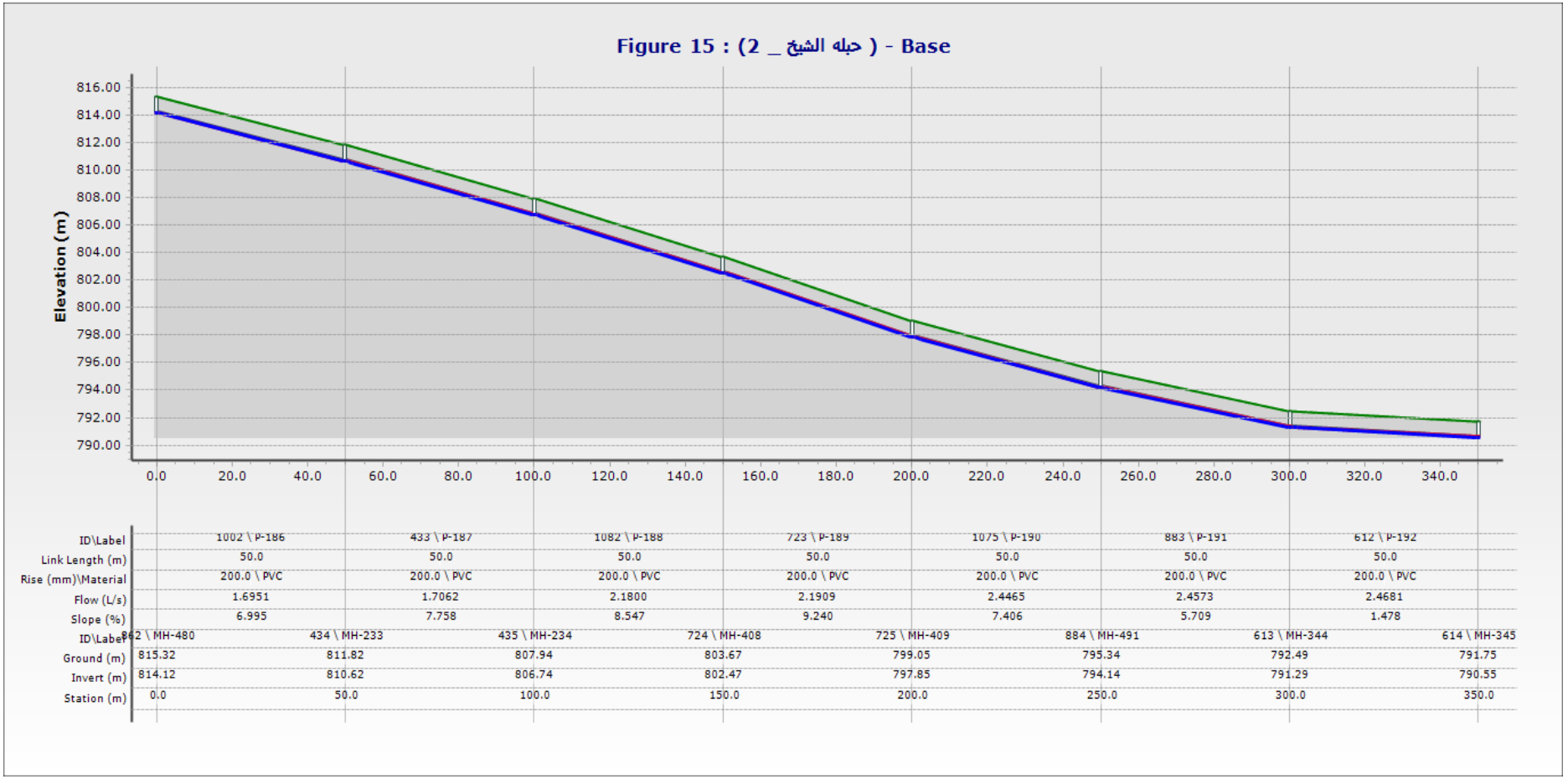
C.14 : Figure 13 : Profile for (13_ واد القف)



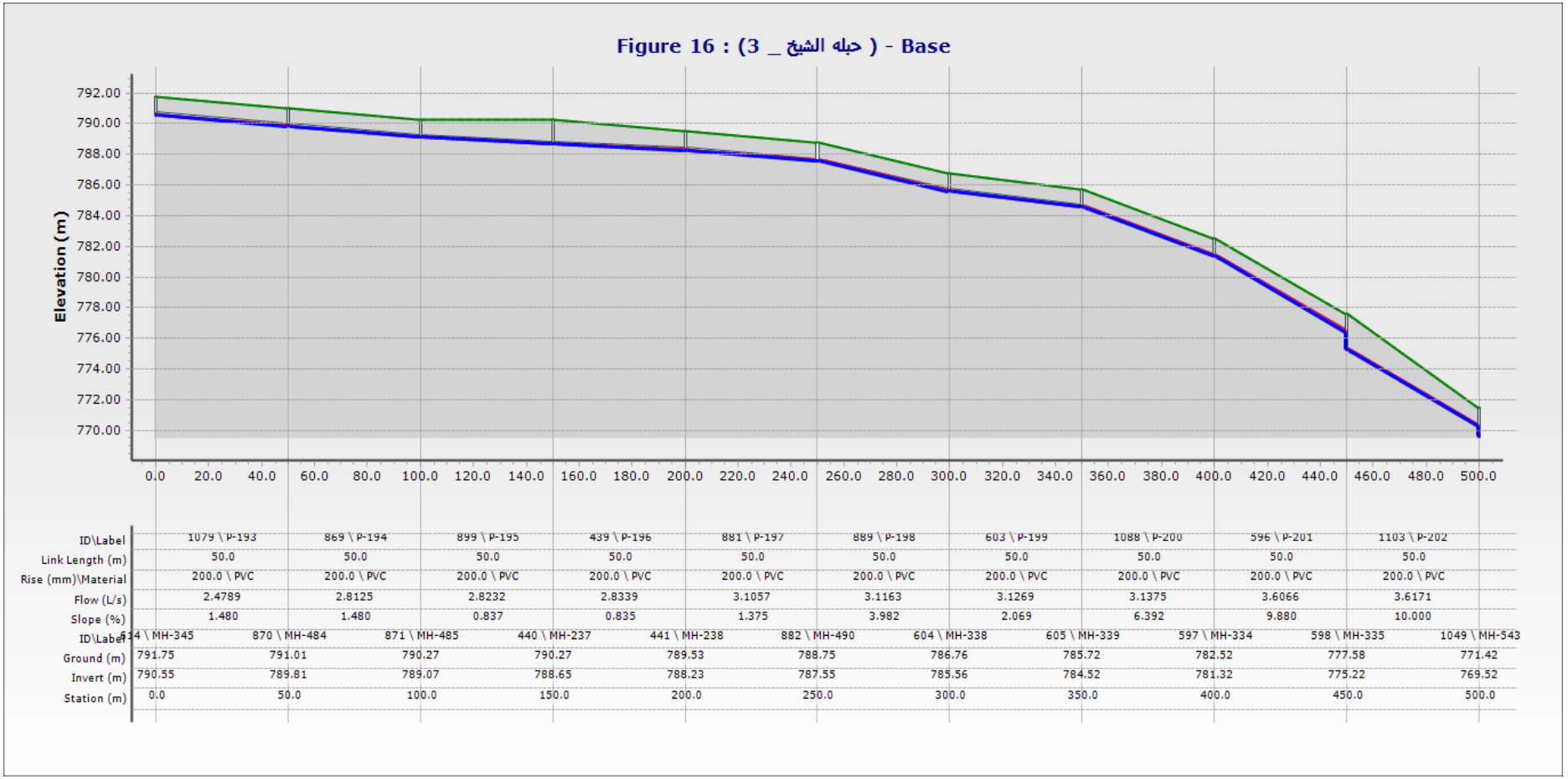
C.15 : Profile for main (حبله الشيخ) general



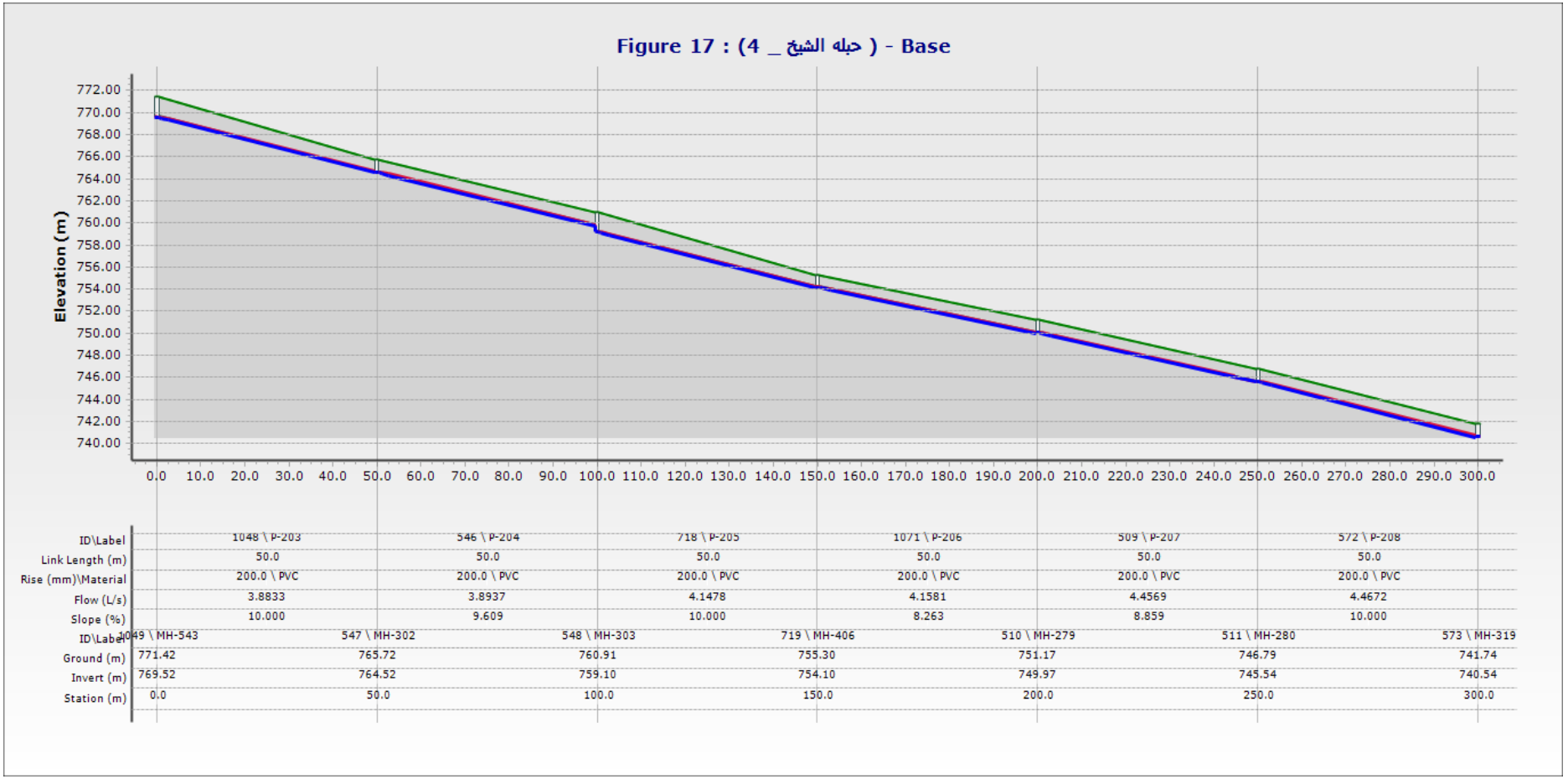
C.16 : Figure 14 : Profile for (1_ حبله الشيخ)



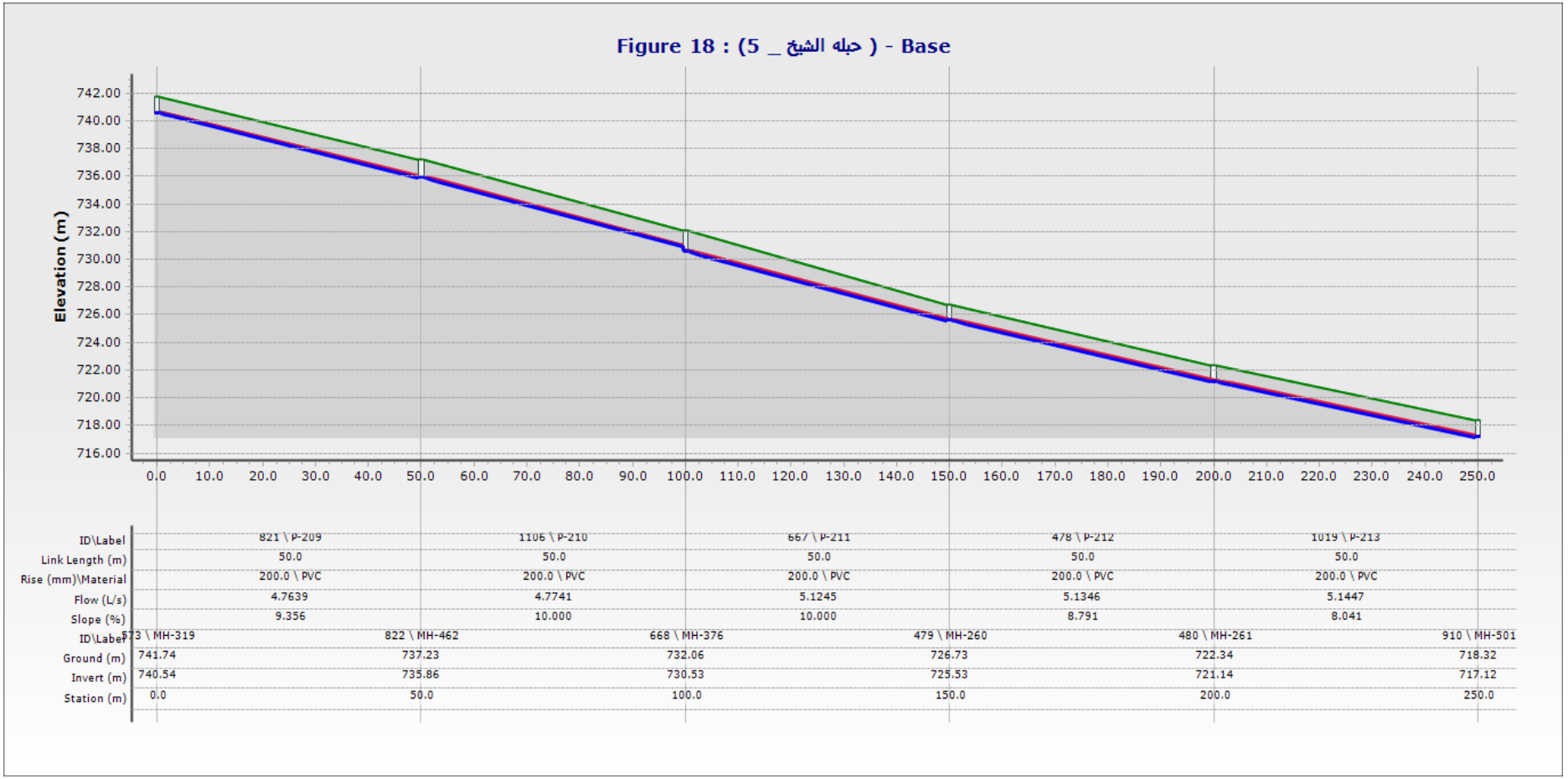
C.17 : Figure 15 : Profile for (2_ حبله الشيخ)



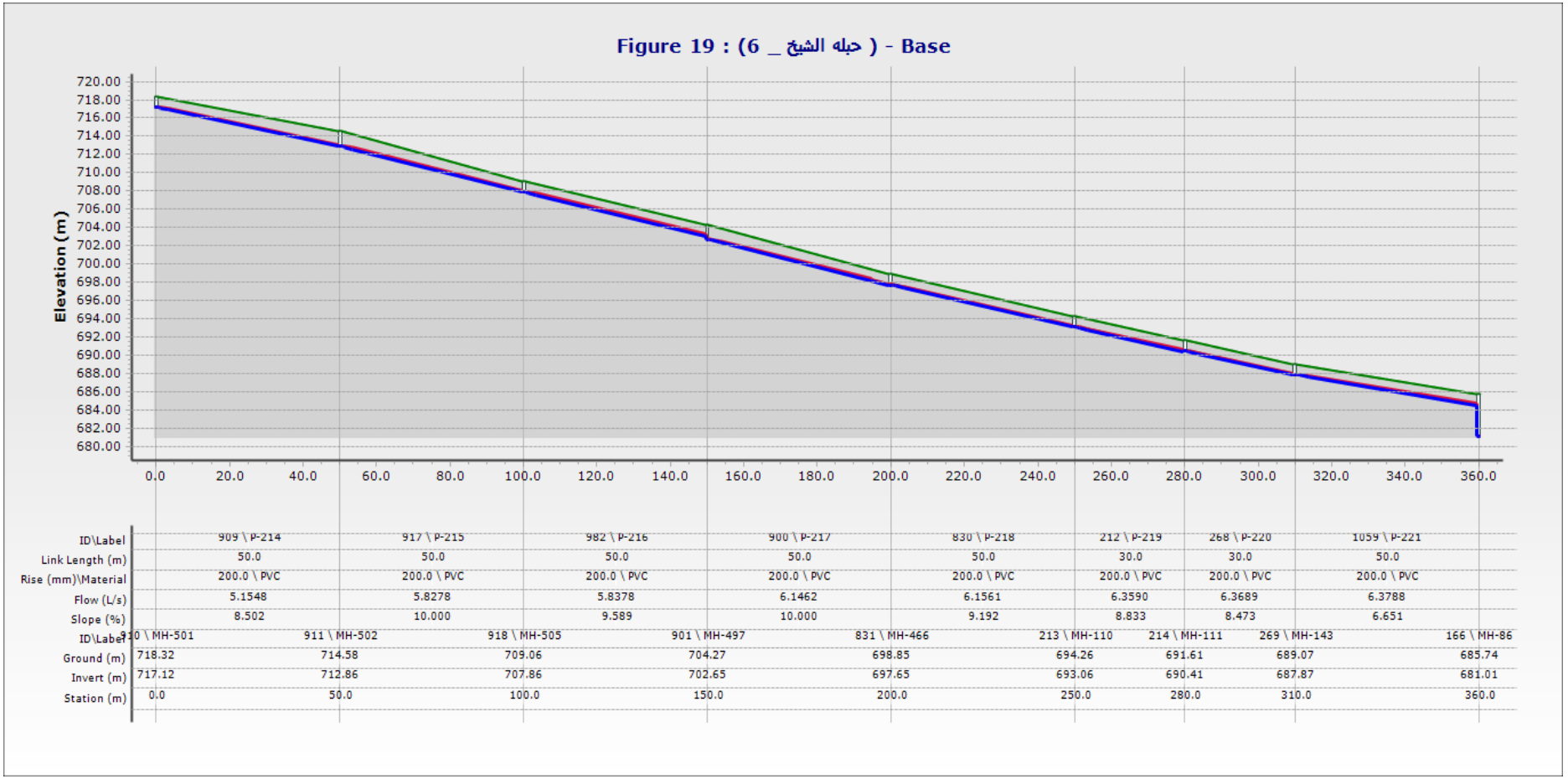
C.18 : Figure 16 : Profile for (3_ حبله الشيخ)



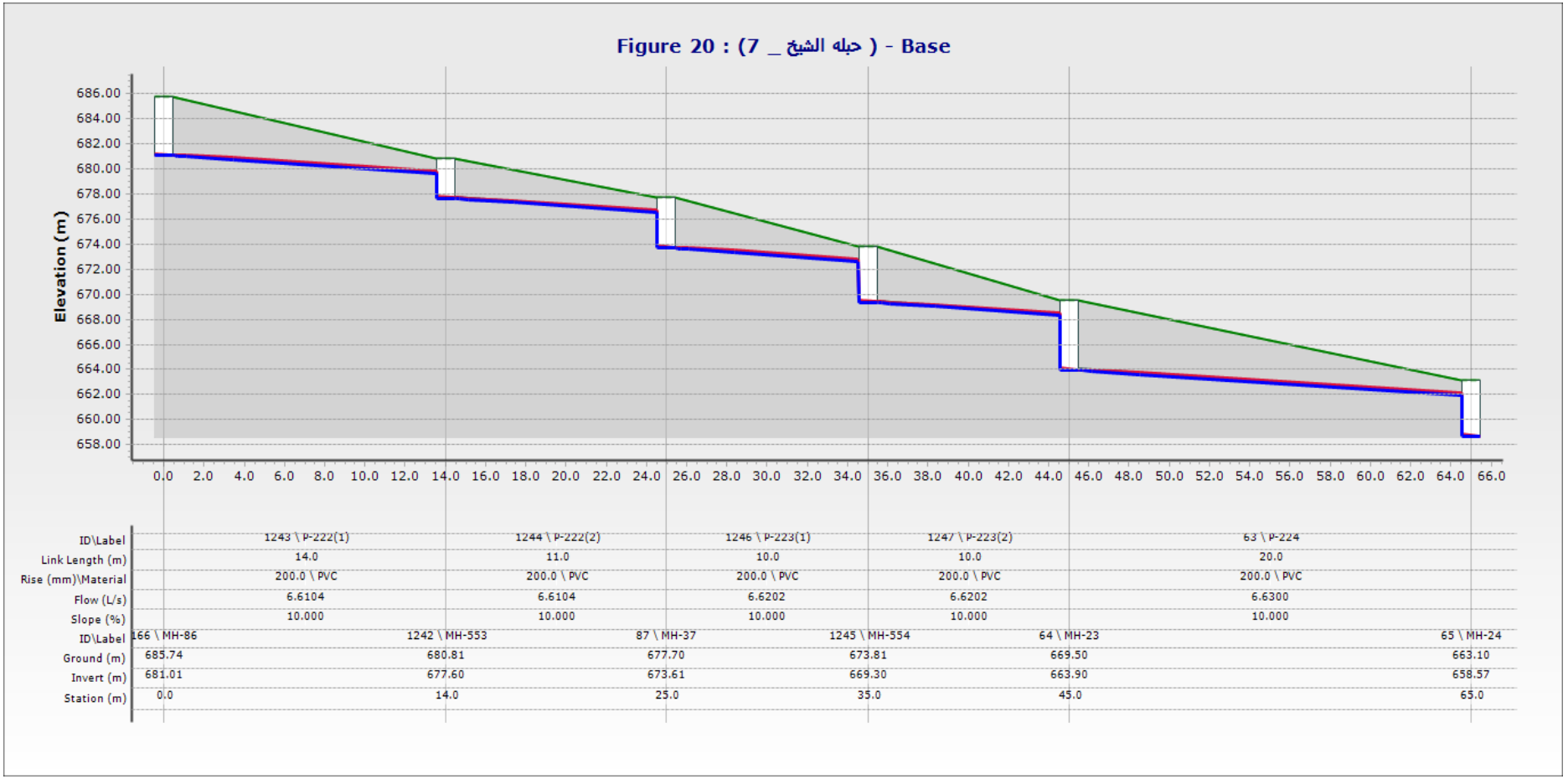
C.19 : Figure 17 : Profile for (4_ حبله الشيخ)



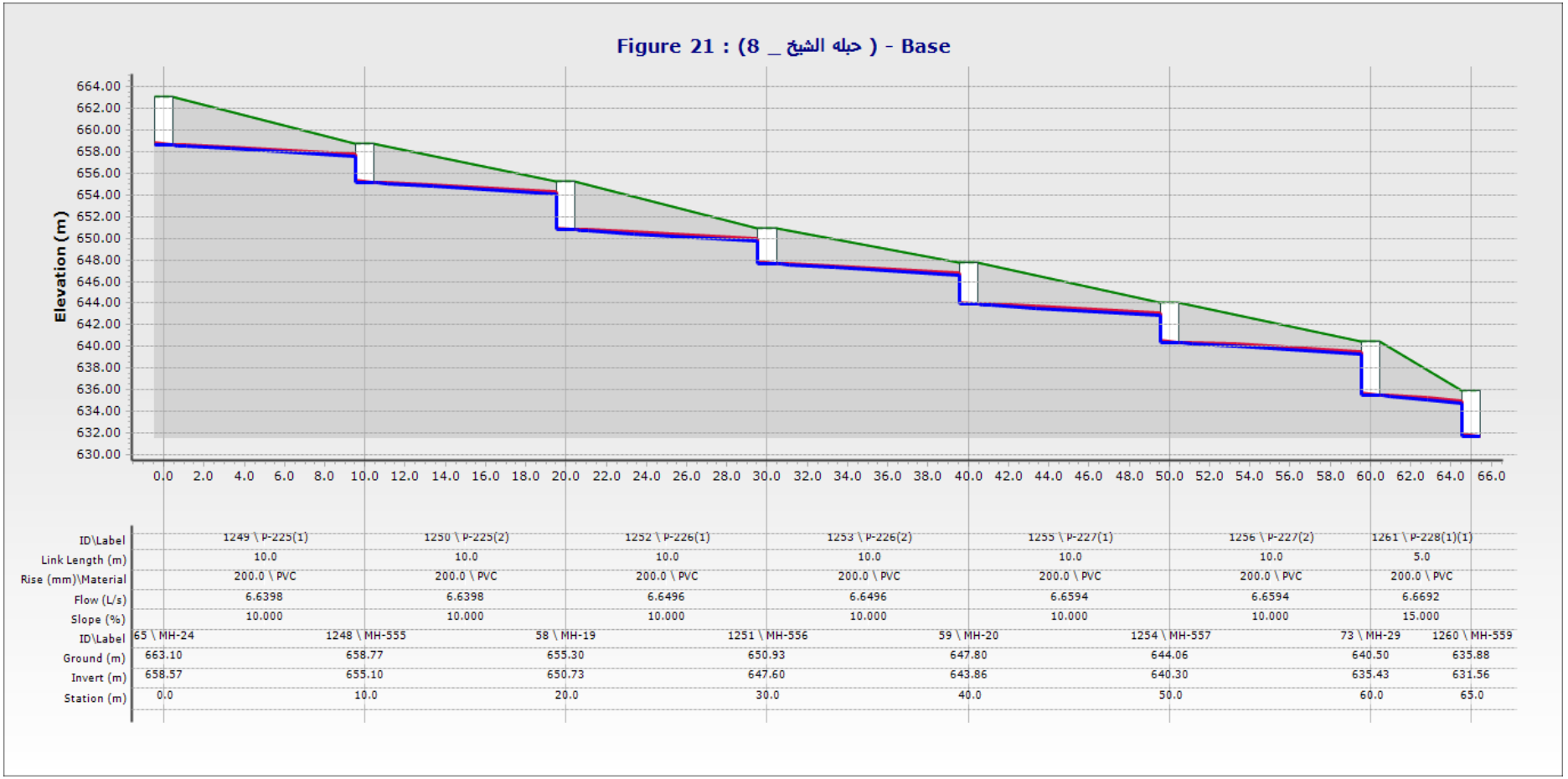
C.20 : Figure 18 : Profile for (5_ حبله الشيخ)



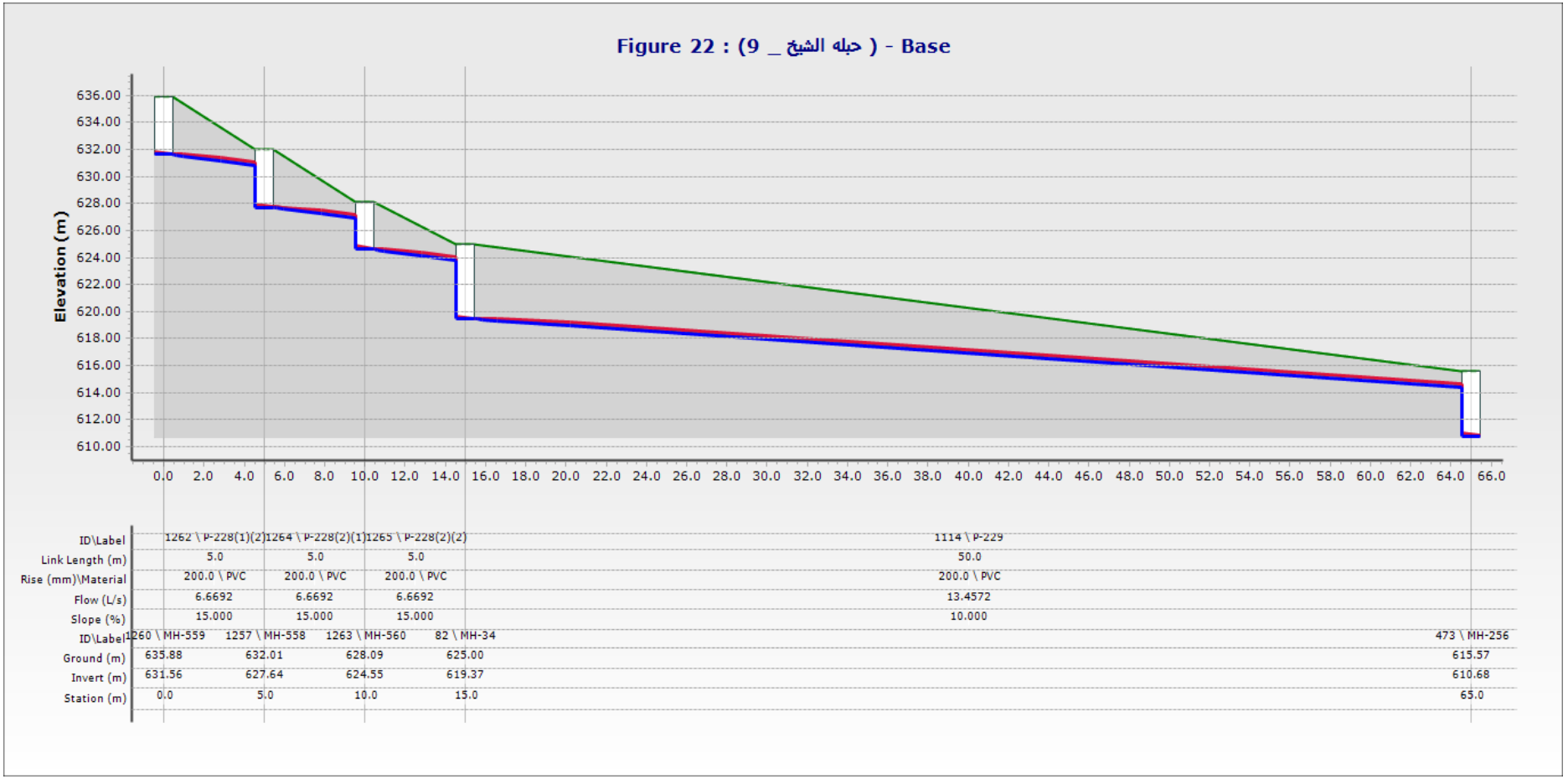
C.21 : Figure 19 : Profile for (6_ حبله الشيخ)



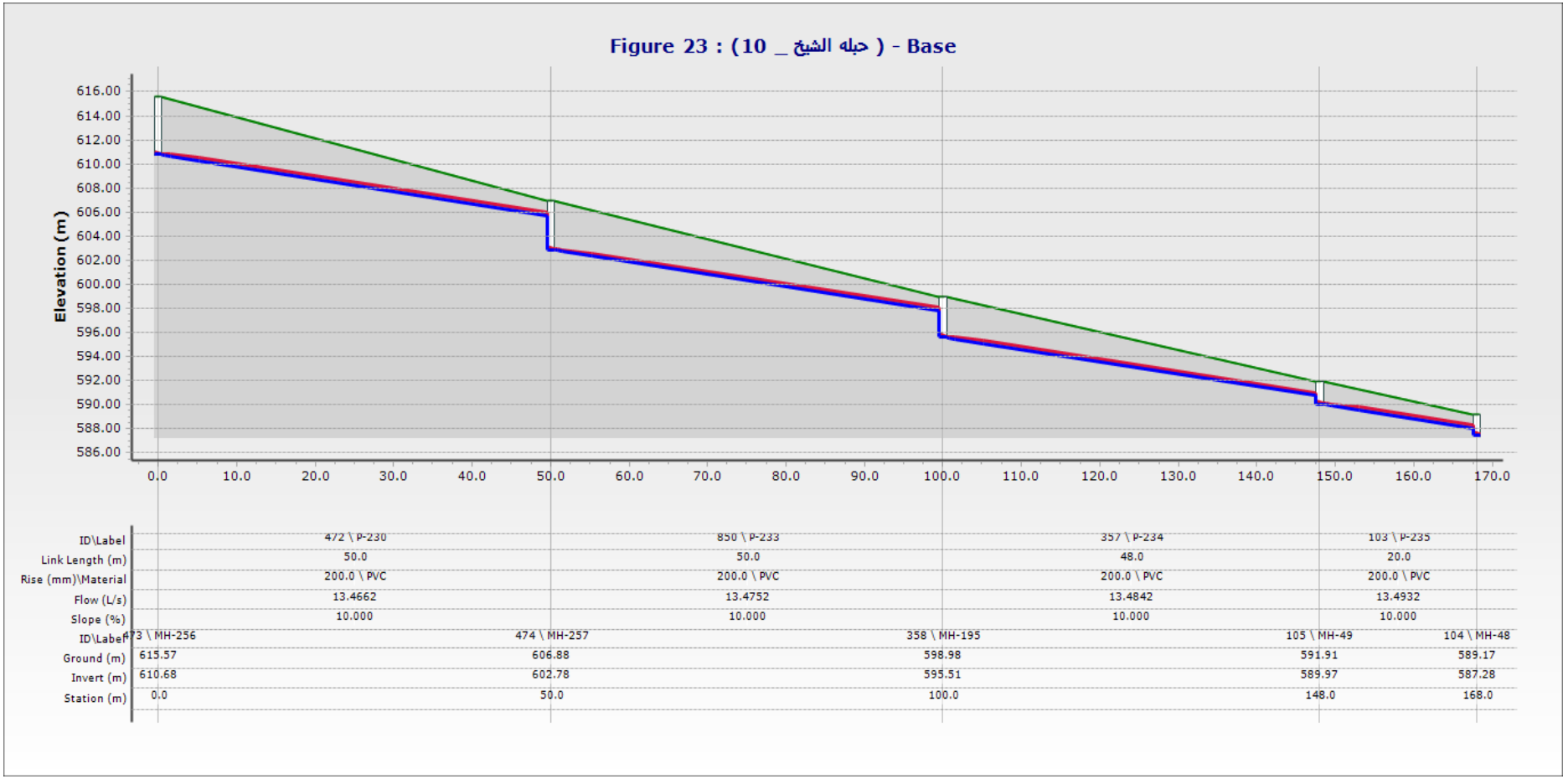
C.22 : Figure 20 : Profile for (7_ حبله الشيخ)



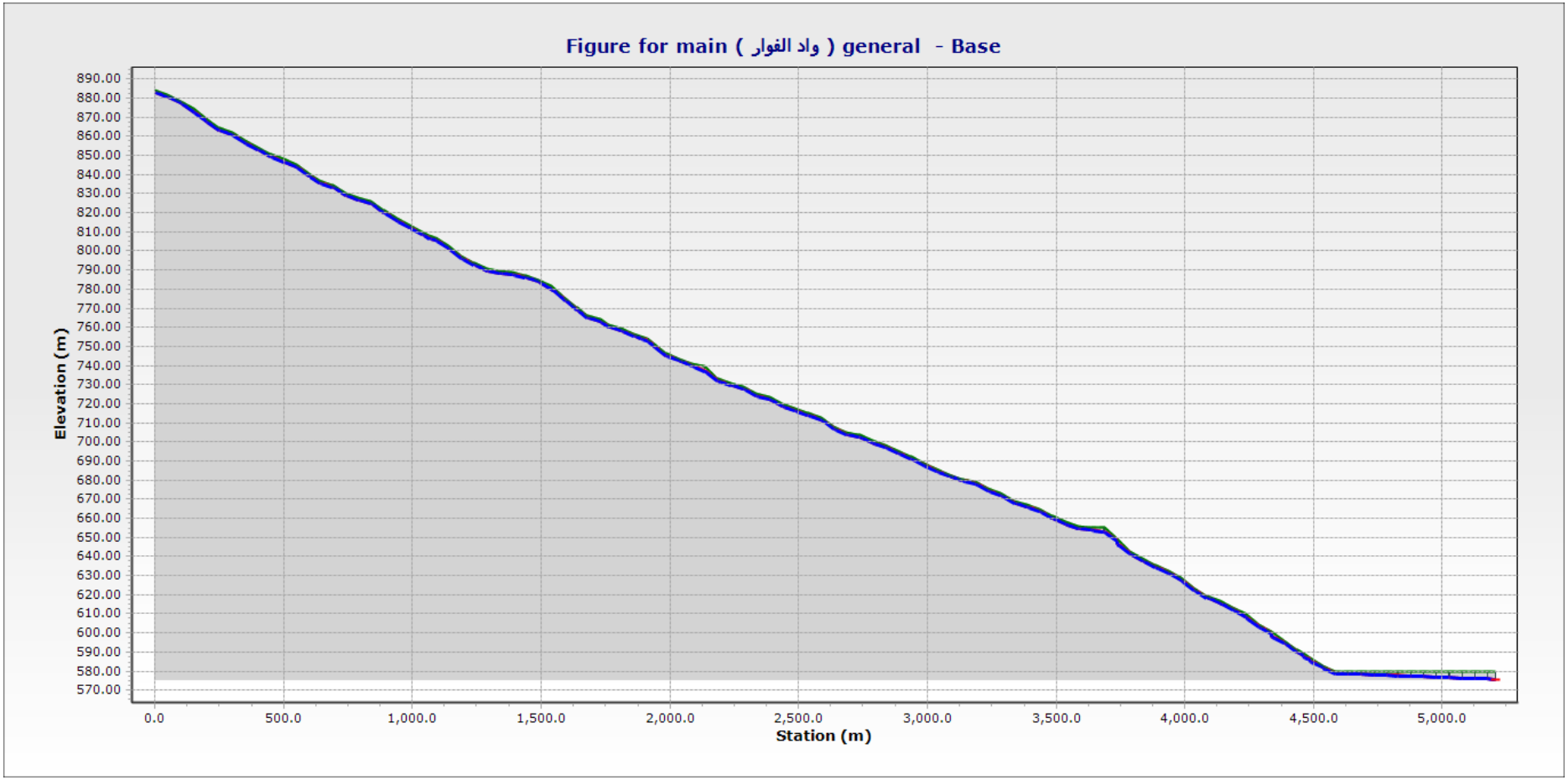
C.23 : Figure 21 : Profile for (8_ حبله الشيخ)



