Qatar produces more than 2.5 million tons of municipal waste per year with an average waste generation rate of 1.8 kg/day/capita which is one of the highest rates in the world. The rapid growth of municipal solid waste has become one of the serious environmental problem that Qatar is facing with. Qatar’s municipal waste is composed of organic and recyclables materials. Municipal solid waste incineration has been performed in Qatar since 2011. Approximately 60 tonnes of fly ash is generated daily from municipal waste incineration in Qatar. This fly ash is stabilised with cement and then disposed into special landfill. Forty percent of municipal waste of Qatar is composed of recyclables of which 14% is plastic. The major portion of plastic wastes, about 90% of total, are composed of light density polyethylene (LDPE) and high density polyethylene (HDPE) wastes. Therefore, there is a huge potential for recycling of PE wastes in Qatar considering the shortage of raw materials i.e. natural aggregate for construction industry. The scarcity of available land for disposal of municipal wastes and limited natural resources of raw materials for construction industry has opened new research areas for proper disposal and recycling of municipal wastes. Therefore, in this research work, municipal solid waste incineration (MSWI) fly ash and municipal polymeric wastes were used as secondary raw materials for the preparation of cement based composites. The influence of these secondary raw materials on the fabricated composite concretes were examined in terms of workability, strength and durability.