

## SECTION 200

### CONTROLLED LOW STRENGTH MATERIAL

#### 200.1 DESCRIPTION

A. General:

This work shall consist of furnishing and placing a flowable mortar fill material at the locations shown on the drawings or as directed by the Engineer.

B. Related Work:

Section 8	Water Mains
Section 9	Sewer Mains
Section 11	Utility Excavation and Backfill
Section 55	Concrete Masonry
Section 100	Portland cement
Section 101	Air-Entraining Admixtures
Section 102	Chemical Admixtures for Concrete
Section 104	Water for Use in Portland cement Concrete
Section 105	Fine Aggregate for Use in Portland cement Concrete
Section 106	Masonry Mortar Sand and Epoxy Resin Mortar Sand
Section 107	Coarse Aggregate for Use in Portland cement Concrete

#### 200.2 MATERIALS

- A. Cement shall be Type I and shall comply with the requirements of Section 100 of these Specifications.
- B. Fly Ash shall meet the requirements of ASTM C-618, Class C.
- C. Aggregate shall meet the requirements of Sections 105, 106 and 107 of these Specifications. Sand shall be fine sand that will stay in suspension during placement and setting. The suggested gradation of the aggregate is as follows:

<u>Sieve Size</u>	<u>% Passing</u>
¾ inch	100
200	0-10

**D. Mix Design:**

Controlled low strength material shall achieve sufficient aggregate bond for adequate compressive strength to support anticipated loads. The compressive strength may be higher for material used strictly as structural backfill and as indicated in the detailed specifications for a specific project.

Controlled low strength material utilized for “water main encasement” and “sewer main encasement” shall achieve sufficient aggregate bond for adequate compressive strength to support the utilities and other anticipated loads. The compressive strength of the material after curing shall remain in a condition that it can be readily removed utilizing hand tools and small excavating equipment. A minimum and/or maximum compressive strength requirement may be specified for the product in the detailed specifications for a specific project.

Controlled low strength material shall obtain a minimum 28-day bearing strength of seventy-five (75) pounds per square inch and shall achieve a twenty (20) pounds per square inch bearing strength prior to backfilling on the material.

The suggested mix design for controlled low strength material is as follows:

Quantity of Dry Material per Cubic Yard

Cement	100 pounds (minimum)
Fly Ash	300 pounds
Aggregate	2800-2600 pounds

The weight of cement and fly ash shall be adjusted to achieve adequate compressive strength. The amount of water shall be such that the material flows properly without excessive segregation.

These quantities of dry materials, mixed with an appropriate quantity of water (approximately 50-70 gallons), should yield approximately one (1) cubic yard of controlled low strength material.

The Contractor may submit alternate mix designs to the Engineer for approval prior to placement of the controlled low strength material. The Engineer reserves the right to reject the mixed material if a flowable mortar suitable for placement cannot be produced.

### **200.3 PROPORTIONING AND MIXING EQUIPMENT**

The proportioning and mixing equipment shall meet the requirements of Section 55 of these Standard Specifications.

## 200.4 CONSTRUCTION REQUIREMENTS

### A. Placement:

Controlled low strength material may be placed into the area to be filled directly from the mixer truck, by pumping or by any other reasonable means. Controlled low strength material shall not be placed upon frozen ground, snow or ice.

If proposed depth of controlled low strength material fill warrants, the material shall be placed in layers. Maximum lift thickness shall be three (3) feet, except where such thickness would cause lifting or displacement of the utility, pipe or structure. In such case, depth of controlled low strength material fill shall be limited to prevent displacement of culverts, pipe or other structures. If possible, both sides of the structure shall be filled simultaneously to avoid displacement. If it is not possible to fill both sides simultaneously, fill shall be alternated side to side in shallow lifts. Each filling stage shall be as continuous as possible to prevent cold joints. Additional lifts shall not be placed until the material has lost sufficient moisture to walk on without indenting more than two inches.

### B. Temperature Limitations:

Batching, mixing and placing may be started when air temperature is at least thirty-four (34°) degrees F and rising. Material temperature at time of placement shall be a minimum of forty (40°) degrees F.

### C. Backfill:

Backfilling and compacting on top of the in-place controlled low strength material shall not proceed until the in-place material achieves a minimum bearing strength of twenty (20) pounds per square inch.

### D. Protection:

The in-place controlled low strength material shall be protected in accordance with Section 55 of these Specifications, except that the temperature shall be maintained at fifty (50°) degrees F or above for a period of twenty-four (24) hours or until the strength requirement is met and backfill is completed.

## 200.5 METHOD OF MEASUREMENT

Controlled low strength material shall be measured to the nearest cubic yard of material placed, unless other measurement provisions are specified. Measurement provisions shall be consistent with the Bid Proposal. In lieu of actual field measurement for volume of material placed, truck delivery tickets will be used.

**200.6 BASIS OF PAYMENT**

Controlled low strength material will be paid at the unit price established in the Bid Proposal.

**END OF SECTION**