HOME
CREATIONS & DEVELOPMENT

HOME | Creations & Development

HYDROLOGICAL STUDIES PROVIDER OF CHOICE

Risks & Threats

- Floods and deluges threaten urban expansion across the Kingdom
- Nearby mountains or deserts increase risks significantly

- Extreme water conditions cause damage and destruction of private property and public infrastructure.
- In large volumes, rushing water can reach high speeds putting inhabitants in danger.

Risks & Threats

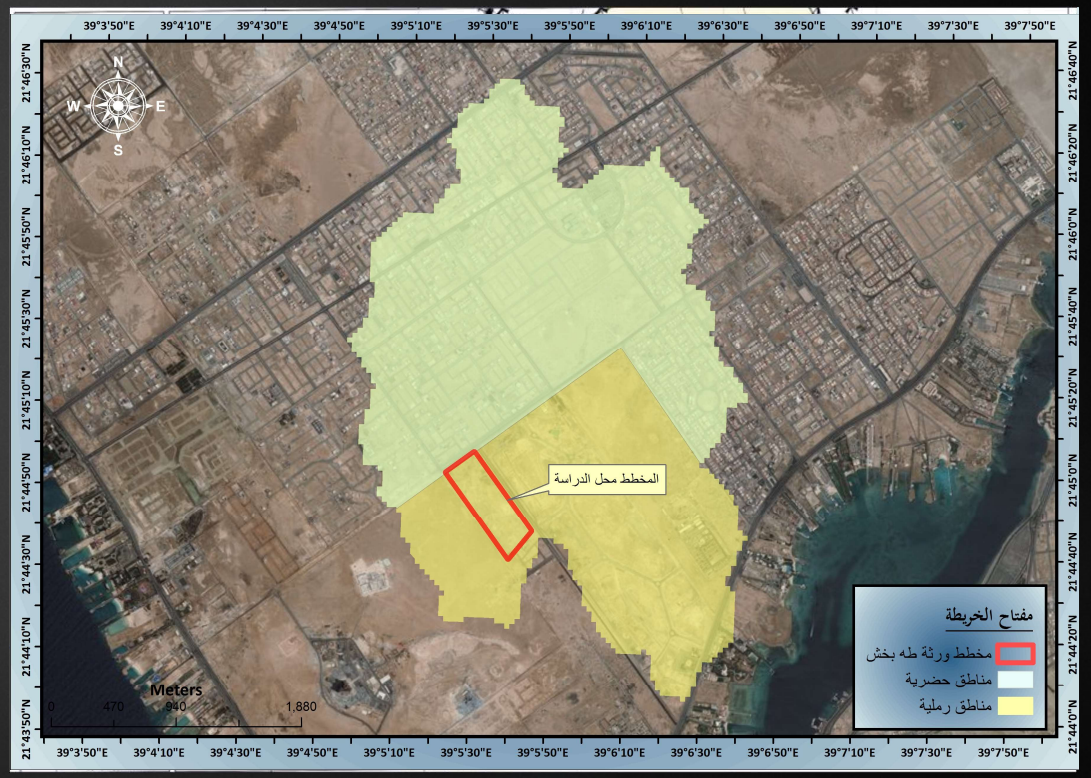
Regardless of whether the development is the continuation of a pre-existing network or the creation of new networks and roads,

risks, impact and protection must be carefully calculated before commencing urban planning or establishing any central or regional road networks.

Influencing Factors

Factors affecting floods & flood behavior:

- Area of drainage basin and its characteristics
- Land use within the drainage
- Types of vegetation arising from within the drainage basin



Reliable Solutions

- Designs & schemes produced from best-in-industry studies
- Full compliance with Ministry of Municipal & Rural Affairs standards & regulations
- 400+ approved studies issued throughout the Kingdom

وزارة الشؤون البلدية والقروية

Hydrologic Study Procedure

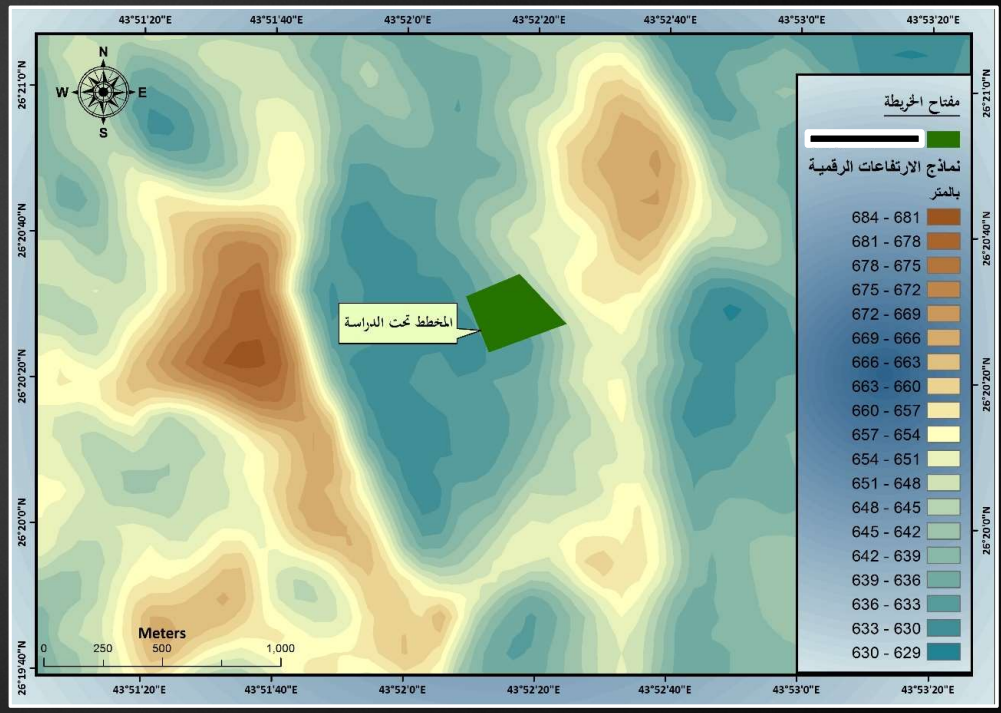
- Topographic Study & Survey Works
- Geological Study & Land Use Maps
- Metrological Study & Rainfall Data Analysis
- Morphological Study
- Hydrological Modeling
- Suggested Alternatives for Solutions