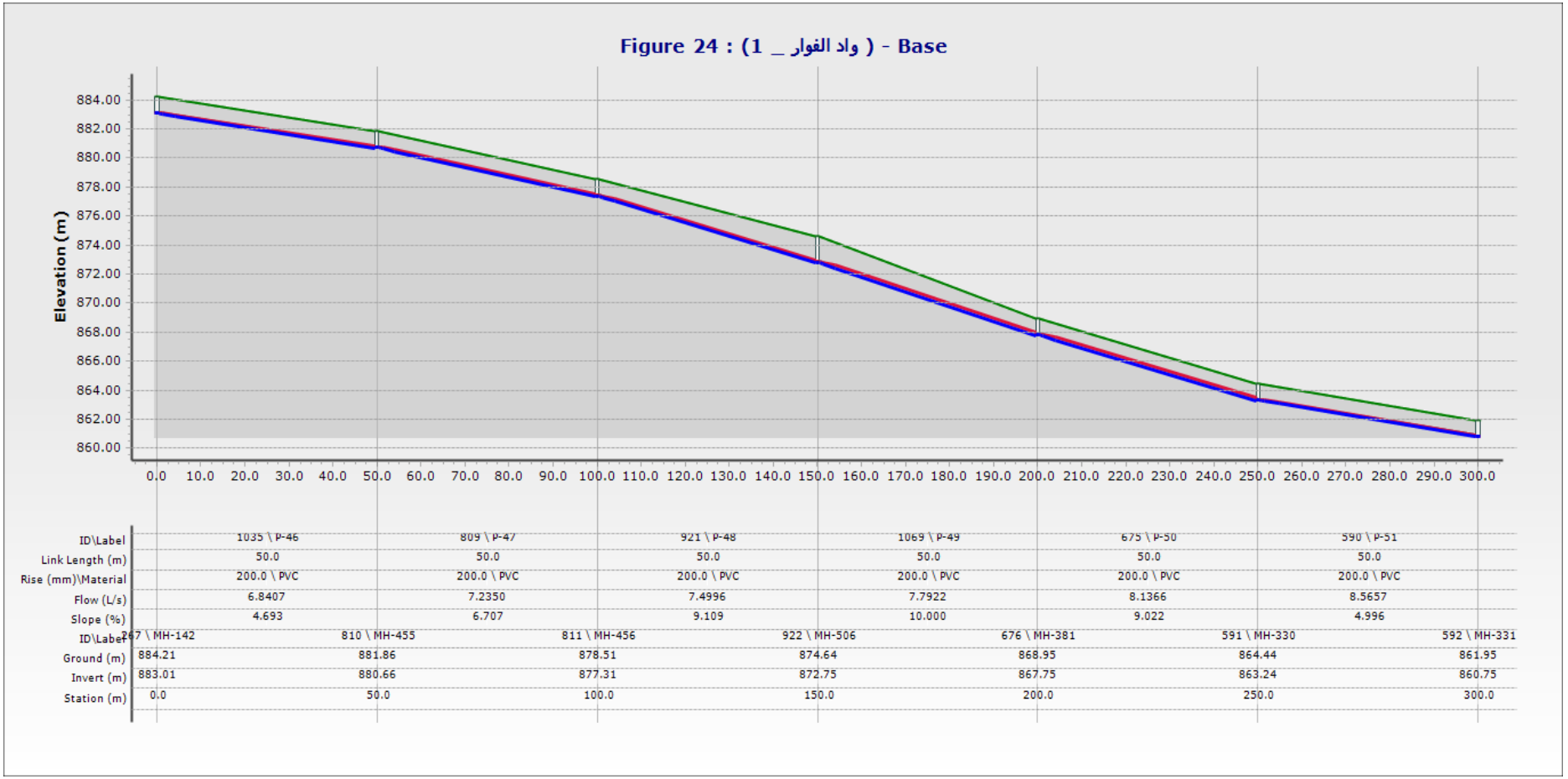
C.24 : Figure 22 : Profile for (9_ حبله الشيخ)



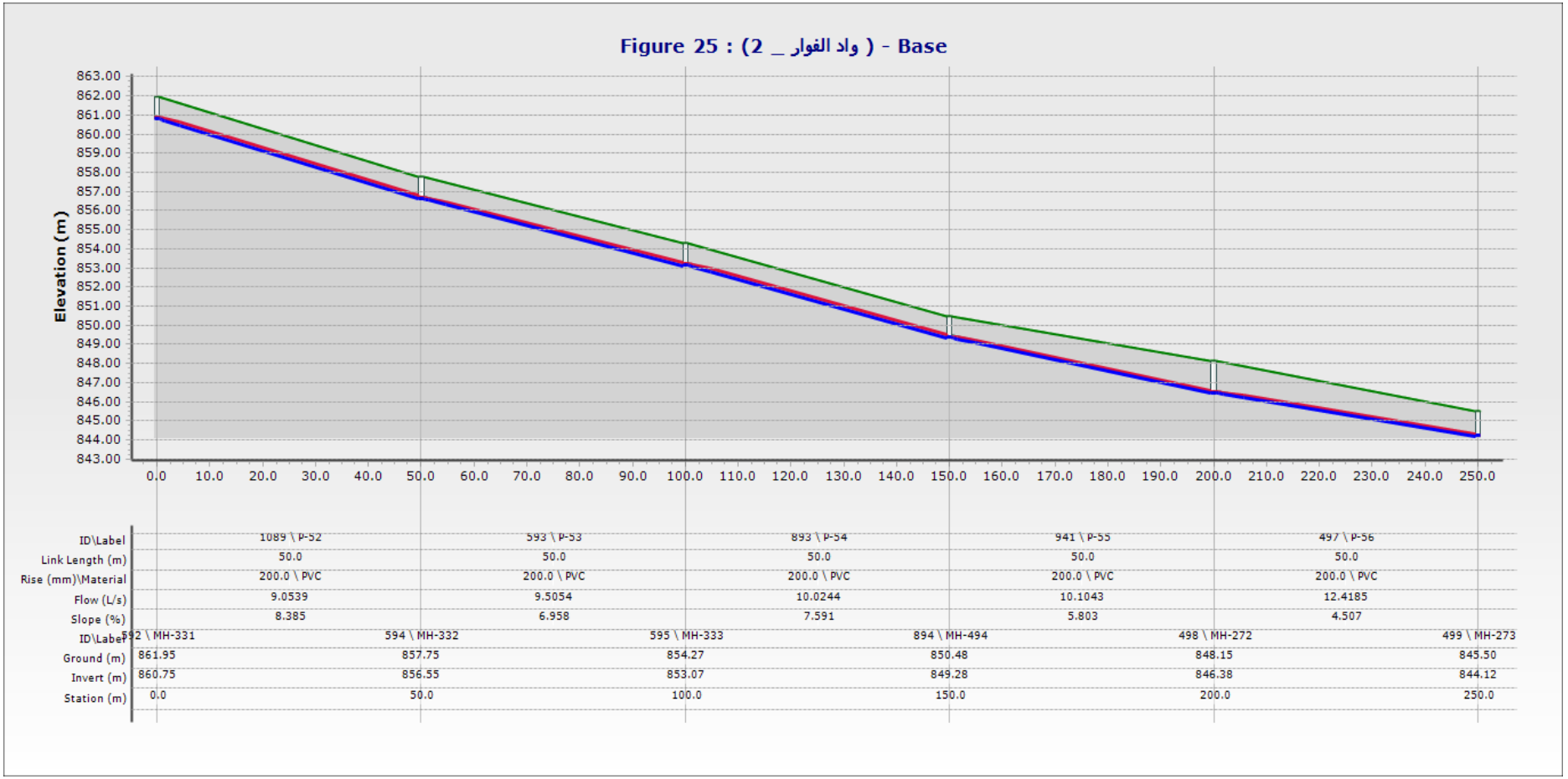
C.25 : Figure 23 : Profile for (10_ حبله الشيخ)



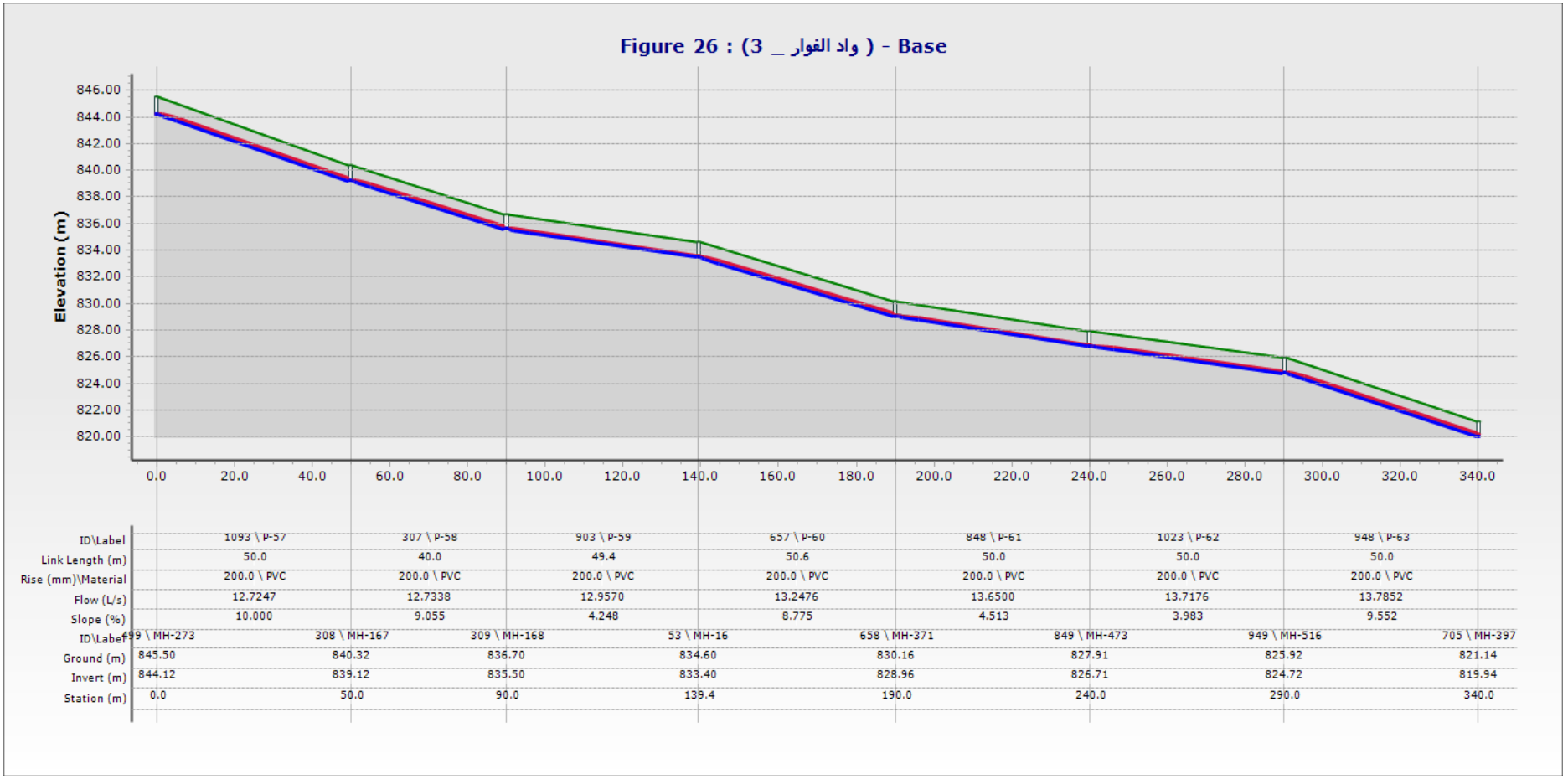
C.26 : Profile for main (واد الفوار) general



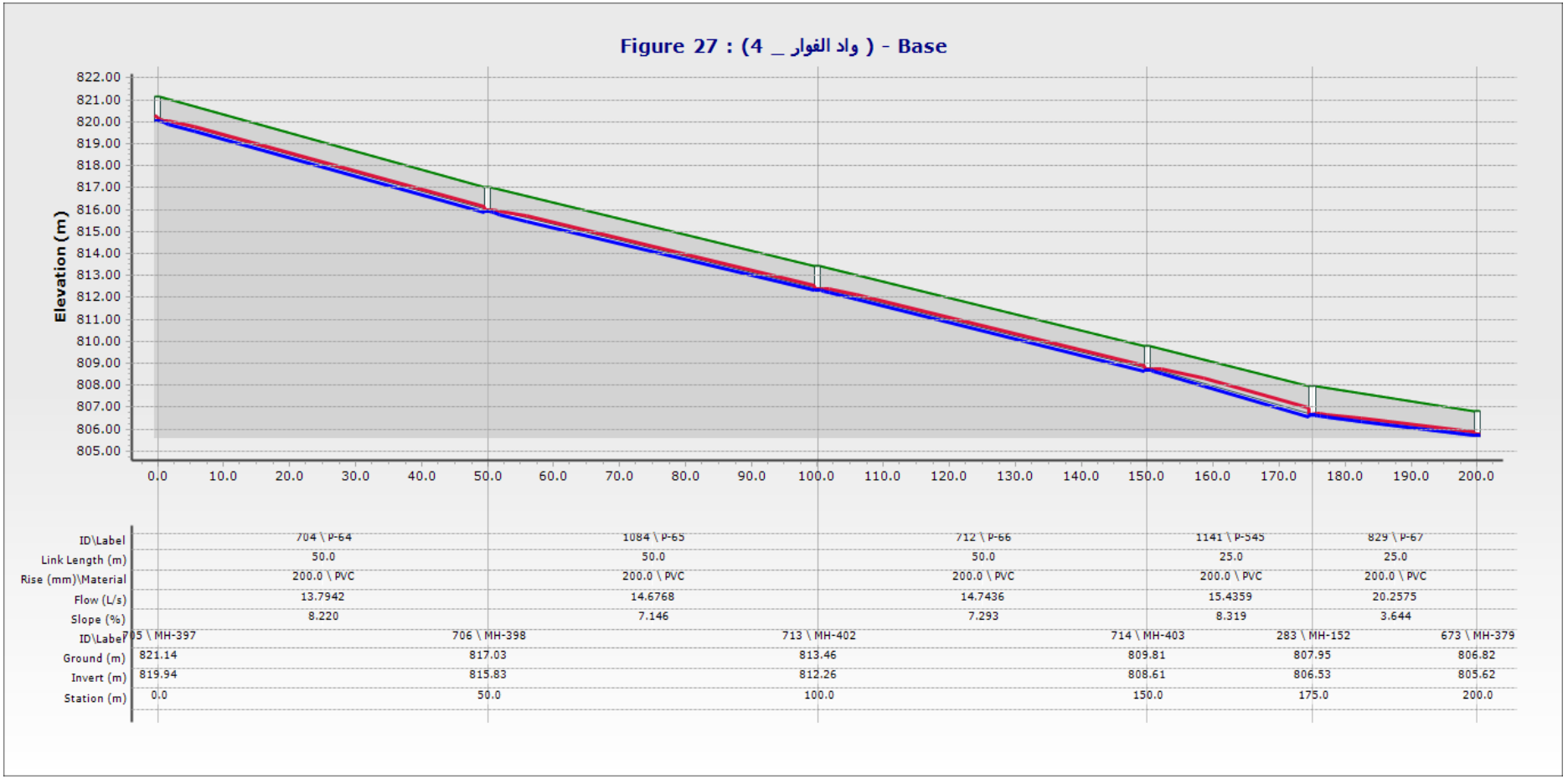
C.27 : Figure 24 : Profile for (1_ واد الفوار)



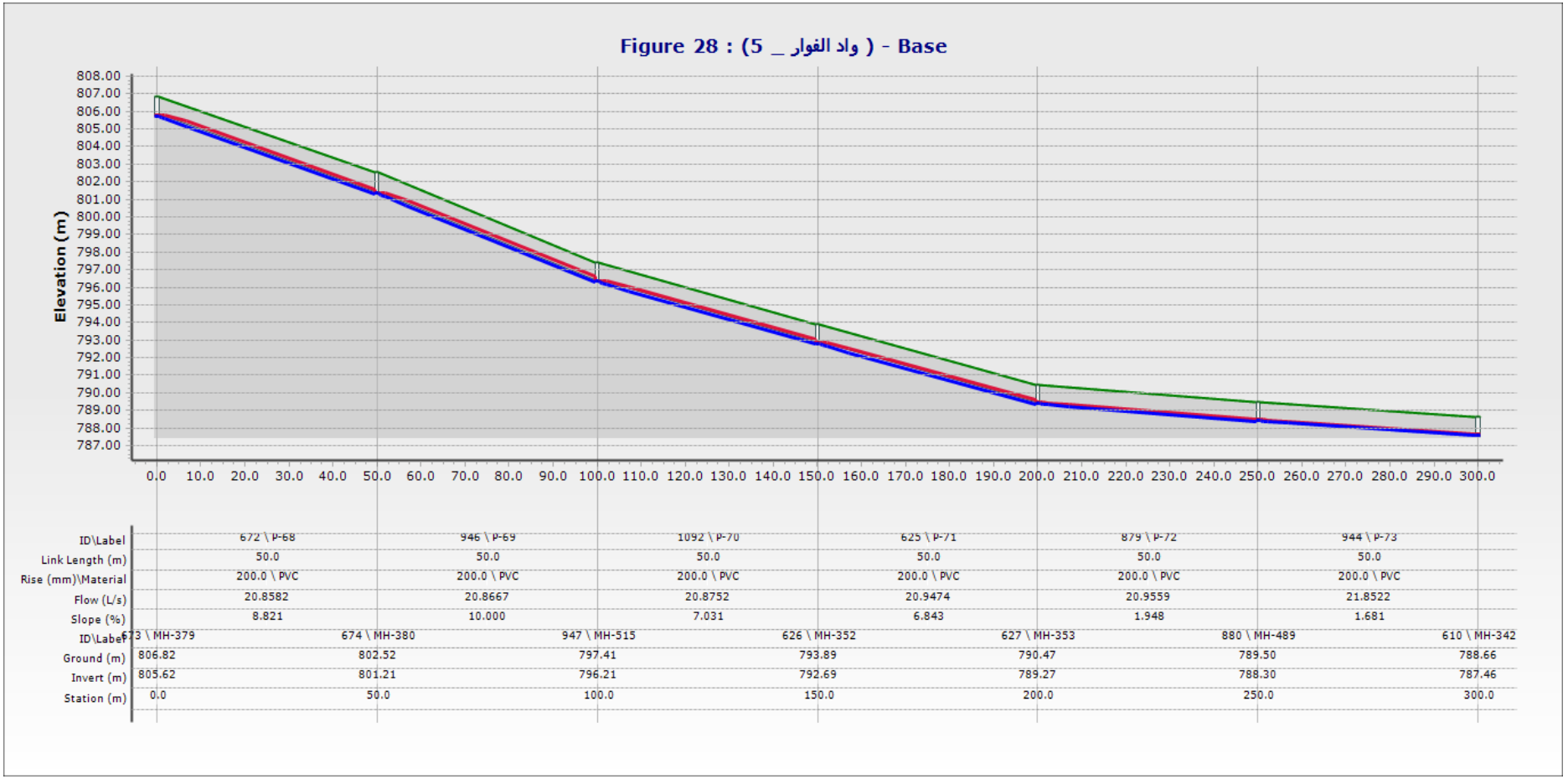
C.28 : Figure 25 : Profile for (2_ واد الفوار)



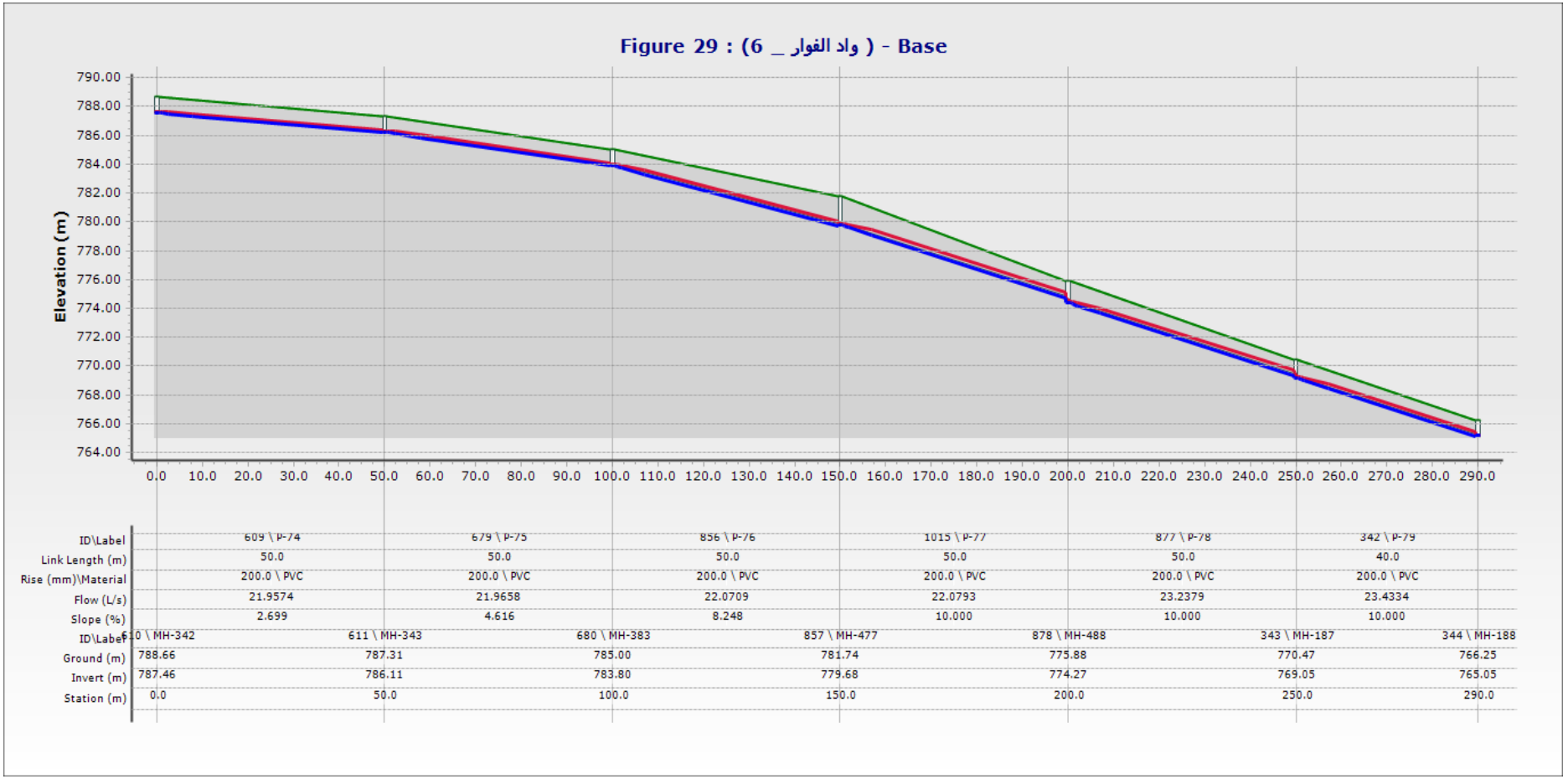
C.29 : Figure 26 : Profile for (3_ واد الفوار)



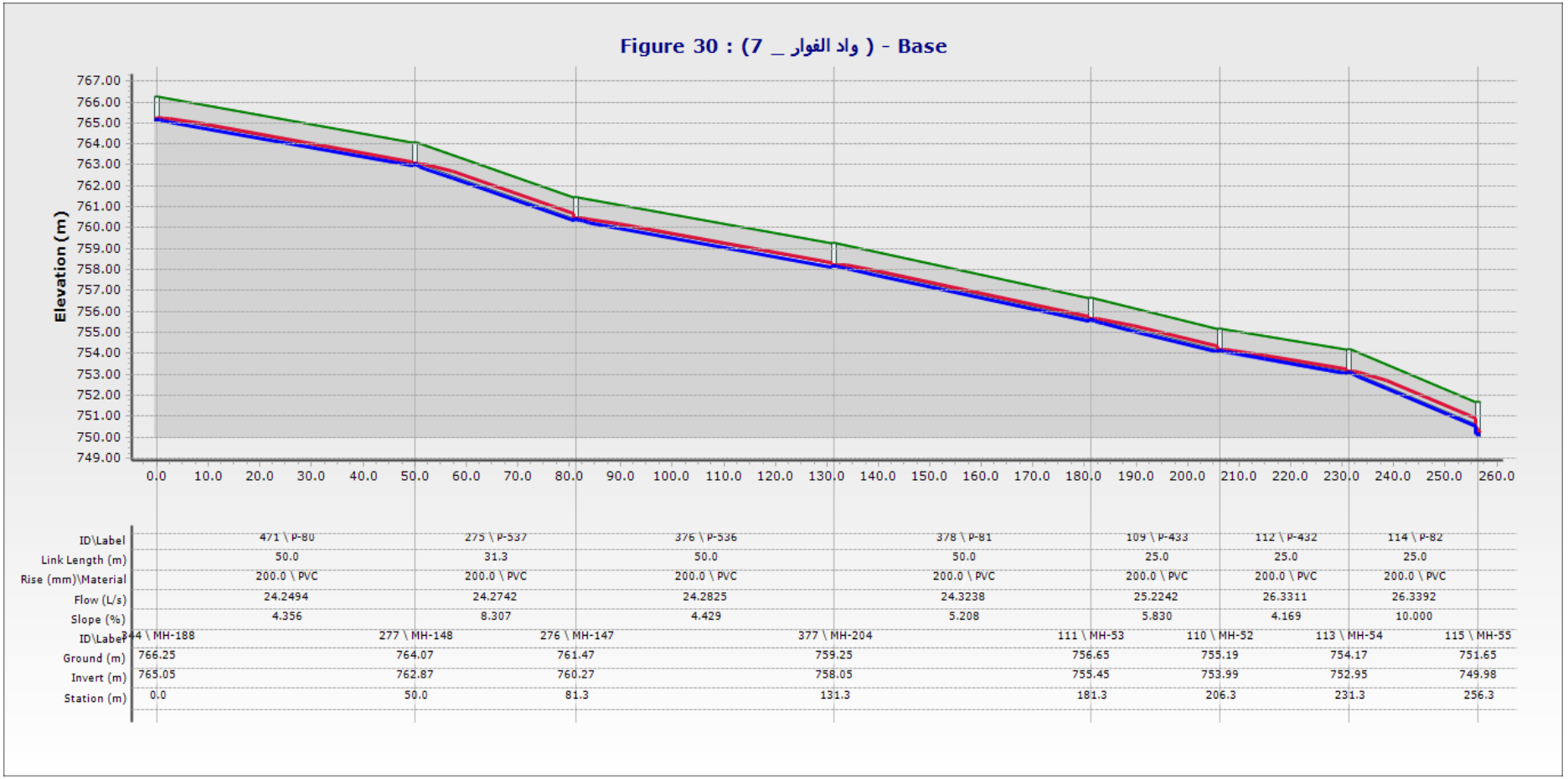
C.30 : Figure 27 : Profile for (4_ واد الفوار)



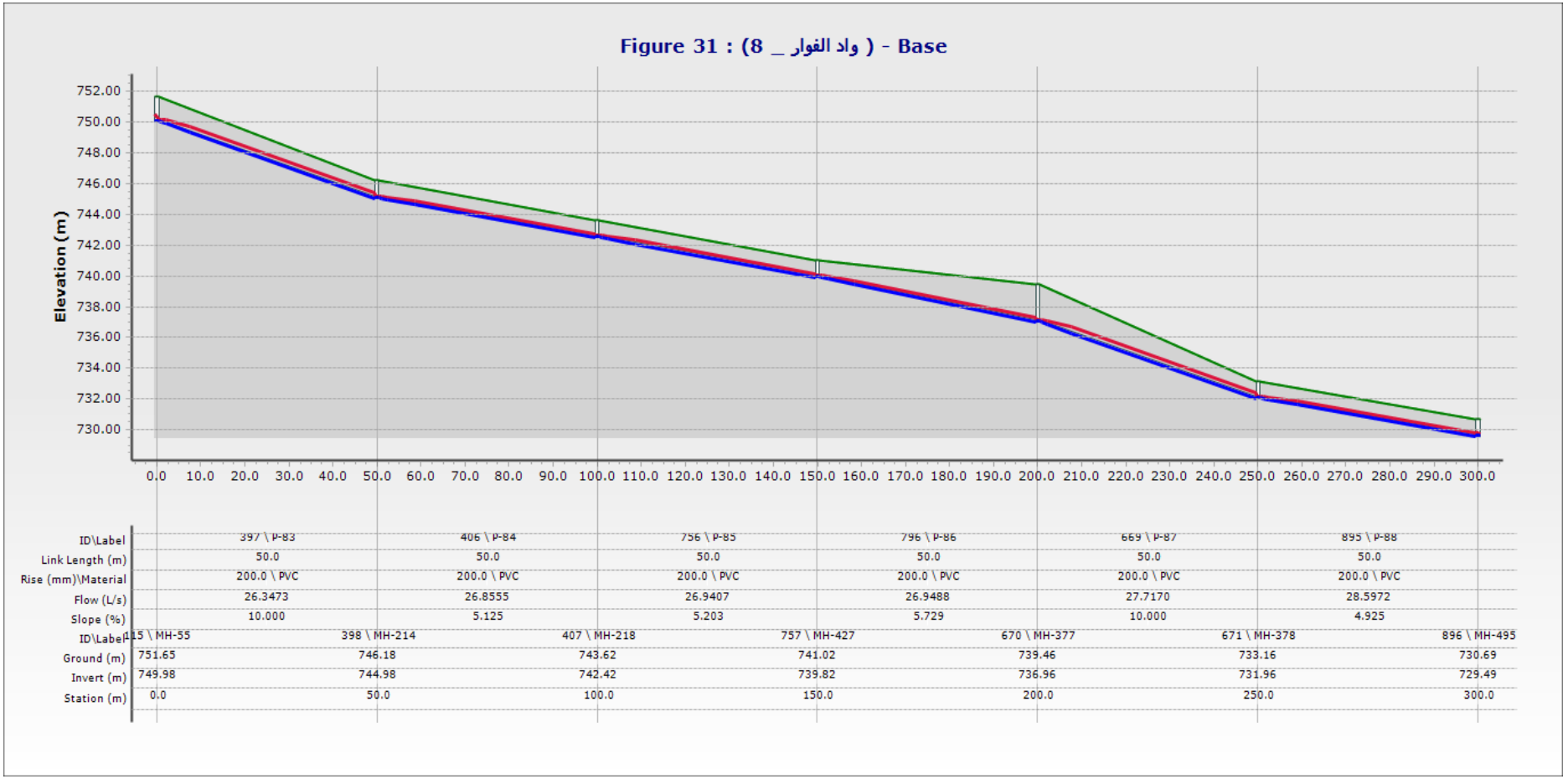
C.31 : Figure 28 : Profile for (5_ واد الفوار)



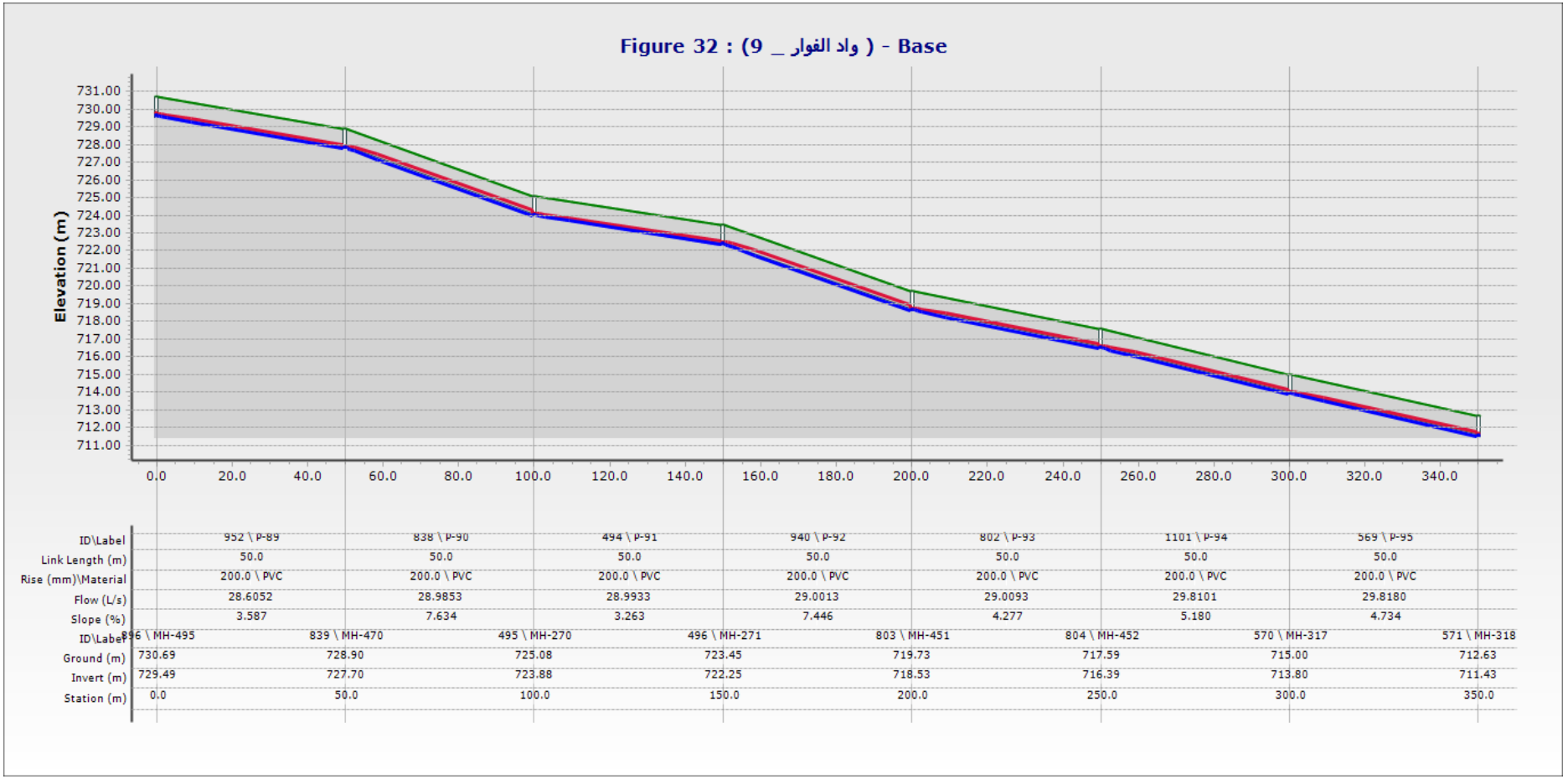
C.32 : Figure 29 : Profile for (6_ واد الفوار)



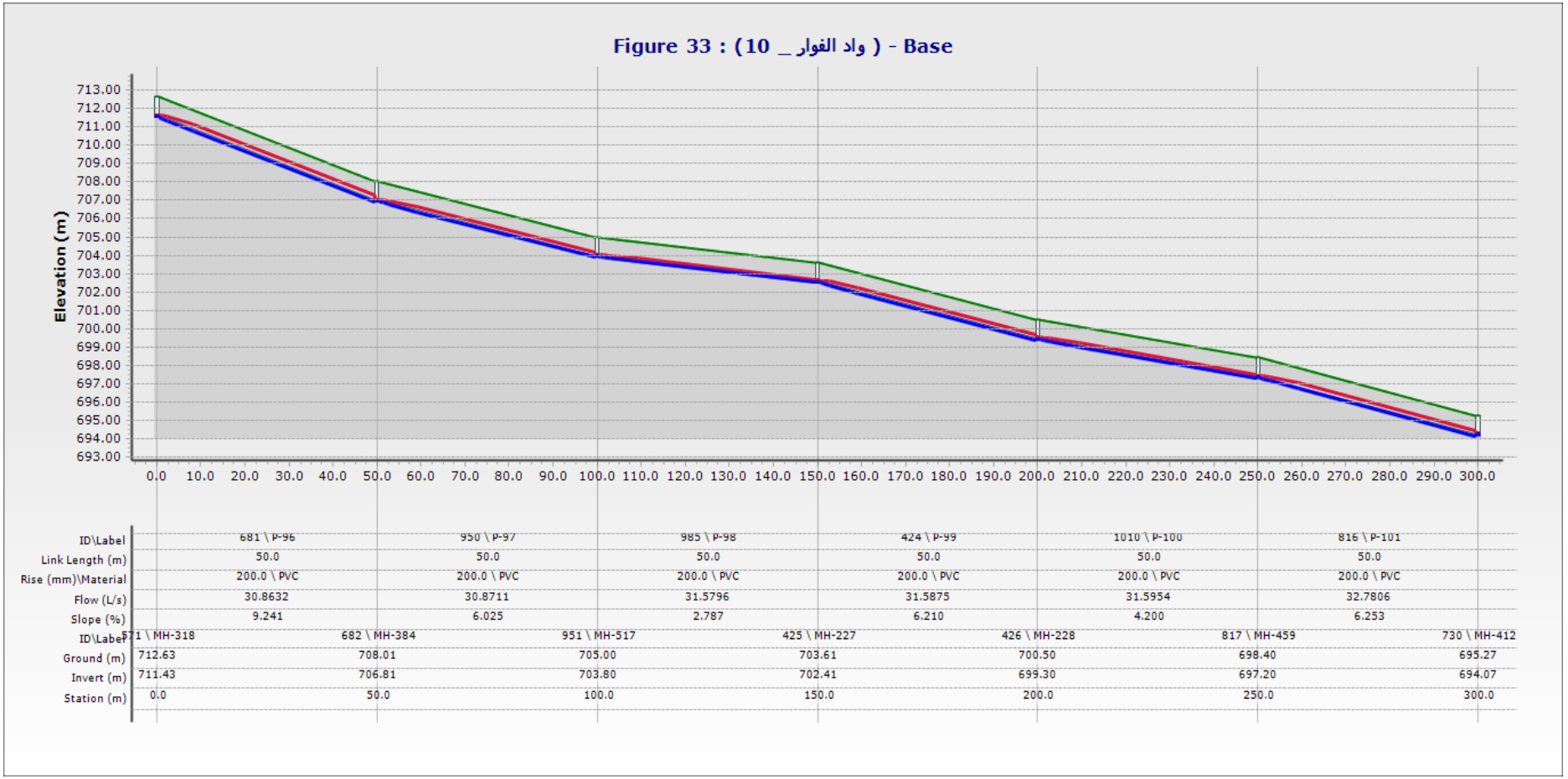
C.33 : Figure 30 : Profile for (7_ واد الفوار)



