

SECTION 01 71 23 FIELD ENGINEERING

PART 1 - GENERAL

1.1 PREPARATION

- A. Lay out and install all Work to lines and grades in accordance with Contract Documents.

1.2 LAYOUTS AND MEASUREMENTS

- A. Provide all survey Work required for horizontal and vertical location of all Work in this Project.
- B. The location shall be staked from lines shown on the Drawings. Mark the limits of the Project site and obtain Underground Service Alert (USA North/1-800-227-2600 or 811) clearance prior to starting clearing or excavation Work. Provide USA permit number to University's Representative prior to starting site Work.
- C. Contractor shall be responsible for replacement and reestablishment of control stakes, monuments, and lines furnished by the University that are destroyed or disturbed by Contractor's operation.
- D. Furnish to the University's Representative, prior to Project acceptance, 2 complete sets of the field notes for the survey Work and cut sheets in addition to 1 set of Drawings marked showing all deviations from Project alignment and grades.
- E. Generally, grades shall match adjacent surfaces, and existing flow lines shall be maintained.

1.3 SURVEY REFERENCE POINTS

- A. Basic horizontal and vertical control points for the Project will be established from existing structure.
- B. Locate and protect control points prior to beginning the Work, and preserve all permanent reference points throughout construction operations.
  - 1. Do not change reference points without prior approval of the University's Representative.
  - 2. Report to the University's Representative when any reference point is lost, destroyed, or requires relocation due to necessary changes in grades or locations.
  - 3. Replace, at no additional cost to University, control points that may be lost or destroyed; base replacements on original survey control.

1.4 PROJECT SURVEY REQUIREMENTS

- A. Establish lines and levels, locate, and lay out:
  - 1. Site improvements.
    - a. Stakes for grading and fill placement.
    - b. Utility slopes and invert elevations.
  - 2. Batter boards for structures.
  - 3. Building foundations, column locations, and floor levels.
  - 4. Controlling lines and levels required for mechanical and electrical Work.
- B. Verify layouts as Work proceeds to assure compliance with required lines, levels, and tolerances.

1.5 RECORDS

- A. Maintain a complete and accurate log of all control and survey Work as it progresses.
- B. On completion of foundation walls and major site improvements, prepare a certified survey showing all dimensions, locations, angles, and elevations of construction.

1.6 SUBMITTALS

- A. Upon request, submit documentation to verify accuracy of field engineering Work.
- B. For all seismic bracing systems, submit structural calculations and details prepared and signed by the Contractor's licensed engineer that include all resultant forces applied to the building structure.

Do not over stress building structure. Calculations will be reviewed for compliance with design criteria, not for arithmetic.

#### 1.7 SUPPORT AND BRACING

##### A. General

1. Design all support and bracing systems. Provide for attachment to portions of the building structure capable of bearing the loads imposed. Design systems to not over stress the building structure.

##### B. Seismic Bracing

1. Design and install all support systems to comply with the seismic requirements of the 2007 California Building Code (CBC) and ASCE7, Chapter 13 for nonstructural components.
2. Design and install seismic bracing so as not to defeat the operation on any required vibration isolation or sound isolation devices.
3. Seismic design data shall be presented on construction documents in accordance with Section 1603.1.5 of the California Building Code (CBC).
4. Seismic bracing shall be designed by a structural engineer licensed in California.
5. For seismic bracing for mechanical, electrical and plumbing systems, refer to the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), "Guidelines for Seismic Restraints of Mechanical Systems and Plumbing Piping Systems" for guidelines.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 71 23