CHAPTER 1

INTRODUCTION

1.1 Background

Quality of soil-subgrade determines the pavement performance. A stable soil-subgrade and properly draining pavement helped to produce a long-lasting pavement. Subgrade soil provides support to the remainder of the pavement system. The quality of the subgrade would be greatly influence the pavement design and the service life of the pavement. The failures of pavement, in form of heave, depression, cracking and unevenness are caused by the seasonal moisture variation in the subgrade soil. To overcome this problem, the soil properties need to be improved.

Soil improvement is interpreted as a technique to improve the engineering properties of soil by cooperating certain materials with some desired properties which does not consist of or contain least in the soil to evolve the parameters such as shear strength, hydraulic conductivity, compressibility and density. Clay is one of the most important minerals used by the manufacturing industry and the environment. The term "clay" is applied to a material having a particle size of less than 2 micrometers (25,400 micrometers
= 1 inch) and the family of minerals having the same chemical composition and crystal structure of the usual features (Velde, 1995). Thus, clays may be composed of mixtures of finer grained clay minerals and clay-sized crystals of other minerals such as quartz, carbonate, and metal oxides. Clays and clay minerals are found mainly on or near the surface of the Earth. Houses, offices, schools, and factories built on soils containing swelling clays may be subject to structural damage caused by seasonal swelling of the clay portion of the soil. Thus, these types of soil need treatment to improve its properties.

There are many alternative ways to treat this type of soil (clay). Crushed glass and plastic is one of material that can be used to treat this soil. Glass is a hard material normally fragile and transparent common in our daily life. It is composed mainly of sand and an alkali. Once it is broken it is regarded as useless and so discarded constituting a nuisance in the community. This broken/crushed glass fragments that cannot be reused by bottle manufactures is what is referred to as glass cullet. The material is typically collection schemes and from premises handling large quantities of containers or other products. The physical properties of the glass are that they exhibit high permeability, high crushing resistance, and small strain stiffness. These properties of glass make it suitable to be treated with weak soil at Kg Tg Medang, Pekan, Pahang and as such could improve its geotechnical properties which will enhance its usage in geotechnical engineering works for construction of roads, buildings, embankments etc.

1.2 Problem Statement
Geotechnical is one of important term, especially when associated with natural disasters. Malaysia recently surprised by some natural disaster involving geotechnical problems. First, the catastrophic collapse of Block 1 of the Highland Tower Condominium in Hulu Klang, Selangor in December 1993. This disaster not only destroys things, but dozens of lives were lost. Second, slope failure at Mahameru Highway near National Forestry Department. Incident on May 8, 2013 has caused traffic congestion but no lives were lost. Finally, the incident that occurred on December 6, 2008 has shocked the world because it involves the loss of property, approximately 20 houses were destroyed and the number of victims is very high. Most of the disasters that have been mentioned above happen due to down poured for a few hours that causing the changes of soil strength.

Weak soil is not suitable for development, this is because, this type of soil give trouble to the developer as well as take a huge risk for structural failure of the building that will be built later. Among its effects is the deposition of soil that led to the structural failure of the building, such as cracks and so on. Therefore, the use of crushed glass and plastic as raw nurses are encouraged. Furthermore, these materials are easy to find because it is a waste product. This method is also capable of reducing solid waste that cannot be eliminated, especially plastic.

Solid waste can be defined as the useless and unwanted products in the solid state derived from the activities of and discarded by society. Solid waste is one of the three major environmental problems in Malaysia. It plays a significant role in the ability of Nature to sustain life within its capacity. As of the year of 2008, 23,000 tonnes of waste is produced each day in Malaysia, with less than 5% of the waste is being recycled. Currently, over 23,000 tonnes of waste is produced each day in Malaysia. However, this amount is expected to rise to 30,000 tonnes by the year 2020. The amount of waste generated