

**SECTION 02 21 13  
SITE SURVEYS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Researching and collecting documents informing surveys.
  - 2. Performing boundary survey, topographic survey, and GPR utility survey.
  - 3. Creating survey drawings.

**1.2 APPLICABLE PUBLICATIONS**

- A. Comply with references to extent specified in this section.
- B. American Land Title Association and American Congress on Surveying and Mapping (ALTA-ACSM):
  - 1. Accuracy Standards for ALTA-ACSM Land Title Surveys.
- C. Federal Geographic Data Committee (FGDC):
  - 1. STD-007.03-98 - Geospatial Positioning Accuracy Standards Part 3: National Standard for Spatial Data Accuracy.
  - 2. STD-007.04-02 - Geospatial Positioning Accuracy Standards Part 4: Standards for Architecture, Engineering, Construction (A/E/C) and Facility Management.

**1.3 SUBMITTALS**

- A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Survey Drawings:
  - 1. Prints: Two sets of black line, full size prints of each drawing.
  - 2. Electronic Files: Consistent with computer-aided design (CAD) Standards described at [www.cfm.va.gov/til/projReq.asp](http://www.cfm.va.gov/til/projReq.asp).

**1.4 QUALITY ASSURANCE**

- A. Land Surveyor: One of the following:
  - 1. Experienced professional land surveyor licensed in state in which project is located.
  - 2. Experienced professional civil engineer licensed in state in which project is located and authorized to practice land surveying as civil engineer.

**1.5 WARRANTY**

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

**PART 2 - PRODUCTS****2.1 ACCESSORIES**

- A. Monuments: Iron pin, with driven 16 mm (5/8 inch) diameter, minimum 600 mm (24 inches) long to prevent displacement.
- B. Stakes: Hardwood.
- C. Flagging: Plastic, roll form, highly visible, solid color.

**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Research public and VA facility records for deeds, maps, monuments, plats, surveys, title certificates or abstracts, rights-of-way, easements, section line, other boundary line locations, and other documents pertaining to project site.
- B. Research public and VA facility utility records for aerial, surface, and subgrade structures and utility service lines and easements.

**3.2 PREPARATION**

- A. Coordinate with Contracting Officer's Representative for site access.
- B. Coordinate with adjacent property owners when access to adjoining properties is required.
  - 1. Notify Contracting Officer's Representative when access is denied.

**3.3 SURVEYS**

- A. Perform survey on ground according to Accuracy Standards for ALTA-ACSM Land Title Surveys and FGDC STD-007.3 and FGDC STD-007.4.
- B. Boundary Survey:
  - 1. Locate permanent monuments within and along survey boundary.
  - 2. Set permanent monument at property corners when monument is not found.
  - 3. Temporarily mark monument locations with stake and flagging.
  - 4. Reconcile differences between legal description and survey.
- C. Topographic Survey:
  - 1. Vertical Control: National Geodetic Survey or existing VA Medical Center benchmark.

2. Establish minimum three permanent benchmarks plus one permanent benchmark for each 1.6 hectares (4 acres) within survey boundary.
  3. Determine project site contours at maximum 300 mm (1 foot) interval.
  4. Determine spot elevations at specified locations.
- D. GPR Utility Survey:
1. Locate piped utilities and utility structures. Identify service type, sizes, depths, and pressures.
  2. Locate fire hydrants.
  3. Locate wired utilities and utility structures. Identify service type, rated capacities, and elevations above and below grade.
  4. Identify each utility authority including contact person and phone number.
- E. Locate permanent structures within survey boundary by perpendicular dimension to property lines.
1. Determine structure plan dimensions, heights, and vertical offsets.
  2. Determine projections and overhangs beyond structure perimeter at grade.
  3. Determine number of stories and primary building materials.
- F. Locate rights-of-way and easements within and adjacent to survey boundary by perpendicular dimension to property line.
1. Locate project site access from rights-of-way by dimension from survey monument. Determine site access width.

### **3.4 SURVEY DRAWING REQUIREMENTS**

- A. Consult Contracting Officer's Representative to confirm required survey scale and drawing size.
1. Drawing Size: Maximum 760 by 1070 mm (30 by 42 inches).
  2. Boundary Survey Scale: Maximum 1 to 35 (1 inch equals 30 feet).
  3. Enlarged Detail Areas: Scale as required to present dimensional data and survey information clearly. Maintain orientation aligned with smaller scale view.
  4. Plan Orientation: North at top of drawing sheet.
- B. Drawing Notations:
1. Land Surveyor: Name, address, telephone number, signature, seal, and registration number.
  2. Survey Dates: Date survey was initially completed and subsequent revision dates.

