

SECTION 02200: STRUCTURE EXCAVATION AND BACKFILLING

PART I - GENERAL

WORK SPECIFIED HEREIN

All labor, materials, equipment and services necessary to complete the structure excavation, backfilling, compacting and related items as indicated or specified.

SUBSTITUTIONS

In accordance with Section 01600.

SUBMITTALS

Unless otherwise notes, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.

Review submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

Shop drawings for review by the Professional of Record are not required for this section.

QUALITY ASSURANCE

Provide testing as specified herein (unless previously documented in geotechnical report by site developer).

Provide 5 field density tests of under-slab fill at locations directed.

Provide 5 field density tests of backfill at locations and elevations directed.

See Section 01400 for provisions covering payment for testing.

PART II - PRODUCTS

UNDER-SLAB FILL

As per geotechnical report (see Section 02150).

BACKFILL MATERIAL

Backfill material shall consist of the material excavated from the site (provided it is free of debris or vegetation) or shall be selected material as specified herein for under-slab fill per the geotechnical report criteria.

Backfill around pipes and conduits shall be clean sand (100% passing a #8 sieve) unless the local utility companies specify a different backfill. The utility company backfill shall govern if there are differences in backfill materials.

PART III - EXECUTION

PREPARATION

Identify all lines, elevations, and grades necessary to construct building subgrades as shown in the plans and specifications.

Protect benchmarks, property corners, monuments or other reference points.

Locate and identify all site utilities that have previously been installed and may be in danger of damage by grading operations.

Locate and identify all existing utilities that are to remain and protect them from damage.

EXCAVATION

Excavate building areas to line and grade as shown in the plans and specifications being careful not to overexcavate beyond the elevation needed for building subgrades.

Perform excavation using capable, well maintained equipment and methods acceptable to the Owner and the project document requirements.

Excavations for foundations and footings shall have clean vertical walls, all corners squared up. Keep entire excavation free from any loose material. Excavation shall conform to dimensions and elevations indicated with allowances for erection of forms, shoring, waterproofing, and inspection of footings.

Material to be excavated shall be non-classified and shall include all earth or other materials encountered in excavating. The Contract Sum is understood to cover the removal of all such materials to the depth and extent indicated or specified. The use of explosives will not be permitted.

The Drawings show predetermined elevations or depths for bottoms of footings. If additional depth of excavation should be necessary, the Contractor will be paid for the work in accordance with the provisions of the General Conditions.

Shore and brace excavations if necessary to prevent cave-ins. Remove shoring before backfilling is completed, but not until permanent supports are in place.

If excavation, through error or carelessness, is carried beyond depth indicated, backfilling will not be permitted except under floor slabs. Increase foundation depth as required and place backfill below floor slabs (material as herein specified) without extra compensation.

Remove all excess excavated material from the grounds and legally dispose of same.

UNDER-SLAB FILL PLACEMENT

Place under-slab fill to the thickness and grade indicated, smooth and even, free of voids. Compact to specified density. Grade to a tolerance of 1/4" in 10 feet.

BACKFILL

After completion of the foundations, walls and other construction, and removal of forms, clean the excavations of trash and debris.

Place the backfill symmetrically against each side of the walls to prevent eccentric loading. Place backfill in horizontal 6" layers with the proper moisture content for the required degree of compaction.

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Backfill pipe and conduit trenches in a manner to prevent disturbance to the pipes or conduits. Fill under and around pipes thoroughly to a point approximately 12" above the top of the pipe and compact. Backfill remainder of trench in 6" layers and compact.

Building area subgrade pad shall be that portion of site directly beneath and 10 feet beyond the building and appurtenances.

The building area subgrade pad shall be prepared in strict accordance with the geotechnical report criteria.

Backfill materials used in preparation of the building pad shall be place in lifts or layers not to exceed 6 inches loose and compacted per the geotechnical report criteria.

COMPACTION

Compaction of under-slab fill and backfill shall be in horizontal lifts not exceeding 6" in thickness. Compact in accordance with requirements of geotechnical report.