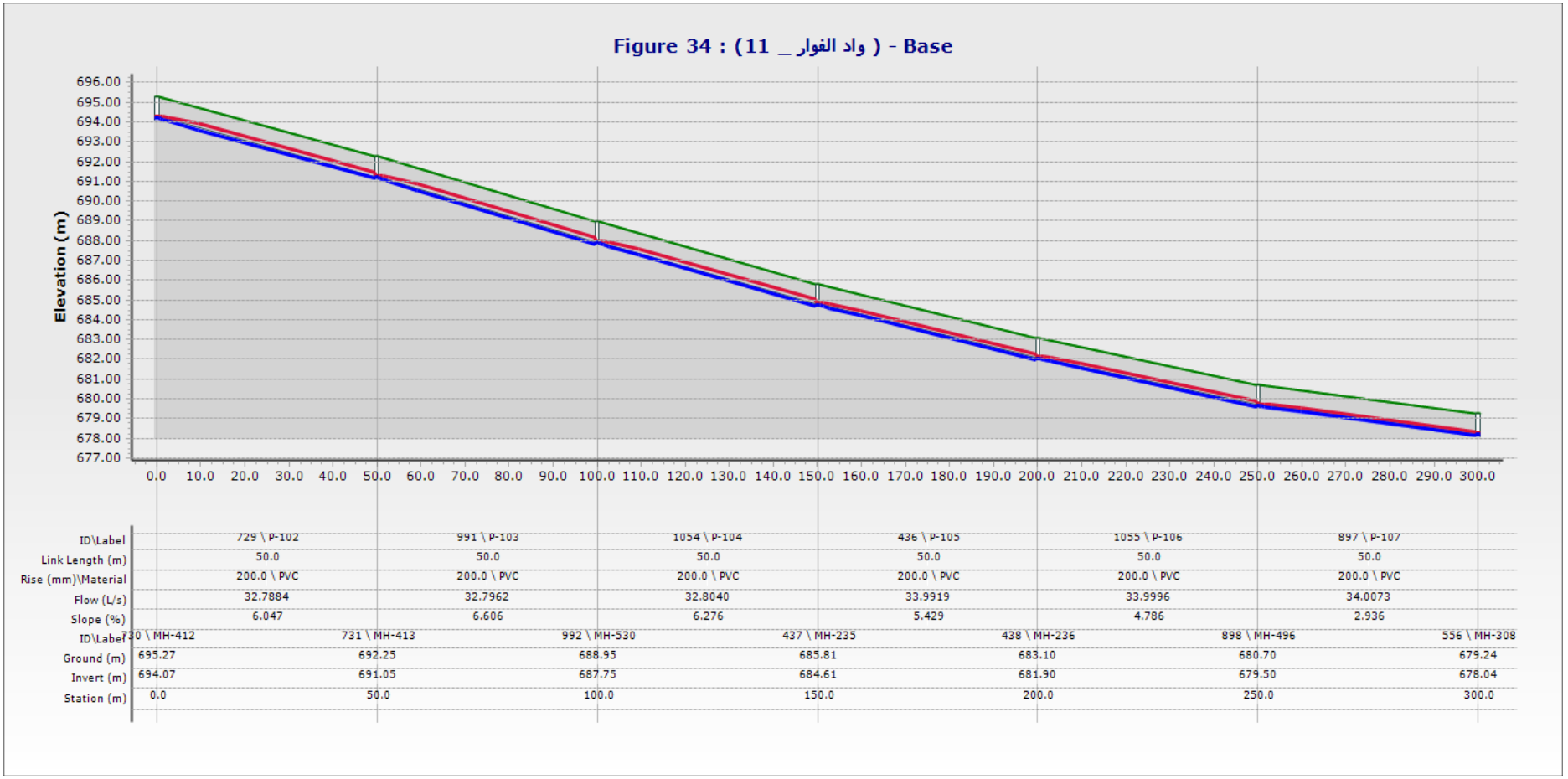
C.34 : Figure 31 : Profile for (8_ واد الفوار)



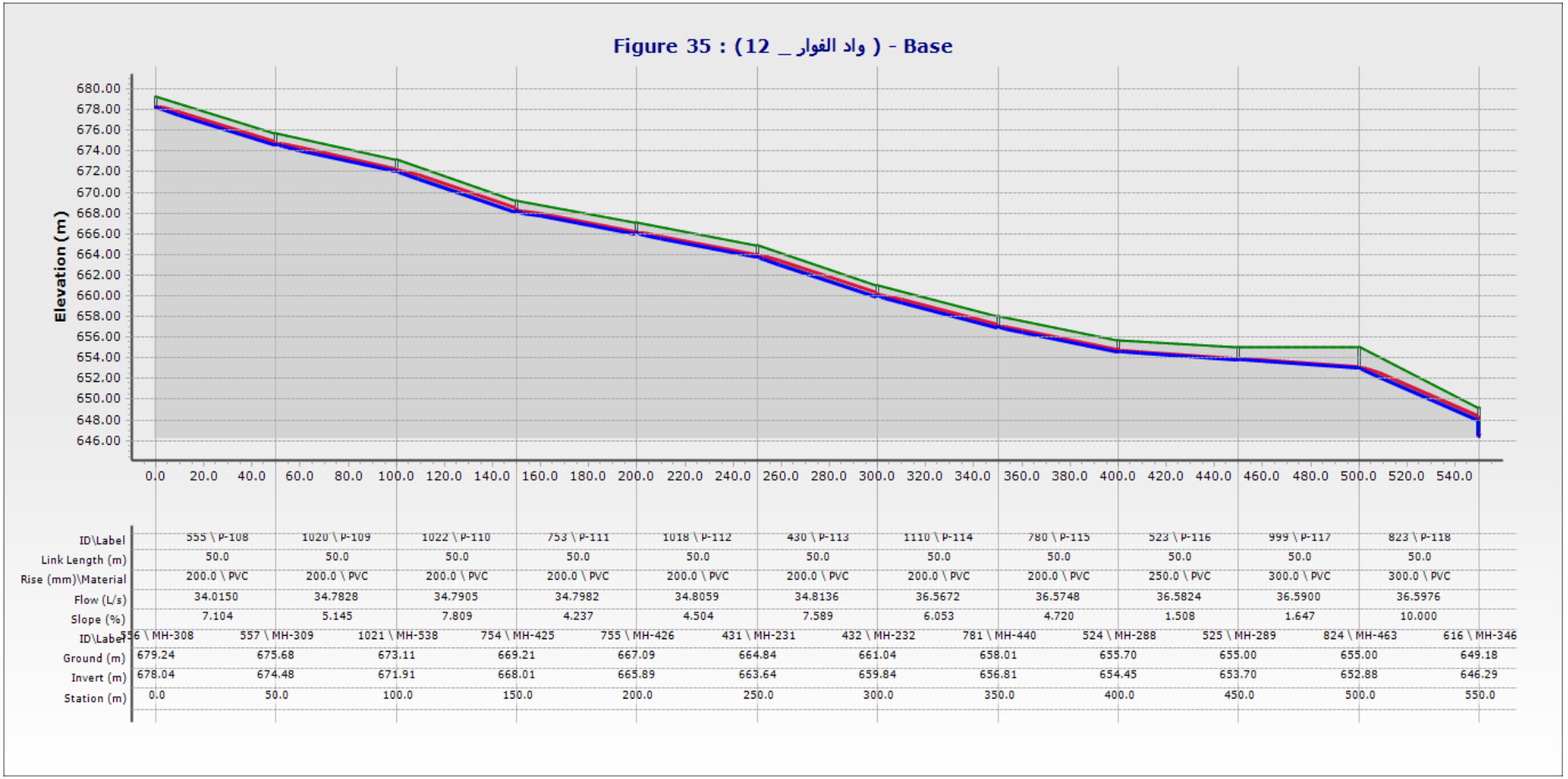
C.35 : Figure 32 : Profile for (9_ واد الفوار)



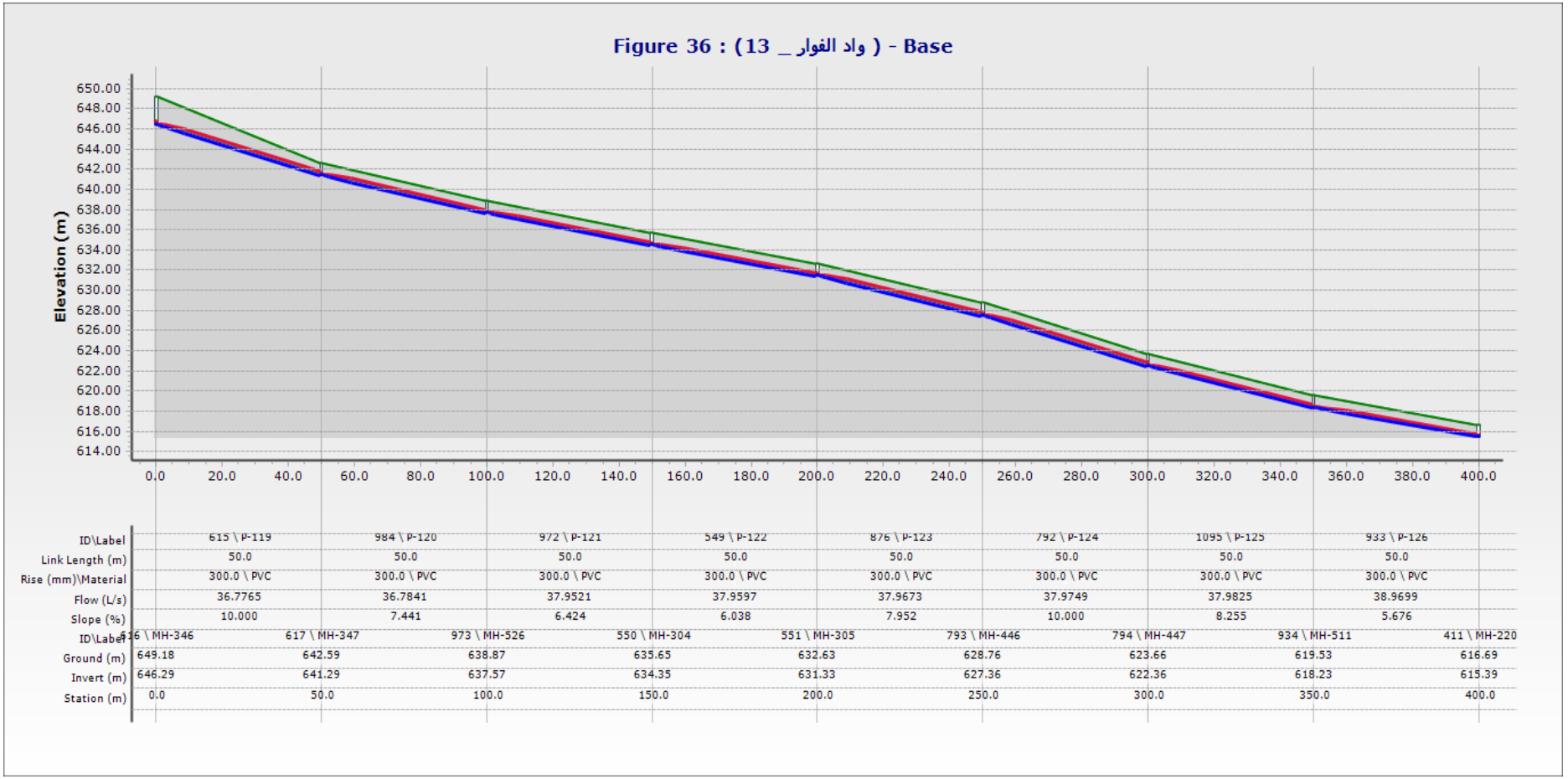
C.36 : Figure 33 : Profile for (10_ واد الفوار)



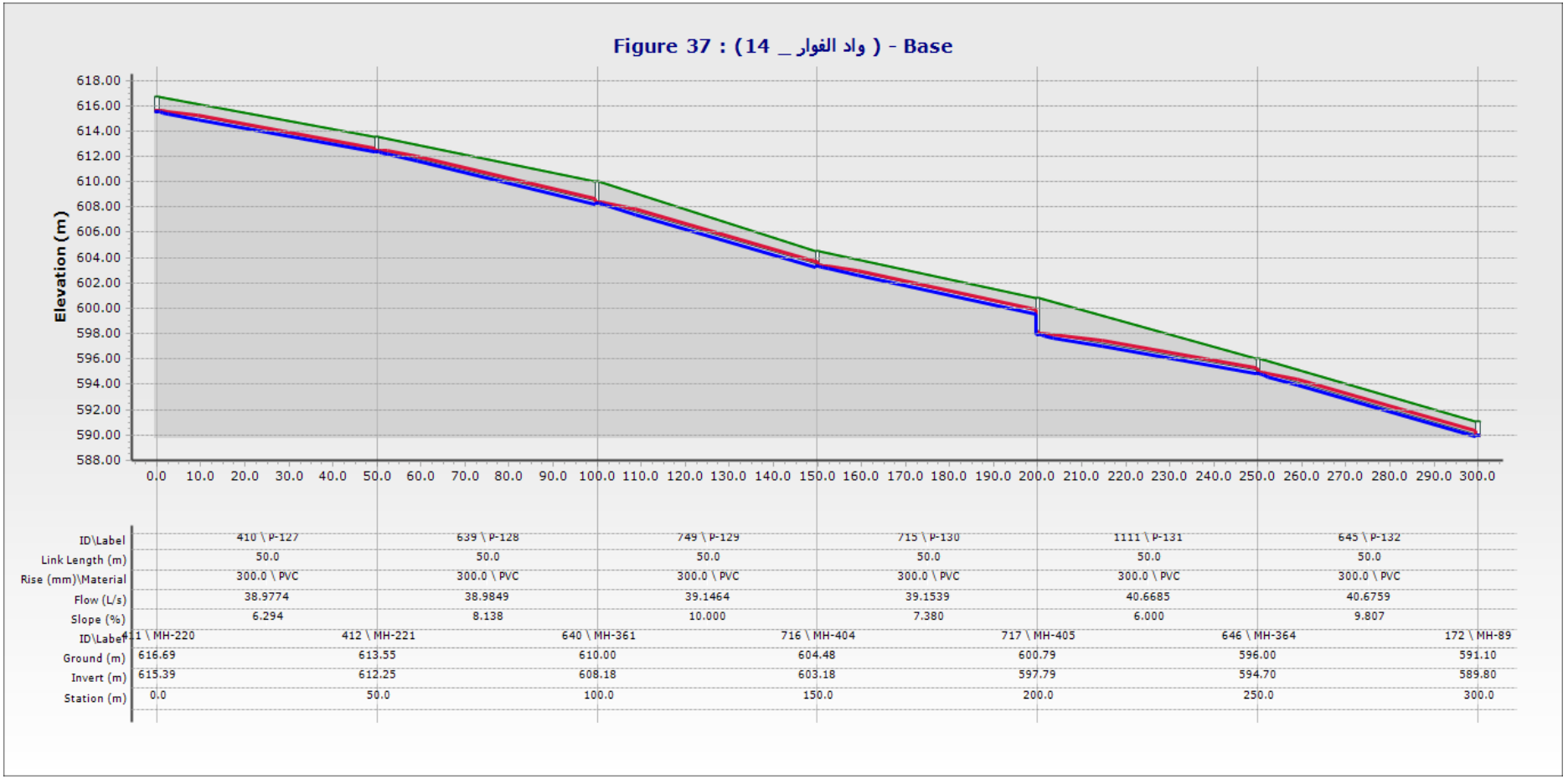
C.37 : Figure 34 : Profile for (11_ واد الفوار)



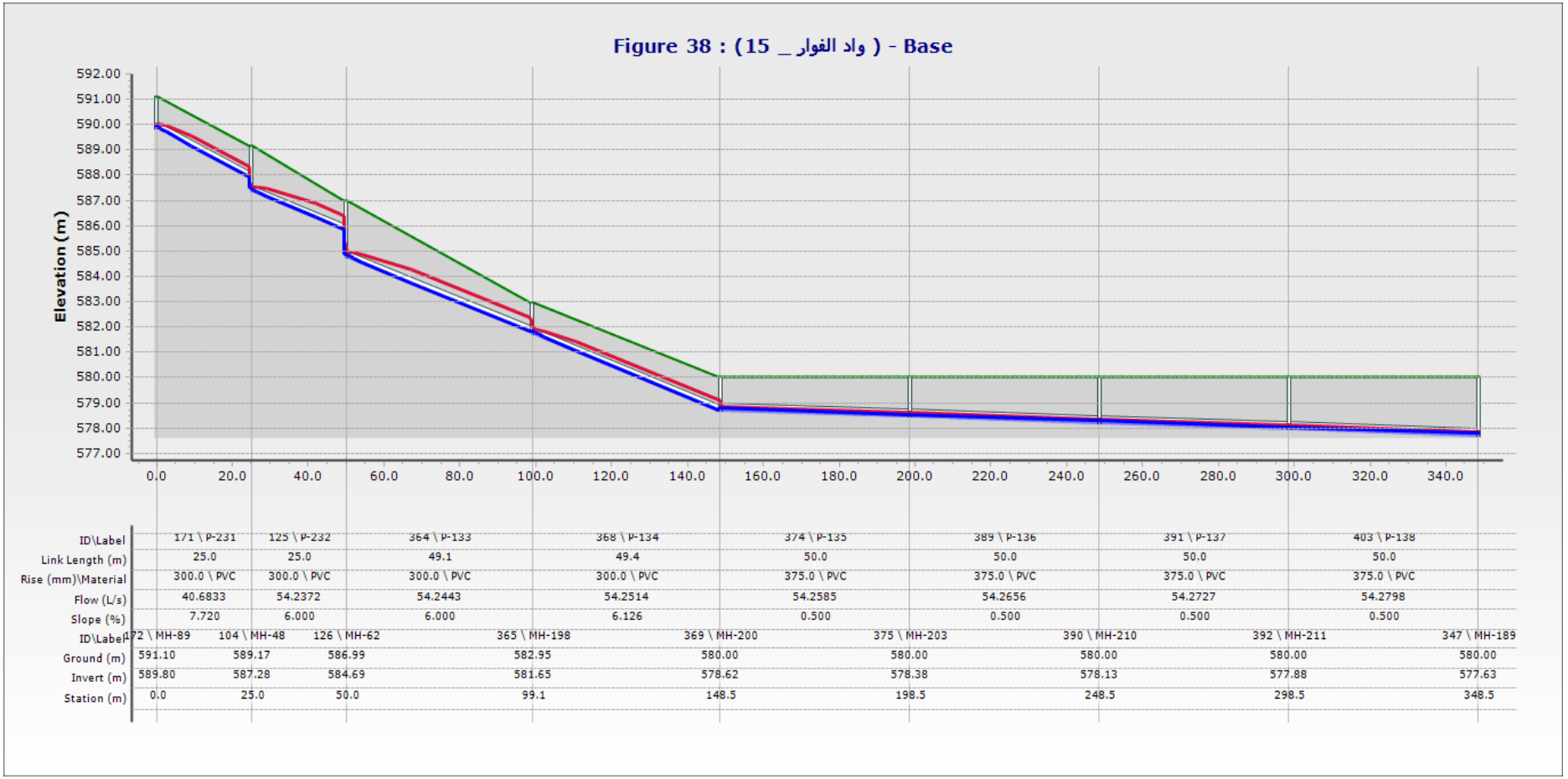
C.38 : Figure 35 : Profile for (12_ واد الفوار)



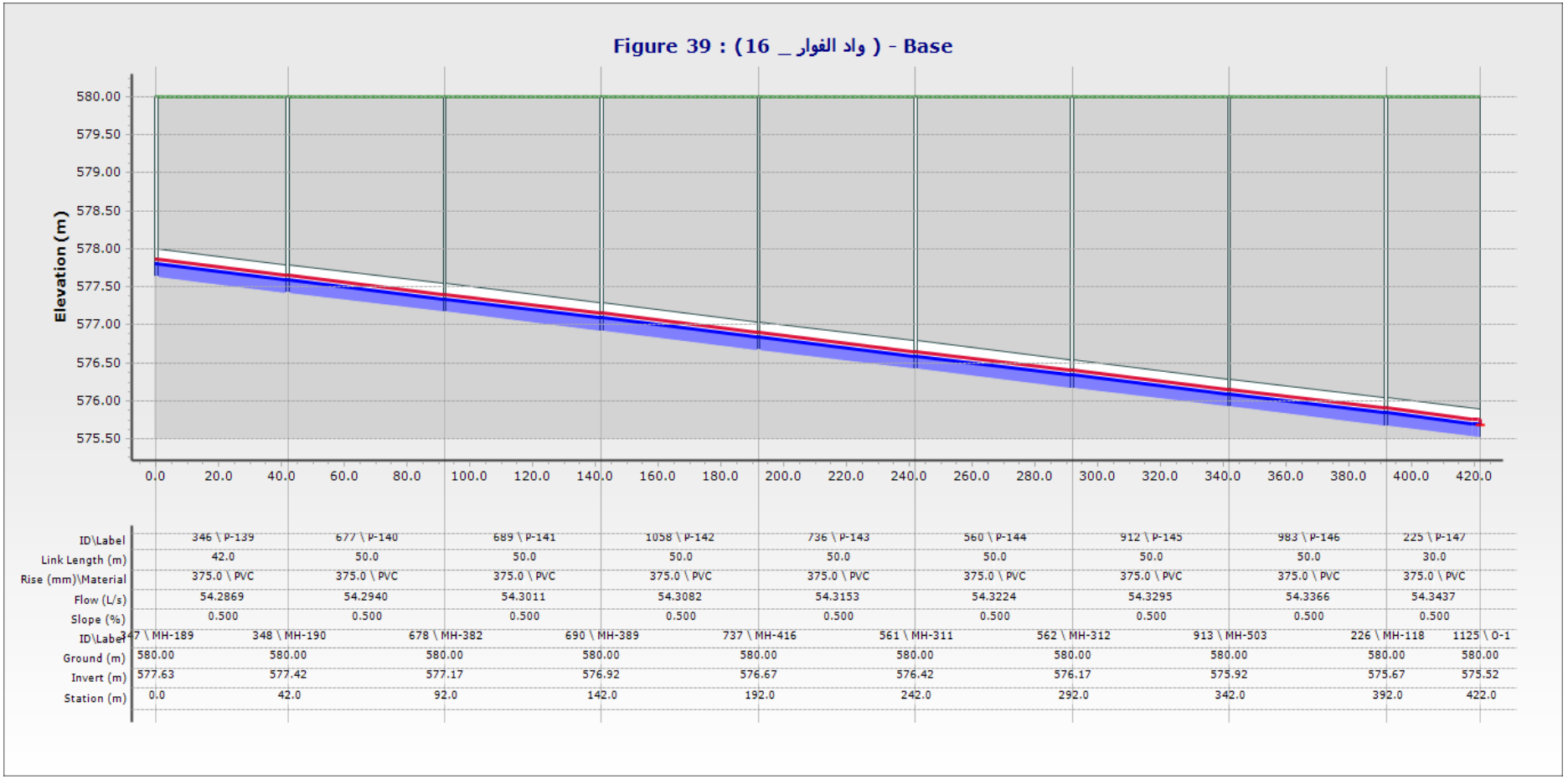
C.39 : Figure 36 : Profile for (13_ واد الفوار)



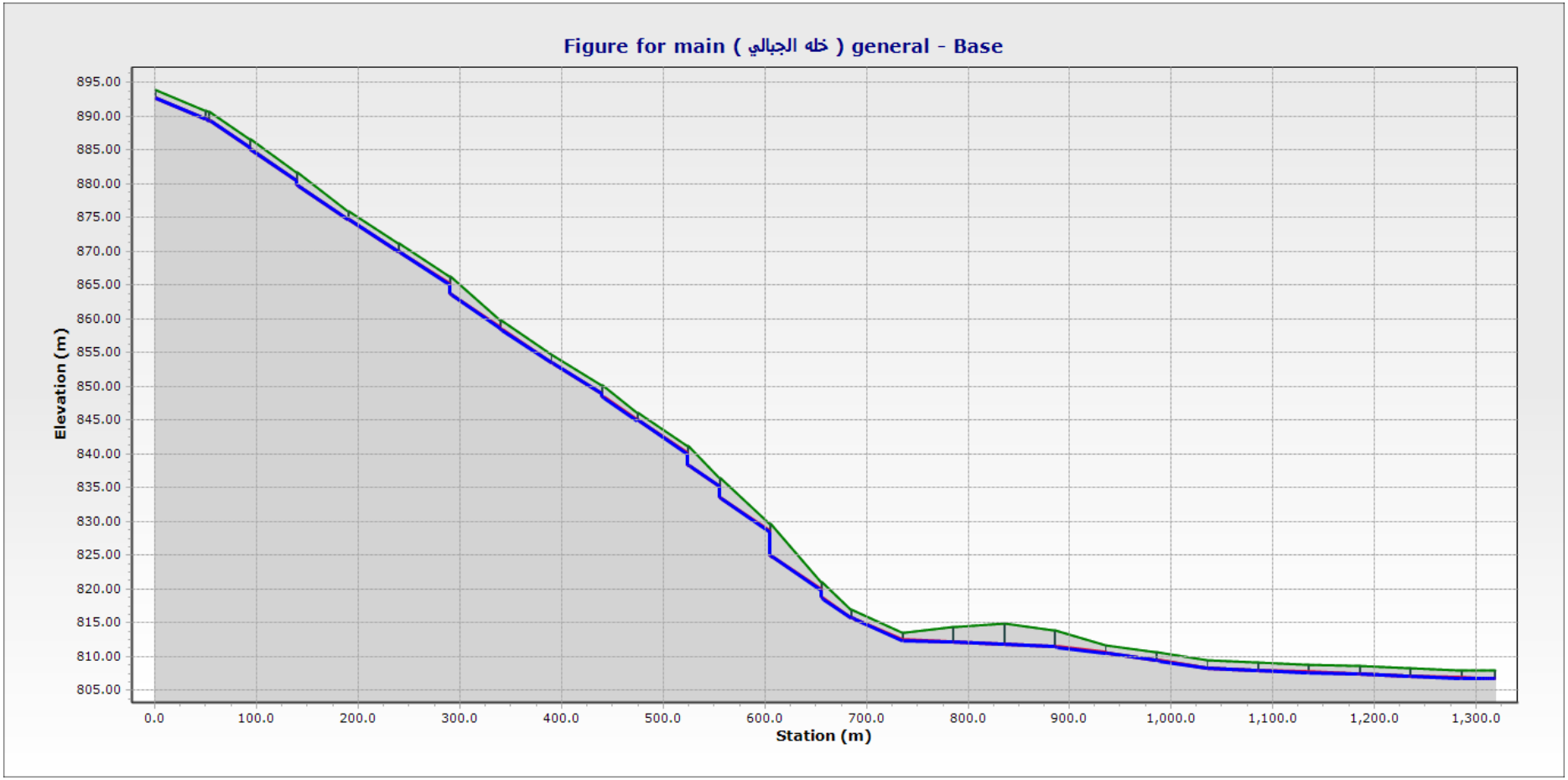
C.40 : Figure 37 : Profile for (14_ واد الفوار)



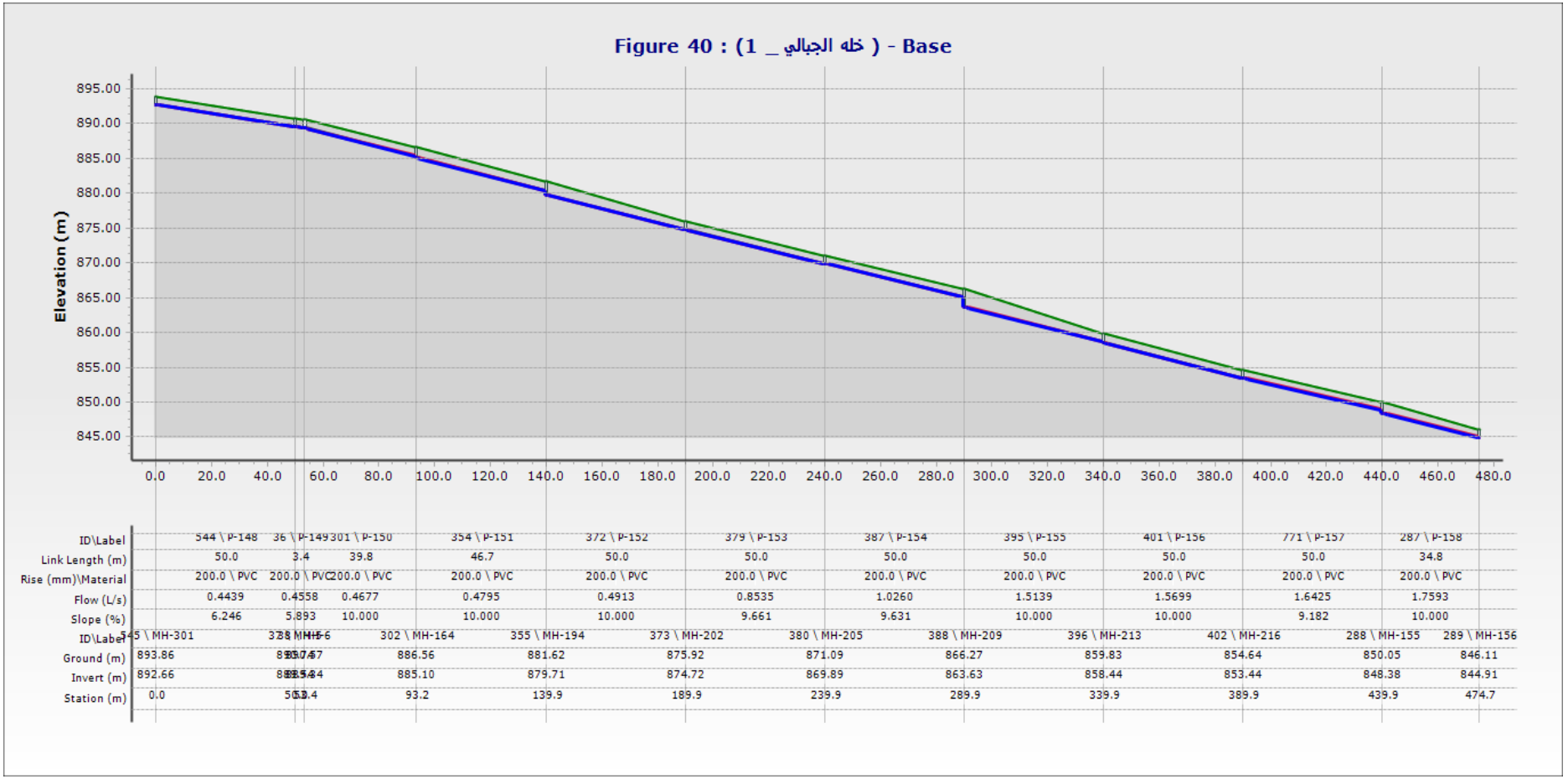
C.41 : Figure 38 : Profile for (15_ واد الفوار)



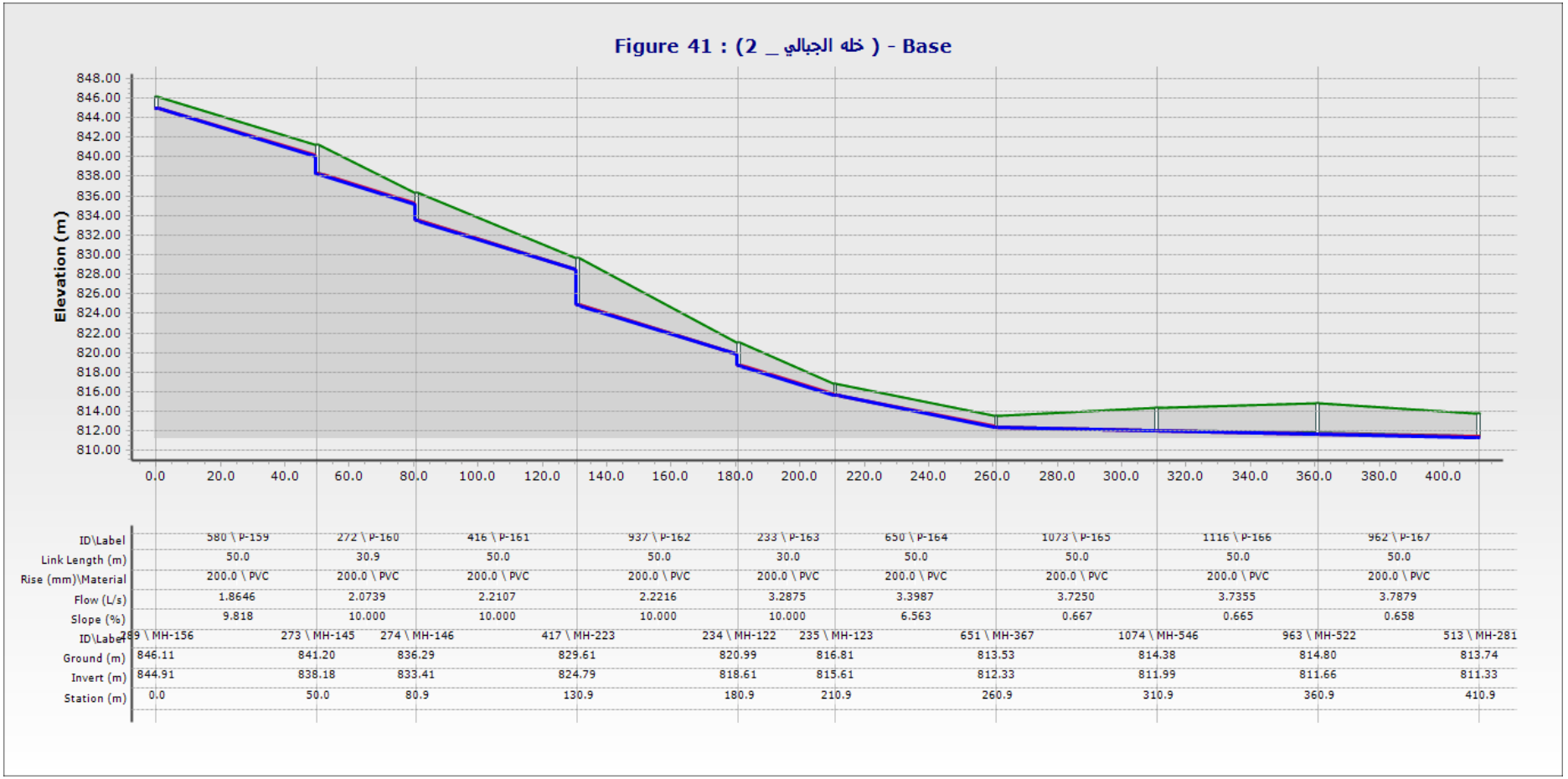
C.42 : Figure 39 : Profile for (16_ واد الفوار)



