



# Assignment

## Geotech and Foundation Engineering

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Section: “A”

Semester: 6<sup>th</sup>

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DEPARTMENT OF CIVIL ENGINEERING

## **Introduction:**

This report is about dualization of old Bannu Road which is approx 80 km.

Start point is Tehsil Domel dist. Bannu and End point is Krappa dist. Karak.

Client of this project is NHA (National Highways Authority) and construction contract is awarded to FWO (Frontier Works Organization). Road is distributed in 2 section i.e: pakage 1 & pakage 2.

The first package of the project, Domail-Khurram portion is 40 km long, the lowest evaluated bidder, at the bid price of Rs7.132 billions.

The second package Khurram to krappa (40 km) of the project awarded to the same lowest bidder at the bid price of Rs5.927 billion with the same completion period but so far over 12 per cent physical progress has been achieve.





## **Objectives:**

In this project it is intended to take a live project and carry out necessary soil investigation in order to arrive at soil profile, different layer of road, bearing Capacity and settlement analysis for the proposed project.

## **Site Investigation:**

Site investigations are generally done to obtain the information that is useful for one or more of the following purposes

- To determine the bearing capacity of the soil.
- To estimate the probable maximum and differential settlements
- To establish the ground water level and to determine the properties of water.

## **Lab Investigation:**

Following tests are conducted to investigate the soil properties.

- 1) Determination of Specific Gravity.**
- 2) Determination of Plasticity Index.**
  - a) Liquid Limit.
  - b) Plastic Limit.
- 3) Determination of Shrinkage Limit.**
- 4) Determination of free swell index.**
- 5) Determination of Grain size distribution.**
- 6) Dry sieve analysis for coarse fraction.**
- 7) Hydrometer analysis for fine fraction.**
- 8) Combined gradation of soil sample.**
- 9) Unconsolidated undrained Triaxial Shear test.**
- 10) Consolidation.**
- 11) Swelling pressure.**
- 12) In-Situ Density and In-Situ moisture content.**

Soil samples were collected to determine the Index properties and Engineering properties. The Index properties and Engineering properties determine for Identification and Classification properties. By using these properties we determined Safe Bearing Capacity based on shear failure criteria and Final Settlements.

Final settlement should be with in permissible limits.

## **Conclusion:**

The properties of soil listed below.

<b>S.NO</b>	<b>SOIL PROPERTY</b>	<b>VALUE</b>
1	Specific Gravity	<b>2.432</b>
2	Gravel % ( 4.75 mm - 80 mm )	<b>10.07%</b>
3	Sand % (0.075 mm - 4.75 mm )	<b>62.3%</b>
4	Silt % ( 0.002mm - 0.075mm )	<b>12.09%</b>
5	Clay % < 0.002 mm	<b>15.54%</b>
6	Liquid limit	<b>115%</b>
7	Plastic limit	<b>32.84%</b>
8	Shrinkage limit	<b>44.275%</b>
9	Plasticity Index	<b>82.16%</b>
10	IS - Classification	<b>SC</b>
11	Free swell index	<b>543.34%</b>
12	Total settlement	<b>177.91 mm</b>



# QUIZ

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## **ADONIS:**

ADONIS is Free Finite Element Software for Geo-Engineers. The goal of the ADONIS development is to improve the modeling and computational simulation in geotechnical engineering. ADONIS is an easy-to-use yet powerful geotechnical-engineering tool .

## **AllPile:**

AllPile is a Windows-based analysis program that handles virtually all types of piles, including steel pipes, H-piles, pre-cast concrete piles, auger-cast piles, drilled shafts, timber piles, jetted piles, tapered piles, piers with bell, micropiles (minipiles),

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## **Alp:**

The easy way to analyse soil structure interaction of a laterally-loaded pile When it comes to laterally-loaded pile design software, Alp makes things simple. This laterally loaded pile analysis software models soil shear failure and non-linear.

## **ALP99 :**

Axially loaded pile: Elastic pile supported by elasto-plastic springs.

*Filed under: Geotechnical Design Software - Deep Foundation*

## **AMRETAIN:**

AMRetain is a software for checking single or double retaining walls made of ArcelorMittal, sheet piles. It has been developed by Terrasol for ArcelorMittal, and is based on the commercial software K-Rea (also developed by Terrasol).

## **RockPlane:**

RockPlane is a software tool for the evaluation of localized instability rocky elements affected by seismic movements and/or by presence of water pressures within intersurface fractures. The software provides slide and overturning risk safety factors.

## **GEO STUDIO:**

The GeoStudio suite includes eight products which can be used for analysing slope stability, ground water seepage, stress deformations and various other geotechnical problems

## **PLAXIS:**

It is used for 2-Dimensional and 3-Dimensional geotechnical analysis of deformation and stability of soil structures, as well as groundwater and heat flow, in geo-engineering applications such as excavation, foundations, embankments and tunnels.

## **FLAC3D:**

It is used in advanced geotechnical analysis of soil, rock, and structural support in three dimensions. *FLAC3D* is used in analysis, testing, and design by geotechnical, civil, and mining engineers.