3. Certification: Certify each drawing adjacent to land surveyor's seal:
  - a. "I hereby certify that all information indicated on this drawing was obtained or verified by actual measurements in the field and that every effort has been made to provide complete and accurate information."
  - b. Title, number, and total number of drawings on each drawing.
  - c. Scale in metric and imperial measurement.
  - d. Graphic scale in metric and imperial measurement.
  - e. Graphic symbol and abbreviation legends.
  - f. North arrow for plan view drawings.
  - g. Benchmark locations.
  - h. Horizontal and vertical control datum.
  - i. Adjacent property owner names.
  - j. Zoning classifications.
  - k. Building street numbers.
4. Evidence of Possession: Indicate character and location of evidence of possession affecting project site. Notation absence signifies no observable evidence of possession.
- C. Vicinity Map: Indicate project site and nearby roadways and intersections.
- D. Record Documents Forming Survey Basis: Indicate titles, source, and recording data of documents relied upon to complete survey.
- E. Legal Description: Recorded title boundaries.
- F. Land Area: Report in sq. m (sf) as defined by the boundaries of the legal description of the surveyed premises, including legal description of the land.
  1. Accuracy: 0.1 sq. m (1 sq. ft.) .
- G. Boundary Lines: Show point of beginning, length and bearing for straight lines, and angle, radius, point of curvature, point of tangency, and length of curved lines.
  1. Include bearing basis and data necessary to mathematically close survey.
  2. When recorded and measured bearings, angles, and distances differ, indicate both recorded and measured data.
    - a. Indicate when recorded description does not mathematically close survey.
  3. Indicate found and installed monuments establishing basis of survey.

4. Contiguity, Gores, and Overlaps: Identify discrepancies within and along survey boundary.
- H. Lots and Parcels: Indicate entire lots and parcels included within and intersected by survey boundary.
- I. Roadways: Indicate names and widths of rights-of-way and roadways within and abutting survey boundary.
  1. Indicate changes in rights-of-way lines either completed or proposed.
  2. Indicate accesses to roadways.
  3. Indicate abandoned roadways.
  4. Indicated unopened dedicated roadways.
- J. Setbacks: Indicate recorded setback and building restriction lines.
- K. Structures and Site Improvements: Indicate buildings, walls, fences, signs, and other visible improvements.
  1. Indicate each building dimensioned to property lines and other structures.
  2. Indicate exterior dimensions of buildings at ground level. Show area of building footprint and gross floor area of entire building.
  3. Indicate maximum measured height of buildings above grade, point of measurement, and number of stories.
  4. Indicate spot elevations at building entrances, first floor, service docks, corners, steps, ramps, and grade slabs.
  5. Indicate structures and site improvements within 1500 mm (5 feet) of survey boundary.
  6. Indicate encroachments on project site, adjoining property, easements, rights-of-way, and setback lines from fire escapes, bay windows, windows and doors opening out, flue pipes, stoops, eaves, cornices, areaways, stoops, other building projections, and site improvements.
  7. Identify setback, height, and floor space area restrictions set by applicable zoning and building codes and recorded subdivision maps. Indicate if no restrictions exist.
- L. Easements:
  1. Indicate easements evidenced by recorded documents.
    - a. Indicate when easements cannot be located.
  2. Indicate observable easements created by roadways, rights-of-ways, water courses, drains, telephone, telegraph, electric and other wiring, water, sewer, oil, gas, and other pipelines within project

site and on adjoining properties when potentially affecting project site.

3. Indicate observable surface improvements of underground easements.

M. Pavements :

1. Indicate location, alignment, and dimensions for vehicular and pedestrian pavements .
2. Indicate pavement encroachments from adjacent properties onto project site and onto adjacent properties from project site.
  - a. Dimension encroachments from survey boundary.
3. Indicate roadway centerlines with true bearings and lengths by 15 m (50 feet) stationing.
  - a. Describe curves by designating points of curvature and tangency. Include curve data and location of radius and vertex points.
  - b. Indicate elevations at station points along roadway centerlines, roadway edges, and top and bottom of curbs.
4. Indicate parking areas, parking striping, and total parking spaces.
  - a. Identify accessible, fuel efficient, parking spaces.
5. Indicate curb cuts, driveways, and other accesses to public ways.

N. Indicate cemetery and burial ground boundaries.

O. Waterways:

1. Indicate boundaries of ponds, lakes, springs, and rivers bordering on or running through project site. Note date of measurement and that boundary is subject to change due to natural causes.
2. Indicate flood plain location and elevation.
3. Indicate watershed extent affecting project site.

P. Indicate topographic contours.

Q. Flood Zone: Indicate applicable flood zone from Federal Flood Insurance Rate Maps, by scaled map location and graphic plotting.

R. Public and Private Utilities:

1. Indicate information source and operating authority for each utility.
2. Indicate utilities existing on or serving project site.
3. Indicate fire hydrants on project site and within 150 m (500 feet) of survey boundary.
4. Indicate manholes, catch basins, inlets, vaults, and other surface indications of subgrade services.
5. Indicate depths or invert elevations, sizes, materials, and pressures of utility pipes.

6. Indicate wires and cables serving, crossing, and adjacent to project site.
7. Indicate exterior lighting, traffic control facilities, security, and communications systems.
8. Indicate utility poles on project site and within 3 m (10 feet) of survey boundary.
9. Indicate dimensions of cross-wires or overhangs affecting project site.

S. Observable Evidence:

1. Indicate in-progress and recently completed earth moving work, building construction, and building additions.
2. Indicate in-progress and recently completed pavement construction and repairs.
3. Indicate areas used as solid waste dump, sump, and sanitary landfill.

T. Trees:

1. Indicate individual trees with minimum 150 mm (6 inches) diameter measured at 400 mm (48 inches) above grade.
2. Indicate wooded area perimeter outline and description of predominant vegetation.

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