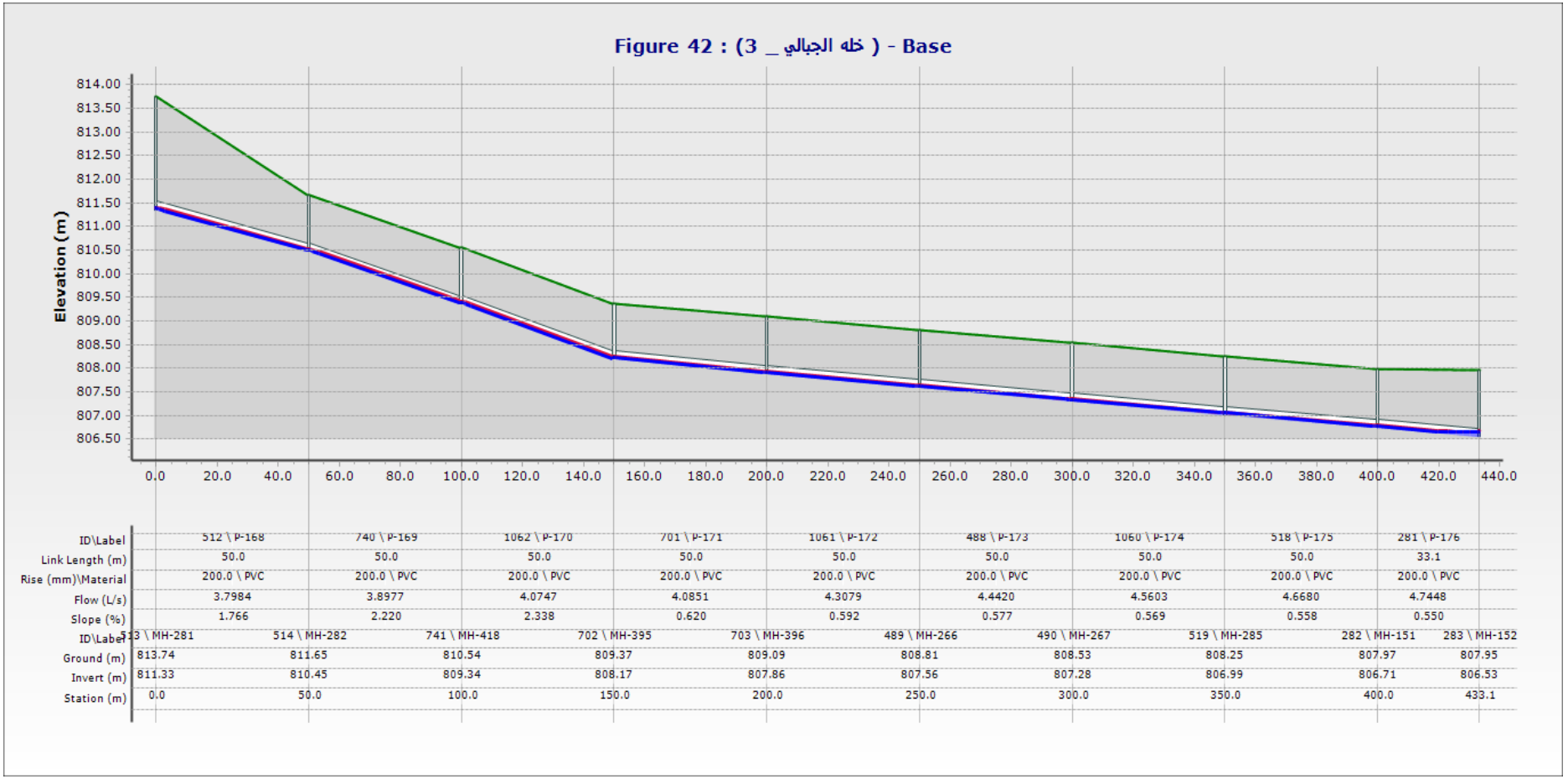
C.43 : Profile for main (خله الجبالي) general



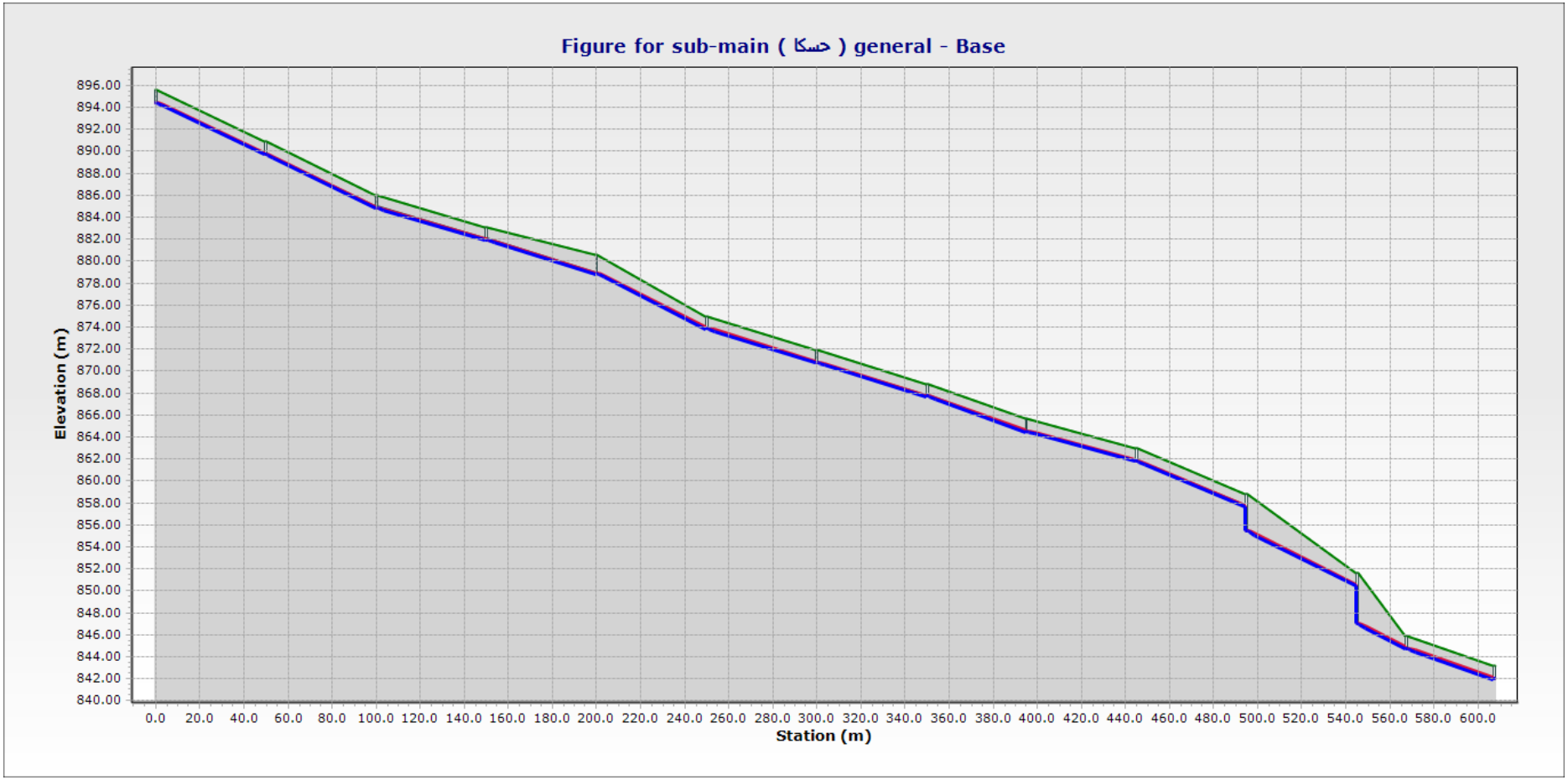
C.44 : Figure 40 : Profile for (1_ خله الجبالي)



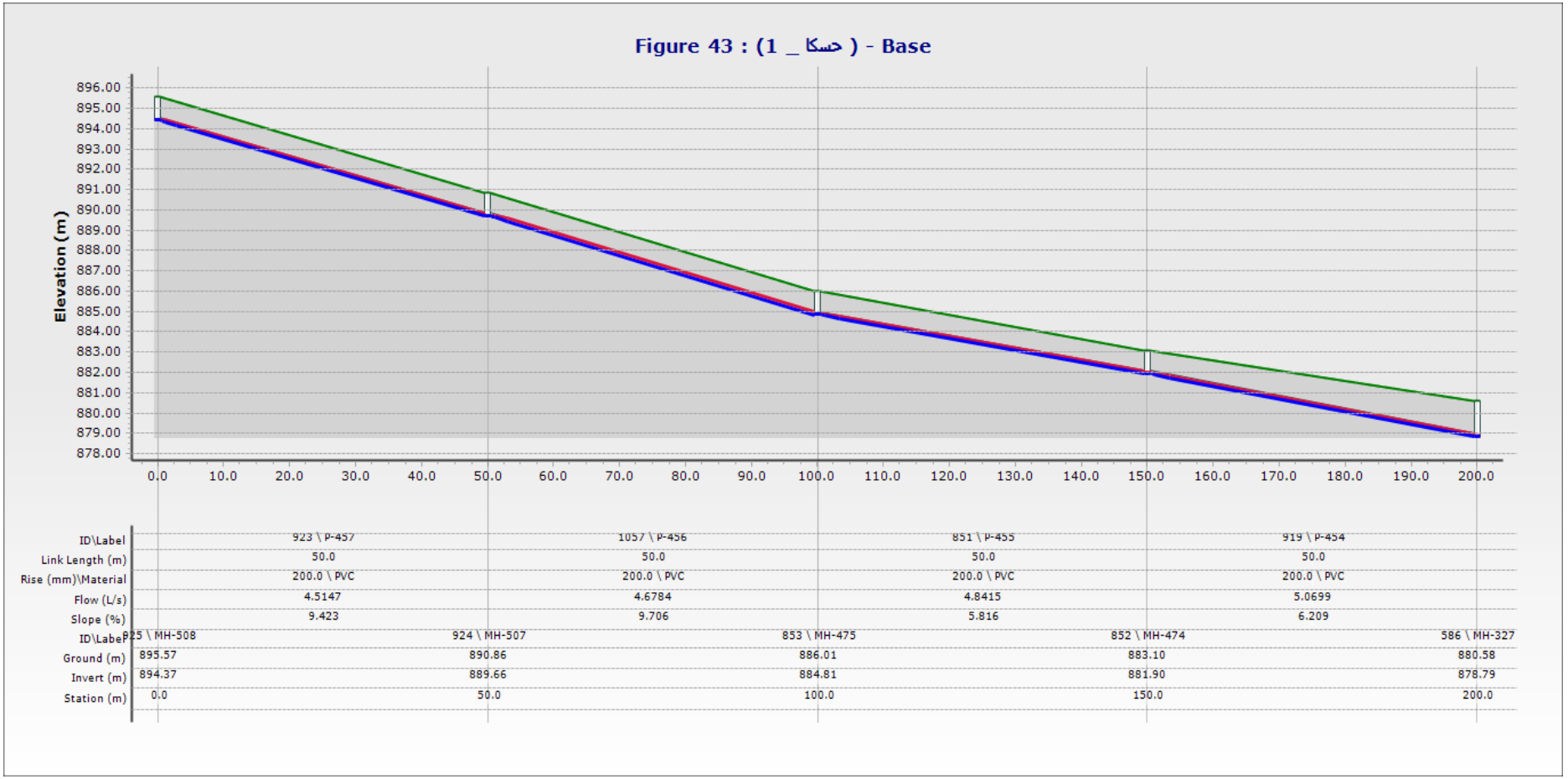
C.45 : Figure 41 : Profile for (2_ خله الجبالي)



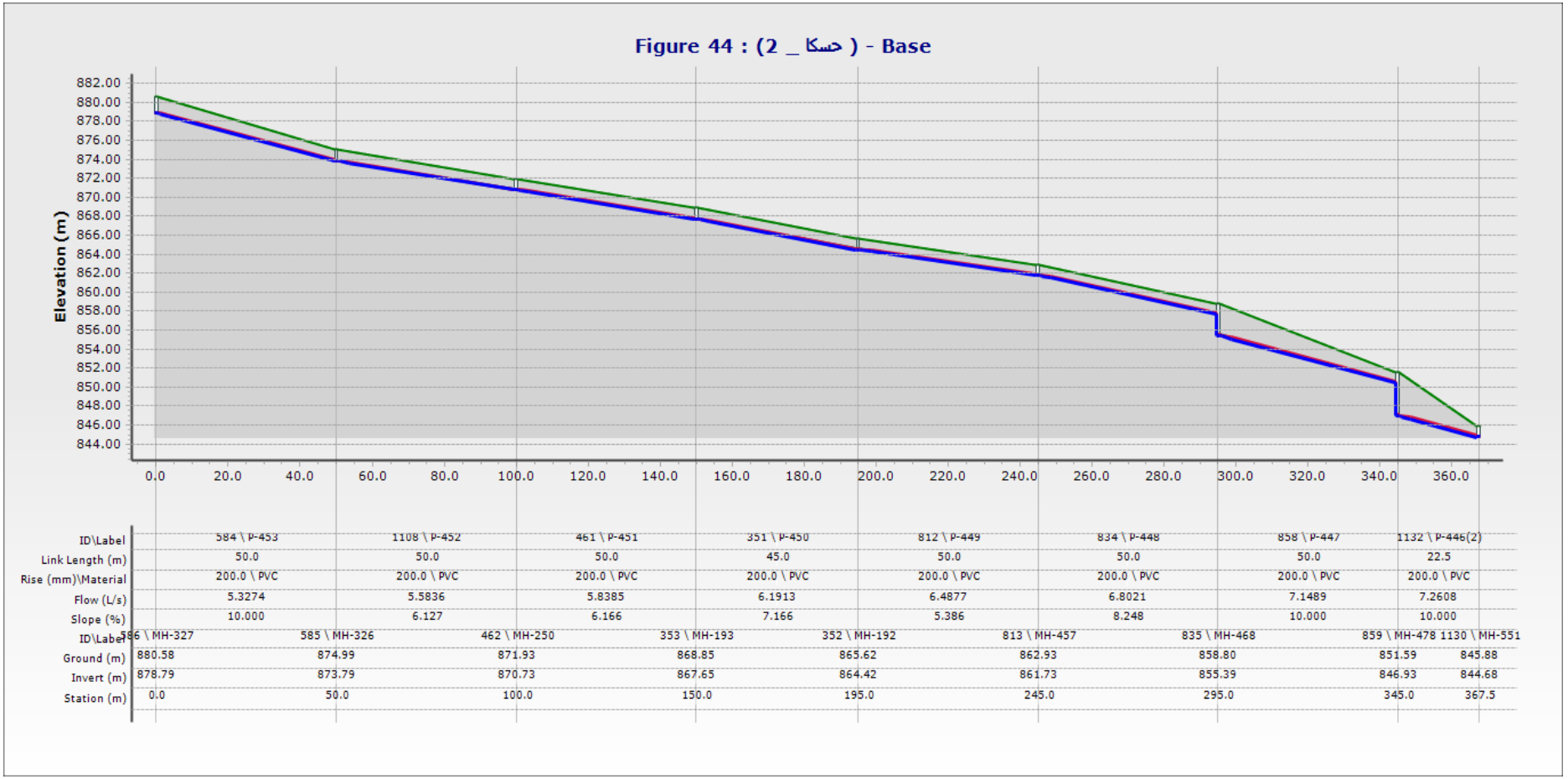
C.46 : Figure 42 : Profile for (3_ خله الجبالي)



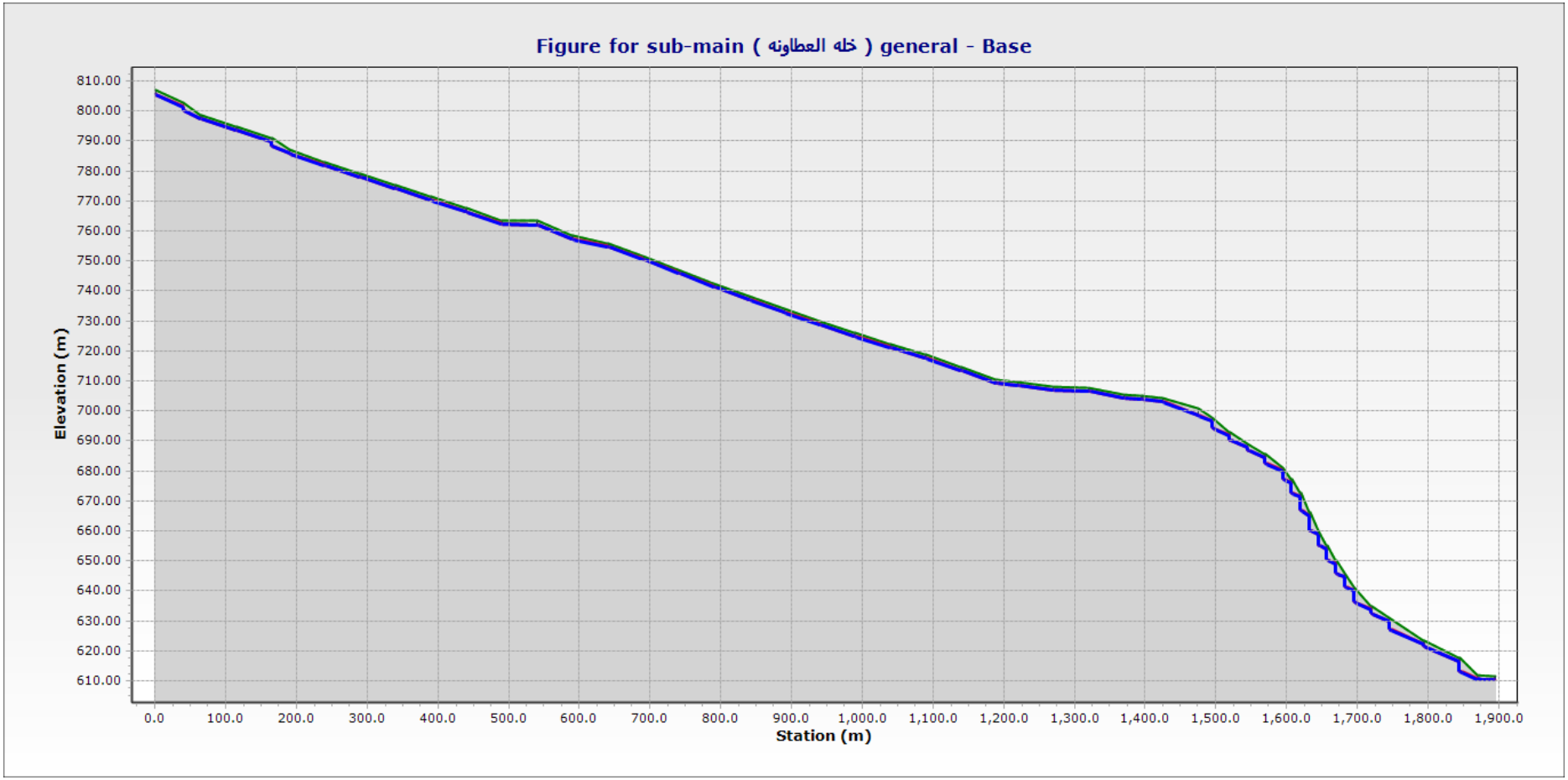
C.47 : Profile for Sub-main (حسكا) general



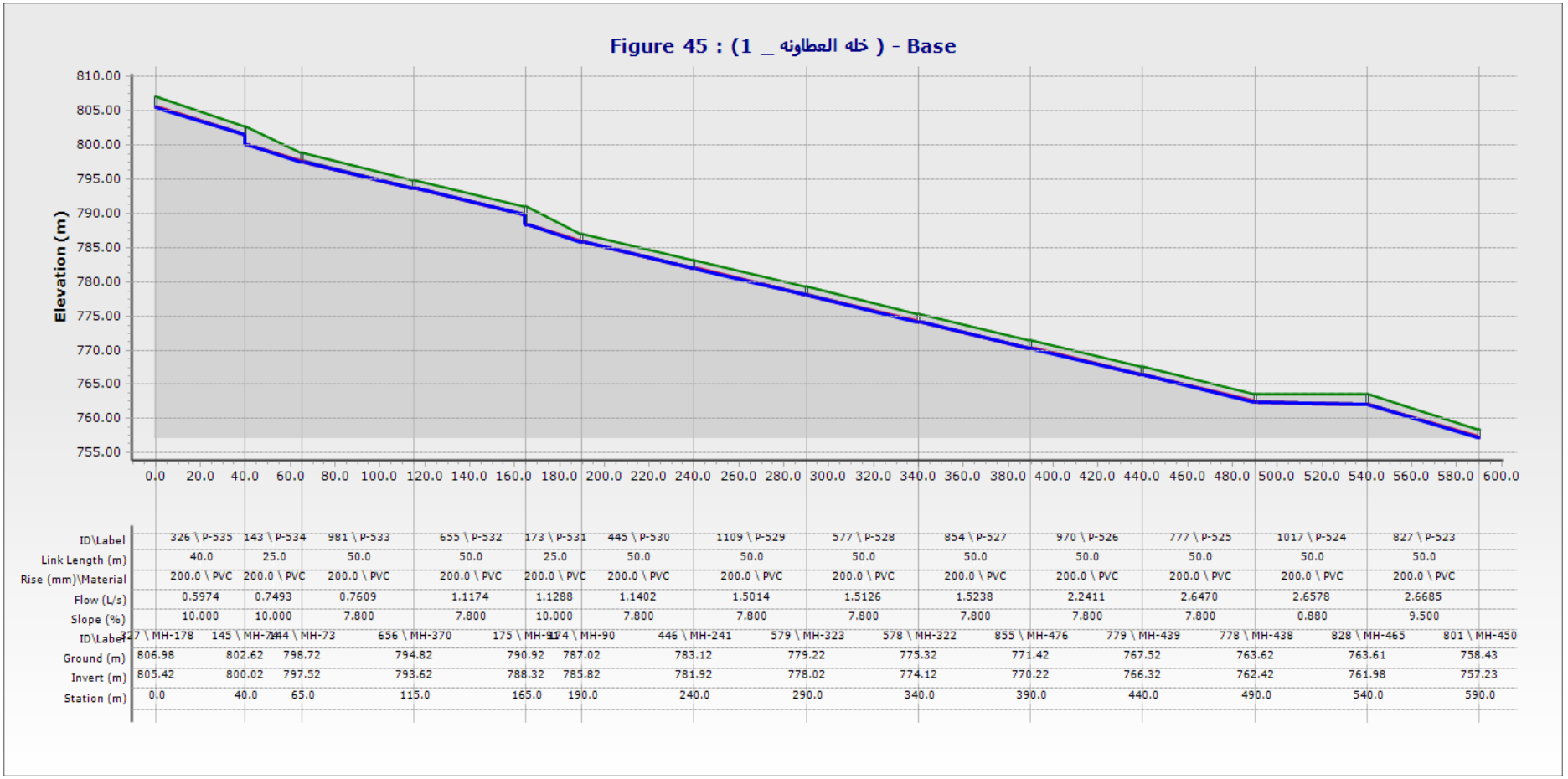
C.48 : Figure 43 : Profile for (1_ حسكا)



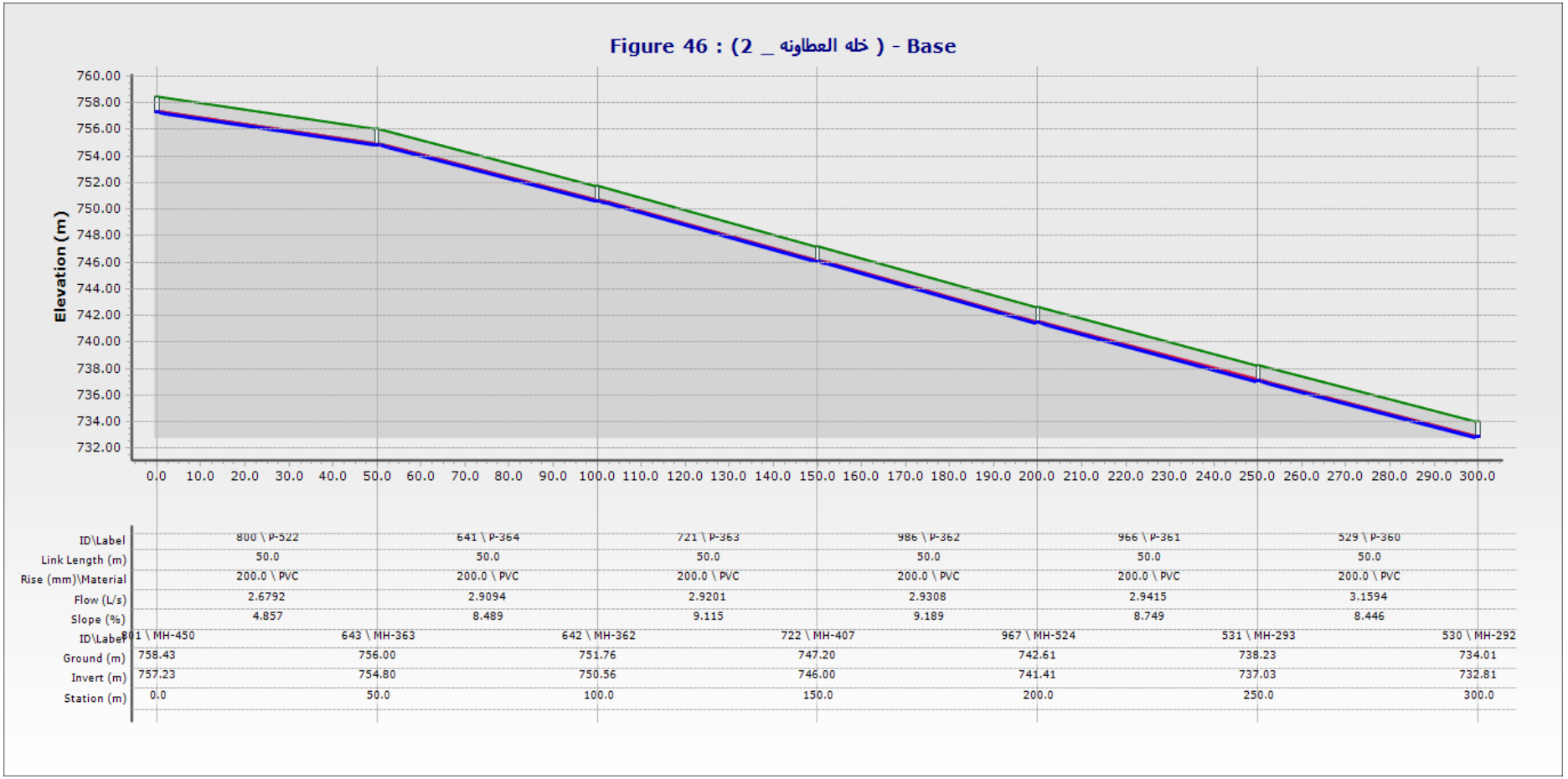
C.49 : Figure 44 : Profile for (2_ حسكا)



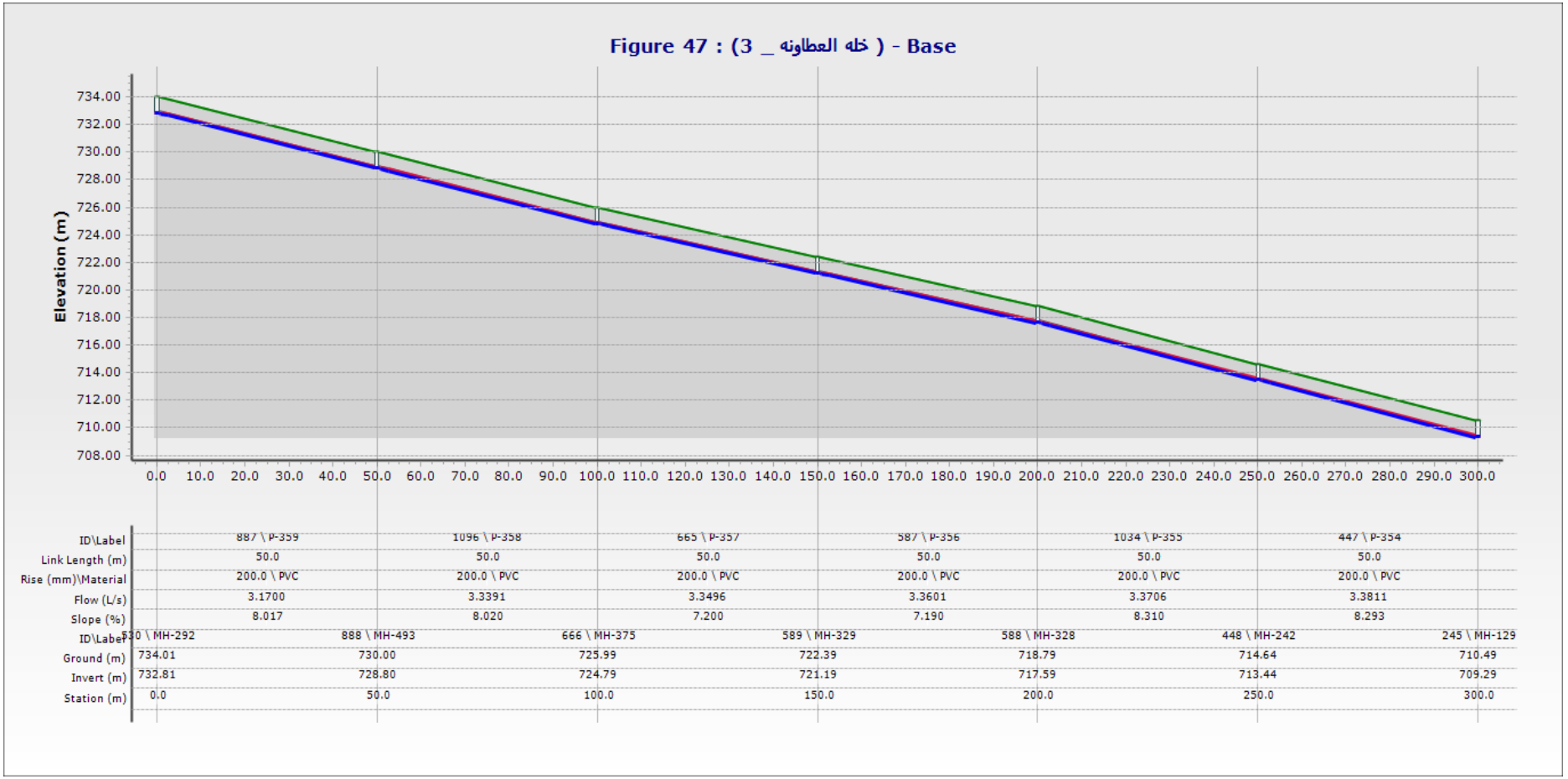
C.50 : Profile for Sub-main (خله العطاونه) general



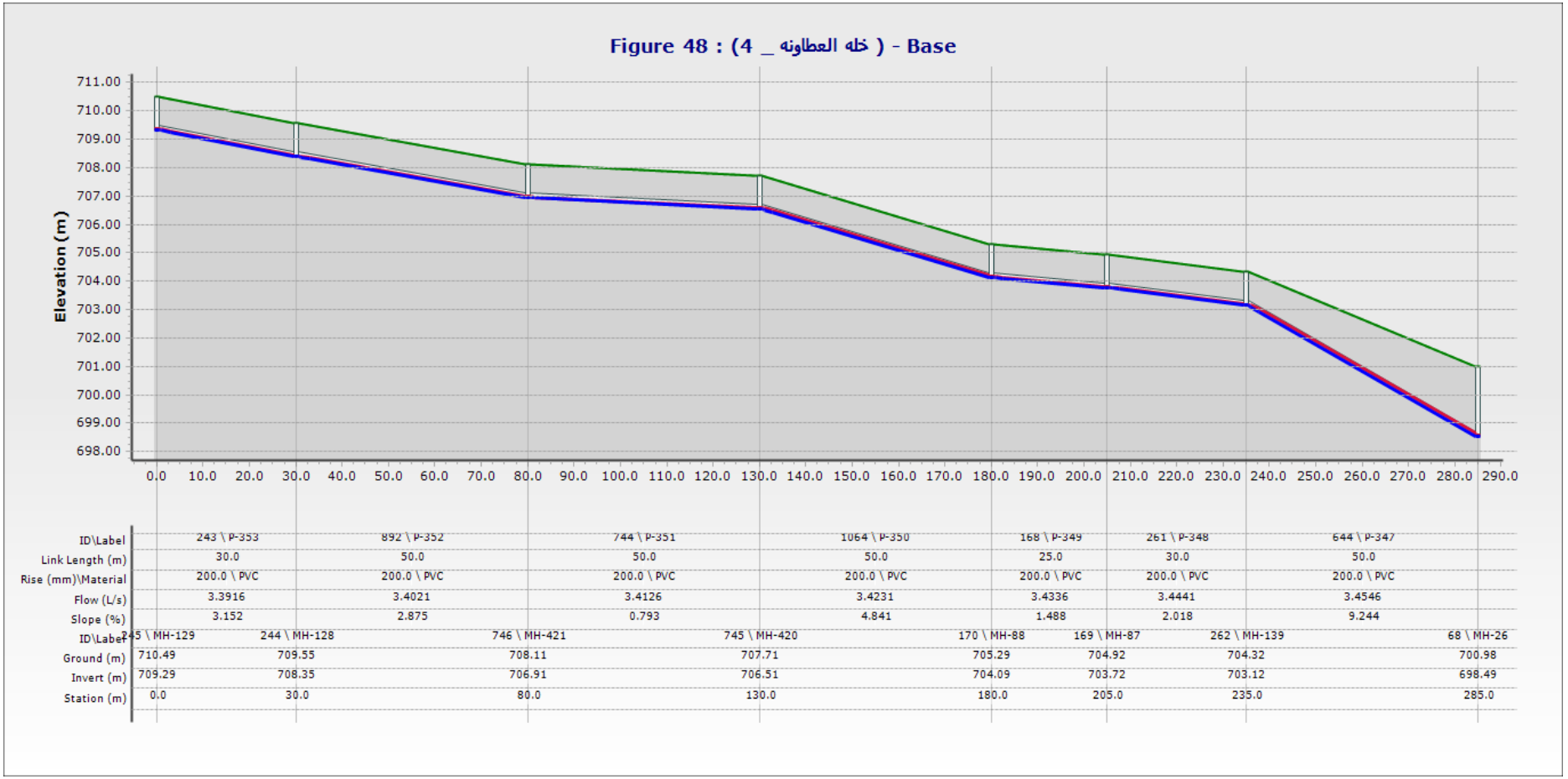
C.51 : Figure 45 : Profile for (1_ خله العطاونه)



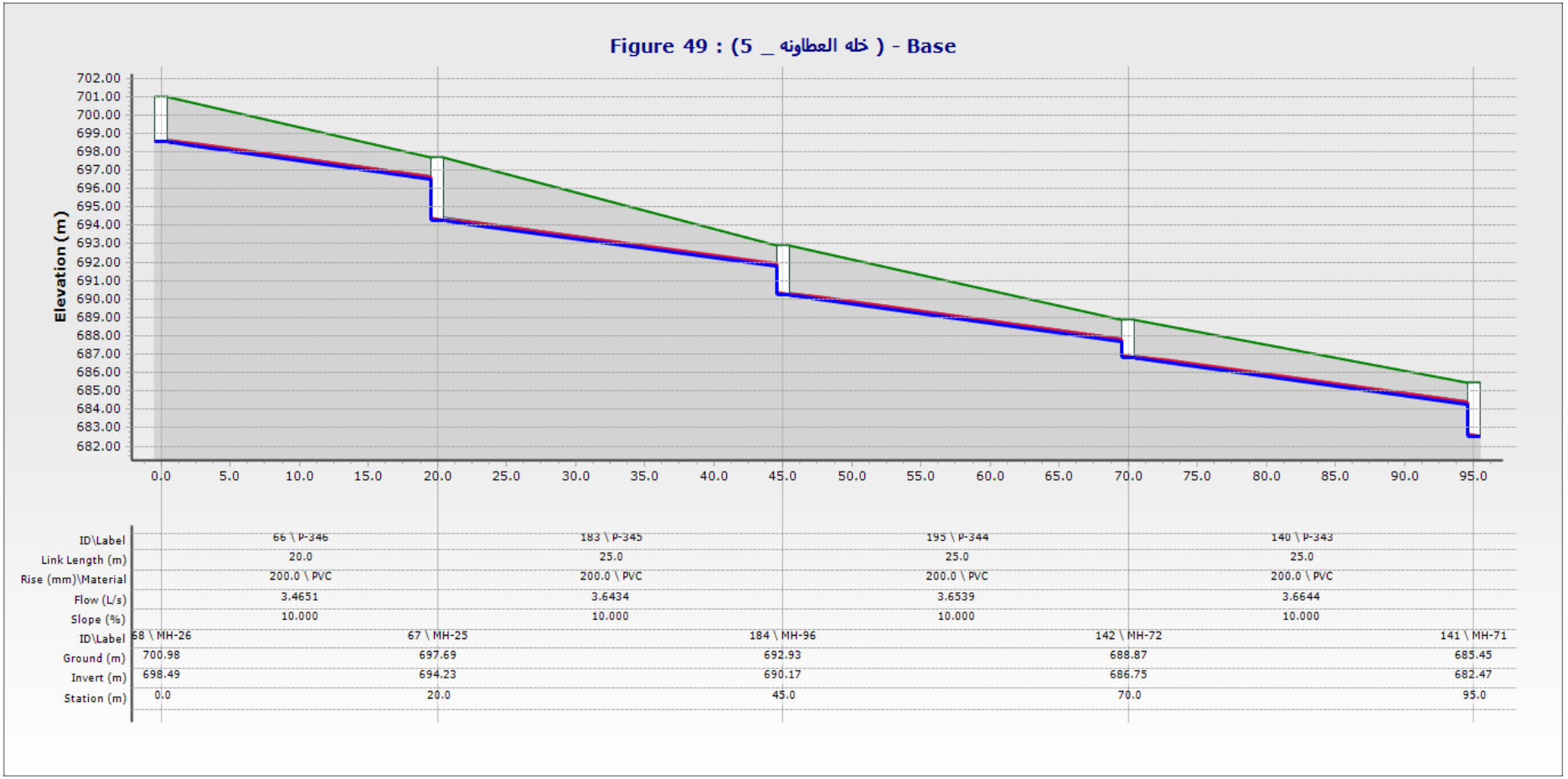
C.52 : Figure 46 : Profile for (2_ خله العطاونه)