Topographic Study & Survey Works

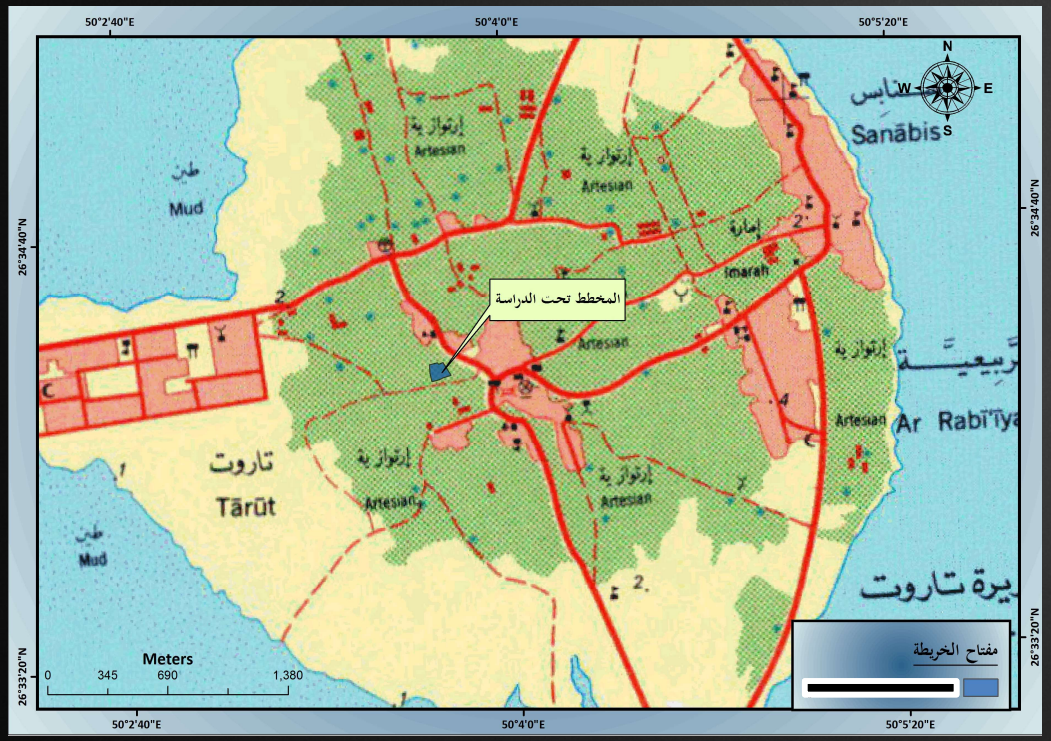
Methods: Topographic data and survey analysis.

Technology: A digital elevation model of the study area, with a precision of 10 meters (WGS84),

Determinations: Paths of wadis and streams, land surface gradients, slopes, boundaries and characteristics of drainage basins.



Topographic Study & Survey Works



With topographic maps produced by SGS, we identify principal land features that affect and threaten the study area.

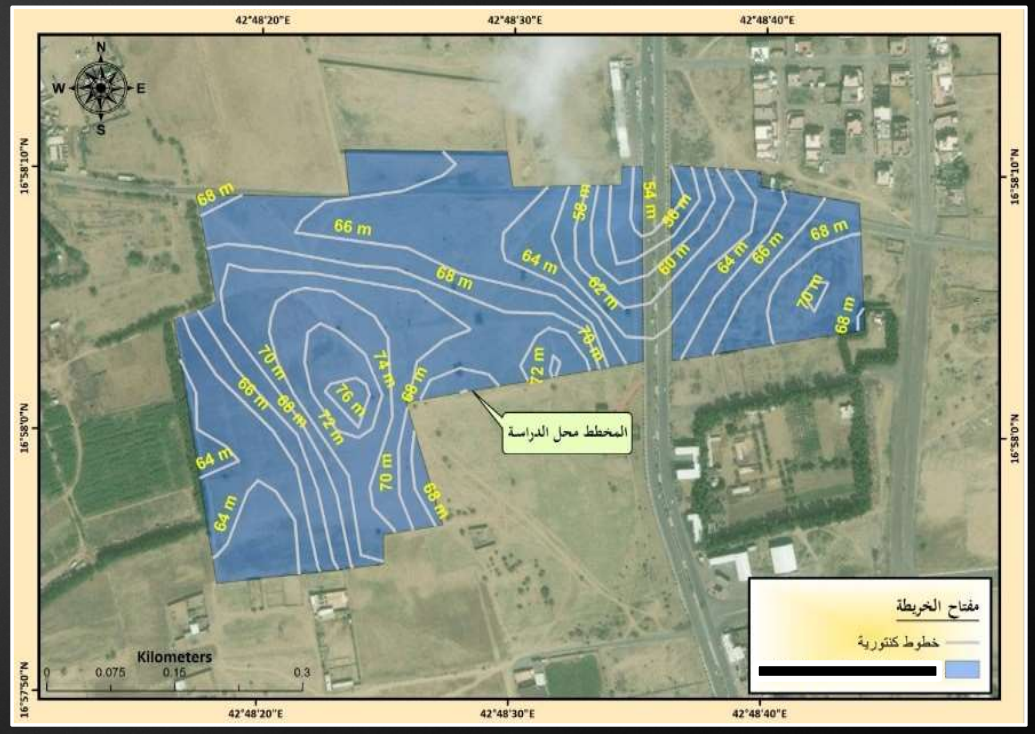
Topographic Study & Survey Works

A detailed topographic survey & resulting data are used to:

- design preemptive measures, and
- engineer alternatives for protection from flood hazards.

A detailed survey of streets is used for:

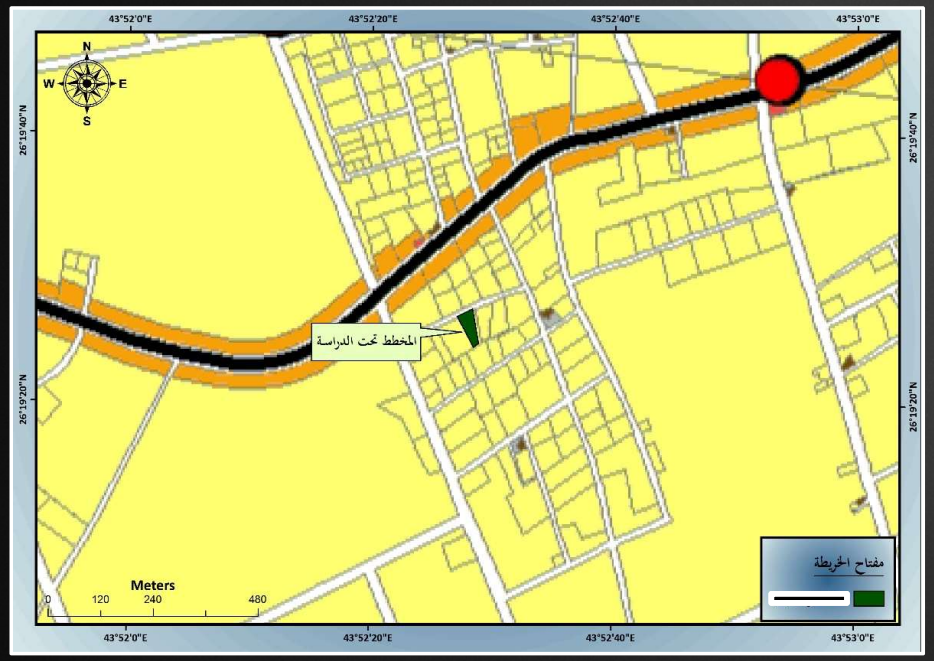
- design of storm drainage networks



Geological Study & Land Use Maps

The main objective of a geological and land use study is to calculate the Curve Number (CN) to estimate the values of the expected flood water flow, and to identify the current and potential land usage within the drainage basin that can affect the surface flow rates of flood water and rain.

Geological Study & Land Use Maps



To define the characteristics of the surface soil and land usage, we use:

- geological maps & satellite images (Google Earth)
- soil maps & land use maps produced by the Ministry of Agriculture.

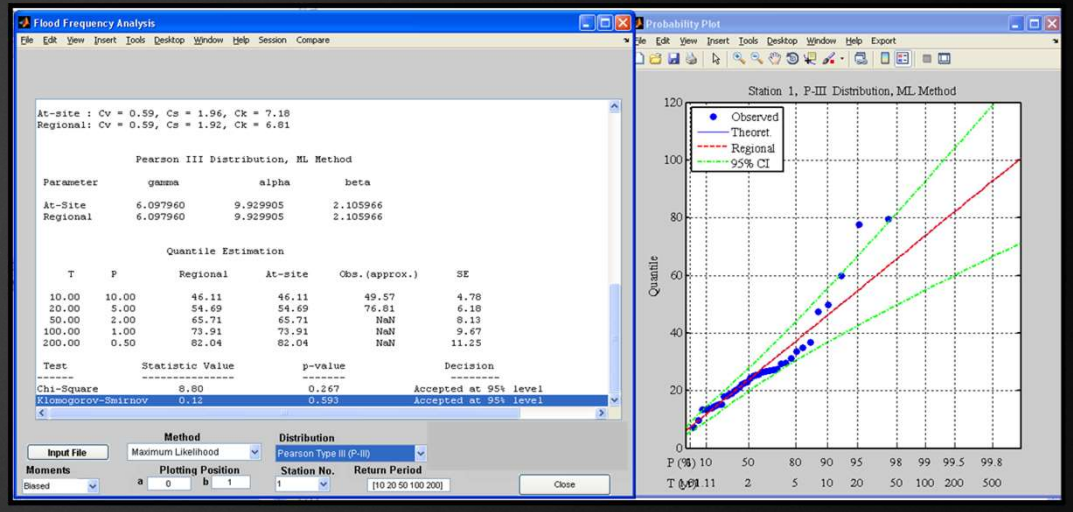
Metrological Study & Rainfall Data Analysis

- Hydrologic studies are based mainly on measurements of the amount of rainfall collecting in the drainage basin that affect the study area.
- The intensity and depth of rainfall falling on the drainage basin affecting the study area is one of the most important elements used to calculate the expected water flow.
- Rainfall data previously recorded at monitoring stations close to the drainage basin is used in preparation for flood drainage projects.

Metrological Study & Rainfall Data Analysis

Section Summary:

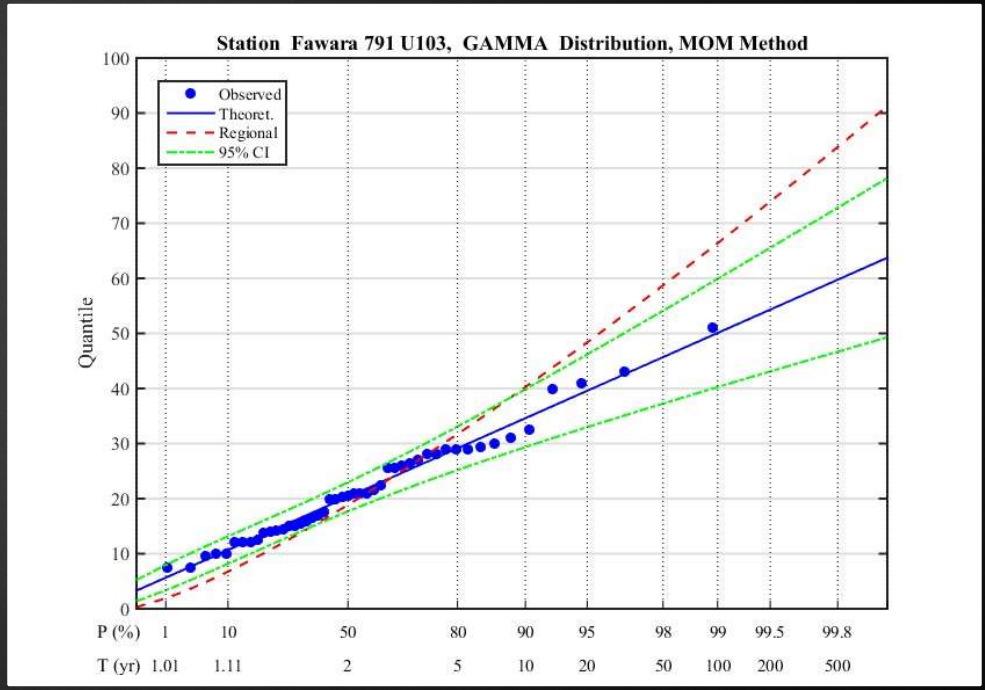
1. Analysis of the rainfall data for the stations close to the scheme under study & selecting the appropriate distribution that achieves the lowest standard error



Metrological Study & Rainfall Data Analysis

Section Summary:

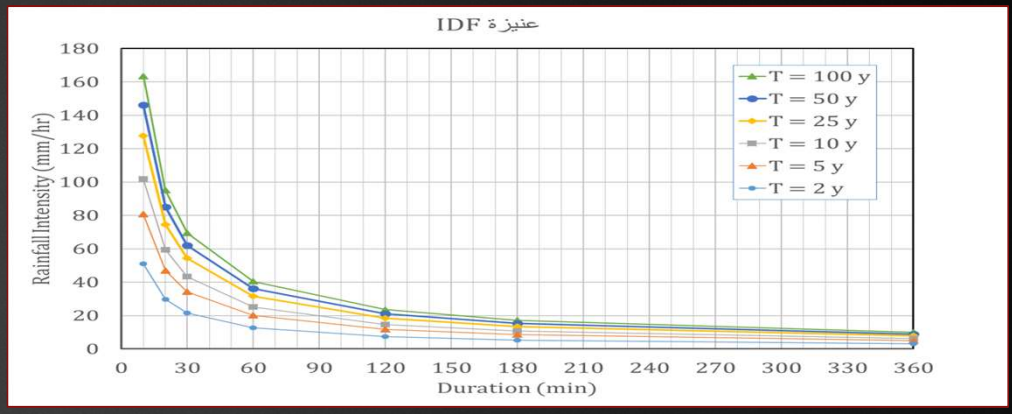
1. Analysis of the rainfall data for the stations close to the scheme under study and selecting the appropriate distribution that achieves the lowest standard error
2. Determination of the values of the design rain depth for the different return periods 2, 5, 10, 25, 50 & 100 years

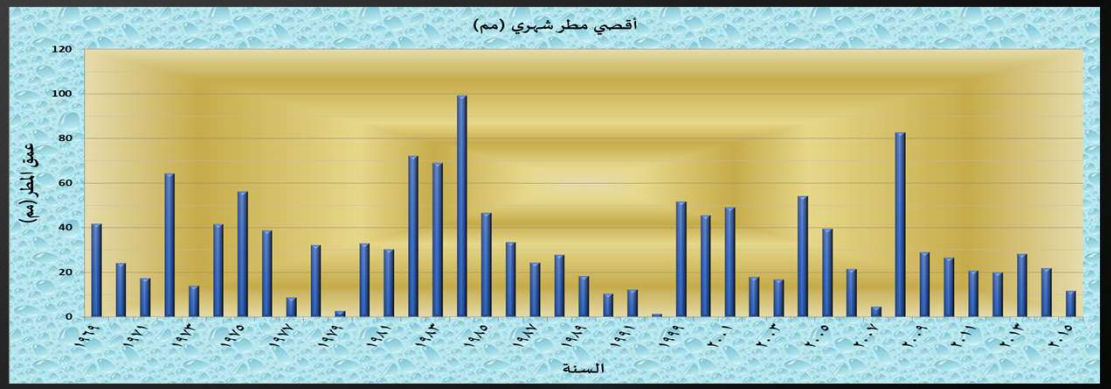


Metrological Study & Rainfall Data Analysis

Section Summary:

1. Analysis of the rainfall data for the stations close to the scheme under study and selecting the appropriate distribution that achieves the lowest standard error
2. Determination of the values of the design rain depth for the different return periods 2, 5, 10, 25, 50 and 100 years
3. Conclusion of the intensity, depths, frequency curve (IDF) used in the design of drainage networks proposed in the scheme under study.





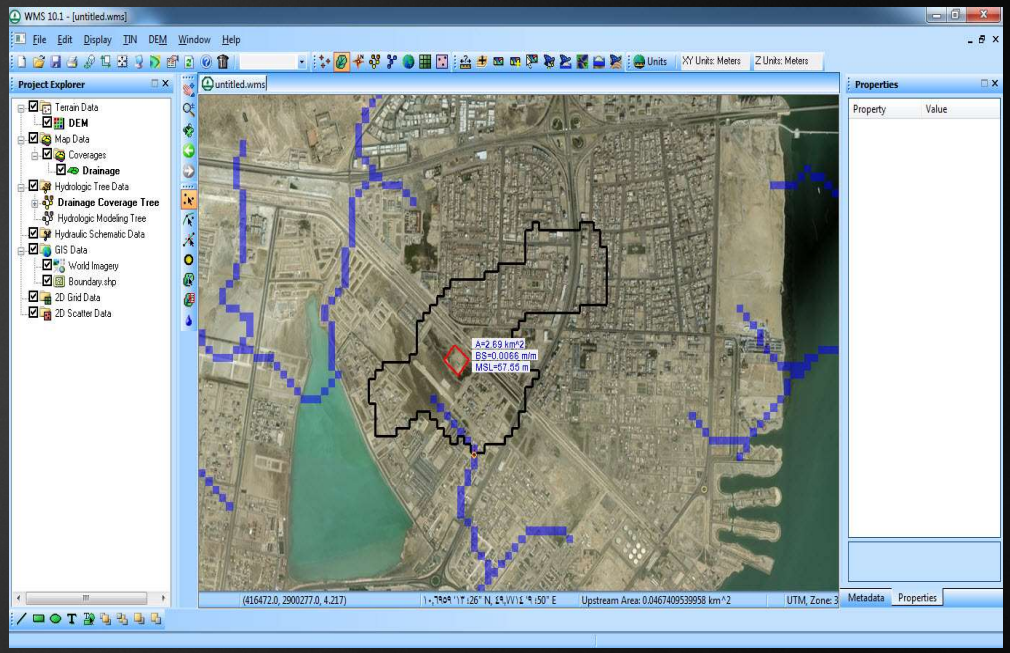
Morphological Study

Method: Collection & analysis of topographic, morphological maps & digital elevation models.

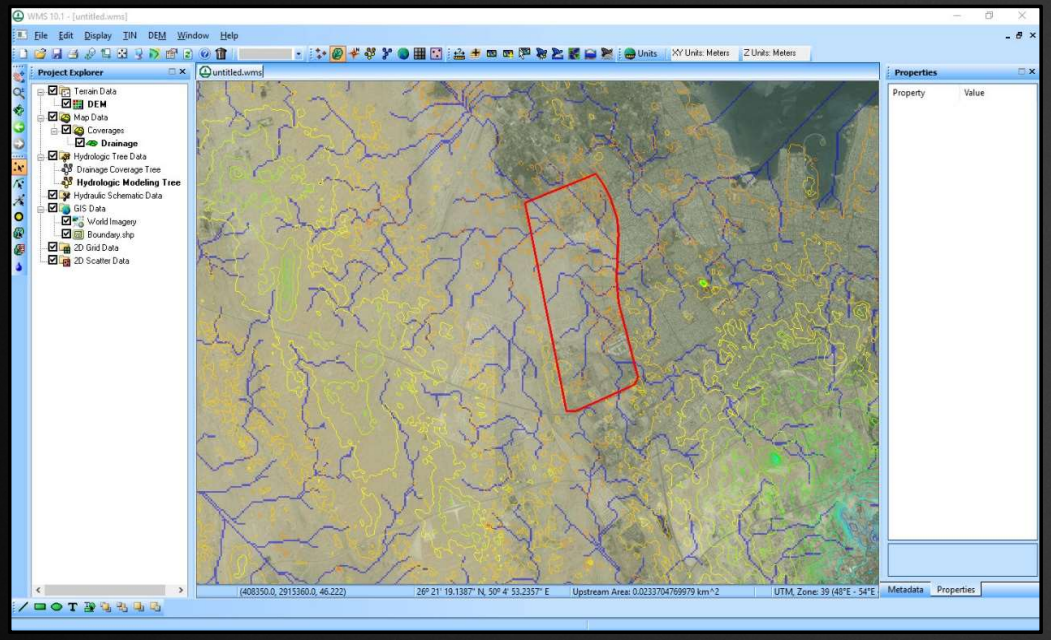
Technology: Geographic information systems (GIS) and satellite images.

