

1 **(February 6, 2023)**

2 **Contractor Surveying - Structure**

3 The Contracting Agency has provided primary survey control in the Plans.

4
5 The Contractor shall be responsible for setting, maintaining, and resetting all alignment
6 stakes, slope stakes, and grades necessary for the construction of bridges, noise walls,
7 retaining walls, buried structures, and marine structures. Except for the survey control
8 data to be furnished by the Contracting Agency, calculations, surveying, and measuring
9 required for setting and maintaining the necessary lines and grades shall be the
10 Contractor's responsibility.

11
12 The Contractor shall inform the Engineer when monuments are discovered that were
13 not identified in the Plans and construction activity may disturb or damage the
14 monuments. All monuments noted on the plans "DO NOT DISTURB" shall be protected
15 throughout the length of the project or be replaced at the Contractor's expense.

16
17 Detailed survey records shall be maintained, including a description of the work
18 performed on each shift, the methods utilized, and the control points used. The record
19 shall be adequate to allow the survey to be reproduced. A copy of each day's record
20 shall be provided to the Engineer within three working days after the end of the shift.

21
22 The meaning of words and terms used in this provision shall be as listed in "Definitions
23 of Surveying and Associated Terms" current edition, published by the American
24 Congress on Surveying and Mapping and the American Society of Civil Engineers.

25
26 The survey work by the Contractor shall include but not be limited to the following:

- 27
28 1. Verify the primary horizontal and vertical control furnished by the Contracting
29 Agency and expand into secondary control by adding stakes and hubs as well
30 as additional survey control needed for the project. Provide descriptions of
31 secondary control to the Contracting Agency. The description shall include
32 coordinates and elevations of all secondary control points.
33
34 2. Establish, by placing hubs and/or marked stakes, the location with offsets of
35 foundation shafts and piles.
36
37 3. Establish offsets to footing centerline of bearing for structure excavation.
38
39 4. Establish offsets to footing centerline of bearing for footing forms.
40
41 5. Establish wing wall, retaining wall, noise wall, and buried structure horizontal
42 alignment.
43
44 6. Establish retaining wall top of wall profile grade.
45
46 7. Establish buried structure profile grade.
47
48 8. Establish elevation benchmarks for all substructure formwork.
49
50 9. Check elevations at top of footing concrete line inside footing formwork
51 immediately prior to concrete placement.
52

- 1 10. Check column location and pier centerline of bearing at top of footing
- 2 immediately prior to concrete placement.
- 3
- 4 11. Establish location and plumbness of column forms, and monitor column
- 5 plumbness during concrete placement.
- 6
- 7 12. Establish pier cap and crossbeam top and bottom elevations and centerline of
- 8 bearing.
- 9
- 10 13. Check pier cap and crossbeam top and bottom elevations and centerline of
- 11 bearing prior to and during concrete placement.
- 12
- 13 14. Establish grout pad locations and elevations.
- 14
- 15 15. Establish structure bearing locations and elevations, including locations of
- 16 anchor bolt assemblies.
- 17
- 18 16. Establish box girder bottom slab grades and locations.
- 19
- 20 17. Establish girder and/or web wall profiles and locations.
- 21
- 22 18. Establish diaphragm locations and centerline of bearing.
- 23
- 24 19. Establish roadway slab alignment, grades and provide dimensions from top of
- 25 girder to top of roadway slab. Set elevations for deck paving machine rails.
- 26
- 27 20. Establish traffic barrier and curb profile.
- 28
- 29 21. Profile all girders prior to the placement of any deadload or construction live
- 30 load that may affect the girder's profile.
- 31
- 32 22. Establish locations for marine structures including fixed and floating berthing
- 33 structures, vehicle and pedestrian foundations and spans, and marine-based
- 34 buildings.
- 35

36 The Contractor shall provide the Contracting Agency copies of any calculations and

37 staking data when requested by the Engineer.

38

39 The Contractor shall submit the computed elevations at the top of bridge decks as a

40 Type 2 Working Drawing. The elevations shall be computed at tenth points along the

41 centerline of each girder web.

42

43 The Contractor shall ensure a surveying accuracy within the following tolerances:

44

	<u>Vertical</u>	<u>Horizontal</u>
45 1. Stationing on structures		±0.02 feet
46 2. Alignment on structures		±0.02 feet
47 3. Superstructure elevations	±0.01 feet	
48	variation from	
49	plan elevation	
50	±0.02 feet	
51 4. Substructure	variation from	
52		

Plan grades.

Buried structures shall be within the tolerances described in Section 6-20.3.

The Contracting Agency may spot-check the Contractor's surveying. These spot-checks will not change the requirements for normal checking by the Contractor.

When staking the following items, the Contractor shall perform independent checks from different secondary control to ensure that the points staked for these items are within the specified survey accuracy tolerances:

- Piles
- Shafts
- Footings
- Columns

The Contractor shall calculate coordinates for the points associated with piles, shafts, footings and columns. The Contracting Agency will verify these coordinates prior to issuing approval to the Contractor for commencing with the survey work. The Contracting Agency will require up to seven calendar days from the date the data is received to issuing approval.

Contract work to be performed using contractor-provided stakes shall not begin until the stakes are approved by the Contracting Agency. Such approval shall not relieve the Contractor of responsibility for the accuracy of the stakes.

Payment

Payment will be made for the following bid item when included in the proposal:

"Structure Surveying", lump sum.

The lump sum contract price for "Structure Surveying" shall be full pay for all labor, equipment, materials, and supervision utilized to perform the Work specified, including any resurveying, checking, correction of errors, replacement of missing or damaged stakes, and coordination efforts.