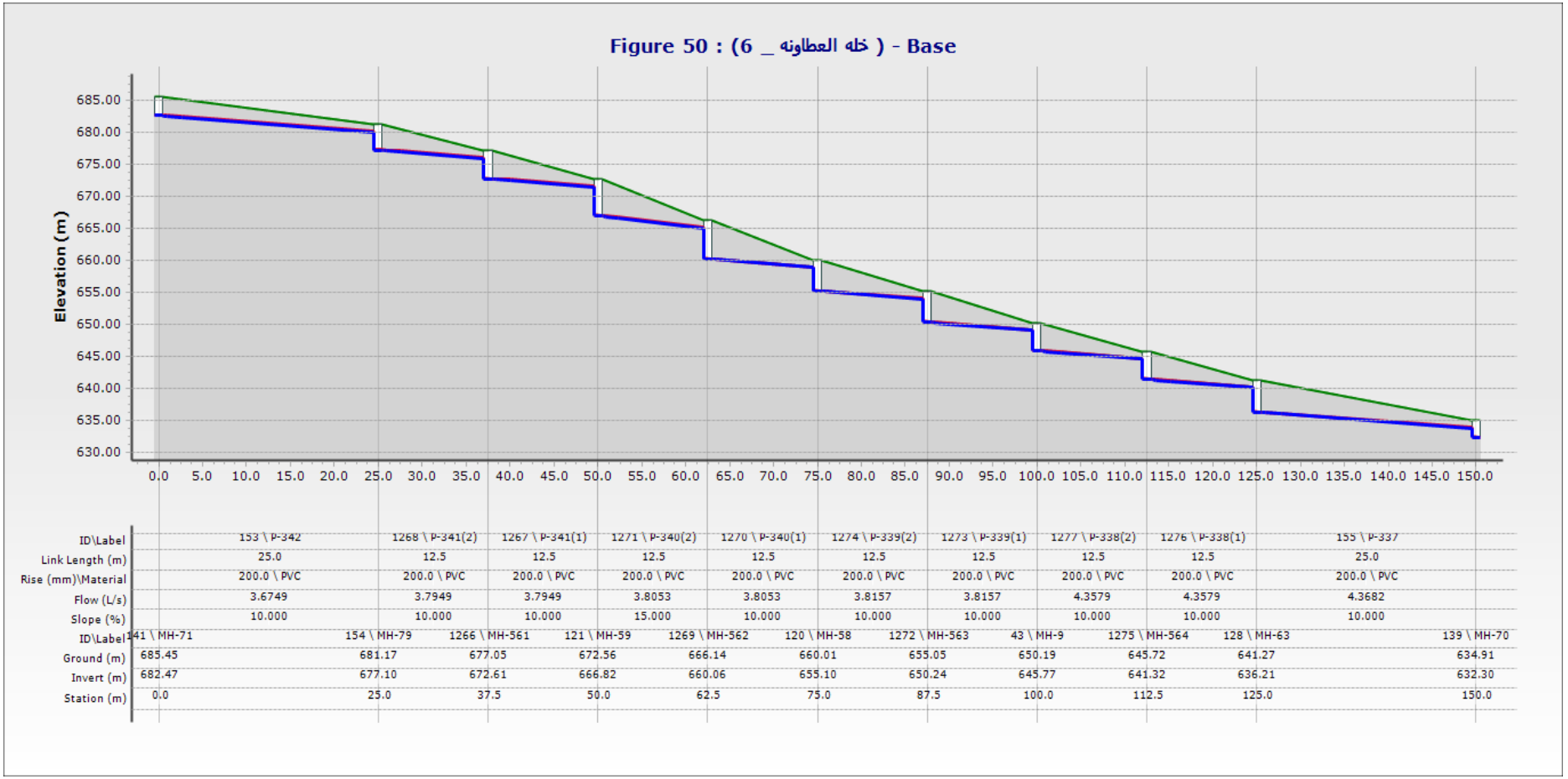
C.53 : Figure 47 : Profile for (3_ خله العطاونه)



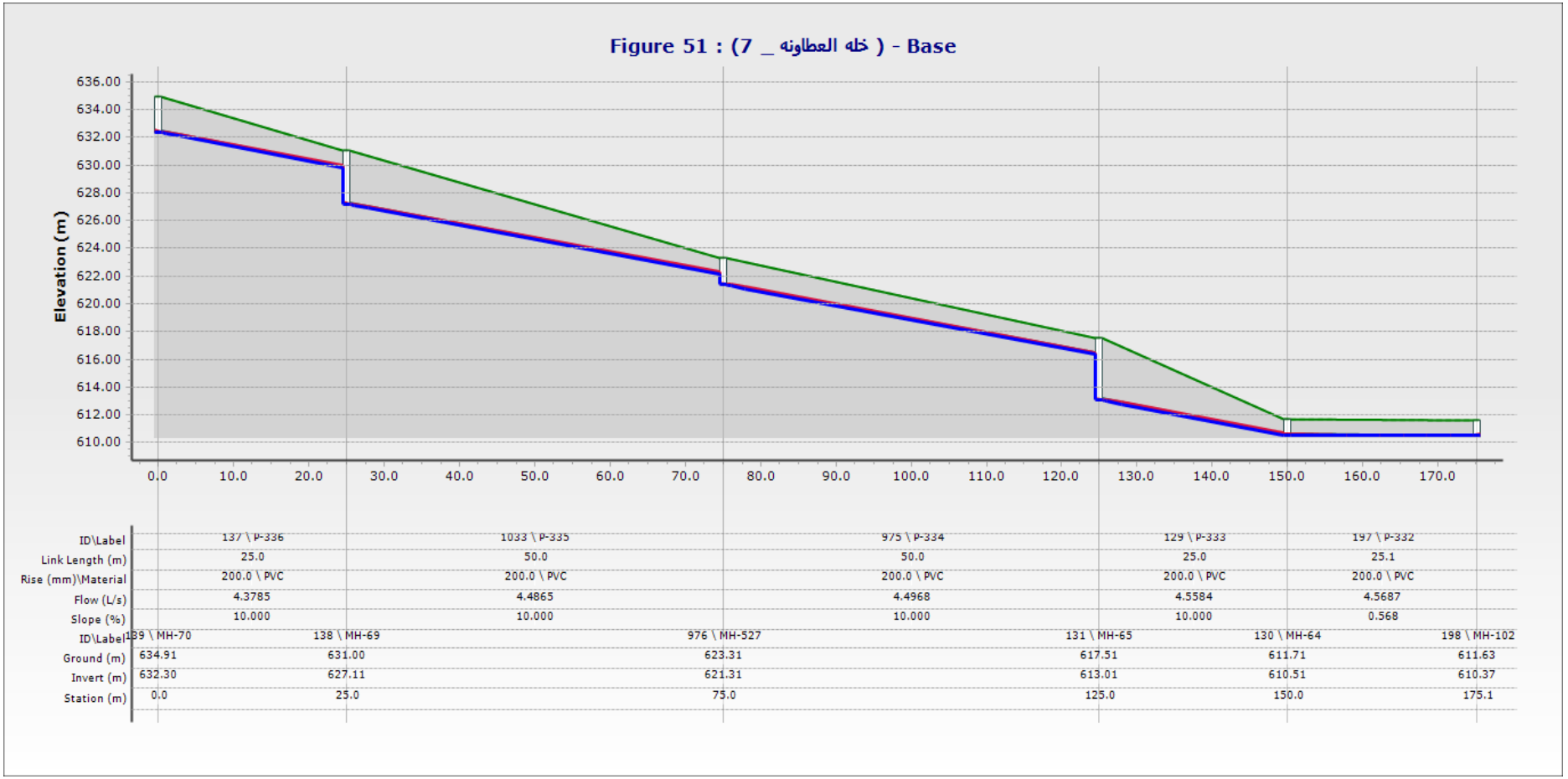
C.54 : Figure 48 : Profile for (4_ خله العطاونه)



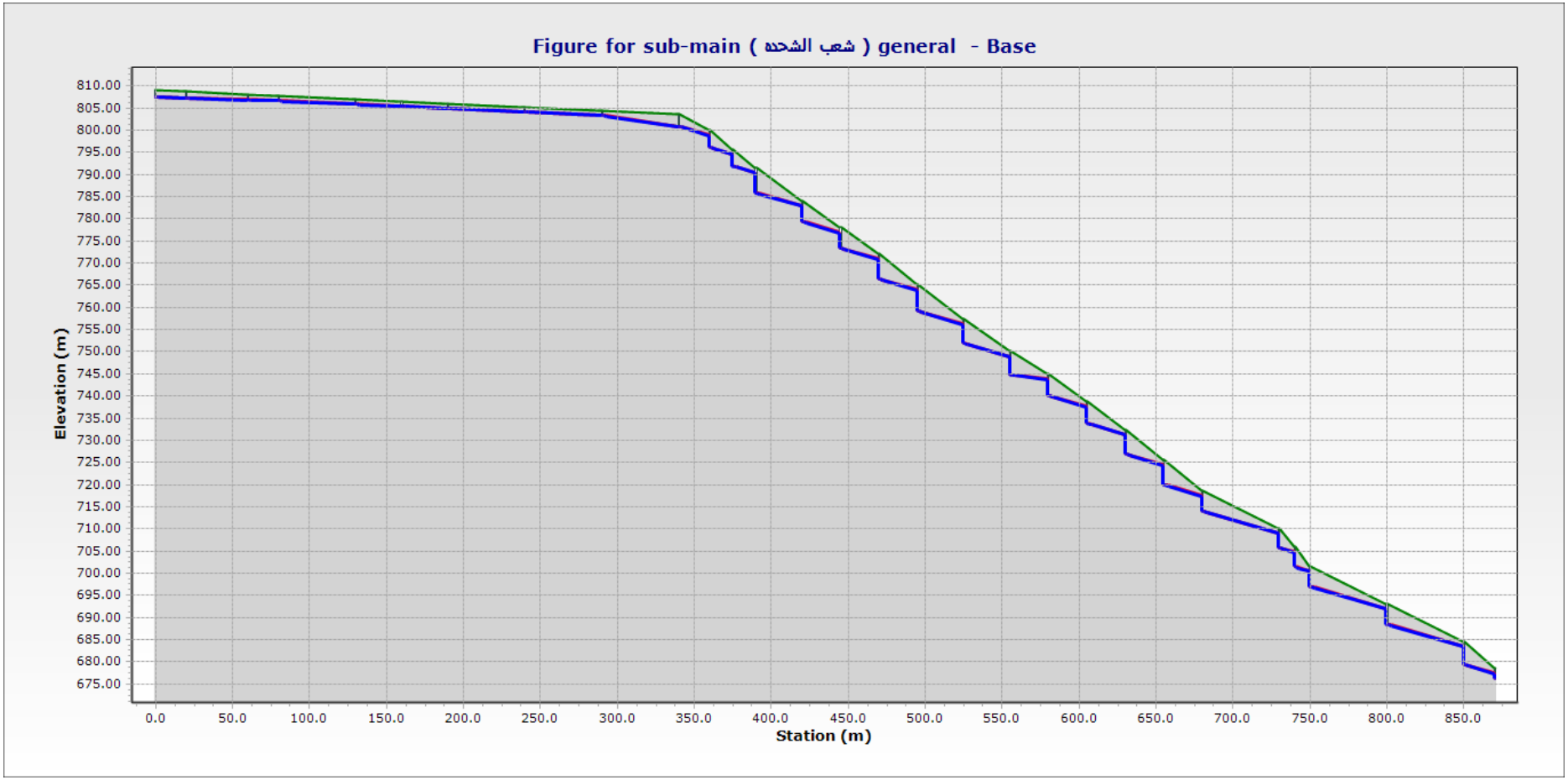
C.55 : Figure 49 : Profile for (5_ خله العطاونه)



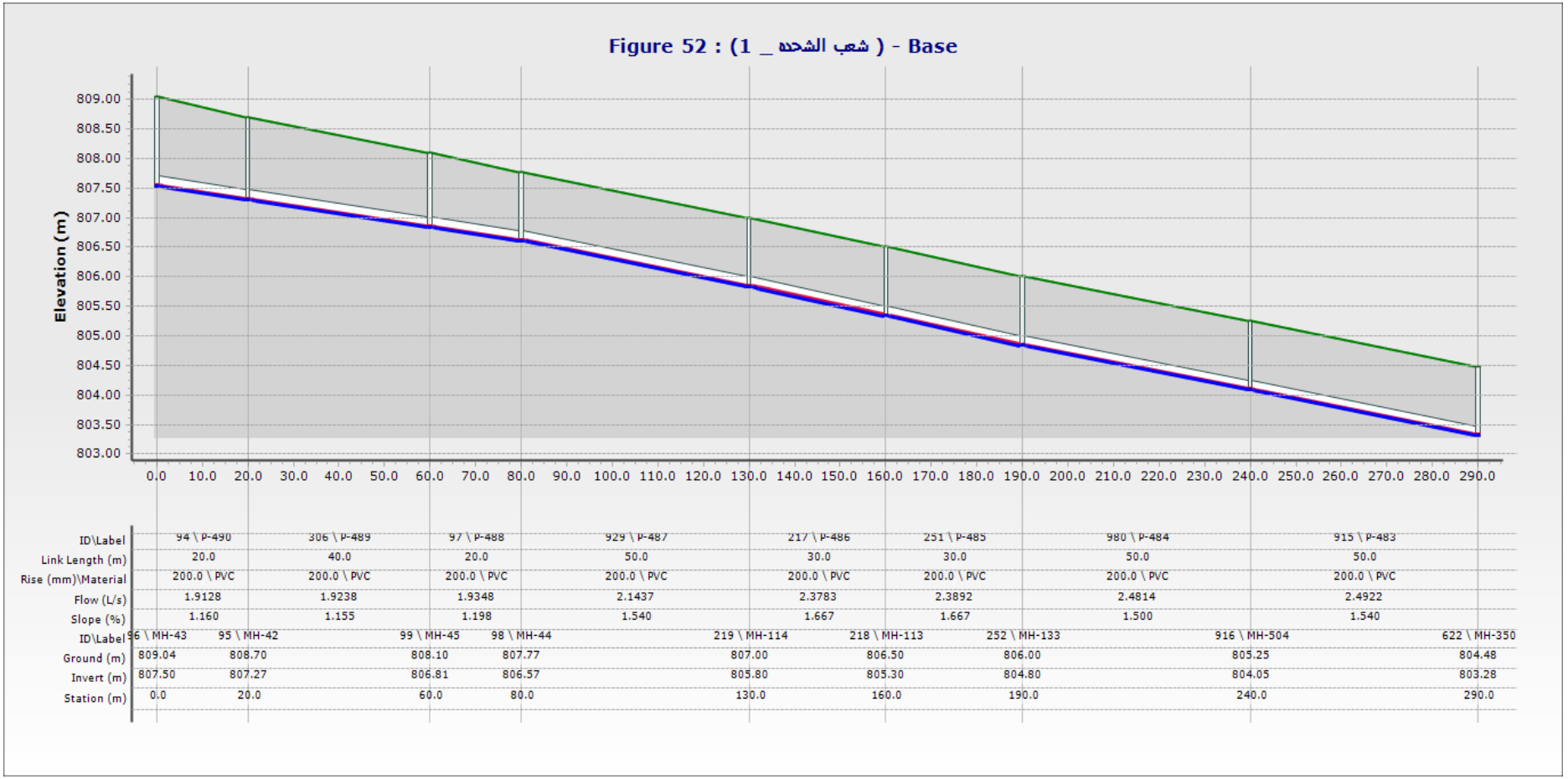
C.56 : Figure 50 : Profile for (6_ خله العطاونه)



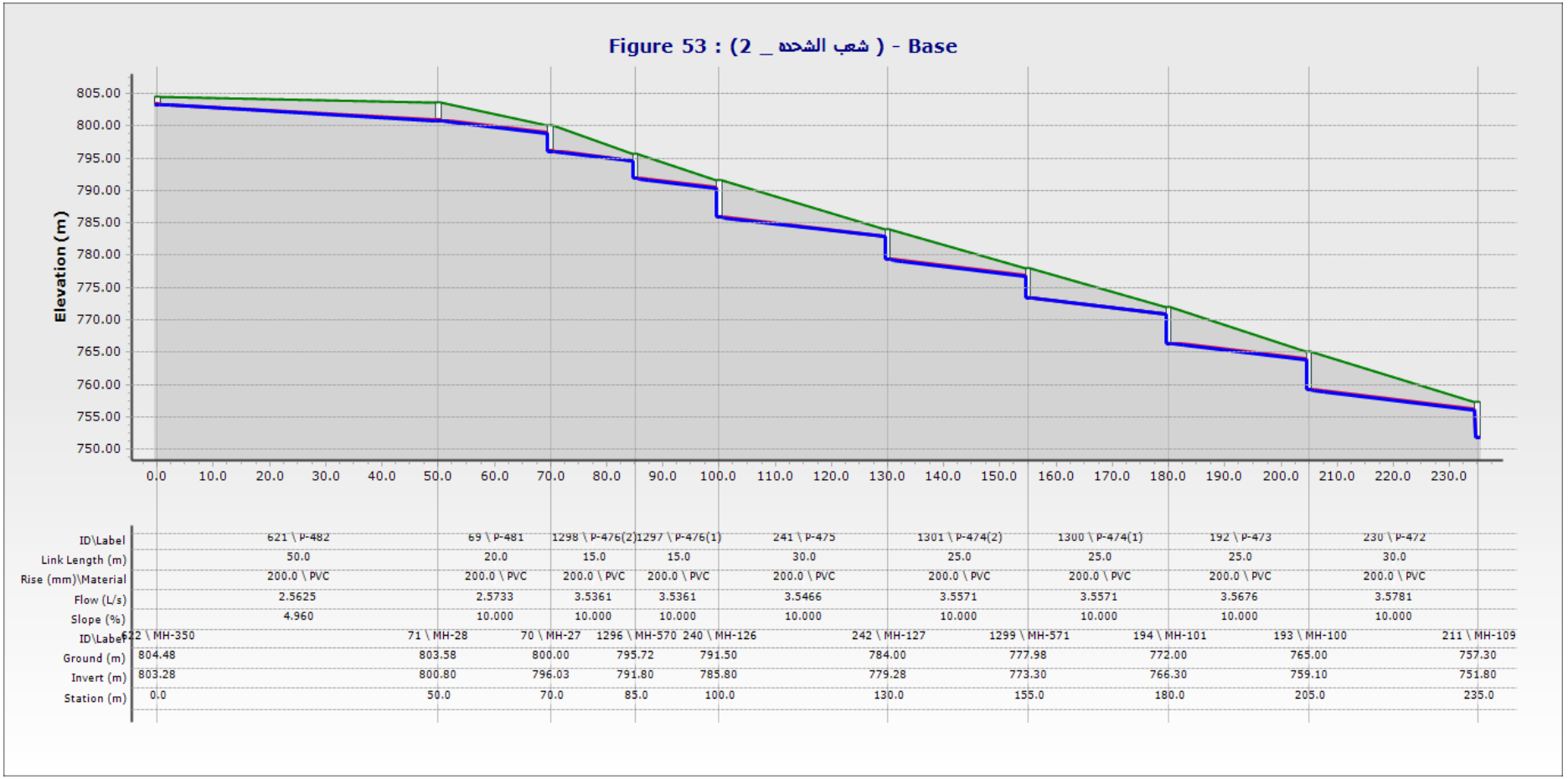
C.57 : Figure 51 : Profile for (7_ خله العطاونه)



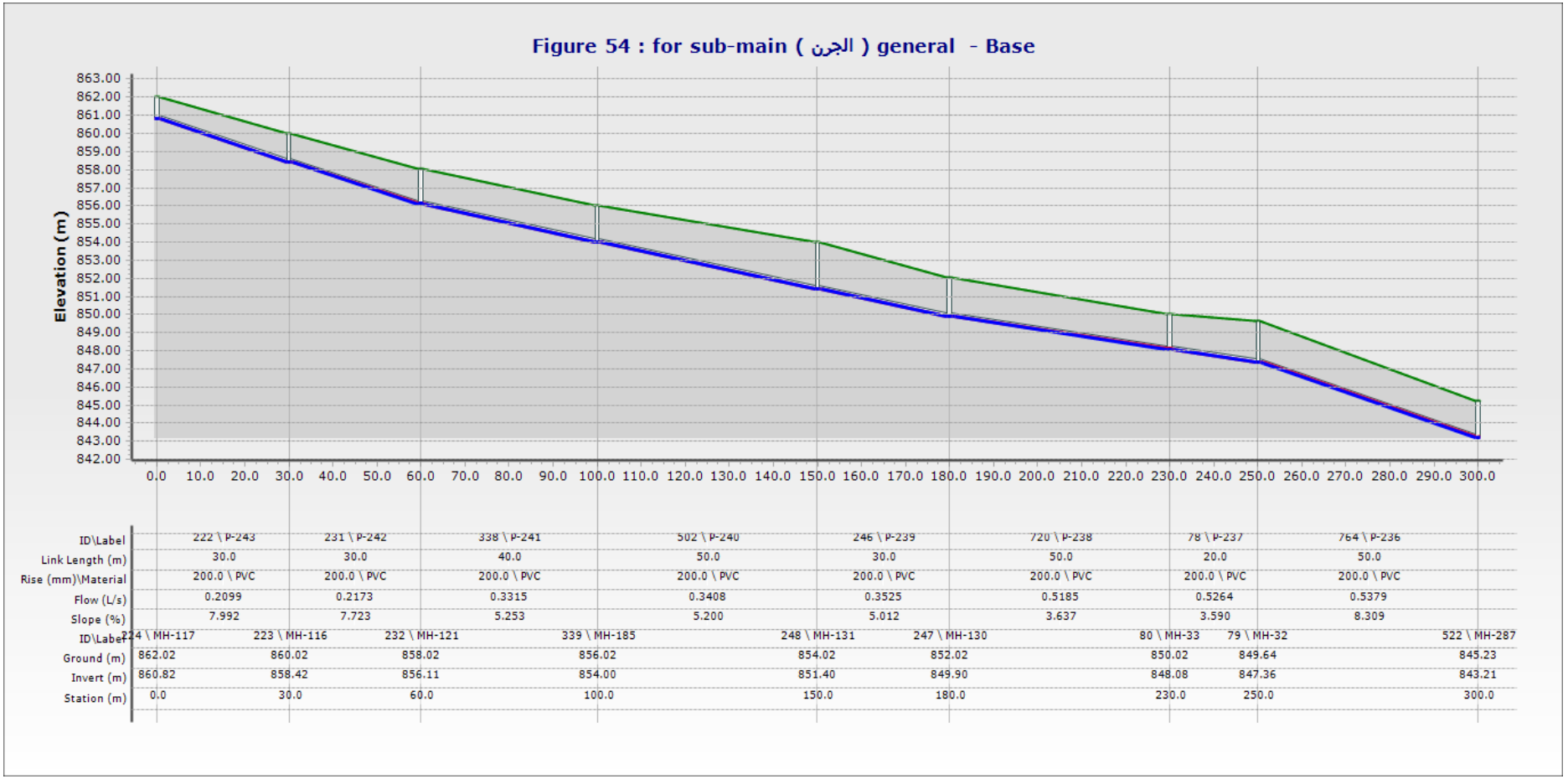
C.58 : Profile for Sub-main (شعب الشحده) general



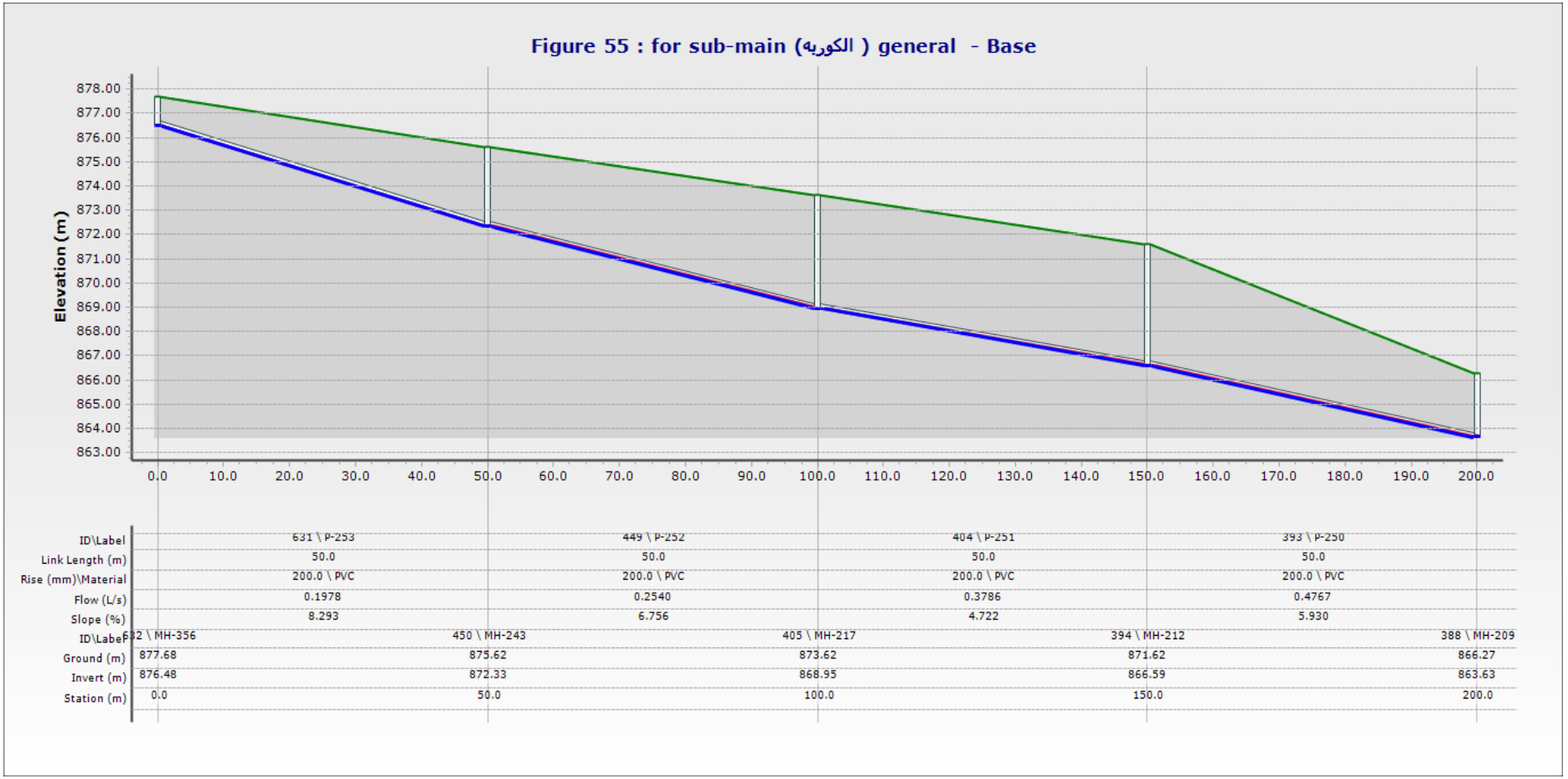
C.59 : Figure 52 : Profile for (1_ شعب الشحده)



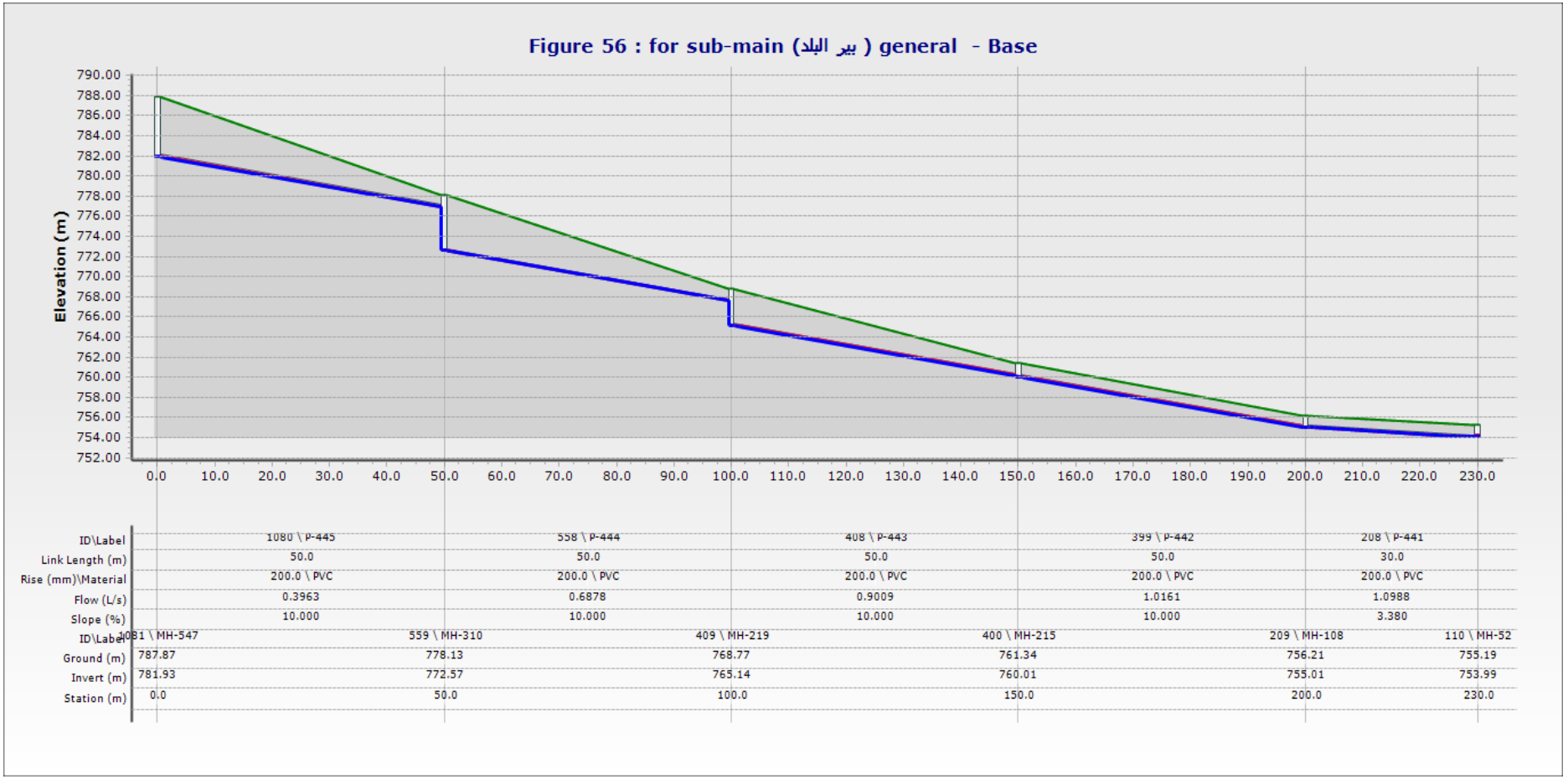
C.60 : Figure 53 : Profile for (2_ شعب الشحده)



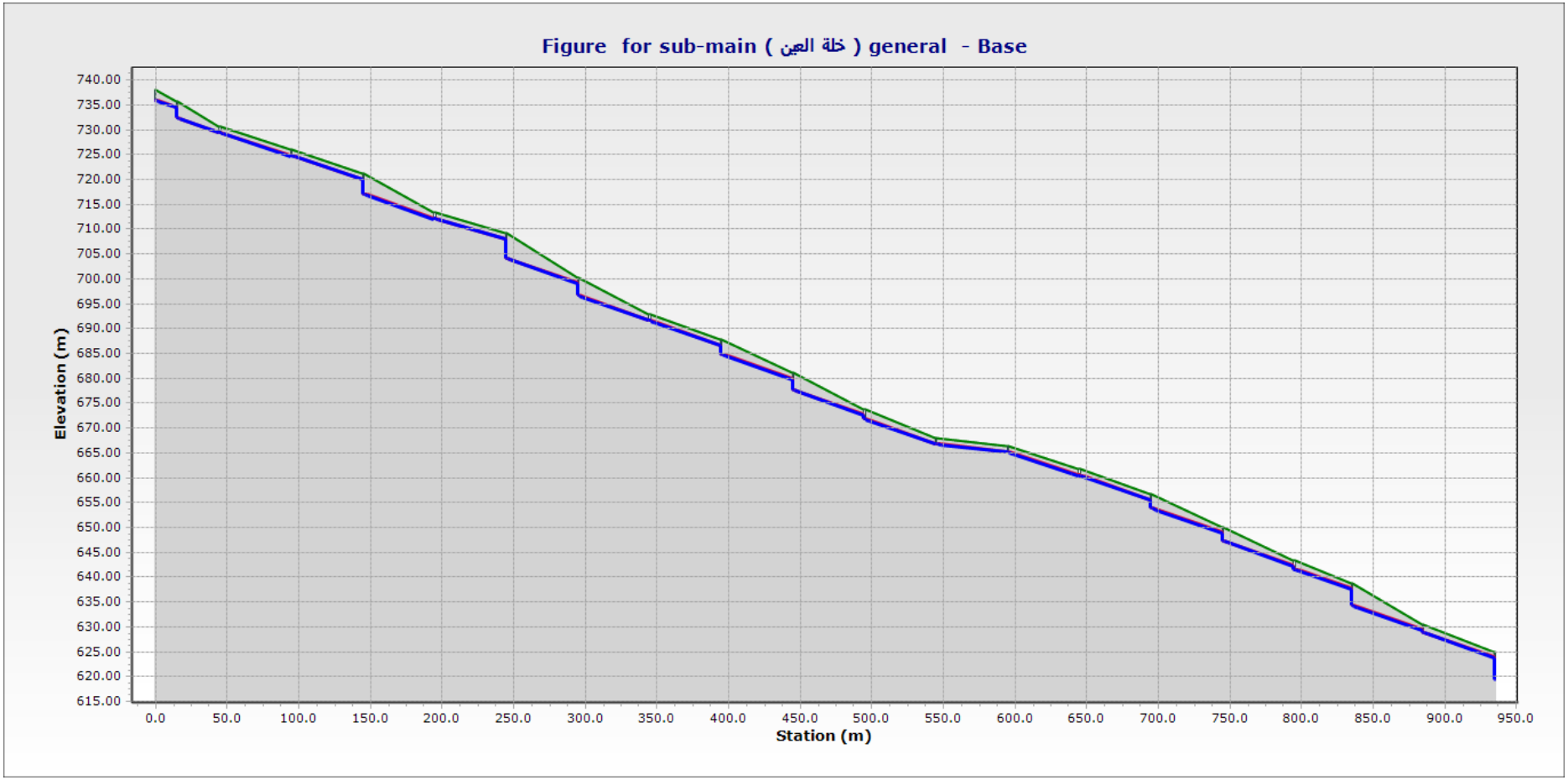
C.61 : Figure 54 : Profile for Sub-main (جرن) general



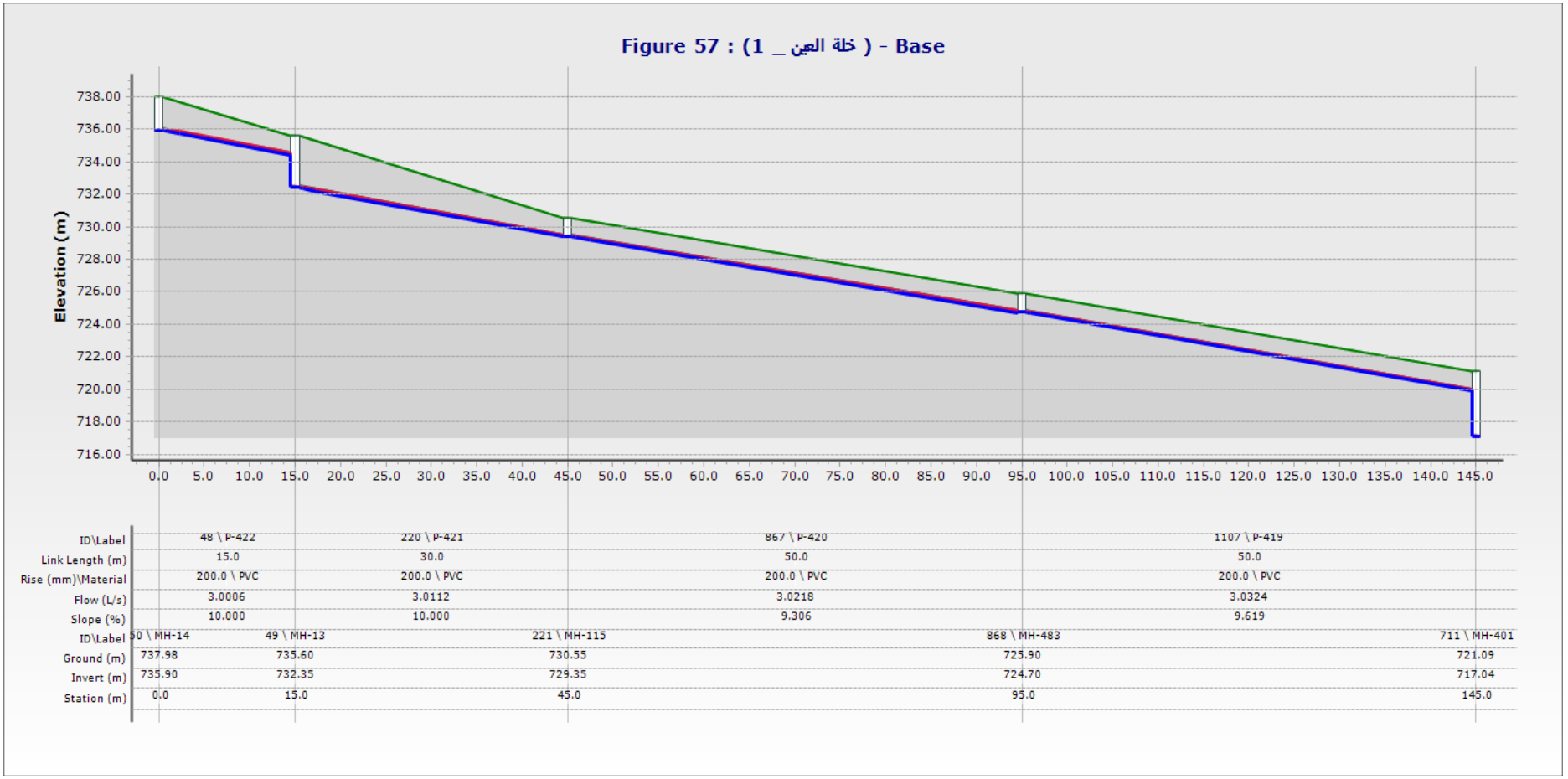
C.62 : Figure 55 : Profile for Sub-main (الكوربه) general