Qualitative & Quantitative Analyses:

- Nature of the earth's surface, slopes & deviations
- Nature of Wadi drainage basin, topographic average slope, highest & lowest level, & longest path.



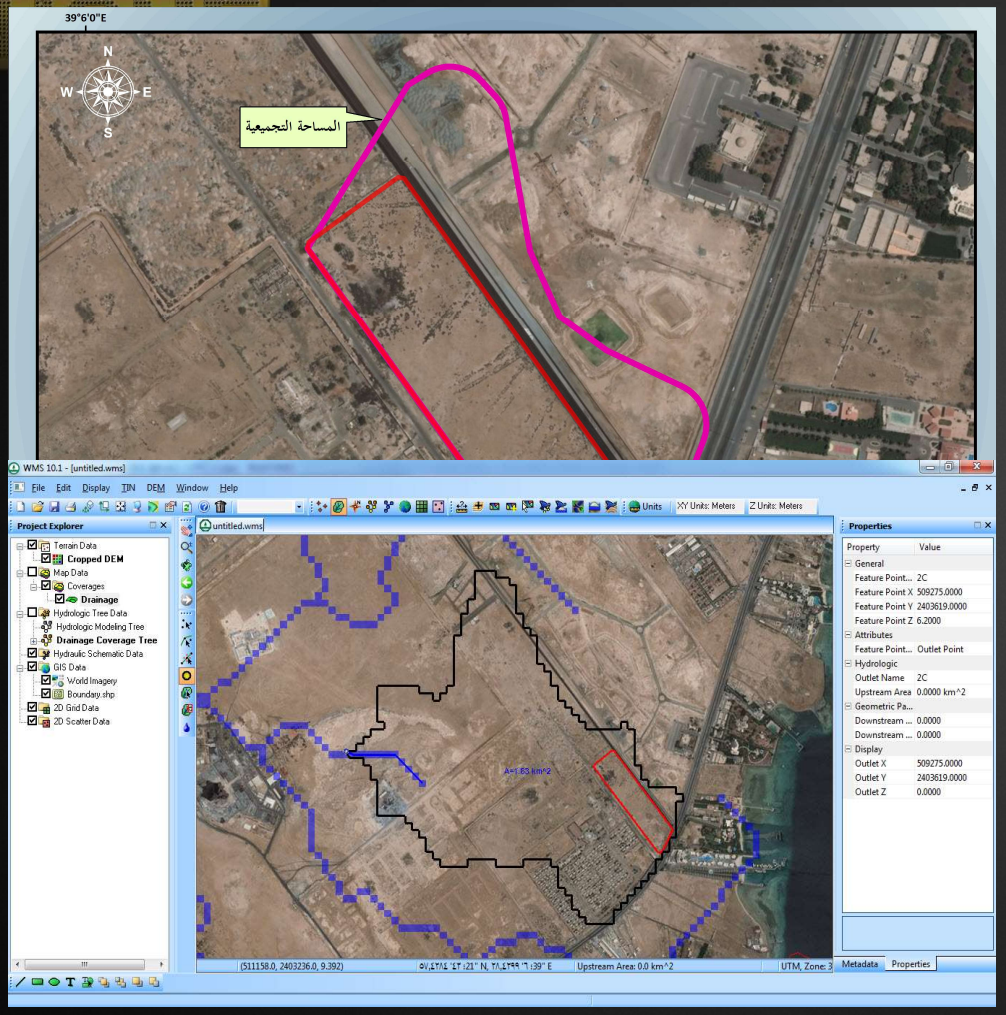
Morphological Study



Section Summary:

1. Drainage basins and waterways affecting the planned scheme derived from Watershed Modeling System (WMS) or its equivalent

Morphological Study



Section Summary:

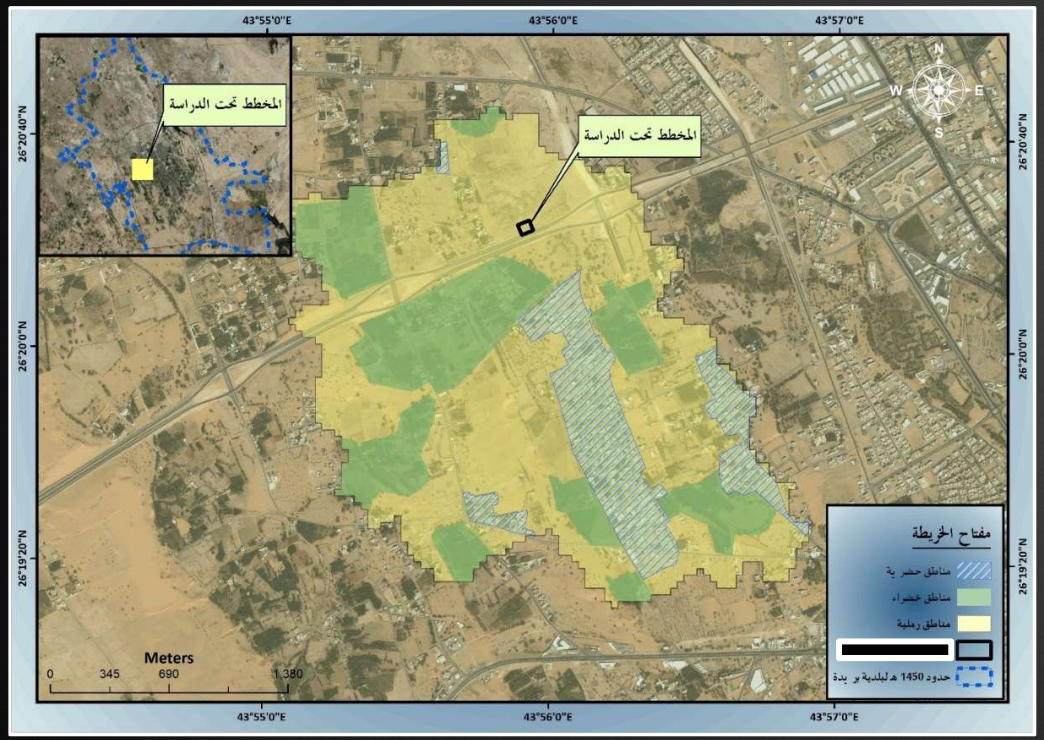
1. Drainage basins and waterways affecting the planned scheme derived from Watershed Modeling System (WMS) or its equivalent;
2. Manual verification of the results from the WMS of all drainage basins affecting the scheme.

