**Triple Soil Mix (CSM)**

The TSM (Triple Soil Mix) wall is an innovative technology/process which mixes the in-situ soils with grout slurry (generally cement) to provide a retaining wall and/or an environmental barrier. Generally used in loose soils with shallow depth in comparison to CSM walls.

Triple rotating augers are driven into the ground in the presence of cementitious/bentonite slurry to form a mixture that will harden to a min. 15MPa and provide a durable and stable wall. By loosening, conveying and mixing of the soil, minimum friction between rods and mixed soil is ensured. Therefore, it is possible to construct walls effectively with rigs of medium power.

The TSM wall can range between 370-550mm depending on the rig attachment. The wall is generally reinforced with universal beams or columns to carry building loads and cater for the bending and shear forces within the wall. Each panel is 1.4m and is formed in a series of overlapping primary and secondary panels. Overcutting into fresh adjacent panels is called “fresh-in-fresh method”. The overcut is a watertight joint. The permeability of the wall is almost the same as a concrete wall and can be both anchored or strutted for temporary excavation support.

### Sequence of wall construction

![Diagram showing the sequence of wall construction](image)
Advantages:
- Cost Effective
- High Productivity
- In-situ Soils used as Construction Material
- Very Little generation of Spoil (important in contaminated soils)
- No Vibrations during Construction
- Close to Wall Drilling (Only 100mm from an adjacent structure/wall)
Projects:

89-90 North Steyne, Manly

**Scope:** Design & Installation of 80No. TSM Panels up to 12-14m into very dense sands (pre-drilling with open auger was required). Temporarily supported by struts.

Waterloo Ferrari Maserati Showroom

**Scope:** Design & Installation of TSM Panels up to 12m panels for a 2 level basement excavation. Temporarily supported by ground anchors.