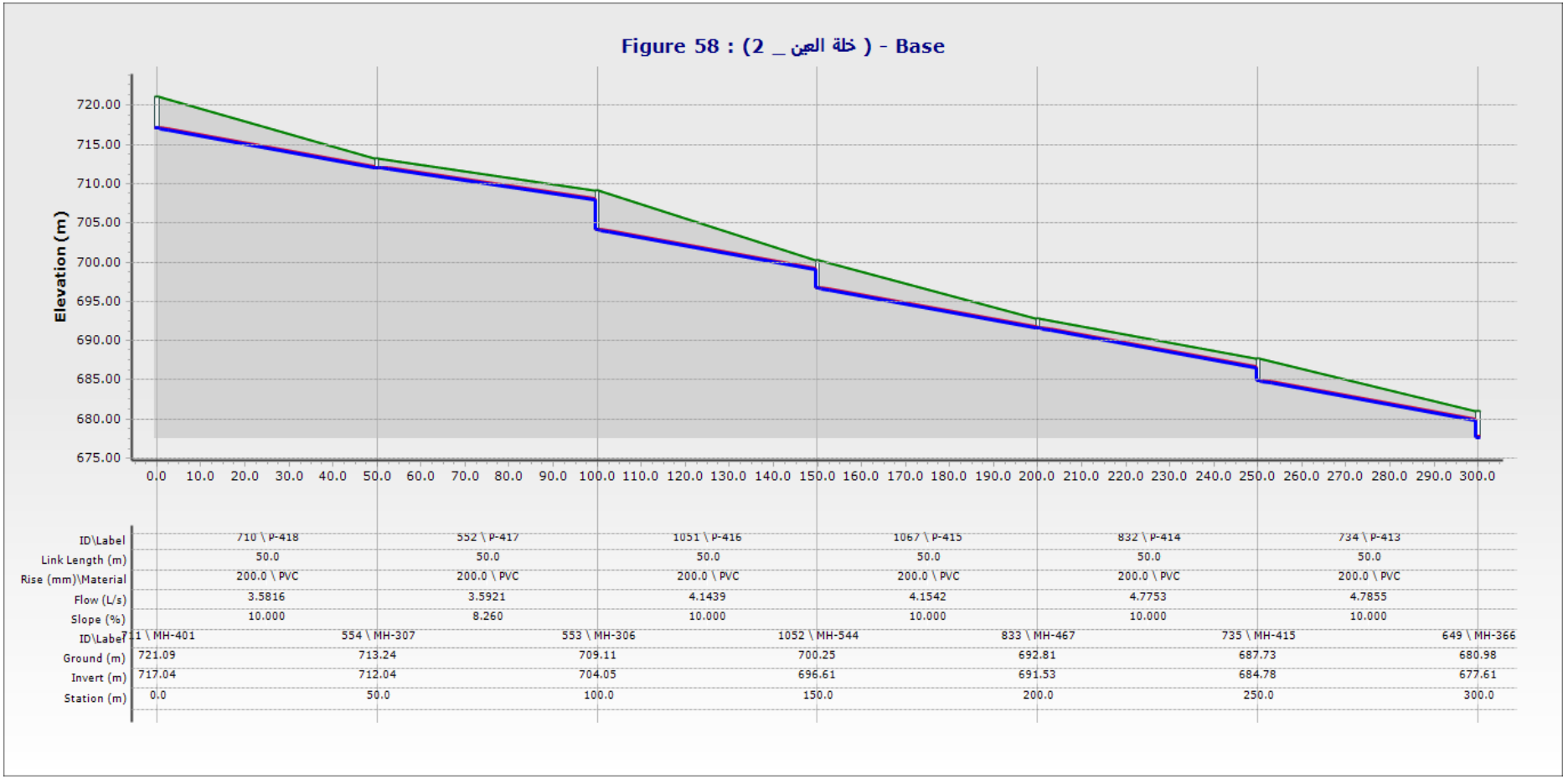
C.63 : Figure 56 : Profile for Sub-main (بير البلد) general



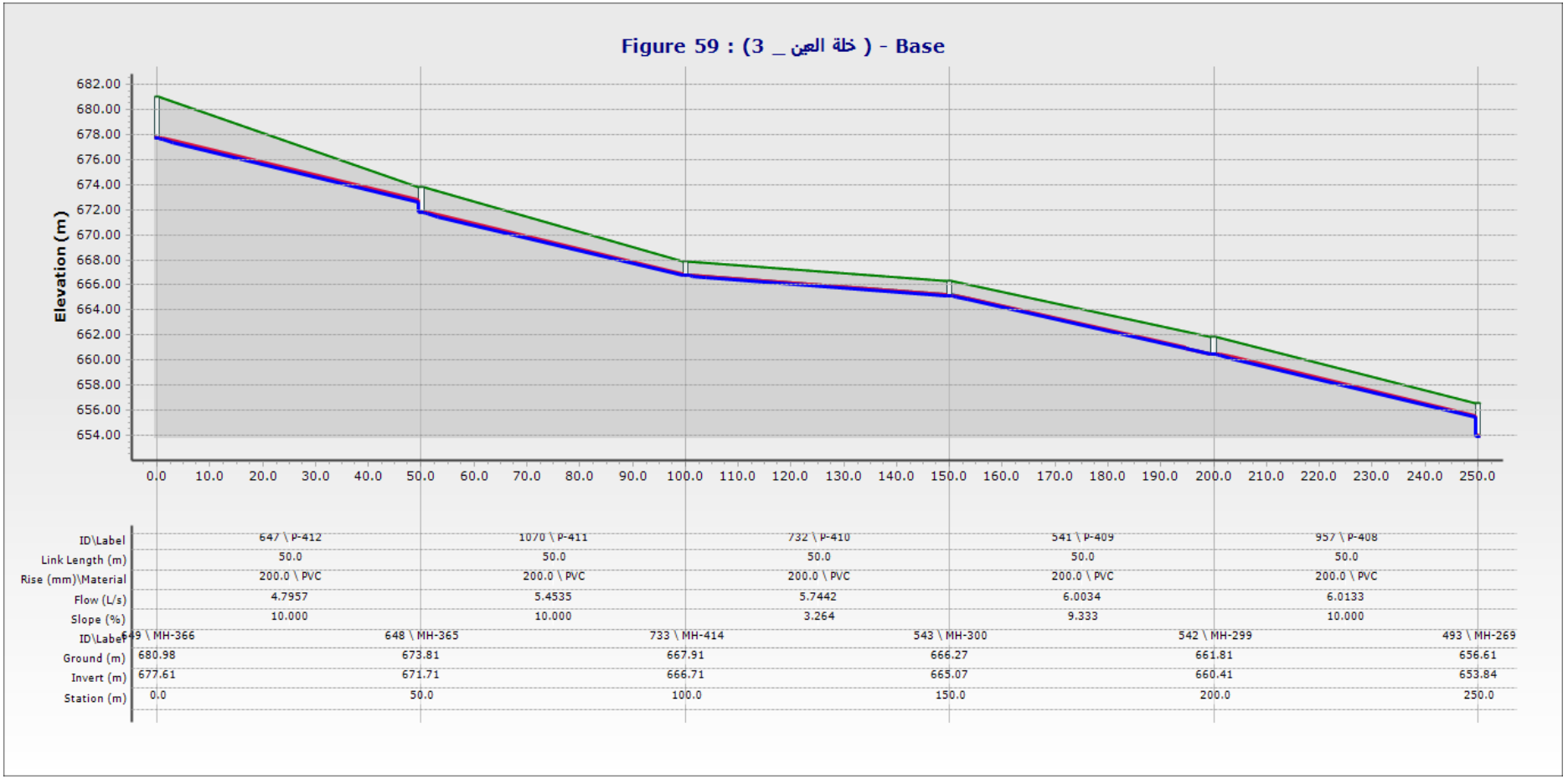
C.64 : Profile for Sub-main (خلة العين) general



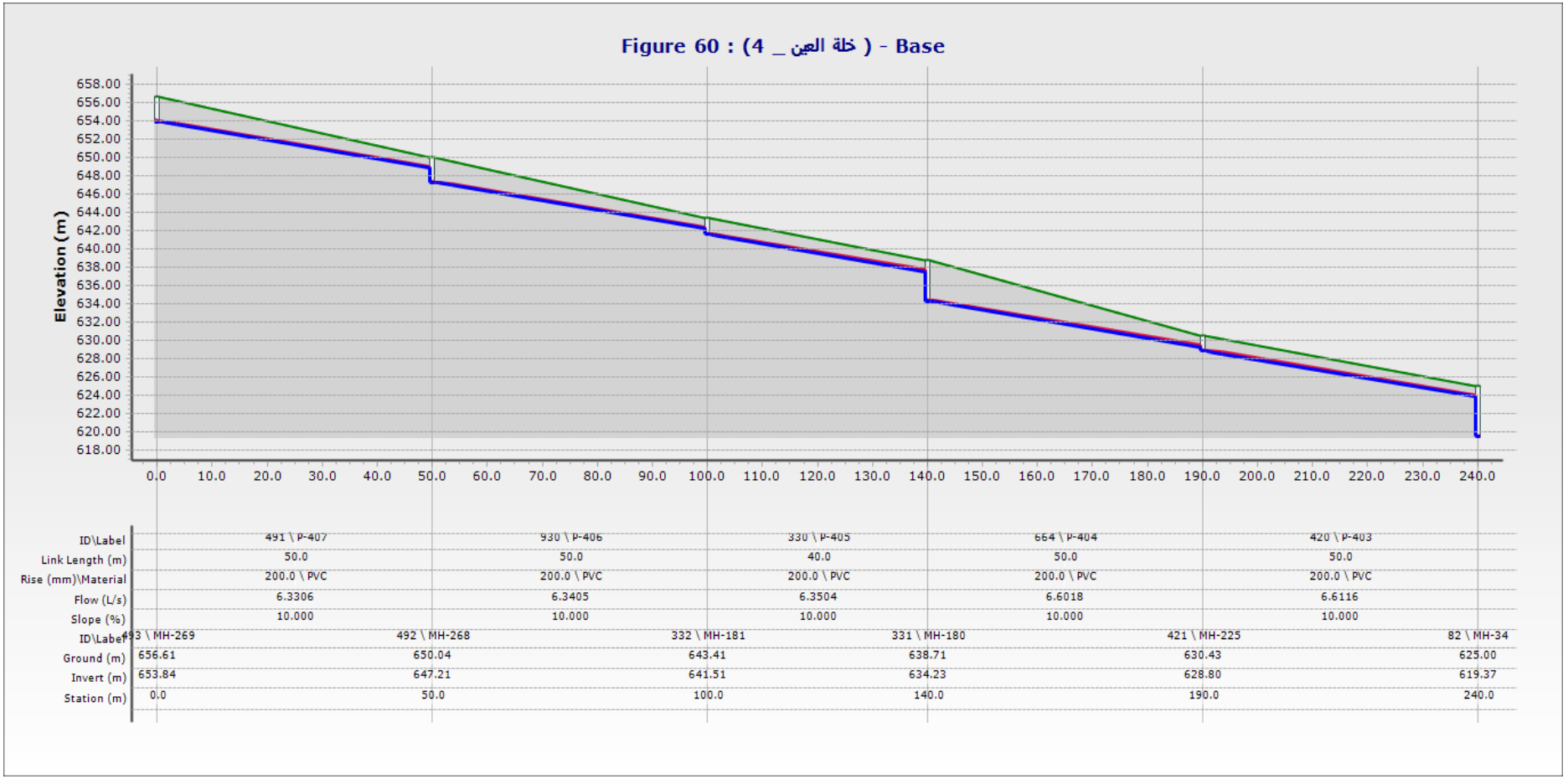
C.65 : Figure 57 : Profile for (1_ خلة العين)



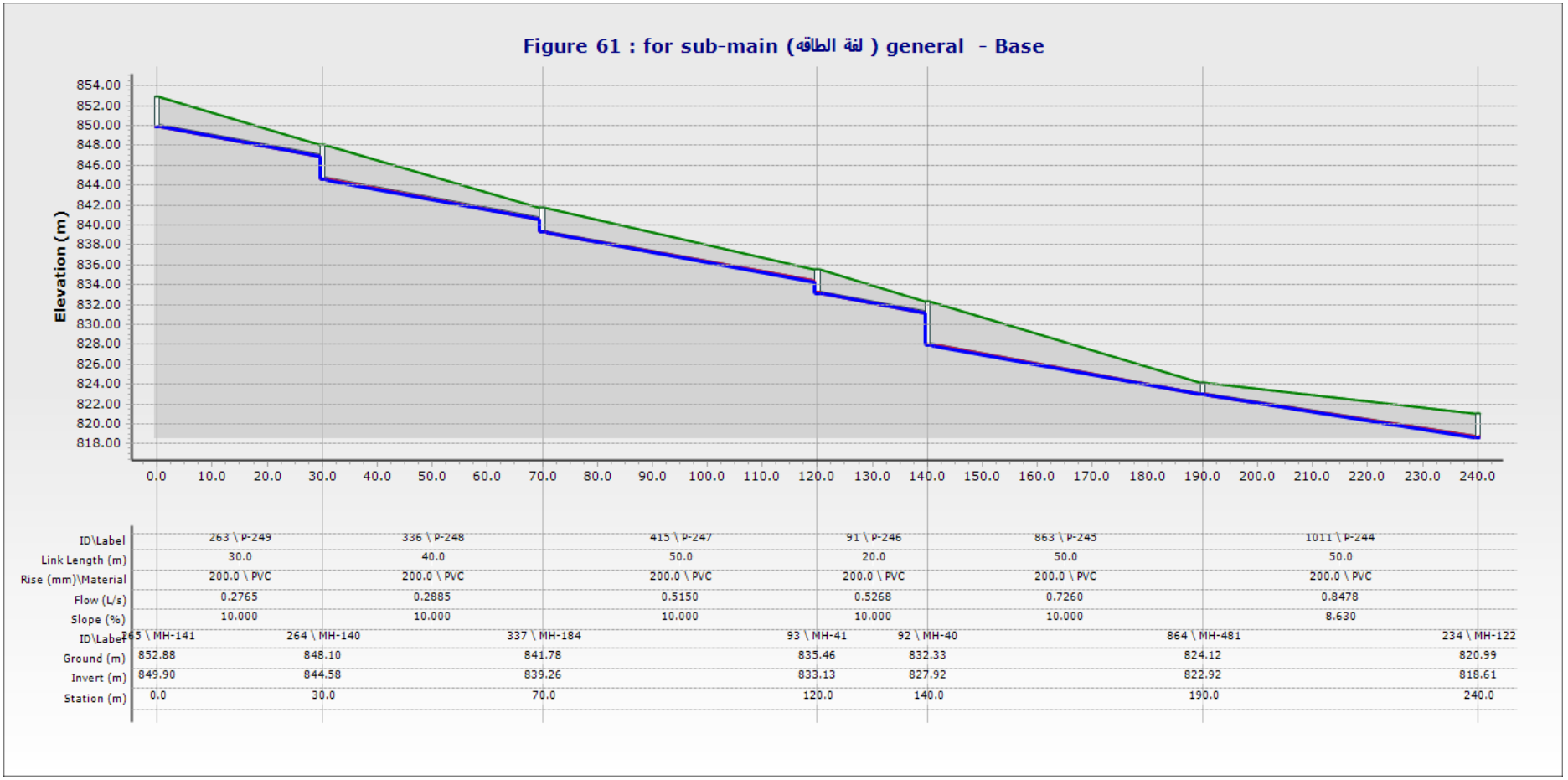
C.66 : Figure 58 : Profile for (2_ خلة العين)



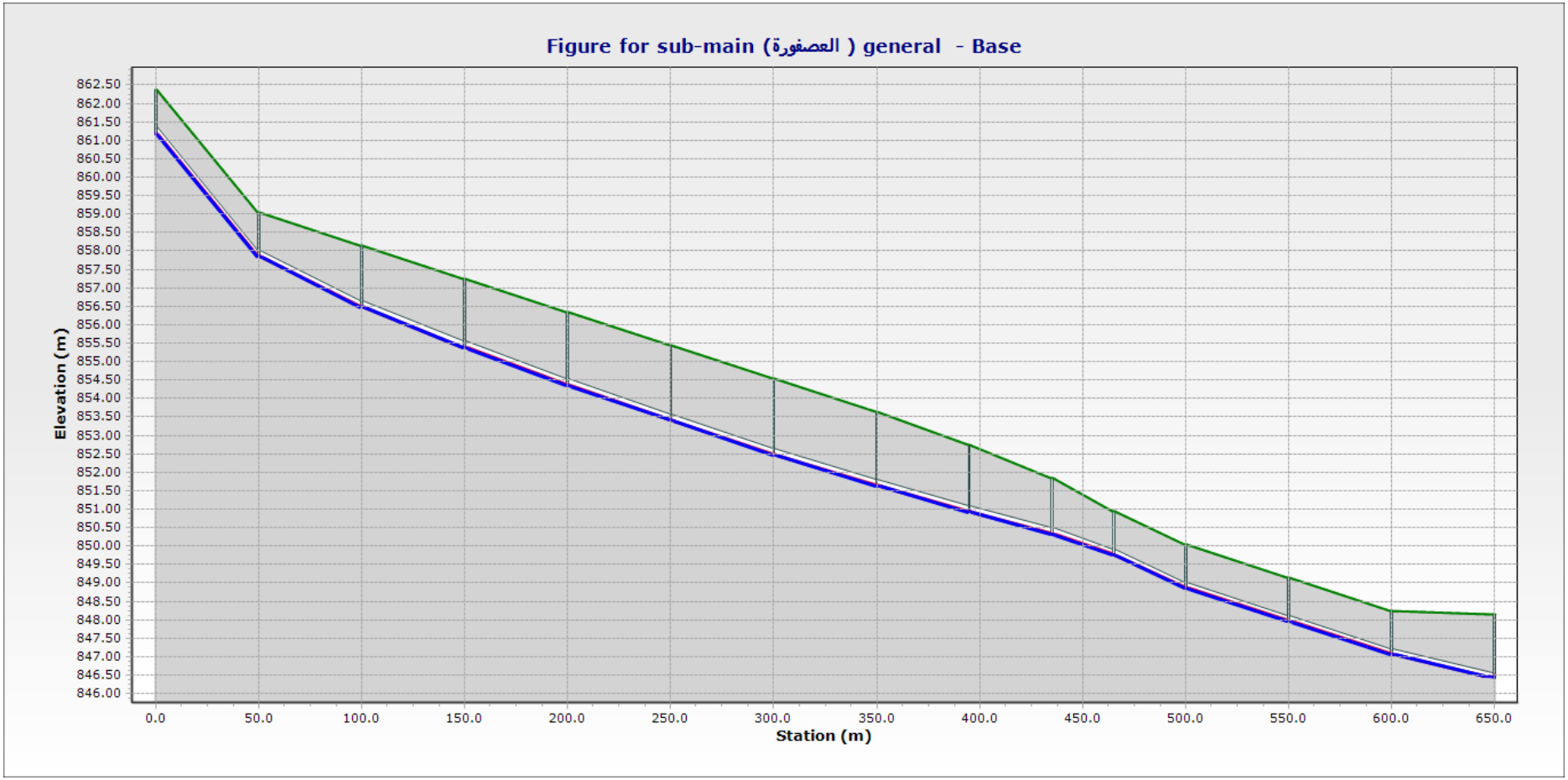
C.67 : Figure 59 : Profile for (3_ خلة العين)



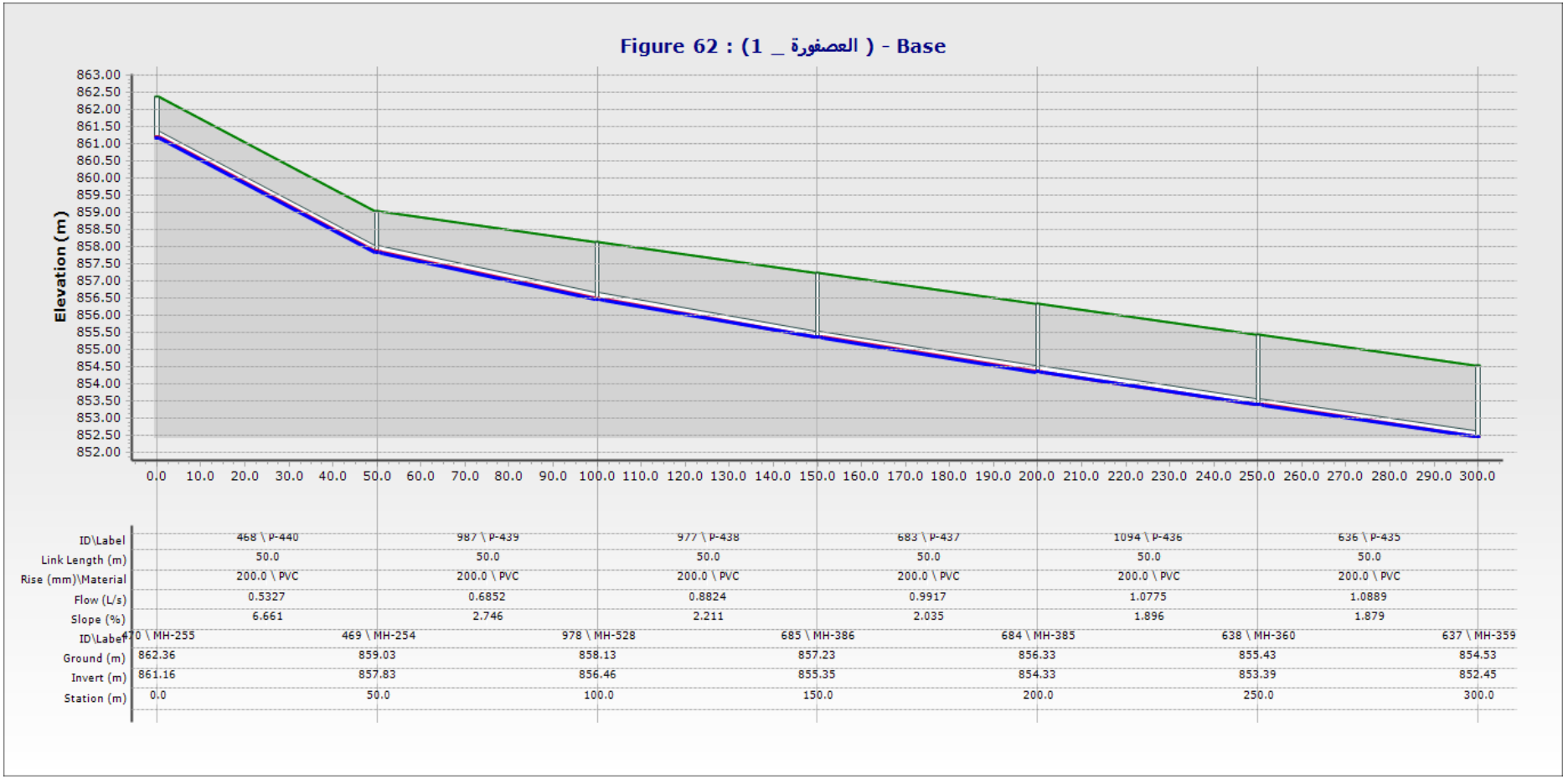
C.68 : Figure 60 : Profile for (4_ خلة العين)



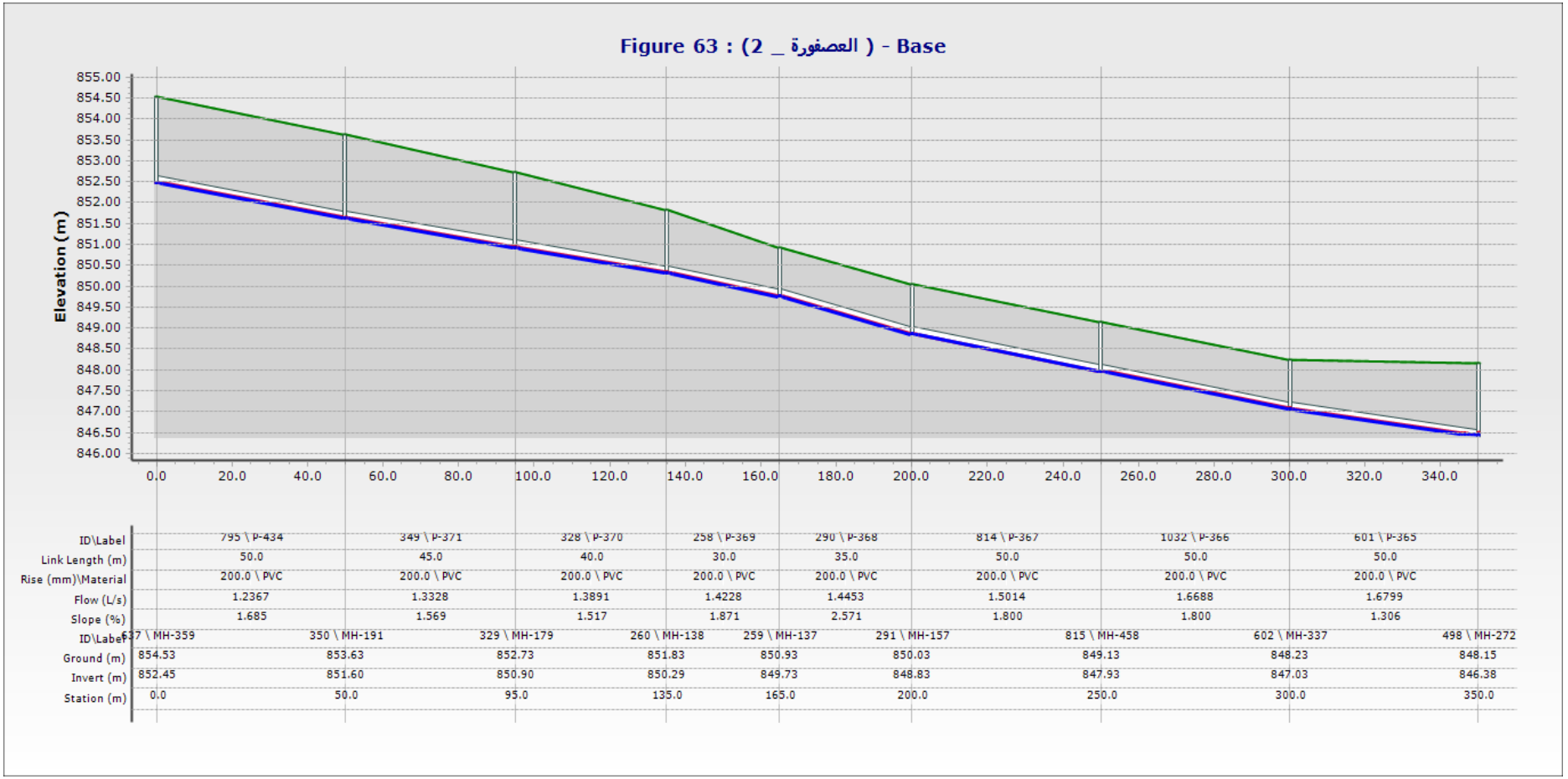
C.69 : Figure 61 : Profile for Sub-main (لفة الطاقه) general



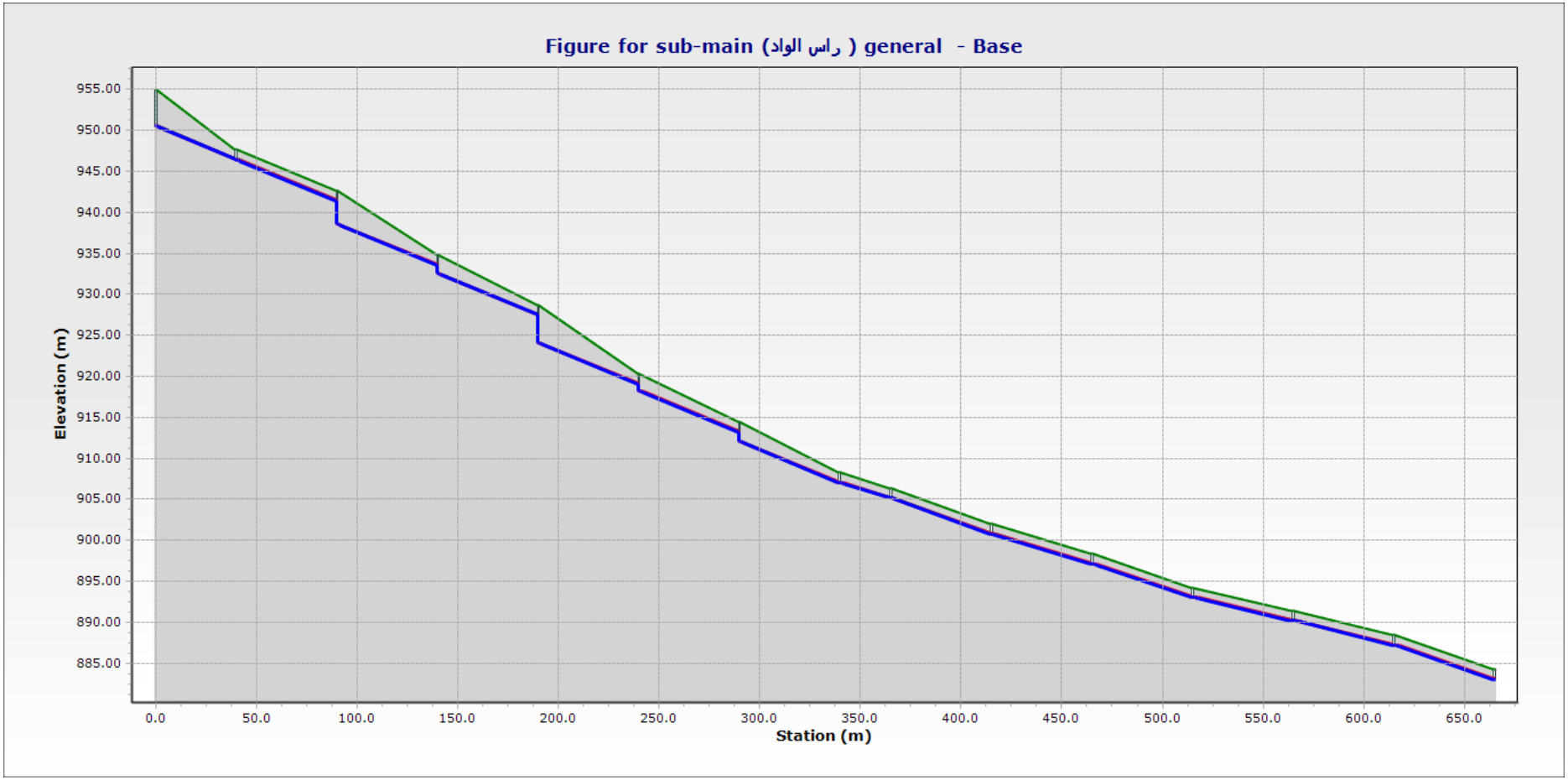
C.70 : Profile for Sub-main (العصفورة) general



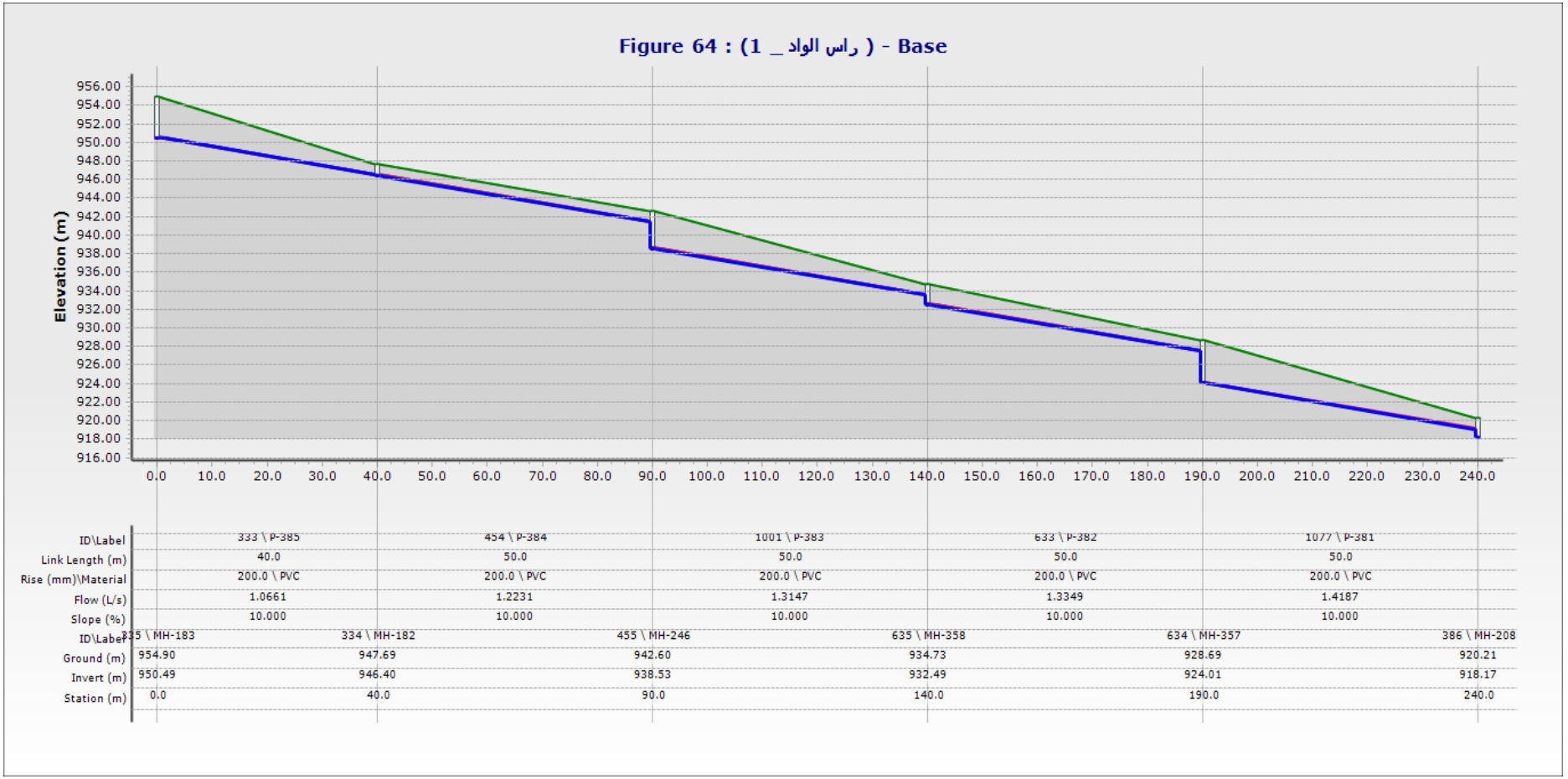
C.71 : Figure 62 : Profile for (1_ العصفورة)



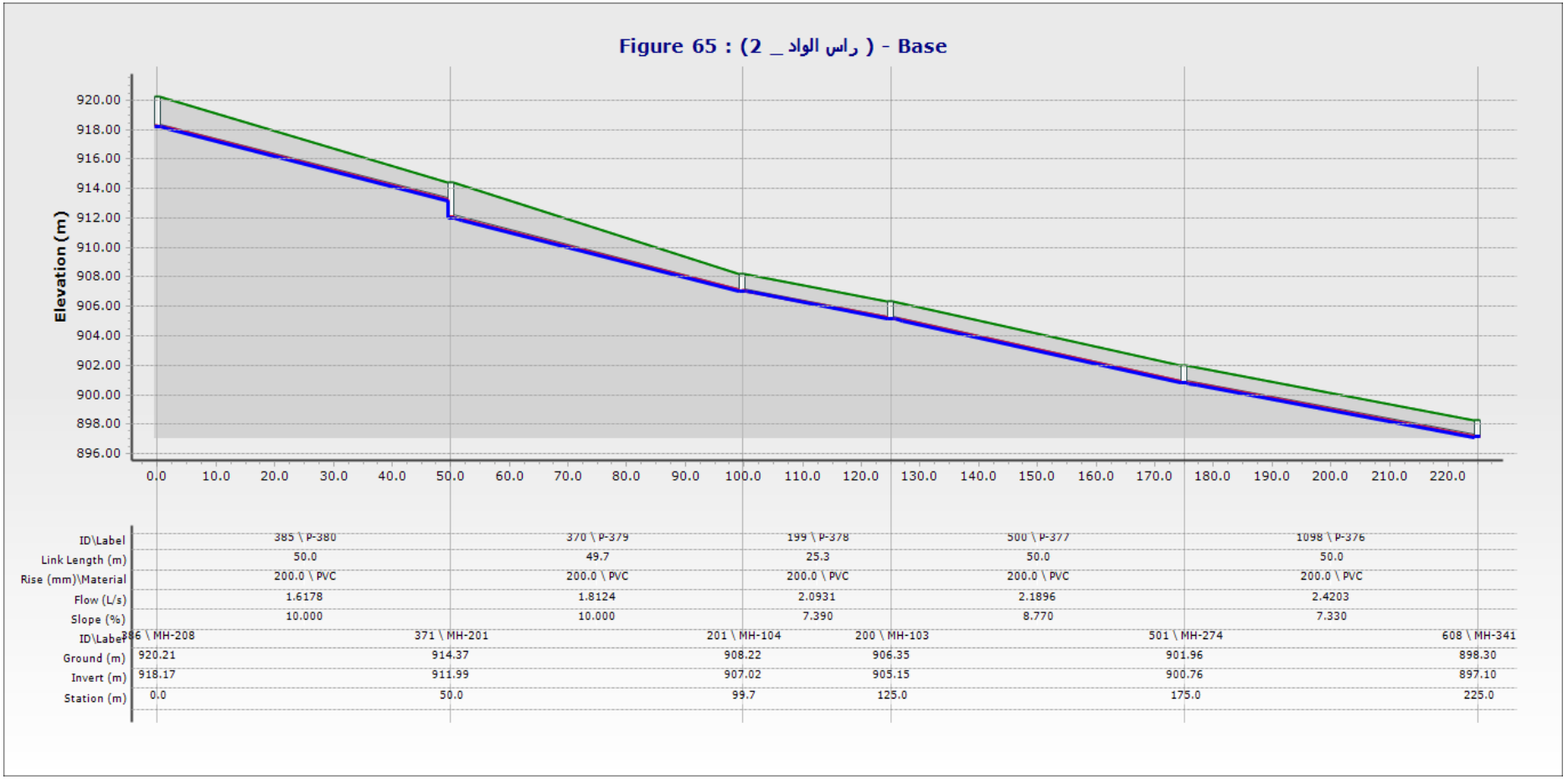
C.72 : Figure 63 : Profile for (2_ العصفورة)