Morphological Study

Section Summary:

1. Drainage basins and waterways affecting the planned scheme derived from Watershed Modeling System (WMS) or its equivalent;
2. Manual verification of the results from the WMS of all drainage basins affecting the scheme.
3. The conclusion of all morphological characteristics affecting the scheme under study area of the collection basin.

Morphological Study



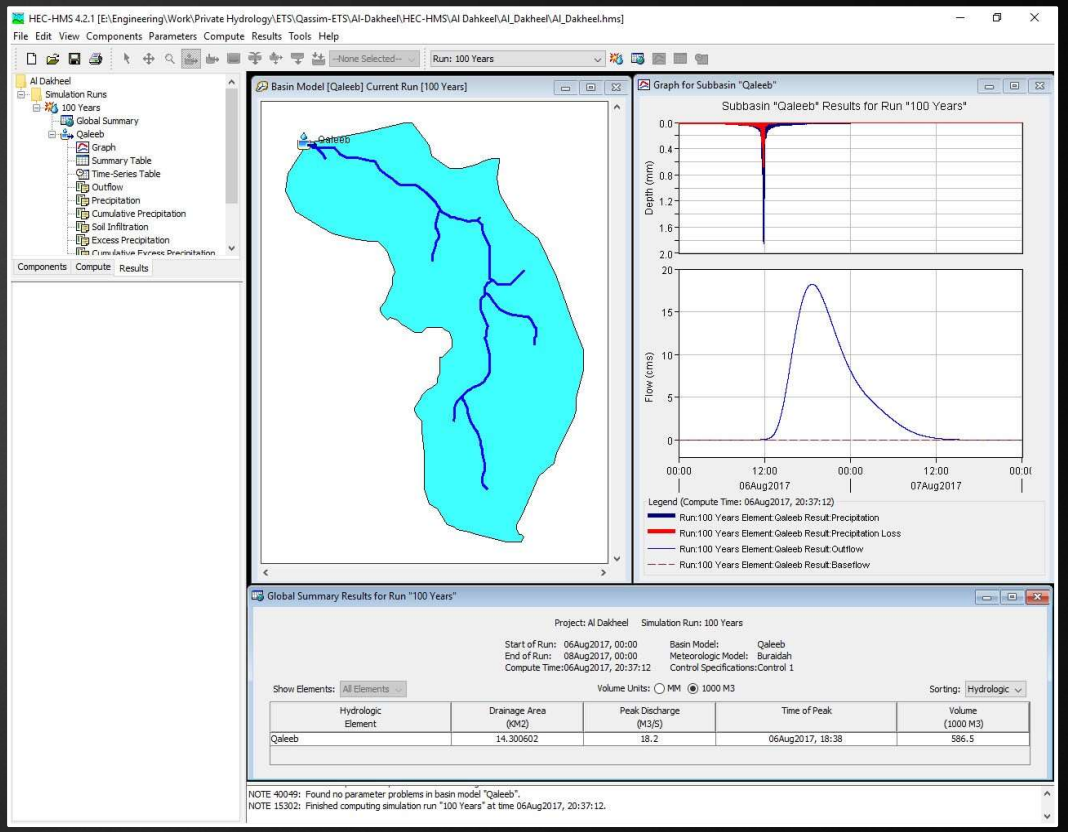
Section Summary:

1. Drainage basins and waterways affecting the planned scheme derived from Watershed Modeling System (WMS) or its equivalent;
2. Manual verification of the results from the WMS of all drainage basins affecting the scheme.
3. The conclusion of all morphological characteristics affecting the scheme under study area of the collection basin,
4. Determine the CN of all drainage basins by using the soil type and the land uses of the area

Hydrological Modeling

Section Summary:

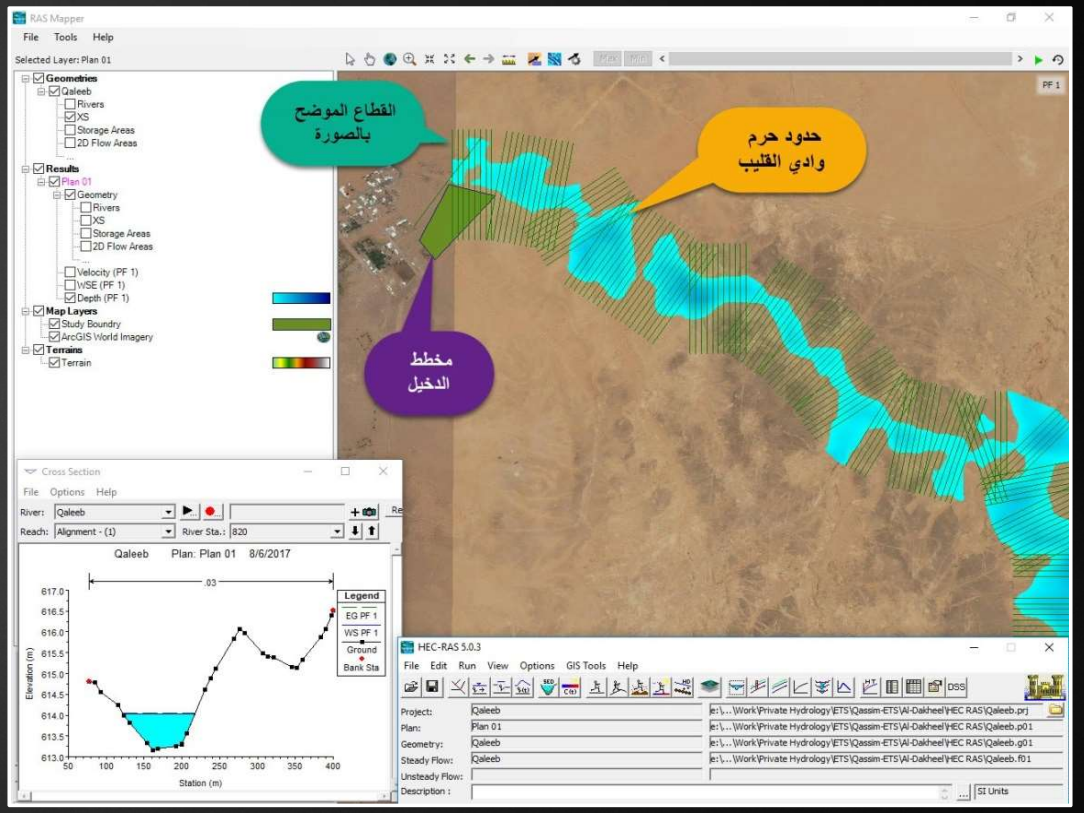
1. The area of each drainage basin is used to find out the appropriate method of calculating the expected flow rate, either using SCS or the Rational Method.
2. Maximum quantities of disposal from drainage basins for different return periods using the HEC-HMS software;