Maintain optimum moisture content of fill materials to attain required compaction density.

MAINTENANCE OF SUBGRADE

Finished subgrades shall be verified to ensure proper elevation and conditions for construction above subgrade.

Protect subgrade from excessive wheel loading during construction, including concrete trucks and dump trucks.

Remove areas of finished subgrade found to have insufficient compaction density to depth necessary and replace in a manner that will comply with compaction requirements by use of material equal to or better than best subgrade material on site. Surface of subgrade after compaction shall be hard, uniform, smooth, stable and true to grade and cross sections.

END OF SECTION

PART I - GENERAL**WORK SPECIFIED HEREIN**

All labor, materials, equipment and services necessary to provide the Cast-In-Place Concrete work as indicated or specified including:

- Concrete, reinforcement and formwork for foundations, pilasters, slabs, sidewalks, stairs, etc.
- Installation of anchor bolts for steel columns, posts and other anchored work as may be required.
- Grouting of column bases.
- All embedded anchors, anchor slots, sleeves and other inserts as required.
- Vapor retarder and granular subbase beneath slabs on grade.
- All dowels from concrete into masonry walls or pilasters.
- All other items required to make the work of this Section.

SUBSTITUTIONS

In accordance with Section 01600.

SUBMITTALS

The contractor shall prepare all shop drawings, product literature, etc. as required to properly coordinate and construct the project, and as per the requirements of the Project Manual.

Submit the following items for review by the Professional of Record in accordance with Section 01300, Submittals.

1. Submit shop drawings showing fabrication dimensions and locations for placing reinforcing steel and accessories and details of steel reinforcement.
2. Submit concrete mix design for each class of concrete for review well in advance of concrete placement. Concrete mix design shall include all strength data necessary to show compliance with the project specifications for either the trial batch or field experience method.

QUALITY ASSURANCE

- Provide Special Inspections for concrete as shown on the drawings and as required by Building Official.
- See Section 01400 for required testing.
- See Section 01400 for payment provisions for testing.

RELATED DOCUMENTS

- Unless otherwise shown or specified, the work shall conform to the following standards of the American Concrete Institute:
 1. ACI 117-90 Standard Specifications for Tolerances for Concrete Construction and Materials.

2. ACI 306.1-90 Standard Specification for Cold Weather Concreting.
3. ACI 308.1-98 Standard Specification for Curing Concrete.
4. ACI 318-95 Building Code Requirements for Structural Concrete

- Unless otherwise shown or specified, the work shall conform to the following standards of the Concrete Reinforcing Steel Institute:

1. Manual of Standard Practice, 1997

FIELD ACCEPTANCE OF CONCRETE

- Air-entrained concrete not within the specified limits of air-entrainment shall not be used in the work.
- Concrete not within the specified slump limits at the point of placement shall not be used in the work.
- Concrete not within the specified temperature limits shall not be used in the work.

ACCEPTANCE OF CONCRETE STRENGTH

- Test results for standard molded and cured test cylinders shall be evaluated separately for each specified concrete design mixture. Evaluation will be valid only if tests have been conducted in accordance with procedures specified. For evaluation, each specified design mixture shall be represented by at least five tests.
- The strength level of concrete shall be considered satisfactory when the average of all sets of three consecutive compressive strength test results equal or exceed the specified compressive strength, f'_c , and no individual strength test result falls below the specified compressive strength, f'_c , by more than 500 psi.
- The costs of any additional tests or analysis, including additional architectural or engineering services, performed to prove the adequacy of concrete strength, shall be borne by the contractor.

ACCEPTANCE OF STRUCTURE

- Completed concrete work shall conform to all applicable requirements of the Construction Documents.
- Concrete work that fails to meet one or more requirements of the Construction Documents but subsequently is repaired to bring the concrete into compliance may be accepted.
- Concrete work that does not meet the tolerances of ACI 117 will be rejected.
- Concrete with defects that adversely affect the appearance of the specified finish will be rejected.
- Concrete work that fails to meet one or more requirements of the Construction Documents and cannot be brought into compliance will be rejected.