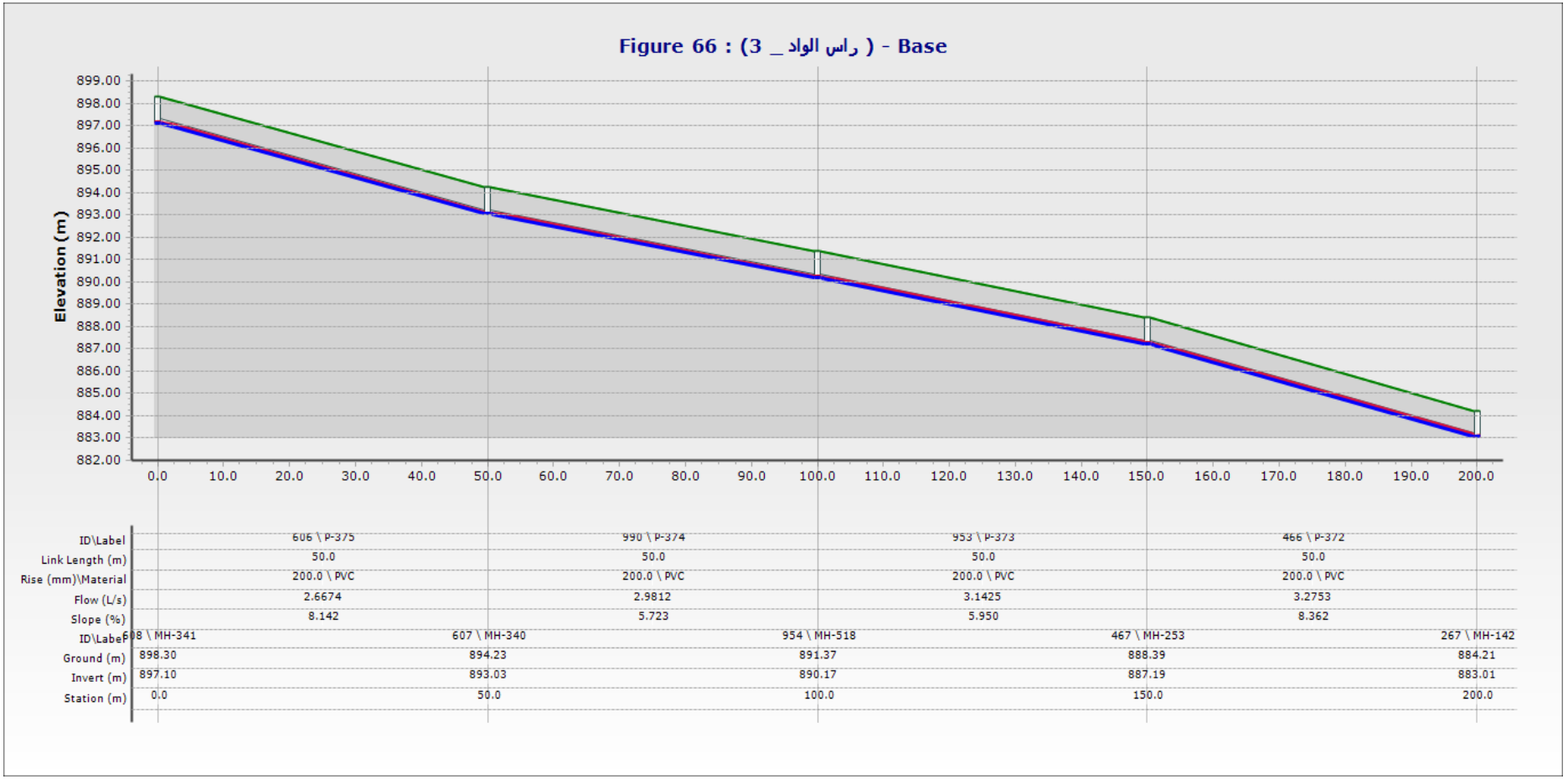
C.73 : Profile for Sub-main (راس الواد) general



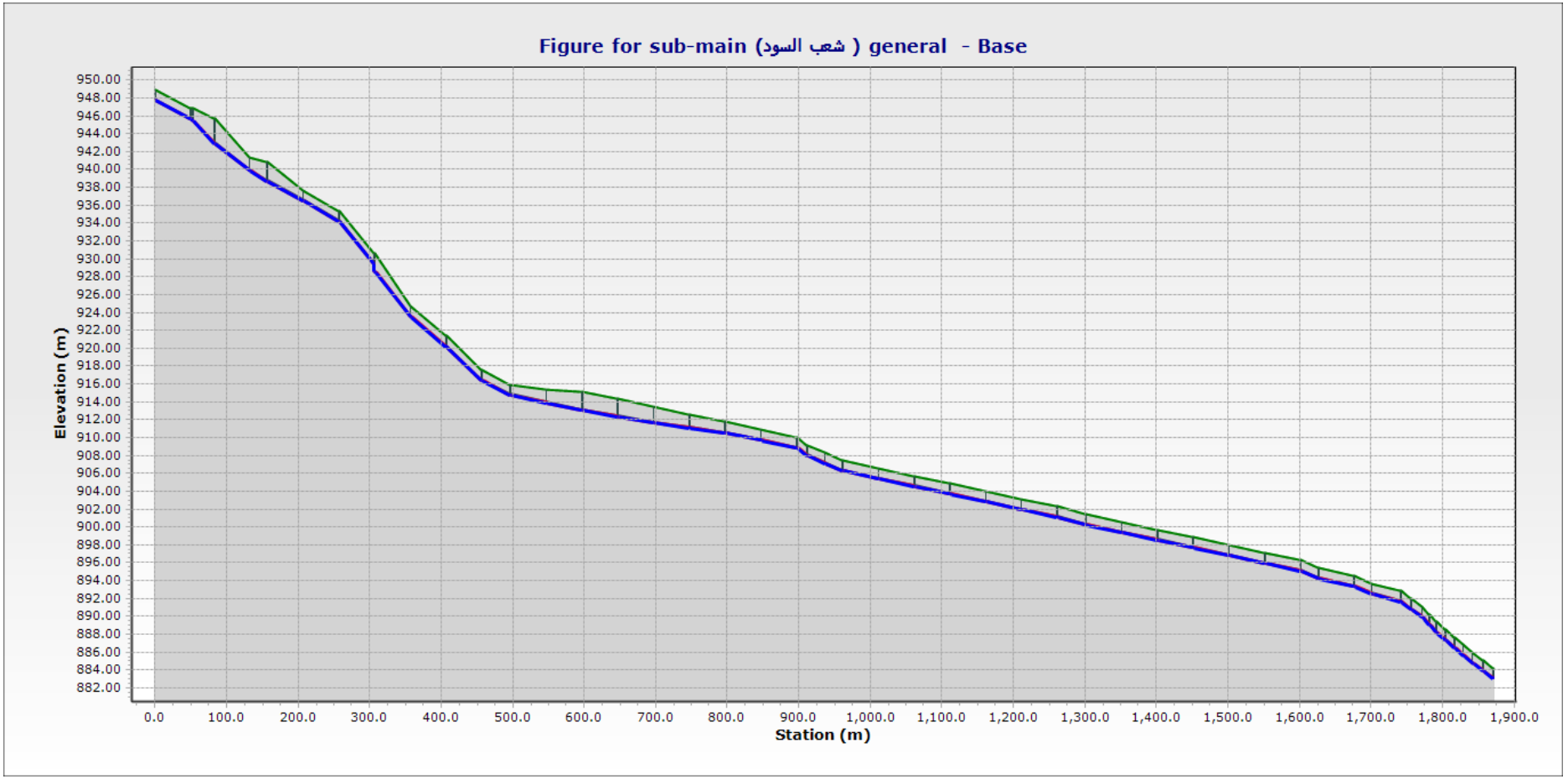
C.74 : Figure 64 : Profile for (1_ راس الواد)



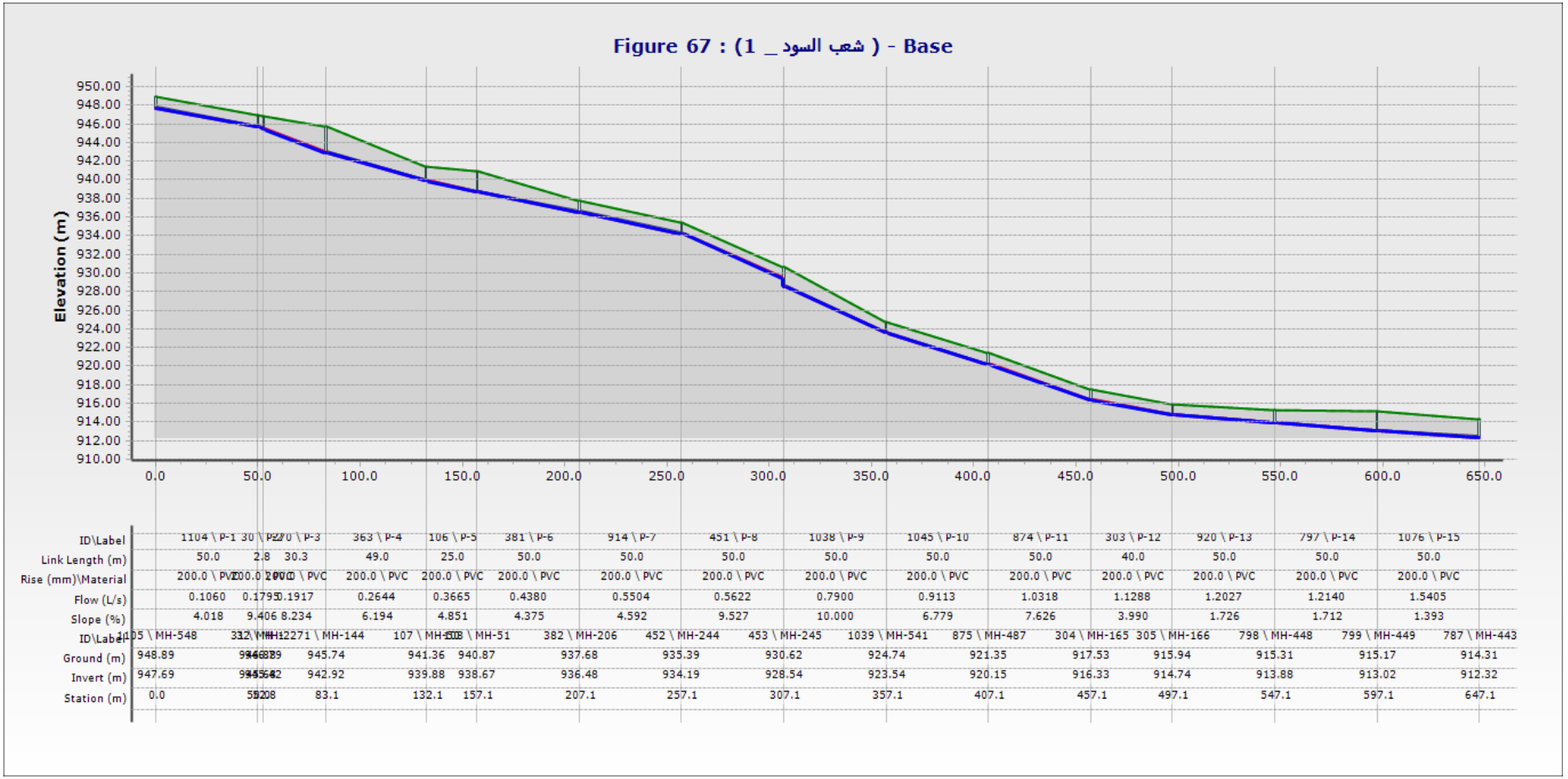
C.75 : Figure 65 : Profile for (2_ راس الواد)



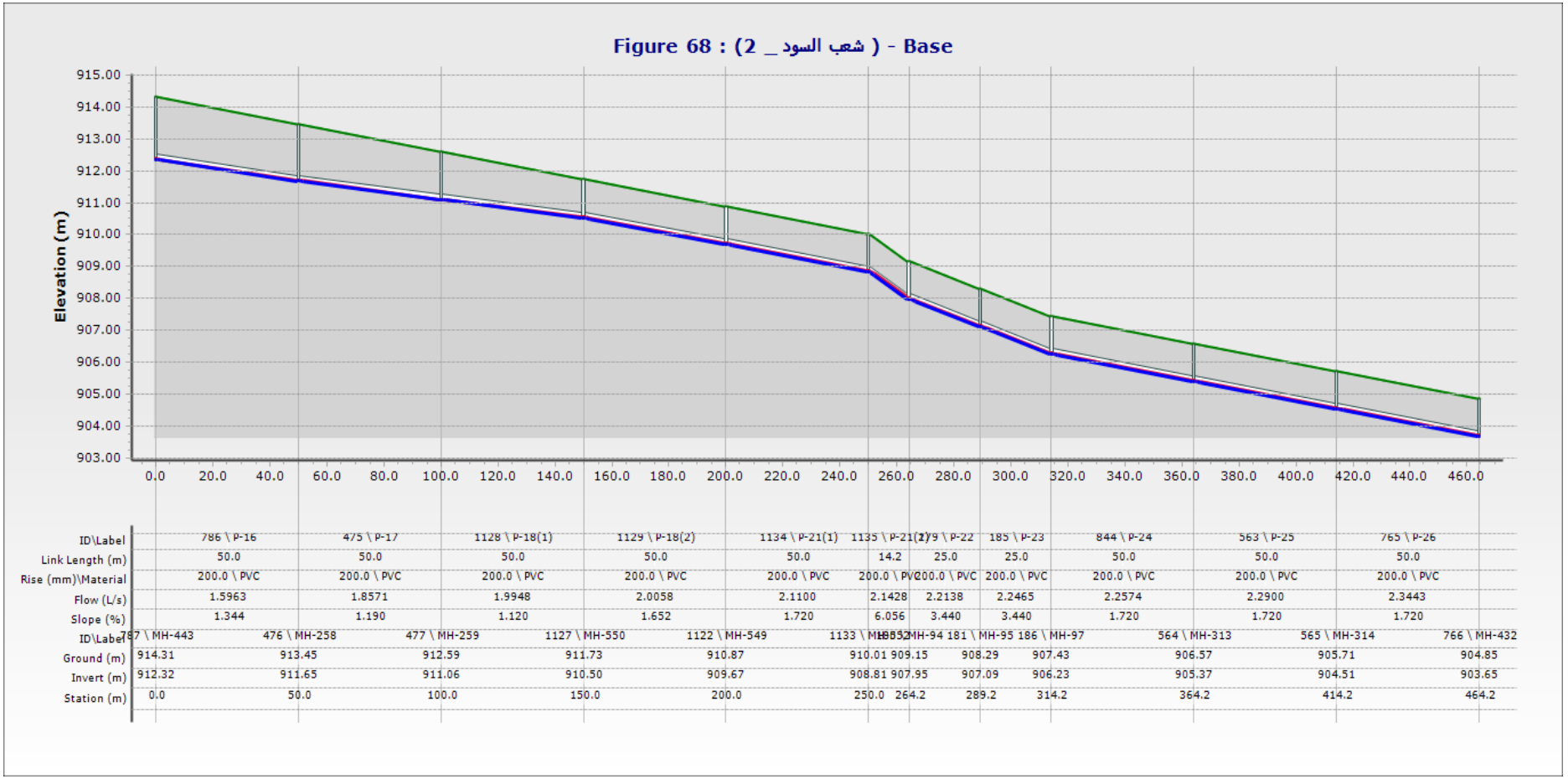
C.76 : Figure 66 : Profile for (3_ راس الواد)



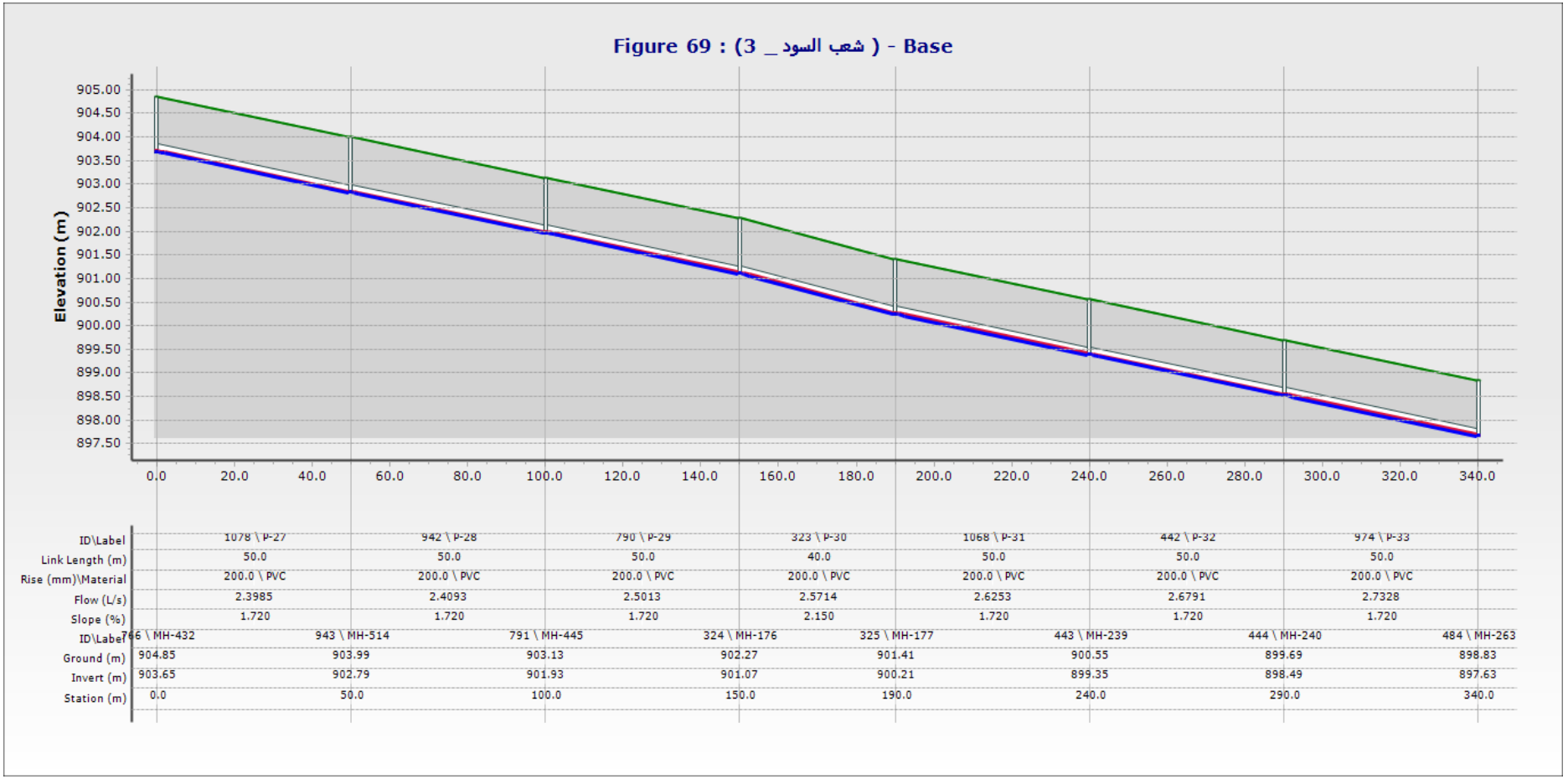
C.77 : Profile for Sub-main (شعب السود) general



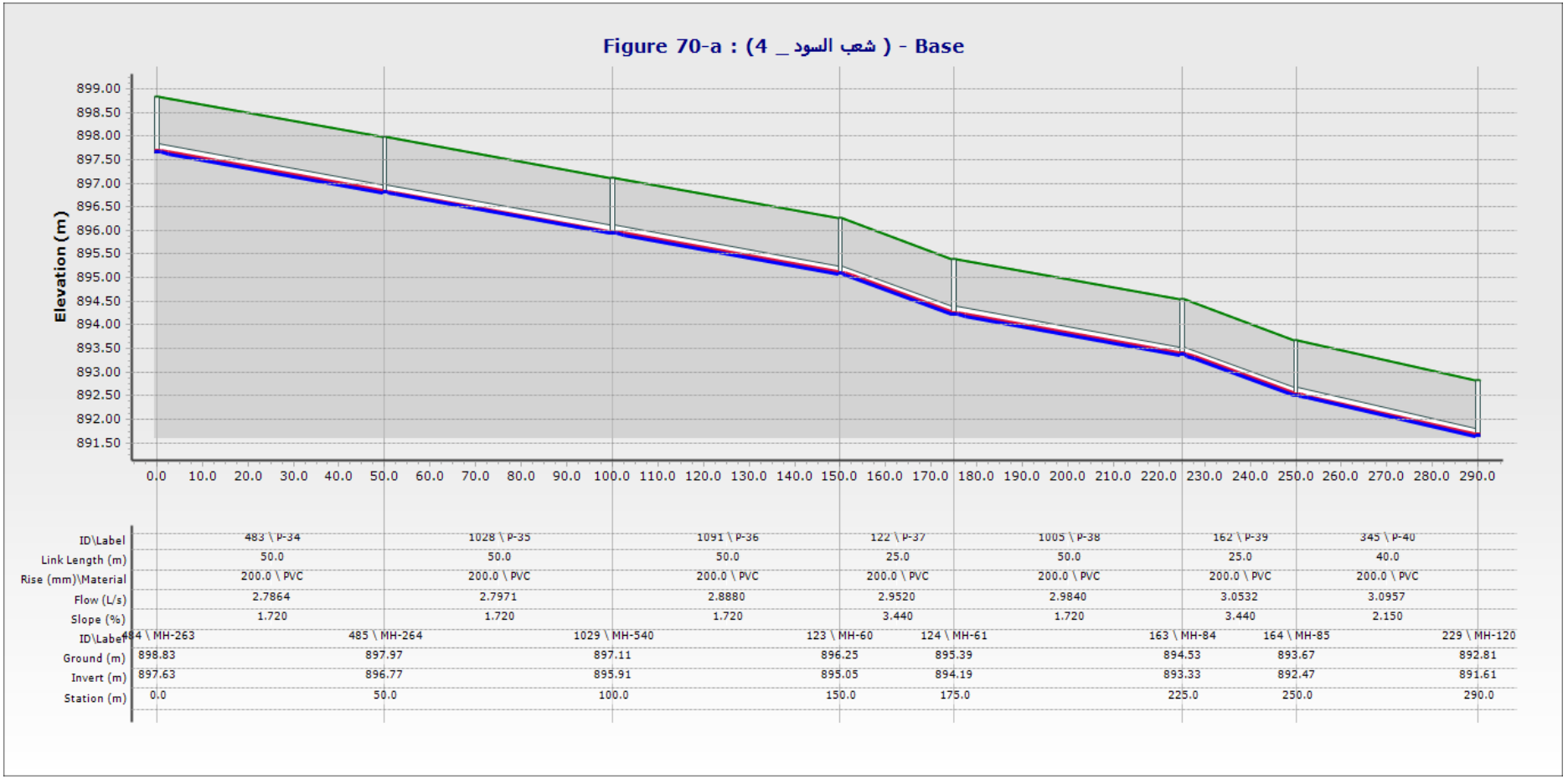
C.78 : Figure 67 : Profile for (1_ شعب السود)



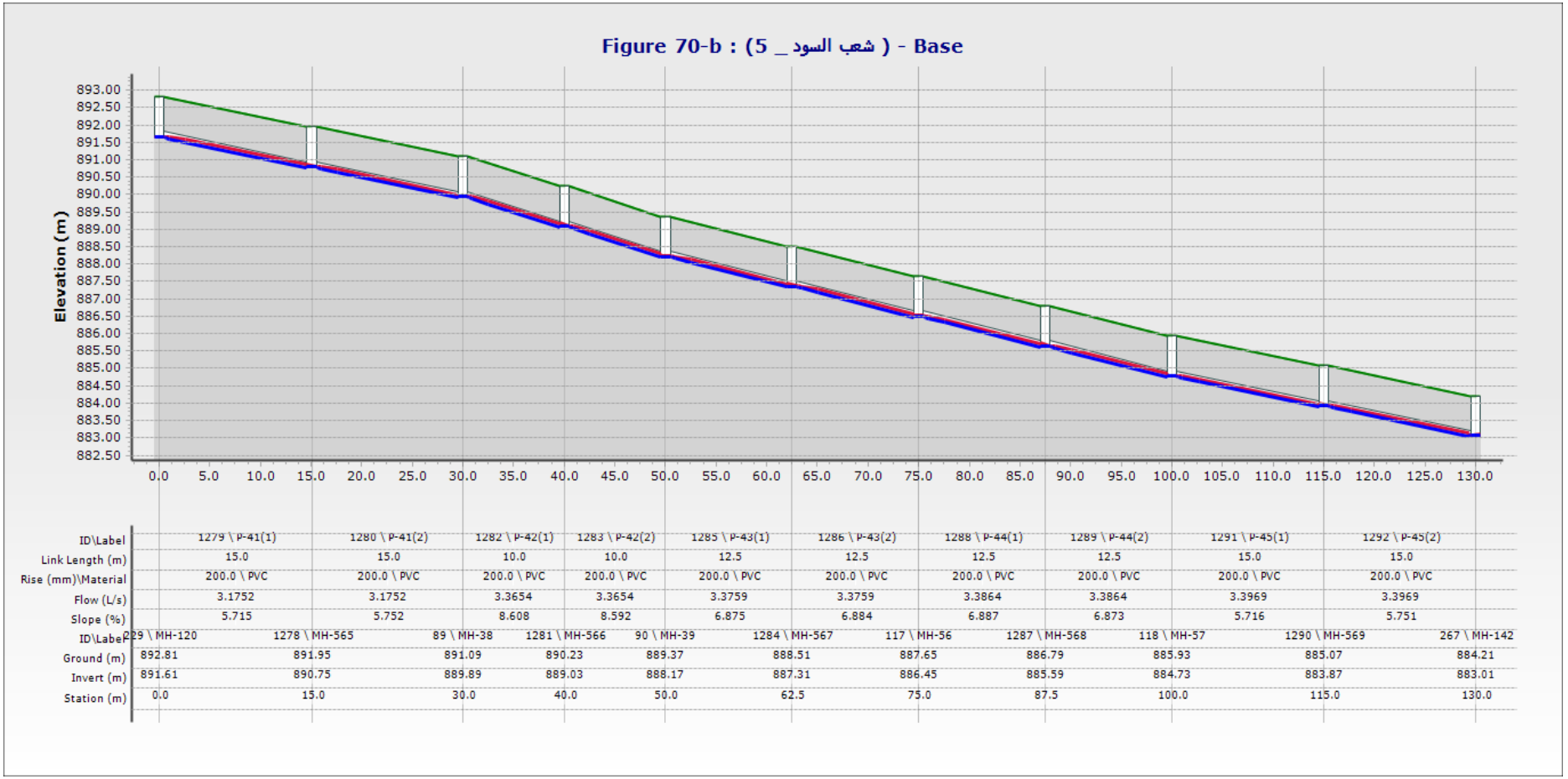
C.79 : Figure 68 : Profile for (2_ شعب السود)



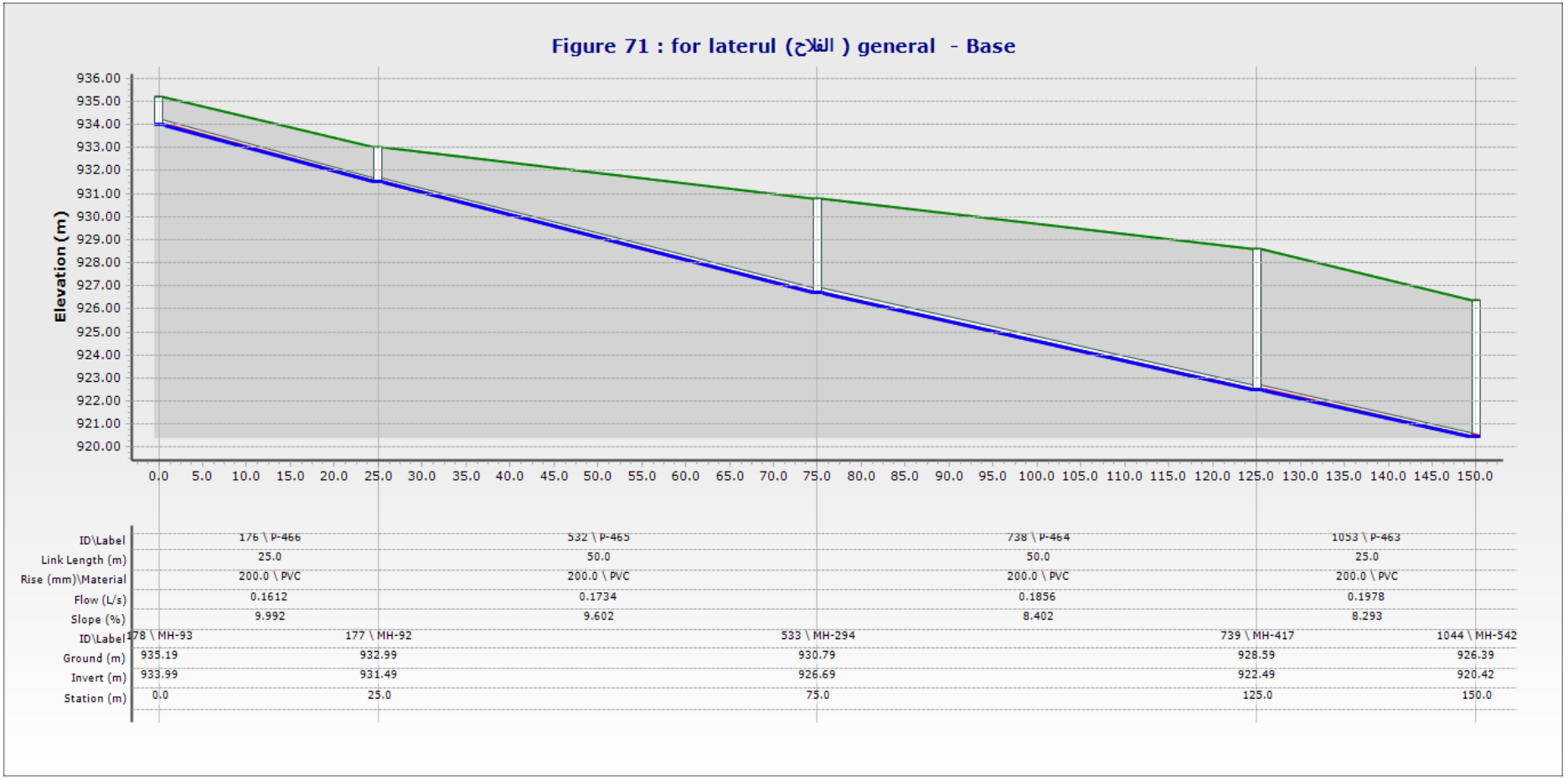
C.80 : Figure 69 : Profile for (3_ شعب السود)



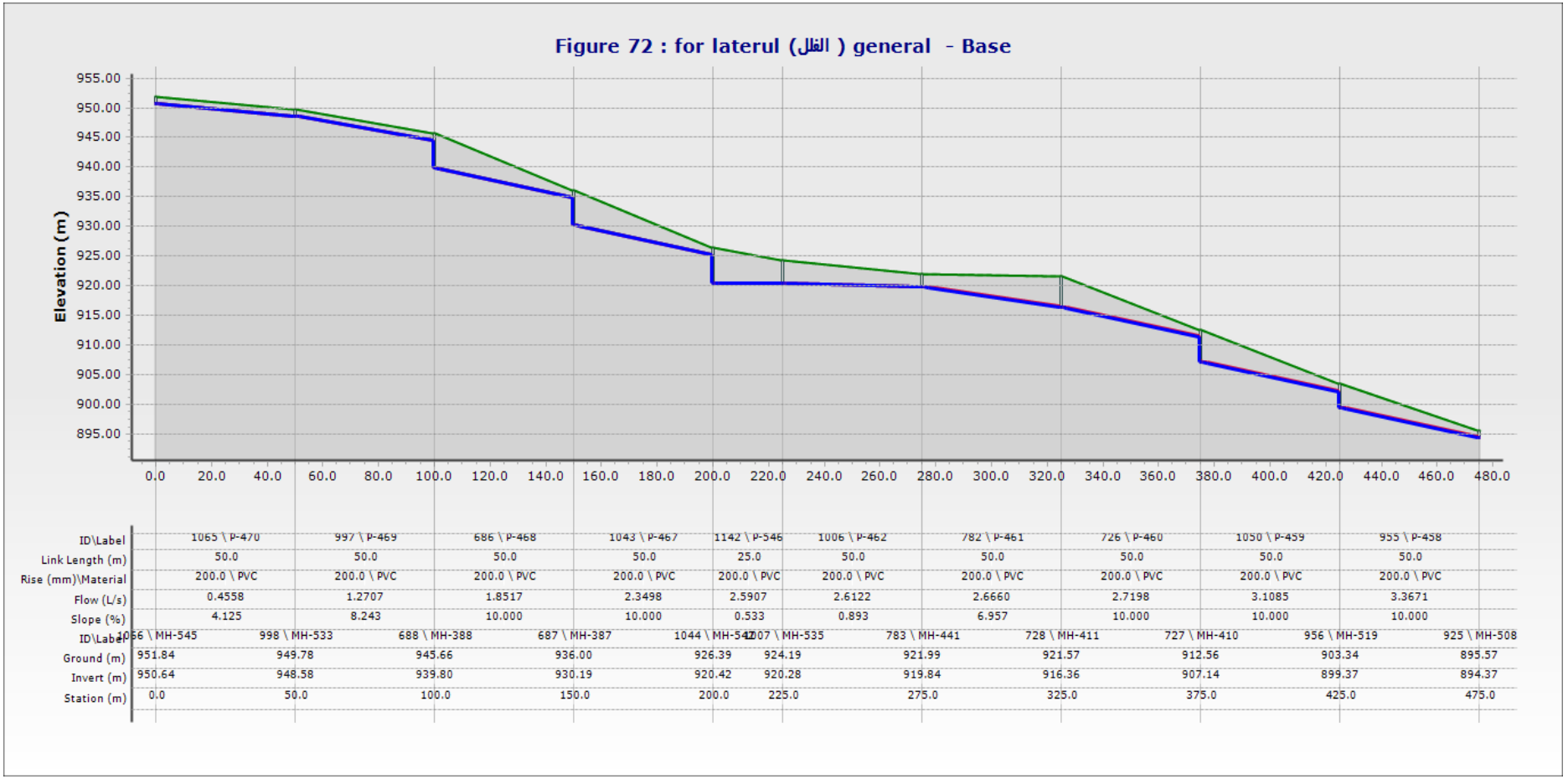
C.81 : Figure 70 - a : Profile for (4_ شعب السود)