Hydrological Modeling

Section Summary:

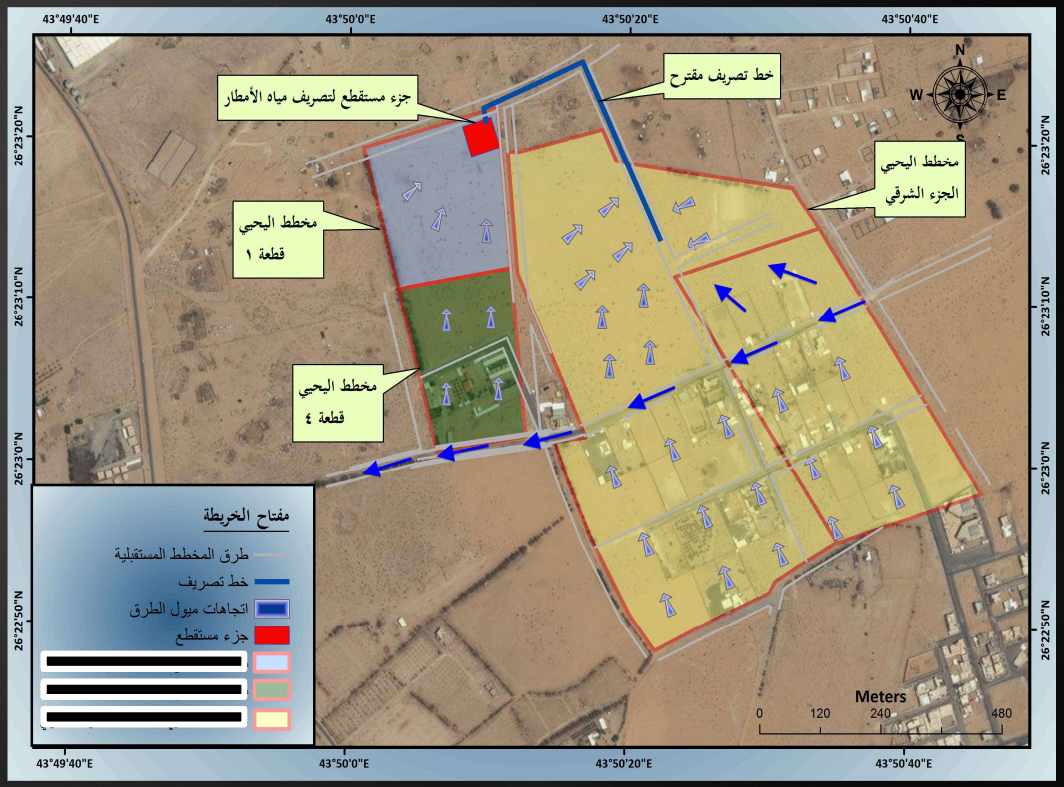
1. The area of each drainage basin is used to find out the appropriate method of calculating the expected flow rate, either using SCS or the Rational Method .
2. Maximum quantities of disposal from drainage basins for different return periods using the HEC-HMS software;
3. Identification of the floodplain affecting the scheme studied through the HEC-RAS software.



Alternative Solutions

Section Summary:

1. Recommendations for alternatives to the proposed solutions to protect the desired scheme from flood hazards and rainwater drainage;

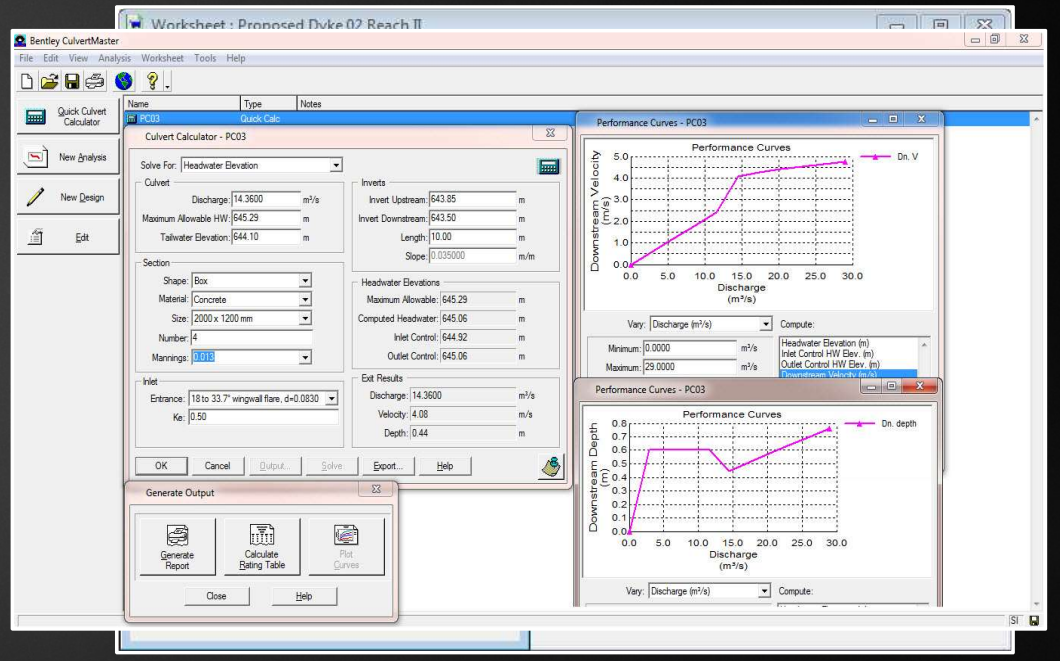


Alternative Solutions

Section Summary:

1. Recommendations for alternatives to the proposed solutions to protect the desired scheme from flood hazards and rainwater drainage;

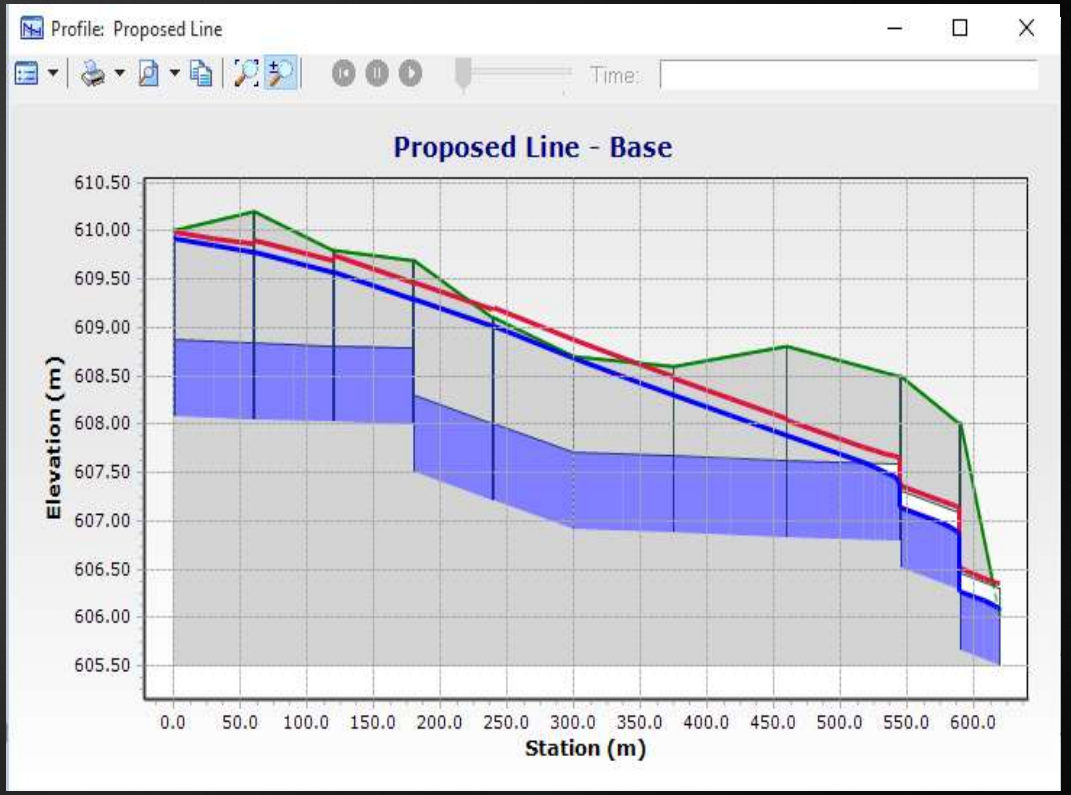
2. Production of hydraulic models of the proposed solutions, using FlowMaster and Culvert Master Software;



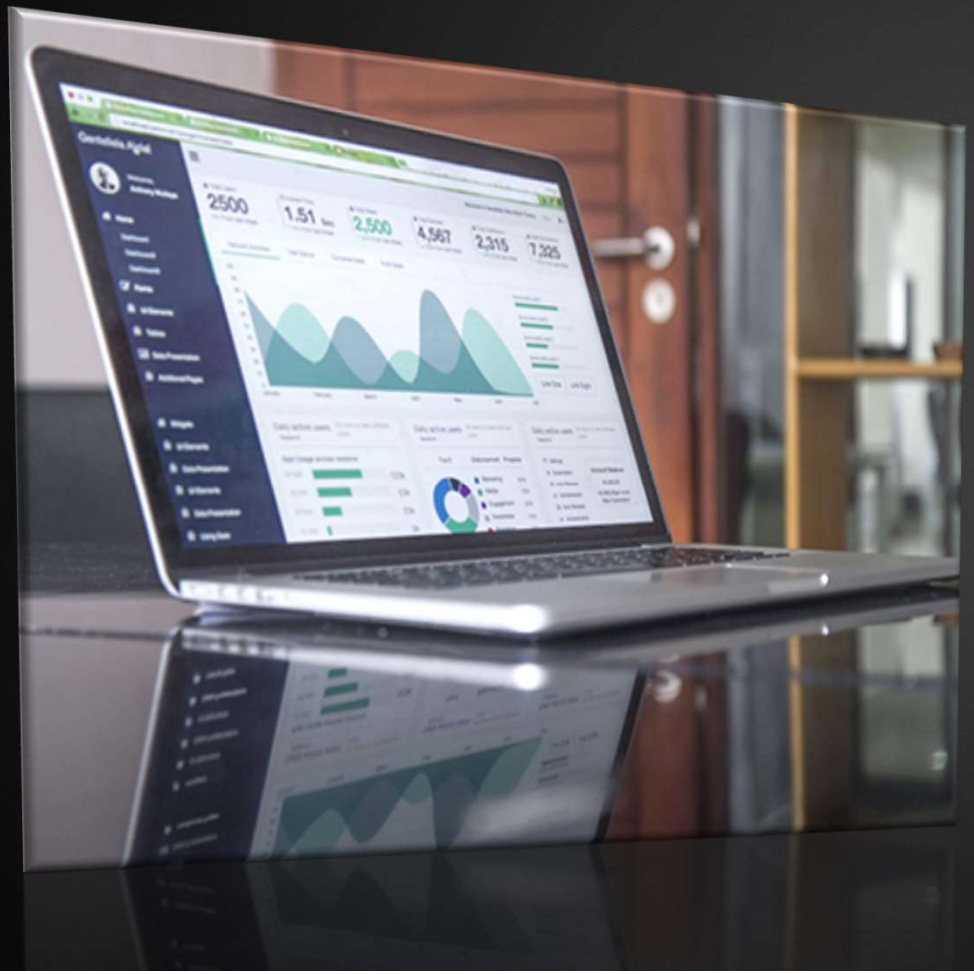
Alternative Solutions

Section Summary:

1. Recommendations for alternatives to the proposed solutions to protect the desired scheme from flood hazards and rainwater drainage;
2. Production of hydraulic models of the proposed solutions, using FlowMaster and Culvert Master Software;
3. Production of hydraulic modeling of the proposed storm drainage network designed using CivilStorm software;



TIME IS MONEY $$$



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