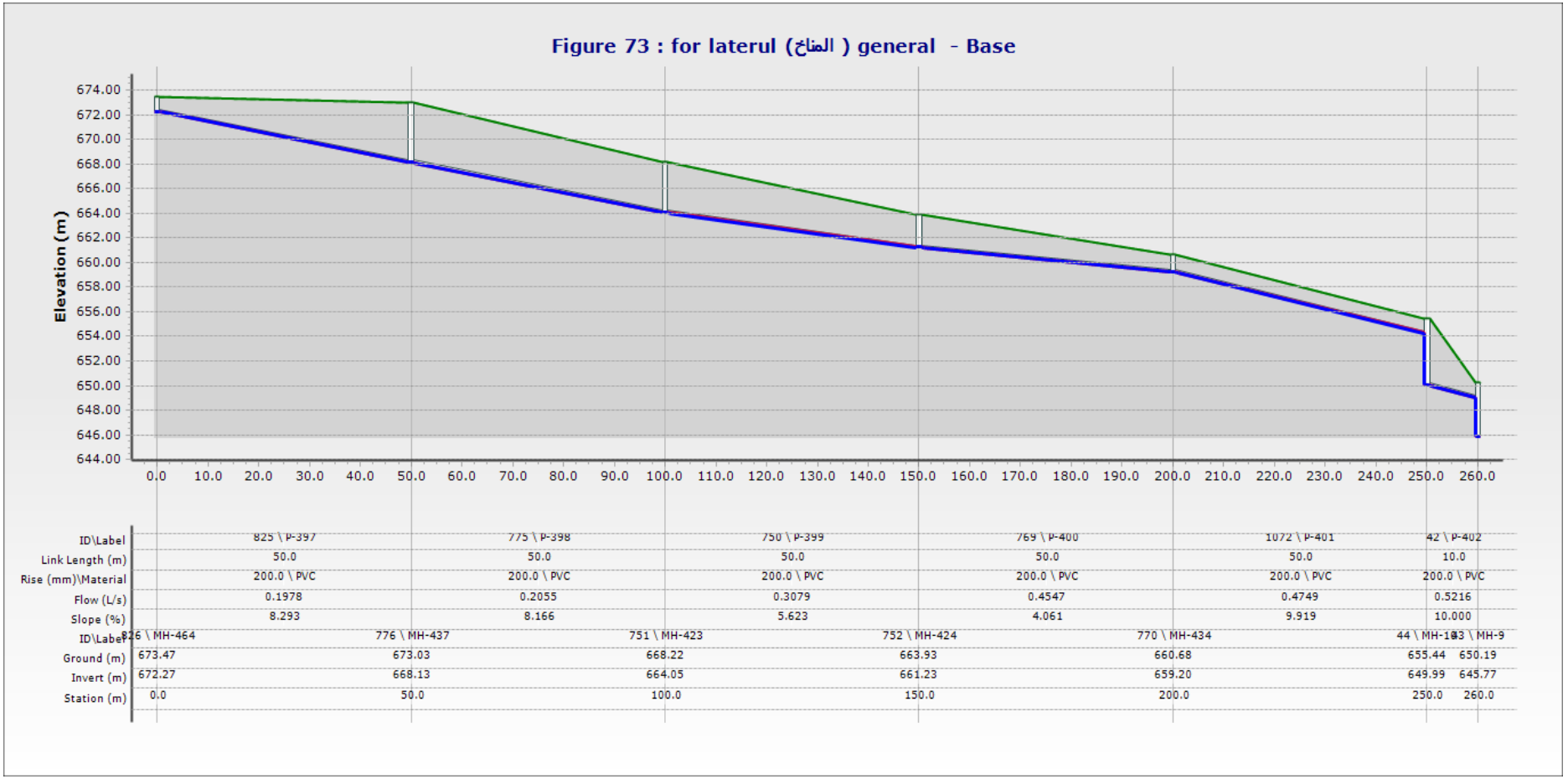
C.82 : Figure 70 - b : Profile for (5_ شعب السود)



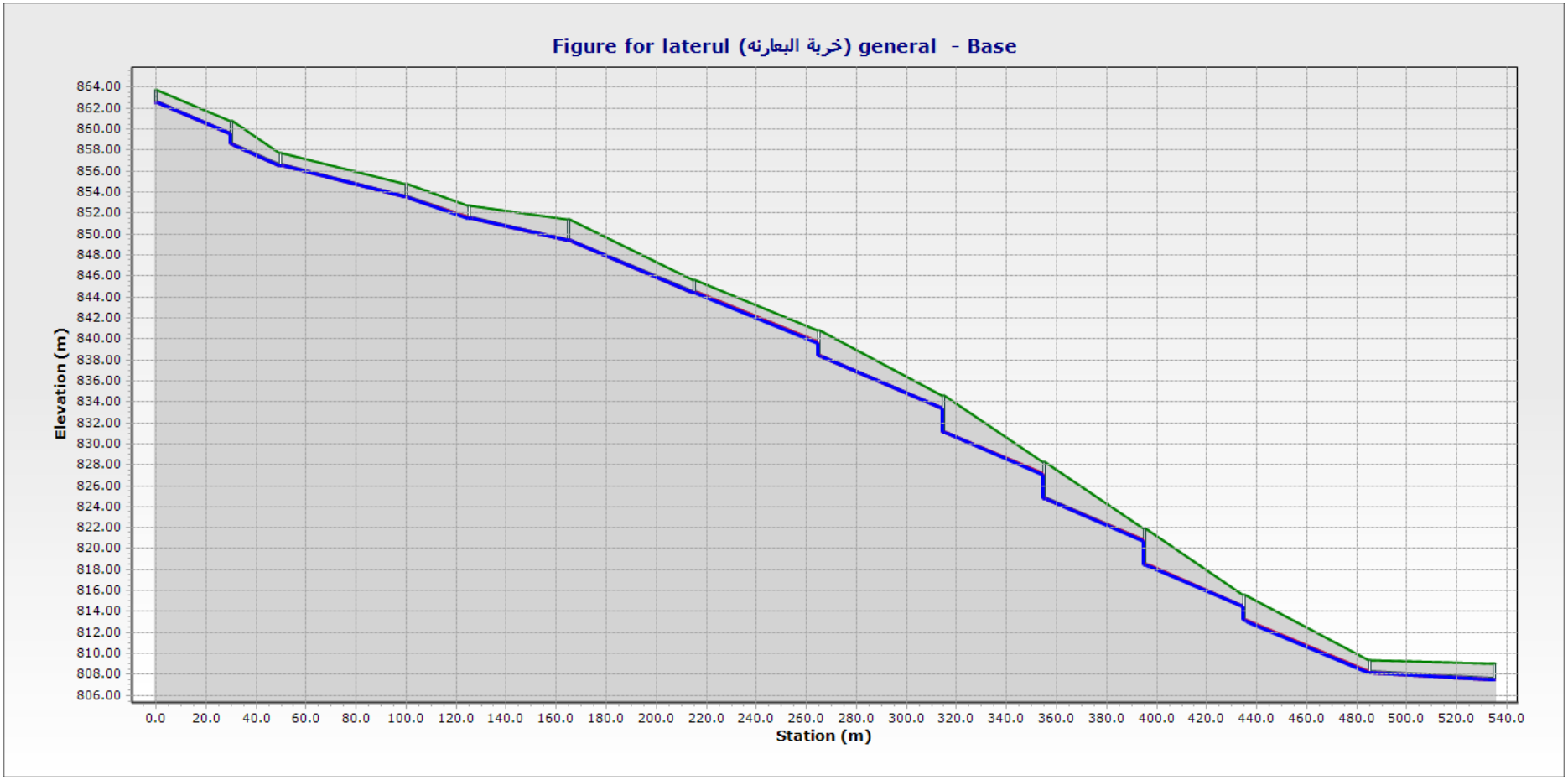
C.83 : Figure 71 : Profile for Lateral (الفلاح) general



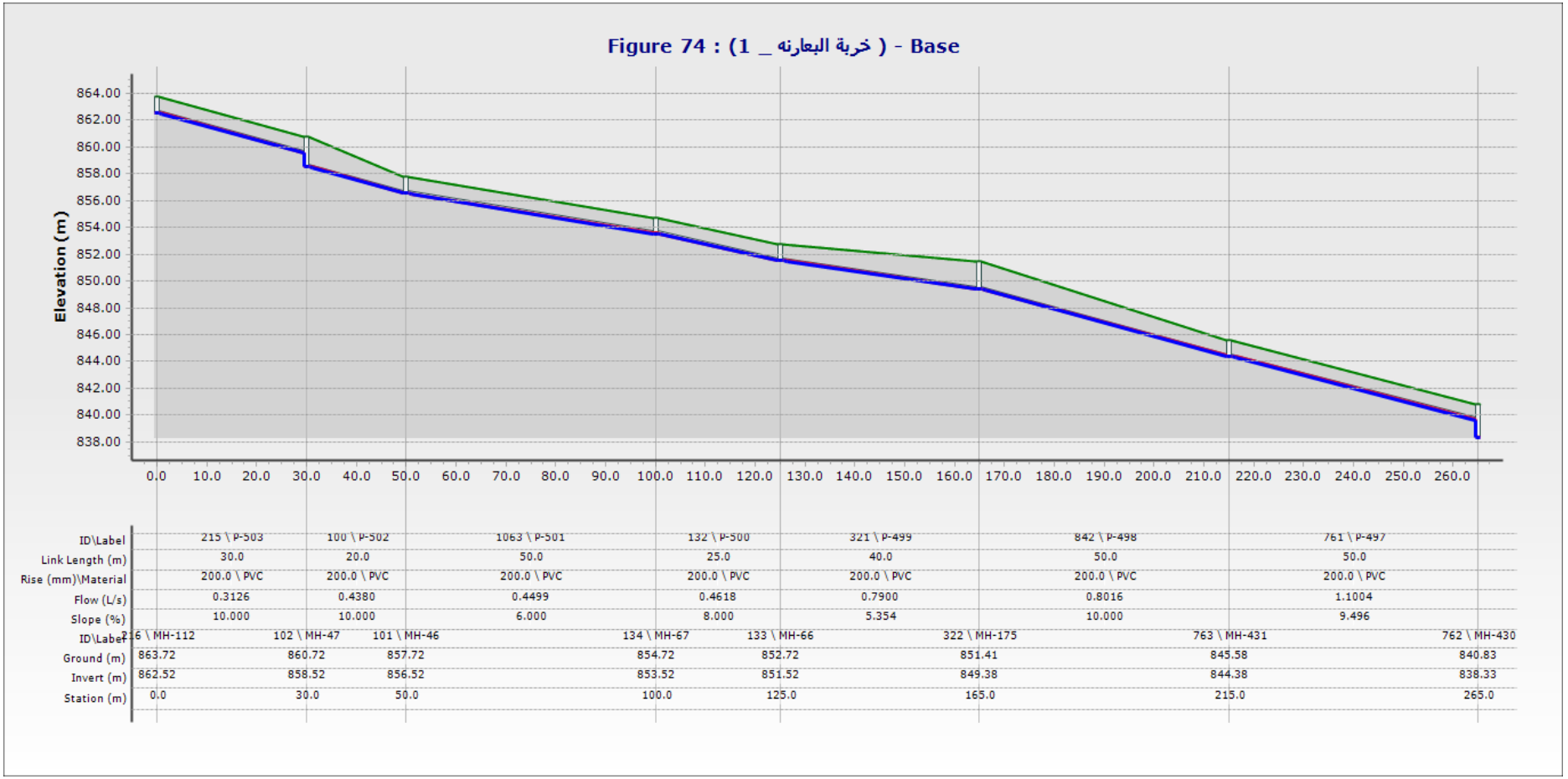
C.84 : Figure 72 : Profile for Lateral (الفلل) general



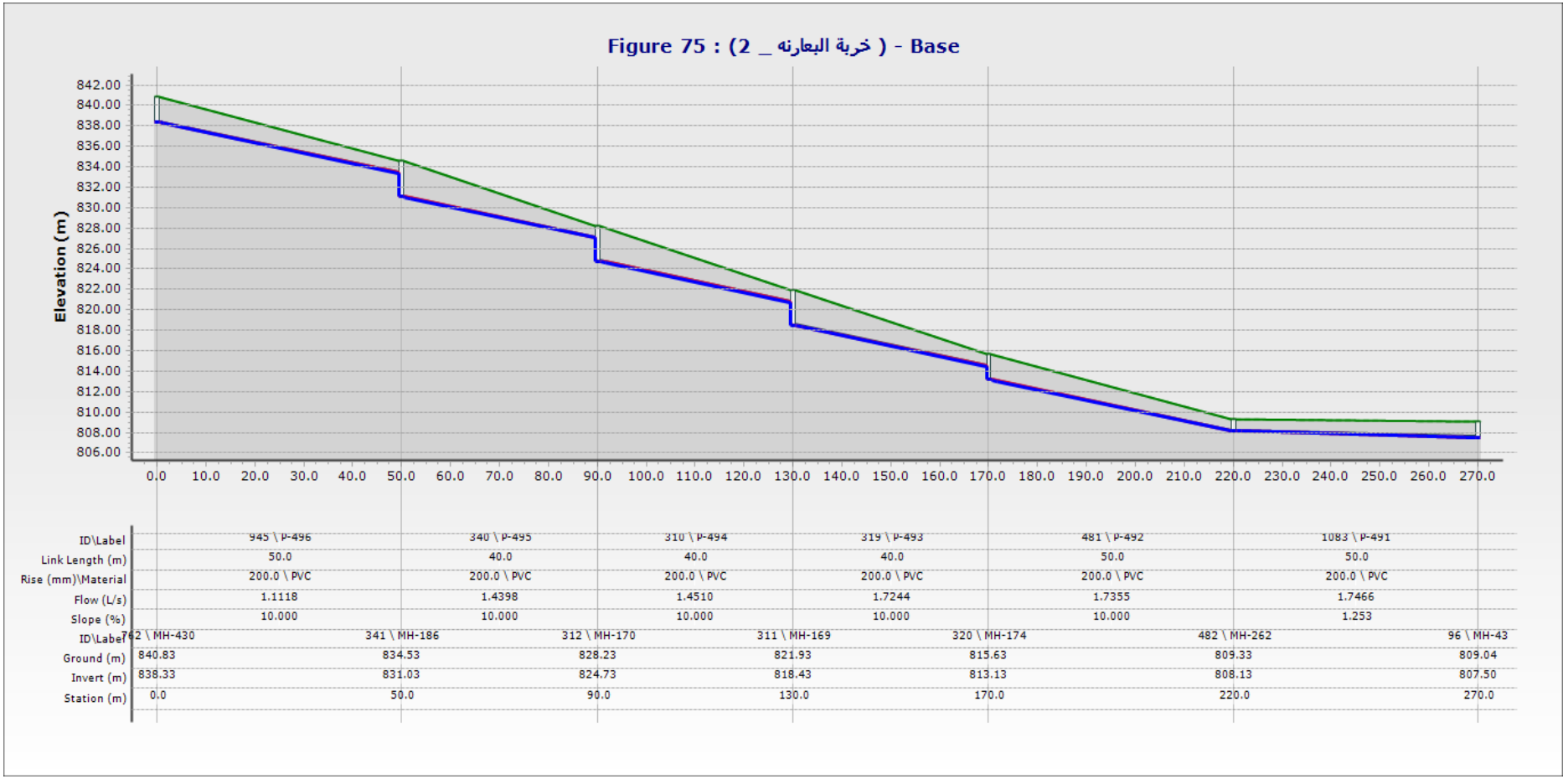
C.85 : Figure 73 : Profile for Lateral (المناخ) general



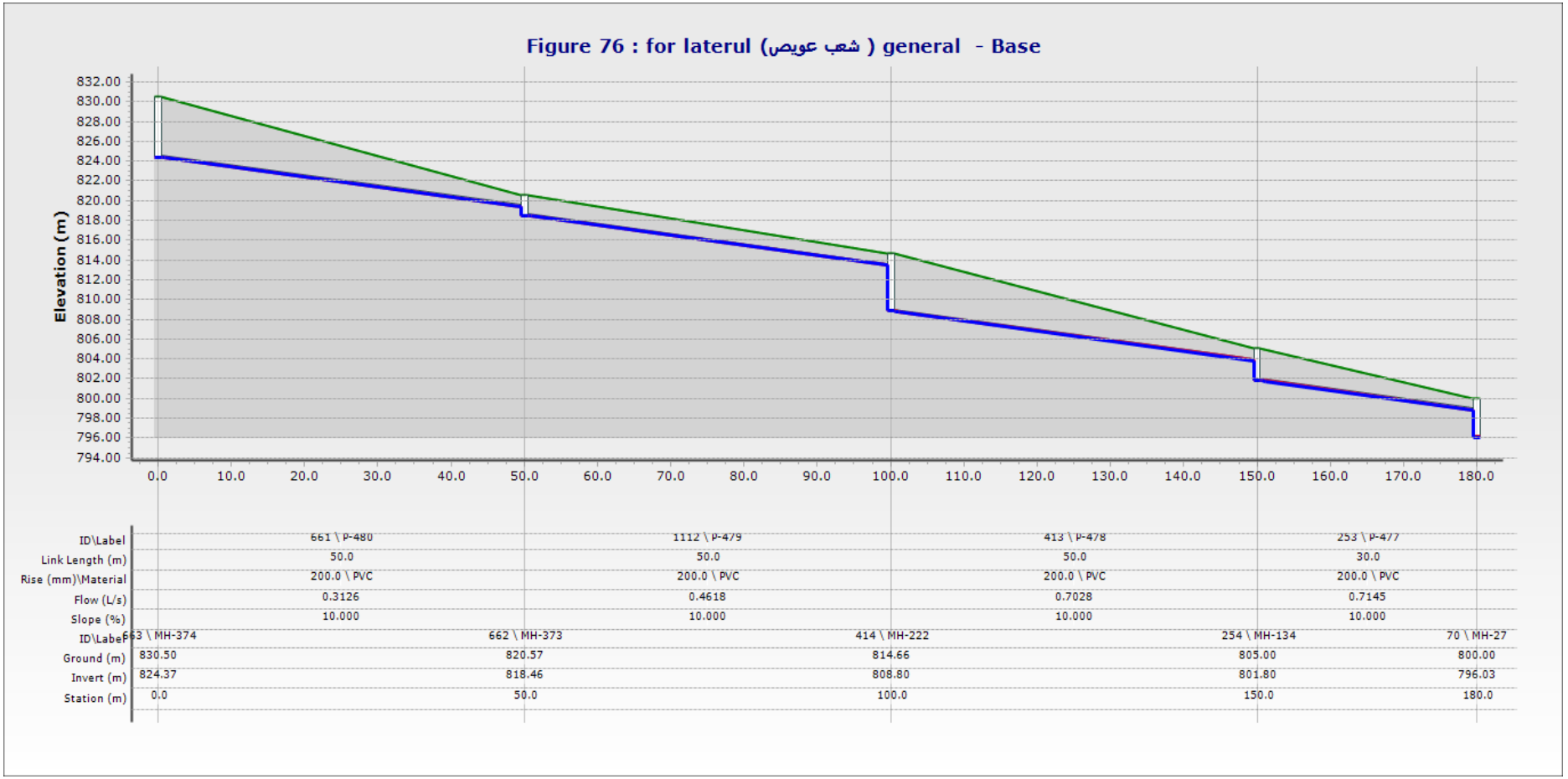
C.86 : Profile for Lateral (خربة البعارنه) general



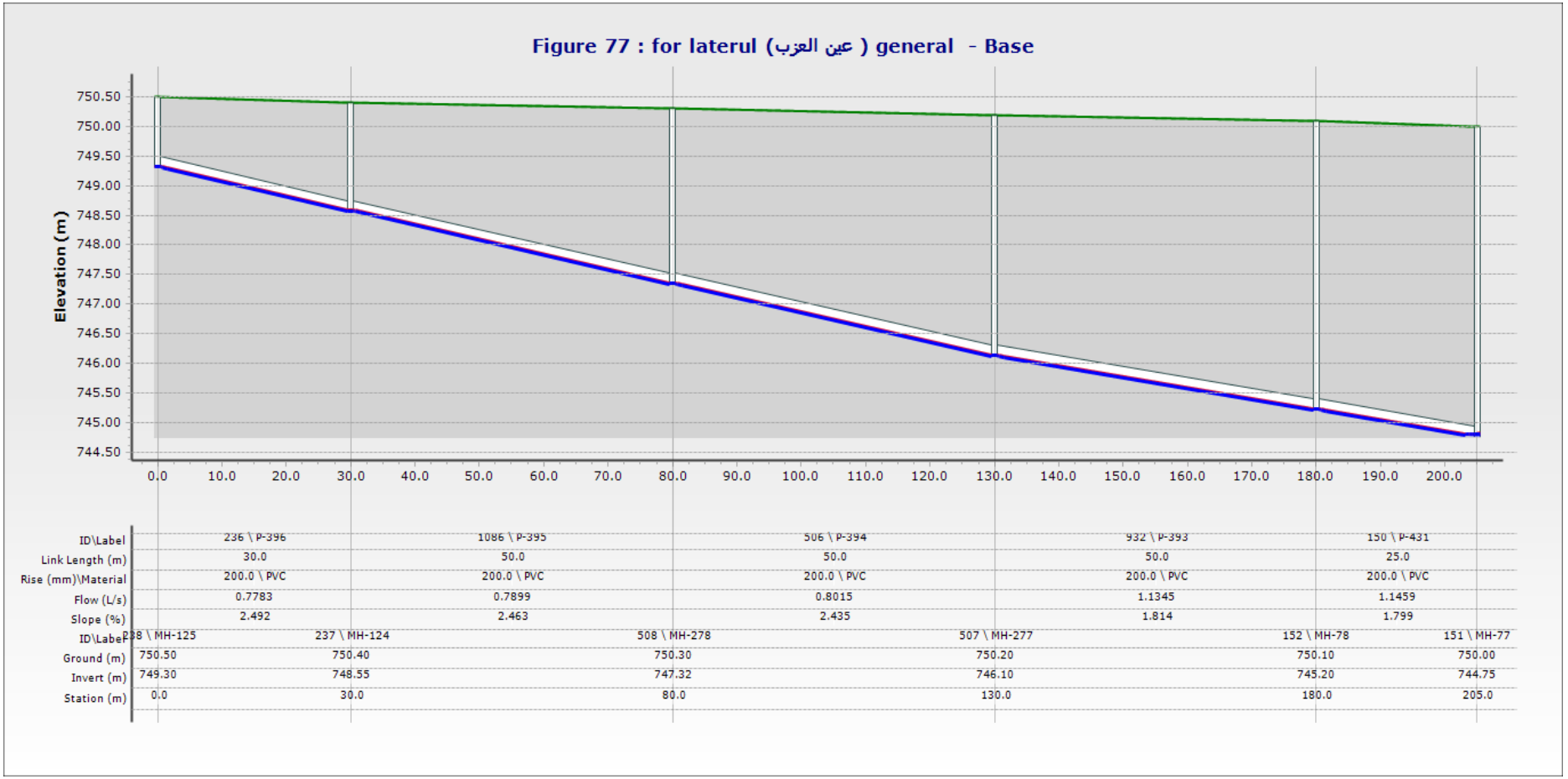
C.87 : Figure 74 : Profile for (1_ خربة البعارنه)



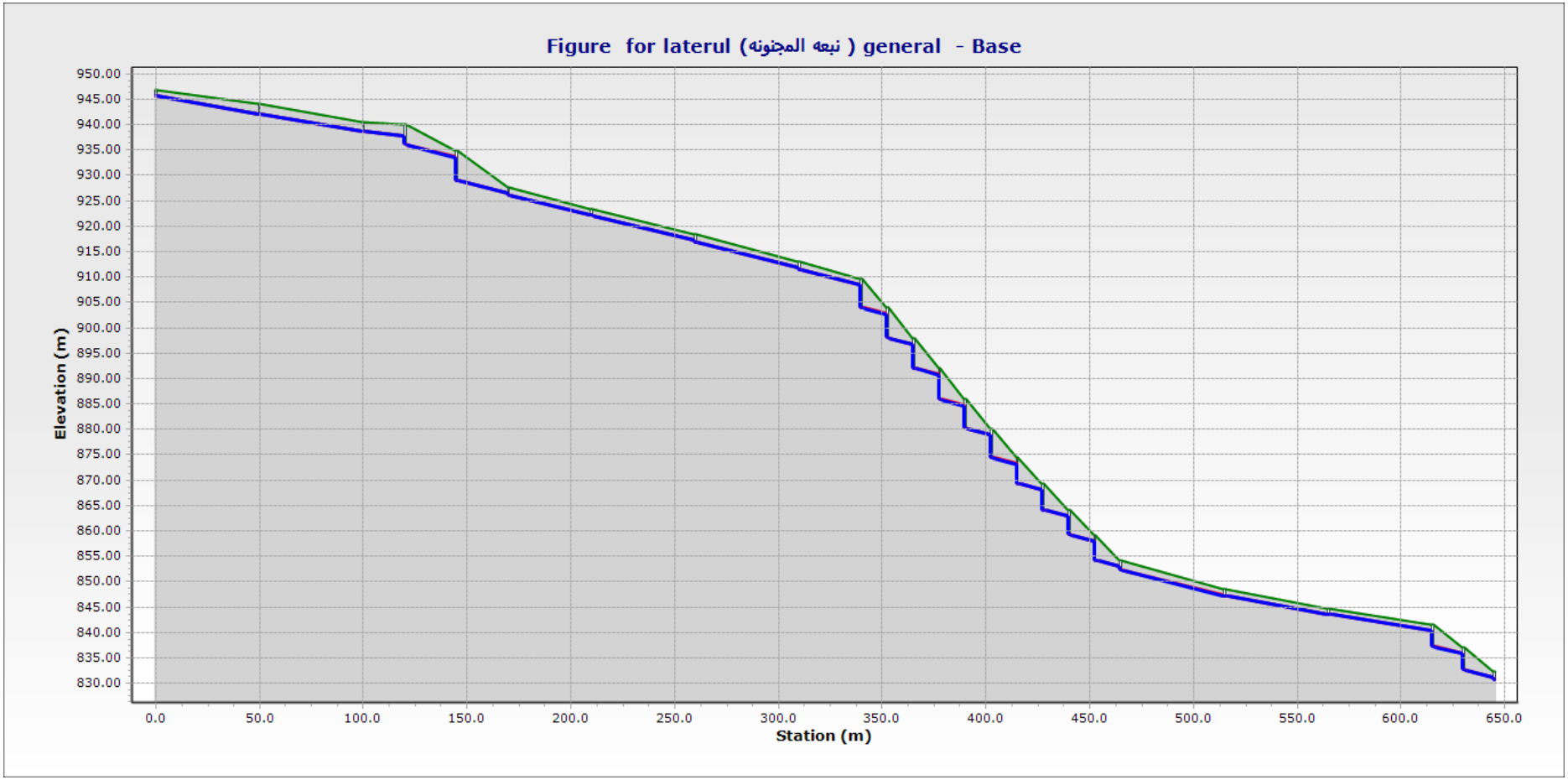
C.88 : Figure 75 : Profile for (2_ خربة البعارنه)



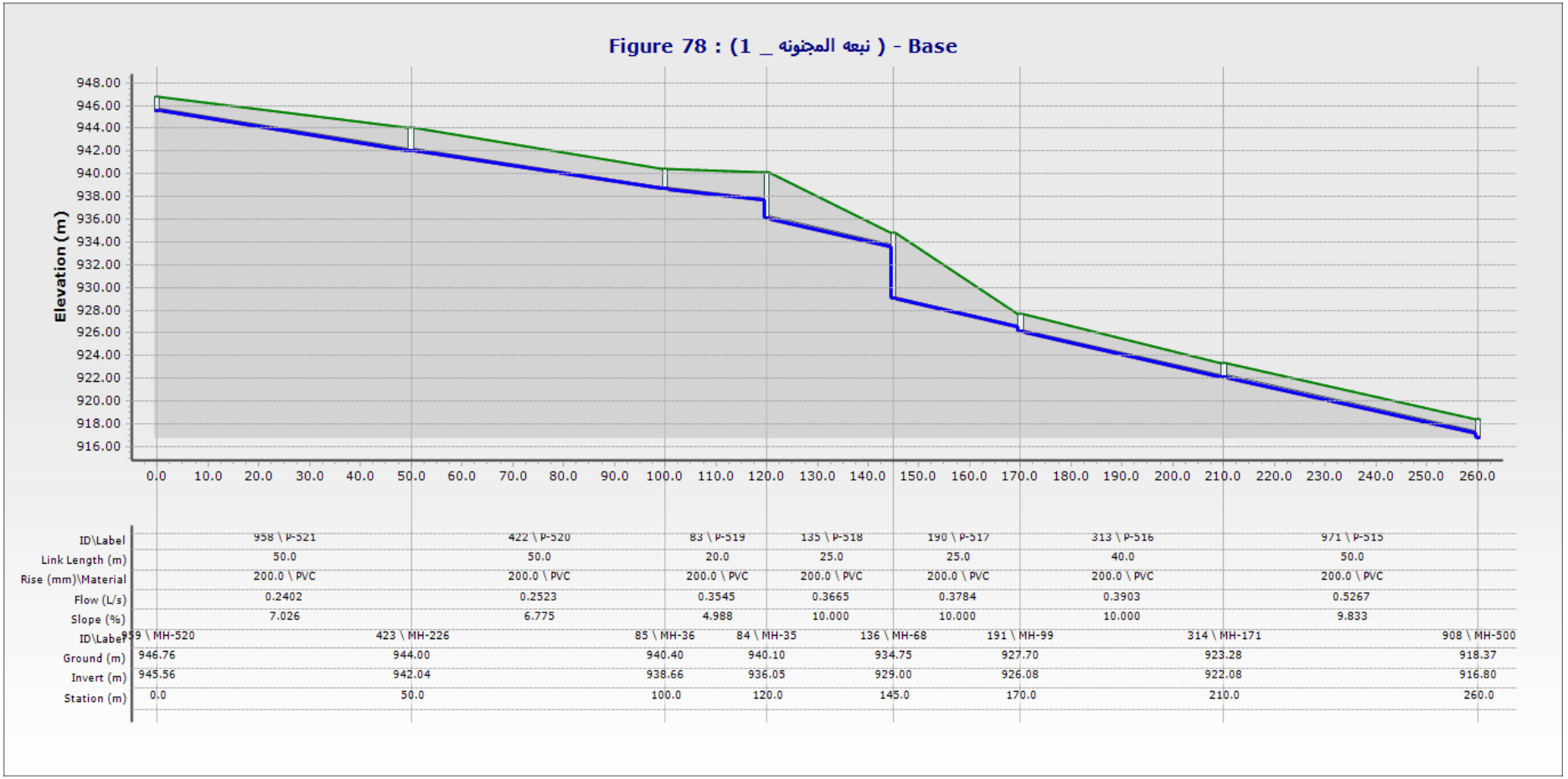
C.89 : Figure 76 : Profile for Lateral (شعب عويص) general



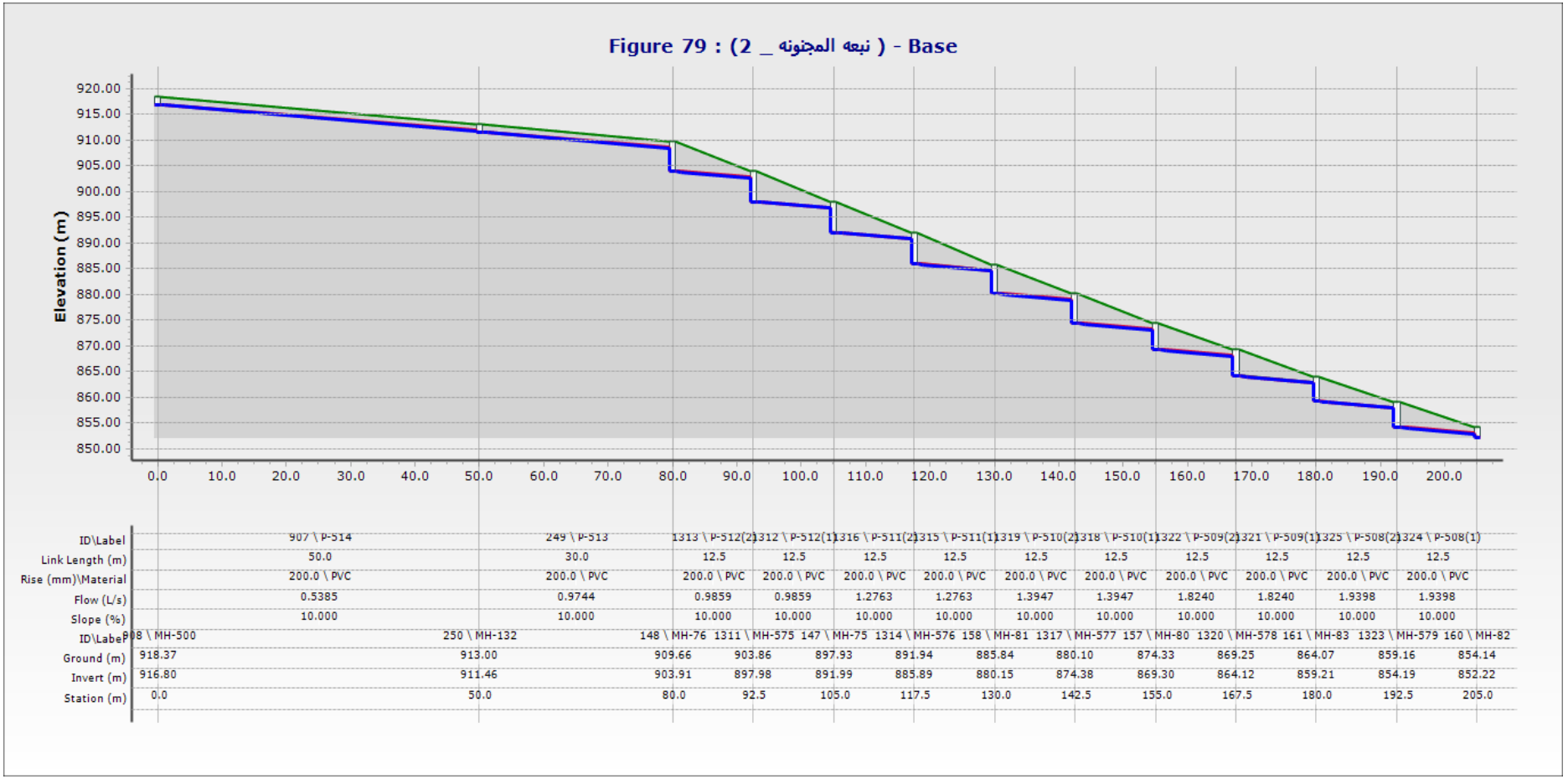
C.90 : Figure 77 : Profile for Lateral (عين العزب) general



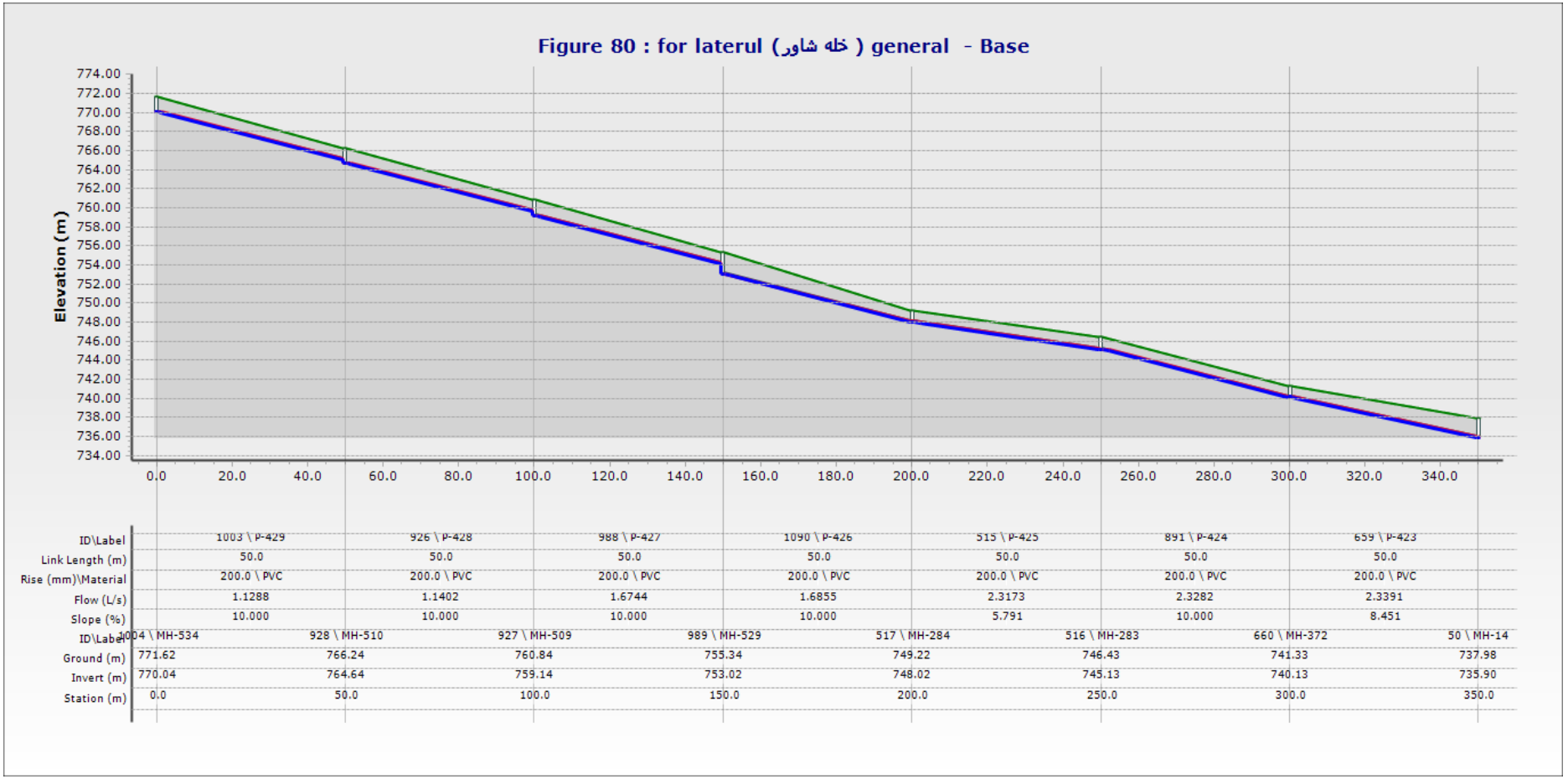
C.91 : Profile for Lateral (نبعه المجنونه) general



C.92 : Figure 78 : Profile for (1_ نبعه المجنونه)



C.93 : Figure 79 : Profile for (2_ نبعه المجنونه)



C.94 : Figure 80 : Profile for Lateral (خله شاور) general

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